THREAD CONTROLLING DEVICE FOR SEWING MACHINES

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This invention relates to needle-thread controlling mechanisms for lock-stitch sewing machines and has for its object to provide means for conveniently changing the effective stitch-setting action of a conventional needle-thread handling mechanism, thereby to increase the work-range of the sewing machine.

For certain kinds of work involving the stitching of leather and like materials, it is desirable to draw both of the interlocked threads of a lock-stitch seam well into the material, whereby the stitches present the same appearance upon opposite faces of the work. To accomplish this result, it has hitherto been the practice when stitching leather of firm texture to provide a conventional needle-thread handling mechanism with a take-up lever proportioned to effectively set the stitches. However, softer and weaker leather tends to tear under the conditions requisite to properly set stitches in leather of firmer texture. Consequently, the same sewing machine was unadapted to meet the incidents or the prevalent practice of frequently changing the kind of leather materials to be stitched.

The present invention consists in the combination with a conventional needle-thread take-up lever of a sewing machine, of a device providing for conveniently regulating the final setting of stitches, as hereinafter described and disclosed in the accompanying drawing which illustrates a preferred embodiment of the invention and in which:

Fig. 1 is a front-side elevation, partly in section, of a portion of a lock-stitch sewing machine containing the present improvement. Fig. 2 represents, in perspective, separate views of the parts of the stitch-setting regulating device shown detached from the sewing machine.

The sewing machine which is in part illustrated in the drawing corresponds substantially to that more fully disclosed in the United States patent to J. A. Knox, No. 1,864,136, June 21, 1932, said sewing machine having a work-support 1 including a throat-plate 2. Overhanging the work-support is a hollow bracket-arm 3 which terminates in a head 4.

Suitably journaled in the bracket-arm 3 is a rotary actuating shaft 5 carrying at one end a crank-disk 6, connected by a link 7 to a needle-bar 8. The needle-bar 8 carries an eye-pointed needle 9 and is journaled for endwise reciprocation in vertically aligned bearings provided in a swinging frame 10. The frame 10 is hung upon a fulcrum-pin 11 suitably fixed in the bracket-arm head 4 so that the pivotal axis of the frame 10 is substantially parallel with the axis of rotation of the actuating shaft 5. The frame 10 derives vibratory movements from the usual crank-arm 12 on one end of a needle-feed rock-shaft 13, journaled in the bracket-arm 3 and actuated in the usual or in any suitable manner.

Cooperating with the needle 9 below the work-support, in the formation of lock-stitches, is a rotary hook 14 of the vertical-axis type and 10 having a needle-thread-loop seizing beak 14'. Journaled in the rotary hook 14 is the thread-case 15 restrained, in the usual or any suitable manner, against rotation with the hook 14. The rotary hook 14 is carried by the upper end of a vertically disposed hook-shaft 16 rotatably journaled in a hook-saddle 17, said hook-shaft 16 carrying a bevel-gear 18 driven by a bevel-gear 19 upon one end of a horizontally disposed hook-actuating shaft 20 also journaled in the hook-saddle 17. The hook-actuating shaft 20 is actuated in the usual or any suitable manner and in the present case rotates once for each rotation of the shaft 5, the bevel-gears 16 and 10 being proportioned so that the hook-shaft 16 rotates twice for each rotation of its actuating shaft 20.

The work is advanced by a horizontal-axis feed-wheel 21 which partly extends above the work-support through a slot in the throat-plate 2, said feed-wheel being disposed directly adjacent the rotary hook 14 and being actuated in the conventional manner to continuously advance the work. Opposed to the feed-wheel 21 is a presser-roller 22 carried by a presser-bracket 23 secured to the lower end of the usual spring-depressed presser-bar 24 which is endwise vertically movably in the bracket-arm head 4.

From its supply (not shown), the needle-thread N is passed through a suitably apertured thread-guide 25, upon the bracket-arm head 4, and then between the disks of the usual tension-device 26 into engagement with the conventional slack-thread controller spring 27. In accordance with the prior practice, the thread, after being brought into engagement with the controller-spring 27, was passed directly through an aperture in the free end of an arm 28 of the usual take-up lever and then downwardly through suitable guides to the needle 9.

The take-up lever above referred to is similar to that disclosed in the United States patent to W. F. Dial et al., No. 699,915, March 25, 1902, being pivotally supported between its ends upon a fulcrum-pin 30 suitably secured in the head 4.
The arm 31 of the take-up lever is slidingly embraced by a sleeve 32 pivotally carried by the upper end of the needle-bar link 1, and the arm 28 of the take-up lever extends forwardly through a slot 33 in the head 4.

In Fig. 1 of the drawing, the arm 28 is illustrated as substantially at the lower end of its path of movement, i.e., the arm 28 has completed its slack-thread giving movement and is about to begin to pull upwardly upon the thread to draw it off the rotary hook and to set the stitch. It will be noted from Fig. 1 of the drawing that the arm 28 in its lowest position is nevertheless above the level of the tension device 25 and its slack-thread controller spring 27, so that in moving upwardly to pull up the needle-thread loop and to set the stitch, the thread N acts to pull the controller-spring 27 upwardly, said spring functioning primarily to take up the slack thread initially given by the take-up arm 28 as it commences its downward movement, as is well understood in the art.

In accordance with the present invention, there is provided a regulating device for controlling the quantity of slack thread given up by the take-up arm as it approaches the limit of its slack-giving movement, whereby the final setting of the stitches will be effected by the rotary hook in its expansion of the needle-thread loop to cast it about the thread-case 15, as will be understood from the following description.

Secured by screws 34 upon the front face of the bracket-arm head 4, adjacent the take-up arm 28 and between the thread-guide 29 and the tension-device 26, is a supporting plate 35 provided with a thread-confining loop 33, said loop 33 functioning primarily to restrain the needle-thread N from excessive whipping on the needle side of said take-up lever 28.

Adjustably pivoted upon the supporting-plate 35, by a screw 37 threaded into an aperture 39 in said plate 35, is a carrier-plate 39 provided with an aperture 40 to receive the pivot-screw 37. The carrier-plate 39 is provided with an arcuate slot 41 having the pivot-screw 37 as its center of curvature, through which slot passes a securing screw 42 threaded into an aperture 43 in the supporting plate 35. An edge of the carrier-plate 35 is shaped to provide a point 44 which overlies suitable graduations provided upon the supporting plate 35, whereby to indicate adjusted positions of the carrier-plate 39.

The carrier-plate 39 is also provided, adjacent the take-up arm 28, with a stitch-setting regulating member in the form of a thread-guiding loop 45 comprising, in the present instance, a tongue bent backwardly from said plate in spaced relation thereto, said tongue having an inwardly directed free end loosely entering a depression in the carrier-plate to provide for conveniently passing the thread N into the loop 45. The thread-guiding loop 45 is illustrated in full lines in Fig. 1 of the drawing at one extreme of adjustment of the carrier-plate and is illustrated in dotted lines in its opposite extreme position.

It will be noted that the needle-thread N passes from the slack-controller spring 27 through the adjustable guide-loop 45 and then through the eye of the take-up lever 28 to the needle. When the carrier-plate 39 is disposed in the position thereof illustrated by full lines in Fig. 1, the take-up lever 28 in its descending slack-giving movement bends the thread N sharply about the guide-loop 45, whereby the take-up lever 28 gives up a minimum of thread for expansion by the rotary hook 14. Consequently, the expansion of the needle-thread loop by the rotary hook increases the tension of the thread sufficiently to cause the loop-limb leading to the previously formed stitch to act to further and finally set said stitch.

However, when stitching softer materials, it is not only unnecessary to impose the same pull upon the needle-thread to set stitches into the work, as is required in materials of firmer texture, but when stitching materials such as soft leather and leather imitations there is a liability that excessive thread tension will cause the work material to tear between stitches.

The present invention provides for the above noted contingency. By adjustment of the guide-loop 45 into the position thereof illustrated by dotted lines in Fig. 1 of the drawing, the thread is not bent about said guide-loop by the take-up lever in its slack-thread giving movement and consequently the guide-loop is rendered ineffective to modify the length of thread given up by said lever. Under the circumstances, the thread is not tensioned to the extent before described, by the expansion of the thread-loop by the loop-taker and the stitch is set by the thread drawing up action alone of the take-up lever. It will be understood, of course, that the setting of the stitches can be further controlled by adjustment of the guide-loop 45 into positions intermediate its limits of adjustment.

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

In a sewing machine, in combination with a reciprocatory needle, a loop-taker complementary to said needle in the formation of lock-stitches, a needle-thread tensioning device, and a vibratory take-up lever, of a stationary thread-guide disposed adjacent said take-up lever in position to modify the length of thread given up by said lever, and means providing for adjustment of said thread-guide into an ineffective position thereof.

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