

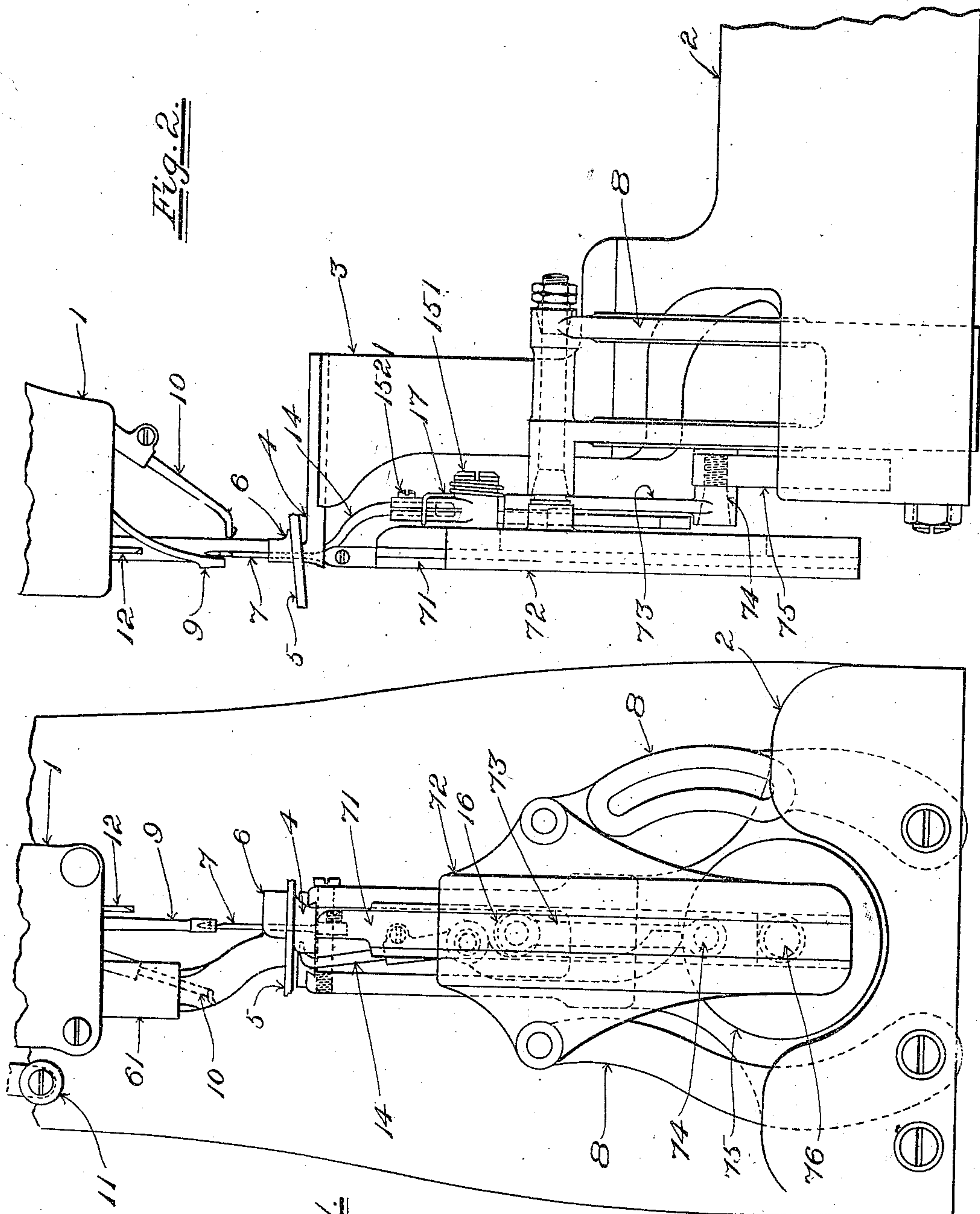
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PATENTED FEB. 12, 1907.

F. W. MERRICK.
LOOP LOCK STITCH SEWING MACHINE.

APPLICATION FILED OCT. 12, 1905.

2 SHEETS—SHEET 1.



Witnesses:
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Fig. 1.

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UNITED STATES PATENT OFFICE.

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LOOP-LOCK-STITCH SEWING-MACHINE.

No. 843,760.

Specification of Letters Patent.

Patented Feb. 12, 1907.

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To all whom it may concern:

Be it known that I, FRANK W. MERRICK, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Loop-Lock-Stitch Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention consists in a machine of simple construction fitted for working at high speed, operating to produce the so-called "loop-lock" stitch. Such stitch is made by the use of two threads, one thread
15 having a loop thereof extended into the substance of the material or stock in which the stitch is formed from one surface of the said material or stock and the other thread having a doubled portion thereof extended from
20 the opposite surface of the material or stock into the said substance, passing through and caught by the loop aforesaid of the first thread and bent back upon itself around the bight of the said loop. A seam formed by the
25 said stitch resembles in external appearance a lock-stitch seam made with the aid of a shuttle and is free from the ridge that is constituted by the interchaining portions of the stitches of a chain-stitch seam.

30 An embodiment of the invention is illustrated in the accompanying drawings, in which latter—

Figure 1 is an end elevation of a portion of a machine containing the said embodiment, only such parts being shown as are required
35 for the purposes of a clear presentation of the invention itself. Fig. 2 shows in side or front elevation the parts which are shown in Fig. 1. Fig. 3 is a detail view, on a scale somewhat
40 larger than Figs. 1 and 2, showing the work-support, a thickness of material or stock resting thereon, the presser resting upon the said material or stock, the needle, the needle-bar, and the looper. Figs. 4, 5, and 6 are
45 views similar to Fig. 3, showing different stages in the operations by which a stitch is formed.

Having reference to the drawings, at 1 is shown a portion of the head forming part of the overhanging arm or gooseneck of the
50 fixed frame of the machine. 2 is a portion of the lower part of the said frame. 3 is the fixed post, which is located upon one end of the said lower part 2 of the frame, and 4 is
55 the work-support upon the top of the said

post. A piece of material or stock 5, which for brevity may be termed the "work," is shown lying upon the top of the work-support 4. At 6 is shown a presser bearing upon the top of the said piece of material or stock, 60 and at 61 is shown the lower portion of the presser-bar, which latter, as usual, is fitted to guides with which the head 1 is provided.

At 7 is a hooked needle working upwardly from below; at 71, the needle-bar; at 72, the
65 feed-post, having guides in which the needle-bar is fitted and moves lengthwise; at 73, a motion-transmitting link having one end thereof pivotally joined to the needle-bar; at 74, a crank-pin to which the other end of the
70 said link is connected; at 75, a disk carrying the said crank-pin, and at 76 a rotating shaft that is mounted in bearings in the lower part 2 of the frame and on which the crank-disk
75 75 is made fast. When the shaft 76 is rotated, motion is communicated to the needle-bar in the usual manner through the connections which have just been described.

8 8 are parallel rockers on which the feed-post 72 is mounted, substantially as in 80 United States Letters Patent for feed mechanism for sewing-machines granted to me April 11, 1905, No. 786,909. The feed movements are produced by causing the said rockers to vibrate back and forth in the line of the
85 feed by means not necessary to be shown or explained herein.

At 9 is shown a portion of the thread-guide, the latter being operated to lay the thread in the open eye of the needle when the latter 90 occupies its elevated position; at 10, a portion of the thread-finger or thread-measurer; at 11, Fig. 1, a portion of the take-up arm or lever, and at 12 an awl, the awl-bar (not shown) being fitted to guides with which the
95 head 1 is furnished.

As thus far described the parts are old.

In operation the awl descends, making a hole through the material or stock, and then rises, followed by the needle, which latter 100 passes up through the hole made by the awl. The thread-guide lays the thread *a* in the open eye of the needle, which descends, drawing a loop of thread through the awl-hole in the material or stock. 105

At 14 is a looper working beneath the material or stock and operating to place a doubled portion of a second thread *b* within the loop drawn down by the needle. The
110 said looper is applied to a looper-carrier 15, 110

the latter being supported upon the feed-post at the inner side thereof by means of a pivotal stud or screw 151. The upper end of the looper-carrier is formed with a split clamp which receives the stem of the looper and is tightened upon the said stem by means of a screw 1521 to hold the looper securely. The stem of the looper is bent laterally, as shown in Fig. 2, so as to cause the working end of the looper to extend into the same vertical plane with the needle in the direction of the feed. The said working end is bent or curved and also pointed to form a beak and has an eye 142 through the said beak near the point, and a second eye 141 is made through the upper portion of the looper-stem adjacent the beak. The second or under thread *b*, coming from a suitable source of supply, (not shown,) is passed through the eye 141 and then upward through the eye 142. The top of the looper next the work is located close to the latter and is slightly grooved to accommodate the portion of under thread which extends from eye 142 to the work. The working end of the looper plays back and forth in the line of the feed in the plane of the needle from a normal position at the side of the needle toward which the work is fed. For the actuation of the looper the looper-carrier is operatively combined with the needle-bar by means of a roll or other projection with which the needle-bar is furnished and which acts in the movements of the needle-bar to occasion the required working of the looper. The said roll is shown at 16. It makes contact with the body of the looper-carrier. The said body is furnished with a straight surface at 152, along which the roll travels through the greater part of the movement of the needle-bar and needle up and down without any movement of the looper taking place, with a cam portion 153, which the roll 16 impinges against as the needle-bar and needle approach the end of their stroke in drawing a loop of upper thread through the work and with a dwell portion 154 below the said cam portion. The pressure of the roll against the inclined cam-surface during the descent of the needle-bar and needle operates to turn the looper-carrier and move the looper to cause the working end of the latter to pass in above the point of the needle between the said point and the under surface of the work, as indicated in Fig. 4. Thereby the beak of the looper is caused to enter the said loop of upper thread, as represented in the said figure. The extent of the movement which is given to the looper by the action of roll 16 against the surface of the cam portion 153 of the looper-carrier is such as to cause the looper to press against one side of the loop of upper thread held by the descending needle and strains such side toward the opening of the eye of the needle, as indicated in Fig. 5. The roll

16 moves along the straight dwell portion 154 during the final portion of the descent of the needle-bar and needle without further movement being communicated to the looper, the contact of the roll with the said dwell portion operating to keep the looper stationary in the position shown in Fig. 5 during such portion of the said descent and also during the first portion of the ascent of the needle-bar and needle. As the needle-bar and needle begin to rise the strain of the hook of the needle upon the loop of upper thread is relaxed, permitting the said loop to pass out from the eye of the needle under the pressure of the looper against one side thereof, such pressure existing in the position of the looper shown in Fig. 5, as already explained. The loop of upper thread thus freed from the needle is drawn by the action of the take-up up against the beak of the looper. As this occurs the continued rise of the needle-bar carries the roll 16 upward along the cam portion 153 of the looper-carrier.

The looper-carrier is engaged by a spring 17, Fig. 2, having the coil thereof loosely supported upon the hub portion of the looper-carrier, with one bent end of the said spring in engagement with the looper-carrier and the other with the feed-post. The said spring acts with a tendency to move the looper-carrier and looper in the direction opposite to that in which they are moved by the pressure of roll 16 against cam portion 153, and it holds the looper-carrier pressed into contact with the roll. As, therefore, the roll 16 travels upward along the surface of the cam portion 153 the looper-carrier and looper are moved reversely through the action of the spring, so as to withdraw the beak of the looper from the ascending loop of upper thread. In this withdrawing movement of the looper the portion of under thread which by the advancing movement of the looper was extended from the last-completed stitch to the eye 142 (see Fig. 5) is doubled or buckled upon itself and left projecting beyond the extreme tip of the looper, as will appear in Fig. 6. As the said tip escapes from the tightening loop of upper thread the said loop clasps the doubled and projecting portion of the under thread, retaining the same and drawing the same up into the awl-hole as the final tightening of the stitch takes place. Thereby the stitch is completed. During the upward travel of the roll 16 along the surface 152 of the looper-carrier, occurring as the needle-bar and needle rise to cause the needle to pass through a newly-formed awl-hole in the work preparatory to receiving the upper thread for the production of the next stitch, the looper dwells in its retracted position occupied in Fig. 3.

In consequence of being mounted upon the feed-post and accompanying the same and the needle-bar and needle in the feed and re-

turn movements the looper always retains its working relations with respect to the needle.

In the illustrated embodiment of the invention the use of a detent for locking the doubled portion of under thread during the withdrawing movement of the looper is dispensed with.

On its way to the working end of the looper the under thread *b* passes through a tension device 18. The latter is mounted upon or in connection with the looper-carrier in order that the movements of the looper may not act to take up the under thread *b*, so as to withdraw the doubled or buckled portion thereof, and thereby prevent such portion from being caught properly by the tightening loop of upper thread.

I claim as my invention—

1. In a loop-lock-stitch sewing-machine, the combination with the needle, needle-bar, and feed-post, supporting the needle-bar, of a looper constructed to introduce loops of the loop-lock thread within loops of another thread passed by the needle through the material being stitched, said looper mounted upon the feed-post and accompanying the latter in its movements and means for operating the said looper.

2. In a loop-lock-stitch sewing-machine, the combination with the needle, needle-bar, and feed-post, supporting the needle-bar of a looper for the loop-lock thread operated by the said needle-bar and supported by the said feed-post said looper constructed to introduce loops of the loop-lock thread within loops of another thread drawn by the needle through the material being stitched.

3. In a loop-lock-stitch sewing-machine, the combination with the needle, needle-bar, and feed-post, supporting the needle-bar of a looper for the loop-lock thread constructed to introduce loops of the loop-lock thread within loops of another thread drawn by the needle through the material being stitched, a looper-carrier pivotally connected with the said feed-post, and a roll or projection carried by the needle-bar and engaging with the said looper-carrier to operate the said looper.

4. In a loop-lock-stitch sewing-machine, the combination with the reciprocating hooked needle, of the reciprocating looper constructed and operating to insert a doubled portion of locking-thread into the loop of thread drawn by the needle, and also acting to cast off the said loop from the needle and means for actuating the said looper.

5. In a loop-lock-stitch machine, in combination, a reciprocating needle by which a loop of thread is passed through the material

being operated upon, a looper working in close proximity to one surface of the said material and having a delivery end which enters the said loop and around which the latter tightens in being drawn, the said looper having a guide-eye for the loop-lock thread delivering the said thread at the surface of the looper next the adjacent surface of the said material, and the looper operating by its return movement to buckle the loop-lock thread upon itself within the embracing loop of needle-thread, and operating means for the needle and looper.

6. In a loop-lock-stitch machine, in combination, a reciprocating needle by which a loop of thread is passed through the material being operated upon, a looper working in close proximity to one surface of the said material and having a delivery end which enters the said loop and around which the latter tightens in being drawn, the said looper having a guide-eye for the loop-lock thread delivering the said thread at the surface of the looper next the adjacent surface of the said material, and the looper operating by its return movement to buckle the loop-lock thread upon itself within the loop of needle-thread, actuating means for the needle and looper, and a take-up operating to draw the needle-loop to clasp the buckled loop-lock thread at the tip of the looper as the latter withdraws.

7. In a loop-lock-stitch machine, in combination, a reciprocating needle by which a loop of thread is passed through the material being operated upon, a looper having a delivery end which enters the said loop and around which the latter tightens, the said looper having a guide-eye for the loop-lock thread delivering the said thread at the adjacent surface of the said material, and being grooved to confine the thread at such surface, the looper operating by its return movement to buckle the loop-lock thread upon itself within the loop of needle-thread, and operating means for the needle and looper.

8. In a loop-lock-stitch sewing-machine, the combination with the reciprocating needle, and looper constructed and operating to introduce a doubled or buckled portion of thread into the needle-loop, of a tension device for the loop-lock thread mounted upon or in connection with the said looper and actuating means for the looper.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK W. MERRICK.

Witnesses:

CHAS. F. RANDALL,
EDITH J. ANDERSON.