Oct. 21, 1952 E. J. ABBOTT 2,614,759

BOBBIN HOLDER

Filed July 25, 1949 2 SHEETS—SHEET 1

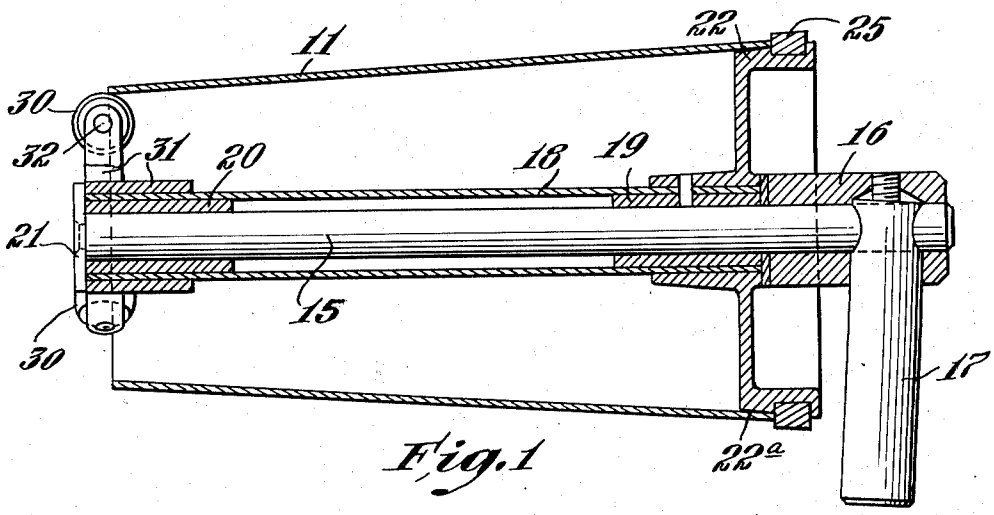


Fig. 1

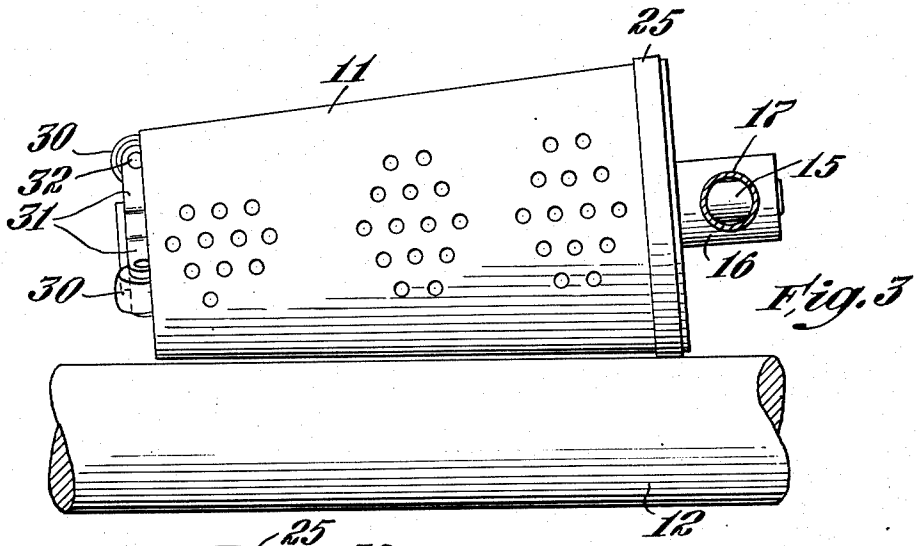


Fig. 3

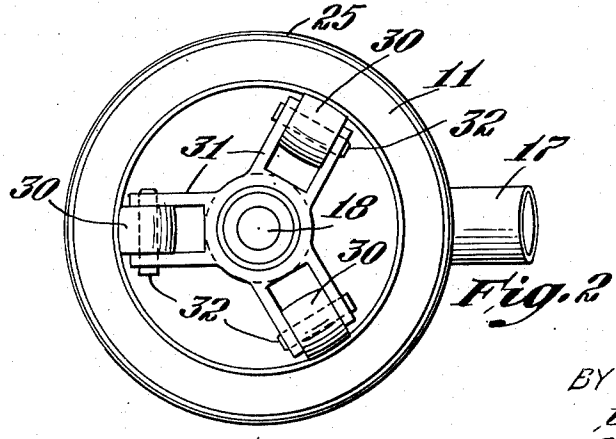


Fig. 2

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BOBBIN HOLDER

Filed July 25, 1949 2 SHEETS—SHEET 2

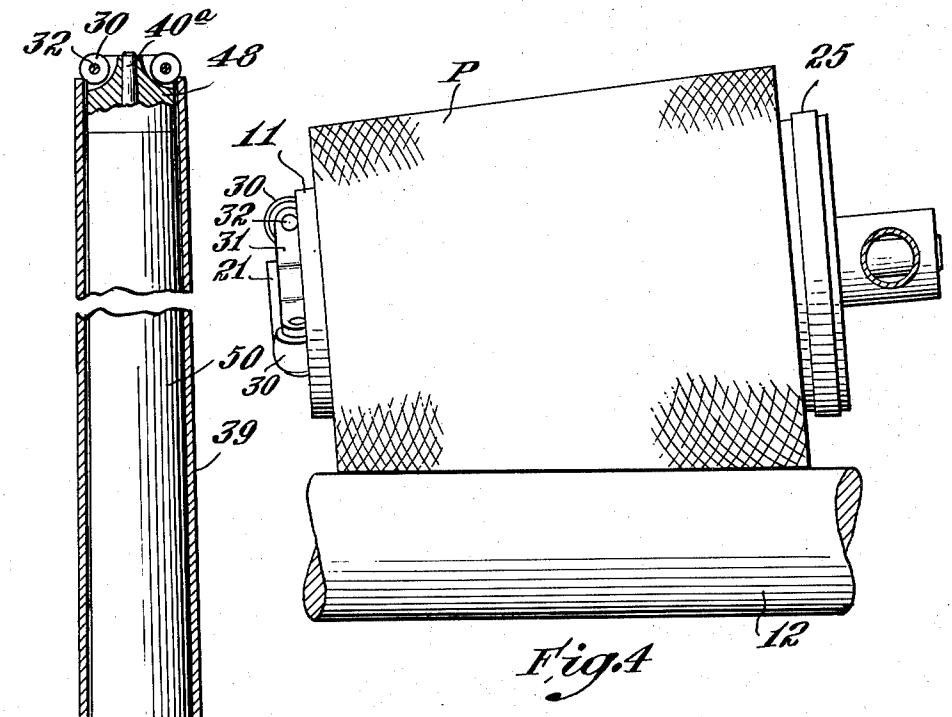


Fig. 4

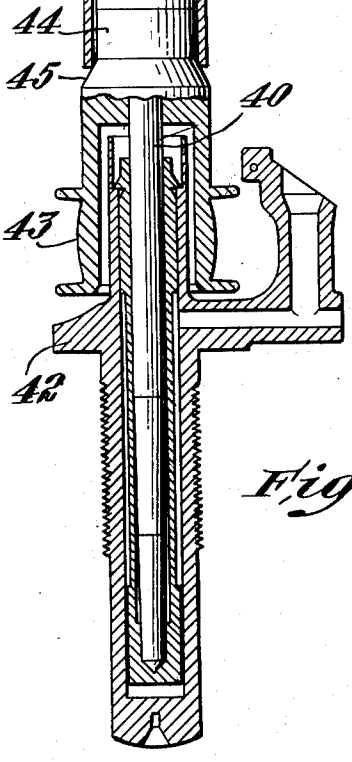


Fig. 5

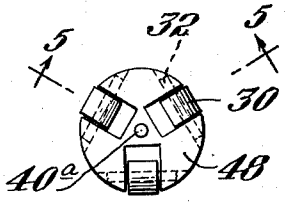


Fig. 6

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2,614,759

UNITED STATES PATENT OFFICE

2,614,759

BOBBIN HOLDER

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Application July 25, 1949, Serial No. 106,607

11 Claims. (Cl. 242—46.2)

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This invention relates to bobbin holders of the types employed in holding bobbins, in position for winding or unwinding in textile machinery such for example as spinning machines and winding machines.

With certain constructions of bobbin holders the bobbin is held in place by simple friction, and such reliance upon simple friction may give rise to considerable difficulty. If too much friction exists between the bobbin and the bobbin holder, the bobbin is difficult to remove in the doffing operation. If too little friction exists, there is danger of the bobbin becoming loose and working its way endwise off from the bobbin holder. Various constructions employing clamps or catches or the like as a substitute for simple friction have been devised, but in general such expedients are likely to introduce other difficulties, such as interference with ease of application or removal of the bobbin, complication of construction, or likelihood of breakage.

The invention aims to provide a bobbin holder with which it is easy to place the bobbin in seated position on the holder and easy to remove the bobbin from the holder, but which will securely hold the bobbin against accidental displacement, and to accomplish this by means of a simple durable construction.

Other objects of the invention and advantageous features will be apparent from this specification and its drawings wherein the invention is explained by a description of a preferred embodiment of a bobbin holder for a winding machine and of a preferred embodiment of a bobbin holder for a spinning or similar machine. The illustrated winding machine bobbin holder is adapted for frictional drive of the winding package by means of a drive roll but is equipped with a tire of resilient material for relieving the bobbin from contact with such drive roll until the first few layers of yarn have been wound, the tire serving to rotate the bobbin during the winding of such first few layers. The illustrated spinning machine bobbin holder is of the driven spindle type.

In the drawings,

Fig. 1 is a horizontal sectional view showing a preferred form of bobbin holder for a winding machine, the bobbin being in place thereon;

Fig. 2 is a left end elevation of the bobbin holder of Fig. 1 with an end washer removed from the spindle of the bobbin holder;

Figs. 3 and 4 are front elevations showing the bobbin holder cooperating with a drive roll for rotating the bobbin, Fig. 3 showing the bobbin

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empty and Fig. 4 showing a substantial amount of yarn wound on the bobbin;

Fig. 5 is a vertical sectional view showing a preferred form of bobbin holder for a spinning or similar machine, the bobbin being in place thereon and the upper portion of the view being taken on the line 5—5 of Fig. 6; and

Fig. 6 is a top end elevation of the bobbin holder of Fig. 5, omitting the bobbin.

The bobbin holder of Figs. 1 to 4, for use in winding machines, is especially adapted for holding bobbins which are formed as perforated stainless steel tubes 11 for use in dyeing yarn, as for instance in the dyeing apparatus of United States patent application Serial No. 87,873, filed April 16, 1949, now Patent No. 2,577,727 dated December 11, 1951. A wound package P of yarn to be dyed is wound upon the bobbin 11 while the package rests upon and is driven by a rotating drive roll 12 as shown in Fig. 4.

The bobbin holder includes the usual interior non-rotating spindle 15 fixed in a sleeve 16 at one end and penetrating a tubular arm 17 which may be a part of the usual pivotally mounted spindle-carrying arm that positions the spindle and winding package for movement away from the drive roll as the winding package grows.

A sleeve 18 carrying bushings 19 and 20 is rotatably mounted on the spindle 15 and carries the elements for supporting the bobbin. An end washer 21, shown in Fig. 1 and removed in Fig. 2, may be employed to retain the sleeve and its associated parts upon the spindle 15.

A base-centering element 22 over which the base of the bobbin 11 is adapted to be slipped has a peripheral conical surface 22^a of slightly greater taper than that of the interior of the bobbin 11 so as to facilitate placing the bobbin thereon and accurately centering the bobbin. The base-centering element 22 preferably carries a tire 25 of resilient material such as rubber having a slightly larger diameter than the largest diameter of the conical bobbin 11 so as to relieve the metal surface of the bobbin from contact with the friction drive roll, as shown in Fig. 3, during the winding of the first few layers of yarn, on the bobbin, thus avoiding cutting the yarn between the bobbin and drive roll in the device as shown, or cutting the drive roll in case a grooved drive roll of plastic material is used. During the winding of these first few layers the tire 25 contacts with the roll 12 and thus drives the bobbin holder and bobbin, following which the tire 25 leaves contact with the roll 12 and the package is driven by contact of its

yarn with the roll 12, as for instance in the later stage shown in Fig. 4.

The base end of the conical bobbin preferably abuts against the side face of the resilient tire 25, and in this position the base end portion of the bobbin is engaged frictionally by the base-centering element on only a narrow part of the periphery 22a of the base-centering element, so that little friction is created between the bobbin and the base-centering element 22 in applying or removing the bobbin. The tire 25, abutting against the end of the bobbin, constitutes a stop element limiting the extent of wedging action between the base-centering element and the bobbin and prevents the bobbin from being wedged onto the bobbin centering element with a tight fit that might render the bobbin difficult to remove.

Adjacent to the tip of the bobbin the bobbin holder is provided with a plurality of rollers 30 spaced circumferentially of the bobbin holder. As shown, three such rollers 30 spaced at equal intervals may be carried by a spider 31 fixed upon the sleeve 18, each roller being rotatable upon a shaft 32 carried between adjacent arms of the spider.

A bobbin 11 may readily be slipped on over the rollers 30 and the rollers will rotate as they are contacted by the interior of the bobbin moved over them. At least one of the rollers is, and preferably all of the rollers are, made of resiliently distortable material such as rubber. With the bobbin in its seated position as shown in Fig. 2, the three rollers together extend to a diameter of a circle which is slightly larger than the smallest internal diameter of the bobbin. Thus during at least the last part of the operation of seating the bobbin on the holder the one or more distortable rollers (preferably all of the rollers are distortable) is or are compressed slightly.

When the bobbin is seated, the position of the rollers with relation to the bobbin is such that an outwardly facing edge of the interior surface of the bobbin is engaged by the rollers, with the centers of these rollers lying outwardly, endwise of the bobbin holder, beyond such edge. In seating the bobbin on the holder a toggle action is secured as such outwardly facing edge passes the centers of the several rollers, and the rollers thereupon retain the bobbin securely on the holder and preclude accidental displacement of the bobbin.

The reverse toggle action occurs when the bobbin is removed and the one or more resiliently distortable rollers are distorted as the outwardly facing edge of the interior surface of the bobbin is moved endwise to the center lines of the rollers.

The invention combines the advantages of such toggle locking or unlocking action with the advantage of reduction of frictional drag as the bobbin is passed over the rollers in seating or removing the bobbin.

It is preferred that all of the rollers be resiliently distortable, in order to reduce the necessary amount of distortion of any one roller, to more securely hold the bobbin, and also to more accurately center the tip end of the bobbin particularly in view of slight variations in diameter of the tip ends as between individual bobbins.

The bobbin holder of Figs. 5 and 6, for use in spinning and twisting machines is especially adapted for holding slightly tapered tubular bobbins 39 formed of paper or fiber composition.

A spindle 40 having a reduced diameter blade portion 40a is mounted in a suitable conventional bearing in a base 42. A whirl 43 is secured to the spindle and has extending upwardly therefrom an integral extension 44 of smaller diameter adapted to enter in the base portion of the bobbin. A conically tapered portion 45 of the whirl engages the base end of the bobbin 39 and acts as a base-centering element. A metal tip portion 48 is secured to the blade 40a in the region of the tip of the bobbin, and the space between the tip portion 48 and the extension 44 of the whirl is filled by a tube 50 which may be of wood or fiber composition surrounding the blade.

The tip portion 48, tube 50, and extension 44 correspond in taper to the slight taper of the bobbin 39 and are slightly smaller in diameter than the inside of the bobbin so as to be slightly spaced therefrom when the bobbin is seated on the base-centering element 45.

The tip portion 48 is recessed to receive three rollers 30, corresponding to the rollers 30 of Figs. 1 to 4, each rotatable upon a shaft 32 which is secured within the tip portion 48.

As in the device of Figs. 1 to 4 the bobbin may readily be slipped on over the rollers 30 which will rotate as they are contacted by the interior of the bobbin. The three rollers 30 together extend to a diameter which is slightly larger than the smallest internal diameter of the bobbin, and the rollers are compressed slightly in the course of seating the bobbin on the holder.

Likewise, as in the case of the device of Figs. 1 to 4, the rollers 30 in Figs. 5 and 6 are so positioned with relation to the bobbin that an outwardly facing edge of the interior surface of the bobbin is engaged by the rollers, with the centers of these rollers lying outwardly, endwise of the bobbin holder, beyond such edge, and when so engaged by the rollers the bobbin is securely held in seated position and prevented from accidental displacement.

In both the device of Figs. 1 to 4 and the device of Figs. 5 and 6 the material of the bobbin has been shown as being uniform in thickness, the smallest internal diameter of the bobbin being at the tip end, and the outwardly facing edge of the interior surface of the bobbin, engaged by the rollers 30 as described, is at the extreme end of the bobbin. However if there were an enlargement of the bore of the bobbin adjacent to the tip end, such outwardly facing edge of the interior of the bobbin could be the edge of the smallest diameter portion of the bore, and could engage the rollers 30 at the location of engagement of the bobbin and rollers in either Fig. 1 or Fig. 5, and a portion of the bobbin could extend outwardly beyond the rollers, that is to the left in Fig. 1 or upwardly in Fig. 5, preferably out of contact with the rollers. Therefore it will be understood that the outwardly facing edge of the interior of the bobbin, engaged as described with the rollers 30, is not necessarily at the extreme end of the bobbin, although so shown in the drawings in order to provide a bobbin of simplest construction.

With both illustrated forms of the invention the bobbin is easy to place on the bobbin holder and easy to remove therefrom, but is securely held against unintentional displacement. The bobbin 11 or 39 slips easily over the rollers until just before the final seating of the bobbin, at which time the rollers, undergoing compression, briefly offer a resistance tending to check the endwise movement of the bobbin, and finally as

the bobbin is seated, the rollers securely lock it in place. In removing the bobbin a substantial force must be exerted for an instant, to start the outwardly facing edge of the interior surface of the bobbin outwardly to the center lines of the rollers, whereupon the bobbin comes off the holder easily. As will be apparent from the two forms of the invention illustrated, only simple, sturdy structure need be employed.

While the invention has been illustrated as employing the above described rollers in the holding of conical bobbins, it will be apparent that the rollers are also applicable to bobbin holders for cylindrical bobbins. In such case the rollers can engage with the cylindrical interior of the bobbin throughout passage of the whole length of the bobbin over the rollers, and then can assume the same locking relation to the seated bobbin as in the case of the illustrated conical bobbins.

Rotation of the rollers is deemed advantageous, not only in improving the ease of placing and removing bobbins, but also in causing any wear upon a roller to be distributed over its entire periphery.

What is claimed is:

1. A bobbin holder including a plurality of rollers adapted to be rotated by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, at least one of said rollers being of resiliently distortable material and adapted to be compressed by the bobbin, and said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface of the bobbin, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

2. A bobbin holder including a plurality of rollers of resiliently distortable material and adapted to be rotated and compressed by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

3. A bobbin holder including a plurality of rollers spaced circumferentially of the bobbin holder with portions of their peripheral surfaces exposed to engage the interior of the bobbin and be rotated by the interior surface of the bobbin as the bobbin is moved over the rollers, at least one of said rollers being of resiliently distortable material and adapted to be compressed by the bobbin, and said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface of the bobbin, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

4. A bobbin holder including a plurality of rollers spaced circumferentially of the bobbin holder with portions of their peripheral surfaces exposed to engage the interior of the bobbin, said rollers being of resiliently distortable material and adapted to be rotated and compressed by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

5. A bobbin holder including a portion shaped to support a base portion of a bobbin, and a plurality of rollers adjacent to the outer end of the bobbin and adapted to be rotated by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, at least one of said rollers being of resiliently distortable material and adapted to be compressed by the bobbin, and said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface of the bobbin, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

6. A bobbin holder including a portion shaped to support a base portion of a bobbin, and a plurality of rollers adjacent to the outer end of the bobbin, said rollers being of resiliently distortable material and being adapted to be rotated and compressed by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

7. A bobbin holder including a portion shaped to support a base portion of a bobbin, and a plurality of rollers adjacent to the outer end of the bobbin and spaced circumferentially of the bobbin holder with portions of their peripheral surfaces exposed to engage the interior of the bobbin so that said rollers are adapted to be rotated by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, at least one of said rollers being of resiliently distortable material and adapted to be compressed by the bobbin, and said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface of the bobbin, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

8. A bobbin holder including a portion shaped to support a base portion of a bobbin, and a plurality of rollers adjacent to the outer end of the bobbin and spaced circumferentially of the bobbin holder with portions of their peripheral surfaces exposed to engage the interior of the bobbin, said rollers being of resiliently distortable material and being adapted to be rotated and compressed by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

9. A bobbin holder including a conically shaped

portion for frictional engagement with a base portion of a bobbin, and a plurality of rollers adjacent to the outer end of the bobbin, said rollers being of resiliently distortable material and being adapted to be rotated and compressed by a portion of the interior surface of a bobbin as the bobbin is moved over said rollers, said rollers being positioned so that when the bobbin is seated on the holder the rollers are adapted to engage an outwardly facing edge of such interior surface, with the centers of such rollers lying outwardly, endwise of the bobbin holder, beyond such edge, thereby retaining the bobbin on the holder against accidental endwise displacement.

10. In a winding machine including a friction drive roll for rotating a winding bobbin, a rotatable bobbin holder including a base-centering element adapted to extend into and center the base of a bobbin, and a tire of a resilient material on said base-centering element and having a diameter larger than the largest diameter of the bobbin so as to relieve the bobbin from contact with said friction drive roll at the beginning of winding, said tire being located in position for a side face thereof to abut the base end of such bobbin when the bobbin is centered by said base-centering element.

11. In a winding machine including a friction drive roll for rotating a winding bobbin, a rotatable bobbin holder including a tapered base-centering element adapted to extend into and

center the base of a bobbin, and a tire of a resilient material on said base-centering element and having a diameter larger than the largest diameter of the bobbin so as to relieve the bobbin from contact with said friction drive roll at the beginning of winding, said tire being located in position for a side face thereof to abut the base end of such bobbin when the bobbin is centered by said base-centering element, thereby to limit the extent of wedging action between the base-centering element and the bobbin.

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Executor Under the Will of Edward J. Abbott, Deceased.

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