June 9, 1931. W. N. PARKES 1,809,391

SEWING MACHINE LOOP TAKER MECHANISM

Filed May 10, 1929

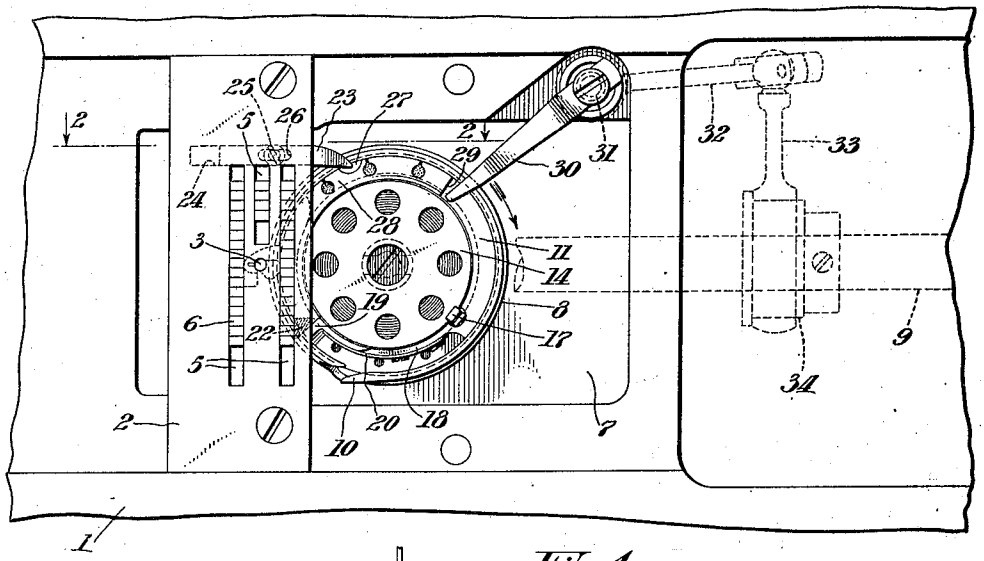



Fig. 1.

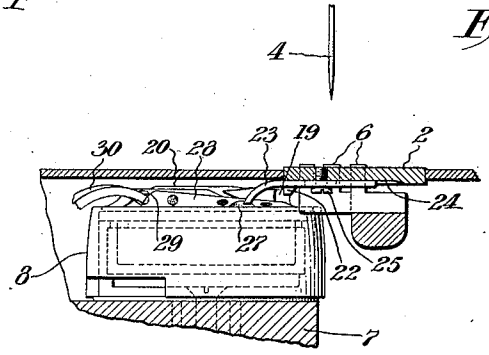



Fig. 2.

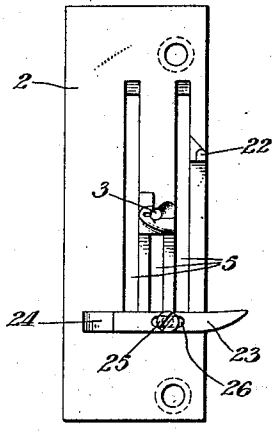



Fig. 3.

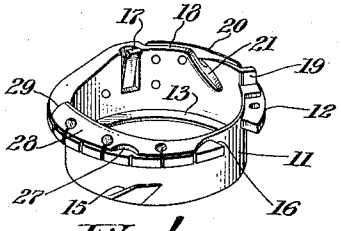



Fig. 4.

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Patented June 9, 1931 1,809,391

# UNITED STATES PATENT OFFICE

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## SEWING MACHINE LOOP-TAKER MECHANISM

Application filed May 10, 1929. Serial No. 361,896.

This invention relates to improvements in sewing machines having a loop-taker rotatable about an axis which is substantially parallel to the path of endwise reciprocation of a needle to cast needle-thread loops about a bobbin-carrier, journaled in the loop-taker, in the formation of lock-stitches.

It is the object of the present invention to provide for an increased speed of operation of lock-stitch sewing machines under commercial conditions requiring a high quality of stitching and durability of the parts so operated and particularly in a sewing machine having a loop-taker in which is journaled a bobbin-carrier containing a relatively large mass of thread around which the needle-thread loops are cast by the loop-taker.

The present invention is in the nature of a further improvement upon the loop-taker mechanism forming the subject of my pending United States patent application Serial No. 332,612, filed Jan. 15, 1929, and is primarily directed to improved means for limiting the oscillation of the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker.

Commonly known expedients for limiting oscillation of the bobbin-carrier in reverse directions involved the employment of spaced stop-shoulders either upon the bobbin-carrier or the under side of the throat-plate for cooperation with a stop-lug upon the other of these members, said stop-elements being located directly adjacent the throat-plate needle-aperture. Consequently, these stop-elements interfered with the free handling of the needle-thread loop by the loop-taker at the beginning of the spreading of the loop and again in the drawing up of the loop by the take-up to set the stitch.

In a preferred embodiment of the present invention, the stop-element for limiting the reverse oscillation of the bobbin-carrier is adjustably secured upon the throat-plate so as to be spaced a substantial distance from a horizontal straight line transverse to the tangent to the path of the loop-taker beak in its loop-seizing position. This stop-element is positioned to engage the bobbin-carrier on its cast-on side, i. e., on the side about which the needle-thread loops are initially cast following seizure of said needle-thread loops by the loop-taker, and at a point permitting the limb of the loop cast across the upper face of the bobbin-carrier to extend in a straight line to the throat-plate needle-aperture. This construction therefore has the advantage of permitting quick spreading of the needle-thread loop without interference by the bobbin-carrier stop and at the same time provides for an unobstructed passage for the needle-thread loops beyond said stop-finger for a major portion of the circular periphery of the bobbin-carrier.

While it is preferred to employ the stop disclosed in my prior patent application before referred to for the purpose of restraining the bobbin-carrier against rotation with the loop-taker, the present invention, in its broadest aspect, comprehends the use of any suitable stop for this purpose. It is desirable, however, to have this stop located on the cast-off side of the loop-taker so that the usual opener may have ample time to provide a thread-clearance past said last mentioned stop. By positioning the opener to engage the bobbin-carrier at a point directly beyond the stop-element constituting the present improvement, said opener will have the necessary time conducive to operation of the machine at high speed to perform its function.

In the accompanying drawings, Fig. 1 is a top plan view of a portion of a sewing machine cloth-plate, with the usual slide-plates removed to expose a loop-taker embodying the present improvement. Fig. 2 is a sectional view substantially on the line 2—2 of Fig. 1, but including sections of the slide-plates. Fig. 3 is a bottom plane view of the throat-plate, with its integral and attached stop-elements. Fig. 4 is a perspective view of the bobbin-carrier.

The present loop-taker may be supported and actuated in substantially the same manner as more fully disclosed in said prior patent application Serial No. 332,612, and in fact the primary difference in the two constructions resides in the means employed for limiting oscillation of the bobbin-carrier in a

direction opposite to the direction of rotation of the loop-taker.

Referring to the drawings, the improvement is shown as embodied in a sewing machine having a cloth-plate 1, upon which is suitably secured a throat-plate 2 provided with the usual aperture 3 for a vertically reciprocatory needle 4. The throat-plate also has parallel slots, as 5, in which operates a feed-dog 6 actuated in any well known manner to advance the work.

Journaled in a bracket 7, suitably secured to the under side of the cloth-plate, is a loop-taker 8 of the vertical-axis type and deriving two rotations for each completed needle-reciprocation from an actuating shaft 9 beneath the cloth-plate, said shaft 9 rotating at one half the speed of the loop-taker. The loop-taker 8 has a loop-seizing beak 10 and is cupped to receive a bobbin-carrier 11 provided with an interrupted bearing-rib 12 journaled in a suitable raceway in the loop-taker.

The bobbin-carrier 11 is open at its top and is substantially bottomless, its base comprising a narrow, internal flange 13 supporting a thread-carrying bobbin 14. Extending outwardly and upwardly from the bobbin-carrier base is an auxiliary hook 15 acting to direct toward the bottom of the bobbin-carrier a limb of the needle-thread loop initially caught by the nose 16 afforded by one end of the interrupted bearing-rib 12. The bobbin 14 is latched against accidental upward movement out of its carrier by a bobbin-retainer 17.

Upon the cast-off side of the loop-taker, the bobbin-carrier 11 is formed with a flange 18 above the bearing-rib 12, said flange being bent outwardly at one end to provide a stop-shoulder 19 which is substantially equal in width to that of the bearing-rib 12. Suitably secured upon the flange 18 at the outer side of the bobbin-carrier is a tension-spring 20 which bridges a bobbin-thread slit 21. The bobbin-thread is led through the slit 21, under the tension-spring 20 and over the stop-shoulder 19 so that said bobbin-thread extends from the stop-shoulder 19 to the throat-plate needle-aperture close to the under side of the throat-plate.

In order to restrain the bobbin-carrier against rotation with the loop-taker, the stop-shoulder 19 of the bobbin-carrier is positioned to engage a stop-lug 22 depending from the throat-plate, said stop-lug being spaced a substantial distance from a horizontal straight line transverse to the tangent to the path of the loop-taker beak 10 in its loop-seizing position. With the loop-taker rotatable in the direction of the arrow shown in Fig. 1, the stop-lug 22 is located a substantial distance in front of the throat-plate needle-aperture 3, whereby the needle-thread loop is unobstructed in its approach to said aperture 3 during the completion of the stitch.

Oscillation of the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker is limited by a fixed stop-element comprising, in the present instance, a finger 23 seated in a groove 24 provided in the under side of the throat-plate 2 in a direction transverse to the direction of feed. The groove 24 is spaced a substantial distance rearwardly of the throat-plate needle-aperture, being located beyond the feed-slots 5 in said throat-plate. Preferably, the finger 23 is adjustably secured to the throat-plate by a screw 25 passing through an elongated aperture 26 in said finger. The free end of the finger 23 curves downwardly to slightly enter a recess 27 provided in a cast-on flange 28 upon the bobbin-carrier 11 above its bearing-rib 12, said cast-on flange gradually inclining upwardly from a point adjacent the loop-detaining nose 16 of the bearing-rib and terminating abruptly in a shoulder 29, the length of the flange 28 being approximately equal to one third of the circumference of the bobbin-carrier. The recess 27 is located approximately midway of the length of the flange 28 and is spaced from a straight line transverse to the tangent to the loop-taker beak path in its loop-seizing position a distance substantially equal to the spacing of the stop-shoulder 19 from said line at the opposite side thereof. It will be apparent that in this construction the upper limb of the needle-thread loop is free from the bend therein formed by the throat-plate lugs heretofore employed and that therefore said limb of the loop may extend straight to the throat-plate needle-aperture as the loop is initially cast about the bobbin-carrier, although said bobbin-carrier is positioned close to the plane of the under side of the throat-plate.

The shoulder 29 at the end of the cast-on flange 28 is intermittently engaged, i. e., once only for each needle reciprocation, by an opener-finger 30 fixed upon the upper end of a vertically disposed rock-shaft 31 carrying at its lower end a lateral arm 32. The arm 32 is suitably connected with one end of a pitman 33 of which the other end has a strap embracing an eccentric 34 upon the actuating-shaft 9. The opener-finger 30 functions to oscillate the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker and for the purpose of opening a thread-loop passage between the stop-shoulder 19 and stop-lug 22, which normally engage each other by reason of the journaling of the bobbin-carrier in the loop-taker. The point of engagement of the opener-finger with the bobbin-carrier is directly beyond the free end of the stop-finger 23 and it will be observed that there are no bobbin-carrier engaging elements between the opener-finger and the stop-lug 22, comprising at least one

half of the circular periphery of the bobbin-carrier. Consequently, the opener-finger has ample time to provide a thread-loop passage past the stop-lug 22 from the time that the loop has passed said opener-finger, thereby allowing operation of the opener-finger in a manner conducive to high speed operation of the machine.

Having thus set forth the nature of the invention, what I claim herein is:—

1. In a sewing machine provided with a throat-plate having a needle-aperture, a reciprocatory needle, a vertical-axis rotary loop-taker having a loop-seizing beak, a bobbin-carrier journaled in said loop-taker, means for restraining the bobbin-carrier against rotation with the loop-taker, and means for limiting oscillation of the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker comprising a stationary stop-element engaging the bobbin-carrier on its thread-loop cast-on side at a point spaced a substantial distance from a straight line transverse to the tangent to the path of the loop-taker beak in its loop-seizing position.

2. In a sewing machine provided with a throat-plate having a needle-aperture, a reciprocatory needle, a vertical axis rotary loop-taker complemental to said needle in the formation of lock-stitches, a bobbin-carrier journaled in said loop-taker, means for restraining the bobbin-carrier against rotation with the loop-taker, and means for limiting oscillation of the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker comprising a stop-element projecting from said throat-plate at a point spaced substantial distance from the needle aperture in the throat-plate, said stop-element engaging the bobbin-carrier, on its thread-loop cast-on side.

3. In a sewing machine provided with a throat-plate having a needle-aperture, a reciprocatory needle, a vertical-axis rotary loop-taker having a loop-seizing beak, a bobbin-carrier journaled in said loop-taker, means for restraining the bobbin-carrier against rotation with the loop-taker, means for limiting oscillation of the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker comprising a stop-element engaging the bobbin-carrier on its thread-loop cast-on side at a point spaced a substantial distance from a straight line transverse to a tangent to the path of the loop-taker beak in its loop-seizing position, and means for oscillating the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker to provide a thread-loop clearance past the means employed for restraining the bobbin-carrier against rotation with the loop-taker.

4. In a sewing machine provided with a throat-plate having a needle-aperture, a reciprocatory needle, a feed-dog for advancing the work past the needle, a vertical-axis rotary loop-taker complemental to said needle in the formation of lock-stitches, a bobbin-carrier journaled in said loop-taker, means for restraining the bobbin-carrier against rotation with the loop-taker, a stop-element engaging the bobbin-carrier on its thread-loop cast-on side comprising a finger secured upon the throat-plate for adjustment transversely of the direction of feed and at a point spaced a substantial distance rearwardly of the throat-plate needle-aperture, and an opener-finger engaging the bobbin-carrier at a point adjacent the point of engagement of the bobbin-carrier by said finger to oscillate said bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker.

5. In a sewing machine provided with a throat-plate having a needle-aperture, a reciprocatory needle, a vertical-axis rotary loop-taker, a bobbin-carrier having a peripheral bearing-rib journaled in said loop-taker, said bearing-rib being interrupted to provide a loop-detaining nose, and said bobbin-carrier having a thread-loop cast-on flange above the bearing-rib provided with a recess spaced a substantial distance from said nose circumferentially of the bobbin-carrier, means for restraining the bobbin-carrier against rotation with the loop-taker, and a stationary stop-finger positioned to enter the bobbin-carrier flange recess to thereby limit oscillation of the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker.

6. In a sewing machine provided with a throat-plate having a needle-aperture, a reciprocatory needle, a vertical-axis rotary loop-taker, a bobbin-carrier having a peripheral bearing-rib journaled in said loop-taker, said bearing-rib being interrupted to provide a loop-detaining nose, and said bobbin-carrier having a thread-loop cast-on flange above the bearing-rib terminating in a shoulder and provided with a recess spaced a substantial distance from said nose circumferentially of the bobbin-carrier, means for restraining the bobbin-carrier against rotation with the loop-taker, a stationary stop-finger positioned to enter the bobbin-carrier flange recess to thereby limit oscillation of the bobbin-carrier in a direction opposite to the direction of rotation of the loop-taker, an opener-finger positioned to engage said flange-shoulder, and means for actuating said opener-finger to oscillate the bobbin-carrier once only for each complete needle-reciprocation.

7. In a sewing machine provided with a throat-plate having a needle-aperture, a reciprocatory needle, a vertical-axis rotary loop-taker having a loop-seizing beak, a bobbin-carrier journaled in said loop-taker, and means for limiting oscillation of said bobbin-carrier in opposite directions about

its journal-axis comprising stationary stop-elements positioned to engage the bobbin-carrier at points spaced a substantial distance from opposite sides of a horizontal straight line passing through the needle path in a direction transverse to a tangent to the path of the loop-taker beak in its loop-seizing position, the stop-element which restrains the bobbin-carrier against oscillation with the loop-taker being disposed at the loop cast-off side of the loop-taker.

In testimony whereof, I have signed my name to this specification.

WILLIAM N. PARKES.