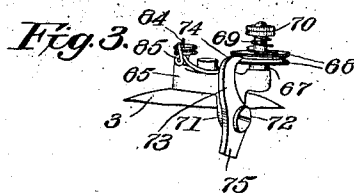
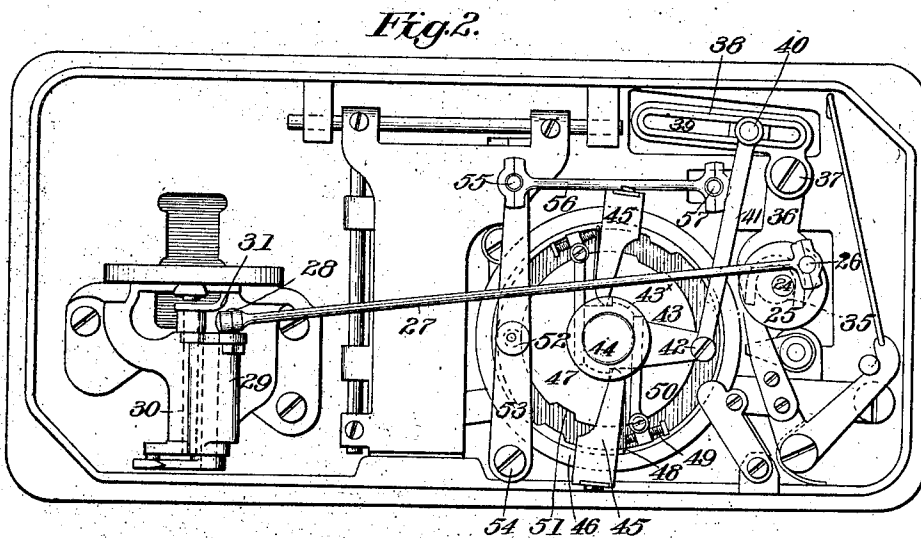
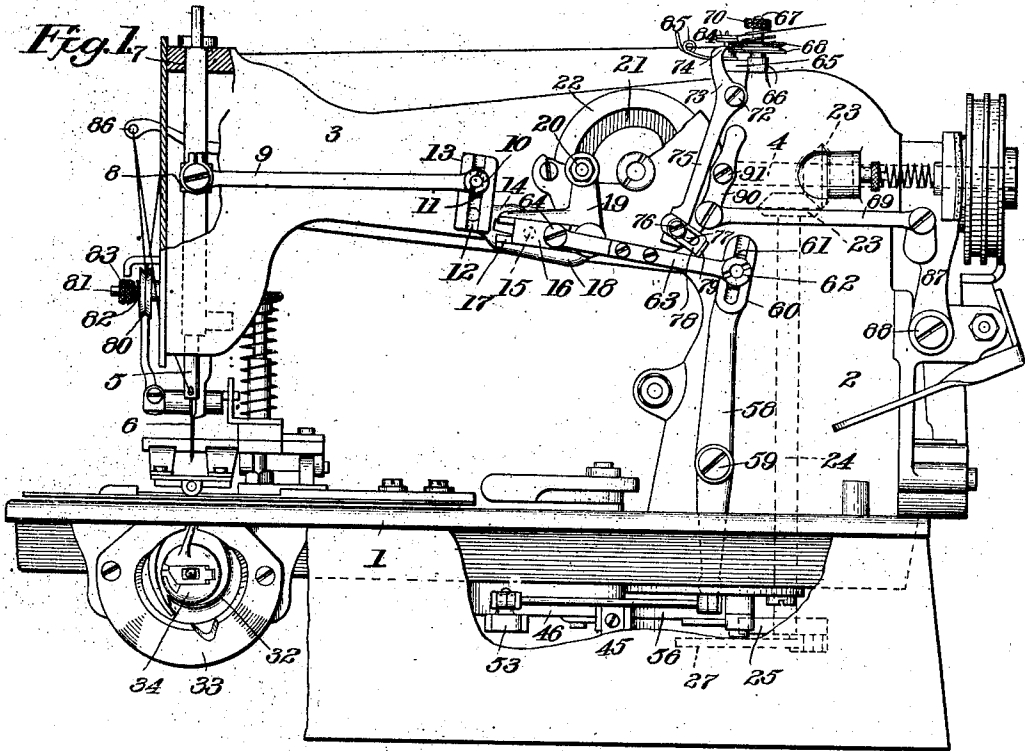


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 THREAD CONTROLLING MECHANISM FOR SEWING MACHINES.
 APPLICATION FILED AUG. 17, 1911.

1,053,271.

Patented Feb. 18, 1913.



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THREAD-CONTROLLING MECHANISM FOR SEWING-MACHINES.

1,053,271.

Specification of Letters Patent.

Patented Feb. 18, 1913.

Application filed August 17, 1911. Serial No. 644,597.

To all whom it may concern:

Be it known that I, ALEXANDER BOYD, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Thread-Controlling Mechanism for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to means for controlling the threads in sewing machines, and particularly in machines for producing barred-end buttonholes; and it has for its chief object to provide a buttonhole sewing machine adapted for production of barred buttonholes having a purl-stitch edge-covering overseam and either a purl-stitch or a whip-stitch bar at one or both ends of the same.

In its preferred form, the improvement comprises a tension device including a uniformly acting primary tension element and an auxiliary tension element with means for releasing the latter at the completion of each alternate group or succession of stitches of predetermined number, and means adapted for adjustment to render the releasing means either effective or ineffective in performing its normal function.

In the accompanying drawings, Figure 1 is a front side elevation of a buttonhole stitching and barring machine constructed substantially in accordance with the United States patents to E. B. Allen No. 856,617, of June 11, 1907, and No. 857,145, of June 18, 1907, and embodying the present improvement, and Fig. 2 a plan of the under side of the same. Fig. 3 is a perspective view of a bracket-piece carrying the auxiliary tension and the guiding elements to which the upper or needle-thread is led to and from the auxiliary tension.

The machine is shown constructed with the bed-plate 1 and the bracket-arm comprising the hollow standard 2, and the tubular member 3 in which is journaled the main-shaft 4 having the usual operative connection with the reciprocating needle-bar 5 carrying the needle 6. The needle-bar 5 is journaled for vertical reciprocation in the swinging frame 7 which is fulcrumed in the head of the bracket-arm and provided at one side with the stud 8 to which is pivotally connected one end of the pitman 9 hav-

ing its opposite end connected by the stud-screw 10 with an adjustable block 11 fitted within the channel 12 of the upright arm 13 of a bellcrank-lever fulcrumed upon the arm 3 and having a rearwardly extending slotted arm 14. The slot of the bellcrank-arm 14 is entered by roller-stud 15 carried by the slide-block 16 fitted within the slide-way 17 formed in the lateral arm 18 of a second bellcrank fulcrumed upon the bracket-arm 3 and having an upwardly extending arm 19 which carries a roller-stud 20 entering the cam-groove 21 of the cam-disk 22 driven by a connection with and rotating at one-half the speed of the main-shaft. The cam-disk 22 operates, by the connections just described, to impart the usual jogging movements to the needle-bar frame.

Connected by means of the bevel-gears 23 to rotate in unison with the main-shaft is the upright shaft 24 carrying at its lower end beneath the bed-plate the crank-disk 25, carrying a stud 26 connected by means of the pitman 27 with a crank-pin 28 upon an intermediate rock-shaft 29, which is connected in turn with the shuttle-driver rock-shaft 30 carrying the shuttle-driver 31. The driver 31 affords a well known means of actuating the oscillating shuttle 32 journaled in the race 33 and provided with the thread case 34 containing the lower thread.

As represented in dotted lines in Fig. 2, the shaft 24 has fixed thereon adjacent the crank-disk 25 the feed-actuating eccentric 35 embraced by a fork in one of the arms 36 of a bellcrank-lever fulcrumed at 37 and having its other arm 38 formed with a slot 39 in which is adjustably secured the stud 40 embraced by one end of a pitman 41 whose other end is pivotally connected by means of the stud-screw 42 to the vibratory clutch-lever 43 mounted upon the fulcrum-stud 44. The hub 43* of the clutch-lever is provided with diametrically opposite notches each entered by the inner extremity of a clutch-dog 45 whose opposite end is transversely slotted to afford a jaw embracing the depending flange 46 of the feed-wheel 47. Each of the clutch-dogs has secured to one edge near the inner end an outwardly extending flat spring 48 which rests in contact with the point of a screw 49 carried by an arm 50 rigidly secured upon the hub of the clutch-lever 43, which acts to keep the clutch-dog in operative engage-

ment with the feed-wheel flange 46. From the mechanism just described the feed-wheel derives its step-by-step rotary movements for producing the required travel of the work-holder relatively to the stitch-forming mechanism.

The feed-wheel has in its lower face a cam-groove 51 entered by a stud 52 upon a vibratory lever 53 fulcrumed upon the screw-stud 54 and carrying at its opposite end the stud 55 which is connected by means of the pitman 56 with the stud 57 upon the lower end of a rock-lever 58 fulcrumed intermediate its ends upon the stud-screw 59, tapped into the standard 2. The rock-lever 58 is formed at its upper end with a segmental slot 60 in which is adjustably secured a block 61 having a stud-screw 62 connected by means of the pitman 63 with a stud-screw 64 upon the slide-block 16. The cam-groove 51 is so shaped that it shifts the rock-lever 58 at the completion of each group of stitches of predetermined number composing the edge-covering overseam and the bar so as to suitably change the length of lateral jog of the needle, the slide-block 16 being moved forwardly to increase the throw of the needle for the barring operation, and backwardly to reduce the same for the side-stitching.

Secured upon the top of the arm 3 is a bracket-piece 65 provided with a boss 66 in which is secured the shouldered stem 67 of the auxiliary tension to which are applied the loose oppositely cupped disks 68 which are normally pressed together upon the shoulder of the stem 67 by means of the spring 69 interposed between the upper disk and the thrust-nut 70 applied to the threaded upper portion of the stem. The bracket-piece 65 has a depending lug 71 carrying the screw-stud 72 which serves as a fulcrum for the release-lever which is formed with an upper arm 73 having a backwardly extending wedge-shaped projection 74 in register with the adjacent faces of the tension-disks 68, the release lever having a depending arm 75 carrying at its lower end the clamp-screw 76 whose threaded shank enters the slot 77 in the rearwardly extending adjustable contact-plate 78 which is formed at its rearward extremity with a lateral lip, 79 adapted for engagement with the forward edge of the upper arm of the rock-lever 58.

As represented in Fig. 1, the contact-plate 78 is in its rearward or operative position wherein the lip 79 is out of contact with the rock-lever 58 but within the range of movement of the latter as the upper arm of the same advances to throw the needle-jogging mechanism into barring condition; whereby the point 74 of the release-lever arm 73 wedges between the auxiliary tension-disks 68 to release the tension upon the thread.

By loosening the screw 76 and shifting the contact-plate 78 forwardly so as to set the lip 79 out of the range of movement of the rock-lever 58 in moving between side-stitching and barring positions, the releasing lever is unaffected by the needle-jog controlling action of the rock-lever 58, and the operation of the auxiliary tension upon the upper thread becomes constant.

To insure the subsection of the upper thread to a certain degree of tension throughout the entire button-hole stitching cycle of operation, a uniformly acting primary tension element of usual or suitable form is applied to the head of the bracket-arm through which the upper thread is led to the needle. This is shown comprising the usual loose disks 80 pressed together and upon the shoulder of the stem 81 by means of the spring 82 interposed between the outer tension-disk and the thrust-nut 83.

In threading the machine for operation, the upper thread is led from the source of supply between the disks of a common form of thread-retainer 84 mounted upon the bracket-piece 65 and thence between the auxiliary tension-disks 68 and through the eye 85 of a thread-guide also secured upon the bracket-piece 65. It is thence led through the usual guide-eye at the rear of the bracket-arm downwardly between the primary tension-disks, upwardly through the eye of the take-up lever 86, and finally to the eye of the needle.

The operation of the machine in stitching buttonholes is similar to that of the machine represented in United States patents of E. B. Allen before mentioned, excepting in the action of the compound tension device. In adjusting the strength of the two tension elements the primary tension is set to produce a drag upon the needle-thread only sufficient to bring the interlock of the upper and lower threads within the body of the fabric for production of a series of whip-stitches; while the auxiliary tension element is adjusted to produce upon the upper thread, when closed thereon, an additional drag sufficient to cause loops of shuttle-thread to be drawn upward under the action of the take-up entirely through the fabric for production of a purl intermediate the overedge and depth-stitch needle-thrusts. During the side-stitching, the upper arm of the needle-jog controlling rock-lever 58 is in its rearward position wherein the needle receives short jogging movements and the auxiliary tension is permitted to operate upon the thread to produce a purl-stitch overseam along the edge of the buttonhole. When the rock-lever 58 is shifted for the barring operation, the jog of the needle is increased and the auxiliary tension is simultaneously opened by the action of the releasing lever 73 75 whereby the

interlock of the upper and lower threads for the barring stitches is positioned in the body of the fabric. By merely adjusting the contact-plate 78 as before described, without changing any other part of the mechanism, a buttonhole may be made with the purl-stitch continued into the bar so that the appearance of the stitching remains the same throughout the entire buttonhole. As the action of the two tension elements upon the thread requires to be adjusted with precision, it is desirable that neither should be disturbed after it has been correctly adjusted; and the present improvement affords a means of producing different styles of buttonholes by different methods of manipulation of the stitching-threads without in any manner changing the adjustment of any of the thread-engaging parts.

As shown herein, the machine is provided with a stop-motion device including a swinging stop-lever 87 fulcrumed upon the stud 88 and having a link connection 89 with one arm of a rock-lever 90 mounted upon a fixed fulcrum-stud 91 and having its other arm adapted for engagement with the lower arm 75 of the tension release lever. The rock-lever 90 is normally out of engagement with the lever-arm 75, as represented in Fig. 1, but when the stop-lever 87 is thrown backwardly to stop the machine the rock-lever 90 is turned upon its fulcrum so as to engage the lever-arm 75 for opening the auxiliary tension for convenience in removing or adjusting the work. A device of well known construction is employed for opening the primary tension when the work-clamp is opened.

While the present improvement is shown and described herein in what is considered its preferable form, it is evident that the same may be very considerably modified without departure from the scope of the present invention. It is herein represented as applied to a compound tension device, but it is evidently equally applicable to other forms of thread-controlling devices for automatically changing the position of the interlock of the upper and lower threads in the production of successive groups of stitches, such as those forming the subjects of the United States patents to E. B. Allen No. 757,171, of April 12, 1904, and No. 784,291, of March 7, 1905; the essence of the present invention being the provision of means adapted for adjustment to render either effective or ineffective the automatically acting means for changing the position of the interlock of the threads.

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

1. In a sewing machine, the combination with stitch-forming mechanism comprising a needle carrying an upper thread and a co-

operating loop-taker carrying lower thread, of automatically acting means operating at the completion of each group of stitches of predetermined number whereby the position of the interlock of the upper and lower threads may be changed in the succeeding group of stitches from that of the preceding group, and means including an adjustable element adapted to be set in or continuously out of operative relation with an element of the stitch changing means whereby the latter may be rendered either effective or ineffective in the production of consecutive groups of stitches.

2. In a sewing machine, the combination with stitch-forming mechanism comprising a needle carrying an upper thread and a co-operating loop-taker carrying a lower thread, of means for applying a tension to the upper thread, automatically acting means whereby the tension upon the upper thread may be changed after the production of each group of stitches of predetermined number, and including an adjustable element adapted to be positioned to render the tension-changing means either effective or ineffective during the production of consecutive groups of stitches.

3. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism comprising a needle carrying an upper thread and a co-operating loop-taker carrying a lower thread, and a tension device provided with means for adjusting the maximum and minimum intensity of its action, of tension controlling means acting automatically upon the tension device and adapted to vary the tension upon the thread between said limits for the side-stitches and bar-stitches, respectively, and means acting independently of said means of adjustment for preventing the action of said tension-controlling means during both the side-stitching and barring operations without disturbing the adjustment of the tension.

4. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism comprising a needle carrying an upper thread and a co-operating loop-taker carrying a lower thread, means for changing the length of the stitches in the side-stitching and bar-stitching, a uniformly acting primary upper-thread tension, and an auxiliary upper-thread tension, of tension controlling means actuated by the stitch-changing means and designed in its normal operation to render the auxiliary tension inoperative in the barring operation, and including an adjustable element adapted to be set in or continuously out of operative relation with an element of the stitch-changing means.

5. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism comprising a laterally jogging needle carrying an upper thread and a

coöperating loop-taker carrying a lower thread, means including a vibratory lever for changing the amplitude of the needle-jog for the side- and barring-stitches, respectively, a uniformly acting primary upper-thread tension and an auxiliary upper-thread tension, of a tension releaser comprising a lever acting upon the auxiliary tension and carrying an adjustable contact-piece adapted to be set either in or out of the range of movement of the vibratory lever of the needle-jog changing means.

6. In a sewing machine, the combination with stitch-forming mechanism comprising a needle carrying an upper thread and a co-operating loop-taker carrying a lower thread, of adjustable means for determining the position of the interlock of the upper

and lower threads relative to the face of the work in the production of a group of stitches, automatically acting means adapted to operate at the completion of said group of stitches to change the position of the interlock of the threads in the succeeding group of stitches, and means acting independently of the adjustment of the interlock positioning means for rendering the interlock changing means ineffective in performing its function.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ALEXANDER BOYD.

Witnesses:

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H. J. MILLER.