Dec. 29, 1964 C. G. PICKETT 3,163,136

TRIMMING DEVICE FOR SEWING MACHINE

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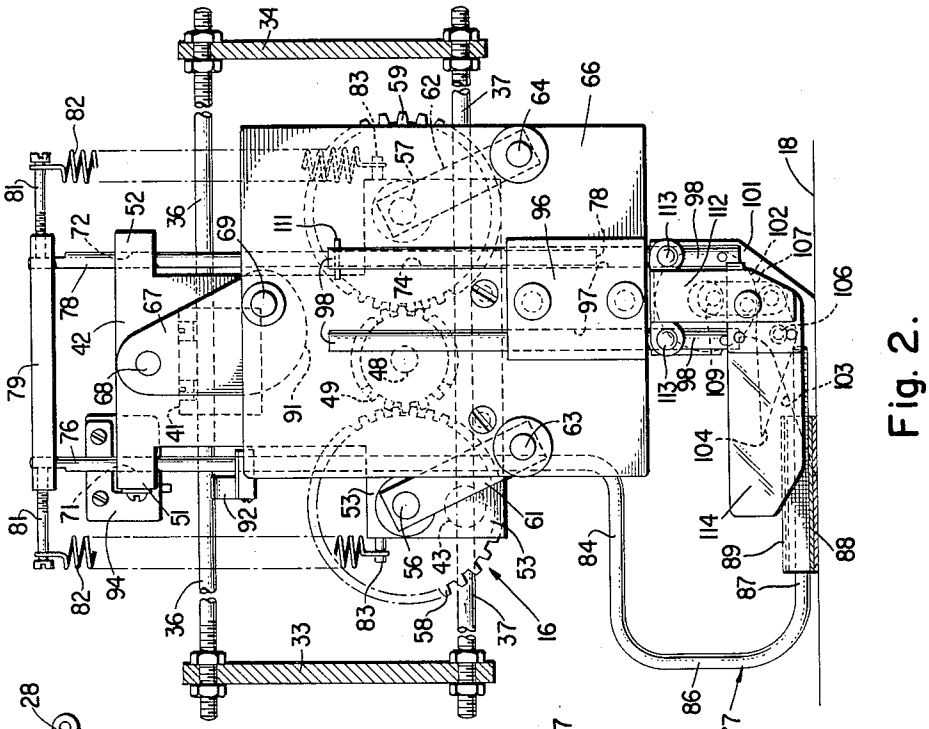


Fig. 2.

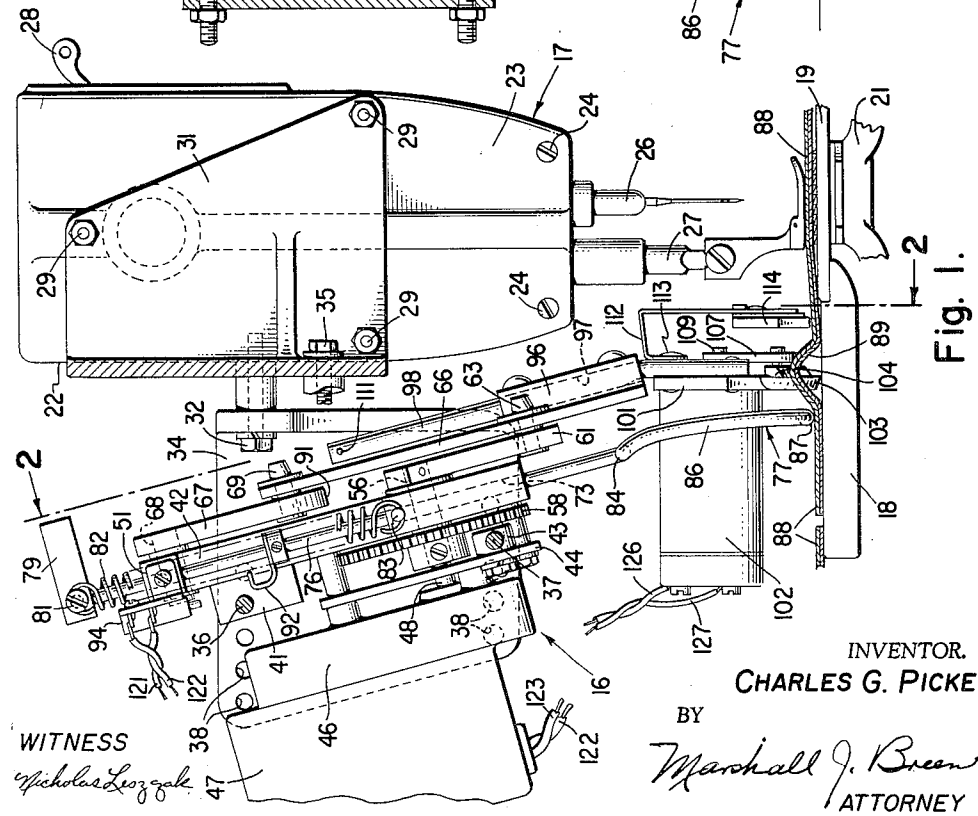


Fig. 1.

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TRIMMING DEVICE FOR SEWING MACHINE

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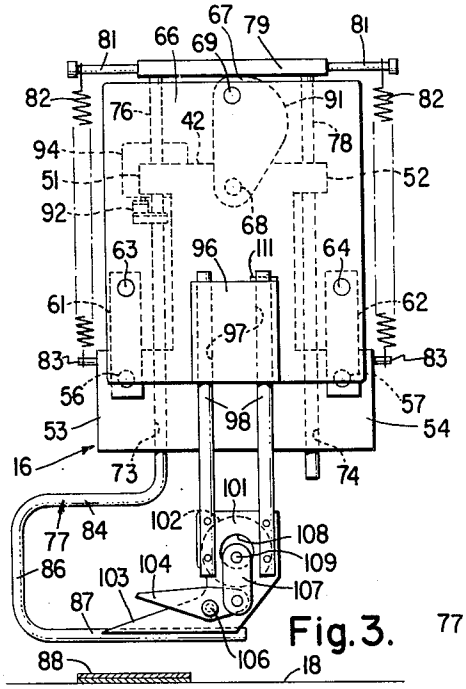


Fig. 3.

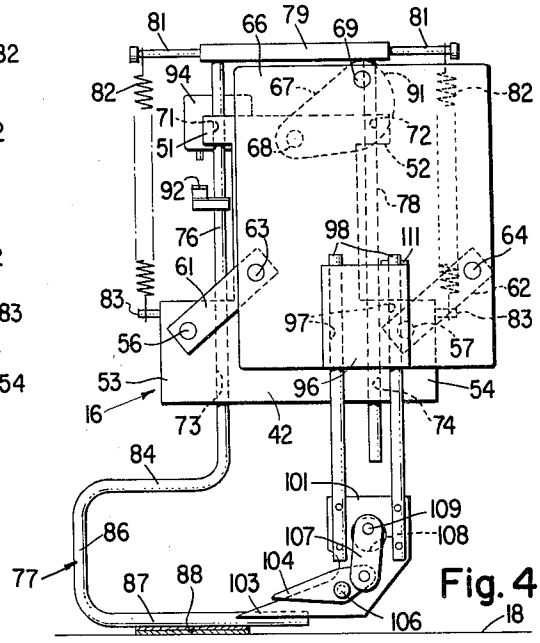


Fig. 4.

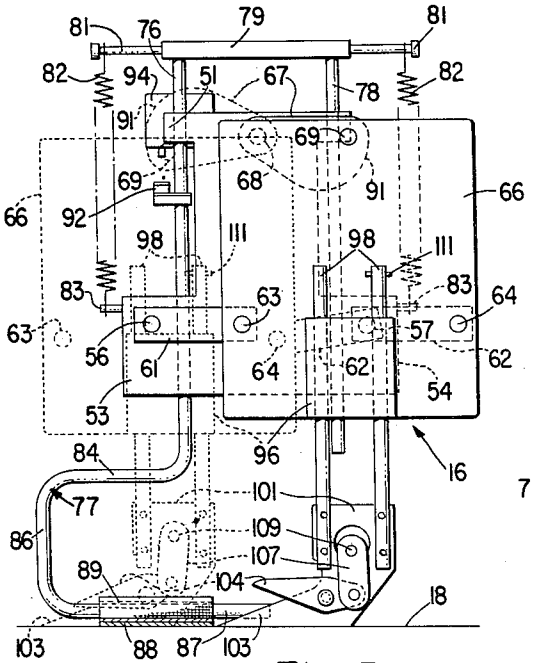


Fig. 5.

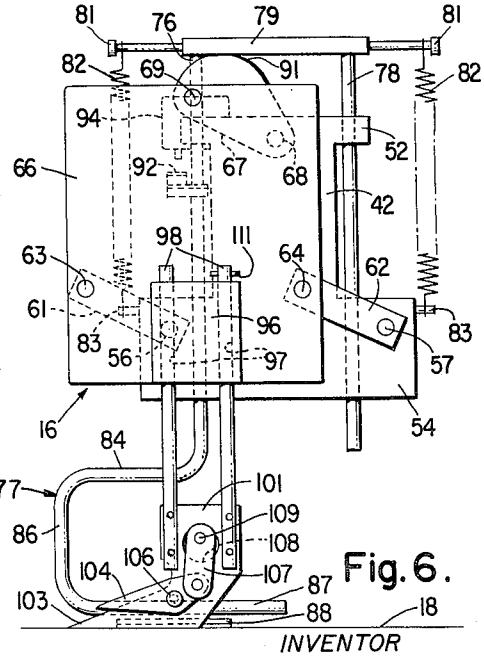


Fig. 6.

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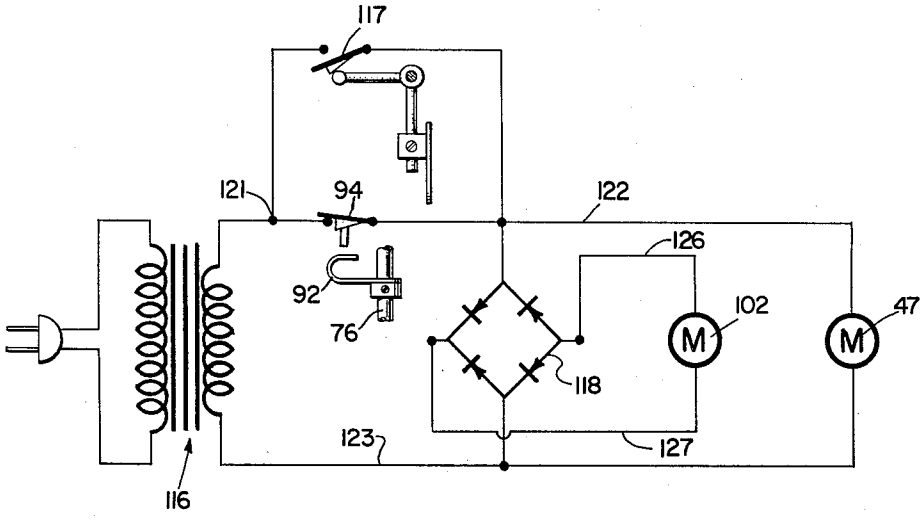


Fig. 7.

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TRIMMING DEVICE FOR SEWING MACHINE

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5 Claims. (Cl. 112—130)

This invention relates to trimming devices and more particularly to trimming devices designed to sever into short lengths a long sewed strip of material as the said strip of material is fed away from a sewing machine on which it has been sewed, and a primary object of the present invention is to provide an improved device of this character.

Another object of the invention is to provide an improved trimming device having means for raising and lowering the trimming device between trimming operations.

A further object of the invention is to provide an improved trimming device having means for stopping one portion of a moving strip and thereby causing said strip to form a loop at a position suitable for trimming.

A still further object of the invention is to provide an improved means for mounting a trimming device on a sewing machine so that the position of the trimming device can be adjusted easily.

A further object of the invention is to provide an improved means for moving the scissors of a trimming device to and from a cutting position.

Another object of the invention is to provide an improved means for stopping movement of the trimming device at the end of its cycle of operation.

Another object of the invention is to provide a trimming device which can be started at will, and which, when once started, will clamp a strip being fed from a sewing machine, lower a pair of scissors to a cutting position, move the scissors across the strip to perform the cutting operation, raise the presser device and the scissors to a clear position and stop movement of the presser device and the scissors.

Having in mind the above and other objects that will be evident from an understanding of this disclosure, the invention comprises the devices, combinations and arrangements of parts as illustrated in the presently preferred embodiment of the invention which is hereinafter set forth in such detail as to enable those skilled in the art readily to understand the function, operation, construction and advantages of it when read in conjunction with the accompanying drawings in which:

FIG. 1 is an elevational end view of a sewing machine to which has been attached a trimming device embodying he present invention,

FIG. 2 is an elevational view of the trimming device taken substantially on the line 2—2 of FIG. 1,

FIG. 3 is a schematic view of the trimming device, the parts being shown in an inactive raised position,

FIG. 4 is a view similar to FIG. 3 but showing an arm of the trimming device lowered to a clamping position whereby the sewed strip being fed from the sewing machine is clamped against the work supporting surface of the sewing machine bed,

FIG. 5 is a view similar to FIG. 3 wherein the solid line portions of FIG. 5 show parts of the trimming device in the positions they assume prior to beginning a cut and wherein the dash-dash line portions show parts in the position they assume after completion of the cut,

FIG. 6 is a view similar to FIG. 3 but showing parts of the trimming mechanism as they begin to rise on their way to assuming the position shown in FIG. 3, and

FIG. 7 is a diagram showing the electric circuit.

FIG. 1 shows the trimming device 16 of this invention as associated with and supported from a sewing machine 17. The sewing machine 17 has many conventional parts,

including a work supporting plate 18, a throat plate 19 carried by the plate 18, a feed dog 21 above which is supported a head 22 having a face plate 23 held in place by screws 24. The head 22 supports a needle bar 26, a presser bar 27, and take-up lever 28, and the face plate 23 by means of a plurality of screws and nuts 29 supports one flange of an angle bracket 31, the other flange of which supports a stud 32. The stud 32 in turn supports a second angle bracket 33 and a third angle bracket 34 is held to the arm (not shown) of the sewing machine 17 by means of a stud 35. The two brackets 33 and 34 support a pair of rods 36 and 37 and the trimming device 16 is carried by the rods 36 and 37 in such a manner that the trimming device 16 can be adjusted to any desired position longitudinally of the rods. Also, because the angle brackets 33 and 34 are provided with a plurality of sets of holes 38—38, the trimming device 16 can be adjusted toward or away from the sewing machine 17 by placing the rods 36 and 37 in the selected holes 38—38.

Specifically the trimming device 16 is held to the rods 36 and 37 in the following manner. The rod 36 passes through a block 41 carried on the rear face of an upstanding mounting plate 42 and the rod 37 passes through a block 43 which is held to a thin plate 44 and the thin plate 44 is secured to the mounting plate 42. A gear box 46 of an electric motor 47 is secured to the thin plate 44 and the electric motor 47 drives gears (not shown) in the gear box 46 which gears in turn drive, at a low speed, a shaft 48 which carries a pinion 49.

The mounting plate 42, as best seen in FIGS. 5 and 6, is substantially I-shaped in form and thereby has two upper arms 51 and 52 and two lower arms 53 and 54 extending horizontally outwardly from the main body of the plate 42. The lower arm 53 carries (FIG. 4) a rotatable shaft 56 and the lower arm 54 carries (FIG. 6) a rotatable shaft 57. The ends of the shafts 56 and 57 to the rear of the mounting plate 42 respectively carry (FIG. 2) gears 58 and 59 both of which are in mesh with and are driven by the pinion 49. The ends of the shafts 56 and 57 in front of the mounting plate 42 respectively carry ends of a pair of crank arms 61 and 62. The distal ends of the arms 61 and 62 respectively carry forwardly projecting pivot pins 63 and 64 and on the front ends of these pins 63 and 64 is pivotally carried a movable plate 66. The upper end of the mounting plate 42 is connected to the upper end of the movable plate 66 by a third crank arm 67, the arm 67 being connected to the plate 42 by a pivot pin 68 and the arm 67 being connected to the plate 66 by a pivot pin 69.

From the above it can be seen that, as the motor 47 drives gears in the gear box 46 to slowly drive the shaft 48 and the pinion 49, the pinion 49 drives the two gears 58 and 59 to rotate the shafts 56 and 57 to turn the crank arms 61 and 62. Then the crank arms 61 and 62 through their pins 63 and 64 drive the movable plate 66 from the upper position shown in FIG. 3 to the right side position shown in FIG. 4, to the lowered right side position shown in solid lines in FIG. 5, to the lowered left side position shown by dash-dash lines in FIG. 5, to the left raised position shown in FIG. 6 and finally back to the fully raised position shown in FIG. 3. As a matter of interest, it should be pointed out that the position of the movable plate 66 shown in FIG. 3 is part way between the two positions shown in FIG. 5.

Arms 51 and 53 (FIG. 4) are formed with aligned cylindrical holes 71 and 73 and arms 52 and 54 are formed with aligned cylindrical holes 72 and 74. A cylindrical shank 76 of a work-engaging or presser device 77 is slidably carried in the holes 71–73, and a cylindrical guide rod 78 is slidably carried in the holes 72–74. The upper ends of the shank 76 and the upper end of the guide rod 78 are connected by a horizontally disposed bar 79. Screws 81—81 carried by opposite ends of the

bar 79 are connected by tensioin springs 82—82 to pins 83—83 carried by the lower arms 53 and 54 of the mounting plate 42. The springs 82—82 provide a downward bias for the rod 78 and especially for the presser device 77. The lower end of the presser device 77 has a horizontal bar 84, a bent bar 86 (FIG. 1) and a sole portion 87, the sole portion 87 when in its lowered position, as shown in FIGS. 1 and 2, presses on the upper surface of a strip of sewed material as the said strip of material 88 is fed away from the sewing machine 17 in a known manner by the feed dog 21. From FIGS. 1 and 2 it can be seen that when the sole portion 87 rests on the material 88 it stops a portion of the material 88 and thus the material 88 is forced to form a loop 89, because the feed dog 21 continues to feed one portion of the material while the sole portion 87 holds another portion of the material 88.

Reference to FIG. 2 shows that the crank arm 67 differs from crank arms 61 and 62 in that the crank arm 67 has an edge cam 91 which, as best seen in FIG. 6, functions to raise the bar 79 against the bias of the springs 82—82. Because of the cam 91 and the bar 79, the sole portion 87 is (FIG. 3) raised free from contact with the strip of material 88 or is allowed to contact (FIGS. 4 and 5) the material 88. The shank 76 carries a lug 92 which when the movable plate 66 is in the raised position (FIG. 3) engages and opens the electrical contacts of a normally closed electric limit switch 94 carried by the upper arm 51 of the mounting plate 42. The function of the switch 94 will be described in more detail hereinafter.

The lower end of the movable plate 66 carries a front protuberance 96 which is provided with a pair of downwardly extending bores 97—97 designed to accommodate a pair of upstanding rods 98 and 98. A plate 101 is mounted on the reverse side of the lower ends of the rods 98—98 and a high speed electric motor 102 is mounted on the rear side of the plate 101, and the lower end of the plate 101 is formed into a lower scissor or cutting blade 103. Cooperating with lower scissor blade 103 is an upper scissor or cutting blade 104 which is pivotally mounted on a pin 106 carried by the blade 103. The upper blade 104 is pivotally connected to the lower end of a link 107 and the upper end of the link 107 is driven, through a hole 108 formed in the plate 101, by an eccentric 109 carried by the end of the shaft of the motor 102. The upper end of one of the rods 98 carries diametrical pin 111 which engages the upper portion of the protuberance 96 when the parts are in the position shown in FIG. 3, thus holding the blades 103 and 104 above the work supporting plate 18. A bracket 112 (FIGS. 1 and 2), one end of which is held by rivets 113—113 to the rods 98—98, supports a shield 114 which prevents the operator's hand from engaging the blades 103 and 104.

The electrical equipment used to drive and control the two motors 47 and 102 of the trimming device 16 preferably comprises (1) a transformer 116 for providing a low voltage source of A.C. electric power, (2) the previously mentioned normally closed limit switch 94 for stopping the trimming device 16 at the end of its cycle as shown in FIG. 3, (3) a foot or knee operated normally open switch 117 for starting the trimming operation, and (4) a full wave rectifier 118 for supplying A.C. power to the motor 102. From FIG. 7 it can be seen that a conductor 121 extends from one terminal of the low voltage secondary winding of the transformer 116 to terminals of the parallel connected switches 94 and 117, and a conductor 122 extends from the other terminals of the switches 94 and 117 to one of the A.C. terminals of the rectifier 118 and also to one terminal of the motor 47. A conductor 123 extends from the other terminal of the low voltage secondary winding of the transformer 116 to the second A.C. terminal of the rectifier 118 and also to the second terminal of the motor 47. The two D.C. terminals of the rectifier 118 are connected by conductors 126 and 127 to the terminals of the motor 102. From the above, it can be seen that whenever proper electric power is supplied to the primary of the transformer 116 and the contacts of either switch 94 or switch 117 are closed the motors 47 and 102 will operate. If it is assumed that parts of the trimming device 16 are in the positions shown in FIG. 3, the switch 94 will be held open by the lug 92 and the motors 47 and 102 will be stopped. If the operator closes the switch 117 the motors 47 and 102 will start to operate. Operation of the motor 47 lowers the shank 76 and the lug 92 which causes the switch 94 to close thus causing operation of the motors 47 and 102 and these motors will continue to operate until both switches 94 and 117 are opened.

While operation of the trimming device 16 will be understood from the foregoing, a more complete description of the operation of the present equipment is given below. With the parts in the position shown in FIG. 3, the operator closes the switch 117. This causes the motors 47 and 102 to operate. Operation of motor 102 turns the eccentric 109 to rapidly vibrate the upper blade 104 with respect to the lower blade 103 to produce a cutting or scissors action. Operation of the motor 47 drives gears in the box 46 which in turn slowly turn the shaft 48 and the pinion 49. The pinion 49 drives the gears 58 and 59 to turn the shafts 56 and 57 thereby swinging the crank arms 61 and 62 to cause the movable plate 66 to execute a definite translation, which translation is progressively shown in FIGS. 3 through 6. Movement of the plate 66 causes the cam edge crank arm 67 to operate in unison with the arms 61 and 62. As the plate 66 is lowered from the position shown in FIG. 3 to that shown in FIG. 4, the cam edge arm 67 allows the bar 79, which is biased by the springs 82—82, to be lowered. This lowers the shank 76 and the lug 92 which disengages itself from the switch 94 which closes its contacts. This causes the motors 47 and 102 to continue to run and permits the operator to allow the switch 117 to open. Lowering the shank 76 causes the sole portion 87 to press upon the strip of sewed material 88 at a location behind the lower scissor blade 103. As the sewing machine continues to operate the strip 88 continues to be fed. This causes a loop 89 (FIG. 1) to form between the sole portion 87 and the shield 114. As the plate 66 is further lowered from the position shown in FIG. 4 to the solid line position shown in FIG. 5, the lower scissor blade 103 engages the work supporting plate 18 placing the blades 103 and 104 in position to begin to cut the loop 89. As the plate 66 moves from the solid line position shown in FIG. 5 to the position shown by dash-dash lines in the same FIG. 5, cutting of the loop 89 is accomplished, it being remembered that the scissor blade 104 is continually operated by the motor 102. As the plate 66 moves from the dash-dash position shown in FIG. 5 to the position shown in FIG. 6, the cam 91 engages the bar 79 and raises the shank 76 and the sole portion 87. As the plate 66 moves from the position shown in FIG. 6 to the position shown in FIG. 3, the pin 111 engages the protuberance 96 to raise the rods 98—98, and thus to raise the motor 102, the blades 103 and 104 and the shield 114. Also, as the plate 66 raises the shank 76, the lug 92 opens the switch 94 to stop movement of the plate 66 by stopping the motor 47.

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

1. In combination with a sewing machine having a frame including a work support, stitch-forming instrumentalities and work feeding mechanism for advancing work past said stitch-forming instrumentalities: a work trimming device mounted on said sewing machine frame and adapted to sever work at a location rearwardly of said stitch-forming instrumentalities when viewed in the normal direction of the feed of the work, said work trimming device including scissors means supported for

work cutting movement and for bodily movement relatively to said work, actuating means for imparting both work cutting movement and bodily movement to said work trimming device, a movable work engaging member operable to contact and thereby interrupt the advance of a portion of the work being moved by the work feeding mechanism to form a loop therein so as to position the work for severance by the scissors means, and means to move said work engaging member in proper time relation with respect to the movements of said work trimming device.

2. A work trimming device adapted for use with a sewing machine having a frame including a work support, stitch forming instrumentalities, and work feeding mechanism for advancing work past said stitch forming instrumentalities, said trimming device comprising a mounting plate, means for supporting said mounting plate on said sewing machine, an electric motor carried by said mounting plate, a movable plate adapted for being movably mounted with respect to said mounting plate, a plurality of crank arms connecting said movable plate to said mounting plate, means for driving said crank arms from said electric motor and thereby moving said movable plate with respect to said mounting plate, means slidably mounted on said movable plate, a pair of scissor blades adapted to sever the work, said scissor blades being carried by said last named means, an electric motor also carried by said last named means and adapted for driving at least one of said scissor blades, a presser device slidably mounted on said mounting plate, biasing means, one end of which is connected to said mounting plate and the other end of which is connected for biasing said presser device downwardly to a predetermined position to contact the work and thereby to interrupt the advance of a portion thereof, and means for raising said presser device against the bias of said biasing means to thereby disengage the presser device from the work and to permit its advance.

3. A work trimming device adapted for use with a sewing machine having a frame including a work support, stitch forming instrumentalities, and work feeding mechanism for advancing work past said stitch forming instrumentalities, said trimming device comprising a mounting plate, means for supporting said mounting plate on said sewing machine, an electric motor carried by said mounting plate, a pinion driven by said motor, a pair of gears driven by said pinion, a movable plate adapted for being movably mounted with respect to said mounting plate, a plurality of crank arms driven by said gears and connecting said movable plate to said mounting plate and thereby moving said movable plate with respect to said mounting plate, means slidably mounted on said movable plate, a pair of scissor blades adapted to sever the work, said scissor blades being carried by said last named means, an electric motor also carried by said last named means and adapted for driving at least one of said scissor blades, a presser device slidably mounted on said mounting plate, biasing means, one end of which is connected to said mounting plate and the other end of which is connected for biasing said presser device downwardly to a predetermined position to contact the work and thereby to interrupt the advance of a portion thereof, and means for raising said presser device against the bias of said biasing means to thereby disengage the presser device from the work and to permit advance thereof.

4. A work trimming device adapted for use with a sewing machine having a frame including a work support,

stitch forming instrumentalities, and work feeding mechanism for advancing work past said stitch forming instrumentalities, said trimming device comprising a mounting plate, means for supporting said mounting plate on said sewing machine, an electric motor carried by said mounting plate, a movable plate adapted for being movably mounted with respect to said mounting plate, a plurality of crank arms connecting said movable plate to said mounting plate, means for driving said crank arms from said electric motor and thereby moving said movable plate with respect to said mounting plate, means slidably mounted on said movable plate, a pair of scissor blades adapted to sever the work, said scissor blades being carried by said last named means, an electric motor also carried by said last named means and adapted for driving at least one of said scissor blades, a presser device slidably mounted on said mounting plate, biasing means, one end of which is connected to said mounting plate and the other end of which is connected for biasing said presser device downwardly to a predetermined position to contact the work and thereby to interrupt the advance of a portion thereof, a bar member carried by said presser device, a cam formed on one of said crank arms, and means for driving said cam, said cam moving said presser device against said biasing means to thereby disengage the presser device from the work and to permit advance thereof.

5. A work trimming device adapted for use with a sewing machine having a frame including a work support, stitch forming instrumentalities, and work feeding mechanism for advancing work past said stitch forming instrumentalities, said trimming device comprising a mounting plate, means for supporting said mounting plate on said sewing machine, an electric motor carried by said mounting plate, a pinion driven by said motor, a pair of gears driven by said pinion, a crank arm driven by each of said gears, a movable plate adapted for being movably mounted with respect to said mounting plate and carried by the free ends of said crank arms and thereby moving said movable plate with respect to said mounting plate, an edge cam crank arm pivotally connected at one of its ends to said mounting plate, means pivotally connecting the other end of said edge cam crank arm to said movable plate, a pair of rods longitudinally slidably mounted on said movable plate, a pair of scissor blades adapted to sever the work, said scissor blades being carried by said pair of rods, an electric motor also carried by said pair of rods and adapted for driving at least one of said scissor blades, a presser device longitudinally slidably mounted on said mounting plate, biasing means, one end of which is connected to said mounting plate and other end of which is connected for biasing said presser device downwardly to a predetermined position to contact the work and thereby to interrupt the advance of a portion thereof, and a bar member carried by said presser device and engageable with said edge cam crank arm, said edge cam moving said presser device against said biasing means to thereby disengage the presser device from the work and to permit advance thereof.

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