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BOBBIN HANGER

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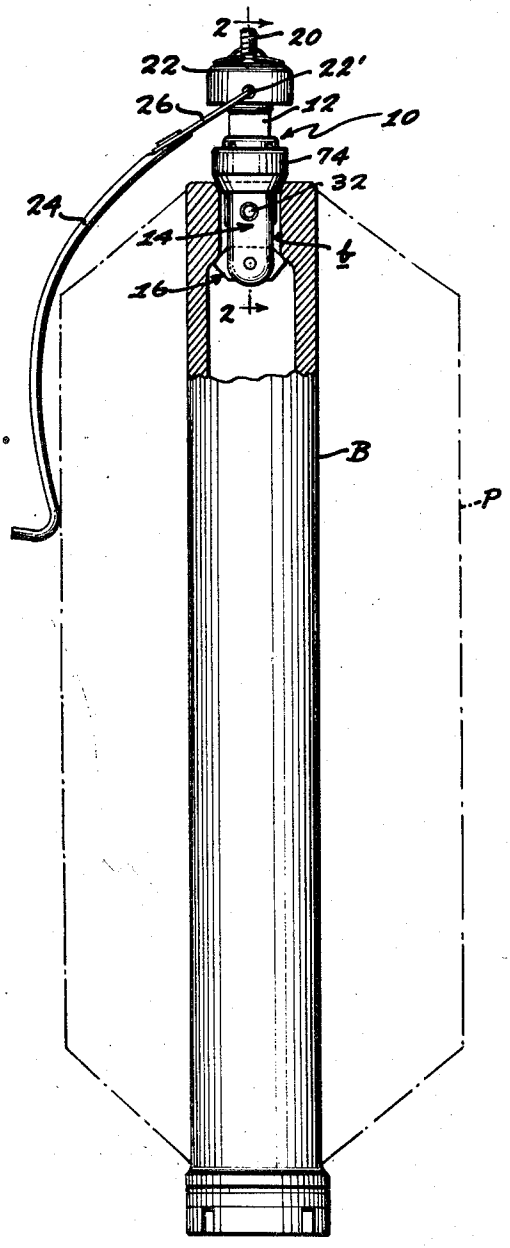


Fig. 1

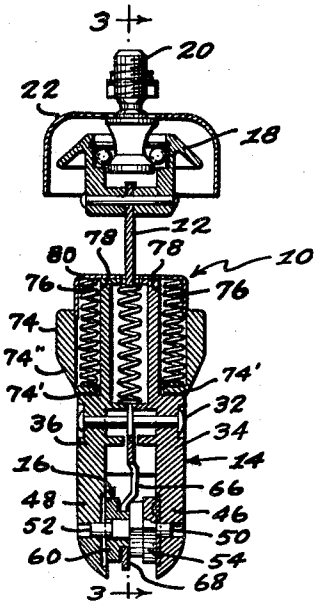


Fig. 2

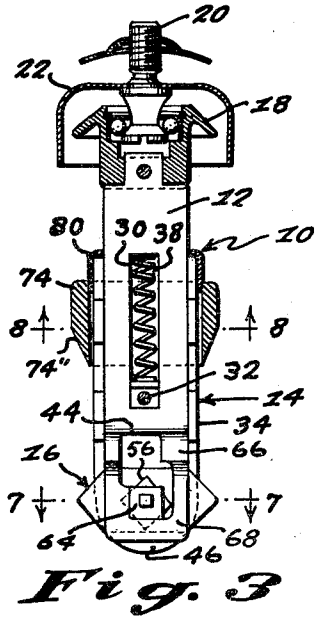


Fig. 3

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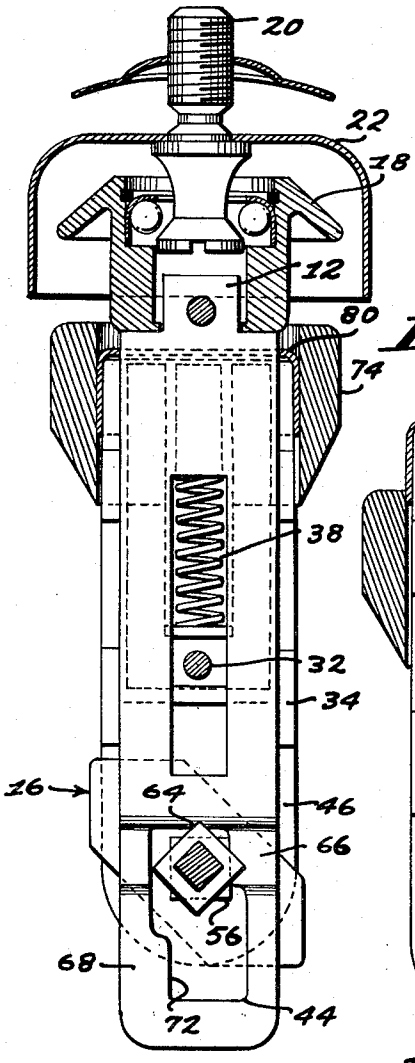


Fig. 4

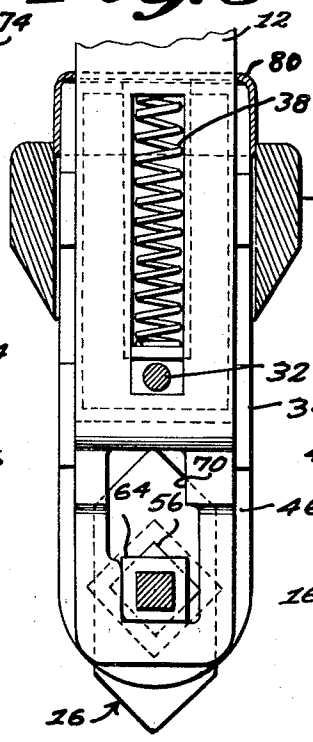


Fig. 5

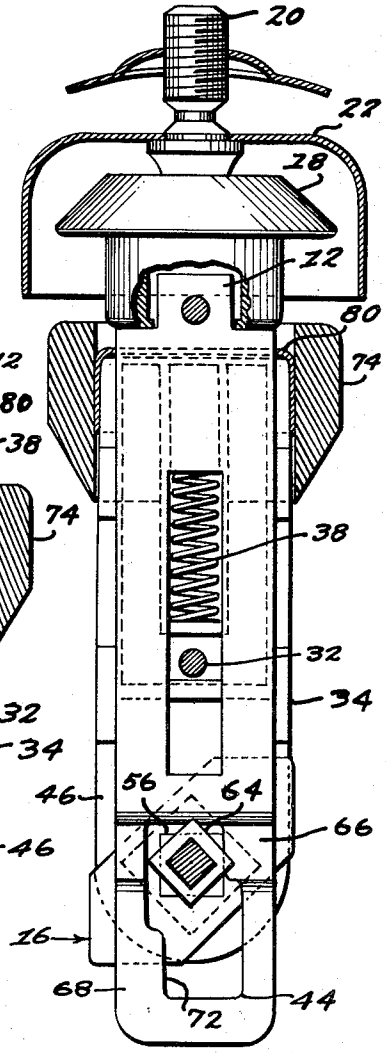


Fig. 6

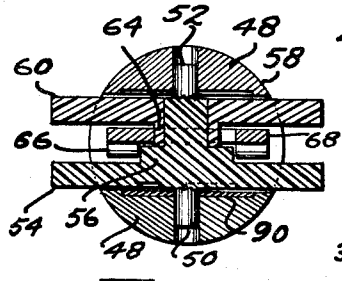


Fig. 7

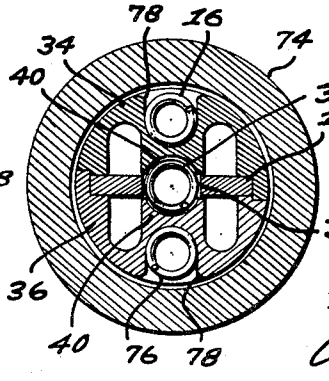


Fig. 8

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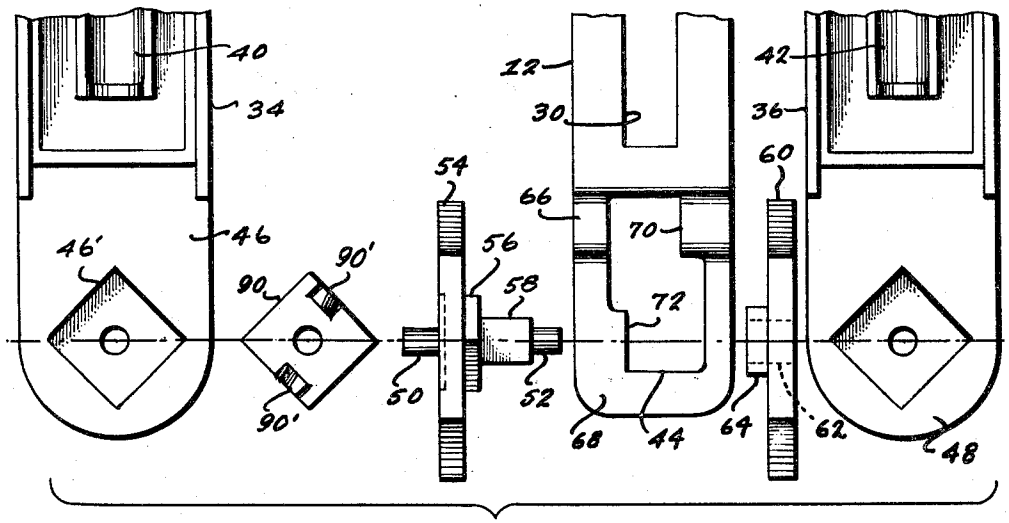


Fig. 9

Fig. 11



Fig. 10

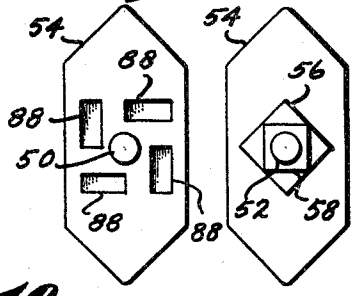


Fig. 12

Fig. 13

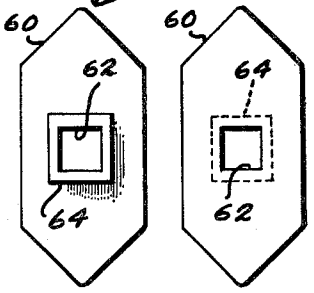
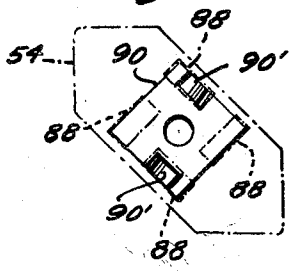


Fig. 14

Fig. 10a



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Fig. 15

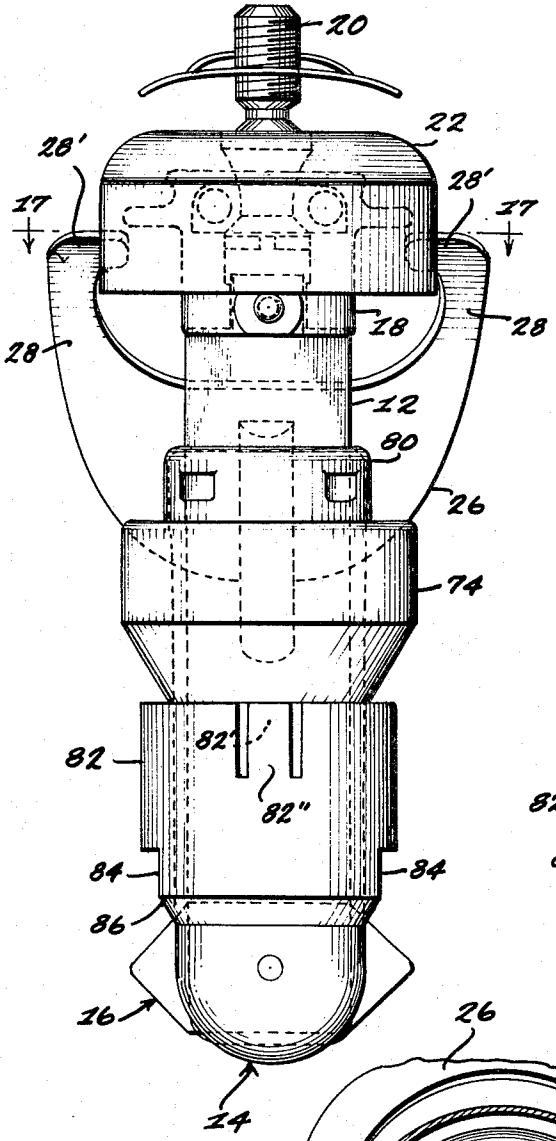


Fig. 16

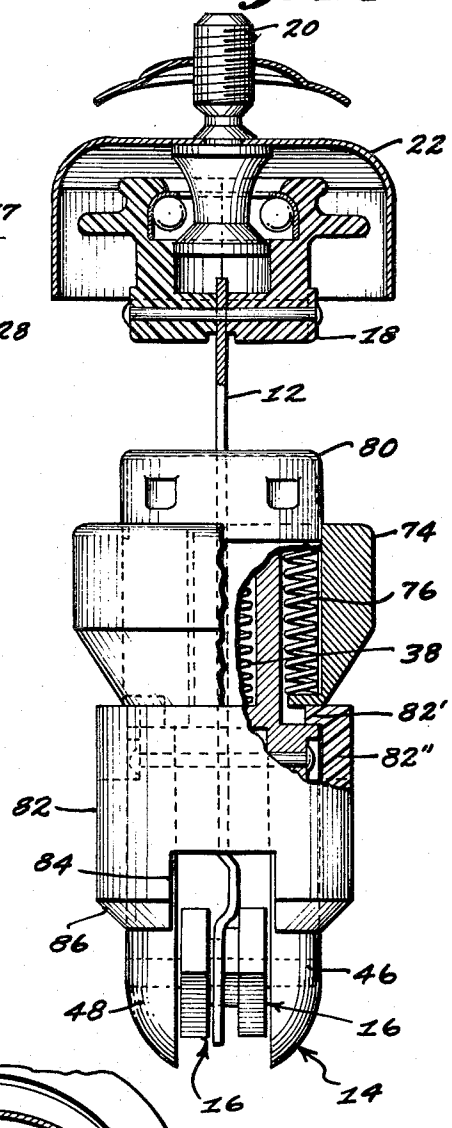
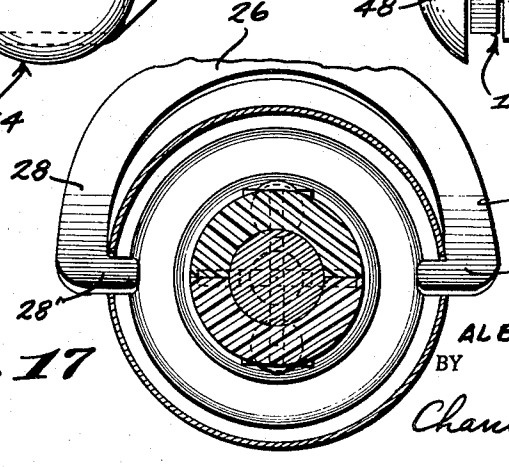


Fig. 17



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3,170,654

BOBBIN HANGER

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10 Claims. (Cl. 242—129.8)

This invention relates to bobbin hangers such as are used for overhead suspension of roving bobbins in spinning frame creel structure, and is concerned in particular with a uniquely simplified structural arrangement for a bobbin hanger of this sort.

Briefly described, the bobbin hanger of the present invention comprises a hanger leg fitted for depending suspension, a housing carried on this hanger leg for sliding manipulation along the depending axis thereof and shaped for penetrating the tip bore of a roving bobbin, and latching means carried by the housing for projection therefrom to lodge within a roving bobbin beneath the tip bore thereof and actuated through camming engagement with the hanger leg adjacent its depending end for alternate projection and retracttion with respect to the housing upon sliding manipulation of the housing on the hanger leg; all as described in further detail below in connection with the accompanying drawings, in which:

FIG. 1 is a side elevation of a bobbin hanger embodying the present invention, with a roving bobbin shown suspended thereon;

FIG. 2 is a vertical section taken substantially at the line 2—2 in FIG. 1;

FIG. 3 is a further vertical section taken substantially at the line 3—3 in FIG. 2;

FIG. 4 is an enlarged vertical section corresponding generally with FIG. 3, but showing the bobbin hanger structure manipulated for a quarter turn retracting actuation of the latching means;

FIG. 5 is a similarly enlarged, but fragmentary, vertical section showing the structure recovered from the FIG. 4 manipulation to complete the retracting actuation of the latching means;

FIG. 6 is a third correspondingly enlarged vertical section showing the bobbin hanger structure manipulated for a quarter turn projecting actuation of the latching means;

FIG. 7 is a horizontal section taken substantially at the line 7—7 in FIG. 3;

FIG. 8 is a further horizontal section taken substantially at the line 8—8 in FIG. 3;

FIG. 9 is an exploded illustration partly in plan and partly in side elevation to show the related form of the bobbin hanger elements at and adjacent the latching means;

FIG. 10 is a side elevation of the washer element shown in plan at the second position from the left in FIG. 9;

FIG. 10*a* is a further plan view of the FIG. 10 washer element corresponding with the FIG. 9 illustration, but having a related dotted line illustration of the FIG. 11 latch member applied thereto;

FIG. 11 is a left-hand plan view of the latch member shown in side elevation at the third position from the left in FIG. 9;

FIG. 12 is a right-hand plan view corresponding to FIG. 11;

FIG. 13 is a left-hand plan view of the latch member shown in side elevation at the fifth position from the left in FIG. 9;

FIG. 14 is a right-hand plan view corresponding to FIG. 13;

FIG. 15 is an enlarged side elevation of the FIG. 1 bobbin hanger shown with an adapter sleeve installed thereon according to the present invention, and with the

pivoted brake arm rotated 90° to illustrate its structure in further detail;

FIG. 16 is a generally corresponding side elevation, partly sectioned, as seen from the right in FIG. 15; and

FIG. 17 is a horizontal section taken substantially at the line 17—17 in FIG. 15.

Referring now in detail to the drawings, the illustrated bobbin hanger embodying the present invention, as designated generally by the reference numeral **10**, is seen in FIG. 1 at its active disposition for suspending a roving bobbin B such as is commonly employed to carry a roving supply package, as indicated at P, for creeling at a spinning frame.

As illustrated, the bobbin hanger **10** comprises a hanger leg **12** on which a housing **14** is carried that is shaped for penetrating the tip bore *b* (see FIG. 1) of the bobbin B, and that presents latching means **16** within the bobbin B for lodging beneath the tip bore *b*. The hanger leg **12** is fitted at its upper end for depending suspension from a bearing unit **18** (see FIGS. 2 and 3), which is assembled on a hanger stud **20** so as to maintain the hanger leg **12** free for rotation about its depending axis..

A dust cap or lint shield **22** is disposed on the hanger stud **20** about the bearing unit **18**, and this dust cap **22** is also employed to carry a brake arm **24** with a pivoted disposition for riding a roving package P carried by a supported bobbin B. The brake arm **24** is formed of a length of rod stock that is shaped suitably for riding the package P at its extending end, and that is attached at its other end by swedging or the like to a pivot yoke **26**. The pivot yoke **26** is formed from a flat plate and is proportioned (see FIGS. 1, 15 and 17) to provide rigid pivot leg portions **28** terminating at inwardly directed pivot ears **28'** that are disposed in diametrically opposed pivot apertures **22'** in the dust cap **22**. The shape of the dust cap **22** gives it an inherent flexibility allowing the ears **28'** to be snapped into place readily at the apertures **22'** upon initial assembly so as to provide an effectively disposed brake arm structure in an extremely simple manner.

The depending length of the hanger leg **12**, which is of flat strip form, has the housing **14** carried thereon for sliding manipulation lengthwise of its depending axis. For this purpose, the hanger leg **12** has an elongated axial slot **30** provided intermediate its length through which a housing assembly pin **32** extends for securing identical housing halves **34** and **36** in slidable relation about the leg **12**. The axial hanger leg slot **30** also serves to accommodate disposition of a bias spring **38** within interior positioning recesses **40** and **42** of the respective housing halves **34** and **36**, so that the housing **14** is always maintained under a yieldable bias toward the depending end of the hanger leg **12**.

Adjacent its depending end, the hanger leg **12** is additionally formed with a cam slot **44** through which the latching means **16** is operated, and the corresponding end portion of the housing **14** is formed as a clevis, by notching of the housing halves at **46** and **48** (compare FIGS. 2 and 9), to carry the latching means **16** for operation. The operating motion of the latching means **16** is one of stepwise rotation, and this rotation takes place about axial shaft elements **50** and **52** of a first latch member **54** that are journaled at the notched clevis portions **46** and **48** of the housing halves **34** and **36**.

The latch member **54** has a principal body portion that is shaped symmetrically with respect to its axis of rotation so as to assume alternate projected (FIG. 3) and retracted (FIG. 5) positions as the stepwise rotating motion takes place to dispose it respectively in transverse and aligned relation to the direction in which the housing **14** slides on the hanger leg **12**. One side of the latch member **54**

is positioned in closely spaced face to face relation with the inside face of the adjacent clevis portion 46 of housing 14, while the other side has a square hub portion 56 formed thereat with a contiguous shank portion 58 extending axially therefrom and terminating at the shaft element 52. This shank portion 58 is of square cross section and is shaped and positioned so that its projected outline is inscribed at 45° within the square outline of the hub portion 56 (see FIG. 12).

The latching means 16 also includes a second latch member 60 having a principal body portion that corresponds substantially with that of the first one 54, and that has an axial bore 62 of square cross section proportioned to fit the first latch member shank portion 58 (compare FIGS. 12 and 13) so as to provide for aligned assembly of the latch members 54 and 60. The second latch member 60, like the first one 54, has a square hub portion 64 at one side thereof which is aligned in relation to its axial bore 62 so that the respective hub portions 56 and 64 have a rotational phase difference of 45°, and the latch members 54 and 60 are assembled to dispose these hub portions 56 and 64 adjacently to serve as cam means in relation to the previously noted camming slot 44 provided in the hanger leg 12 (see FIGS. 2 and 3).

As arranged for operation in the housing 14, the latch members 54 and 60 are disposed respectively adjacent the inside faces of the clevis end portions 46 and 48, with the hanger leg 12 extending therebetween to present the camming slot 44 at the adjacent hub portions 56 and 64; the flat strip form of the hanger leg 12 being disposed transversely of the axis on which the latching means 16 rotates, and first and second lengthwise portions 66 and 68 along the camming slot 44 being offset laterally in opposite directions from the plane of the flat strip form for selectively riding the respective latch member hub portions 56 and 64.

At each of these laterally offset portions 66 and 68, the camming slot 44 is formed with transversely offset end portions that are characterized by respective opposite side edges 70 and 72 positioned to ride the latch member hub portions 56 and 64 alternately. These cam slot side edges 70 and 72 extend lengthwise of the hanger leg 12 and have a position such that a hub portion 56 or 64 disposed thereat will be ridden at a side face (compare FIGS. 3 and 4) and held against rotation. However, the extent of the side edges 70 and 72 is limited so as to leave an intermediate portion of the camming slot 44 in which the hub portions 56 and 64 are free to rotate, and as the side edges 70 and 72 act alternately on the hub portions 56 and 74, the result is a camming action that causes rotation of the latching means 16 in 45° steps each the housing 14 is shifted lengthwise of the hanger leg in either direction.

That is, assuming the latching means 16 to be at its projected position as seen in FIG. 3, upward shifting or sliding of housing 14 on hanger leg 12 results in raising the engaged hub portion 64 above the engaging cam slot side edge 72 so that it is freed for rotation. As this occurs, however, the other hub portion 56 has a side face thereof presented with an inclination of 45° at the extending end of the other cam slot side edge 70, so that further upward shifting requires this inclined side face to align itself at the side edge 70 and, in doing so, to cause a 45° rotation of the latching means 16 to the partially retracted position shown in FIG. 4.

A subsequent downward shifting of the housing 14 will return the hub portion 64 for camming at the initially considered side edge 62 so as to effect a further 45° step of rotation to retract the latching means 16 fully at the FIG. 5 position; and a repeated upward shifting will then partially project the latching means 16 by rotation through another 45° to the position illustrated in FIG. 6, after which a recovery of the housing 14 to its initial downwardly shifted position will result in returning the latching means 16 to its fully projected position that is illustrated in FIG. 6, after which a recovery of the housing 14 to its initial downwardly shifted position will result in returning the latching means 16 to its fully projected position that is illustrated in FIG. 3.

The upward shifting of the housing 14 to operate the latching means 16 in the foregoing manner takes place against the bias of the spring 38 that is provided to maintain the housing 14 normally positioned toward the hanger leg 12, and that serves to actuate a recovering downward shifting after each upward shifting. Actuation of the upward shifting is provided for through a collar member 74 that is carried on the housing 14 for limited relative sliding adjacent the housing end remote from the depending end of the hanger leg 12. This collar member 74 is biased away from the adjacent end of the housing 14, and has an extent of relative sliding such that it bears yieldably at the upper end of the bobbin tip bore *b* when the latching means 16 is lodged within the bobbin B as seen in FIG. 1, while being upwardly displaceable to afford clearance for retracting and projecting rotation of the latching means as indicated in FIGS. 4 and 6.

The bias on the collar member 74 is exerted by springs 76 disposed in elongated notches 78 extending lengthwise at the exterior surface of the housing 14 along the upper end portion thereof. A cap 80 is fixed over the upper ends of the housing halves 34 and 36 to contain the springs 76 in the notches 78, and the collar member 74 is formed with inwardly projecting lugs 74′ that ride in the notches 78 to receive the bias of the springs 76. The bias of the springs 76 is weaker than that of the spring 38 acting on housing 14, so that upward displacement of the collar member 74 to clear the latching means 16 for rotation will always occur before shifting of the housing 14 begins for actuating the rotation; although a sufficiently strong bias is still exerted through the springs 76 to maintain the collar member 74 bearing yieldably at the upper end of a bobbin tip bore *b* and thereby affording an advantageous gripping of an engaged bobbin B in the manner shown in FIG. 1. This gripping action of the collar member 74 not only stabilizes the disposition of a bobbin B on a bobbin hanger 10, but also maintains an effective centering action when the lower end portion of the collar member 74 is tapered, as at 74″ to enter the upper end of the tip bore *b* slightly.

The foregoing arrangement of the collar member 74 also lends itself nicely to the use of an auxiliary adapter sleeve, such as is shown at 82 in FIGS. 15 and 16, in instances where a differing or special type of bobbin structure requires modification of the hanger structure for proper engagement. Thus, the adapter sleeve 82 of FIGS. 14 and 16 is intended for use with a plastic bobbin (not shown) in which the bobbin wall is simply turned inwardly at the upper end of the bobbin so that a very short tip bore results. The adapter sleeve 82 serves in effect to extend the lower bearing face of the collar member 74 downwardly for effective disposition in relation to a shorter tip bore of this sort.

For this purpose, the adapter sleeve 82 is proportioned for sliding disposition on the housing 14 below the collar member 74, and has inwardly extending lugs or ears 82′ formed at its upper end to ride in the housing notches 78 beneath the collar member lugs 74′. The adapter sleeve 82 is preferably formed of a flexible plastic material, such as nylon, so that it may be slotted to dispose the ears 82′ at the end of finger portions 82″ having sufficient flexibility to allow snapping of the ears 82′ into place at the notches 78 as the sleeve 82 is installed on the housing 14. When an adapter sleeve 82 is used, the operation of the latching means 16 occurs exactly as it normally does; the sleeve 82 being formed with notches 84 at its lower end to the extent necessary for clearing the rotating motion of the latching means 16, and having its lower edge beveled or tapered, as at 86, to form a centering function as noted previously in connection with the collar member 74.

Whether used with an adapter sleeve 82 or not, a bobbin hanger 10 arranged according to the present invention

has a bobbin B or the like placed thereon in the same way; namely, by presenting the bobbin B so that the depending nose of the housing **14** is inserted in the tip bore *b* (with the latching means **16** in the retracted FIG. 5 position), then pressing upwardly to displace the collar member **74** and in turn the housing **14** to actuate a projecting rotation step of the latching means **16** to the FIG. 6 position, and finally releasing the upward pressure on the bobbin B to allow downward recovery of the hanger structure so that the latching means **16** is rotated through a further 45° step to its fully projected position to lodge within the bobbin B below the tip bore *b* and the collar member **74** assumes its downwardly bearing disposition at the upper end of the tip bore *b*, as appears in FIG. 1. To remove a bobbin B from a hanger **10**, the same steps are repeated to rotate the latching means **16** first to the FIG. 4 position through upward pressure on the bobbin B, and then to the fully retracted FIG. 5 position as the bobbin B is removed downwardly.

In this connection, it should also be noted that the latching means **16** is preferably arranged to guard against any possibility for reverse rotation from its partially retracted and projected FIG. 4 and 6 positions, by having the outside face of the first latch member **54** formed with a series of ratchet notches **88** about the axial shaft element **50** thereat (see FIG. 11), and by providing a spring washer **90** (see FIGS. 9 and 10) shaped for seating in a recess **46'** at the inside face of the adjacent housing clevis portion **46** and formed with arms **90'** struck outwardly therefrom to ride at the notches **88** as pawls positioned to engage against reverse rotation whenever the latching means **16** is inclined at 45°, as indicated in FIG. 10*a*.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined by the appended claims.

I claim:

1. A bobbin hanger comprising a hanger leg fitted for depending suspension, a housing carried on said hanger leg for sliding manipulation along the depending axis thereof, said housing being shaped for penetrating the tip bore of a roving bobbin, and latching means carried for rotation by said housing for projection therefrom to lodge within a roving bobbin beneath the tip bore thereof, said latching means being formed with cam means at the axis thereof and being engaged at said cam means by a camming slot in said hanger leg adjacent the depending end thereof and being actuated through this engagement for alternate projection and retraction with respect to said housing upon sliding manipulation of said housing on said hanger leg.

2. A bobbin hanger as defined in claim 1 and further characterized in that said cam means is formed by a pair of square hub portions related 45° out of phase, and said camming slot is shaped for acting on one of said hub portions upon sliding manipulation of said housing in one direction on said hanger leg and upon the other hub portion upon sliding in the other direction.

3. A bobbin hanger as defined in claim 1 and further characterized in that said housing has an end portion formed as a clevis for carrying said latching means rotatably thereon adjacent said depending hanger leg end, in that said latching means incorporates a pair of aligned latch members proportioned for alternate projection and retraction with respect to said housing as said latching means is rotated to dispose said members respectively in transverse and aligned relation with the direction in which said housing slides on said hanger leg, in that said aligned latch members each have a square hub portion formed thereon with a disposition that is 45° out of phase with the other, and in that said hanger leg is slotted adjacent said depending end for riding said hub portions selectively in camming relation to cause rotation of said latch members.

4. A bobbin hanger as defined in claim 3 and further characterized in that said latch members have side faces that are disposed in face to face relation at the respective inside faces of the clevis arms of said housing end portion, in that the side face of one of said latch members is formed with ratchet notches in relation to the axis on which said latching means rotates, and in that the adjacent clevis arm face is recessed to receive and position a spring washer disposed thereat with arms struck outwardly therefrom to ride at said notches as a pawl for preventing reverse rotation of said latch members.

5. A bobbin hanger comprising a hanger leg fitted for depending suspension, a housing carried on hand hanger leg for sliding manipulation along the depending axis thereof, said housing being shaped for penetrating the tip bore of a roving bobbin and being formed as a clevis at the end portion thereof adjacent the depending end of said hanger leg, latching means carried rotatably within the clevis end portion of said housing for projection therefrom to lodge within a roving bobbin beneath the tip bore thereof, cam means formed at the axis of rotation of said latching means, and a camming slot formed in said hanger leg adjacent the depending end thereof for riding said cam means to cause rotation of said latching means for alternate projection and retraction thereof with respect to said housing upon sliding manipulation of said housing on said hanger leg.

6. A bobbin hanger as defined in claim 5 and further characterized in that said cam means is formed by a pair of square hub portions that are disposed adjacently with a rotational phase difference of 45°, and in that said camming slot extends along the depending axis of said hanger leg with end portions offset to act selectively and alternately on said hub portions at opposite ends of an intermediate slot portion in which said hub portions are free to rotate, the offset end portions acting in each instance on a hub portion that is slanted at 45° when presented thereat.

7. A bobbin hanger as defined in claim 5 and further characterized in that said hanger leg has a flat strip form, and in that said latching means comprises first and second latch members, the first latch member being formed with axial shaft elements extending from each side thereof and journaled in said clevis end portion of said housing, one of said axial shaft elements having a first square hub portion formed thereon at the adjacent side of said first latch member and a contiguous shank portion of square cross section that is shaped and positioned so that its projected outline is inscribed at 45° within the square outline of said hub portion, the second latch member having an aligned axial bore of square cross section fitting said shank portion and being disposed thereon with a second square hub portion aligned at the adjacent side of said second latch member and disposed adjacent said first hub portion, whereby said hub portions have a rotational phase difference of 45° and form the cam means of said latching means, the flat strip form of said hanger leg being disposed with the depending end portion thereof extending between said latch members transversely of the axis on which said members rotate and having first and second lengthwise portions at the camming slot therein offset laterally in opposite directions from the plane of said flat strip form for respectively riding said first and second hub portions, and the camming slot in said hanger leg being formed lengthwise thereof with an intermediate portion in which said hub portions are free to rotate and with opposite end portions at said first and second laterally offset leg portions having a cam shape in which the respectively ridden hub portion is held against rotation and by which said latch members are rotated 45° each time said hub portions are shifted betwen said end portions by sliding manipulation of said housing on said hanger leg.

8. A bobbin hanger as defined in claim 5 and further characterized in that said housing is yieldably biased on said hanger leg toward the depending end thereof, and a

collar member is carried on said housing for limited relative sliding movement adjacent the end thereof remote from said depending hanger leg end, said collar member being yieldably biased away from said adjacent end at a weaker bias than that acting on said housing, and the extent of said relative sliding movement being such as to allow said collar member to bear yieldably at the upper end of the bobbin tip bore when said latching means is lodged within said bobbin, while providing for displacement of said collar member against the bias thereon to afford clearance for retracting and projecting rotation of said latching means.

9. A bobbin hanger as defined in claim 8 and further characterized in that said housing has at least one elongated notch extending lengthwise at the exterior surface thereof for determining the extent of relative sliding movement of said collar member thereon, said collar member having an inwardly projecting lug riding in said notch against which said collar member bias is applied, and in that a removable adapter sleeve is disposed on said housing beneath said collar member with a positioning projection likewise riding in said notch.

10. A bobbin hanger as defined in claim 5 and further characterized in that said hanger leg is fitted for depending suspension by means of a bearing unit attached at the suspended end thereof, said bearing unit being assembled with a mounting bolt projecting therefrom for hanging said hanger leg rotatably about its depending axis, a dust cap having the shape and disposition of an inverted cup being placed over said bearing unit about said bolt, and a brake arm being pivoted from said dust cap to ride a roving package carried by a bobbin installed on said bobbin hanger, said brake arm incorporating a pivot yoke formed from a flat plate and proportioned to provide rigid pivot legs terminating at inwardly directed pivot ears extending through diametrically opposed pivot apertures in said dust cap.

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