May 13, 1947. R. K. HOHMANN 2,420,536

BOBBIN HOLDER POSITIONING AND EXTRACTING DEVICE

Filed Jan. 15, 1945

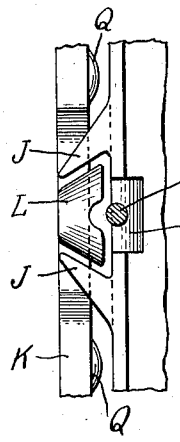


Fig. 3.

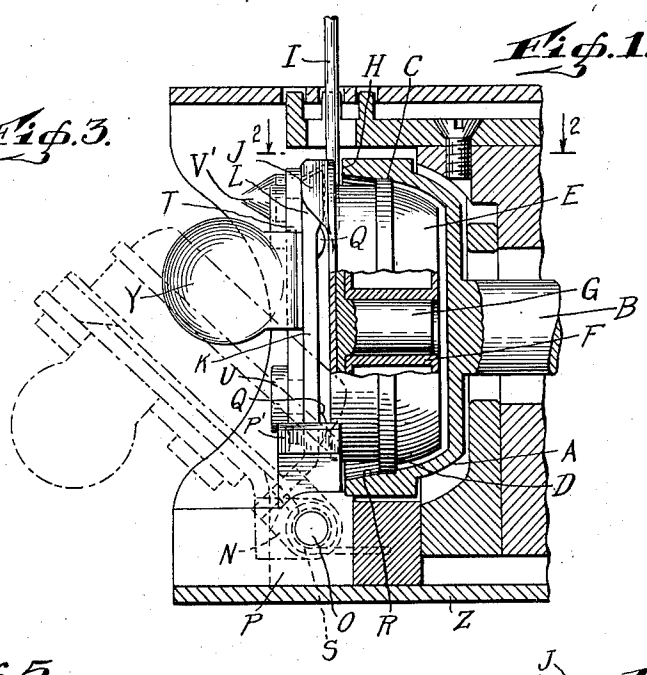


Fig. 1.

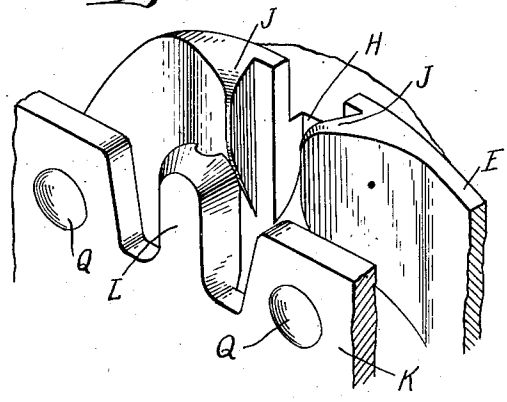


Fig. 5.

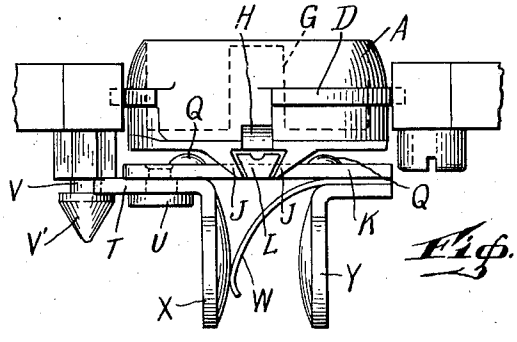


Fig. 2.

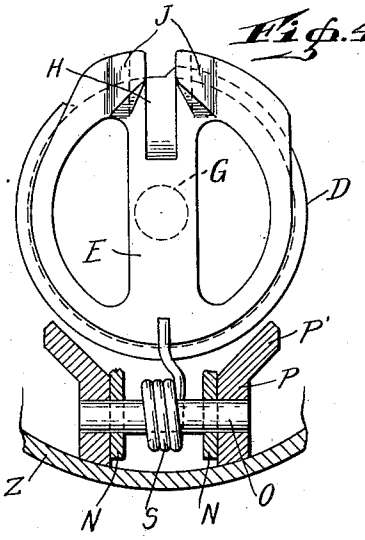


Fig. 4.

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Patented May 13, 1947

2,420,536

UNITED STATES PATENT OFFICE

2,420,536

BOBBIN HOLDER POSITIONING AND EXTRACTING DEVICE

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Application January 15, 1945, Serial No. 572,932

4 Claims. (Cl. 112—181)

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The present invention relates to a sewing machine mechanism of the type comprising a rotary hook or loop taker, revolving or oscillating about an axis and formed with a chamber adapted to receive a bobbin case holder, and with a raceway to receive a guide rib portion of the bobbin holder. In the normal operating condition of the mechanism, the bobbin holder is held in said raceway and is prevented from sharing the rotative movements of the hook.

The general object of the present invention is to provide improved means characterized by their simplicity and effectiveness and means operative to prevent the bobbin casing from rotating or moving out of operative relation with the hook in the normal operative condition of the mechanism, and operative to move the bobbin holder out of the loop taker as well as to guide the movement of the bobbin holder into the loop taker, when occasion arises for the withdrawal of the bobbin holder from, or its insertion in the loop taker.

In what I now regard as the preferred practical form of the invention, my novel bobbin holder positioning and extracting device comprises a member detachably connected to the bobbin holder and mounted in the mechanism framework for movement between one position in which it maintains the bobbin holder in its normal operative relation to the loop taker, and a second position in which it holds the bobbin holder out of the loop taker and in a position to be readily grasped and removed by the operator for bobbin replacement or other purposes. The detachable connection between said member and the bobbin holder is a loose dovetail joint connection comprising an undercut slot formed in one, and a cooperating tenon formed on the other of the connected elements.

The present invention may be embodied with advantage in all forms of rotatable loop taker sewing machines, but special advantages are obtainable with the invention when incorporated in a sewing machine of the so called cylinder arm type. In such case, my novel positioning and extracting device is preferably arranged to move the bobbin holder between an operative position within the cylinder arm and a second position in which a graspable portion, at least, of the bobbin holder is outside of the cylinder arm.

The various features of novelty which characterize my invention are pointed out with particularity in the the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, its advantages, and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described preferred embodiments of the invention.

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Of the drawings:

Fig. 1 is a sectional elevation;

Fig. 2 is a partial section on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged reproduction of parts shown in Fig. 2;

Fig. 4 is an end elevation of a bobbin holder and associated retainer parts partly broken away and in section; and

Fig. 5 is a perspective view of portions of a bobbin holder and retaining element.

In the embodiment of the invention shown by way of example in the drawings, A represents the hook member or loop taker, and B the hook shaft, of a rotary hook sewing machine. The loop taker A is cup shaped and formed with an internal raceway C for the peripheral guide rib D, of a bobbin holder E, which is movable into and out of the member A through the open front end of the latter. In the normal operating condition of the parts, shown in full lines in Fig. 1, the guide rib D has its peripheral edge surrounded by a cylindrical portion of the raceway C, and has its radially extending rear side bearing against an annular, radially extending portion of said raceway. The bobbin holder is open at its rear side, as shown in Fig. 1, for insertion and removal of a bobbin F which, as shown in Fig. 1, is journalled on a central post or stud portion G of the bobbin holder. The bobbin holder E is cut away to provide a groove H loosely receiving the lower portion of the cooperating needle I, when the latter extends through the work as shown in Fig. 1. Projections J are formed on the front end wall of the bobbin holder at the opposite sides of the groove H and adjacent the periphery of the holder. In respect to the features just described, the hook, bobbin holder and bobbin parts shown are of conventional form, and embody nothing claimed as novel herein.

In accordance with the present invention, the adjacent edges or side walls of the projections J are undercut to collectively form the oppositely inclined, or undercut, side walls of the groove or socket portion of a loose dovetail joint connection between the bobbin holder E and a bobbin holder positioning and extracting element K. The latter includes a tongue portion L having oppositely inclined side edges and forming the tenon portion of the dovetail joint connection. The

member K is mounted in the sewing machine frame for movement between a normal operating position in which it holds the bobbin holder E in the hook raceway C, and prevents it from sharing the rotative movement of the loop taker, and a second position in which the bobbin holder E is extracted from the hook cavity and may be separated from the member K by movement relative to the latter in the direction of the length of the tongue or tenon L.

The member K may be formed and mounted in various ways. In the desirable form shown in the drawings, the member K is hinged to the instrument framework to turn between its positions shown in full and dotted lines in Fig. 1. The hinge connection comprises spaced apart apertured ears N integrally connected, and transverse, to the plate-like body portion of the member K. A hinge pintle O is mounted in bracket portions P of the sewing machine framework and extends through apertures in the ear portions N. As shown, the body portion of the member K is formed at its bobbin holder side with projections Q shaped and disposed to collectively prevent objectionable movement of the bobbin holder relative to the raceway C in the hook A, although the projections are normally displaced from the corresponding portions of the front end surface of the bobbin holder by the few thousandths of an inch needed to permit the ready movement of the needle thread loop around the bobbin holder in the course of which the thread must pass between the member K and bobbin holder E. The loose mounting of the tenon L in the undercut slot formed by the projections J, provides the clearance space required for the movement of the thread loop between said tenon and projections.

The tenon L extends transversely of the pintle O and when the member K is in its position shown in dotted lines in Fig. 1, the bobbin holder may be removed or put in place by a corresponding movement in the direction of the length of the tenon L. Such movement of the bobbin holder has the effect of respectively removing the tenon from or inserting it into the lower end of the undercut slot between the projections J. With the parts in position shown in dotted lines in Fig. 1, the bobbin holder is engaged and supported by the oppositely inclined, diverging upper end portions P' of the bracket parts P. As is plainly shown in Fig. 4, the said parts P' form a cradle-like support adapted to support the bobbin holder when the parts are in positions shown in dotted lines in Fig. 1. As the member K is turned from its dotted line position into its full line position shown in Fig. 1, the lower portion of the bobbin holder rib D is moved over the conical internal rim surface R of the hook and into the raceway C. In the final portion of the movement of the member K into its vertical position, the rib D is displaced upwardly from the parts P' as is shown in Fig. 4.

As shown, the member K is biased for movement from its full line position into its dotted line position by a spring S. The latter has its body portion coiled loosely about the pintle O, and has one end portion anchored in the sewing machine framework and has its other end portion connected to the member K.

The member K is normally held in its vertical position by latching means, which in the form shown in Figs. 1 and 2 comprises a latch member T. The member T has its lower end pivotally connected to the member K by a pivot U and has

its other end shaped to engage a latch pin V secured to the framework back of the latch pin head V'. The latch member T is biased for movement into latching engagement with the pin V by a curved spring W. The latter has one end secured to the member K and has its other end bearing against a finger piece extension X of the latch member T. A cooperating finger piece Y is rigidly secured to the member K. Finger pressure moving the finger piece X toward the finger piece Y, moves the latch member T out of engagement with the latch pin V. As the parts are moved from their dotted line position into their full line position shown in Fig. 1, the conical head V' of the pivot V cams the latch member T to the right, as seen in Fig. 2, until the member K turns into its vertical position, whereupon the spring W moves the latch member T into engagement with the latch pin V.

The bobbin holder positioning and extracting device shown and described is adapted for use in different types and kinds of sewing machines, but special advantages are obtainable, however, by mounting said device in a sewing machine in which the hook is mounted in such a tubular work support Z as is shown in Fig. 1. Such a work support, commonly called a "cylinder arm," is used in machines, such as sock darners, in which the work pieces operated on are of a tubular character and may be pulled over the free end of the cylinder arm. In such machines, the diameter of the cylinder arm is customarily made as small as is practically feasible and heretofore the provision of suitable accessibility for bobbin replacements and bobbin holder adjustments has presented difficulties. With the use of the present invention, however, the member K may be arranged as shown in Fig. 1 to turn from a position in which it is wholly within the cylinder arm Z as shown in full lines, into its dotted line position. In that position the major portion of the member K is outside of the cylinder arm, as is the upper portion, at least, of the bobbin holder. In consequence, the latter may be readily grasped by the hand of the operator for movement in the direction of the length of the tenon L away from the member K and cylinder arm Z. Thereafter the bobbin holder may be replaced by moving it into the position in which the projections J are at opposite sides of the tenon L, and then allowing the bobbin holder to move along the member K under the action of gravity into engagement with the bracket parts P'.

As will be apparent from Figs. 1 and 2, the tenon L and undercut slot forming walls of part J are proportioned and arranged to form a loose dovetail joint connection with clearance spaces between the tenon and the parts J which permit the loop forming needle thread to pass readily between the tenon L and associated slot walls in the loop forming operation. The clearance space between the projections Q of the member K and the adjacent portions of the bobbin holder permit ready movement of the thread loop between said projections and the bobbin holder.

While in accordance with the provisions of the statutes, I have illustrated and described the best forms of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the forms of the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims, and that in some cases certain features of my invention may be used to ad-

vantage without a corresponding use of other features.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a sewing machine mechanism, the combination with a loop taker turning about an axis and formed with a bobbin holder chamber open at one end, of a bobbin holder, a bobbin holder positioning and extracting member movable toward and away from said loop taker and connection means comprising cooperating portions of said member and bobbin holder having abutting surfaces through which movement of said member toward said loop taker moves said bobbin holder into said chamber, and having other surfaces which extend into overlapping relation across a plane parallel to said axis through which movement of said member away from said loop taker moves said bobbin holder out of said chamber.

2. In a sewing machine mechanism, the combination with a loop taker turning about an axis and formed with a bobbin holder chamber open at one end, of a bobbin holder, a bobbin holder positioning and extracting member movable toward and away from said loop taker and connection means comprising cooperating portions of said member and bobbin holder through which movements of said member toward and away from said loop taker move said bobbin holder into and out of said chamber, said cooperating portions including a tenon, and walls undercut to form a slot in which said tenon is loosely received, said tenon and slot walls cooperating to provide a loose dovetail joint connection between the member and bobbin holder.

3. In a sewing machine mechanism, the combination with a hollow, work supporting, cylinder arm open at one end, of a loop taker within said arm and turning about an axis extending longitudinally of said arm and formed with a bobbin holder chamber open at its end adjacent the said open end of said arm, a bobbin holder, a bobbin holder positioning and extracting member, a

hinge connection between said member and cylinder arm with its hinge axis transverse to the first mentioned axis and at one side of chamber and adjacent the open end of said arm and means comprising interlocking portions of said member and holder which extend into overlapping relation across a plane parallel to the first mentioned axis and connect said holder to said member, whereby turning movement of said member is adapted to move said bobbin holder between a normal position within said chamber and a second position in which a portion, at least, of said bobbin holder is out of said cylinder arm.

4. In a sewing machine mechanism, the combination with a loop taker turning about an axis and formed with a chamber open at one end and having an internal raceway and a bobbin holder movable into and out of said chamber and seated in said raceway when in said chamber, of a bobbin holder positioning and extracting member detachably connected to said bobbin holder and movable between one position and a second position, said holder and member being formed with surfaces inclined to said axis which extend into overlapping relation across a plane parallel to said axis and provide a loose dovetail joint connection between said member and bobbin holder, whereby said member is adapted when in said one position to hold said bobbin holder in said raceway and prevent it from sharing the turning movement of the loop taker, and is adapted when in said second position to hold said bobbin holder out of said raceway and part way, at least, out of said chamber so that the bobbin holder may then be detached from said member.

RICHARD K. HOHMANN.

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