Nov. 4, 1958 K. M. McLELLAN 2,859,000

BOBBIN

Filed July 2, 1954

Fig. 1.

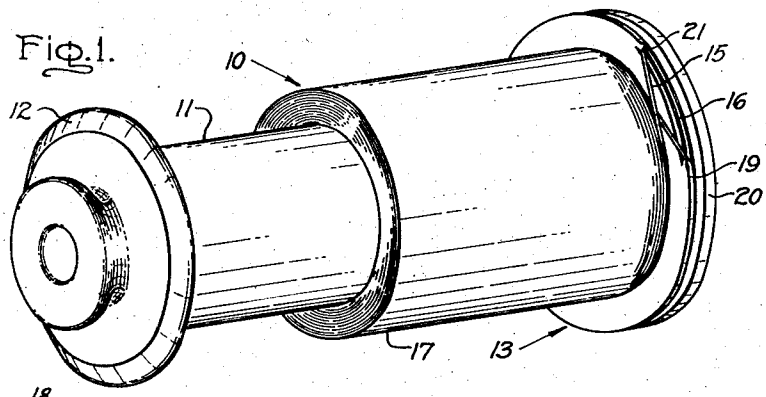


Fig. 5.

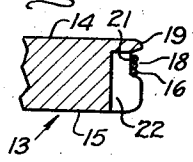


Fig. 2.

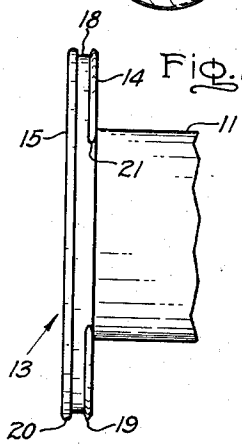


Fig. 4.

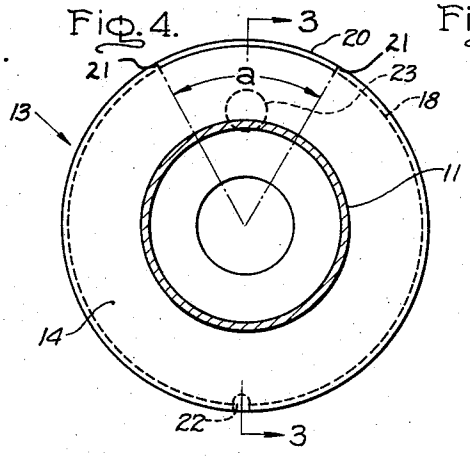


Fig. 3.

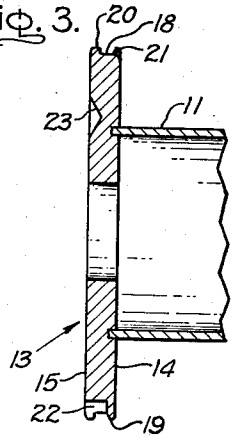


Fig. 6.

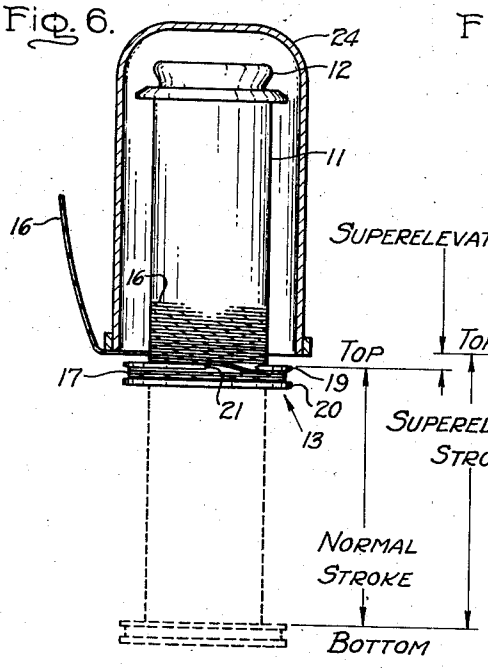
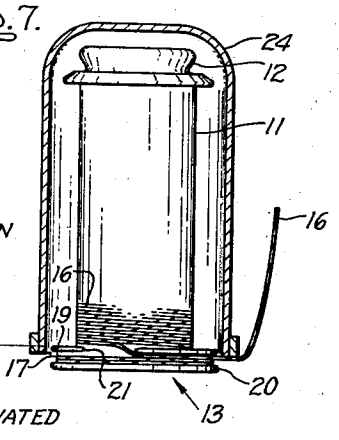


Fig. 7.



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BOBBIN

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5 Claims. (Cl. 242—125.2)

This invention relates to a flanged bobbin that is adapted to receive a transfer tail of yarn wound about one of its flanges.

Transfer tails are provided on yarn packages so that the packages can be directly employed in creeling operations, and for other purposes. A transfer tail eliminates the need for an intermediate package reformation. Transfer tails, also known as magazine wraps or pig tails, advantageously should be in a readily accessible place on a bobbin yarn package. They are formed with a segment of an inner length of yarn that is first wound into the package. This initial length is securely disposed on the package during its formation, and remains firmly fixed during subsequent handling of the package.

When bobbins and like package supports are employed for collecting yarn in the continuous manufacture of viscose rayon yarn or for yarn from other continuous sources of supply, it is difficult to provide transfer tails during collection. This is especially so since the yarn is being continuously supplied at relatively rapid rates to a bobbin, for example, in a cap twister or ring twister take-up assembly. In such instances it is impracticable to even momentarily discontinue or decelerate the rate of yarn supply so as to allow a transfer tail to be manually formed or placed on the bobbin.

The present invention advantageously provides for a flanged, yarn package supporting bobbin adapted to receive in one of its flanges a transfer tail of a yarn that is being wound on it. The bobbin of the present invention can be utilized in ring or cap twisting yarn take-up assemblies, and it is particularly adapted to the cap twisting yarn take-up assemblies having an incorporated transfer tail forming means similar to that disclosed and claimed in the applicant's co-pending application, Serial No. 434,724, filed on June 7, 1954, now Patent No. 2,787,112.

In accordance with the present invention a flanged, yarn package supporting bobbin has a peripheral groove in its lower flange for receiving and supporting a transfer tail of yarn being collected on the bobbin. The groove forms inner and outer walls on the circumference of the lower bobbin flange which separate the respective inner and outer faces of the flange from the groove. The inner wall is cut away to the depth of the groove for a substantial portion of its periphery. The cut away portion of the inner wall picks up the yarn being wound on the bobbin to direct it to the groove whenever an inner length of an end of yarn being first wound on the bobbin is guided or moved out over the lower flange of the bobbin. One or more wraps of yarn may thus be wound in the groove on the flange to provide a transfer tail. The end of yarn is then returned through the cut away portion of the inner wall to be wound on the bobbin. A notch also is provided on the circumference of the lower flange through the outer wall to facilitate removal of yarn wound in the groove. In addition, counterweighting means are advantageously provided on the bobbin to dynamically balance it during rotation.

Further advantages will become apparent in the following description and the accompanying drawing in which like reference numerals refer to like parts, wherein:

Figure 1 is a perspective view, partly in section, of a bobbin in accordance with the present invention supporting a yarn package having a transfer tail,

Figure 2 is a fragmentary front elevation of part of the bobbin showing the peripherally grooved and recessed lower flange,

Figure 3 is a sectional view of the lower bobbin flange and part of the yarn core taken along the line 3—3 in Figure 4,

Figure 4 is a plan view, partly in section, of the lower bobbin flange on the yarn core,

Figure 5 is a fragmentary sectional view of the lower bobbin flange enlarged from Figure 4 to show several wraps of yarn in the peripheral groove forming a transfer tail,

Figure 6, partly in section, depicts the normal stroking pattern of a bobbin within a cap twister take-up apparatus during collection, and

Figure 7, also partly in section, illustrates the manner of forming a yarn transfer tail on a bobbin in accordance with the present invention in a cap twister take-up apparatus.

With reference to the first five figures of the drawing, and initially to Figure 1, there is illustrated a bobbin supporting a yarn package, indicated generally by the numeral **10**. The layers of yarn wound on the bobbin are cut-back and shown partly in section. The bobbin comprises a core **11**, an upper flange **12**, and a base or lower flange, indicated generally by the reference numeral **13**. The package supported on the bobbin is formed according to conventional practice by winding an end of yarn **16** on the bobbin core **11**, between the upper and lower flanges **12** and **13**, in successive layers of yarn **17**.

The lower flange **13** of the bobbin, more specifically shown in Figures 2 and 3, is provided with a peripheral groove **18**. The groove **18** in the flange periphery forms an inner wall **19** and an outer wall **20**, both encircling the flange. The inner wall **19**, located on the same side of the lower flange **13** as the core **11**, separates the inner face **14** of the flange **13**, which abuts yarn wound in the bobbin, from the groove **18**. The outer wall **20** separates the outer face **15** of the flange **13**, at the lower end of the bobbin, from the groove **18**.

Preferably, the groove **18** is poistioned more towards the inner face **14** of the flange **13** from its interfacial center plane to provide for a relatively thinner inner wall **19** in comparision to the outer wall **20**. This is desirable to avoid a hang-up of the yarn during its transfer from the core **11** to the groove **18** and back again or while it is being wound in the groove to provide a transfer tail. As more specifically shown in Figures 2 and 3, the inner wall **19** is advantageously rounded and smooth along its outer circumferential edge portion. Flat spots, roughnesses or other surface irregularities on the outer circumference of the inner wall **19** tend to impart loops to the yarn while it is being wound in the groove **18**.

The inner wall **19** is cut away to the depth of the groove **18** for a substantial portion of its periphery, as illustrated by the angle "*a*" in Figure 4. Advantageously, the cut away portion, indicated by reference numeral **21**, forming the angle "*a*" may extend for between about 60° and about 120° along the flange circumference, and preferably, for best operation, about 90° of the inner wall is cut away. As illustrated in Figure 2, it is desirable for the inner wall **19** to be tapered and rounded smooth at the edges of the cut-away **21**. Such construction assists materially in the pick-up of yarn when it is

guided over the flange to be wound into the groove. Also, it permits the smooth return of the yarn from the groove to the core after the transfer tail has been formed.

Further, a notch **22** is advantageously provided on the circumference of the lower flange between the outer face **15** of the flange **13** and the groove **18** in its periphery. As shown in Figure 5 the notch **22** is cut into the flange **13** slightly deeper than the groove **18**. It is positioned on the circumference of the flange about opposite the cut-away **21** in the inner wall **19**. More specifically, it is positioned about opposite the center of the cut-away. The notch **22** is useful for permitting an easy release of yarn wound as a transfer tail in the groove by allowing for ready access thereto. Scissors or other suitable instruments may be inserted in the notch **22** to cut the yarn **16** and thus release it as a transfer tail. Or, if transfer tails of longer length are desired, a hook or other instrument inserted in the notch **22** may be employed to catch one or more wraps of the yarn **16** and pull it out of the groove over the outer wall **20**. The wraps of yarn so released may then be cut to present the transfer tail on extending the yarn.

Advantageously the bobbin may be dynamically balanced to minimize vibrations and the like when it is being rotated at a collection or yarn take-up speed. Such speeds, in certain take-up apparatus, such as cap twisters, may be as great as 8,000 revolutions or more per minute. A centrifugally unbalanced bobbin may cause vibration, poor performance and excessive wear or even damage when it is rotated at a relatively high rate. Counterweighting means for balancing may be included in the bobbin. Conveniently these are located in its lower flange. For example, a counterweighting effect may be provided by a balance hole **23** bored in the outer face **15** of the lower flange **13** across from the cut-away **21**. This counterbalances the flange and countereffects unbalance which might result from the cut-away **21** in the inner wall **19** and the notch **22**. Other counterweighing means such as weights and the like may also be employed for the bobbin.

A transfer tail for a yarn package supported on a bobbin in accordance with the present invention may be formed in various ways during collection of the yarn without interrupting the rotation of the bobbin during the take-up period in which the package is formed. The transfer tail is wound in the peripheral groove **18** of the flange **13** by guiding or directing an inner length of an end of yarn being first wound in the bobbin out over the lower flange. The cut away portion **21** of the inner wall **19** picks up the yarn and directs it to the groove **18** wherein at least one turn or wrap, preferably several, is wound to provide a transfer tail. After a desired amount of yarn has been wound in the groove **18**, the yarn is guided or directed back onto the core **11** between the bobbin flanges **12** and **13** through the recess. The package may then be wound in a normal manner.

The guiding of the yarn **16** outwardly from the bobbin **10** over the lower flange and into the groove is preferably done as soon as possible after the yarn is "thrown-on" the core according to normal techniques and the collection has been started. It may, for this purpose, be manually guided or directed thereinto. More desirably, however, the bobbin **10** is employed in a take-up apparatus which is adapted to momentarily guide and handle the yarn in such a desired manner. For example, in a ring twister the ring guide may momentarily be brought down over the flange **13** for one or several rotations. Or the bobbin **10** may momentarily be lifted upward for the same purpose. Similar and analogous methods employed in a cap twister will accomplish like results.

Advantageously, the bobbin **10** is employed in a cap twister apparatus which is adapted to momentarily additionally extend the bobbin for more than a normal upward stroke in the cap. In other words, the bobbin is superelevated on an upward stroke within the cap to bring the lower flange **13** up in the cap. The end of yarn is then picked up by the cut away portion **21** of the inner wall **19** on the flange **13** to wind one or more wraps as a transfer tail in the groove **18**.

Figures 6 and 7 illustrate the effect of superelevating the bobbin **10** in a cap to form a transfer tail wound in the groove **18**. Figure 6 depicts the normal vertically reciprocating stroke of the bobbin **10** within a cap **24**. At the top of a normal stroke the whole of the bobbin **10** excepting the lower flange **13** is up within the cap **24** leaving sufficient clearance between the inner face **14** of the lower flange **13** and the lower yarn guiding circumference of the cap **24** for the end of yarn **16** to be taken-up on the bobbin core **11**. At the bottom of a normal stroke the bobbin is in a position depicted by the dotted lines. The inner face of the upper flange **12** of the bobbin is about even with the lower guiding circumference of the cap **24**. The bobbin **10** thus takes up the yarn **16** up to against the inner face of the upper flange **12**. In Figure 7, a part of the lower flange **13** of the bobbin **10** is brought up within the cap **24** at the top of a superelevated upward stroke of the bobbin. This permits the cut-away **21** to pick up the yarn **16** and to cause it to be wound for one or more turns of the bobbin in the peripheral groove **18** of the lower flange **13**. When the bobbin is returned to a normal stroke from a superelevated position, the yarn **16** passes out of the groove **18** through the opposite side of the cut-away **21** from which it was picked up. It then is wound in a normal manner on the core **11** between the flanges **12** and **13** to form a yarn package which has thus been provided with a transfer tail.

A relatively wide cut away portion in the inner wall of a lower bobbin flange in accordance with the present invention provides for many advantages. A bobbin having such a construction is well adapted for employment with take-up apparatus of the cap-twister variety which can be provided with a bobbin superelevating means as heretofore explained. This is particularly so when the take-up apparatus winds the yarn on the bobbin through a relatively slow traverse and the yarn is being laid on the bobbin core at a relatively smaller pitch or degree of helical advance. A narrower cut-away cannot be continually relied upon to properly pick up slightly pitched yarn or to return it for winding on the bobbin core after the transfer tail has been wound in the groove.

Further, the substantial cut away portion of the inner wall permits for ready and convenient identification of the inlet and outlet segments of the transfer tail in the groove. For example, if a bobbin is rotated counterclockwise the inlet segment or inner end of the yarn always passes through the cut-away at its right side, when looking down on the bobbin from above its upper flange. The outlet segment is then, of course, on the left side. The inlet and outlet segments of the transfer tail are thus readily distinguishable. The converse is true when the bobbin has been rotated clockwise during collection. It is of advantage to be able to distinguish the inlet and outlet segments in such a relatively simple manner. Proper identification may avoid an inadvertent severance of a wrong portion of the transfer tail which might result in its being effectively destroyed.

Since certain changes in the practice of this invention may obviously be made without departing from its spirit or scope, it is to be understood that all of the foregoing description be interpreted and considered as merely illustrative and in no sense limiting of the invention, as particularly pointed out and defined in the appended claims.

What is claimed is:

1. In a flanged bobbin adapted to receive, as a transfer tail, on the periphery of one of its flanges a portion of yarn being initially wound on said bobbin; a peripheral yarn receiving groove in a flange of said bobbin; and a wall encircling said flange separating said

groove and the inner face of said flange, said wall being cut away about to the depth of said groove for between about 60° and about 120° of its periphery.

2. In a flanged bobbin adapted to receive, as a transfer tail, on the periphery of one of its flanges a portion a portion of yarn being initially wound on said bobbin; a peripheral yarn receiving groove in a flange of said bobbin; inner and outer walls encircling said flange separating said groove from the inner and outer faces respectively of said flange, said inner wall being cut away about to the depth of said groove for between about 60° and about 120° of its periphery; and a notch on the circumference of said flange extending through said outer wall and communicating between said groove and the outer face of said flange.

3. In a bobbin according to claim 2 wherein said inner wall is cut away for about 90° of its periphery and wherein said notch is positioned on the circumference of said lower flange about opposite the cut away portion of said inner wall.

4. In a flanged bobbin adapted to receive, as a transfer tail on the periphery of one of its flanges a portion of yarn being initially wound on said bobbin; a peripheral yarn receiving groove in a flange of said bobbin; inner and outer walls encircling said flange separating said groove from the inner and outer faces respectively of said flange, said inner wall being cut away about to the depth of said groove for between about 60° and about 120° of its periphery, said inner wall being thinner than said outer wall and being rounded along its outer edge and

tapered rounded at its cut away portion; and a notch on the circumference of said flange about opposite the cut away portion of said inner wall, said notch being deeper in said flange than said groove and extending through said outer wall and communicating between said groove and the outer face of said flange.

5. In a flanged bobbin adapted to receive, as a transfer tail, on the periphery of one of its flanges a portion of yarn being initially wound on said bobbin; a peripheral yarn receiving groove in a flange of said bobbin; inner and outer walls encircling said flange separating said groove from the inner and outer faces respectively of said flange, said inner wall being cut away about to the depth of said groove for between about 60° and about 120° of its periphery, said inner wall being thinner than said outer wall and being rounded along its outer edge and tapered rounded at its cut away portion; a notch on the circumference of said flange about opposite the cut away portion of said inner wall, said notch being deeper in said flange than said groove and extending through said outer wall and communicating between said groove and the outer face of said flange; and counterweighting means on said flange for dynamically balancing said bobbin during rotation.

References Cited in the file of this patent

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