

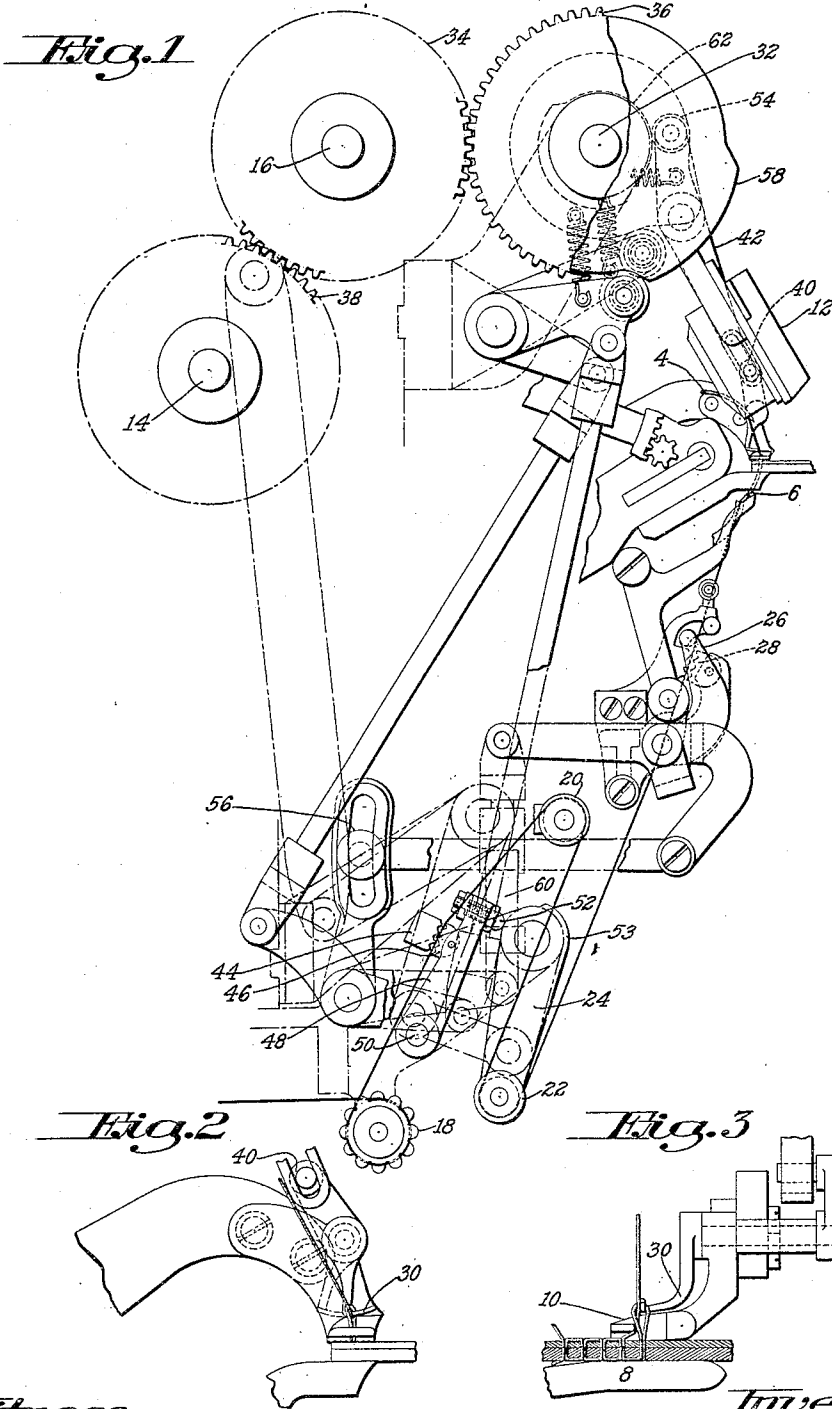
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SEWING MACHINE

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Witness

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SEWING MACHINE

Application filed June 16, 1931, Serial No. 544,911, and in Great Britain August 1, 1930.

This invention relates to sewing machines, and as herein disclosed is embodied in a lockstitch outsole sewing machine such as that disclosed in the application of Erastus E. Winkley, Serial No. 277,113, filed May 12, 1928, upon which Patent No. 1,827,378 issued October 13, 1931.

In the machine of the above patent, the needle loop is pulled off the loop taker and bobbin case by a constant throw main take-up lever operating against a tension and is drawn down until the loop is engaged and held by a loop detaining finger, associated with the presser foot, a predetermined distance above the surface of the work, while the continued operation of the take-up acts to draw from the supply the amount of thread required for the next succeeding stitch. The loop is drawn from the point where it is held by the loop detaining finger to set the stitch in the work by means of a constant throw auxiliary take-up operating against a thread lock so that a uniform stitch is obtained with the stitch locks sunk a uniform distance into the work.

It has been found that with this mechanism, the loop is not always pulled down properly to the loop detaining finger unless a quite considerable tension is applied by the tension device, with the result that loops of thread may be left standing up in the work. This is apparently due to the resistance offered to the loop of needle thread by the loop taker and bobbin case as the loop is being pulled off the shuttle being greater than the resistance of the thread tension with the result that the constant throw main take-up pulls thread from the supply through the tension instead of exclusively pulling the loop from the loop taker and bobbin case. If the tension is increased sufficiently to ensure that the loop will always be drawn down the tension is such that, when the main take-up is pulling thread from the supply for the succeeding stitch, the thread and the loop detaining finger are apt to be unduly strained with the result that the thread stretches and the finger which is small and light may be bent.

The principal object of the present inven-

tion is to improve lockstitch machines utilizing the principle of operation of the machine of the patent above referred to, and with this object in view, a feature of the invention contemplates the provision in a lockstitch sewing machine utilizing this principle of operation, of a thread lock and means for actuating the lock to hold the needle thread as the needle loop is being drawn from the loop taker, in order to insure the removal of the loop therefrom, and to release the thread to permit the needle loop to be drawn down to a predetermined position relatively to the work and thereafter thread for the next stitch to be drawn from the supply through the tension.

In embodying the present invention in a machine such as that disclosed in the Winkley patent above referred to, a supplemental thread lock has been provided together with means for actuating this supplemental thread lock to cause it to operate in timed relationship to the other machine parts to hold the thread between the main take-up and the thread tension while the loop is being pulled from the loop taker and bobbin case substantially down to the detaining finger and then to release the thread and remain open while the main take-up is pulling the needle loop into contact with the finger and is drawing thread from the supply. In the construction hereinafter specifically described, this supplemental thread lock is conveniently operated by the main take-up lever, an operative connection being provided between the take-up lever and the thread lock whereby the thread lock is held closed during the first portion of the thread pulling action of the take-up and is then released so that it remains open during the continued operation of the take-up in drawing thread from the supply.

With the above and other objects in view, as will hereinafter appear, the present invention also consists in the devices, combinations and arrangements of parts hereinafter described and claimed, the advantages of which will be readily understood by those skilled in the art from the following description.

In the drawing illustrating one embodiment of the invention in a lockstitch shoe sewing machine, Fig. 1 is a view in left side elevation of the machine illustrating particularly the thread handling devices and certain of their operative connections, only so much of the machine being illustrated as is necessary to show the connection of the present invention therewith; Figs. 2 and 3 are detail views of the presser foot and loop detaining finger associated therewith.

The invention is herein disclosed as embodied in a lockstitch shoe sewing machine having, except as hereinafter described, a construction and mode of operation substantially similar to the machine disclosed in the patent to Ashworth No. 1,169,909, dated February 1, 1916. A curve hooked needle of ordinary construction is indicated at 4, the curved awl cooperating therewith at 6, the work support at 8, the presser-foot at 10, and the bobbin case and loop taker are indicated generally at 12. These parts are actuated from the shafts 14 and 16 of the machine through connections which are more fully described in the patent to Ashworth above referred to.

The thread passes from the thread supply through a thread tension 18 of any ordinary construction over the pulley 20 around the pulley 22 mounted on the take-up lever 24 which is actuated from the shaft 14 as in the machine of Patent No. 1,169,909 above referred to.

An auxiliary take-up lever is indicated at 26, an auxiliary thread clamp which cooperates therewith at 28, and a loop detaining finger which interrupts the downward movement of the loop after it is drawn from the loop taker is indicated at 30, (see Figs. 2 and 3) these parts being constructed and arranged to operate as in the machine of the Winkley patent referred to. The auxiliary take-up lever, the auxiliary thread clamp and the loop detaining finger are all actuated from the cam shaft 32 which is driven from the shaft 16 through the gear 34 mounted thereon and the intermeshing gear 36 mounted on the cam shaft 32. The shaft 16 is in turn driven from the shaft 14 through a gear 38 which meshes with the gear 34.

The auxiliary take-up lever is actuated by a cam 54, secured to the cam shaft 32, through lever and link connections including an adjustable pin and slot connection 56, and the auxiliary thread clamp 28 is actuated by a cam 58 secured to the cam shaft 32, through lever and link connections including a yielding link of ordinary construction generally indicated by dotted lines at 60. (See Fig. 1.) The loop detaining finger 30 is moved into and out of loop detaining position by a cam 62 secured to the cam shaft 32 through a lever 42 pivotally mounted in the machine frame

and having a cam and slot connection 40 with the finger.

In the present embodiment of the invention, means for locking the thread between the main take-up and the supply while the take-up is drawing down the needle loop from the loop taker consists in a main thread lock positioned between the main take-up and the thread tension device 18. As illustrated, the main thread lock comprises a block 44 fixed to the machine frame and a block 46 pivotally mounted on an arm 48. The arm 48 is pivotally mounted at 50 on the machine frame and carries the spring plunger 52. Operative connections are provided between the main take-up lever 24 and the arm 48 for closing the main thread lock and holding it locked during the actuation of the main take-up to draw the loop from the loop taker nearly down to the loop detaining finger. After the loop has been drawn down to the loop detaining finger, the main thread lock is released in order to permit the main take-up to draw thread from the supply through the thread tension 18.

In the construction illustrated, the main thread lock is actuated by a cam 53 formed on the hub of the take-up lever 24 which cam engages the outer end of a spring plunger 52 mounted in the outer end of the arm 48. The main thread lock is thus actuated through the yielding connection provided by the spring of the plunger, which spring is strong enough to prevent the thread from being pulled through the lock when the lock is closed but allows for different thicknesses of thread.

The operation of the devices constituting the embodiment of the present invention has been indicated in connection with the preceding description of their construction and arrangement, but may be briefly summarized as follows: After the needle loop passes over the top of the bobbin case, it is drawn down towards the work by the action of the main take-up, the main thread lock at this time being in its closed position. During the movement of the main take-up, the main thread lock remains closed until the needle loop has nearly reached the thread detaining finger 30 on the presser-foot so that the needle loop is pulled with certainty from the loop taker and bobbin case without any liability of any thread being pulled through the tension from the supply. The main thread lock is now released and during the continued movement of the main take-up the thread loop is brought into engagement with the detaining finger, and as the main take-up completes its movement, thread for the next stitch is drawn from the supply through the tension and through the open main thread lock. The amount of thread thus drawn from the supply will vary with variations in the thickness of the stock and in the length

of the stitch, the amount of thread left in the needle loop supported on the finger 30 being the same for all thicknesses of work and length of stitch. After the thread has
 5 been drawn from the supply by the final movement of the main take-up, the auxiliary thread clamp is closed and the auxiliary take-up is actuated to draw the needle loop a fixed predetermined distance into the work and
 10 complete the setting of the stitch, the finger 30 in the meantime having been withdrawn from the needle loop in order to permit this action.

What is claimed as the invention is:

15 1. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hooked needle, a loop taker for passing the needle thread around the bobbin thread, a thread tension, means for
 20 pulling on the thread to draw down the needle loop, means for locking the thread while the needle loop is being drawn down and for then unlocking the thread and continuing the pull on the thread to draw thread from
 25 the supply for the next stitch against the resistance offered by the tension, and means for then locking the thread and for finally exerting a pull on the thread to set the stitch a uniform distance into the work.

30 2. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle, a loop taker for passing the needle thread around the bobbin thread, a thread tension, a thread
 35 lock, means for pulling on the thread against the resistance of the thread lock to draw down the needle loop, means for then opening the thread lock and for pulling on the thread against the tension to draw down the
 40 loop to a predetermined position relatively to the work and then draw thread from the supply, and means for finally locking the thread and exerting a pull on the thread to set the stitch a uniform distance into the
 45 work.

3. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle, a loop taker for passing the needle thread around the
 50 bobbin thread, a thread lock, a tension, a thread take-up, means for actuating the take-up to pull on the thread against the resistance of the thread lock to draw down the loop, means for then opening the thread
 55 lock and holding it open while the take-up draws the needle loop down to a predetermined position relatively to the work and then draws thread from the supply, and means for then locking the thread and for
 60 finally exerting a pull on the thread to set the stitch a uniform distance into the work.

4. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle, a loop taker
 65 for passing the needle thread around the

bobbin thread, a main thread lock, a main thread take-up, means for actuating the main take-up to pull on the thread against the resistance of the main thread lock to
 70 draw down the loop, means for then opening the main thread lock and holding it open while the main take-up draws the needle loop down to a predetermined position relatively to the work and then draws thread
 75 from the supply, an auxiliary take-up, an auxiliary thread lock, and means for actuating the auxiliary take-up to pull on the thread against the resistance of the auxiliary thread lock to set the stitch a uniform distance
 80 into the work.

5. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle, a loop taker for passing the needle thread around the bobbin thread, a thread tension, a thread lock,
 85 means for pulling on the thread against the resistance of the thread lock to draw down the needle loop, means for then releasing the thread lock and for pulling on the thread against the tension to draw down the loop to a
 90 predetermined position relatively to the work, and then draw thread from the supply, a loop detaining finger against which the loop is drawn after the thread lock is opened, and means for finally locking the thread and
 95 exerting a pull on the thread to set the stitch a uniform distance into the work.

6. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle, a loop taker
 100 for passing the needle thread around the bobbin thread, a thread lock, a tension a thread take-up, means for actuating the take-up to pull on the thread against the resistance of the thread lock to draw down the
 105 loop, means for then opening the thread lock and holding it open while the take-up draws the needle loop down to a predetermined position relatively to the work and then draws thread from the supply, a loop detaining
 110 finger against which the needle loop is drawn by the take-up after the thread lock is opened, and means acting after thread has been drawn from the supply to lock the thread and finally to exert a pull on the
 115 thread to set the stitch a uniform distance into the work.

7. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle, a loop taker
 120 for passing the needle thread around the bobbin thread, a main thread lock, a main thread take-up, means for actuating the main take-up to pull on the thread against the resistance of the main thread lock to
 125 draw down the needle loop, means for then opening the main thread lock and holding it open while the main take-up draws the needle loop down to a predetermined position relatively to the work and then draws
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the thread from the supply, a loop detaining finger against which the needle loop is drawn by the main take-up after the main thread lock is opened, an auxiliary take-up, an auxiliary thread lock, and means for actuating the auxiliary take-up to pull on the thread against the resistance of the auxiliary thread lock to set the stitch a uniform distance into the work.

- 10 8. A lockstitch sewing machine having, in combination, a hook needle, a loop taker for passing the needle thread around the bobbin thread, a work support, a thread tension, a main take-up, means for actuating the main
15 take-up to draw down the needle loop after it has passed over the bobbin thread, a loop detaining finger, a main thread lock, operative connections between the take-up and the thread lock comprising a cam moving with
20 the take-up and acting to hold the main thread lock closed while the loop is being drawn down and to open the thread lock and keep it open while the take-up draws the needle loop against the finger and then
25 draws thread from the supply, and means for finally locking the thread and exerting a pull on the thread to set the stitch a uniform distance into the work.

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

HARRY BROOKSHAW ALLCOCK.

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