May 3, 1938. W. B. COOPER 2,116,342

TWISTER CAP

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Fig. 1.

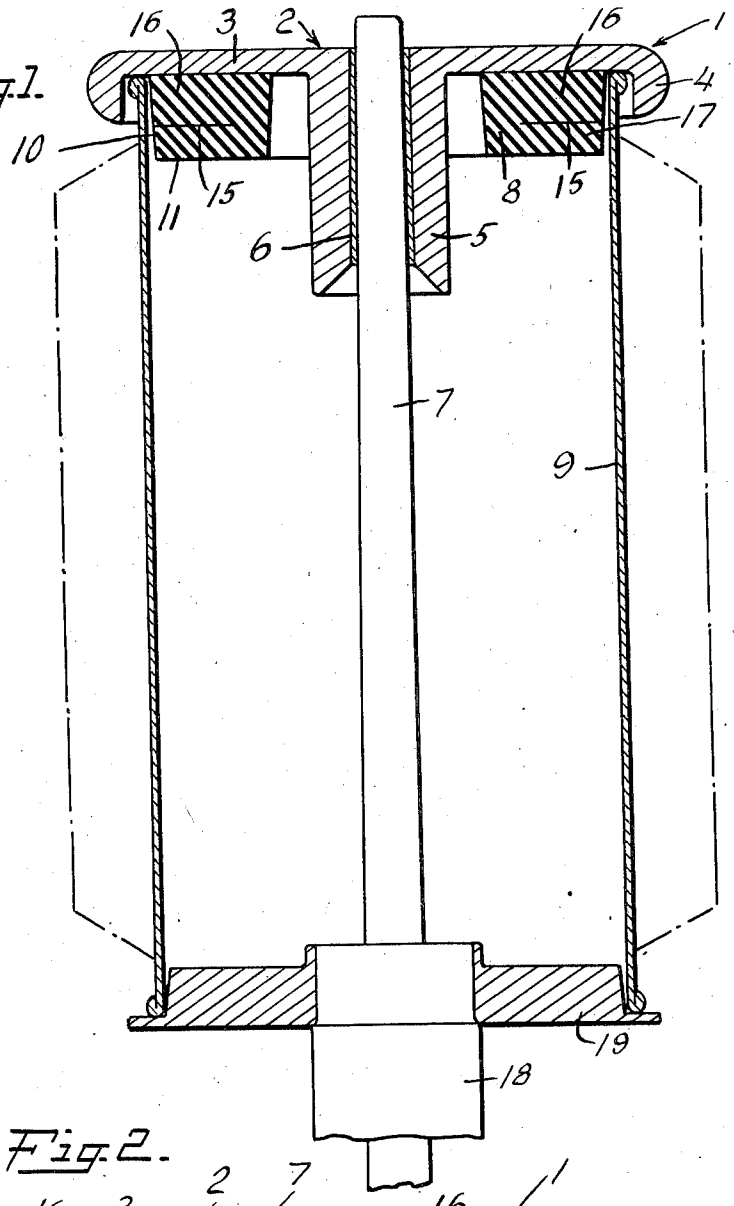
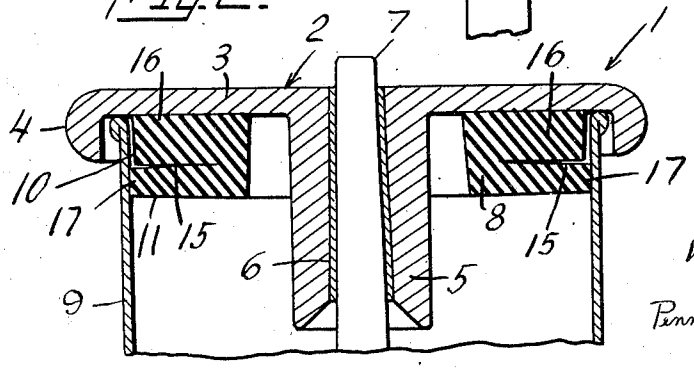


Fig. 2.



INVENTOR
Wilfrid B. Cooper
BY
Pennie, Davis, Marvin & Edmonds
ATTORNEYS

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TWISTER CAP

Wilfrid B. Cooper, Rome, Ga., assignor to Tubize Chatillon Corporation, New York, N. Y., a corporation of Delaware

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3 Claims. (Cl. 117—23)

This invention relates to a twister cap for twisting bobbins of the type which grippingly engages the bobbin under the action of centrifugal force. The invention aims to provide an improved twister cap of this character having a rigid body-member of hard or resilient material adapted to engage a bobbin spindle and a yieldable contact or gripping member fixed to the rigid body-member which is adapted to expand when the cap is rotated and engage the bobbin circumferentially.

The twister cap of the invention is especially adapted for "upstroke" twisting apparatus and comprises a rigid body-member formed of any suitable hard material, such as metal, or molded thermoplastic material, for example vulcanized rubber or the like, having a central bearing surface for engaging a spindle blade, and an annular portion having a substantially flat surface for engaging the yieldable member. In its more complete form, the rigid member has a bored sleeve for engaging the spindle blade, a disc-like portion attached to the sleeve and an annular overhanging lip depending from the disc-like portion which is adapted to surround the upper outer edge of the bobbin. The yieldable member is preferably formed of soft or highly elastic rubber and is preferably fixedly attached to the rigid member as by bonding, cementing, vulcanizing, or the like. The yieldable member is adapted to fit inside of the bobbin when the cap is in engagement with the spindle. In a particularly efficacious construction in accordance with the invention, the rigid body-member is formed of hard rubber and the yieldable member is a piece of relatively thick, flat, soft rubber, bonded on one side to the flat surface of the rigid member. The yieldable rubber-member is preferably circular in section and of sufficient thickness that the free or unattached portion thereof may be expanded or thrown outwardly under the action of centrifugal force and brought into circumferential engagement with the inner surface of the bobbin. The yieldable rubber-member is preferably split or otherwise separated for a short distance inwardly from the outer peripheral or bobbin engaging surface, thereby leaving a suitable portion of the free or unattached part of the rubber to engage the bobbin more or less independently of the remaining portion.

In the accompanying drawing, Fig. 1 shows a sectional view of a twister cap in accordance with the invention; and

Fig. 2 shows a twister cap similar to that illustrated in Fig. 1 in engagement with a bobbin.

In the drawing, the twister cap 1 comprises an annular rigid body-member 2 formed of any suitable hard material, preferably molded plastic material or vulcanized rubber, having a disc-like portion 3 with substantially flat upper and under surfaces and an overhanging or depending lip 4 having a curved outer surface which preferably joins the flat top tangentially. The top and curved surfaces of the lip are highly polished to prevent any entangling of the thread during twisting. The rigid member 2 has a depending sleeve 5 which is bored out at the center to provide a suitable spindle mounting, for example, on the blade of the spindle. When the rigid member is formed of rubber or the like, the bore is preferably provided with a metal liner 6 for engaging the end of the spindle blade 7. The liner makes a close fit with the spindle blade but is free to turn or be vertically adjusted thereon.

The yieldable member 8 is formed of a relatively thick and preferably flat piece of elastic rubber and is suitably fixed to the rigid member as by bonding during vulcanization, preferably over the entire annular area of contact. The piece of yieldable rubber is preferably ringlike, being open at the center, and having an outer diameter slightly less than the inner diameter of the bobbin 9. The outer periphery 10 of the flexible member is preferably in the form of the frustum of a cone and tapers inwardly in the direction of its free or unattached outer surface 11. In a preferred construction, the yieldable rubber member is slit or otherwise divided into two portions from the peripheral surface 10 inwardly a suitable distance as shown by the line 15, thereby leaving the upper or bonded part 16 in firm engagement with the disc-like portion 3 and the lower part 17 highly yieldable under the action of centrifugal force when the twister cap is rotated.

The spindle blade 7 is of the conventional construction in use on "upstroke" twisting machines and is rotated at a high speed by the usual means. The lower portion of the spindle blade is provided with any suitable spindle-driving device 18 and a base 19 for driving the bobbin 9.

The twister cap of the invention may be formed in a single vulcanizing operation in which the rigid member is formed of one kind of rubber and the yieldable member of a different kind of rubber.

In using the twister cap of the invention, the bobbin 9, carrying a cake of substantially dry, untwisted rayon thread, is mounted on the base 19. This member is in rotatable engagement

with the spindle and in frictional gripping engagement with the bobbin. The twister cap is then placed over the upper end of the spindle 7 and when the proper vertical position is reached, the yieldable member fits inside the bobbin and the disc-like portion rests upon the bobbin top. The spindle and, of course, the spindle blade are then rotated at a high rate of speed, for example, at from 5000 to 6000 R. P. M. per minute and the twister cap is rotated therewith. Under the action of the centrifugal force imposed upon the system, the yieldable member 8 and particularly the lower or free end part 17, is displaced outwardly, as shown in Fig. 2, thereby bringing the peripheral portion 10 into gripping engagement with the inner cylindrical surface of the spinning bobbin 9. As a consequence of this action, the yieldable member serves as an automatic clutch, locking the bobbin to the twister cap.

The twister cap of the invention, especially in the form illustrated in the drawing, may be regarded as a unitary or one-piece structure or device. By reason of the intimate contact of the yieldable member with the rigid member of the cap there is no dislocation of the parts and resulting unbalancing during rotation. Loose or free moving parts in twister caps as heretofore constructed cause unbalancing and objectionable vibrations which injure the twisting apparatus and frequently cause the cap or parts thereof to be hurled into the twisting room. The yieldable member bears a fixed relation to the remainder of the cap and when the cap is centered on the spindle blade, the yieldable member is likewise similarly centered.

The yieldable member contacts the bobbin in such manner that there is no opportunity for the hard or rigid part to engage the bobbin and be ground into a fine powder. When hard substances contact the bobbin, which is generally made of aluminum, black powder is formed which deposits on the yarn cake with resulting damage. Heretofore, the yarn has been damaged by the dark dust worn off the bobbin or cap and the present invention eliminates this objectionable condition.

The twister cap of the invention is not only dynamically stable but provides a uniform grip between the flexible member and the bobbin. The flexible member is free to expand and contract uniformly without restraint or friction and the peripheral edge is therefore always in the proper relation to the other portions of the cap. There are no contacting or supporting elements preventing free action of the yieldable member.

I claim:

1. A twister cap for bobbin twisting machines which comprises a rigid member adapted to be rotatably mounted upon a bobbin spindle, and a relatively thick piece of yieldable rubber bonded on one of its sides to the rigid member which has a peripheral bobbin-contacting surface and is adapted to fit inside the bobbin when the cap is mounted upon the spindle, said piece of rubber having an annular slit extending from the said surface inward in the direction of the spindle, thereby leaving a portion of the rubber free to expand under the action of centrifugal force.

2. A twister cap for bobbin twisting machines of the type having an upright spindle and a base thereon for mounting a bobbin or spool which comprises a rigid member having a central opening for effecting a slideable and rotatable engagement with the spindle, said rigid member having an annular under surface concentric with the said opening, and an annular relatively thick yieldable rubber member bonded on one of its sides to the annular surface of the rigid member, said rubber member being annularly slit and having a bobbin-contacting surface adapted to fit inside the bobbin and to be thrown outwardly during rotation into pressed peripheral engagement with the bobbin.

3. A cap adapted to engage the upper end-portion of a cylindrical bobbin which is mounted upon the spindle base of a conventional upstroke twisting machine, comprising a rigid member having a lip adapted to overhang the bobbin, a central opening for engaging a spindle blade and an annular portion between the lip and the opening having an under surface and a smooth upper surface which extends to and joins the surface of the lip, and an annular relatively thick piece of rubber bonded on one of its sides to the under surface of the rigid member which is adapted to fit inside the bobbin when the cap is mounted in operative position over the spindle blade, said piece of rubber being elastic and having a depending lower portion which is highly yieldable under the action of centrifugal force and adapted to be thrown into pressed engagement with the inner circumferential surface of the bobbin.

WILFRID B. COOPER.