

Feb. 28, 1950

E. P. SPAINE
THREAD-TRIMMING AND PULL-OFF MECHANISM
FOR SEWING MACHINES

2,499,335

Filed April 25, 1946

4 Sheets-Sheet 1

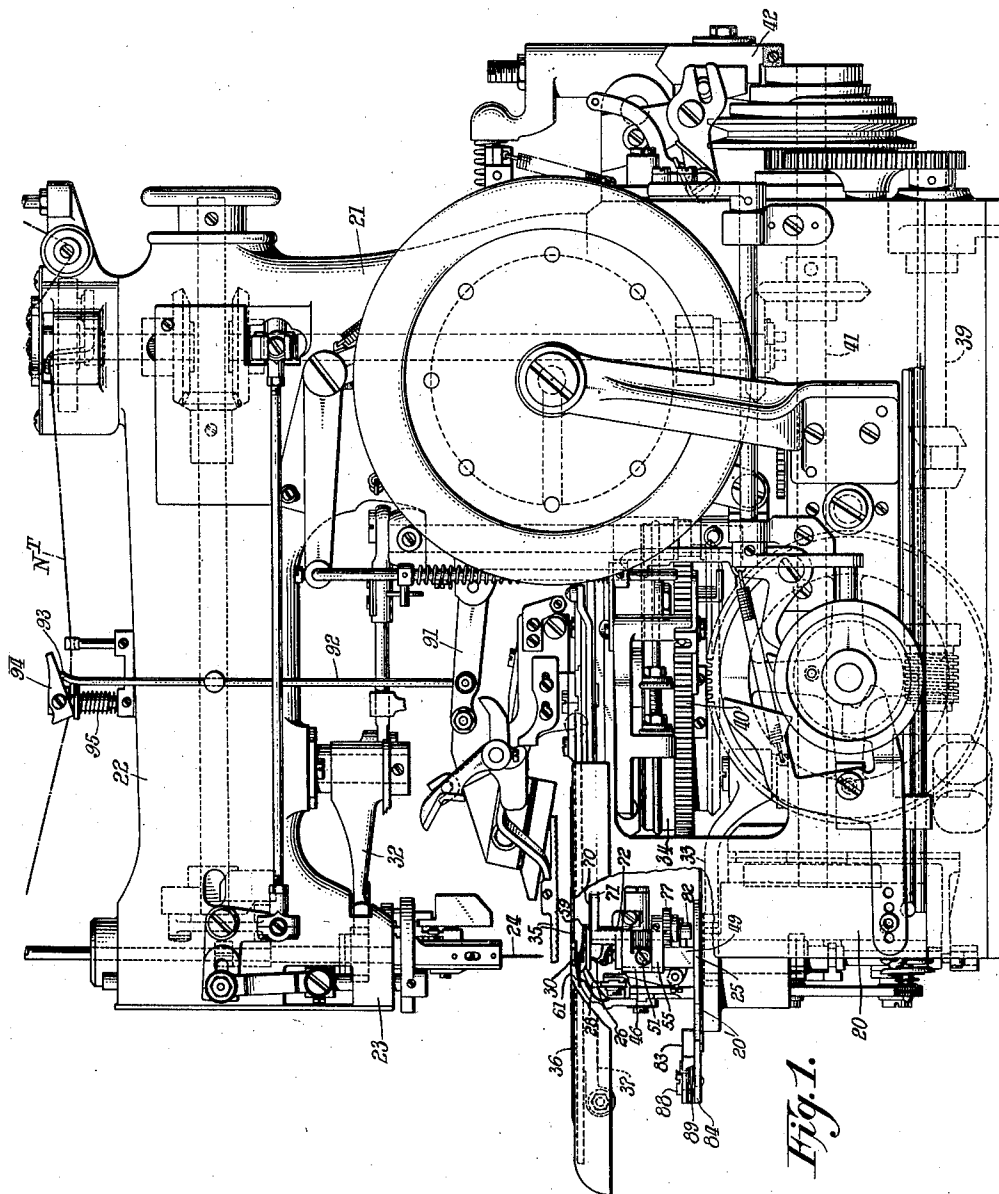


Fig. 1.

Inventor

Edward P. Spaine

Witness

Godfrey P. Reina

By

William P. Stewart

Attorney

Feb. 28, 1950

E. P. SPAINE
THREAD-TRIMMING AND PULL-OFF MECHANISM
FOR SEWING MACHINES

2,499,335

Filed April 25, 1946

4 Sheets-Sheet 2

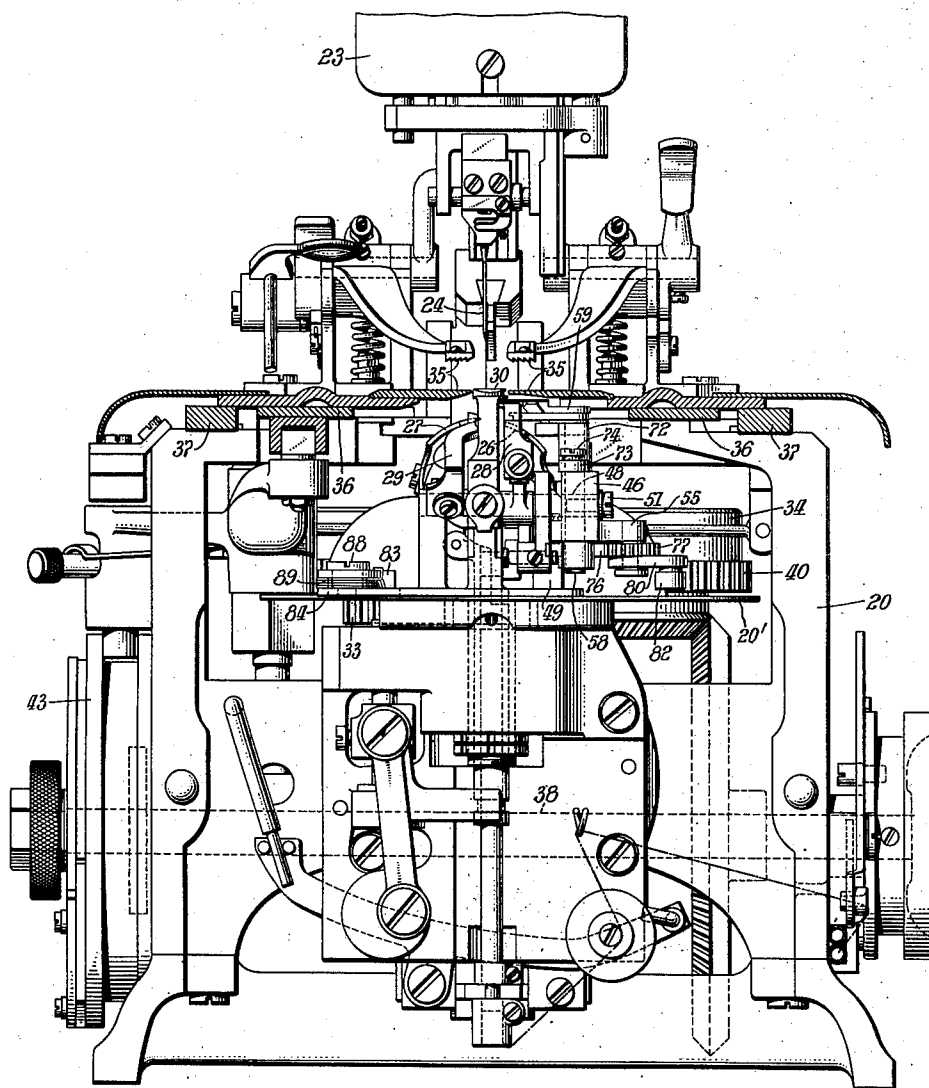


Fig. 2.

Inventor
Edward P. Spaine

Witness:
Godfrey Pecina

By William P. Stewart
Attorney

Feb. 28, 1950

E. P. SPAINE
THREAD-TRIMMING AND PULL-OFF MECHANISM
FOR SEWING MACHINES

2,499,335

Filed April 25, 1946

4 Sheets-Sheet 3

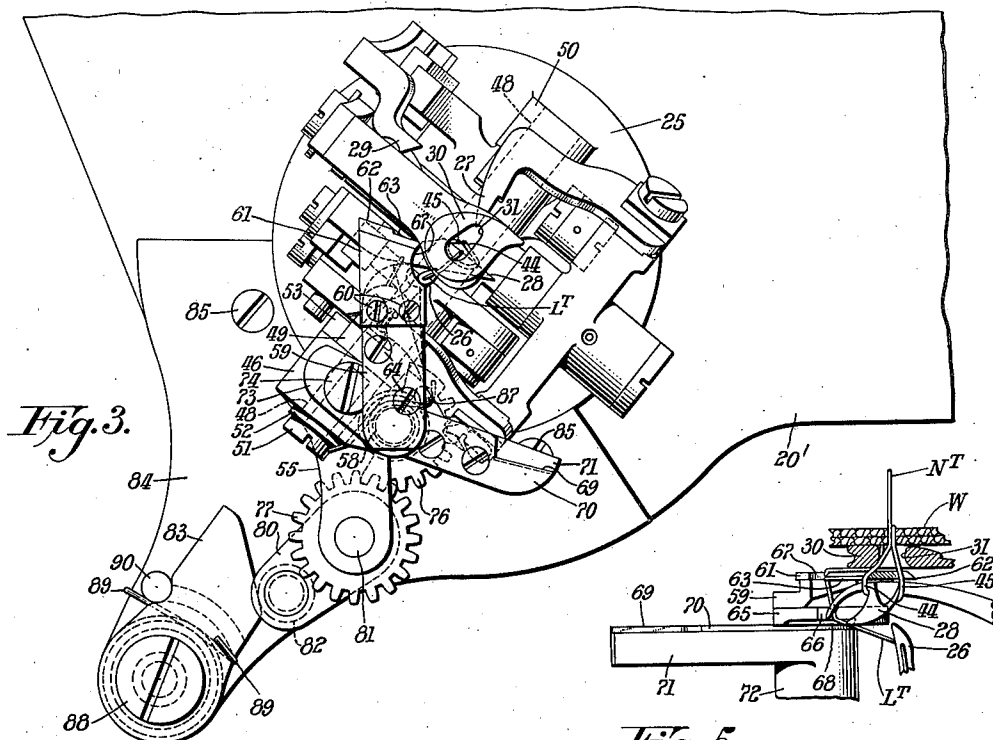


Fig. 5.

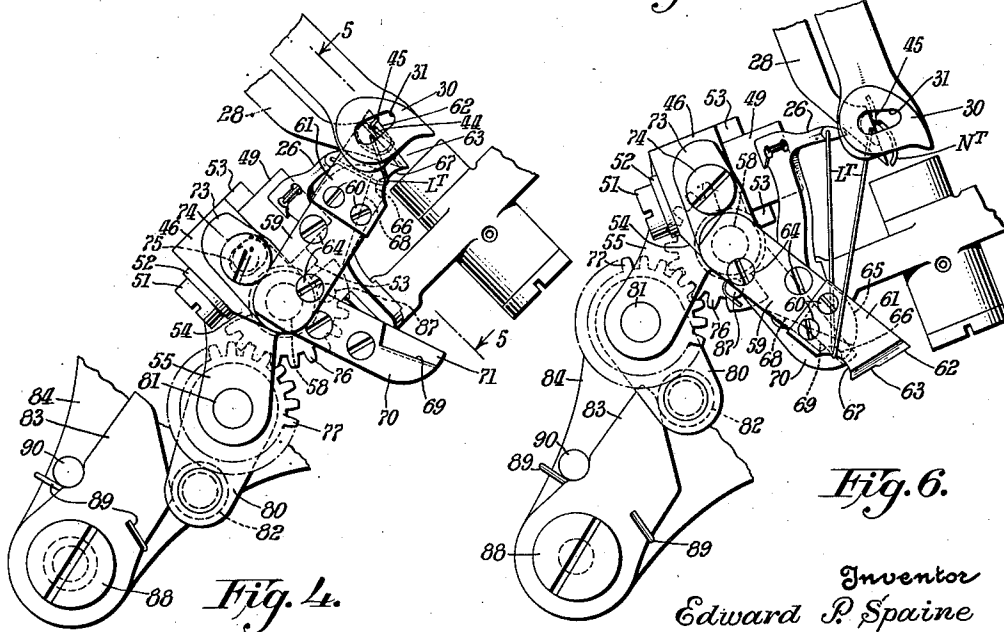


Fig. 4.

Fig. 6.

Witness
Joseph Pecina

Inventor
Edward P. Spaine
By
William P. Stewart
Attorney

Feb. 28, 1950

E. P. SPAINE
THREAD-TRIMMING AND PULL-OFF MECHANISM
FOR SEWING MACHINES

2,499,335

Filed April 25, 1946

4 Sheets-Sheet 4

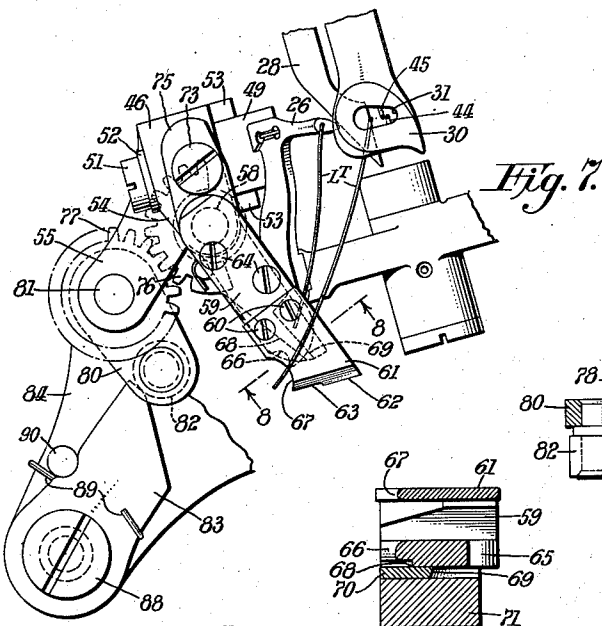


Fig. 7.

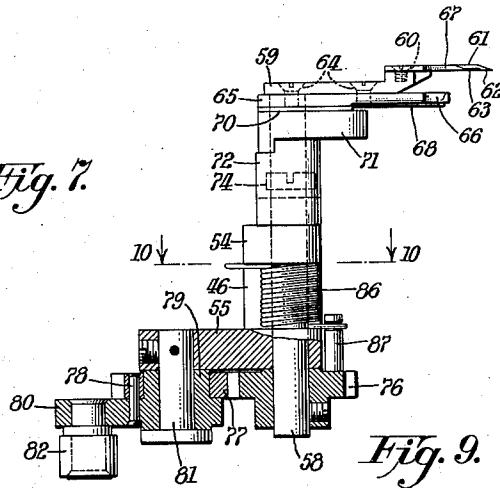


Fig. 9.

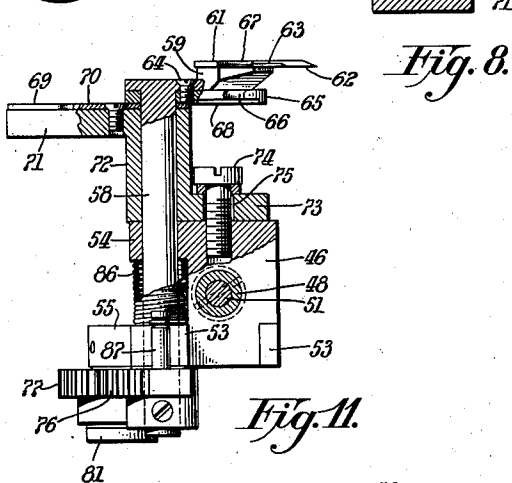


Fig. 8.

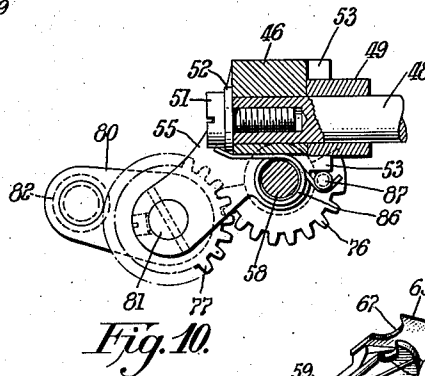


Fig. 10.

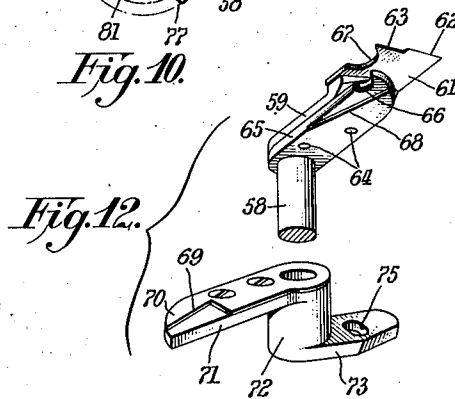


Fig. 12.

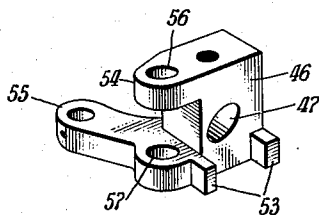


Fig. 13.

Witness:
Godfrey Pecina

Inventor
Edward P. Spaine
By
William P. Stewart
Attorney

UNITED STATES PATENT OFFICE

2,499,335

THREAD-TRIMMING AND PULL-OFF MECHANISM FOR SEWING MACHINES

Edward P. Spaine, Bridgeport, Conn., assignor to
The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application April 25, 1946, Serial No. 664,886

17 Claims. (Cl. 112-252)

1

This invention relates to sewing machines of the group-stitch type which are constructed to sew a short seam and then come to rest automatically, and it has particular reference to devices for cutting the needle thread and the looper thread.

The invention is herein illustrated as embodied in a buttonhole sewing machine of the type in which the stitch-forming mechanism, including the upper-thread-handling mechanism and the under-thread-handling mechanism, is adapted to be rotated at each end of the buttonhole. The under-thread-handling mechanism is carried by a turret beneath the work-holding means and comprises looper devices and loop-detainers arranged to concatenate the under thread with the needle thread and present the needle-thread-loops properly to receive the needle during its penetrating stroke. When the stitch-forming mechanism is brought to rest at the end of the stitching operation the needle is raised and a loop of needle thread is held by one of the detainers of the under-thread mechanism, while the looper thread passes directly from the work to the under-thread-handling mechanism.

It is the object of the present invention to provide an improved thread-trimming and pull-off mechanism which will operate first to cut the work-limb of the needle-thread-loop which is held on the loop-detainer, then to engage and pull off a length of looper thread from its source of supply to insure the proper initial stitch-formation in the subsequent stitching operation, and finally to cut the looper thread.

A further object of the invention is to provide a thread-trimming and pull-off device of the above described character which is simple in construction and which is adapted to be secured on the turret of the under-thread-handling mechanism, whereby the rotation of the turret causes the actuation of said thread-trimming and pull-off device.

Another object of the invention is to provide a unitary device of the class described designed so that a single oscillation of the knife-carrying arm will first sever the needle thread, then pull-off a measured length of looper thread, and finally sever the looper thread.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages at-

2

tained thereby will be readily understood by those skilled in the art.

In the accompanying drawings,

Fig. 1 is a right side elevational view of a buttonhole sewing machine embodying my invention.

Fig. 2 is a front elevational view, partly in section, of the sewing machine, showing the inoperative position of the thread-trimming and pull-off device during the sewing operation.

Fig. 3 is an enlarged top plan view of the under-thread-handling devices in their arrested position at the end of the stitching operation, showing the turret supporting said devices turned about its vertical axis to the point where the actuating crank for the thread-trimming and pull-off device is just engaging the abutment-latch on the machine-frame.

Fig. 4 is a view similar to Fig. 3 with the turret advanced to the point where the knife of the thread-trimming and pull-off device has swung into engagement with the needle thread preparatory to severing the same, while the looper thread receiving notch on the knife-carrying arm has engaged the looper thread and has begun its pull-off action.

Fig. 5 represents an enlarged vertical sectional view taken substantially along the line 5-5, Fig. 4.

Fig. 6 is a view similar to Fig. 4, showing the needle thread severed and the knife-carrying arm turned to the position of maximum looper-thread pull-off.

Fig. 7 is a view like Fig. 6 with the knife-carrying arm advanced just beyond the point where the looper-thread is severed.

Fig. 8 represents an enlarged vertical sectional view taken substantially along the line 8-8, Fig. 7, showing the looper thread severing knife-blades in cooperative thread-cutting relation.

Fig. 9 is an enlarged elevational view, partly in section, of the improved thread-trimming and pull-off assembly.

Fig. 10 represents a horizontal sectional view taken substantially along the line 10-10, Fig. 9, showing, in addition, the manner of mounting the unitary assembly upon the turret-bracket.

Fig. 11 is a right side elevational view, partly in section, of the assembly as illustrated in Fig. 9.

Fig. 12 represents a fragmentary disassembled perspective view of the stationary ledger-blade and the movable knife-carrying arm, showing the needle thread severing knife and the looper thread knife-edge which cooperates with the ledger-blade in cutting the looper thread.

Fig. 13 is an enlarged perspective view of the supporting bracket, showing its details of design.

Referring more in detail to the drawings, the invention is shown as embodied in a well-known form of eyelet-end buttonhole sewing machine which has been converted into a tacking machine by being fitted so that the stitching mechanism thereof is operated only during the traverse of what normally would be one side of a conventional eyelet-end buttonhole. It will be understood that in a sewing machine of the type shown the stitching mechanism can be operated so that stitching is produced along the first side of the buttonhole only or along the second or return side of the buttonhole only. In the machine illustrated the stitching is produced along the first side of the buttonhole. Generally speaking, the operating cycle of the machine shown includes the depressing of the usual starting lever causing the work-clamping members to close on the work, after which the usual cutting levers advance to properly cut the work. Following the cutting of the work, the rapid feed is rendered effective to carry the work from cutting position into sewing position, after which the rapid feed is tripped and the step-by-step slow feed and the stitching mechanism are started to effect the production of a straight zigzag seam along what would normally be the first side of a buttonhole. As the eye-end of the buttonhole is approached, the slow feed and the stitching mechanism are stopped, and the rapid feed is reinstated to cause the rapid travel around the eye and back the return side of the buttonhole to the regular starting or cutting position. As is customary during the movement around the eye, the upper-thread-handling mechanism and the lower-thread-handling mechanism, together with the supporting turret therefor, turn about aligned vertical axes. The rotation of the turret is effective to carry the actuating crank-arm of the thread-trimming and pull-off device into contact with the abutment-latch on the machine-bed, whereby the device is actuated to sever the needle thread, pull-off a supply of looper thread, and sever the looper thread.

The sewing machine illustrated comprises a frame including a hollow box-like bed 20 from one end of which rises a standard 21 of an overhanging bracket-arm 22 terminating in a head 23.

The stitch-forming mechanism is of the well-known type embodying an upper endwise reciprocatory and laterally vibratory needle 24 and complementary under thread mechanism constructed substantially in accordance with the disclosure of U. S. Patent No. 1,372,473, dated March 22, 1921. The under thread mechanism is mounted on a turret 25 which is turnable about a vertical axis and carrier threaded and nonthreaded implements or loopers 26 and 27 and a pair of loop-detainers 28 and 29. As fully explained in the above mentioned U. S. Patent No. 1,372,473, the loop-detainer 28 is the one which takes the needle-thread-loop N^T from the nonthreaded looper 27 and holds it spread for entry by the needle. This same loop-detainer 28 is the one which retains the last needle-thread-loop at the termination of the stitching operation, as shown in Fig. 5. The turret 25 also carries the usual work-supporting needle-throat-member 30 having an aperture 31 through which the needle 24 reciprocates.

The needle-actuating mechanism is also mounted to turn about a vertical axis coincident with the axis of the turret 25 and the usual turning movements are imparted to the upper needle

and complementary under looper mechanisms by the connected upper and lower sector gears 32 and 33 (Fig. 1), respectively, which are actuated in unison by the regular connections with the feed-cam 34. This well-known mechanism is more completely shown, for example, in U. S. Patents No. 1,162,207, November 30, 1915; No. 1,532,4, reissued April 4, 1922; and No. 1,534,017, April 21, 1925. The mechanism operates to rotate the stitch-forming devices in one direction during the sewing around the eyelet-end of a buttonhole and to reversely rotate the stitch-forming devices between sewing periods to restore them to initial position. In the present machine the stitching mechanism is not operating during the travel around the eye or back the return side of the buttonhole, but despite this the stitch-forming devices traverse their usual turning movements.

The work W to be sewn is held through the entire cycle in a work-clamp, indicated as 35, which is of the traveling type. The work-clamp is first rapidly moved over the bed 20 to carry the work forwardly from initial or work-cutting position to stitching position, then more slowly moved in step-by-step fashion to place the stitches along the desired pattern, and then rapidly returned to initial position. The work-clamp 35 is carried by the usual cross-slide plate 36 (Fig. 2) which is adapted to slide laterally of the machine-bed 20 on a longitudinal slide-frame 37 shiftable in ways longitudinal of the machine-bed. The work-clamp 35 is given its longitudinal travel and lateral components of its feeding movement by suitable lever-connections with the main feed-cam 34 mounted in the bed 20 of the machine and driven at a rapid rate prior and subsequent to the sewing period by a cross rotary shaft 38 which receives power from a rapid-feed shaft 39 (Fig. 1) through an automatically controlled clutch (not shown). The feed-cam 34 is more slowly driven during the sewing operation by a suitable gear-train 40 (Fig. 1) actuated from the main sewing shaft 41, the period of operation of which is controlled by a stop-motion device 42, all in the manner more fully described in the above mentioned U. S. Patent No. Re. 15,324. Means is provided for automatically throwing the stop-motion device 42 into and out of operation to start and stop the stitch-forming mechanism, the control trips for the stop-motion device being fast on a removable and replaceable pattern wheel 43 carried on the cross rotary shaft 38.

As usual, in the machine shown, the stitch-forming mechanism is so constructed that when the same comes to rest with the needle 24 raised as shown in Fig. 1 there will be a loop N^T of needle thread retained by the loop-detainer 28 (Figs. 3 and 5) of the under thread mechanism, the needle thread extending from the eye of the needle through the work W and forming the loop 44 of which one leg 45 is connected to the last stitch. The looper thread L^T passes directly from the work W down through the aperture 31 in the needle-throat member 30 to the thread-carrying looper 26.

According to the present invention, I have provided means automatically actuated and operable between the needle-throat member 30 and the loop-detainer 28 for first severing the work-limb 45 of the retained needle-thread-loop 44, then engaging the looper thread and pulling off a supply thereof for the subsequent stitching operation, and finally severing the looper thread at the termination of the pull-off action. To

that end I have provided a unitary thread-severing assembly comprising a supporting bracket 46 (Fig. 13) apertured, as at 47, to receive the extended outboard end of the regular loop-retainer supporting shaft 48 (Figs. 3 and 10) carried by the upstanding spaced posts 49 and 50 integral with the turret 25. The supporting bracket 46 is held upon the end of the loop-retainer shaft 48 by a cap-screw 51 and washer 52, and is prevented from turning on the shaft by two lugs 53 which engage the opposite sides of the turret-post 49. Extending laterally from the supporting bracket 46 are upper and lower limbs 54 and 55 bored, as at 56 and 57 (Fig. 13), to provide aligned, vertically spaced, bearings in which is journaled an oscillatory knife-carrying shaft 58. Preferably integral with the upper end of the shaft 58 is a horizontal arm 59 having fastened on the upper surface of its free end, as by two screws 60, a hardened knife-blade 61. The knife-blade 61 is formed at its outer end with a sharpened needle-thread-cutting edge 62 disposed so that the initial turning of the oscillatory shaft swings said cutting edge into thread-severing contact with the tensioned work-limb 45 of the needle-thread-loop 44 retained on the loop-detainer 23. To insure that only the work-limb of the needle-thread-loop is cut, the front portion of the cutting edge 62 is relieved and dulled slightly, as indicated at 63, so that as the knife swings to cut the needle thread, the dulled portion will first engage and deflect the needle-limb of the needle-thread-loop, thus leaving the work-limb 45 in position to be engaged and cut by the sharpened edge 62 of the knife-blade.

After the needle thread is cut, the remainder of the swinging motion of the knife-carrying arm 59 effects first a pull-off of the looper thread from its source of supply and then a severing of the looper thread. Referring to Figs. 9, 11 and 12, it will be observed that to the under side of the knife-carrying arm 59 there is detachably fastened by two screws 64 a hardened looper-thread-severing knife-blade 65 formed adjacent its free end with a looper-thread-receiving notch 66 disposed vertically beneath a similar notch 67 formed in the needle thread knife-blade 61. The two vertically aligned notches 66 and 67 are disposed to engage the looper thread L^T (Figs. 4 and 5) as the knife-carrying arm 59 swings between the needle-throat member 30 and the loop-detainer 28. The entire looper thread pull-off action occurs during the swinging of the knife-carrying arm 59 from the position of initial engagement of the looper thread by the spaced knife-blades 61 and 65 to the position shown in Fig. 6. The pull-off action on the looper thread is terminated with the cutting of the looper thread.

To effect the cutting of the looper thread, the knife-blade 65 is provided in its under face with a knife-edge 68 (Fig. 12) adapted to swing into shearing relation with the sharpened edge 69 of a stationary ledger-blade 70. The ledger-blade 70 is detachably mounted on the upper lateral extension 71 of a supporting member 72. The body of the member 72 is bored longitudinally (Fig. 11) to provide an extension of the bearing for the oscillatory knife-carrying shaft 58 and, at its lower end, the member 72 is formed with a lower lateral extension 73 clamped upon the top of the supporting bracket 46 by a clamp-screw 74 extending through a slot 75 in the extension 73. Through the medium of the slot

75 and the clamp-screw 74 the ledger-blade supporting member 72 can be adjusted circularly for a limited extent about the axis of the knife-carrying shaft 58. Since the adjustment of the member 72 is about the axis of the shaft 58, the thread-shearing relationship between the knife-edge 68 and the sharpened ledger-blade edge 69 is not disturbed during adjustment of the latter. It will be appreciated that the adjustment of the ledger-blade 70 about the shaft 58 provides means for regulating the length of the looper thread pulled from its source of supply by the swinging action of the knife-carrying arms 59 and 69. From the above description it will be understood that the knife-blades 61 and 65 and the ledger-blade 70 each can be readily removed for resharpening or replacement.

Oscillation of the knife-carrying shaft 58 to cause cutting of the two sewing threads and pulling off of the looper thread is effected in a single continuous motion, as hereinbefore mentioned, by the turning of the turret 25. In Fig. 9 it will be seen that the knife-carrying shaft 58 has a sector-gear 76 secured on its lower end. This sector-gear 76 meshes with a gear 77 preferably press-fitted and keyed, as by pin 78 (Fig. 9), upon the reduced hub 79 of a crank 80 journaled on a pivot-stud 81 depending from the extended lower limb 55 of the supporting bracket 46. Carried by the free end of the crank 80 is a roller 82 which is normally disposed to engage an abutment-latch 83 carried on a stationary extension-plate 84 fastened by screws 85 (Fig. 3) passing through a guard-plate 20' secured to the machine-bed 20. During the normal sewing operation the turret 25 is positioned as shown in Figs. 1 and 2. In this position of the turret the knife-carrying arm 59 is yieldingly biased by a coil-spring 86, acting between the supporting bracket 46 and a pin 87 carried by the sector-gear 76, into a retracted or set position determined by the engagement of the pin 87 with one of the lugs 53 on the supporting bracket 46 (Fig. 11). In the set position the knife-blade 61 is disposed forwardly of and slightly to the right of the needle-throat-member 30 in the manner shown in Fig. 3, so that the initial swinging movement of the knife-carrying arm 59 will cause the knife-blades to pass between the needle-throat-member 30 and the loop-detainer 28 and engage the looper thread and the two limbs of the detained needle-thread-loop.

After the completion of the stitching operation, the turret 25 is turned through 180 degrees (clockwise direction, Fig. 3) during the rapid travel around the eye and back the return side of the machine-cycle. The initial turning of the turret 25 carries the roller 82 of the crank-arm 80 into contact with the abutment-latch 83. As the turret continues in its turning movement the crank-arm 80, through the gears 77 and 76, effects an oscillation of the knife-carrying shaft 58 causing the knife-carrying arm 59 to swing in a single continuous motion from its retracted position (Fig. 3), through the needle thread severing position (Fig. 4) and the looper thread pull-off position (Fig. 6), to its looper thread severing position (Fig. 7). The actuating connections of the thread-cutting and pull-off device are so proportioned that the entire effective oscillation of the knife-carrying arm takes place during substantially 35 degrees rotation of the turret 25. After the parts have moved to the position shown in Fig. 7, continued rotation of the turret carries the roller 82 beyond the abut-

ment-latch 83. When this occurs the coil-spring 86 biases the knife-carrying arm 59 to its retracted or set position.

In the regular cycle of the machine illustrated, the turret is reversely rotated (counterclockwise) at the end of the operation to restore it to its initial position. In order to permit the crank-arm 80 to swing past the abutment-latch 83 when the turret is reversely rotated, the abutment-latch is pivotally mounted at 88, whereby the latch swings in a clockwise direction against the action of a spring 89 under pressure exerted by the roller 82 on the abutment-latch 83. When the roller 82 passes beyond the abutment-latch 83 the spring 89 snaps the same back into its normal operating position determined by a stop-pin 90.

While the improved device disclosed is adapted to be actuated during the forward turning of the turret 25, it is a simple matter to modify the device if it is desired that the device operate during the reverse turning of the turret, which action would be necessary if the machine were fitted to perform the stitching operation during the travel along what would normally be the return side of the buttonhole. To effect this change in operation, it would be necessary only to remove the gears 76 and 77 and substitute a single crank member therefor to be mounted on the lower end of the knife-carrying shaft 58. The abutment-latch 83 would also have to be reversely mounted and properly located on the guard-plate 20' which is carried by the machine-bed 20.

For the practical operation of a sewing machine equipped with thread-trimming devices adapted to sever the needle thread or looper thread, or both, it is essential that the thread-end extending from the needle or looper be sufficiently long to prevent the unthreading of said needle or looper during the formation of the initial stitch of the subsequent stitching cycle. It will be understood from the above that a sufficient and proper length of looper thread is accounted for by the pull-off action exerted on the looper thread by the knife-carrying arm 59 as it swings from needle-thread-severing position to looper-thread-severing position. To insure the formation of an adequate length of needle thread, the machine illustrated also is fitted with a common form of needle thread nipping and pull-off mechanism disclosed, for instance, in the U. S. patent of E. P. Spaine et al., No. 2,210,638, August 6, 1940. This needle thread nipping and pull-off mechanism, which is actuated by the regular work-clamp closing lever 91 (Fig. 1), comprises a vertically disposed rod 92 having at its upper end a lateral extension 93 overlying the needle thread L^T and underlying the usual nipper-release lever 94. When the clamp-closing lever 91 is depressed to close the work-clamp 35, the lateral extension 93 of the rod 92 is drawn downwardly to first lower the nipper-release lever 94, permitting a coil-spring 95 to nip the needle thread, and then engage and pull a measured length of needle thread from the supply. During the recovery motion of the clamp-closing lever 91, the pulled off needle thread is slackened and the lever 94 is operated to release the needle thread and permit it to run freely to the needle. The measured length of needle thread thus provided is adequate to supply the demands of the needle-bar during its initial reciprocation, without causing the unthreading of the needle 24.

In machines of the type disclosed, it is com-

mon practice to employ one needle thread and two looper threads; the resulting seam of this combination being a three-thread seam. When the machine is so fitted, the cooperation of the threaded needle and the two threaded loopers is such that no loop of needle thread is detained by the usual loop-retainers. Consequently, when the machine comes to rest the lead of the needle thread from the last stitch in the work does not extend within the range of movement of the knife-carrying arm 59. Therefore, when it is desired to apply the present thread pull-off and trimming device to a three-thread machine, the needle thread knife-blade 61 can be removed, leaving only the looper thread knife-blade 65 for cutting the looper thread at the termination of the looper thread pull-off stroke. Since there are two loopers, each with its own thread, a second pull-off and trimming mechanism of the same design as my present one can be used at a position directly opposite on the turret 25 to the one illustrated, thereby to sever the second looper thread. The needle thread may be cut by hand or by any suitable mechanical means.

From the above description, it will be seen that I have invented an improved thread-trimming and pull-off mechanism which is simple in construction and effective in operation to sever the needle and looper threads and to pull off an accurate length of looper thread from its source of supply; all of the operations being carried out in proper sequence by a single continuous oscillation of the knife carrying arm. Also, it will be evident that the thread-trimming device can be utilized to operate on a single thread, whether it be the needle thread or the looper thread.

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

1. A two-thread sewing machine having, in combination, stitch-forming mechanism including a thread-carrying needle and a complementary thread-carrying under mechanism arranged so that when the machine comes to rest the needle-thread and the under thread extend from the last stitch in the work to said under mechanism, and a thread-severing device including two elements movable relatively to each other into and out of thread-severing relationship, a movable arm carrying one of said elements, and operating connections constructed and arranged for imparting a single actuating stroke to said arm so that the element carried thereby severs one of said sewing threads, engages and pulls off a length of the second thread and finally severs said second thread.

2. A two-thread sewing machine having, in combination, stitch-forming mechanism including a thread-carrying needle and a complementary thread-carrying under mechanism arranged so that when the machine comes to rest the needle-thread and the under thread extend from the last stitch in the work to said under mechanism, and a thread-severing device including knife means, an oscillatory arm carrying said knife-means, a stationary ledger-blade, and operating connections for imparting a single actuating stroke to said oscillatory arm so that said knife-means first severs one of said sewing threads, pulls off a measured length of the second sewing thread and finally severs said second sewing thread.

3. A two-thread sewing machine having, in combination, stitch-forming mechanism including a thread-carrying needle and a complementary

thread-carrying under mechanism arranged so that when the machine comes to rest the needle-thread and the under thread extend from the last stitch in the work to said under mechanism, and a thread-severing device including an oscillatory arm, a plurality of knife-blades on said arm constructed and arranged to move into contact with said threads, a ledger-blade disposed for thread-shearing cooperation with one of said knife-blades, and means for imparting a single actuating stroke to said oscillatory arm for causing one of said knife-blades to sever one of said threads and the other of said knife-blades to move into shearing relation with said ledger-blade to cut the other of said threads.

4. A two-thread sewing machine having, in combination, stitch-forming mechanism including an upper thread-carrying needle and complementary under thread-carrying mechanism, and a thread-severing device including an oscillatory arm, knife-means carried by said arm, a ledger-blade, means for actuating said arm to cause said knife-means to move into thread-shearing cooperation with said ledger-blade, and means supporting said ledger-blade, said last-named means having capacity for adjusting said ledger-blade in a curved path about the axis of oscillation of said arm.

5. A sewing machine having in combination, an apertured needle-throat member, stitch-forming mechanism including a reciprocatory thread-carrying needle and complementary thread-carrying loop-taking means arranged so that when the machine comes to rest a loop of needle thread is retained on the loop-taking means and the loop-taker thread extends from the latter up through the aperture in said needle-throat member to the work, and a thread-severing device including an oscillatory arm, a pair of knife-blades carried by said arm, a ledger-blade, and means for actuating said arm to cause one of said knife-blades to engage and cut one limb of the retained needle-thread-loop and to cause said arm to engage and pull off a length of the loop-taker thread and finally to move the other of said knife-blades into shearing relation with said ledger-blade to cut said loop-taker thread.

6. A sewing machine having, in combination, stitch-forming mechanism comprising upper thread handling mechanism and complementary under mechanism arranged so that when the machine comes to rest a loop of upper thread is retained by the complementary under mechanism, and an upper thread-severing device including an oscillatory knife formed with a sharpened cutting edge, and means for oscillating said knife to cause the latter to engage and deflect one limb of said retained thread-loop and subsequently to sever the other limb of said retained thread-loop.

7. A sewing machine having, in combination, stitch-forming mechanism comprising upper thread handling mechanism and complementary under mechanism arranged so that when the mechanism comes to rest a loop of upper thread is retained by the complementary under mechanism, and a needle-thread severing device including a movable cutter having a sharpened cutting portion and a dulled thread-engaging portion, and means for moving said cutter to cause the dulled portion thereof first to engage and deflect one limb of said retained needle thread-loop so that the sharpened portion thereof subsequently can engage and sever the other limb of said retained needle thread-loop.

8. A sewing machine having, in combination, a needle-throat member formed with an aperture, stitch-forming mechanism comprising a reciprocatory thread-carrying needle positioned to operate through said aperture and complementary under mechanism disposed below said needle-throat member and including a loop-detainer arranged so that when the mechanism comes to rest a loop of needle-thread is retained on said loop-detainer, and a thread-severing device including a movable cutter disposed to operate between said needle-throat member and said loop-detainer and formed with a sharpened cutting portion and a dulled thread-engaging portion, and means for moving said cutter to cause the dulled portion thereof first to engage and deflect one limb of said retained needle-thread-loop so that the sharpened portion thereof subsequently can engage and sever the other limb of said retained needle-thread-loop.

9. A two-thread sewing machine having, in combination, a stitch-forming mechanism including a thread-carrying needle and complementary thread-carrying mechanism, rotary supporting means for the stitch-forming mechanism including a turret, a thread-severing device supported on said turret, and means rendered effective by the turning of said turret for imparting a single continuous actuating stroke to said thread-severing device for first severing one of said sewing threads, pulling off a measured length of the second sewing thread and finally severing said second sewing thread.

10. A sewing machine having, in combination, stitch-forming mechanism including a reciprocatory needle and a complementary thread-carrying loop-taker, and a thread-severing device including an oscillatory arm, knife-means carried by said arm, a ledger-blade, means for actuating said arm to cause it to engage and pull off a length of the loop-taker thread and then to carry said knife-means into thread-shearing relation with said ledger-blade to sever the loop-taker thread and thereby terminate the thread pull-off action of said oscillatory arm, and means supporting said ledger-blade and having capacity permitting adjustment of said ledger-blade in a curved path about the axis of oscillation of said arm.

11. A thread-severing device for sewing machines comprising a supporting bracket, a shaft journaled in said supporting bracket, knife-means carried by said shaft, a ledger-blade complementary to said knife-means in severing thread, a ledger-blade supporting member mounted on said supporting bracket for turning movement about the axis of said shaft to permit adjustment of said ledger-blade, and shaft actuating means adapted for imparting movements to said shaft to swing said knife means into thread-shearing relation with said ledger-blade.

12. A thread-severing device for sewing machines comprising a supporting bracket, a shaft journaled in said supporting bracket, knife-means carried by said shaft, a ledger-blade complementary to said knife-means in severing thread, a ledger-blade supporting member mounted on said supporting bracket and bored to provide an extension of the supporting bracket bearing for said shaft, and means for actuating said shaft to move said knife-means into thread-shearing relation with said ledger-blade.

13. A unitary thread-severing device for sewing machines comprising a supporting bracket, a shaft journaled in said supporting bracket, knife-

11

means carried by said shaft, a ledger-blade sustained by said supporting bracket, and means including a crank for imparting a turning movement to said shaft to swing said knife-means into thread-shearing relation with said ledger-blade.

14. A unitary thread-severing device for sewing machines comprising a supporting bracket, a shaft journaled in said supporting bracket, knife-means carried by said shaft, a ledger-blade sustained by said supporting bracket, spring means for biasing said knife-means spaced from said ledger-blade, and means including a crank for imparting a turning movement to said shaft to swing said knife-means into thread-shearing relation with said ledger-blade.

15. A thread-severing device for sewing machines comprising a supporting bracket, a shaft journaled in said supporting bracket, knife-means carried by said shaft, a ledger-blade, a member supporting said ledger-blade and fastened on said supporting bracket for turning adjustment about the axis of said shaft, spring-means for biasing said shaft in a direction to space said knife-means from said ledger-blade, and means including an element fast on said shaft for imparting a turning movement to said shaft in opposition to said spring-means for swinging said knife-means into thread-shearing relation with said ledger-blade.

16. A thread-severing device adapted for attachment on a sewing machine having stitch-forming devices carried on rotary supporting means including a turret, comprising, a supporting bracket, a shaft journaled in said supporting bracket, knife-means carried on said shaft,

12

spring-means effective for biasing said knife-means into a retracted position, and actuating means including an element fast on said shaft and rendered effective by the turning of said turret for imparting a thread-severing stroke to said knife-means.

17. A sewing machine having, in combination, stitch-forming mechanism including a reciprocatory thread-carrying needle and complemental thread-carrying loop-taking means arranged so that when the machine comes to rest the needle-thread and the loop-taker thread extend from the last stitch in the work to the loop-taking means, and a thread-severing device including a first movable thread-severing member operable in a plane intersected by the two threads when the machine is at rest, a second member arranged in thread-shearing relation with said first member, and means for actuating said first movable thread-severing member to cause said member to effect pulling off a length of one of said threads from its supply and the severing of both of said threads.

EDWARD P. SPAINÉ.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,291,335	Wood	Jan. 14, 1919
1,839,305	Fisher	Jan. 5, 1932
2,335,827	Gunther	Nov. 30, 1943