

June 1, 1965

F. GRECO

3,186,367

THREAD CUT-OFF DEVICE

Filed March 7, 1963

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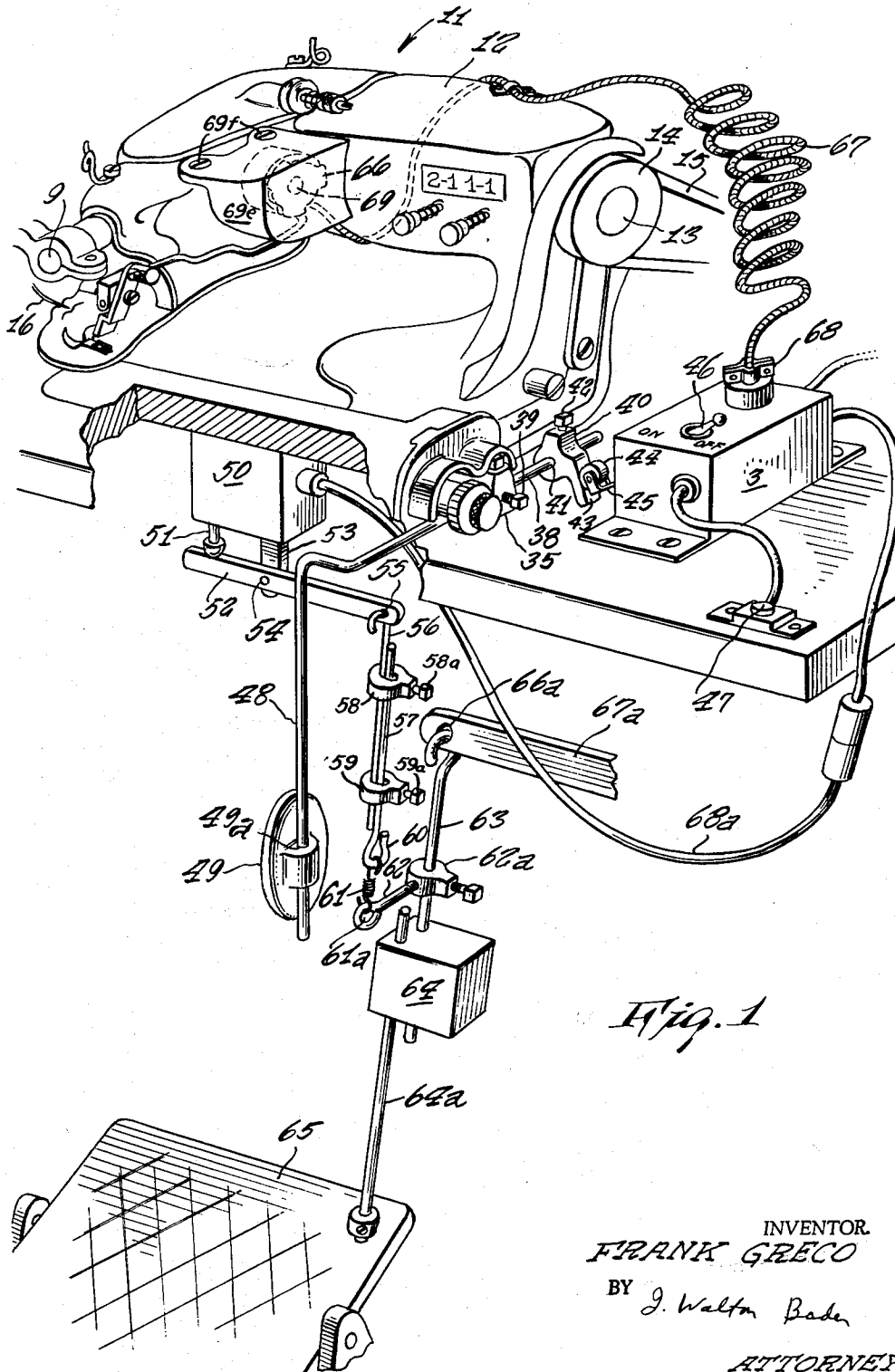


Fig. 1

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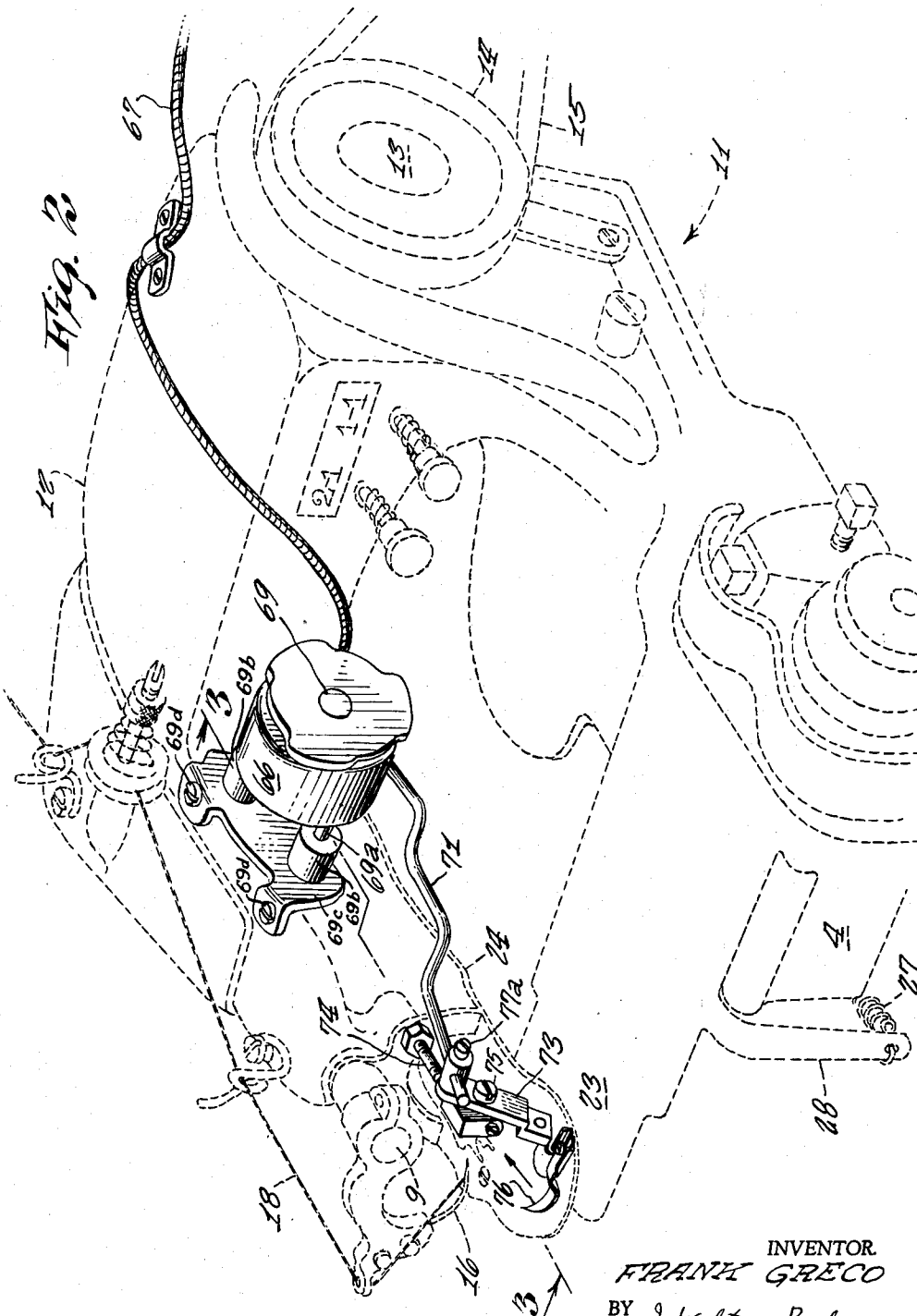
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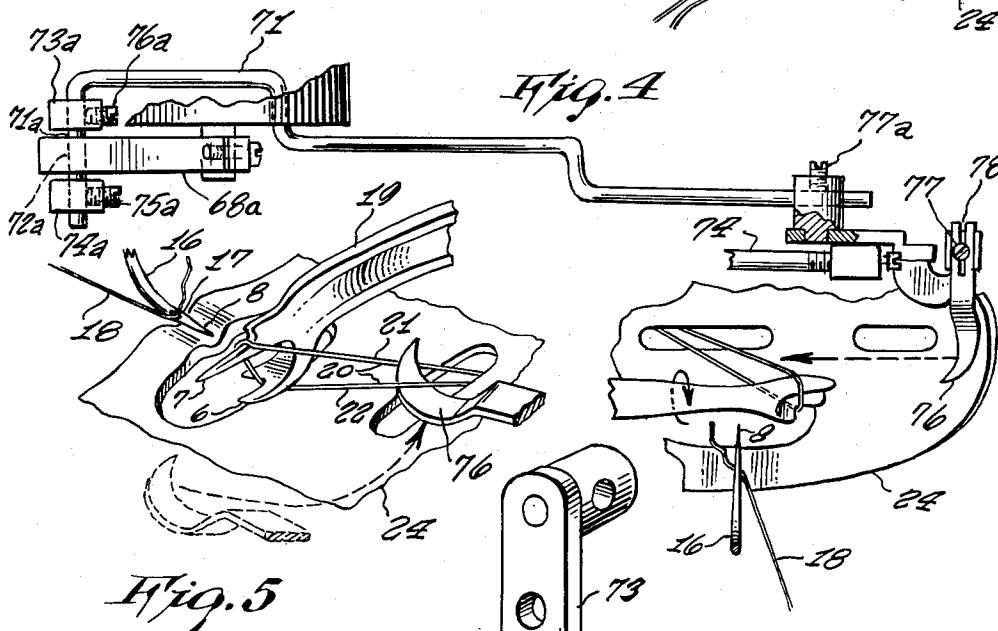
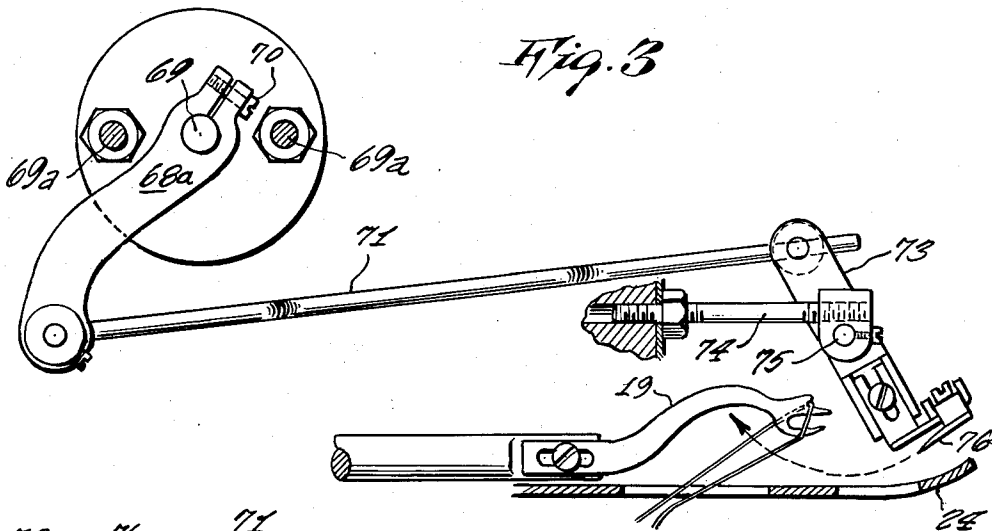
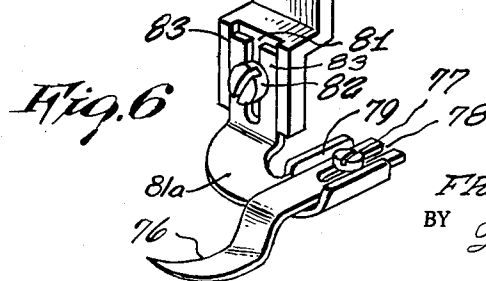


Fig. 5



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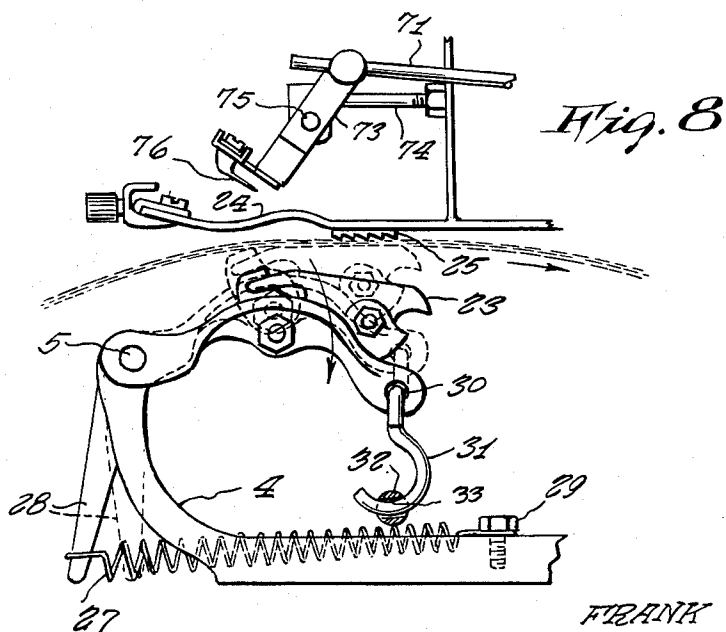
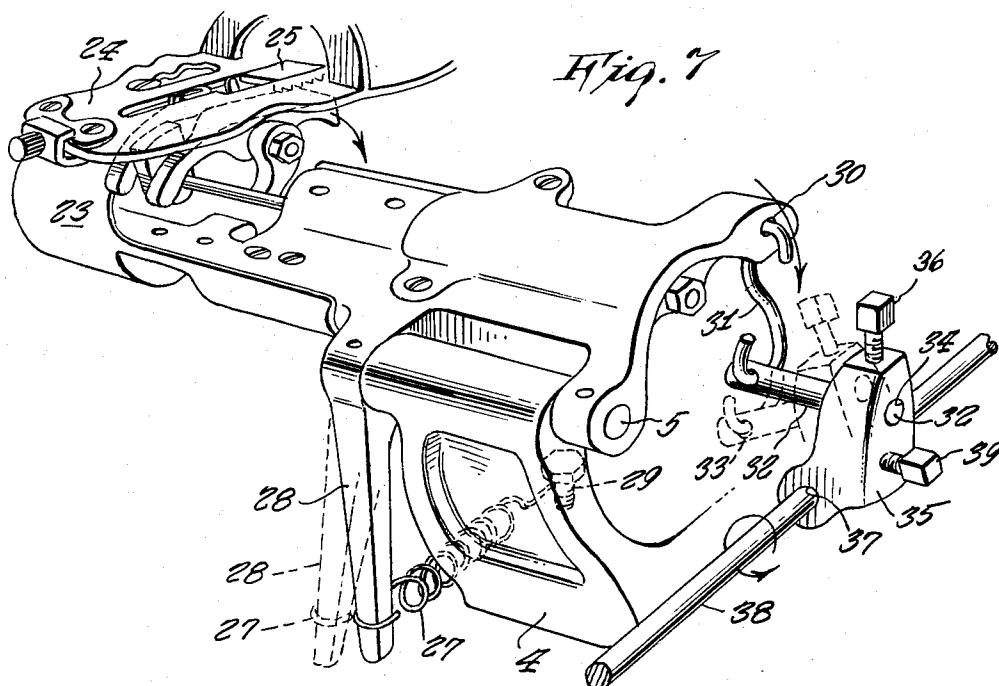
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4 Sheets-Sheet 4



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THREAD CUT-OFF DEVICE

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Filed Mar. 7, 1963, Ser. No. 263,651
3 Claims. (Cl. 112-252)

This invention relates to a thread cut-off device which has particular utilization in a blindstitch sewing machine having a curved needle.

In the sewing of fabrics with a sewing machine the needle of the machine bears a thread operatively connected thereto and repeatedly carries the thread through the work. When the work is completed, since the thread supply must necessarily be a continuous one, it is necessary for the operator of the machine to break the thread in order to remove the fabric from the machine. Where the thread is heavy such manual breakage becomes difficult and may cause injury to the operator or injury to the machine. Manual breakage is considerably more difficult where the sewing machine utilizes both a needle and a looper and is almost impossible where a blindstitch sewing machine is employed, particularly one of the "Dearborn" type which includes a curved needle and a looper.

Where a single thread "Dearborn" machine is used as the sewing machine to which the instant invention is attached the device utilizes a curved needle to which a thread is attached. This thread is then looped about a looper and the looped portion of the thread is the portion cut. In this sewing machine structure the machine is provided with a presser foot having fabric feeding means operatively connected thereto. A base member underlies the presser foot and is normally in operative relationship therewith while work is being done on the fabric by the machine. Therefore, in this type of structure, it is preferable to provide mechanism which will disengage the fabric from operative relationship with the presser foot simultaneously with cutting of the thread.

Also, in this type of machine, the needle must be positioned at a point away from the fabric when the thread is being cut and the fabric disengaged. This can be done manually (as shown in the instant drawings) or can be done by utilization of a number of conventional needle positioning mechanisms.

The instant invention also optionally includes adjustment means for the cutting blade which will permit the blade to be positioned horizontally and vertically so as to describe the proper arc and to be in proper juxtaposition with the portion of the thread to be cut.

Also, in the "Dearborn" type of sewing machine, since the cutting blade is disposed above the presser foot and describes an arc thereabove in operation, some type of safety device should be employed so as to prevent operation of the cutting blade while the sewing machine is running. Obviously accidental operation of the cutting blade while the machine is running will, at best, cut the thread which is sewing the work together and thereby cause damage to the goods or, at worst, can cause serious injury to the operator whose fingers might be guiding the work and might inadvertently come into the path of the blade.

The instant invention, as will be seen from the description which follows, is an extremely advantageous structure carrying out the objects set forth above. The device is simple and foolproof in operation and is relatively inexpensive to manufacture.

Other objects and advantages of the instant invention may be apparent to those skilled in this art.

The invention will be further described by reference to the accompanying drawings which are made a part of this specification.

FIG. 1 is a perspective view, partly in section, of the thread cutting device of this invention attached to a "Dearborn" blindstitch sewing machine and showing the control means that may be used. Certain parts of the sewing machine which are conventional and not necessary for the description of the operation of this invention are not shown.

FIG. 2 is a detail front perspective view, on an enlarged scale, of the solenoid member, the cutter member and the linkages of the thread cutting device of this invention. The sewing machine structure associated with the device is shown in phantom lines. The housing for the solenoid and the attachment thereof to the frame of the sewing machine is different than the structure shown in FIG. 1.

FIG. 3 is a detail sectional view, of the structure shown in full lines in FIG. 2, taken along lines 3-3 of FIG. 2.

FIG. 4 is a top view of the structure shown in FIG. 3. FIG. 5 is a detail top perspective view, on an enlarged scale, of the looper of the sewing machine, the thread loop connected thereto, and the cutting blade of the device of this invention in cutting position showing the operation of the parts. The normal position of the cutting blade is shown in phantom lines.

FIG. 6 is an enlarged detail front perspective view of the cutting blade of the device of this invention and attached structure showing the means for horizontal and vertical adjustment of the blade.

FIG. 7 is a detail top perspective view showing part of the means utilized to move the base member of the sewing machine out of contact with the presser foot and fabric feeding means so as to permit the work to be inserted and removed from the machine. The open position of the base member is shown in phantom lines.

FIG. 8 is a detail side view of the structure shown in FIG. 7 but with the closed position of the base member shown in phantom lines.

A full and detailed description of the instant invention, which represents the best mode known to the applicant of carrying out the same, will now be given by specific reference to the accompanying drawings.

The sewing machine 11, which is of the conventional "Dearborn" type, is formed with a supporting frame 12, a main drive shaft 13, a pulley 14 and a belt 15 which is attached to a source of power (not shown). Shaft 13 actuates needle bar 9 which in turn reciprocally moves needle 16 laterally. Needle 16 is provided with eye 17 at its forward end thereof adjacent its point 8 and thread 18 is disposed through eye 17.

Thread 18 also bears a loop 20 having adjacent sides 21 and 22. Loop 20 is disposed about prongs 6 and 7 of looper 19. Base member 23 normally abuts the underside of presser foot 24. Pin 5 extends through recesses provided in base member 23 and rotatably secures base member 23 to support 4. Base member 23 is also formed with arm 28 to which spring 27 is secured at one end. Spring 27 is secured at its opposite end to screw 29 and is under tension. Base member 23 may be moved downwardly away from presser foot 24 as indicated by arrows in FIG. 7.

A fabric feeding member 25 is operatively connected to presser foot 24.

Base member 23 is also provided with opening 30 through which one end of link 31 is disposed. The opposite end of link 31 is disposed through opening 33 within arcuately movable arm 32. Arm 32 is in turn disposed within opening 34 located within dog 35 and is secured in non-movable position by screw 36. Dog 35 also bears an additional opening 37 therethrough within which rotatably movable shaft 38 is disposed. Shaft 38 is firmly connected to dog 35 by means of screw 39. Dog 40 is provided with opening 41 therewithin through which an

end portion of shaft 38 is disposed. Shaft 38 is firmly connected to dog 40 by screw 42. Dog 40 also bears an operating portion 43 upon which wheel 44 is disposed. Wheel 44 is in turn connected to arm 45 of switch 3 and causes switch 3 to open and close. Switch 3 may also be opened manually by means of lever 46 and, in such position, will not be actuated by arm 45. Switch 3 may also be actuated (when lever 46 is in "on" position) by button 47.

Shaft 38 also bears an offset substantially vertical portion 48 to which actuating member 49 is disposed at one end thereof. Actuating member 49 is provided with an opening 49a through which portion 48 of shaft 38 is disposed. Actuating member 49 is secured in position by a screw (not shown).

Interrupting switch 50 is formed with a downwardly projecting plunger 51. When plunger 51 is in "up" position interrupting switch 50 will be open and no power will flow through switch 3. When plunger 51 is in "down" position switch 50 will be closed and power will flow to switch 3. Plunger 51 is spring-loaded and normally is in "down" position.

Support 53 is secured to the casing of switch 50. Lever 52 abuts the lower end of plunger 51 and is pivotally movable about pin 54. Lever 52 also bears opening 55 through which link 56 is disposed. Link 56 is connected to link 57 by connectors 58 and 59 which are secured in position by screws 58a and 59a. Link 57 bears a hook portion 60 at one end thereof and a spring 61 is secured therewithin. Spring 61 is also secured within eye 61a located within link 62 which is in turn connected to connector 62a. Connector 62a is also secured to link 63 which is also disposed within connector 64 and secured in position by screws (not shown). Connector 64 is also secured to rod 64a by means of additional screws (not shown). Rod 64a is secured to pedal 65.

Link 63 is also secured within opening 66a located within lever 67a. Lever 67a controls the main switch of the sewing machine by conventional structure.

Switch 50 joins switch 3 by wires 68a.

Plug 68 is secured to switch 3 and to wires 67 which are in turn connected to solenoid 66. Solenoid 66 (in FIG. 2) bears a pair of bolts 69a which are disposed in housings. A pair of washers 69b space solenoid 66 from support 69c which in turn bears a pair of recesses adapted to accommodate bolts 69a. Support 69c further bears an additional pair of recesses through which screws 69d pass and secure element 69c to frame 12 of the sewing machine. In FIG. 1 element 69e (which corresponds to element 69c in FIG. 2) is a partially enclosed housing which is supported on frame 12 by screws 69f. Solenoid 66 is formed with a rotatably movable shaft 69 to which arm 68a is connected and held in position by screw 70. Arm 71 is axially movable and bears an offset portion 71a at one end thereof. Portion 71a is disposed within recess 72a provided within one end of arm 68a and is further secured in position by securing members 73a and 74a through which offset portion 71a extends and is held firmly therewithin by screws 75a and 76a. The opposite end of arm 71 is connected to arm 73 and held in position by screw 77a. Arm 73 is pivotally movable about pin 75 which pivotally secures an intermediate portion of arm 73 to support arm 74. Arm 73 bears a U-shaped portion 83 thereupon. An additional downwardly extending portion 81a is provided upon arm 73 and is provided with a recess 81 thereupon. A screw 82 is disposed within recess 81 and secures portion 81a to arm 73. The position of portion 81a may be adjusted vertically by loosening screw 82 and moving portion 81a along recess 81 within U-shaped portion 83 to the point desired. Portion 81a is also formed with a U-shaped recess 79 within which cutting blade 76 is disposed. Cutting blade 76 is formed with a recess 78 and a screw 77 is disposed within recess 78 and secures cutting blade 76 to portion 81a. Cutting blade 76 may be horizontally adjusted by loosening

screw 77 and moving cutting blade 76 along recess 78 to its desired position, thence tightening screw 77 to secure the blade in position.

With the foregoing description the operation of this invention may now be explained. The operator of the sewing machine initially moves lever 46 into "off" position thereby rendering the thread cutting device of this invention inoperative. Operating portion 49 secured to shaft 38 is then moved by the operator in the direction of the arrow shown in FIG. 1. This movement causes base member 23 to move downwardly about pin 5 and thereby creates a space between base member 23 and presser foot 24. Pulley 14 is moved manually so as to bring needle 16 out of contact with the work in its lateral-most position as shown in FIG. 1. The work is then inserted between presser foot 24 and base member 23 and operating portion 49 released. Lever 46 is then turned to "on" position and pedal 65 depressed so as to cause the main switch of the sewing machine (not shown) to close and to cause the sewing machine to operate and sew the work. It is noted that if, while the machine is sewing the work, button 47 should be inadvertently depressed the thread cutting device of this invention will not be operative because interrupting switch 50 is open so long as pedal 65 is being depressed.

After the work is sewn pedal 65 is released. The operator of the machine then either places needle 16 into its lateral-most position by movement of pulley 14 or, if an automatic needle positioner is employed in connection with the sewing machine to which the device is attached, needle 16 assumes the proper position automatically. The operator then either presses button 47 to cause cutting blade 76 to cut side 21 of loop 20 (FIG. 5) or the operator merely pushes operating portion 49 in the direction of the arrow shown in FIG. 1. If operating portion 49 is pressed not only will the thread be cut but base member 23 will be moved away from presser foot 24 thereby permitting the work to be simply removed from the machine.

Thereafter the operator of the machine turns lever 46 into "off" position, inserts new work between base member 23 and presser foot 24 and repeats the process.

The foregoing specific embodiments of this invention as set forth in the specification herein are for illustrative purposes and for purposes of example only. Various changes and modifications may obviously be made within the spirit and scope of this invention and would occur to those skilled in this art. The scope of this invention is determined solely by a reading of the appended claims.

I claim:

1. In a blind stitch sewing machine having a supporting frame, in combination, stitch-forming instrumentalities, means for operating said stitch-forming instrumentalities, said stitch-forming instrumentalities including a thread carrying needle and cooperating looper, a fixed presser-foot secured to the supporting frame, a thread cutter pivotally mounted on the supporting frame, said thread cutter including a substantially vertically disposed cutter arm, a blade holder connected to said cutter arm and vertically adjustable thereon, a substantially horizontally disposed blade connected to said blade holder and horizontally adjustable thereon, a solenoid mechanically connected to said thread cutter, a solenoid switch electrically connected to said solenoid, a work support pivotally mounted beneath and adjacent to said presser-foot, means for biasing said work support upwardly adjacent said presser-foot, a transverse rotatably movable shaft, a lever arm connected to said shaft, a first dog mounted on said shaft and mechanically connected to said work support, a second dog mounted on said shaft and adapted to actuate said solenoid switch, whereby the movement of said lever arm rotates said shaft to simultaneously move said work support downwardly away from said presser-foot and actuate said solenoid switch to thereby actuate said thread cutter, a normally open selectively operable button switch connected to said solenoid switch, said solenoid switch includ-

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ing a lever connected thereto for selectively preventing the actuation of the solenoid switch, pedal operated means for actuating said switch forming instrumentalities, an interrupting switch mechanically connected to said pedal operated means and electrically connected to said solenoid switch and adapted to prevent the actuation of said solenoid switch when said pedal operated means actuates said stitch-forming instrumentalities.

2. In a blind stitch sewing machine having a supporting frame, in combination, stitch-forming instrumentalities, means for operating said stitch-forming instrumentalities, said stitch-forming instrumentalities including a thread carrying needle and cooperating looper, a fixed presser-foot secured to the supporting frame, a movable cutting blade, means for moving said cutting blade in a path that will allow the cutting blade to sever a limb of a loop of thread held by said looper, a movable work support positioned beneath and normally adjacent to said fixed presser-foot, and means for initiating the limb cutting motion of said cutting blade upon movement of said work support, said means for initiating the limb cutting motion of said cutting blade including a solenoid connected to said cutting blade, a solenoid switch electrically connected to said solenoid, a shaft connected to said work support and said solenoid switch, said shaft having an actuating member the operation of which moves the shaft

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and in turn moves the work support out of engagement with said presser-foot and simultaneously actuates said solenoid switch thereby to activate the solenoid and move the cutting blade along its limb severing path.

5 3. The combination as in claim 2 wherein said means for operating said stitch-forming instrumentalities includes a main sewing machine actuation switch lever, a foot-pedal connected to said main sewing machine switch lever, means for preventing the operation of said solenoid switch when said foot-pedal is depressed, said last-named means including an interruption switch mechanically connected to said foot-pedal and electrically connected to the solenoid switch whereby the depression of the foot-pedal simultaneously activates said stitch-forming instrumentalities and said interruption switch thereby electrically disconnecting the solenoid switch

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25 JORDAN FRANKLIN, *Primary Examiner*.