Dec. 22, 1936. G. A. SOUTHAM ET AL 2,065,349

ROTARY HOOK

Filed April 11, 1934

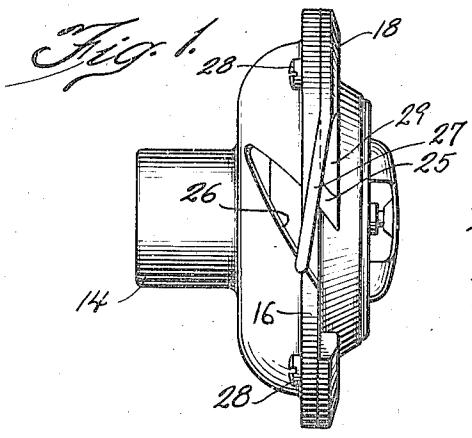


Fig. 1.

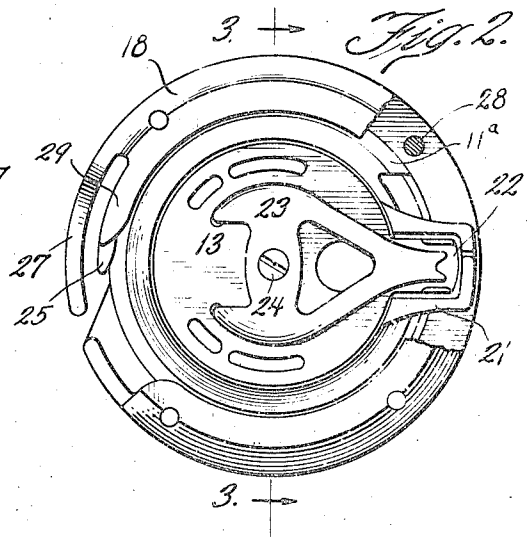


Fig. 2.

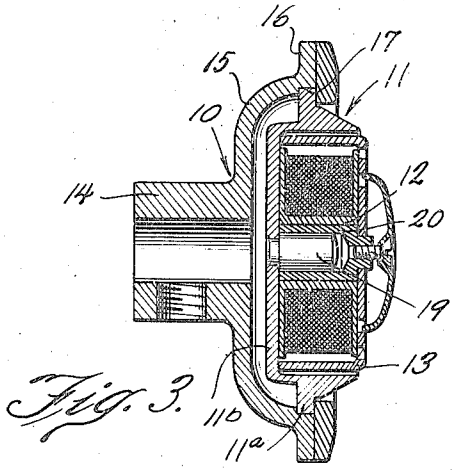


Fig. 3.

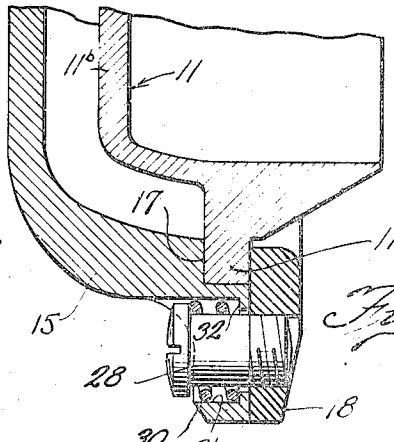


Fig. 4.

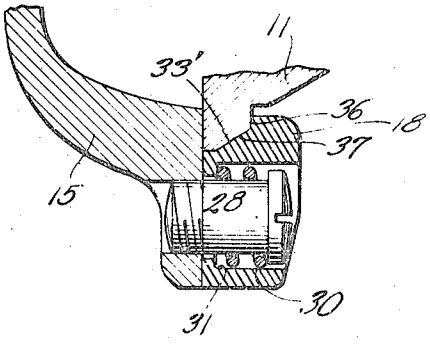


Fig. 6.

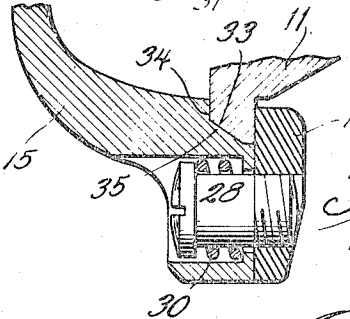


Fig. 5.

Inventors:
George A. Southam &
George R. Wainwright
By Owen E. Stephen
Their Atty.

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ROTARY HOOK

George A. Southam and George R. Wainwright, Rockford, Ill., assignors to Free Sewing Machine Co., Rockford, Ill., a corporation of Illinois

Application April 11, 1934, Serial No. 719,985

13 Claims. (Cl. 112—228)

The invention relates to an improved rotary hook construction for high-speed, lock-stitch type sewing machines and has as its general object to provide a rotary hook of novel and improved construction rendering the hook more efficient in operation and easier and more economical to manufacture.

A more particular object of the invention is to facilitate and simplify manufacture of the hook by forming the thread guard thereon as an integral part of the gib ring instead of as a part of the thread-loop carrier.

Another object is to mount the improved gib ring yieldably on the thread-loop carrier to obtain a floating gib ring rendering the rotary hook less subject to becoming jammed and facilitating clearing of the hook.

Yet another object of the invention is to provide a yieldable or floating gib ring and a beveled rib on the bobbin case base with a corresponding beveled raceway formed by the gib ring and thread-loop carrier to provide clearance on all sides of the rib when the floating gib is forced away from the thread-loop carrier.

Other objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is an edge elevational view of a rotary hook embodying the features of the invention.

Fig. 2 is a front face elevational view of the hook shown in Fig. 1, with a portion of the gib ring broken away.

Fig. 3 is a diametrical cross-section taken approximately along line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary view showing in detail the mounting of the gib ring.

Fig. 5 is an enlarged fragmentary view of a modification showing the beveled rib and raceway.

Fig. 6 is an enlarged fragmentary view showing another modified form of beveled rib and raceway.

For purposes of disclosure, the scope of the invention being defined by the appended claims, the invention is shown in the drawing and will be described hereinafter as embodied in a rotary hook comprising generally a thread-loop carrier 10 supporting for relative rotational movement a bobbin case base 11 which in turn rotatably supports a bobbin 12 retained in the base by a case 13. The thread-loop carrier 10 has a hub 14 by means of which it is secured to the driving shaft of a sewing machine (not shown) and a bowl-shaped portion 15 terminating in a radial flange 16. Received partially within the bowl-shaped portion 15 is the bobbin case base 11 which is generally cylindrical and formed intermediate its ends with a circumferential rib 11a. The rib 11a is received in an annular groove 17, shown in Figs. 3, 4 and 5 as formed in the inner periphery of the flange 16, and is retained in the groove by a gib ring 18 secured to the flange 16 and forming with the groove 17 a raceway for the rib 11a.

The bobbin case base 11 is of conventional construction having a closed rear face 11b, spaced from the bowl-shaped portion 15 when the base is mounted in the thread-loop carrier, and an open front face. Projecting forwardly from the rear face 11b and secured thereto centrally thereof is a pin 19 received within a tubular sleeve 20 of the bobbin case 13 when the latter is positioned within the base 11 to close the open face thereof. Extending radially from the base 11 is a recessed tongue 21 which cooperates with a tongue 22 extending radially from the case 13 to support the bobbin thread in position adjacent the path of the sewing machine needle. A spring clip 23 is secured to the bobbin case by means of a screw 24 and acts in cooperation with the tongue 22 to maintain the proper tension on the bobbin thread. The rib 11a is cut away opposite the tongue 21 as shown in Fig. 2.

Projecting toward the front beyond the plane of the flange 16 is a loop-piercing tongue 25 and immediately forwardly of the tongue in the direction of rotation, the thread-loop carrier is formed with a converging slot 26 extending radially inwardly obliquely to the axis of the hook in a direction counter to the rotation thereof. The tongue 25 and the slot 26 operate in a well known manner to engage and spread the thread-loop formed by the downstroke of the needle of the machine, drawing one side of the loop within the carrier through the cut away portion of the rib 11a to pass the loop on opposite sides of the bobbin case base 11 and thus lock the stitch.

Heretofore the slot 26 was closed at the periphery of the thread-loop carrier by a portion of the flange 16 which continued across the slot to form a thread guard. To facilitate manufacture of the hook, the thread guard is formed herein as an integral part of the gib ring 18 thus permitting the slot 26 to be open at the periphery of the thread-loop carrier which materially facilitates the formation thereof. Herein the gib ring 18 is shown as a split ring positioned with one end terminating approximately at the forward edge of the slot 26 and having a finger 27 at the

other end extending across the loop-piercing tongue and the slot 26 to form the thread guard. The gib ring is secured to the flange 16 by means of circumferentially spaced screws 28 and is formed with a second finger 29 conforming in contour to the rear edge of the tongue 25 and with its outer edge flush with the edge of the tongue (see Fig. 1) to provide a smooth uninterrupted transition from the ring to the tongue.

A construction is employed which minimizes the possibility of locking or jamming of the hook by the presence of foreign matter in the raceway formed by the groove 17 and the gib ring and facilitates clearing the hook should it become jammed. To that end the gib ring 18 is floatingly mounted, that is, having a limited lateral movement. Herein such floating or yieldable mounting of the gib ring is obtained by the use of coiled compression springs 30 encircling the screws 28 and interposed between the heads thereof and the flange 16, the thread-loop carrier 10 being formed with recesses 31 to receive the springs. At the inner end each recess 31 is formed with a shoulder 32 against which the spring 30 abuts and which slidably engages the screw projecting therethrough to form a guide means for the lateral movement of the gib ring. The threads on the screws 28, as conventionally shown in the drawing, permit the screws to be turned in only a fixed distance and thus assure uniform compression of all of the springs. In Figs. 3 and 4 the rib 11a on the bobbin case base and the raceway in which it is received are rectangular. It will be apparent from the foregoing description that should foreign matter enter the raceway, the gib ring 18 is free to yield laterally thus enabling the bobbin case base to rotate relative to the thread-loop carrier in spite of the foreign matter, with the possibility that the hook will eventually clear itself of the foreign matter, or the gib ring may be conveniently moved manually to facilitate removal of the foreign matter from the raceway by the operator of the machine.

Figs. 5 and 6 show modified forms of the construction of the raceway and the rib 11a on the bobbin case base enabling the hook to clear itself even more readily or to facilitate to a greater extent the removal of foreign matter by the operator of the machine. In the modified forms the rib on the bobbin case base is no longer rectangular but has a beveled peripheral surface. The raceway formed by the gib ring and the thread-loop carrier is correspondingly beveled. In Fig. 5 the beveled surface 33 faces toward the rear of the hook and the thread-loop carrier is formed with an annular groove 34 having a beveled surface 35 to correspond to the beveled surface 33 of the rib 11a. The gib ring is of the same construction as that in Figs. 1 to 4.

In Fig. 6 the gib ring 18 is substantially thicker than that shown in the other figures and a groove 36 for receiving the rib 11a is formed therein instead of in the thread-loop carrier. The groove has a beveled surface 37 to correspond to the beveled surface 33' on the rib 11a which is however, formed to face toward the front of the rotary hook. The screws 28 are also reversed from the position shown in the remaining figures and are threaded into the thread loop carrier with the springs 30 concealed in recesses 31 formed in the gib ring.

It will be apparent that with the peripheral surface of the rib 11a beveled, movement of the floating gib ring laterally not only provides clearance along the radial faces of the rib 11a but also at the beveled face of the rib. Thus a clearance is provided between each of the faces of the rib and the raceway, thus rendering it almost impossible for foreign matter in the raceway to prevent relative rotation of the thread-loop carrier and the bobbin case base.

We claim as our invention:

1. In a rotary hook for sewing machines, a rotary thread-loop carrier having a loop-piercing tongue, a bobbin case base having a circumferential rib, and a gib ring secured to said carrier and forming therewith a raceway for the rib on said base, said ring having a thread guard integral therewith and at least a part of the thread guard disposed forwardly of said loop-piercing tongue considered in the direction of rotation.

2. In a rotary hook for sewing machines, a rotary thread-loop carrier having a slot extending inwardly from the periphery thereof obliquely to the axis of said carrier to form a loop spreading tongue, a bobbin case base having a circumferential rib, and a gib ring secured to said carrier and forming therewith a raceway for the rib on said base, said ring having a thread guard integral therewith and extending across the loop spreading tongue and the slot.

3. In a rotary hook for sewing machines, a bowl-shaped rotary thread-loop carrier having a radial flange at its periphery and a slot extending inwardly from the periphery obliquely to the axis of the hook and counter to the direction of rotation to form a thread-loop spreading tongue, a bobbin case base partially received within said carrier and having a circumferential rib, and a split gib ring secured to said carrier and forming with the flange thereon a raceway for the rib on said base, said ring having a finger extension at one end projecting across the slot to form a thread guard.

4. In a rotary hook for sewing machines, a rotary thread-loop carrier, a bobbin case base having a circumferential rib, a gib ring disposed on the outside of said carrier and forming therewith the entire raceway for the rib on said bobbin case base, and means for yieldably mounting and guiding said gib ring on said carrier for limited lateral movement.

5. In a rotary hook for sewing machines, a rotary thread-loop carrier, a bobbin case base having a circumferential rib, a gib ring disposed opposite said carrier and forming therewith a substantially 360° raceway for the rib on said base, and means for yieldably mounting said ring on said carrier for limited lateral movement comprising circumferentially spaced screws and compression springs encircling the same, said screws also serving to guide said ring in its lateral yielding movement.

6. In a rotary hook for sewing machines, a bowl-shaped rotary thread-loop carrier having a slot extending inwardly from the periphery thereof obliquely to the axis of the hook to form a loop spreading tongue, a bobbin case base partially received within said carrier and having a circumferential rib, a gib ring disposed opposite said carrier and forming therewith a raceway for the rib on said base, said ring having a portion extending across the slot in said carrier to form a thread guard and means for yieldably mounting and guiding said ring for limited lateral movement.

7. In a rotary hook for sewing machines, a bowl-shaped rotary thread-loop carrier having a radial flange at its periphery and an annular groove formed in the flange, a bobbin case base having a

circumferential rib, a gib ring disposed opposite the flange on said carrier and forming with the groove therein a raceway for the rib on said base, circumferentially spaced recesses formed in the flange of said thread-loop carrier, an annular shoulder in each recess, a screw extending through each recess and threaded into said gib ring, and a coiled compression spring encircling said screw and abutting the head thereof and the shoulder in said recess to hold said gib ring yieldably against the flange of said thread loop carrier.

8. In a rotary hook for sewing machines, a rotary thread-loop carrier, a bobbin case base having a circumferential rib with a beveled peripheral surface, a gib ring disposed opposite said carrier and forming therewith a raceway having a beveled surface corresponding to the rib on said base, and means for yieldably mounting said ring on said carrier.

9. In a rotary hook for sewing machines, a rotary thread-loop carrier member, a bobbin case base having a circumferential rib with its peripheral surface beveled, a retaining ring member disposed opposite said carrier member, one of said members having an annular groove with a beveled surface corresponding to the beveled surface of the rib on said base and forming with the other member a raceway for the rib, and means for yieldably mounting said retaining member on said carrier member.

10. In a rotary hook for sewing machines, a rotary thread-loop carrier, a bobbin case base having a circumferential rib with a beveled peripheral surface facing toward the front of the hook, a gib ring disposed opposite said carrier and having an annular groove beveled to conform to the rib on said base and forming with the carrier a raceway for the rib, and means for yieldably mounting said ring on said carrier.

11. In a rotary hook for sewing machines, a rotary thread-loop carrier, a bobbin case base having a circumferential rib with a beveled peripheral surface facing toward the rear of the hook, said carrier having an annular beveled groove in which the rib of said base is received, a gib ring disposed opposite said carrier and forming with the groove therein a raceway for the rib, and means for yieldably mounting said ring on said carrier.

12. In a rotary hook for sewing machines, a rotary thread-loop carrier, a bobbin case base having a circumferential rib with a beveled peripheral surface, a gib ring disposed opposite said carrier and having an annular groove beveled to conform to the rib on said base and forming with the carrier a raceway for the rib, circumferentially spaced recesses formed in said ring, a shoulder in each recess, a screw projecting through each recess and threaded into said carrier, and a compression spring interposed between the head of the screw and the shoulder in the recess.

13. In a rotary hook for sewing machines, a bowl-shaped rotary thread-loop carrier having a radial flange at its periphery, a bobbin case base received within the carrier having a circumferential rib with a beveled peripheral surface facing the carrier, said carrier having an annular complementary beveled groove in which the rib of said base is received, a gib ring disposed opposite the flange on said carrier and forming with the groove therein a raceway for the rib on said base, circumferentially spaced recesses formed in the flange of said thread-loop carrier, an annular shoulder in each recess, a screw extending through each recess and threaded into said gib ring, and a coiled compression spring encircling said screw and abutting the head thereof and the shoulder in said recess to hold said gib ring yiedably against the flange of said thread-loop carrier.

GEORGE A. SOUTHAM.
GEORGE R. WAINWRIGHT.