July 24, 1956 N. E. KLEIN 2,756,006

BOBBIN

Filed Oct. 3, 1951 2 Sheets-Sheet 1

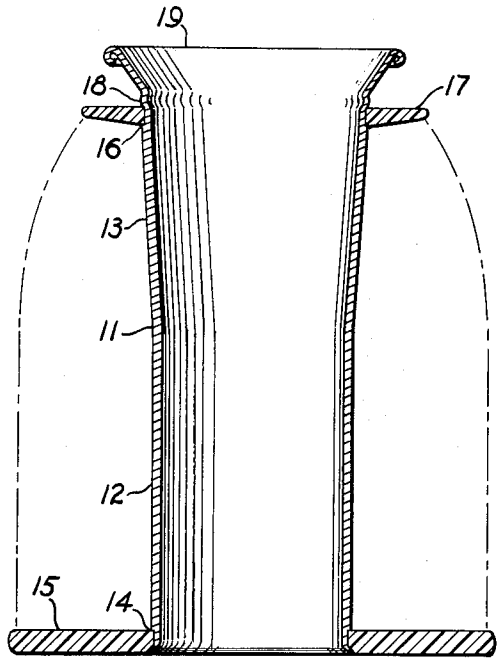


Fig. 1.

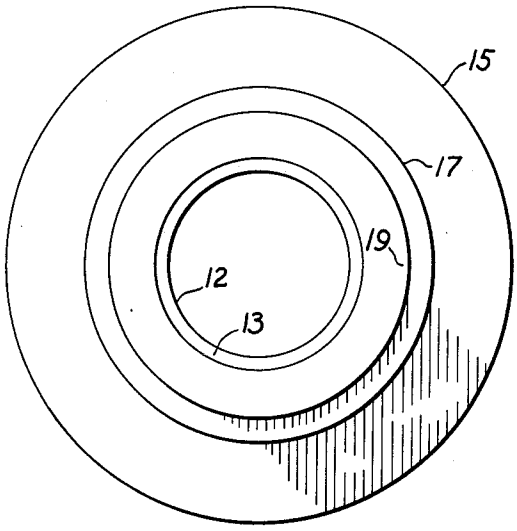


Fig. 2.

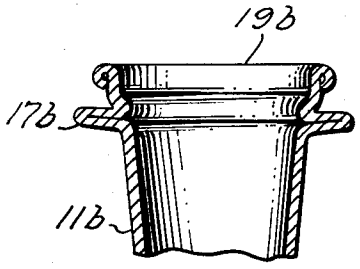


Fig. 6.

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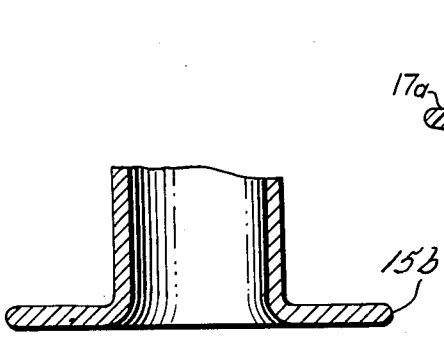


Fig. 7.

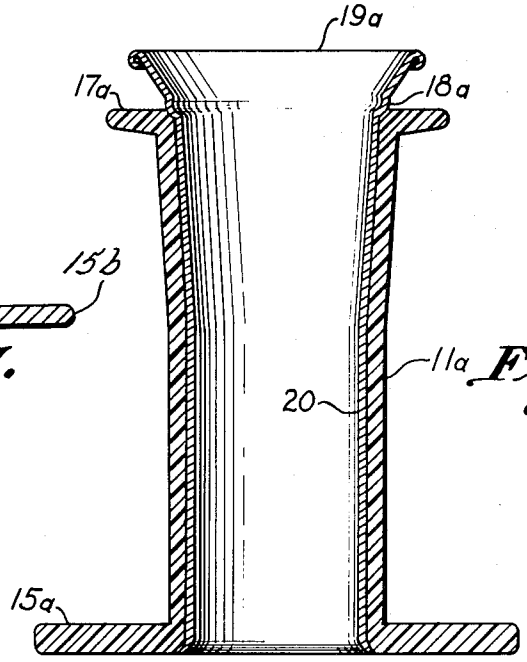


Fig. 3.

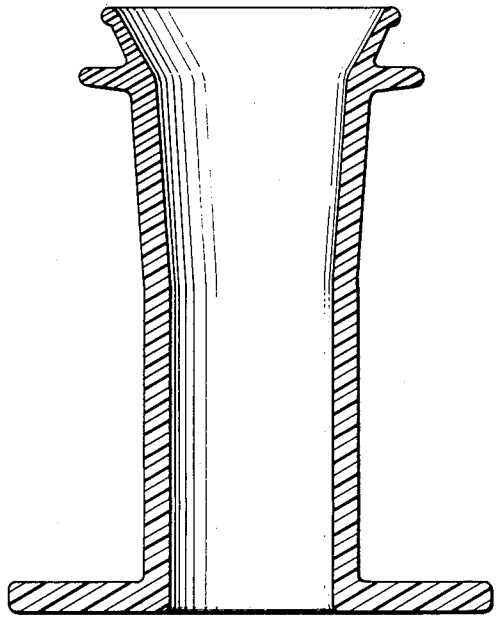


Fig. 4

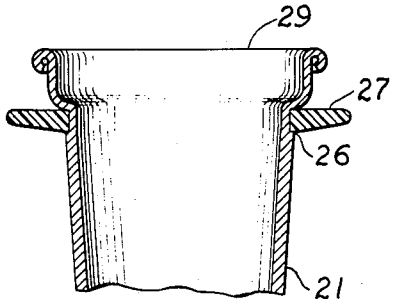


Fig. 5.

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2,756,006

BOBBIN

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Application October 3, 1951, Serial No. 249,547

5 Claims. (Cl. 242—118)

This invention relates to a bobbin and relates with more particularity to an improved bobbin especially adapted for use with high speed twisters.

The bobbin which comprises the present invention is an improvement upon the bobbin disclosed in my copending application, entitled "Bobbin," Serial Number 186,784, filed September 26, 1950, now Patent No. 2,620,145. These bobbins were particularly designed for use with 2-for-1 twisters such as is disclosed in my applications, Serial Number 133,047, filed December 15, 1949, now Patent Number 2,731,786, and Serial Number 179,069, filed August 12, 1950, now Patent Number 2,625,786, and an application of John W. May, Serial Number 184,611, filed September 13, 1950, now Patent No. 2,597,015.

In such twisters, the supply bobbin fits within a cup mounted upon a spindle and rotatable independently thereof. Centrally disposed within the cup is an upstanding tubular member which encloses the yarn tensioning and guide means. The yarn from a supply bobbin is passed upwardly over the top of the bobbin, over a yarn guide, and downwardly through the pedestal at the center of the bobbin, thence laterally by way of a passage through the spindle to a flyer, and finally upwardly to a take-up means. The rotation of the flyer causes the yarn to balloon about the supply bobbin between the flyer and the take-up means. One rotation of the spindle in such 2-for-1 twisters imparts at least two twists to the yarn.

In use, the bobbin fits within a cup having a centrally located pedestal which extends up through the central hollow portion or bore of the bobbin proper and beyond the upper termination of the bobbin. This pedestal houses a tensioning device and means for guiding the yarn strand or end to the passage through the spindle, from whence it travels to a flyer. For this reason, it is essential that both ends of the bore of the bobbin be entirely unobstructed.

It is, of course, necessary in winding and twisting operations that the bobbin, either filled with yarn or empty, be handled by an operator, as in doffing, loading and the like. Where no means is provided by which the bobbin may be grasped, the fingers of the operator come in contact with the yarn so that moisture, dirt and so forth is rubbed off on the yarn. In addition, since the bobbin is lifted by its top, which is the direction in which the yarn package tapers, this lifting tends to cause the windings to slough or peel off, forming snarls which materially increase the number of "ends down" or broken threads during the winding or twisting operation, resulting in a loss in production. Thus, it is obviously very desirable to provide the bobbin with a handle in order to eliminate "skin-to-yarn" contact.

While bobbins having handles to facilitate the handling thereof are known in the art, it was found not to be possible to adapt these handles to the bobbins of the type disclosed in my copending application for the reason that these handles all tended to obstruct the bore of the bobbin. Furthermore, the addition of these handles would have necessitated additional operations in the manufacture of the bobbin and, thus, materially added to the cost of that manufacture.

It is, therefore, an object of this invention to provide a bobbin with a handle such as will not tend to interfere with the flow or travel of the yarn through the center of the bobbin and which will leave the bore of the bobbin free for the reception of the pedestal mount of the twister.

Another object of this invention is to provide a bobbin with a handle which will not introduce additional problems to and require additional steps in the manufacture of the bobbin and hence will allow the bobbin to be produced at an extremely low cost.

Other and further objects and features of this invention will be readily apparent from the following detailed description, taken in connection with the drawings, in which:

Figure 1 is a vertical sectional view of one form of the bobbin of the present invention;

Figure 2 is a top view of the bobbin of Figure 1;

Figure 3 is a vertical sectional view of a modification of the bobbin embodying this invention;

Figure 4 is a vertical sectional view of a further form of the present invention; and Figure 5 is a vertical sectional view of the top portion of a bobbin which is a modified form of the bobbin in Figure 1;

Figure 6 is a vertical sectional view of the top portion of a bobbin which is a modified form of the bobbin in Figure 1; and Figure 7 is a vertical sectional view of the bottom portion of a bobbin which is a modified form of the bobbin in Figure 1.

As shown in Figures 1 and 2 the bobbin comprises a hollow central core or barrel member **11** formed of metal, such as an aluminum alloy or the like, the major portion **12** of its length being of uniform diameter, and the remaining minor portion **13** of its length being outwardly flared. The lower marginal portion of the barrel **11** is slightly reduced in diameter so as to provide a shoulder **14**, which is spaced a short distance from the lower edge of barrel **11**. Encircling this portion of reduced diameter is an annular lower flange member **15**, which is restricted against travel upwardly of the barrel by means of shoulder **14**. The inner vertical face of the annular flange **15** is chamfered and the lower edge of the barrel **11** is rolled into this chamfer in order to rigidly secure the flange **15** to the barrel **11**.

That portion of the barrel **11** adjacent the top edge thereof is slightly reduced in diameter to provide a second or upper shoulder **16**, similar to lower shoulder **14**. The upper shoulder **16**, however, is spaced a greater distance from the top edge of barrel **11** than is the lower shoulder **14** from the lower edge of barrel **11**. Supported by this upper shoulder **16** is an annular upper flange member **17**, which is secured in this position by means of an outwardly directed bead **18**, formed on the barrel **11** adjacent the upper horizontal surface of upper flange **17**. Extending beyond the bead is upper marginal portion **19** of barrel **11**, which portion is outwardly flared, the angle of flare increasing as the top edge of the barrel **11** is approached, thereby forming a handle particularly well adapted to be grasped by the fingers of an operator desiring to move or handle the bobbin whether empty or filled with yarn. The extreme marginal portion of the extension **19** may, if desired, be rolled to provide a peripheral bead.

It should be readily apparent that the bobbin as shown in Figures 1 and 2 is peculiarly adapted to be simply and economically manufactured. For example, the annular flange members **15** and **17** may be punched from a large

sheet or material, the centeral openings or holes in said flanges being slightly smaller than the maximum diameter of the reduced portions of the respective ends of the barrel **11** so that a tight fit is obtained upon assembly. The tapered, bead and flared portions of the barrel **11** may be formed by the use of conventional dies or by known metal spinning processes. The latter is especially well suited to the manufacture of these bobbins by virtue of the particular metal preferably used in this invention, i. e., stainless steel, and the shape of the bobbin.

Preferably, the core or barrel is formed out of a light stainless steel or aluminum alloy and the flange members out of a synthetic plastic or resin, such as paper base phenolic resin. It would be within the scope of this invention to form the flanges of metal separate and apart from the barrel or, in the case of the small upper flange, integral with the barrel, as by spinning the flange outwardly of the barrel, as shown in Figure 6. It is also possible that both the annular flanges and the barrel may be formed from the same material, such as a steel alloy or the like. In such case the upper and lower flanges may be either separately formed with respect to the barrel and assembled as a unit in accordance with the arrangement shown in Figure 1 or may be integrally formed as shown in Figures 6 and 7.

Since it is desirable that metal-to-yarn contact be eliminated insofar as possible, a light coating of synthetic resin or plastic material may be applied to those metallic surfaces which would come in contact with the yarn in the normal course of events.

An alternative form of the present invention which eliminates metal-to-yarn contact is shown in Figure 3. There, the core **11***a*, lower flange **15***a* and top flange **17***a* are molded in one piece from a light weight, strong plastic or synthetic resin. An inner liner **20** formed of metal, such as aluminum and the like, fits within and conforms to the bore of the one piece unit, projecting a short distance beyond the top surface of the upper flange **17***a*. The lower edge of the liner **20** is rolled outwardly to engage the lower edge of the inner face of the bore of the unitary member and a bead **18***a*, similar to bead **18**, is provided near the top of the liner, which bead engages the top edge of the inner face of the bore. The upper marginal portion or extension **19***a* of the liner is flared outwardly in a manner similar to that previously described in connection with upper marginal portion **19**. A further modification is shown in Figure 4, the handle and bobbin being molded together as an integral unit from well-known synthetic plastic and resinous compounds.

Figure 5 shows a slightly different form of handle, which eliminates the need for a bead as a means for holding the upper flange against the upper shoulder. In this form, the tubular barrel is designated **21**, the upper flange **27**, and the upper marginal portion of the barrel **29**. The upper marginal portion **29** is bent outwardly to hold the upper flange **27** against the upper shoulder **26**, then upwardly and is provided with a bead at the top edge thereof.

As is pointed out in my copending application, Serial Number 186,784, the ratio of the overall diameter of the top flange member to the outside diameter of the core should not exceed 1.73 to 1 in order to reduce overhang of the top flange, making for ease in unwinding of the yarn.

It is to be understood that the foregoing detailed description is given merely by way of illustration and not by way of limitation and that many variations and modifications should be apparent to one skilled in the art without departing from the spirit of my invention.

Having thus described my invention, what I claim is:

1. A bobbin adapted to be rotated about a vertical axis comprising an open-ended, thin-walled, tubular barrel having a shoulder thereon at a point spaced from the top edge of said barrel, an annular flange rigidly secured to said barrel immediately adjacent to the lower edge thereof, and a second annular flange mounted on said barrel in contact with said shoulder, a portion of said barrel near the top edge thereof being deformed to provide means cooperating with said shoulder for rigidly securing said second flange to said barrel, the top marginal portion of said barrel which extends beyond said second flange being outwardly flared.

2. The bobbin as in claim 1 wherein said portion is deformed in the shape of an outwardly directed bead.

3. A bobbin adapted to be rotated about its longitudinal axis comprising an open-ended thin-walled tube, a first annular flange rigidly secured to said tube adjacent to one end thereof, a second annular flange mounted on said tube in spaced apart relation from said first mentioned flange and intermediate said first flange and the opposite end of said tube, means between said second flange and said first flange holding said second flange against axial movement toward said first flange, a portion of said tube near said opposite end thereof and immediately beyond the axially outer surface of said second flange being deformed to provide means cooperating with said holding means for rigidly securing said second flange to said tube, the marginal end portion of said tube which extends beyond said second flange being outwardly flared.

4. A bobbin adapted to be rotated about a vertical axis comprising an open-ended thin-walled tube, a first annular flange rigidly secured to said tube adjacent to the lower edge thereof, a second annular flange mounted on said tube in spaced apart relation from said first mentioned flange and intermediate said first flange and the top edge of said tube, an abutment formed on the outer surface of said tube below said second flange and holding said second flange against axial movement toward the lower end of said tube, a portion of said tube near the top edge thereof and immediately above the upper surface of said second flange being deformed to provide means cooperating with said holding means for rigidly securing said second flange to said tube, the top marginal portion of said tube which extends beyond said second flange being outwardly flared.

5. A bobbin according to claim 3 wherein said holding means between said second flange and said first flange comprises a tubular body adjacent said thin-walled tube and disposed between said flanges.

References Cited in the file of this patent

UNITED STATES PATENTS

1,957,860	Stone	May 8, 1934
2,225,591	Jordan	Dec. 17, 1940
2,368,025	Jamison	Jan. 23, 1945
2,453,247	Moss	Nov. 9, 1948
2,620,145	Klein	Dec. 2, 1952

FOREIGN PATENTS

7,636	France	July 9, 1907
373,435	Great Britain	May 26, 1932
627,506	Great Britain	Aug. 10, 1949