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LOCKING DEVICE FOR BOBBIN CAPS

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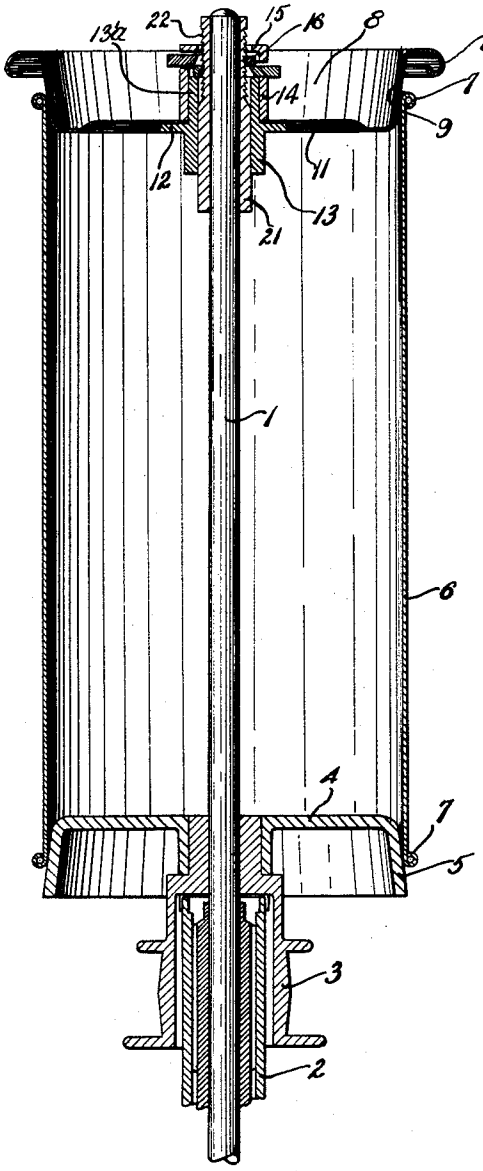


Fig. 1

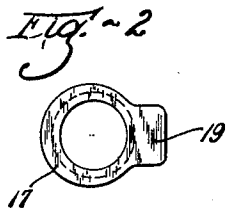


Fig. 2

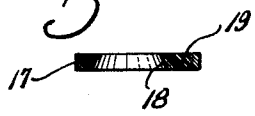


Fig. 3

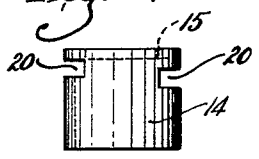


Fig. 4

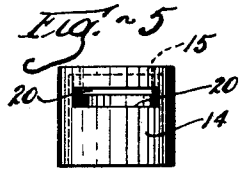


Fig. 5

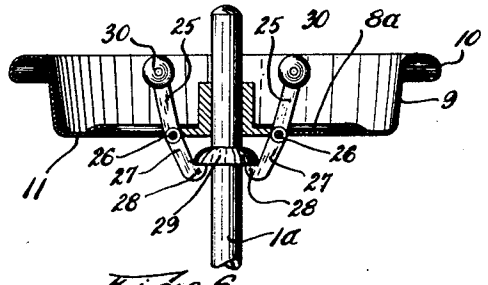


Fig. 6

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UNITED STATES PATENT OFFICE

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LOCKING DEVICE FOR BOBBIN CAPS

Application filed February 16, 1931. Serial No. 515,949.

This invention relates to locking devices for retaining bobbins on the spindles of twisting or like machines used in the textile industry. One object of the invention is to provide an improved cap adapted to be readily applied to the spindle for retaining the bobbin thereon, together with improved means interconnecting the cap and spindle and actuated by centrifugal force, so as to automatically lock the cap to the spindle while the parts are rotating and to release the cap when the spindle is at rest.

A further object of the invention is to provide a bobbin cap of the type described which of itself carries the centrifugal locking device, the latter being of simple form and so arranged as to enable the cap to be manufactured and sold at low cost, the locking parts being not likely to get out of order in service.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawing, Fig. 1 represents a sectional elevation illustrating one form of locking device applied in practical form; Fig. 2 is a plan view of the locking member; Fig. 3 is a sectional elevation thereof; Fig. 4 is a side elevation of a retaining sleeve for the locking member; Fig. 5 is another side elevation thereof, the view being taken from the right in Fig. 4; and Fig. 6 is a sectional elevation, corresponding to Fig. 1, and showing a modification.

The invention is adapted for use on any type of machine in which a spool or bobbin is designed to be rotated by a spindle, to be endwise releasable therefrom, and to be releasably locked in place by mechanism of the kind to be described. The arrangement shown in the drawing is designed for a twisting machine, it being understood that the spindle of such machines is driven at relatively high speed, sometimes at the rate of 6000 R. P. M. Referring to the drawing, the spindle 1 is rotatably mounted in suitable bearings in a stationary frame part 2, the spindle being provided with means for driving it, such as the belt pulley 3, adjacent which is a driving and holding head 4 provided with a tapered flange 5. Parts 3, 4 and 5 are fast with each other and rotate together or as a unit. To these parts is releasably attached the spool or bobbin 6, which may be of any suitable form or design and is shown as a hollow cylinder around the surface of which the yarn is wound. The bobbin is usually provided at its ends with small flanges or beads 7. In applying it to the spindle to be driven thereby, the bobbin is telescoped over the driving head 4 or, in other words, is slid down over the tapered flange 5 thereof, which consequently forms a seat or support for the bobbin, the other end of the bobbin being supported by a so-called cap marked generally 8 and provided with a similar tapered flange 9 which is introduced or telescoped within the open end of the bobbin. In attaching these bobbins to the spindle, the bobbin is applied to the lower head member 4 and the cap 8 is sleeved over the spindle and pushed down into the bobbin until the latter is held rigidly and firmly and is properly centered upon the spindle.

In the operation of these devices, it sometimes happens that the bobbin is not exactly centered or is slightly out of balance, as a result of which, or for other causes, the high speed of rotation produces a tendency of the bobbin to move laterally or gyrate, or at any rate, to set up lateral forces which tend more or less to pry off the cap so that the latter will escape from the spindle and release the bobbin while the spindle is running.

When the angle of taper of the head 4 and cap 8 is properly chosen, the very acute wedging action secures quite a firm clamping effect and largely prevents escape of either the cap or the bobbin. However, it is nevertheless often desirable to provide a more or less positive lock for holding cap and bobbin upon the spindle and the present invention supplies such locking means. The locking means preferably involves parts which more or less interconnect cap 8 and spindle 1 and is designed to be rendered effective by centrifugal force. In other words, referring to the cap and spindle, one or the other thereof carries movable parts adapted

upon rotation of the spindle to move outwardly by centrifugal force and produce an interlocking between parts of the spindle and parts of the cap to lock the latter in place and prevent its escape until the spindle has come to rest, whereupon the centrifugally acting parts are releasable, either manually or otherwise, for the purpose of removing and releasing the bobbin.

In the arrangement shown in Fig. 1, cap 8 is of shallow dish form with the edge of its flange curled or rolled into a bead 10 to present a smooth periphery so that the rotating cap will not injure the hand if it is touched. The central disc-like body portion 11 is brazed, soldered or otherwise secured to a flange 12 of a hub 13 provided with a central through opening so that it may be sleeved over the spindle. To the upper end of the hub,—that which lies within the hollow dish cavity,—is applied a sleeve or thimble 14 having an upper inwardly extending flange 15. This sleeve is a press fit upon the upper hub extension 13*a* and when pushed home so that its lower end is next to the body wall 11, the upper flange 15 is spaced above the upper end of the hub, thus forming a cavity 16 within the thimble and between the hub and the flange 15 and surrounding the spindle 1. In this cavity I locate the automatic locking member or members. One of said members is shown in Figs. 2 and 3. It comprises a washer-like member or annulus 17 provided with a central opening, the edge of which may be somewhat undercut as at 18. Said annulus is unbalanced or unsymmetrical around the central axis in any suitable manner, such as by providing it at one side with an extension 19. In the arrangement shown in Fig. 1 two locking members are employed. They are superposed upon each other in such manner that the ring or washer-like annular portions of the two members lie on top of each other, and the edge extensions 19 of the two members are oppositely disposed, projecting out through slots or openings 20 located at diametrically opposite points in the wall of the thimble 14. With this arrangement, when the spindle is rotated, the unequal weighting of the washer locking members 17 around the central axis causes said members to fly out laterally by centrifugal force. The effect is for each of the two extensions 19 to move outwardly through its slot 20. This motion is taken advantage of to effect engagement between either or both of said locking members and corresponding shoulders on the spindle 1. The shoulders may be formed directly in the spindle itself, by cutting annular grooves therein, but in Fig. 1 the shoulders are provided by the attachment to the spindle of a sleeve 21, which is a driving fit on the spindle and which is annularly grooved externally to provide a series of annularly extending teeth or abutment shoulders 22. The spacing between successive teeth 22 is preferably made somewhat different from the spacing between the teeth of the two locking members 17, the purpose being to insure that one at least of the two members 17 actually engages beneath a shouldered abutment or tooth 22 to produce the locking effect. The bobbins 6 may vary slightly in length and if they become worn the caps 8 may seat in the open ends of the bobbins at different levels, so that a sufficient length of sleeve 21 is toothed to insure automatic locking engagement between the cap and spindle over a reasonable zone of variation in the usual varying factors.

With this construction the bobbin is applied to the lower head 4 and the cap 8 is applied to the bobbin, as before, the cap being pushed down to a firm seat in the open bobbin end. During application of the cap, the inclined lower faces 18 of the members 17 automatically center such members so that the cap is sleeved over the spindle without especial care or attention. With the parts all assembled and pushed home, rotation of the spindle is started and the locking members fly outwardly and either or both thereof accomplish an interlock with the spindle and retain the parts against any possible escape. When winding or unwinding of the bobbin is completed, the spindle is stopped and cap 8 is removed by pressing endwise upon the exposed extensions 19 to release the locking device and enable the cap to be removed.

Fig. 6 shows a modified form in which the locking members are of lever form. Two of them are shown, but any suitable number may be used. In this arrangement, the cap 8*a* is provided with two levers 25 hinged at 26 on axes which are horizontal in Fig. 6. The lower arms 27 of the levers lie beneath the disc-like wall of the cap and are provided with hooked or shouldered terminal portions 28 designed to engage beneath a shoulder on a collar or enlargement 29 of the driving spindle 1*a*. The upper arms of the levers lie within the dished like cavity of the cap and are provided at their upper ends with enlargements or weights 30.

This cap is used in the same way as the one before described, by sleeving it over the end of the spindle and pushing it down to its seat in the open end of the bobbin (not shown). During such applying motion the shouldered terminal portions 28 of the levers ride over the beveled inclined upper surface of the flange 29 and when the applying motion is completed the terminals 28 are beneath the shoulder of flange 29. Upon rotation of the spindle the weights 30 fly outwardly and move the terminals into position beneath the flange 29 as shown, thus locking the cap to the spindle by centrifugal effect. The cap is released when the spindle is at

rest by pressing inwardly on the weights 30 which form handles for the purpose.

What I claim is:

1. In combination, a driving spindle provided inwardly of its end with a head for receiving one end of a tubular bobbin telescoped over the spindle, a cap adapted for application to the free end portion of the spindle and into holding relation with the other end of a bobbin on said head, and movable means adapted upon rotation of the spindle to interconnect the free end portion of said spindle and said cap for retaining the latter upon the spindle.

2. A combination of the character described in claim 1, in which said movable means is actuated by centrifugal force and has a portion movable inwardly toward the central axis, for the purpose stated.

3. In combination, a driving spindle, a bobbin holding cap having a hub surrounding and adapted for detachable connection thereto, and centrifugally acting means carried by the hub and movable into engagement with the spindle for removably locking the cap to the spindle.

4. A cap for use with bobbin driving spindles, said cap comprising a body portion designed for application to a bobbin, a central hub adapted for application to a spindle, and means carried by said cap and actuated by centrifugal force and having portions thereby moved inwardly toward the central axis.

5. In combination, a bobbin driving spindle provided with a shoulder, a bobbin holding cap having a centrally perforated hub adapted to be sleeved over said spindle, said hub having a centrifugally acting locking device designed upon rotation of said spindle to move into releasable locking engagement with the spindle shoulder.

6. A locking cap for bobbins, comprising a disc-like body portion, a central hub connected thereto, and two locking devices carried by said cap and movable in opposite directions by centrifugal force when the same is rotated, each of said members having a portion designed to move inwardly toward the central axis for locking purposes.

7. A locking cap for bobbins, comprising a disc-like body portion, a central hub connected thereto, two locking devices carried by said cap and movable in opposite directions by centrifugal force when the same is rotated, each of said members having a portion designed to move inwardly toward the central axis for locking purpose, and a driving spindle adapted to receive said cap and provided with a series of longitudinally spaced shoulders for engagement by said locking members.

8. In a twister, a spindle having a blade, a cap mounted on the upper end of said blade, and having an axial opening to receive said blade, and centrifugally operated means effective to lock said cap to said blade during rotation of said spindle.

9. In a twister, a spindle having a blade, a cap mounted on the upper end of said blade and having an axial opening to receive said blade, and means carried by said cap and movable by centrifugal force into engagement with said blade to thereby lock said cap to said blade during rotation of said spindle.

In testimony whereof I hereby affix my signature.

LAVERN J. JORDAN.