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G. GOEBEL ET AL
 THREAD CONTROLLING DEVICE FOR LOCK STITCH
 SEWING MACHINE LOOP TAKER

3,155,061

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2 Sheets-Sheet 1

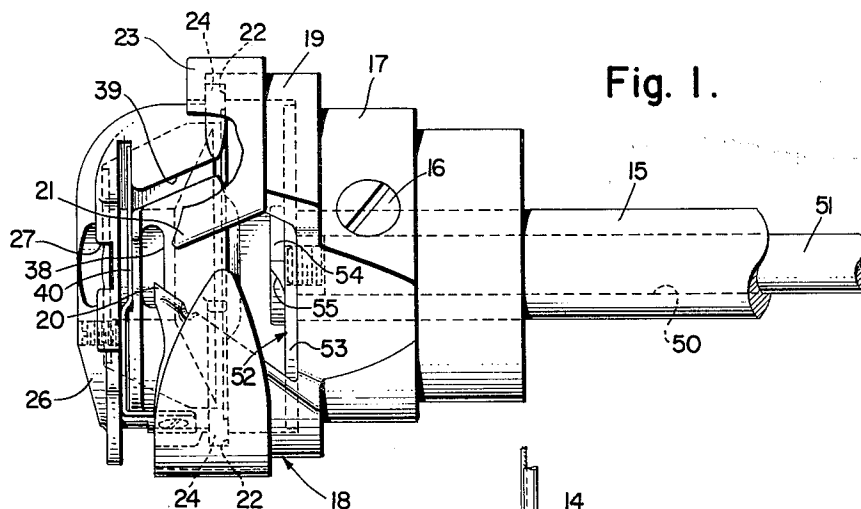


Fig. 1.

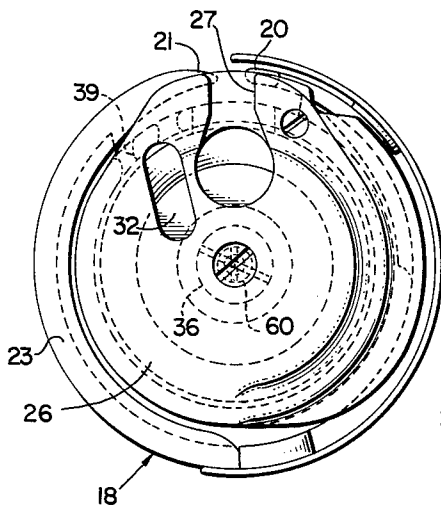


Fig. 2.

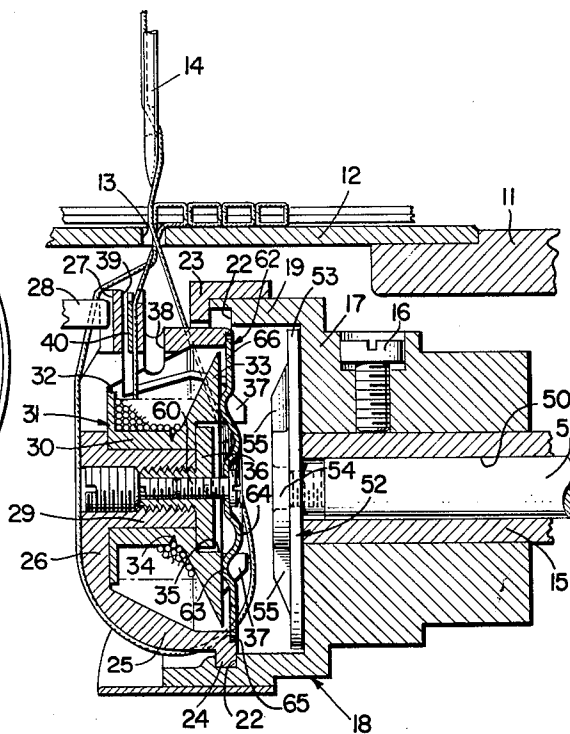


Fig. 3.

WITNESS

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Fig. 4.

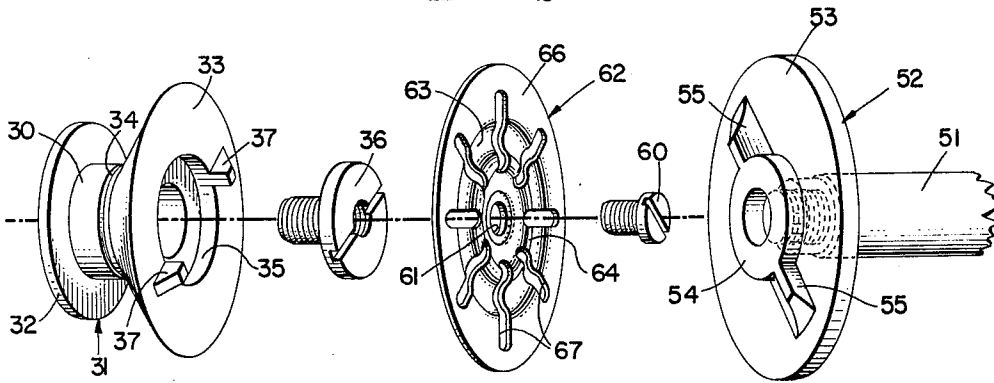
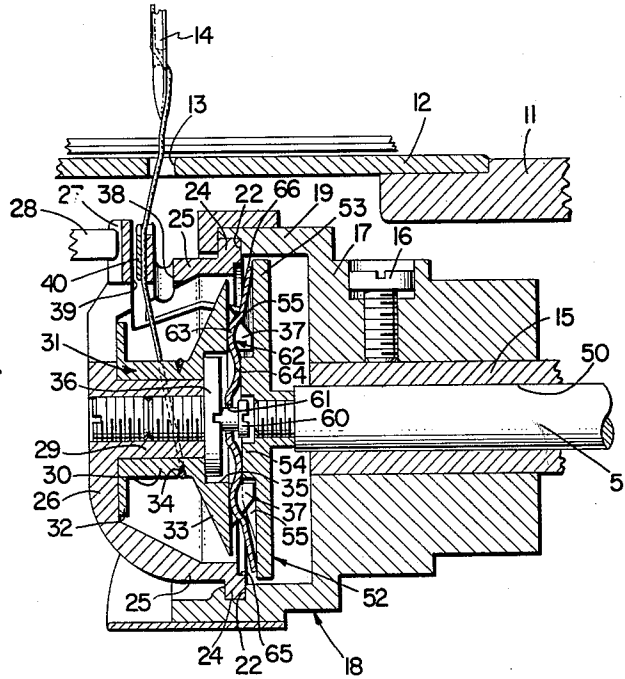


Fig. 5.

WITNESS

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THREAD CONTROLLING DEVICE FOR LOCK STITCH SEWING MACHINE LOOP TAKER

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6 Claims. (Cl. 112—181)

This invention relates to lock stitch sewing machines, and more particularly, to lock stitch sewing machine loop takers of the type in which the bobbin thread supply may be replenished in place in the loop taker.

It is an object of this invention to provide a novel and effective means for controlling the thread loop seized by the loop taker so that it is either cast completely about the bobbin without the possibility of admission thereto during sewing, or moved onto said bobbin with the utmost of certainty upon initiation of bobbin thread replenishment.

A further object of this invention is to provide a device for controlling the path of travel of needle thread loops relatively to a loop taker of a lock stitch machine, which controlling device also resists turning of the bobbin during sewing to prevent overspinning of the bobbin.

A still further object of this invention is to provide a needle thread path controlling device for a lock stitch sewing machine loop taker which is compact, simple in operation and can not in any way interfere with the operation of either the sewing instrumentalities nor the bobbin thread replenishing instrumentalities.

With the above and other object and advantages in view, this invention is hereafter described as applied in the preferred embodiment illustrated in the drawings in which:

FIG. 1 represents a top plan view of a loop taker of a lock stitch sewing machine having this invention applied thereto.

FIG. 2 represents a front elevational view of the loop taker of FIG. 1.

FIGS. 3 and 4 are vertical cross sectional views taken axially of the loop taker of FIG. 1 and including fragments of a sewing machine work support, bobbin case rotation retaining means, needle, and sewing thread. FIG. 3 illustrates the relative position of parts during sewing; and FIG. 4, the relative position of parts during bobbin thread replenishment, and

FIG. 5 represents an exploded perspective view of the bobbin, bobbin winding member, and the thread controlling disk of this invention.

The loop taker of this invention is of the type in which a thread, for instance the needle thread, may be replenished on the bobbin in place in the loop taker. FIG. 4 illustrates the loop taker with the parts in a position for bobbin thread replenishment. The loop taker may also be rendered effective to sew lock stitches using the thread replenished on the bobbin as a locking thread. FIG. 3 illustrates the loop taker with the parts in a position for sewing.

While the mechanisms for controlling and actuating the bobbin thread replenishing functions do not form a direct part of this invention, the United States patent of Ketterer et al. #3,063,392, November 13, 1962 may be referred to for a detailed disclosure of such controlling and actuating mechanisms.

In the drawings, 11 indicates a sewing machine bed fitted with a throat plate 12 apertured, as at 13, for penetration by a sewing machine needle 14. Made fast on a rotary shaft 15 beneath the bed by a fastening screw 16 is the body portion 17 of a loop taker indicated generally as 18. The loop taker body portion includes a cup shaped extremity formed by an annular sidewall 19 formed as illustrated in FIGS. 1 and 2 with a cup seizing beak 20

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and a loop detaining tail 21. The side wall 19 is formed with an internal annular bearing raceway 22. The raceway 22 is in part formed completely in the sidewall 19 and in part completed by a removable gib 23.

Journalled in the bearing raceway 22 is a bearing rib 24 formed on the rim 25 of a cup shaped bobbin case 26, the removable gib 23 providing for insertion of the bearing rib 24. A notch 27 formed in the bobbin case loosely accommodates a rotation restraining finger 28 which is fixed relatively to the bed 11 to prevent the bobbin case from turning with the loop taker body portion.

The bobbin case 26 includes a central stud 29 on which the hub portion 30 of a thread carrying bobbin 31 is freely journaled. The bobbin also includes a small plain flange 32 and a larger conical flange 33 between which thread is adapted to be wound. The hub of the bobbin may be formed with a V shaped annular notch 34 adapted to catch or snub a thread on the bobbin during thread replenishment. The conical flange 33 of the bobbin is preferably formed with a counterbore 35 accommodating the head of a screw 36 threaded in the stud 29 and serving to hold the bobbin in place. The conical flange 33 is also formed with a pair of driven lugs 37 by which the bobbin may be turned during thread replenishment. The bobbin case rim 25 is formed with a needle clearance aperture 38 and with an L shaped thread passageway 39 leading from the edge of the rim 25 to a bobbin thread tensioning spring 40 bearing against one side of the passageway 39.

The rotary shaft 15 to which the loop taker 18 is secured is provided with an axial bore 50 in which a rod 51 is axially slidable. Secured to the rod 51 within the sidewalls 19 of the loop taker body portion and between the loop taker and the bobbin case 26 is a thread replenishing member 52 which includes an annular flange 53 an annular abutment ring 54 projecting forwardly from the flange 53 toward the bobbin case, and a pair of radial bobbin driving lugs 55 extending outwardly from the abutment ring 54 along the flange 53.

The screw 36 which constrains the bobbin 31 on the stud 29 is preferably drilled and tapped to receive a headed fastening screw member 60. The fastening member 60 passes through a central aperture 61 in a flexible annular disk 62 preferably formed of spring metal. The annular disk is formed with annular corrugations preferably two in number of which the corrugation 63 of largest diameter is offset toward the bobbin case and the corrugation of least diameter 64 is offset toward the loop taker body portion 17. The fastening screw 60 is adjusted so as to hold the annular disk 62 with the corrugation 63 bearing against the bobbin flange 33 and with the periphery 66 of the annular disk 62 disposed in an annular seat 65 formed internally in bobbin case rim 25. The fastening screw 60 preferably is adjusted to urge the disk corrugation 63 against the bobbin with sufficient pressure as to apply frictional resistance to turning of the bobbin during the sewing operations when the parts occupy the positions illustrated in FIG. 3, thus to prevent overspinning of the bobbin during sewing. A plurality of radial slots 67 formed in the disk provide accommodation for the driven lugs 37 of the bobbin when the disk is assembled on the bobbin case.

The disk 62 in its stable condition, as illustrated in FIG. 3, occurs with the disk periphery disposed in engagement with the bobbin case rim 25 on the seat 65 thereof and thus the disk seals off the cup shaped bobbin case and provides a positive barrier preventing thread loops which are being manipulated by the loop taker beak 20 from entering the bobbin case or being directed onto the bobbin.

When the thread replenishing member 52 is shifted axially of the loop taker toward the bobbin case, how-

ever, the abutment ring 54 will contact the corrugation 64 of the disk 62 and as illustrated in FIG. 4, the corrugation 63 bearing against the bobbin flange 33 will act as a fulcrum so as to cause the periphery 66 of the disk 62 to snap out of the annular seat 65 of the bobbin case rim and to move to a position against the flange 53 of the thread replenishing member. The disk 62 will thus during bobbin thread replenishment not only open a clear path to the bobbin for admittance of thread thereto but in bearing against the flange 53 of the thread replenishing member 52 it will provide a positive barrier to the free passage of a loop of thread about the bobbin case as the thread loop is being manipulated by the loop taker beak.

It will be appreciated that the disk 62 need not necessarily be corrugated and that the disk 62 might bear against the screw 36 or the stud 29 as a fulcrum for its snap open action rather than against the bobbin flange. The added advantage of the engagement of the disk 62 with the bobbin flange resides in the control of over-spinning.

Having set forth the nature of this invention what we claim herein is:

1. A loop taker for a lock stitch sewing machine having a circularly moving body portion formed with an annular bearing raceway, a cup-shaped bobbin case having a rim formed with an annular bearing surface complementary to said body portion bearing raceway, a thread carrying bobbin journaled within said cup-shaped bobbin case, a thread replenishing member disposed between said loop taker body portion and said bobbin case, means shiftably supporting said thread replenishing member axially of said loop taker toward and away from said bobbin case, a thread path controlling disk, means supporting said thread path controlling disk relatively to said bobbin case with the periphery of said disk seated against said bobbin case rim to prevent admission onto said bobbin of a thread loop being manipulated by said loop taker, and means on said thread replenishing member for effecting a deformation of said disk and a shift of said disk periphery into spaced relation from said bobbin case rim when said thread replenishing member is shifted toward said bobbin case so as to direct a thread loop being manipulated by said loop taker onto said bobbin.

2. A loop taker for a lock stitch sewing machine having a circularly moving body portion formed with an annular bearing raceway, a cup-shaped bobbin case having a rim formed with an annular bearing surface complementary to said body portion bearing raceway, a thread carrying bobbin journaled within said cup-shaped bobbin case, a thread replenishing member disposed between said loop taker body portion and said bobbin case, means shiftably supporting said thread replenishing member axially of said loop taker and away from said bobbin case, a thread path controlling disk, means supporting said thread path controlling disk relatively to said bobbin case with the periphery of said disk seated against said bobbin case rim to prevent admission onto said bobbin of a thread loop being manipulated by said loop taker, abutment means on said thread replenishing member for engaging said disk inwardly of the periphery thereof when said thread replenishing member is shifted toward said bobbin case, means defining an annular fulcrum for said disk relatively to said bobbin case, said fulcrum being located between said disk periphery and the area of engagement of said abutment means with said disk whereby

a shift of said disk periphery into spaced relation from said bobbin case rim is effected when said thread replenishing member is shifted toward said bobbin case.

3. A loop taker for a lock stitch sewing machine having a circularly moving body portion formed with an annular bearing raceway, a cup-shaped bobbin case having a rim formed with an annular bearing surface complementary to said body portion bearing raceway, a bobbin formed with a hub and with opposed thread confining flanges extending from said hub, a thread replenishing member disposed between said loop taker body portion and said bobbin case, means shiftably supporting said thread replenishing member axially of said loop taker toward and away from said bobbin case, a thread path controlling disk, means supporting said thread path controlling disk relatively to said bobbin case with the periphery of said disk seated against said bobbin case rim to prevent admission onto said bobbin of a thread loop being manipulated by said loop taker, abutment means on said thread replenishing member for engaging said disk inwardly of the periphery thereof when said thread replenishing member is shifted toward said bobbin case, means on said disk contacting a flange of said bobbin to define an annular fulcrum for said disk relatively to said bobbin case, said fulcrum being located between said disk periphery and the area of engagement of said abutment means with said disk whereby a shift of said disk periphery into spaced relation from said bobbin case rim is effected when said thread replenishing member is shifted toward said bobbin case.

4. A loop taker for a lock stitch sewing machine having a circularly moving body portion formed with an annular bearing raceway, a cup shaped bobbin case having a rim formed with an annular bearing surface complementary to said body portion bearing raceway, an axial stud within said cup shaped bobbin case, a bobbin formed with the hub journaled on said axial stud and with opposed thread confining flanges, a thread replenishing member disposed between said loop taker body portion and said bobbin case, means shiftably supporting said thread replenishing member axially of said loop taker toward and away from said bobbin case, a thread path controlling disk, a headed fastening member secured in said bobbin case stud and constraining said disk between said bobbin case and said thread replenishing member, said disk formed with a first annular corrugation offset toward one flange of said bobbin and with a second annular corrugation inwardly of said first corrugation and offset toward said thread replenishing member, and abutment means on said thread replenishing member for engaging said second corrugation when said thread replenishing member is shifted toward said bobbin case.

5. A loop taker as set forth in claim 1 in which said bobbin case rim is formed with an annular seat accommodating the periphery of said disk when said thread replenishing member is shifted out of engagement with said disk.

6. A loop taker as set forth in claim 1 in which said thread replenishing member includes an annular flange against which said disk periphery moves when said thread replenishing member is shifted toward said bobbin case.

References Cited in the file of this patent

UNITED STATES PATENTS

3,038,429 Ketterer et al. ----- June 12, 1962