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THREAD CUTTER FOR SEWING MACHINES.

APPLICATION FILED DEC. 8, 1917.

1,401,973. Patented Jan. 3, 1922.

Fig. 1.

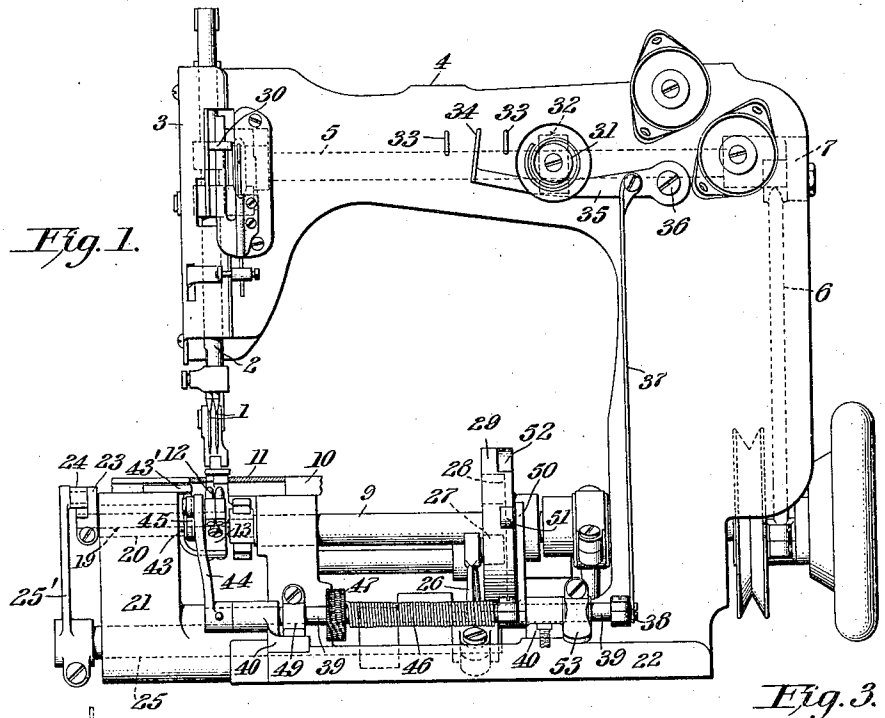


Fig. 2.

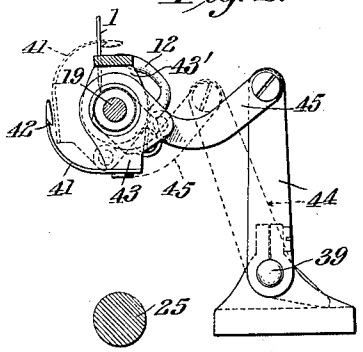


Fig. 3.

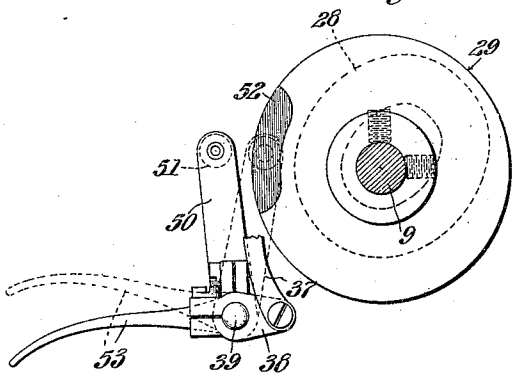


Fig. 4.

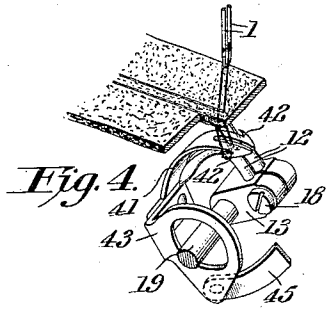
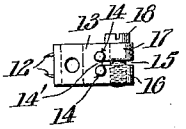


Fig. 5.



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## THREAD CUTTER FOR SEWING MACHINES.

1,401,973. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed December 8, 1917. Serial No. 206,197.

*To all whom it may concern:*

Be it known that I, ALBERT F. FIFIELD, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Thread Cutters for Sewing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to attachments for sewing machines for cutting the thread at the end of a stitching operation.

An object of this invention is to provide new and improved means for cutting the thread close to the under side of the work. A further object of the invention is to provide new and improved means for pulling off thread from the supply so that the thread end will not be drawn through the needle-eye when stitching is resumed. And a still further object of the invention is to provide common means for actuating the cutter and pull-off so that the latter must function before the former. It is also an aim of this invention to arrange and locate the pull-off and thread-cutter out of the operative's way and out of her line of vision in inspecting the work around the presser-foot. And finally it is an object of this invention to attain the ends above stated with simple inexpensive means and without encumbering the stitch-forming mechanism with the weight of the additional parts.

Other objects of the invention will appear in the description of the accompanying drawings, in which Fig. 1 is a side elevation of a machine equipped with the invention. Fig. 2 is a cross-section adjacent the stitching point showing in solid lines the normal position of the cutting blade and in dotted lines the position the cutting blade assumes to enter the loops of thread on a looper before a severing operation. Fig. 3 is a cross-section adjacent the looper operating cam looking toward the stitching point. Fig. 4 is a perspective of the cutting blades and thread previous to a severing operation and Fig. 5 is a bottom plan view of the looper-carrier or clamp.

The invention as illustrated is embodied in a twin-needle and looper chain-stitch machine in which the needles 1 are carried by a needle-bar 2 reciprocating in a head 3 on an overhanging arm 4 in which is journaled the needle-bar operating shaft 5 driven by a pitman 6 linking a crank-arm 7 on the shaft 5 with an eccentric (not shown) on the main-driving shaft 9 which is located beneath the work-support or cloth-plate 10 inlaid in which is the usual throat-plate 11.

The two loopers 12 are supported in a carrier 13 Fig. 5 having a pair of sockets 14 receiving the shanks of the loopers and a slight-space 15 separates a pair of clamping arms 16, 17 into one of which, 16, is threaded a screw 18 loosely passing through the other arm, 17. A wall 14′, preferably rigid, separates the spaced sockets. The space or saw-cut 15 is of such width and extent that it communicates with both the sockets 14 and permits a tight gripping or binding of the looper-shanks when the screw 18 is tightened.

The loopers are moved endwise through mechanism which will now be described. The looper-carrier or clamp 13 is secured in any suitable manner to a rod 19 passing through a bushing 20 supported in a part 21 of the base 22 of the frame of the machine. At the opposite end the rod 19 carries a crank-like arm 23 connected by a link 24 to an arm 25′ on the looper actuating shaft 25 which is journaled below and in line with the needle-paths and which carries centrally of the length of the machine an arm 26 having a roller or follower 27 extending into a cam-groove 28 in the face of a disk 29 on the main-shaft 9 of the machine.

The feeding mechanism is not shown as it forms no part of the present invention and it is to be understood that any suitable form of feeding mechanism may be employed.

The thread-controlling mechanism comprises essentially a take-up indicated generally by the numeral 30 which also may be of any suitable construction and an intermittent tension 31 actuated automatically from a cam 32 on the needle-bar operating shaft 5 in a manner well known and substantially the same as that disclosed in a patent to one Hemleb, No. 1,254,225, dated January 22, 1918.

Between the intermittent tension 31 and the needles a pair of thread-eyes 33 are located spaced apart a slight distance on the overhanging arm. Intermediate these thread-eyes 33 a thread-engaging member 34 is arranged to swing from its normal posi-

tion shown in Fig. 1 down below the line of the eyelets 33. This thread-engaging member is preferably formed on the end of an arm 35 fulcrumed at 36 on the overhanging arm and connected by a bent link 37 to a crank-arm 38 on the rock-shaft 39 supported by spaced brackets 40 secured to the base 22 of the frame.

The thread-cutter is located adjacent the loopers 12 and the throat-plate 11 of both of which it is supported independently. The thread-cutting blade 41 in the embodiment shown resembles a split spear head and it is provided with two cutting edges indicated by the numeral 42, as in this embodiment it is used with a twin-needle and looper machine and a cutting edge is provided for each loop. It is, however, to be noted that each cutting edge operates independently of the other and this edge is duplicated in the illustration merely because there are two loops shown and a cutting edge is desirable for each loop. Obviously if this thread-cutter were installed in a machine with a single loop but one cutting edge would be necessary. The blade 41 is secured to a carrier 43 conveniently pivoted or fulcrumed upon a projecting portion of the bushing 20 and held against lateral movement by an apertured plate or clip 43′, Figs. 1 and 2, secured in any suitable manner to the portion 21 of the base and thereby the cutting blades are constrained to move in a fixed path concentric, or substantially so, with the path of the loopers 12. The blades 41 are actuated from the rock-shaft 39 by the arm 44 connected by a link 45 to the blade-carrier 43. Normally the cutting blades are held in an out of the way position, as shown in solid lines Fig. 2, by the spring 46 coiled about the shaft 39 and tensioned by fixedly anchoring one end in any suitable manner and securing the other end in the collar 47 adjustable about the shaft 39. One of the brackets 40 affords a fixed abutment in the path of the stop or arm 49 on the shaft 39 and determines the normal and ineffective position of the blade 41 as well as of the thread-engaging member 34.

The thread-cutters 42 and the thread-engaging member 34 cannot be operated when the needle is in the path of the cutter and when the intermittent or automatic tension is closed by reason of the provision of another arm 50 on the rock-shaft 39 carrying a friction-roller 51 and arranged with reference to the periphery of the looper-actuating cam or disk 29 so that neither a cutting nor drawing off of thread can be accomplished unless a notch or recess 52 in the disk 29 is opposite the roller 51. Still another arm 53 is clamped to the rock-shaft 39 and extends forwardly toward the front of the machine where it affords a convenient finger-lever for turning the rock-shaft and thereby simultaneously moving the thread-cutting blades 41 and thread-engaging member 34.

When the machine has been brought to rest after a stitching operation the operator may lift the finger-lever 53 which will pull the thread-engaging member 34 down from a line between the eyelets 33 to draw off thread from the supply and simultaneously advance the cutting blades from the solid line to the dotted line positions shown in Fig. 2. When the operative releases the finger-lever 53 the spring 46 will turn or tend to turn the rock-shaft 39 in a counter-clockwise direction, viewing Fig. 3, and thereby simultaneously restore or tend to restore the thread-engaging member 34 to the position shown in Fig. 2 and the cutting blades 41 from the dotted line position shown in Fig. 2 to the solid line position shown therein thus cutting the thread. The cutting edges 42 preferably are made only moderately sharp and need not be keen. The work-limb of the needle-loop caught by the barbed edge will be dragged rearwardly with the cutter in its retracting movement from the dotted line to the solid line position shown in Fig. 2. And owing to the simultaneous slacking or giving up of the thread by the member 34 there is no cutting or severing of the thread until the blade nears the solid line position shown in Fig. 2 when the giving up of thread by the member 34 will have been completed and when the thread is taut between its anchored ends, i. e. between the work and the supply. Thus the cutting blade performs the dual functions of pulling a predetermined quantity of thread (measured off by the member 34) through the eye of the needle to the under side of the work and of severing it with the severed work end of the thread about $\frac{1}{2}$ to $\frac{3}{4}$″ in length. Preferably the movements of the thread-engaging member 34 and of the cutting-blade 41 are of such extent that the length of thread running to the needle will be just long enough to bring the severed end to the surface of the work when stitching is resumed. Inasmuch as the finger-lever 53 cannot be lifted unless the recess 52 is opposite the roller 51 and because the recess 52 occupies a position opposite the roller 51 only when the needle is in an elevated position, the operative cannot either intentionally or unintentionally advance the cutting blades 41 across the needle-path when the needles are down and in the way.

While I have described the invention as it has been embodied in an actual construction, it is to be distinctly understood that the invention is not limited to the precise details disclosed and that various changes and modifications may be made without departing from the underlying principles of the invention.

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

1. In a sewing machine having stitch-forming mechanism including a needle and looper, a thread-cutter having a blade fulcrumed coaxially with the looper and movable independently thereof, and manual means for operating said blade.

2. In a sewing machine having stitch-forming mechanism including a needle and looper, a cloth-plate, a main driving shaft located beneath said cloth-plate, means for actuating said needle and looper from said main driving shaft, a thread-cutter having a blade fulcrumed on an axis coincident with that of the main shaft and movable independently of the looper, and manual means for operating said blade.

3. In a sewing machine having stitch-forming mechanism including a needle and looper, a work-support, a thread-cutting blade fulcrumed on a fixed part of the machine, manual means for moving said blade about its fulcrum including a plural-armed rock-shaft located below the work-support, a main shaft below the work-support, mechanism for operating said looper from said main-shaft including a movable element also located below the work-support interposed in the path of one of the arms on the rock-shaft and shaped to permit movement of said one arm and advance of the cutting blade across the needle-path only when the needle is out of the way.

4. In a sewing machine having stitch-forming mechanism including a needle, a throat-plate, thread-cutting and pull-off mechanism including a blade and a blade-carrier pivotally supported beneath the throat-plate on a relatively stationary part of the machine, means for swinging said blade across the needle-path to first pull thread beneath the work and then sever the same, including an arm accessibly presented at the front of the machine and an actuating arm, means connecting said actuating arm to the blade-carrier, a spring for normally holding said cutting blade out of the needle's path.

5. In a sewing machine having stitch-forming mechanism including a needle, a work-support, a thread-cutter comprising a cutting knife adapted to enter a needle-thread loop movable beneath the work-support, means located between the needle-eye and the supply for measuring off thread, and means for actuating said measuring off means and subsequently pulling the thread measured off beneath the work and severing it with the cutter-blade to furnish thread for the first stitch on resuming operation of the stitch-forming mechanism.

6. In a sewing machine having stitch-forming mechanism including a needle, a work-support, a presser-foot, a thread-cutter comprising a movable knife-blade only shaped to enter, spread and position a needle-thread loop by movement in one direction and to sever the thread by movement in the opposite direction and located entirely beneath the work-support, means located away from the needle and permitting inspection of the work around the presser-foot for drawing off thread from the supply, and means for actuating said drawing off means and said blade.

7. In a sewing machine having stitch-forming mechanism including a needle and looper, a work-support, a take-up, an intermittent tension device supported on a fixed part of the machine away from the needle, a thread-cutter having a cutting knife movable beneath the work-support, means located between the needle and the intermittent tension device for drawing off thread from the supply, manual means for actuating the drawing off means and the blade and means permitting operation of said manual means only when the tension is released.

8. In a sewing machine having stitch-forming mechanism including a needle and looper, a work-support, a thread-cutter having a movable blade located beneath the work-support, an intermittent tension device located above the work-support and remote from the needle, a thread-engaging member located between the needle and the intermittent tension, fixed thread-eyes on opposite sides of said thread-engaging member, and means for moving said thread-engaging member to draw off thread from the supply and for moving said blade to pull and cut the thread after it has been drawn off including a shaft located beneath the work-support and provided with a plurality of arms and also including a rotary stop governing one of the arms carried by said shaft for preventing breaking of the needle when it is below the work-support.

9. In a sewing machine having stitch-forming mechanism including a needle and looper, a throat-plate, thread-cutting mechanism having a blade located between the looper and the throat-plate and supported independently of both, a thread gripping device and means for moving the blade endwise in a path concentric with that of the looper to first pull thread beneath the throat-plate and then to cut the thread.

10. In a sewing machine having a stitch-forming mechanism including a needle and looper, a work-support, means above the work-support and operable when the machine is at rest for measuring off thread from the supply, and a single means below the work-support for pulling the quantity of thread measured off to the under side of the work and then severing it.

11. In a twin-needle sewing machine hav-

ing a work-support and suitable under-thread handling mechanism arranged therebeneath, a thread severing mechanism including a cutting member having a split spear-shaped head and provided with relatively sharp edges on the base-portion of the head whereby separate needle-threads may be severed.

12. In a sewing machine having a work-support, in combination, twin needles and loopers cooperatively arranged on opposite sides of the work-support and having a fixed path of movement clear of the loopers and intermediate the loopers and the work-support, said thread severing member having a split spear-shaped head provided with cutting edges for severing each of the needle-threads while it is looped about the looper.

13. In a sewing machine having stitch-forming mechanism including a needle and looper, thread-cutting means pivoted substantially coaxially with the looper and mounted so as to be movable independently thereof, and means for operating said thread-cutting means.

14. In a sewing machine having stitch-forming mechanism including a needle, a single means adapted upon operation thereof to draw a length of thread through the eye of the needle and subsequently sever the same, means for operating said first means, and means between the needle-eye and the thread supply for determining the amount of thread drawn through the needle-eye.

15. In a sewing machine having stitch-forming mechanism including a needle, means independent of the stitch-forming mechanism adapted to engage the needle thread loop beneath the work and upon movement thereof draw a length of thread through the needle-eye, said means also adapted to subsequently sever the thread, means for operating said first means, and means between the needle-eye and the thread supply for determining the amount of thread drawn through the needle-eye.

16. In a sewing machine having stitch-forming mechanism including a needle, thread-severing means including a movable blade, means on the blade adapted upon movement thereof to draw a length of thread through the needle-eye and subsequently sever said thread, means for operating the blade, and means between the needle-eye and the thread supply for determining the amount of thread drawn through the needle-eye.

17. In a sewing machine having stitch-forming mechanism including a needle and loop-handling means, a work-support, a combined thread pull-off and severing means mounted below the work-support adapted to pull thread from the needle to the underside of the work and later sever the same, means located between the needle and the supply for measuring off thread, and a common actuating means for the thread pull-off and severing means and the measuring off means operating to first measure off the thread, then pull the thread measured off beneath the work and then sever the same.

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

ALBERT F. FIFIELD.