F. ASHWORTH.

SHOE SEWING MACHINE.

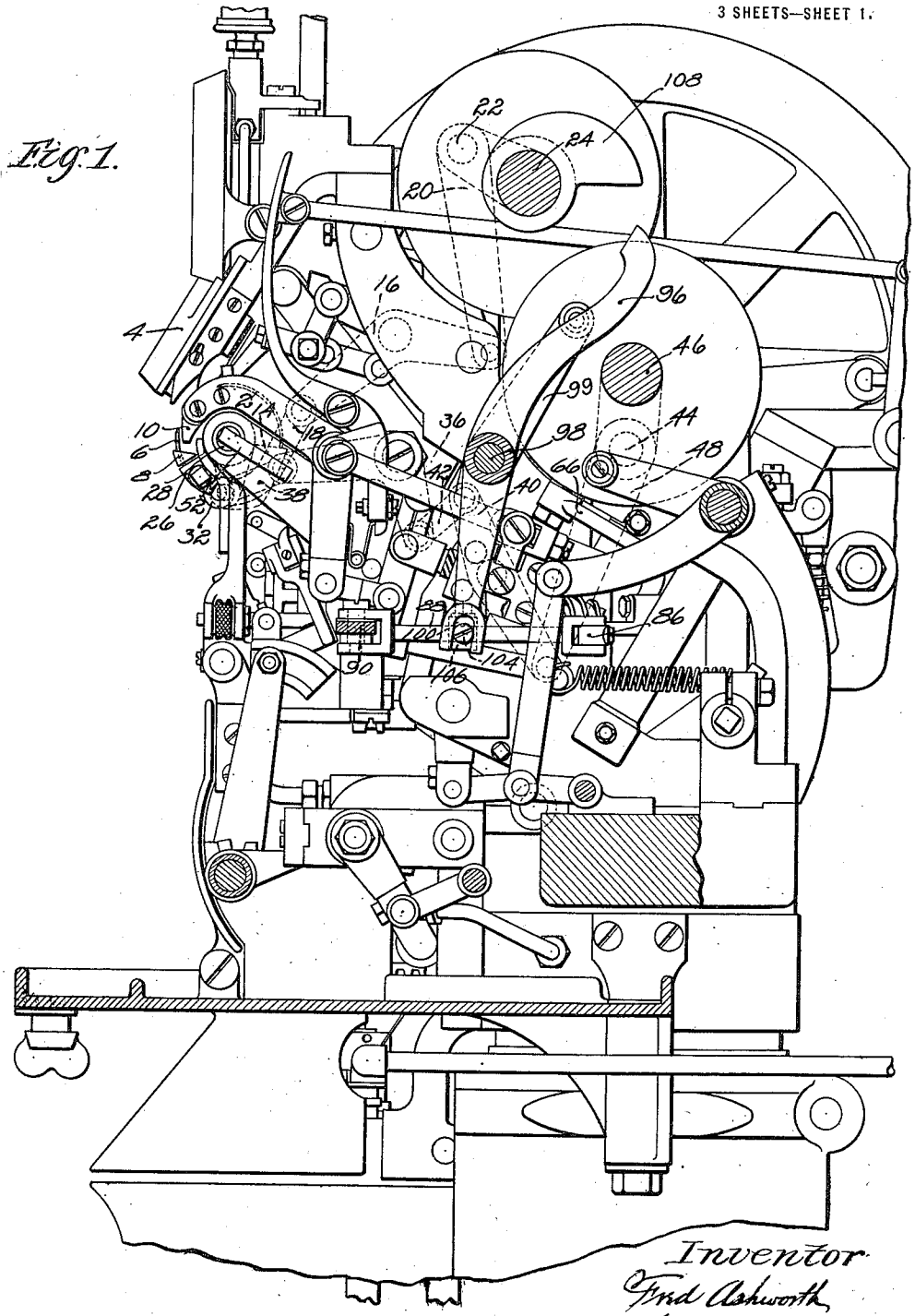
APPLICATION FILED DEC. 8, 1916.

1,286,902.

Patented Dec. 10, 1918.

3 SHEETS—SHEET 1.

Fig. 1.



Inventor

Fred Ashworth

by his attorneys

Phillips, Van Tassel & Fiske

F. ASHWORTH.

SHOE SEWING MACHINE.

APPLICATION FILED DEC. 8, 1916.

1,286,902. Patented Dec. 10, 1918.

3 SHEETS—SHEET 2.

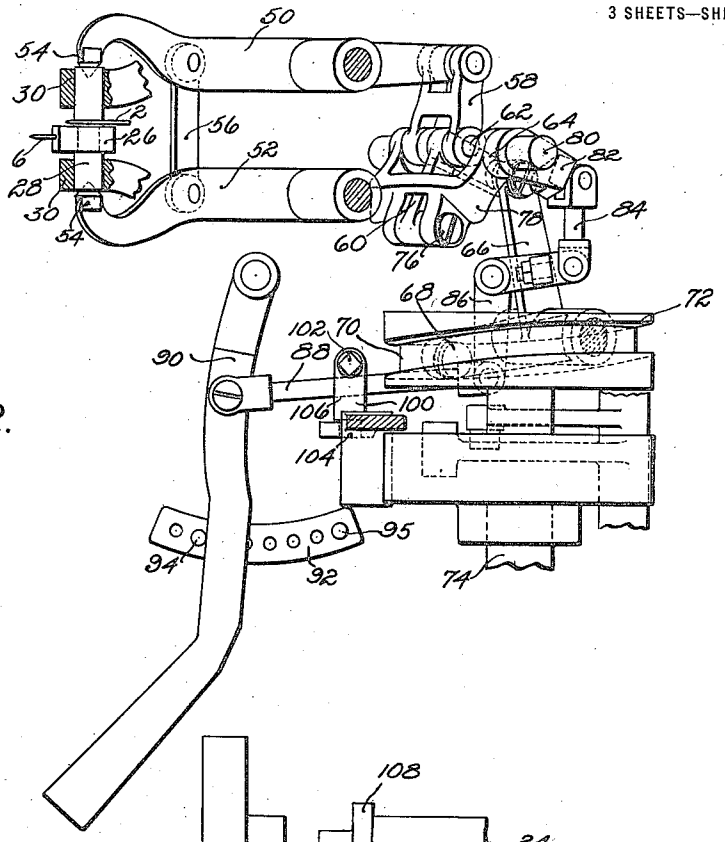


Fig. 2.

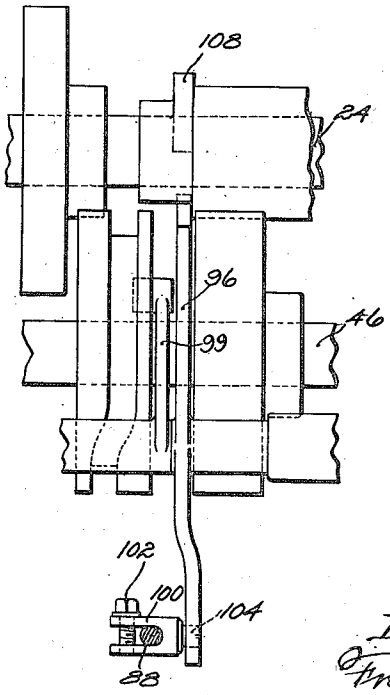


Fig. 3.

Inventor
Fred Ashworth
by his attorneys
Phillips, Van Santvoord & Fisher

F. ASHWORTH.

SHOE SEWING MACHINE.

APPLICATION FILED DEC. 8, 1916.

1,286,902. Patented Dec. 10, 1918.

3 SHEETS—SHEET 3.

Fig. 4

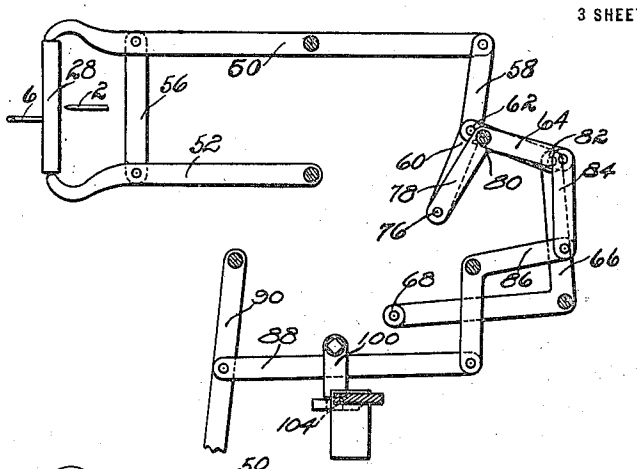


Fig. 5.

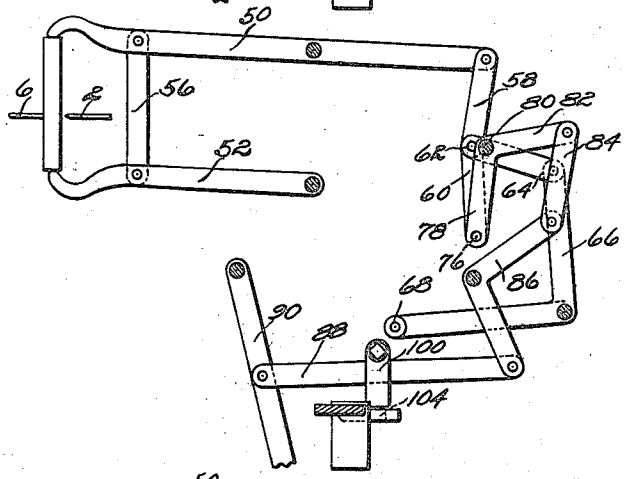
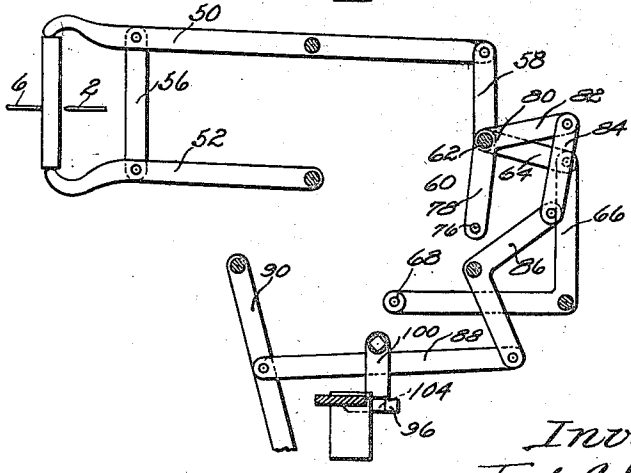


Fig. 6.



Inventor

Fred Ashworth

by his attorneys

Phillips, Van Tassel & Frick.

UNITED STATES PATENT OFFICE.

FRED ASHWORTH, OF BEVERLY, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SHOE-SEWING MACHINE.

1,286,902. Specification of Letters Patent. Patented Dec. 10, 1918.

Application filed December 8, 1916. Serial No. 135,898.

To all whom it may concern:

Be it known that I, FRED ASHWORTH, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Shoe-Sewing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to shoe sewing machines, and more particularly to shoe sewing machines of the type provided with a curved hook needle and a work feeding awl, and employed in sewing outsoles to the welts of welted shoes.

In the manufacture of rubber soled shoes, soles having block heels formed integral with the soles are quite commonly employed. In sewing such a sole to the welt of a shoe upon machines of the above type at present in commercial use, it is impossible to start the first stitch of the seam close to the breast of the heel. This is due chiefly to the fact that when the needle and awl are both retracted, or are in positions to permit the introduction of the work into the machine, the awl is in its limiting rearward position in the line of feed out of line with the needle, and that when the work is inserted and the machine is started, the awl pierces the work and moves forward into line with the needle before the needle pierces the work in the course of the formation of the first stitch. In placing the work in the machine the sole is positioned with the breast of the heel close to or in contact with the left side of the presser-foot. The presser-foot usually extends some distance to the left of the plane of the needle, so that the breast of the heel cannot be placed close to the plane of the needle in placing the work in the machine. The result is that the first stitch is formed more than a normal stitch length from the breast of the heel, which stitch length is usually from a quarter to half an inch in rubber-soled work. The formation of the first stitch of the seam at such a distance from the breast of the heel greatly impairs the appearance of the work.

The object of the present invention is to provide an attachment for machines of the above type for use particularly in sewing rubber-soled shoes having rubber soles with heels attached to enable the first stitch to be formed close to the breast of a heel, which is simple in construction, reliable in operation, and may be readily applied to existing machines.

With this object in view the invention comprises the novel and improved features hereinafter described and pointed out in the claims, the advantages of which will be obvious to those skilled in the art.

The invention will be readily understood from an inspection of the accompanying drawings illustrating the invention in its preferred form, and the following detailed description of the construction therein shown.

In the drawings, Figure 1 is a view in side elevation of an outsole shoe sewing machine to which the invention is applied; Fig. 2 is a detail plan view, partly in section, illustrating particularly the feeding mechanism of the machine; Fig. 3 is a detail view in front elevation illustrating the parts of the present attachment for the machine, and certain adjacent parts of the machine; Fig. 4 is a diagrammatic view illustrating the needle and the parts of the feed mechanism in the positions which they normally occupy when both the needle and awl are in retracted positions; Fig. 5 is a view similar to Fig. 4, illustrating the parts in the positions which they occupy when both the needle and awl are in retracted positions, and the mechanism for imparting feeding movements to the awl has been adjusted to render the same inoperative; and Fig. 6 is a view similar to Fig. 4, illustrating the parts in the positions which they assume in the first cycle of operations just before the needle pierces the work.

The sewing machine illustrated in the drawings is a wax thread, curved hook needle, lock stitch machine for sewing outsoles to the welts of welted shoes, and except as hereinafter described, has substantially the same construction, arrangement and mode of operation of parts as the machine illustrated and described in the patent granted to applicant, No. 1,169,909, dated February 1, 1916. This machine comprises a curved hook needle 2, a loop taker 4, a work feeding awl 6, a work support 8, and a presser-foot 10. During each cycle of

stitch-forming operations of the machine, starting just after the loop has been pulled from the loop taker and drawn down into the work to complete the stitch, the awl pierces the work and then moves laterally into line with the needle to feed the work. The awl then retracts from the work, followed closely by the needle which is projected through the work into position to receive the thread from the looping device. After the needle retracts from the work, holding a loop of thread in its hook, the loop is lifted by the thread lifter into the range of action of the hook of the loop taker. The loop is then carried over the loop taker, and is pulled from the loop taker and drawn down into the work by the action of the takeup.

The needle 2 is secured to a needle carrier 14 mounted to turn co-axially with the awl. The needle carrier is oscillated to actuate the needle as above described through connections from a continuously rotating crank. These connections comprise a bell crank lever 16, a link 18 connecting one arm of the bell crank with the needle carrier, and a link 20 connecting the other arm of the bell crank with the crank 22 carried by the continuously rotating shaft 24.

The awl 6 is mounted on the awl carrier 26 which is secured to a rod or pin 28 which forms a pivot for the carrier. This rod is mounted so as to be capable of oscillating and longitudinal movements in two stationary arms 30 projecting forwardly from the frame of the machine. The awl carrier is oscillated to impart oscillating movements to the awl by means of an awl driver 32 mounted to oscillate co-axially with the awl carrier, the awl carrier having a sliding driving engagement with the awl driver. The mechanism for actuating the awl driver to oscillate the awl carrier and awl in timed relation to the needle as hereinbefore described comprises a bell crank lever 36, a link 38 connecting one arm of the bell crank with the awl driver, a lever 40, a link 42 connecting the other arm of the bell crank 36 with the forward end of the lever 40, a continuously rotating crank 44 on the shaft 46, and a link 48 connecting the rear end of the lever 40 with the crank.

The pin 28 is moved back and forth longitudinally to impart lateral feeding and return movements to the awl and awl carrier by means of two pivoted levers 50 and 52 arranged substantially parallel to each other, the forward ends of which engage slots in bearing pins or buttons 54 provided with conical ends engaging conical recesses in the ends of the pin 28. The lever 50 is cam actuated, and the two levers are connected by a link 56 so that the levers are actuated in unison, and the movements of the pin 28 in both directions are produced by the movements of the levers. The lever 50 is extended rearwardly beyond its pivot, and is pivotally connected to one member 58 of a toggle lever comprising the two pivotally connected members 58 and 60. The middle joint 62 of the toggle lever is connected by a link 64 to one arm of a bell crank cam lever 66, the other arm of which is provided with a roll 68 engaging a cam groove 70 in a cam disk 72 attached to the main shaft 74 of the machine. The movements of this bell crank lever impart through the connections above described positive movements in both directions to the levers 50 and 52, and to the pin 28 upon which the awl carrier is mounted. To enable the extent of the longitudinal movements of the pin to be varied, to produce the required length of stitch, the member 60 of the toggle lever is pivotally connected at 76 to a yoke 78 which is pivotally mounted above and below the toggle lever to turn on an axis 80 as is clearly shown in Fig. 2. By swinging the yoke about its pivot, the position of the toggle lever is changed so that when the toggle is actuated by the bell crank 66, more or less movement is imparted to the lever 50, and consequently to the pin 28. The pivot of the yoke 78 is arranged to be in line with the pivotal connection 62 between the members 58 and 60 of the toggle lever when said lever is in its extreme rearward position, which is the position which the toggle lever assumes after the awl has been moved to the left and is at the limit of its feeding movement. An adjustment of the yoke 78 about its pivot to vary the length of feed does not, therefore, vary the position of the awl at the end of its feeding movement, so that with all lengths of feed the awl is always moved to the same point directly in line with the needle. To enable the length of feed to be readily adjusted by the operator to give the desired number of stitches to the inch either on different shoes or on different parts of the same shoe, the yoke 78 is provided with an arm 82 connected by a link 84 to one arm of a bell crank lever 86, the other arm of which is connected by a link 88 to a feed adjusting hand lever 90 arranged in convenient position to be moved by the operator. The hand lever 90 extends over a perforated gage plate 92 attached to the frame of the machine in the holes in which pins may be inserted on each side of the lever 90 to limit movement of the lever in either direction.

The mechanism for oscillating the needle and awl and the mechanism for imparting feed movements to the awl have substantially the same construction and mode of operation as the corresponding mechanism illustrated in the Ashworth patent referred to above.

To permit the shoe to be inserted in operating position in the machine, or to permit the shoe to be removed from the machine

when a seam has been completed, it is essential that the parts of the machine be placed in the positions which they assume at a point in a cycle of operation when the needle and awl are both retracted or disengaged from the work. As hereinbefore stated, in machines of this type the needle follows the awl through the work as the awl retracts from the work, and the needle reaches a retracted position only after the awl has moved back from its position in line with the needle to its starting position in the line of feed. The needle and awl are, therefore, both in retracted positions only when the awl is a stitch length to the rear of the needle in the direction of feed. Fig. 4 shows diagrammatically the normal relative positions of the awl and needle in the line of feed, and also the normal positions of the other parts of the feed mechanism at the time when the needle and awl are both retracted from the work or when they occupy positions suitable for permitting the insertion or removal of work. When the work is inserted with the needle and awl and the parts of the feed mechanism in the positions shown in this figure, and the machine is then started, the awl pierces the work and feeds the work a normal stitch length before the needle penetrates the work. In sewing a rubber sole having an integral block heel or a sole having an attached heel to the welt of the shoe, the sole and welt of the shoe are inserted between the work support and presser-foot, and the shoe is positioned so that the breast of the heel lies close to or rests against the left end of the presser-foot which, for this kind of work, is preferably made somewhat shorter than that usually employed to enable the breast of the heel to lie close to the plane of the needle. To prevent the awl from feeding the work a distance equal to the length of one stitch before the needle pierces the work, and thereby locating the first stitch a feed length from the breast of the heel, the feed mechanism is adjusted before the machine is started to place the awl in line with the needle and to render the feed mechanism inoperative until after the needle has pierced the work in the first cycle of operations, and mechanism is provided which acts automatically to restore the feed mechanism to its normal operation after the needle has penetrated the work.

The forward or normal position of the hand lever is determined by the stop pin 94 which is placed in one of the perforations in the gage plate to give the required length of stitch, the lever normally resting against the rear side of the pin.

As has been explained above, the cam lever 66 in actuating the toggle lever 58—60 to cause the awl to feed the work, always moves the pivotal connection 62 at the central joint of the toggle into line with the pivot of the yoke 78 regardless of the position of the yoke. With the parts in the position shown in Fig. 4, before starting the machine the operator seizes the lever 90 and swings this lever to the rear until its movement is limited by its engagement with a stop pin 95 placed in the perforated gage plate 92 to the rear of the lever. This movement of the hand lever turns the bell crank 86 and the yoke 78 and swings the pivotal connection between the member 60 of the toggle lever and the yoke about the axis of the yoke. The stop 95 is located so that when the movement of the hand lever is arrested by the stop, the swinging movement of the yoke 78 has brought the pivotal connection between the member 60 of the toggle lever and the yoke to a position such that the line connecting the center of this pivotal connection with the center of the pivotal connection between the member 58 of the toggle and the lever 50 lies midway between the center of the central joint of the toggle and the axis of the yoke 78, as shown in Fig. 5. This brings the awl into line with the needle as will be readily seen from an inspection of Fig. 5. With the parts of the feeding mechanism in the relative positions shown in this figure, upon starting the machine the awl will remain substantially stationary in the line of feed during the movement of the cam lever 66 which in the normal operation of the feeding mechanism produces the lateral feeding movement of the awl. As the machine is started the awl pierces the work and the cam lever 66 is then moved from the position shown in Fig. 5 to that shown in Fig. 6, this movement of the cam lever in the normal operation of the machine imparting the feed movement to the awl. This movement of the cam lever moves the central joint 62 of the toggle lever from the position shown in Fig. 5 to a position in line with the axis of the yoke 78, as shown in Fig. 6. The movement of the cam lever, therefore, imparts substantially no movement to the awl, and the awl is still in line with the needle when the needle pierces the work.

The hand lever 90 remains in the position in which it is placed by the operator, in engagement with the forward side of the pin 95, until the needle has pierced the work in the first cycle of operations, when it is automatically moved forward to its normal position in engagement with the rear side of the pin 94, thereby restoring the feeding mechanism to its normal operation. The mechanism for restoring the lever 90 to its normal position comprises a cam lever 96 pivoted upon the stud 98, which carries the cam lever 99 for actuating the presser-foot. The lower end of the cam lever 96 is adjustably connected with the link 88 by means of a yoke 100 embracing the link 88 and

adapted to be clamped in position on the link by means of a clamping screw 102. This yoke carries a stud 104 projecting laterally therefrom, which engages in a slot 106 in the lower end of the lever 96. The forwardly facing upper end of the lever 96 is arranged to be engaged by a cam 108 mounted on the main shaft 24 of the machine. The lever 96 and the cam 108 are so constructed and arranged that, when the hand lever 90 is in normal position for starting a seam in engagement with the rear side of the pin 94, the upper end of the lever 96 lies just beyond the path of the cam 108, as shown in the drawings. When the hand lever 90 is swung rearwardly by the operator into engagement with the stop pin 95 to carry the awl into line with the needle and render the mechanism for imparting lateral movements to the awl inoperative before the machine is started, the lever 96, through its connection with the link 88, is swung upon the stud 98 to carry its upper end into the path of the cam 108, which then lies out of position to engage the lever. During the first revolution of the main shaft 24 after the machine is started, the cam 108 engages the upper end of the lever 96, and swings the same toward the rear of the machine, thereby, through the connections described, throwing the hand lever 90 forward into engagement with the rear side of the stop pin 94 to restore the feeding mechanism to its normal operation. The cam 108 is so timed relative to the other parts of the machine that the lever 96 is actuated thereby to restore the lever 90 to its normal position just after the needle has pierced the work in the first cycle of operations. After the lever 96 has been thus actuated by the cam 108, the upper end of the lever is thrown beyond the path of the cam, so that the cam does not engage therewith after the shaft has completed its first rotation. When, therefore, the parts of the feeding mechanism have been restored to normal positions by the action of the cam, the normal feeding action of the machine is resumed and continued during the remainder of the sewing operation.

The normal position of the lever 90 varies with different stitch lengths and the adjustable connection between the lever 96 and the link 88 enables the proper coöperative action to be secured between the cam 108 and the lever 96 to restore the lever 90 to its normal position whatever the stitch length may be. The yoke 100 is adjusted upon the link 88 to correspond with variations in the position of the lever 90 or with variations in the length of stitch employed.

Having explained the nature and object of the present invention, and having specifically described a machine embodying the same in its preferred form, what is claimed is:—

1. A shoe sewing machine having, in combination, stitch forming devices, a work feeding awl, mechanism for reciprocating the awl to feed the work, a main driving shaft, means for interrupting the feeding operation of the awl until after the needle has pierced the work in the first cycle of operations, and mechanism arranged to be actuated from the shaft to restore the awl to its normal operation.

2. A shoe sewing machine having, in combination, stitch forming devices including a needle, a work feeding device, mechanism for actuating the work feeding device to feed the work, means arranged to be adjusted to interrupt the feeding operation of the work feeding device until after the needle has pierced the work in the first cycle of operations, a cam, and connections arranged to be actuated by the cam to adjust said means to restore the work feeding device to its normal operation.

3. A shoe sewing machine, having, in combination, stitch forming devices including a needle, work feeding means comprising a work feeding tool and mechanism arranged for adjustment to interrupt the feeding action of the tool, a shaft, a cam carried thereby, and a lever connected with said mechanism normally lying out of the path of the cam and arranged to be moved into the path of the cam by the adjustment of said mechanism to interrupt the feeding action of the tool, the cam being constructed and timed to act on said lever to restore the tool to its normal operation after the needle has pierced the work in the first cycle of operations.

4. A shoe sewing machine having, in combination, stitch forming devices including a needle, a work feeding device, mechanism for actuating the work feeding device to feed the work, a main driving shaft, means for interrupting the feeding action of the work feeding device during the first cycle of operations, and mechanism arranged to be actuated from the shaft to restore the work feeding device to its normal operation.

5. A shoe sewing machine, having, in combination, stitch forming devices including a needle, a work feeding device, mechanism for interrupting the feeding action of the work feeding device during the first cycle of operations, and positively actuated means for restoring said device to its normal operation having provision for adjustment for different feed lengths.

6. A shoe sewing machine, having, in combination, stitch forming devices including a needle, work feeding means comprising a work feeding device, mechanism for reciprocating the work feeding device to feed the

work, a shaft, an adjustable feed regulating lever, and mechanism for restoring said lever to its normal position after an adjustment of the same to render the feeding device inoperative comprising a shaft, a cam carried by the shaft, a lever arranged to be actuated by the cam, and an adjustable connection between the feed regulating lever and the second lever.

7. A shoe sewing machine, having, in combination, stitch forming devices including a needle, a work feeding device, mechanism for reciprocating the work feeding device to feed the work, an adjustable feed regulating device, a lever for adjusting the same, a link connecting the feed regulating device with the lever, and mechanism for restoring said lever to its normal position after an adjustment of the same to render the feeding device inoperative, comprising a member adjustable on the link, a lever connected with said member, a shaft, and a cam on the shaft for actuating the second lever.

FRED ASHWORTH.