March 31, 1964 J. DAUTRICOURT 3,127,119

BOBBIN OR PIRN WINDING DEVICE

Filed June 10, 1961 2 Sheets-Sheet 1

Fig. 1.

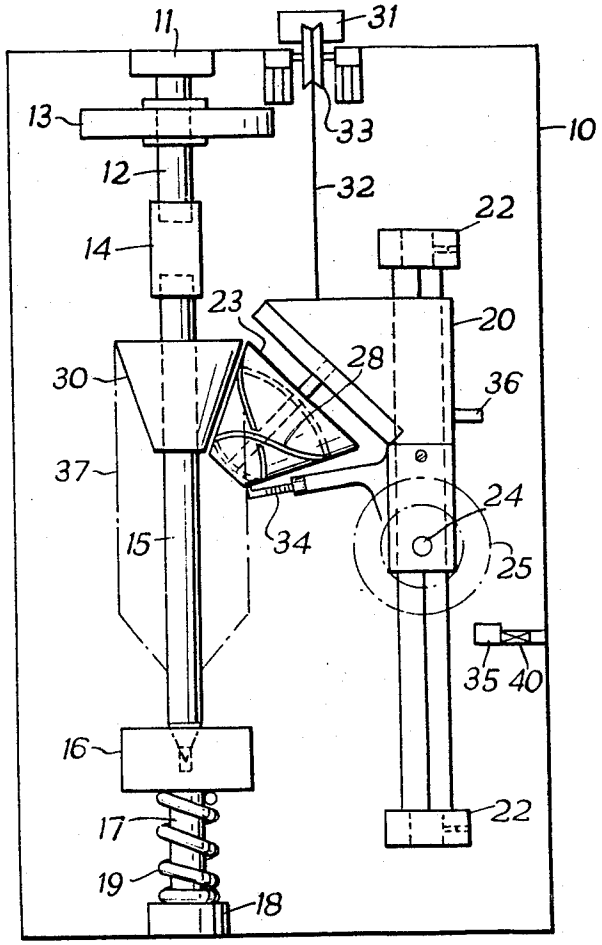
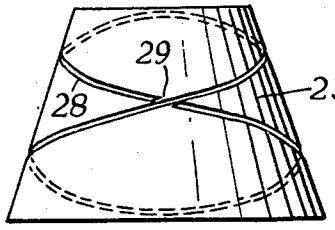


Fig. 3.



INVENTOR
JEAN DAUTRICOURT
BY Morris & Bateman
ATTORNEY

March 31, 1964 J. DAUTRICOURT 3,127,119

BOBBIN OR PIRN WINDING DEVICE

Filed June 10, 1961 2 Sheets-Sheet 2

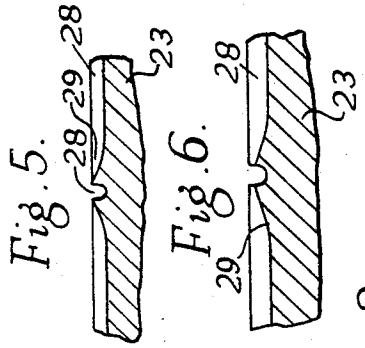


Fig. 5.

Fig. 6.

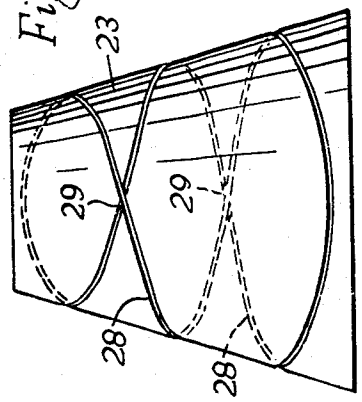


Fig. 4.

Fig. 2.

INVENTOR
JEAN DAUTRICOURT
BY Norris Bateman
ATTORNEY

United States Patent Office 3,127,119 Patented Mar. 31, 1964

3,127,119

BOBBIN OR PIRN WINDING DEVICE

Jean Dautricourt, 40 Vysmyn Straat, Zeebrugge, Belgium

Filed July 10, 1961, Ser. No. 122,945
4 Claims. (Cl. 242—31)

One well known device for winding yarn on to bobbins comprises a cylinder having a deep continuous groove in the form of a figure 8 or a similar figure having more than the two loops of a figure 8. This cylinder is rotated adjacent to or in contact with a bobbin and the yarn fed to the bobbin passes through the groove so that during rotation of the bobbin and the cylinder the yarn is cross wound on the bobbin. This arrangement has generally been applied to the production of cylindrical yarn packages, that is, in which the build up of the yarn on the bobbin or the like takes place over the entire axial length of the yarn package and is progressive from the centre outwardly until the required diameter of the yarn package has been built up.

However, a similar kind of arrangement has been proposed for cross-winding with a conical build-up which progresses from one end of the yarn package to the other, a cone having a deep continuous groove of figure 8 or similar conformation being rotatable in contact with the yarn package. With this cone winding arrangement it is difficult to maintain the yarn within the groove in the rotating cone at all times without applying excessive tension to the yarn.

The present invention is designed to provide a new or improved means for cross-winding tapered yarn packages, that is, in which the build up of the yarn package is in an axial direction. Such a yarn package is suitable for both weft and warp yarns.

According to the invention a substantially conical member is rotatable about its axis, a yarn guiding groove of figure 8 or like formation is formed in the said member, the groove being continuous in the direction from the smaller end to the larger end of the conical member, but is interrupted or substantially reduced in depth at those points in the direction from the larger end to the smaller end where the groove in this direction crosses the continuous groove in the other direction. The direction of the groove is the direction taken by the yarn passing through the groove during rotation of the conical member in one direction. Preferably, a yarn guide or stop is disposed adjacent to the smaller end of the rotary member to prevent the yarn from running or jumping off the smaller end of the rotary member. The rotary member may be driven by contact with the bobbin or yarn package being wound, the latter being positively driven, but, if desired, the rotary member may be independently driven. To permit the axial build up of the yarn, the rotary member may be axially movable, preferably by being mounted on a carriage which is biassed by a spring or by gravity so as to maintain the rotary member in contact with the conical portion of the yarn package but will permit the carriage to move against the spring or gravity during build up of the yarn package.

Yarn winding apparatus constructed according to the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

FIGURE 1 is a plan view of the yarn winding apparatus,

FIGURE 2 is a rear elevation,

FIGURE 3 is a side view of one arrangement of a grooved conical member incorporated in the said apparatus,

FIGURE 4 is a side view of an alternative grooved conical member,

FIGURE 5 is a detail sectional view showing the crossing of the grooves in the conical members of FIGURES 3 and 4, and

FIGURE 6 is a view similar to FIGURE 5 but showing an alternative arrangement.

Referring to the drawings, the particular winding apparatus shown comprises a base 10, a pedestal bearing 11 mounted on the base and carrying a driving shaft 12. Means are provided for driving the shaft 12, in this particular example a pulley 13 is secured on one end of the shaft for engagement by a driving belt (not shown) although it will be understood that any other convenient driving means may be provided for the shaft 12, for example, an electric motor. The shaft 12 carries a coupling member 14 engageable with one end of a spindle 15, the other end of which is rotatable in a conical bearing member 16. The member 16 is secured on one end of a plunger 17 which is axially slidable in a second pedestal bearing 18 on the base 10, a spring 19 around the plunger 17 engages between the bearing 18 and the member 16 so as to urge the latter into engagement with the adjacent end of the spindle 15.

A carriage 20 is slidable along a guide 21 supported between a pair of brackets 22 on the base 10, the guide 21 being parallel with the spindle 15. A grooved conical member 23 is mounted for free rotation about its own axis on the carriage 20 which also has a spindle 24 adapted to support a yarn package 25, yarn guides 26 and a yarn tensioning or braking device 27 of conventional form. The axis of the conical member 23 is inclined to the axis of the spindle 15 at the same angle as the cone angle, so that the side of the conical member 23 adjacent to the spindle 15 is inclined to the axis of the spindle 15 at half the said cone angle.

The conical member 23 has a yarn guiding groove 28 of figure 8 formation, this groove being of substantial depth, and in relation to the direction of rotation of the conical member, the groove 28 is continuous from adjacent to the small end to where it approaches the large end of the conical member. The other half of the groove, that is the return half from the large end to the small end is interrupted at the point 29 where it crosses the first mentioned half of the groove.

The groove arrangement will be clearly seen in FIGURE 3, the groove 28 being of figure 8 formation. An alternative groove arrangement is shown in FIGURE 4 in which the groove 28 has three loops and two points 29 where one part of the groove crosses another part.

A conical member 30 is fitted on one end portion of the spindle 15, the cone angle of this member corresponding with the cone angle of the grooved conical member 23 for engagement with the grooved conical member at the start of the winding operation to drive the member 23 and receive the first layer of yarn. The grooved conical member 23 is maintained in contact with the conical member 30 or the conical portion of the yarn being built up on the spindle 15 by means of a weight 31 on a flexible cable 32 which passes over a pulley 33 and is connected to the carriage 20. Any other convenient means, for example, a spring, may be provided for urging the carriage 20 along its guide 21 in the direction to maintain the grooved conical member 23 in engagement with the conical member 30 or the conical portion of the yarn package being built up on the spindle 15.

The yarn from the package 25 passes through the first yarn guide 26, the tensioning device 27 and the second of the two yarn guides 26 to the groove 28 in the member 23. An adjustable yarn guide 34 is mounted on the carriage 20 to prevent the yarn from running off the smaller end of the grooved conical member 23. It will be appreciated that as the groove 28 is continuous from the small end to the large end of the conical member 23,

there is no danger of the yarn leaving the groove. On the return half of the groove 28 the yarn will readily follow the groove and will bridge the interruption 29 without any tendency to leave the groove because it is now travelling towards the small end of the cone 23 and the diminishing diameter counteracts any tendency for the yarn to leave the groove. It will also be appreciated that if the conical member was rotated in the opposite direction so that the yarn encountered the interruptions during its traverse from the small end towards the large end, then the yarn would tend to leave the groove at the interruptions 29. Consequently it is important that the groove should be related to the direction of rotation of the conical member as described above.

FIGURE 5 is a section showing the crossing point 29 of the groove 28, the section being taken along the longitudinal axis of the interrupted portion of the groove and across the continuous portion of the groove. It will be seen that at each side of the continuous portion of the groove, the interrupted portion becomes progressively shallower as it approaches the crossing point where it is entirely interrupted. An alternative arrangement is shown in FIGURE 6, where it will be seen that the interruption in the groove at the position 29 is partial only, that is, although the so-called interrupted portion of the groove is continuous, it is made very much shallower for a short distance at each side of the position 29. Consequently as the continuous portion of the groove is of substantially constant depth throughout its length, and at the position 29 it is crossed by a shallow portion of groove, the yarn will tend to follow the continuous portion of the groove as it travels towards the larger end of the conical member 23. Similarly, the so-called interrupted portion of the groove will be better able to retain the yarn, even though it is of shallow depth, as the yarn travels towards the small end of the conical member 23. Furthermore, the groove 28 may be flared in cross-section adjacent to the surface of the conical member 23 either throughout its length or at pre-determined positions, e.g. adjacent to the larger end of the conical member 23.

A stop member 35 is mounted on the base 10 and is adapted to be engaged by a stop member 36 on the carriage 23 when the latter had been displaced along its guides a pre-determined distance by the build up of the yarn package on the spindle 15, this yarn package being indicated in dot-dash lines 37 in FIGURE 1. It is preferred that the stop member 36 should be adjustable on the base 10, and that it should be adapted to actuate an electric switch 40 when it is engaged by the stop member 35, the switch 40 being incorpoorated in an electric circuit for stopping the drive to the spindle 15. The member 16 can be displaced against the action of the spring 19 to permit the spindle to be inserted and removed as required.

In the particular construction described above, the grooved conical member 23 is mounted for free rotation,

and is rotated by engagement with the yarn package. However, the conical member 23 may be positively driven, and it may be arranged to drive the pin or bobbin by engagement with the yarn package 37.

The cross-winding of the yarn package 37 provides several advantages, e.g. the yarn package can be dyed without any risk of the yarn at the centre receiving less dye than at the outside, and further more when applied to pirns of weft yarns, the cross-winding minimises ballooning of the yarn in the shuttle.

I claim:

1. In a yarn winding device, a yarn guiding member comprising a substantially conical member rotatable about its axis, a yarn guiding groove extending helically around said member for guiding yarn from the smaller end of said member to the larger end of said member, and a second yarn guiding groove extending helically around said member for guiding yarn from the larger end to the smaller end of said member, said first and second groove being interconnected at each end of said member, and said second groove being at least partially interrupted at each place where it crosses said first groove, and a yarn stop disposed adjacent the smaller end of said grooved conical member to prevent yarn from running off the smaller end.

2. A yarn winding device according to claim 1, in which the said yarn stop is adjustable.

3. A yarn guiding member for a yarn winding device comprising, a substantially conical member rotatable about its axis, a first yarn guiding groove extending helically around said member for guiding yarn from the smaller end of said member to the larger end of said member, and a second yarn guiding groove extending helically around said member for guiding yarn from the larger end to the smaller end of said member, said first and second grooves being interconnected at each end of said member, and said second groove being at least partially interrupted at each place where it crosses said first groove.

4. A yarn guiding member for a yarn winding device as defined in claim 3, wherein said second groove is of minimum depth where it crosses said first groove, and progressively increases in depth in both directions away from said crossing place.

References Cited in the file of this patent

UNITED STATES PATENTS

1,749,355	Reece	Mar. 4, 1930
2,009,014	Leeson	July 23, 1935
2,156,472	Dersen	May 2, 1939
3,053,464	Trost	Sept. 11, 1962

FOREIGN PATENTS

182,658	Austria	July 25, 1955
1,113,770	France	Dec. 12, 1955
1,162,836	France	Apr. 14, 1958