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E. L. SEAMAN

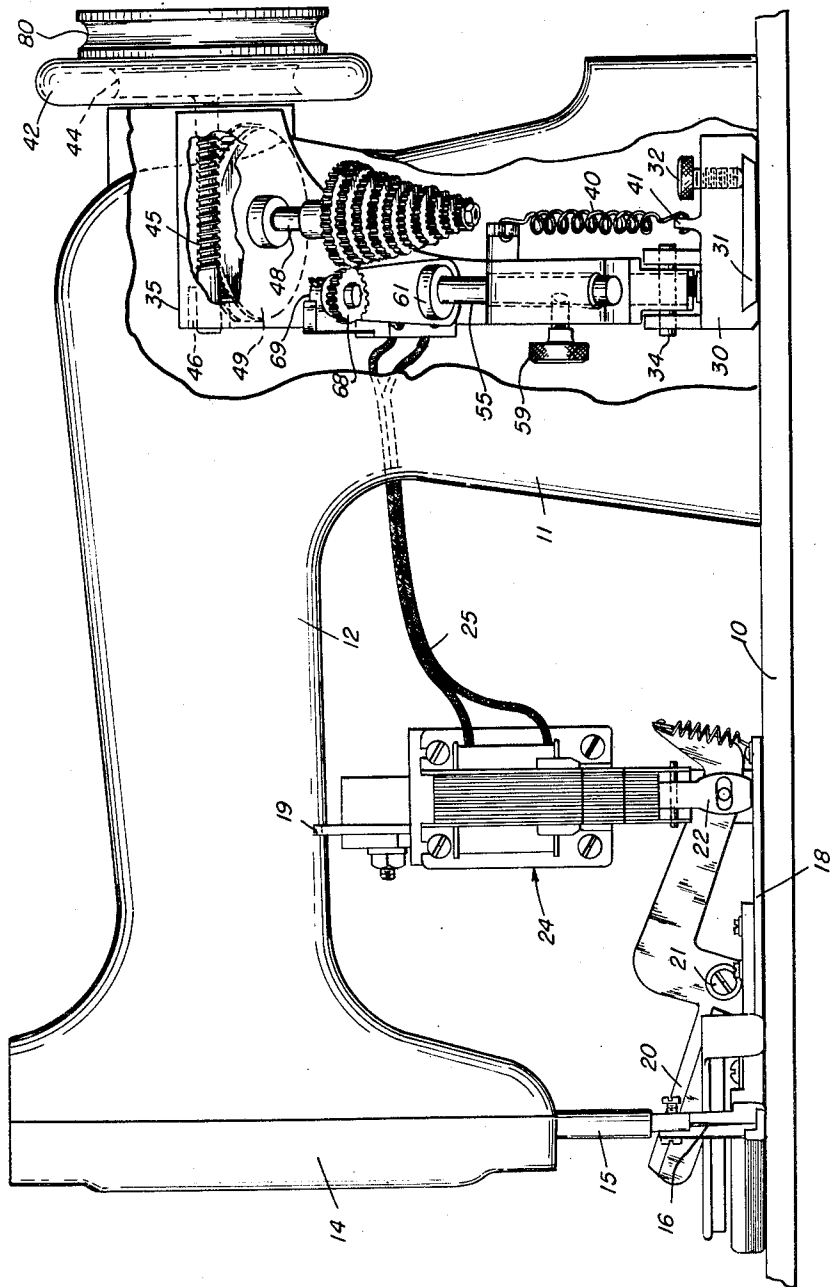
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ELECTRICAL SWITCHING MEANS FOR USE WITH SEWING MACHINES

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2 Sheets-Sheet 1

FIG. 1



INVENTOR.

Edward L. Seaman

BY

Churchill, Rich, Wilmouth & Engel
Attorneys

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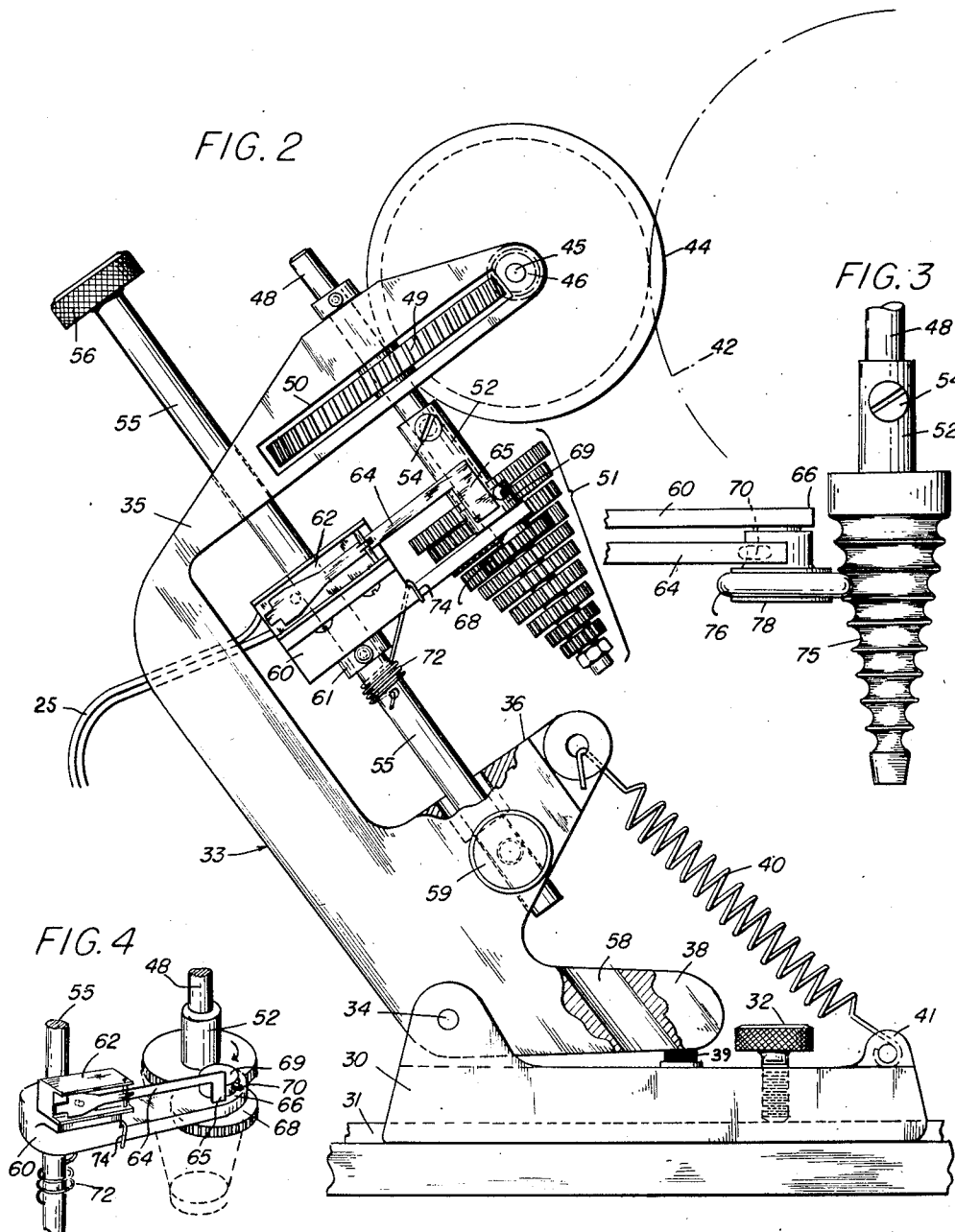
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INVENTOR.

Edward L. Seaman

BY

Churchill, Rich, Weymouth & Engel
Attorneys

1

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ELECTRICAL SWITCHING MEANS FOR USE WITH SEWING MACHINES

Edward L. Seaman, Garden City, N. Y., assignor to S. & W. Sewing Machine Attachment Co., New York, N. Y., a partnership

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6 Claims. (Cl. 200—52)

This invention relates generally to electrically operated cutting attachments for sewing machines. More particularly it relates to variable interval switching means for actuating a cutter to sever the material being stitched in the machine after the formation of a predetermined number of stitches.

In the garment manufacturing industry a variety of articles are manufactured on either operator controlled or continuously running sewing machines, for example belts, belt loops, trimmings, shoulder straps, "spaghetti" etc. which it is desired to cut off in predetermined lengths. Various types of solenoid-actuated cutters adapted to be positioned behind the needle of the sewing machine are known in the art, one such cutter being shown in my copending application Ser. No. 489,495, filed February 21, 1955, of which this is a continuation-in-part. The present invention relates to mechanical means for actuating the switch which controls the solenoid in accordance with the number of revolutions made by the main shaft of the sewing machine.

The general object of the invention is to provide a switch operating attachment for actuating the cutter at regular intervals directly related to the number of stitches made, the attachment being adjustable to vary the length of the intervals. Other objects and advantages will in part appear and in part will be obvious from the following detailed description of the present preferred embodiment of the invention, taken in conjunction with the drawings in which:

Fig. 1 is a front elevation of a sewing machine incorporating the attachment of the invention and a cutter operated thereby, part of the pedestal being broken away to show the attachment behind it;

Fig. 2 is a side elevation of the attachment as seen from the left in Fig. 1, the handwheel of the sewing machine being indicated by a broken line;

Fig. 3 is a fragmentary view showing a modified form of variable switch-actuating mechanism; and

Fig. 4 is a detail perspective view of the adjustable arm carrying the switch and the switch actuator and also showing the timing gears which drive it.

Fig. 1 shows in front elevation a common type of sewing machine which has a bed plate 10, a pedestal 11 and an overhanging arm 12 carrying the sewing head 14. The needle bar is 15 and carries the needle 16. The cutter shown attached to the machine is like that fully described in my aforesaid application Ser. No. 489,495 and is supported on a plate 18 held against bed plate 10 by a clamping device which bears upwardly against the underside of arm 12 at 19. The movable blade 20 of the cutter is pivoted at 21 and is actuated by the armature 22 of a solenoid generally indicated at 24. The solenoid receives its operating current through the conductors 25. The

2

particular cutter used is no part of the present invention and any other type of electrically operated cutter than that shown may be used in conjunction therewith.

Referring now to Fig. 2 as well as Fig. 1, the switch operating attachment of the invention is mounted on a base 30 slidably secured to a dovetail plate 31 attached to bed plate 10. Base 30 may be adjusted in a fore and aft direction and secured in any desired position by the thumb screw 32. The mechanism of the attachment is carried in a frame generally indicated at 33, pivoted to base 30 at 34 and having an upper bearing arm 35, a lower bearing arm 36, and a foot 38 which rests against a stop 39 on base 30. Frame 33 is urged toward stop 39 by a tension coil spring 40 secured at one end to the arm 36 and at the other end to a lug 41 on the base.

The attachment shown is arranged to be driven from the handwheel 42 of the sewing machine and to this end upper bearing arm 35 carries a friction drive wheel 44 provided with a peripheral groove to make better contact with the handwheel 42, wheel 44 being mounted on the end of a worm drive shaft 45 supported in the outer end of upper bearing arm 35. Suitable bushings such as 46 are provided as bearings for shaft 45. Mounted in upper bearing arm 35 at right angles to shaft 45 is a stub shaft 48 on which is fixed a pinion gear 49 to be driven by the worm shaft 45. Pinion 49 is supported in a slot 50 in arm 35 which forms a partial enclosure for it. On the lower end of shaft 48 there is secured a cluster or set of graduated timing gears 51 fixedly mounted on a shaft 52 having a hollow end by which it is attached to shaft 48, being held thereon by screw 54.

Parallel to shaft 48 there is rotatably and slidably mounted in bearings in the upper bearing arm 35 and lower bearing arm 36 respectively a shaft 55 having a knob 56. Shaft 55 may be manually adjusted longitudinally of frame 33 and to allow sufficient movement foot 38 is provided with an aperture 58. Shaft 55 may be held in any adjusted position by means of a thumb screw 59. If desired, the lower end of shaft 55 may be provided with grooves or notches cooperating with the end of screw 59 to provide step-wise longitudinal adjustment.

Rotatably supported on shaft 55 is a switch-carrying arm 60 positioned on shaft 55 between upper and lower collars the lower of which is shown at 61. Mounted offside, as shown in Fig. 4, on arm 60 is a suitable switch, preferably a one-way impulse switch 62 having a pivoted operating arm 64 provided on its end with a cam follower 65. Rotatably mounted in a bearing in the outer end 66 of arm 60 is a stub shaft having on its lower end a driven gear 68 and on its upper end a cam 69 which, in the form shown, consists of a collar having an outwardly extending pin 70 adapted as it revolves to engage the cam follower 65 and operate switch 62. Obviously this cam may be made in other ways and might have more than one high point. Or it might be so related to the switch as to actuate it by one or more low points.

As above mentioned, arm 60 is rotatably mounted on shaft 55 but is fixed in position longitudinally thereof between collars so that it is moved up and down with the shaft. Anchored to shaft 55 is a coil spring 72 the free end 74 of which is bent and hooked around arm 60 so as to urge its outer end 66 toward the timing gears 51. This brings gear 68 into meshing engagement with one or another of the gears 51 depending on the longitudinal position of shaft 55. Thus, by moving the shaft longitudinally, various gear ratios may be established for rotating the switch-actuating cam 69. By rotating shaft 55 the desired pressure may be established through spring

72 to hold gear 68 in engagement with a selected one of the gears 51.

Referring to Fig. 3 wherein the same reference numerals are used on parts already described, it shows a modified form of variable speed drive wherein the gears 51 are replaced by a stepped grooved pulley 75 which is engaged by a resilient driving tire 76 of rubber or the like mounted on a grooved wheel 78 rotatably supported in the end 66 of arm 69 and carrying in its hub the pin 70 which actuates the switch arm 64.

The operation of the device above described is as follows: The plate 31 having been secured to the bed plate 10 of the machine, base 30 of the attachment is adjusted thereon so as to bring the friction drive wheel 44 into driving engagement with the handwheel 42 of the sewing machine, placing spring 40 under tension, whereupon thumb screw 32 is tightened. In this position foot 38 of frame 33 will, of course, be spaced from stop 39. Operation of the sewing machine will now cause the timing gears 51, or the grooved pulley 75, to rotate in a fixed relation to the number of rotations of the main shaft of the sewing machine on the end of which hand wheel 42 is mounted. The stitch length having been adjusted as desired, gear 68 is brought into engagement with one of the gears 51, thus rotating the cam 69 at the desired speed relative to the machine to operate switch 62 at the desired intervals. After a predetermined number of stitches have been formed according to the gear ratio selected, switch 62 will be actuated to send an impulse of current to solenoid 24 which will operate cutter blade 20 thus severing the work passing through the machine. It will be evident that by selecting the proper length of stitch and the proper gear ratio, the operation of the cutter may be given a fixed relation to the length of the article being stitched so that it may be cut into sections at uniform intervals. A range of from 1½" to 24" is provided by the embodiment illustrated.

It is not essential that the attachment be driven from the handwheel 42 but, by modifications of the friction drive wheel 44 easily made by anyone skilled in the art, it may be driven from the belt pulley 80 or from the belt itself (not shown) which drives the machine through said pulley.

It will further be evident that the switching device of the invention is not limited to use with a cutter but may operate any other electrically controlled device, such as a visual or audible signal, marker, footage counter or other sewing machine accessory.

The details of the embodiment of the invention above described being subject to many modifications, it is to be understood that the invention is not limited thereto but is to be construed broadly within the purview of the claims.

What is claimed is:

1. A variable interval switch operating attachment for a sewing machine comprising, a base 30, a frame 33 pivotally supported thereon, resilient means 40 connecting said frame to said base urging the frame in one direction, a drive wheel 44 rotatably supported on said frame and adapted to be driven from the sewing machine (42), variable ratio driving means 51, 75 rotatably supported on said frame, means 45, 49, 48 providing a driving connection between said drive wheel 44 and said driving means 51, 75, a shaft 55 slidably and rotatably supported in said frame 33 parallel to the axis (48, 52) of said driving means, means 59 for securing said shaft in a selected position, an arm 60 supported on said shaft 55, a driven member 68, 78 rotatably mounted on said arm 60 adapted to engage said driving means 51, 75, a cam 69, 70 rotated by said driven member, and a switch 62 carried by said arm having an actuating lever 64, 65 positioned for engagement with said cam 69, 70, whereby the switch is actuated at intervals by the rotation of the cam.

2. A variable interval switch operating attachment for

a sewing machine comprising, a base, a frame pivotally supported thereon, resilient means connecting said frame to said base urging the frame in one direction, a drive wheel rotatably supported on said frame and adapted to be driven from the sewing machine, variable ratio driving means rotatably supported on said frame, means providing a driving connection between said drive wheel and said driving means, a shaft slidably and rotatably supported in said frame parallel to the axis of said driving means, means for securing said shaft in a selected position, an arm supported on said shaft, a driven member rotatably mounted on said arm adapted to engage said driving means, a cam rotated by said driven member, and a switch carried by said arm having an actuating lever positioned for engagement with said cam, whereby the switch is actuated at intervals by the rotation of the cam.

3. A variable interval switch operating attachment for a sewing machine comprising, a frame, a drive wheel rotatably supported on said frame and adapted to be driven from the sewing machine, a cluster of graduated timing gears rotatably supported in said frame, means providing a driving connection between said drive wheel and said timing gears, a shaft slidably and rotatably supported in said frame parallel to the axis of said timing gears, means for securing said shaft in a selected position, an arm supported on said shaft, a driven gear rotatably mounted on said arm adapted to engage said timing gears, a cam rotated by said driven gear, and a switch carried by said arm having an actuating lever positioned for engagement with said cam, whereby the switch is actuated at intervals by the rotation of the cam.

4. A variable interval switch operating attachment for a sewing machine comprising, a frame, a drive wheel rotatably supported on said frame and adapted to be driven from the sewing machine, a stepped pulley rotatably supported on said frame, means providing a driving connection between said drive wheel and said pulley, a shaft slidably and rotatably supported in said frame parallel to the axis of said driving means, means for securing said shaft in a selected position, an arm supported on said shaft, a driven member rotatably mounted on said arm adapted to engage said pulley, a cam rotated by said driven member, and a switch carried by said arm having an actuating lever positioned for engagement with said cam whereby the switch is actuated at intervals by the rotation of the cams.

5. A switch operating attachment for a sewing machine comprising, a frame, means for positioning said frame on the sewing machine, a drive wheel rotatably supported on said frame and adapted to be driven from a rotating part of the sewing machine, driving means rotatably supported on said frame, means providing a driving connection between said drive wheel and said driving means, a manually rotatable shaft supported in said frame parallel to the axis of said driving means, means for securing said shaft in a selected position, an arm rotatably supported on said shaft, a driven member including a cam rotatably mounted on said arm adapted to engage said driving means upon rotation of said shaft in one direction, a coil spring connecting said shaft and said arm and in part surrounding and anchored to said shaft whereby rotation of the shaft varies the tension of said spring and the pressure between said driven member and said driving means, and a switch carried by said arm having an actuating lever positioned for engagement with said cam.

6. A variable interval switch operating attachment for a sewing machine comprising, a base, means slidably securing the base to the sewing machine, a frame pivotally supported thereon, a spring between said frame and said base urging the frame in one direction, a drive wheel rotatably supported on said frame and adapted to engage the hand wheel of the sewing machine, variable ratio driving means rotatably supported on said frame, means providing a speed reducing driving connection between

5

said drive wheel and said driving means, a shaft slidably and rotatably supported in said frame parallel to the axis of said driving means, means for securing said shaft in a selected position, an arm rotatably supported on said shaft, a driven member rotatably mounted on said arm adapted to engage said driving means, a cam rotated by said driven member, a switch carried by said arm having an actuating lever positioned for engagement with said cam, and a coil spring interconnecting said shaft and said arm adapted to be tensioned by rotation of the shaft

5

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6

to increase the pressure between said driven member and said driving means.

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