SEWING MACHINES WITH BOBBIN THREAD CONTROLLING MEANS

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

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This invention relates to lock-stitch sewing machines and more particularly to improvements in thread-controlling devices especially adapted for maintaining a work feed of the sewing machine and for thereby determining the end that a proper stitch formation will be effected.

It is the primary object of the present invention to provide a bobbin-thread restraining means to maintain the bobbin-thread at one side of the throat-plate needle aperture thereby to insure that whenever one or even two needles are employed in a machine such needles will uniformly descend at the same side of the interlocking bobbin-thread thereby to insure that no hitch stitches will be formed during the forward feeding of the work.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawings:

Fig. 1 represents a front perspective view of a sewing machine in which the present invention is embodied.

Fig. 2 represents a top plan view of a fragmentary portion of the sewing machine bed illustrating a portion of the bed with its slide-plate partially removed and with its throat-plate entirely removed so as to expose the loop-taking mechanism as well as a portion of the work-feed mechanism.

Fig. 3 represents a top plan view of a throat-plate which is provided with an aperture adapted for the reception of a laterally vibratory needle.

Fig. 4 represents a bottom plan view of the throat-plate illustrated in Fig. 3.

Fig. 5 represents a sectional view taken substantially on the line 5—5 of Fig. 3.

Fig. 6 represents a fragmentary bottom plan view comparable to Fig. 4 but illustrating a throat-plate of the type having a circular aperture adapted for the reception of a needle which is not shifted laterally.

Fig. 7 represents a top plan view of the rotary loop-taker and illustrating a portion of the work-supporting bed and a piece of work material with the loop-taker being shown as having just caught the needle-thread loop.

Fig. 8 represents an elevation view taken on the left side of the loop-taker as illustrated in Fig. 7.

Fig. 9 represents a top plan view of the rotary loop-taker as having rotated about the bobbin carrier so as to expand the needle-thread loop about the latter element.

Fig. 10 represents a top plan view similar to that disclosed in Figs. 7 and 9 and illustrating a loop-taker in that position wherein the needle-thread loop has been expanded about the bobbin carrier and is in a position where it is about ready to be cast off of the bobbin carrier.

Fig. 11 like Figs. 7, 9 and 10, illustrates a top plan view of the rotary loop-taker and shows the loop-taker in the position it assumes just after the needle-thread loop has been cast off the bobbin-carrier and is being taken up by the so-called needle-thread take-up mechanism.

The following detailed description has to do with the construction of a sewing machine and a throat-plate mechanism as it relates to a sewing machine, and for more complete description of the entire sewing machine reference may be had to my copending application Serial No. 471,766, filed November 29, 1954, now Patent No. 2,862,468, granted December 2, 1958, of which this application is a division.

As illustrated in the drawings, the present invention is adapted to be employed in a sewing machine having the usual work-supporting bed 10 over which is mounted a head portion 11 of the frame supporting a reciprocatory needle-bar 12 and a presser-bar 13. The lower end portion of the needle bar carries an eye-pointed needle 14 which, as hereinafter described, is adapted to cooperate with a rotary loop-taker in the formation of lock-stitches.

Attached to the lower end portion of the presser-bar 13 is a presser-foot 15 which is biased downwardly toward a throat-plate 16 mounted upon the bed 17 and upwardly through slots in the throat-plate 16 are feed-dog elements 17 which cooperate with the presser foot 15 to feed work over the bed 10.

Referring particularly to Figs. 1 and 2, the work-supporting bed 10 is provided directly above a rotary loop-taker, generally designated by the numeral 18 with an opening designated by the numeral 19, which opening is defined by a recessed ledge 20 which supports the conventional type of slide-plate 21 which may be shifted back and forth so as to cover the loop-taker 18 in the manner as disclosed in Fig. 1 or to give access to the loop-taker in a manner as disclosed in Fig. 2. The rear portion of the opening 19 beneath the presser foot 15 is adapted to be covered by means of the throat-plate 16 which, as is shown in Fig. 3 is provided with a needle aperture 22 and apertures 23, 24 and 25 which receive the feed-dog elements 17.

The feed-dog elements 17 are carried by a feed-bar 26 that extends over the loop-taker and is actuated in a manner as is best disclosed in my above noted copending application Serial No. 471,766.

Referring to Figs. 3 to 5, inclusive, the throat-plate 16 is provided with a laterally elongated needle-receiving aperture 22 which is elongated so as to receive the laterally vibratory needle 14. Fig. 6 illustrates a similar throat-plate 27 provided with a circular aperture 28 which is adapted to receive a needle which is restrained from shifting laterally of the direction of work feed so that straight stitching may be performed. In all other respects these two throat-plates 16 and 27 are similar.

Referring particularly to Figs. 4 and 6, the under surface 29 of the throat-plates 16 and 27 are milled away as at 30 so as to provide a bobbin-thread retaining means in the form of an abutment shoulder 31 for maintaining a work limb of the bobbin-thread at the extreme left-hand side of the needle aperture 22 as is viewed in Fig. 3 to the end that a proper stitch formation will be effected. It is to be understood that the thread-receiving abutment shoulder 31 is formed upon the under surface 29 of the throat-plate adjacent the needle aperture and it extends crosswise of the feed-dog receiving slots 23 to 25. The described location of the thread-receiving abutment 31 is such that the abutment functions to maintain the bobbin-thread at the left-hand side of the needle aperture 22 thereby to insure that whenever one or even two needles are employed they will uniformly descend at the same side of the interlocking bobbin-thread so that no hitch stitches will be formed during the forward feeding of the work.
Fig. 7 to 11, inclusive, illustrates the formation of zigzag single-needle lock-stitches on a machine of the type disclosed in my above noted application Serial No. 471,766. Referring particularly to Fig. 7, there is disclosed a fragmentary portion of a throat-plate 16 which supports work-pieces 32 in which zigzag stitches 33 are being formed. A loop-taker ring 34 is adapted to rotate in a counterclockwise direction and as viewed in Fig. 7, the hook back 35 has just seized the loop of the needle-thread 36 and has commenced to carry the thread in a counterclockwise direction so as to concatenate it with the limb of the bobbin-thread 37 which leads from the guide slot 46 of the bobbin-thread-carrier 39 to the work-piece 32.

Fig. 9 illustrates the loop-taking mechanism with the loop-seizing back 35 advanced from the position shown in Fig. 7 to a location where the needle-thread loop 36 just begins to be drawn over the bobbin-thread limb 37. In this figure, it is to be particularly observed that that portion of the needle loop which lies beneath the thread-carrier 39 is maintained upon the upper surface 40 of the thread-supporting bar of the inverted U-shaped member 41 to the end that this limb of the thread will be prevented from dropping below the thread-carrier restraining member 42 and thus becoming fouled thereunder.

Referring now to Fig. 10, it is to be seen that the loop-seizing back 35 has passed through 180° from its loop-seizing position and that the upper limb of the needle thread 36 extends from the loop-seizing back 35 in a left-hand direction to be retained between the lower wall of the thread-case abutment member 43 and the flange 44 of the thread-case for the purpose of controlling the needle-thread loop so that the latter will not loop over the thread-case 39. It is to be particularly understood that the abutment member 43 and the thread-case flange 44 will maintain control over the needle thread 36 until the sewing machine take-up arm (not herein shown) commences to draw up the needle thread as the needle is withdrawn from the work. As soon as the take-up arm commences to raise in the usual fashion it will draw the needle thread 36 upwardly through the needle and as a consequence the thread will be drawn off the loop-seizing back 35 and from between the abutment member 43 and the thread-case flange 44 until it assumes the position as illustrated in Fig. 11 wherein the needle-thread loop is illustrated as being controlled by a finger 45 which is formed upon the thread-case.

In Fig. 11, it is to be particularly observed that the needle-thread loop 36 is fully concatenated about the bobbin thread 37 and at the same time it extends about the controlling finger 45 so that the loop will have little or no tendency to loop about with the possibility of becoming fouled.

From the above it is to be appreciated that the inverted U-shaped member 41 has two functions of which the first is to prevent the thread case from turning in a counterclockwise direction as viewed in Fig. 11, while the second function is to control the under thread portion of the needle-thread in a manner as is disclosed in Fig. 9 wherein the under limb of the thread 36 is supported upon the member 40. By the same token, it is to be understood that the thread-case restraining arm 43 has a double function, of which the first is to prevent the thread-case from revolving in a counterclockwise direction as viewed in Fig. 7, while its second function is to have its lower portion cooperate with the flange 44 of the thread-case in maintaining control over the needle thread prior to the time that the take-up arm will withdraw such thread from the vicinity of the hook.

With reference to Figs. 7 to 11, it is to be understood that the throat-plate abutment shoulder 31 functions at all times to maintain the work limb of the bobbin-thread 37 at the extreme left-hand side of the needle aperture 22 to the end that a proper stitch formation will be effected. By thus maintaining the bobbin-thread in this position it is insured that whenever the needle 14 descends through either of the two types of throat-plate apertures 22 or the work limb 37 will always be disposed at the same side of the needle thereby insuring that no hitch stitches will be formed during the forward feeding of the work.

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

1. In a sewing machine, the combination of a curved loop-taker having an interior loop-seizing hook continuously rotatable about an upright axis, a thread case for an interlocking bobbin-thread supported within the loop-taker, a holder for restraining the case from rotating with the loop-taker, work-feeding means for normally advancing the work along a straight-line horizontal path, an endwise reciprocable needle-carrier to move the needle back and forth along a side of the circular path of movement of the loop-seizing hook at a location rearwardly of the loop-taker axis with reference to the direction of normal work-feed, a throat-plate disposed over the loop-taker and formed with a needle-receiving aperture whereby a horizontal line intersecting the center of the needle-receiving aperture and the loop-taker axis will be disposed in parallelism with the direction of feed, and a bobbin-thread detaining shoulder formed on the bottom surface of the throat-plate in front of the needle-receiving aperture with reference to the direction of normal work-feed and between the aperture and the loop-taker axis.

2. In a sewing machine, the combination of a curved loop-taker circularly movable about an upright axis, a thread case for an interlocking bobbin-thread supported within said loop-taker, a holder for restraining said case from rotating with said loop-taker, work-feeding means for normally advancing the work along a straight-line horizontal path, an endwise reciprocable needle arranged to cooperate with said loop-taker in the formation of lock-stitches at a location rearwardly of the loop-taker axis with reference to the direction of normal work-feed, a throat-plate disposed over said loop-taker and formed with a needle-receiving aperture whereby a horizontal line intersecting the center of the needle-receiving aperture and the loop-taker axis will be disposed in parallelism with the direction of work-feed, and a bobbin-thread detaining shoulder formed on the bottom surface of said throat-plate in front of said needle-receiving aperture with reference to the direction of normal work-feed and between the aperture and the loop-taker axis.

3. A sewing machine as claimed in claim 2 in which said thread-case is provided with a bobbin-thread guide disposed eccentrically of the loop-taker axis.

4. A sewing machine as claimed in claim 2 in which said shoulder is located adjacent a line drawn parallel to the direction of work-feed and tangential to the peripheral wall of said aperture thereby to maintain the work limb of the bobbin-thread at one side of said aperture, and in which said thread case is provided with a bobbin-thread guide disposed eccentrically of the loop-taker axis and at the same side of said needle aperture as is said shoulder.

References Cited in the file of this patent

UNITED STATES PATENTS

28,00,940

1,775,913 Parker --------------- Sept. 16, 1930
1,792,237 Parker --------------- Feb. 10, 1931