A. H. DE VOE.

LOWER THREAD CONTROL FOR CHAIN STITCH MACHINES.

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1,273,157.

Patented July 23, 1918.

Fig. 1.

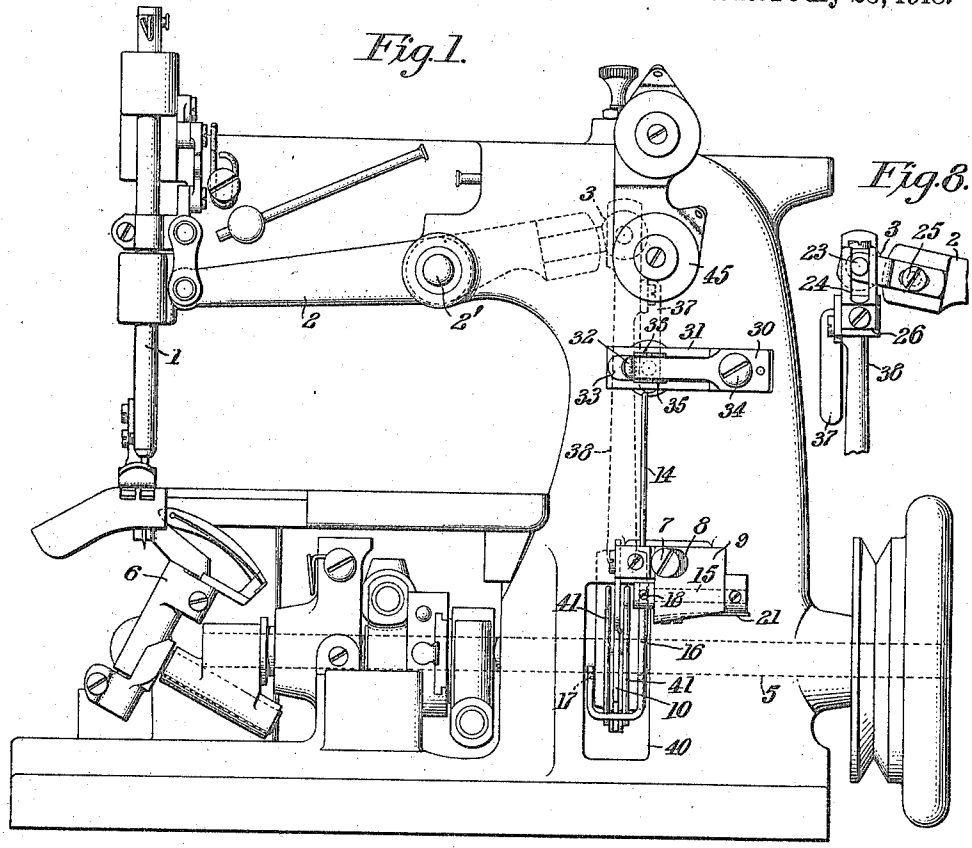


Fig. 6.

Fig. 2.

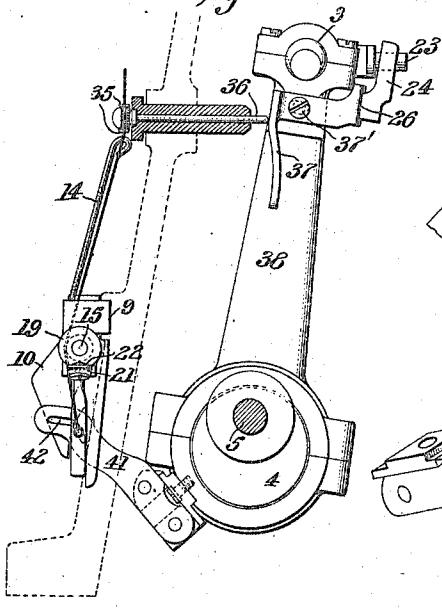


Fig. 3.

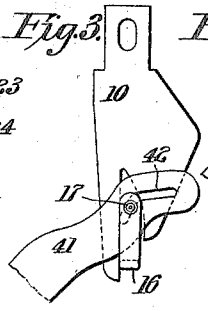


Fig. 4.

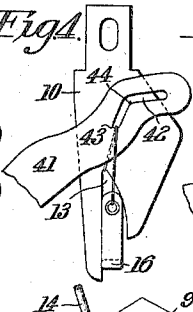


Fig. 5.

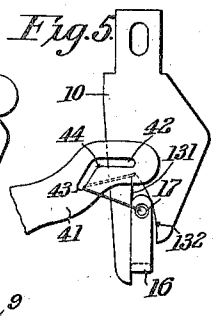


Fig. 6.

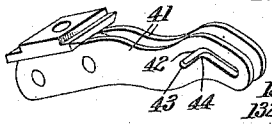
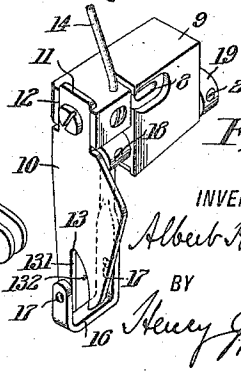


Fig. 7.



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UNITED STATES PATENT OFFICE.

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LOWER-THREAD CONTROL FOR CHAIN-STITCH MACHINES.

1,273,157. Specification of Letters Patent. Patented July 23, 1918.

Application filed August 12, 1916. Serial No. 114,503.

To all whom it may concern:

Be it known that I, ALBERT H. DE VOE, a citizen of the United States, residing at Westfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Lower-Thread Controls for Chain-Stitch Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to sewing machines and particularly to thread-controlling mechanism therefor.

The object of my invention is to provide an improved thread-controlling device for the lower thread of a two-thread chain-stitch machine which is adapted to take up slack as the looper withdraws from the needle-loop, to maintain the thread substantially free from slack as the looper nears the end of its backward stroke and also as it starts on its forward stroke up until it has entered the needle-loop and finally to give up thread rapidly as the looper completes its forward movement.

Another object of my invention is to provide a thread control which accomplishes these results without detracting from the compactness of a construction in which the looper and feed-actuating mechanisms are closely arranged on the main-shaft below the cloth-plate of the machine.

To the attainment of these ends I have placed the take-up proper consisting of relatively fixed guide-eyes embracing two movable arms having angularly shaped slots intermediate which arms is a stationary incisioned plate, together with a thread-nipper and tension-disks on the front of the vertical standard of the frame. A pitman within the vertical standard is driven by an eccentric on the main-shaft below the cloth-plate. This pitman carries the slotted take-up arms at its lower end and at its upper end adjacent a ball-and-socket connection with the needle-actuating lever carries a bent arm which intermittently engages a horizontally arranged plunger for intermittently operating the thread grip. The invention also embraces certain details of construction hereinafter described and referred to in the appended claims.

The invention is illustrated in the accompanying drawings in which Figure 1 is a front side elevation of the machine. Fig. 2 is an end elevation, partly in section, showing the pitman in its relation to the take-up and thread grip. Fig. 3 is a fragmentary detail showing the take-up arms at the beginning of the take-up stroke. Fig. 4 the same at the end of the take-up stroke. Fig. 5 the same when the thread is about to be given up. Figs. 6 and 7 are perspective views of the take-up arms and coöperating devices respectively. Fig. 8 is a detailed view of the connection between the pitman and needle-lever.

The machine is of the two-thread chain-stitch type in which a needle-bar 1 is actuated through a needle-lever 2 pivoted centrally of an overhanging arm as shown at 2′ and driven from a pitman 38 to which it is connected by a ball-and-socket joint 3. The pitman is actuated by an eccentric 4 Fig. 2 fixed to the main-shaft 5, about which it also oscillates as a center being however maintained parallel to the pivot 2′ of the needle-lever 2 in all its movements through the agency of the stud 23 and slotted guiding arm 24 and thereby prevented from rocking on its own longitudinal axis. The axis of the stud 23 is parallel to the pivot 2′ and passes through the center of the ball-and-socket connection 3. For obtaining this relative arrangement of members 23, 24 they are fixedly secured to the needle-lever 2 and pitman 38 respectively in any suitable manner such as the screw and slot connection at 25 and the guideway at 26. The looper indicated at 6 and its actuating mechanism as well as the feed are very similar to that found in my prior Patent No. 1,107,659, granted August 18, 1914, and reference thereto may be had for a full understanding of the details of construction as their specific construction forms no part of the present invention.

By means of a screw 7 and countersunk slot 8 there is adjustably secured to the vertical standard slightly below the elevation of the cloth-plate a block 9 carrying at its end nearest the looper a stationary cam-plate 10. This cam-plate has its upper portion 11 adjustably secured within a guide-way 12 in the block in any suitable manner and has in its lower portion a V-shaped incision 13. One side 131 of this incision is vertical and substantially straight, the other 132 inclined upwardly thereto and slightly curved. The purpose of this curva-

ture is to delay the taking up action of the slotted arms to be hereinafter described until the looper is about to begin its rearward movement. Located vertically above the block is a thread-guarding arm indicated at 14 which shields the thread from the edges of material being operated upon. Journaled horizontally in the block is a rotatable pin 15 parallel to the main shaft 5. Extending downwardly from the pin at its forward end and pivotally supported thereby is a U-shaped bar 16 having guiding eyes 17 in each limb of the U. See Fig. 7. This bar is secured in a hole in the pin and may be adjusted vertically by means of a screw 18. At the end of the pin remote from the stationary cam-plate 10 is a collar 19 adjustably secured thereto by means of a screw 20. A flat spring 21 mounted upon the lower surface of the block is adapted to always frictionally engage the collar on the rock-shaft and when in engagement with a flat surface 22 of the collar the above mentioned U-shaped bar having the guiding eye is substantially perpendicular. The U-shaped bar 16 may be swung forwardly about its pivot to a substantially horizontal position to facilitate threading of the eye 17 and its angular relation to pin 15 may be varied by adjusting the collar 19 through set-screw 20.

Secured in any suitable manner to the lower end of the pitman and extending forwardly and upwardly out through an opening 40 in the vertical standard are two slotted arms 41—41 which embrace the incisioned plate 10 and are in turn embraced by the bar 16 having the thread guiding eyelets. In the forward free ends of these arms are angular-shaped slots 42 which together with the incision 13 in the plate and eyes 17 in the wire constitute the active portions of the take-up.

Directly above the block is a thread-gripping or nipping mechanism indicated generally at 30 consisting of a rigid base portion 31 fixed to the vertical standard and two spring-fingers 32, 33 secured to the base member by means of a clamp screw 34. The inner 32 of these two fingers carries spaced ears 35 between which the outer finger 33 is movable and defining therewith a thread passage which is adapted to be intermittently closed by the forward movement imparted to a horizontally arranged slide-pin 36 actuated from a bent arm 37 adjustably connected by the screw and slot 37′ to the upper end of the needle-actuating pitman 38. This bent arm intermittently engages the slide-pin during the operation of the machine thrusting the inner spring-finger of the thread-gripping device against the outer spring-finger and thereby gripping the thread when it is being taken up and at all other times leaving the thread free passage.

Mounted above the thread-gripping mechanism and on the forward portion of the vertical standard is a constant thread tension 45 of any old and well known construction such as the disk type shown in the drawing.

In the position of the parts shown in Fig. 3 of the drawings, the looper is just about to begin its rearward movement and the thread, which passes from the tension 45 through the thread-gripping mechanism 30 vertically downward to the take-up through the eyelets and slots of which it is then passed to the looper, is about to be taken up by the upward and outward movement of the slotted arms. This movement continues until the arms reach the position shown in Fig. 4 when the taking up action is arrested and the arms continue their movement without any substantial action on the thread until they have reached the position shown in Fig. 5 at which time the thread slips from the bottom 43 of the angular slot 42 in each take up arm up over the shoulder 44 into the horizontal portion of said slots thereby giving up thread rapidly and freely to the looper which has just entered the needle loop.

The U-shaped bar 16 and incisioned plate 10 are made adjustable as described in order to arrange them in coöperative relationship to the moving take-up arms and to permit of slight variations in the timing of the take up action.

The stud 23 and slotted guiding arm 24 are arranged as described in order to move slotted take-up arms 41—41 substantially in a plane and parallel with the incisioned plate 10 without wabbling.

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

1. In a sewing machine, the combination of a main-shaft, means for taking up and giving up thread, means for intermittently gripping the thread, and a common member movable bodily lengthwise for actuating each of said means.

2. In a double-thread chain-stitch sewing machine, the combination with the needle and looper and their actuating mechanism including a main-shaft, of a looper thread-controlling mechanism consisting of a take-up arm, thread-gripping means, a tension, and means including a needle-actuating element for actuating said take-up arm and thread-gripping means controlling the looper-thread.

3. In a double-thread chain-stitch sewing machine, the combination with the needle and looper and their actuating mechanism, of a looper thread-controlling mechanism including a take-up arm, thread-gripping means, a tension, and a needle operating pitman for actuating said take-up arm and thread-gripping means.

4. In a lower-thread control, an incisioned

plate, slotted take-up arms on opposite sides thereof, actuating means for the arms and guiding eyelets on opposite sides of said slotted take-up arms whereby the thread may be bent thrice during the taking up action.

5. In a looper-thread control for a double-chain-stitch machine, the combination of a plate provided with a substantially V-shaped incision, take-up arms on opposite sides of said plate having angular slots therein, and guiding eyes on opposite sides of said plate and beyond said take-up arms, and means for actuating said take-up arms.

6. In a lower-thread controlling mechanism, in combination, a vertically adjustable incisioned plate, slotted take-up arms, vertically and angularly adjustable guiding eyes, and means for moving said take-up arms in a substantially elliptical path whereby the looper-thread may be controlled.

7. In a lower-thread controlling mechanism, in combination, an incisioned plate, slotted take-up arms, thread-guiding eyes, said eyes being carried by a rotatable pin whereby they may be thrown forwardly for easy threading, and means frictionally restraining the rotation of said pin.

8. In a lower-thread controlling mechanism, in combination, an incisioned plate, slotted take-up arms, thread-guiding eyes, said eyes being carried by a rotatable pin whereby they may be thrown forwardly for easy threading, a collar having a flat portion and being mounted on said pin, and means frictionally engaging said collar.

9. In a double-chain-stitch machine, the combination of a needle, looper and actuating mechanism therefor including a needle-actuating pitman, of a lower-thread control comprising take-up arms carried by the pitman and having angular-shaped slots inclosing the looper-thread, an incisioned plate, and thread-guiding eyes coöperating therewith whereby thread is taken up as the looper retracts, maintained substantially free from slack while the looper is in its retracted position and until the looper moving forward has entered the needle-loop, and then liberated for furnishing slack to the looper as the looper completes its forward stroke.

10. In a thread-controlling mechanism for a two-thread chain-stitch machine, the combination with the needle, looper, and their actuating mechanism including a needle-actuating pitman, of take-up arms fixed at one end to said pitman and free at the other end, said arms having thread-inclosing slots in their free ends, means arranged adjacent said slots and coöperating therewith to take up the thread as the looper is retracted to maintain the thread substantially free from slack as the looper is in its retracted position until the looper moving forward has entered the needle-loop and finally give up the thread as the looper completes its forward motion.

11. In a lower-thread controlling mechanism, the combination with a needle, looper and actuating mechanism therefor, and a frame, of a take-up mechanism, thread-gripping means arranged directly above said take-up mechanism, and a tension arranged directly above said thread-gripping means, said take-up, thread-grip and tension being operative externally of the frame whereby the thread passes from the tension to the take-up in a substantially straight line downwardly and from the take-up to the looper laterally in a substantially straight line.

12. In a lower thread control for chain-stitch machines, the combination with stitching mechanism and actuating mechanism therefor including a pivoted needle-lever, a pitman connected thereto and a driving eccentric pivotally supporting said pitman, of take-up arms secured to said pitman adjacent said eccentric, and means for confining said take-up arms for movement in a fixed path substantially in a plane, said means being located adjacent the needle-lever.

13. In a lower thread control for chain-stitch machines, the combination with stitching mechanism and actuating mechanism therefor including a pivoted needle-lever, a pitman connected thereto and a driving eccentric pivotally supporting said pitman, of take-up arms secured to said pitman adjacent said eccentric, and means for preventing the pitman from rocking appreciably about its own longitudinal axis to confine the movement of the take-up arms to a fixed path.

14. In a lower thread control for chain-stitch machines, the combination with stitching mechanism and actuating mechanism therefor including a pivoted needle-lever, a pitman connected thereto by a ball-and-socket joint and a driving eccentric pivotally supporting said pitman, of take-up arms secured to said pitman adjacent said eccentric, and means for preventing the pitman from rocking appreciably about its own longitudinal axis to confine the movement of the take-up arms to a fixed path, said means including a pin, the axis of which is parallel to the pivotal axis of the needle-lever and passes through the center of the ball-and-socket connection between the needle-lever and pitman.

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

ALBERT H. DE VOE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."