

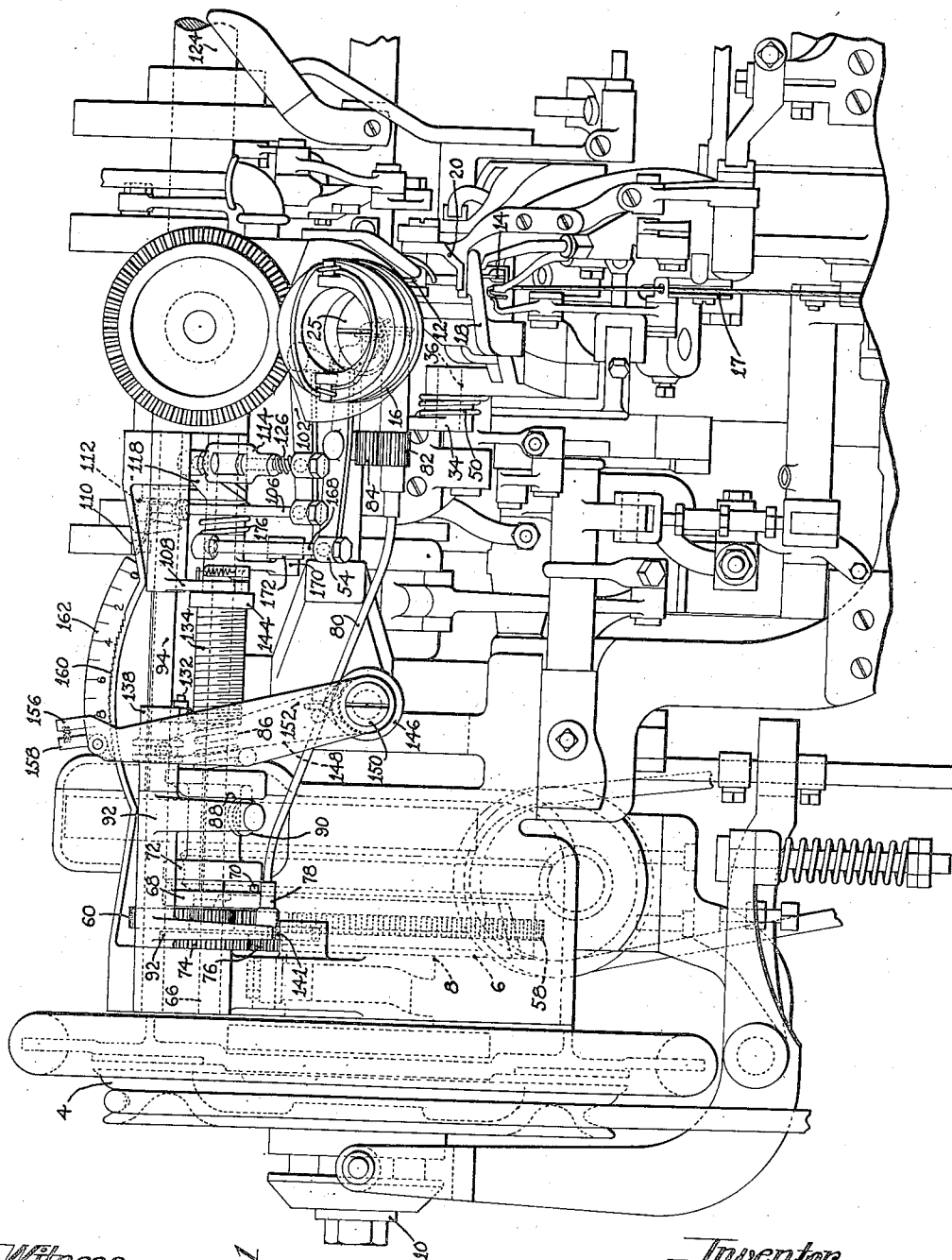
Nov. 9, 1937.

E. E. WINKLEY
LOCKSTITCH SEWING MACHINE

2,098,327

Filed Nov. 19, 1935

8 Sheets-Sheet 1



Witness
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Fig. 1

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Fig. 2

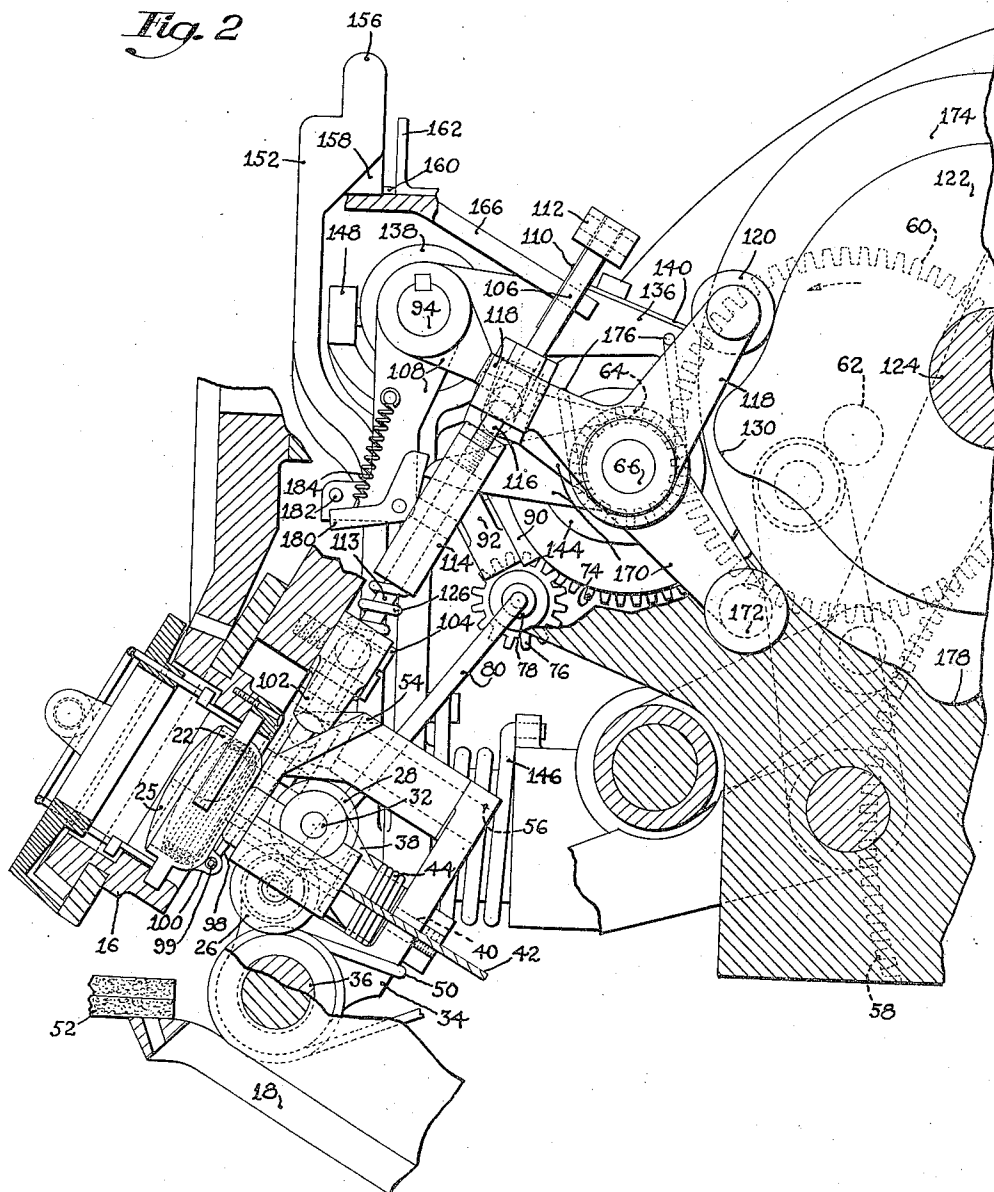
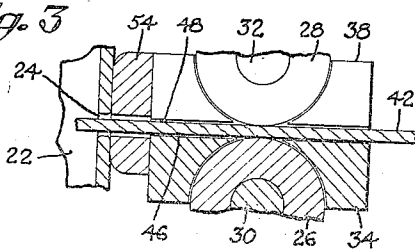


Fig. 3



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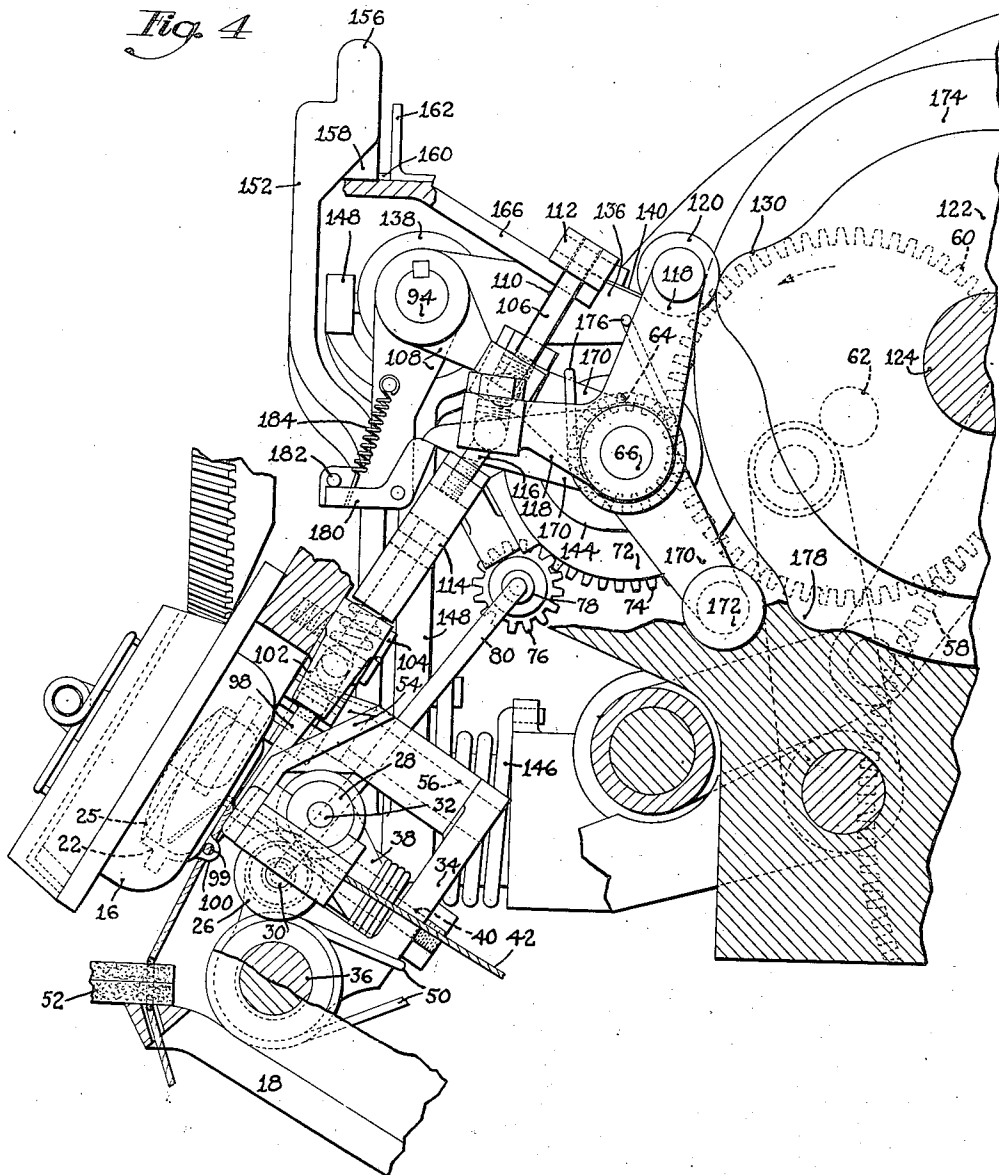
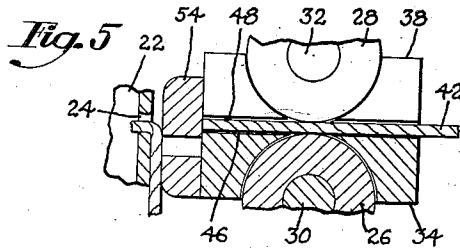
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Fig. 8

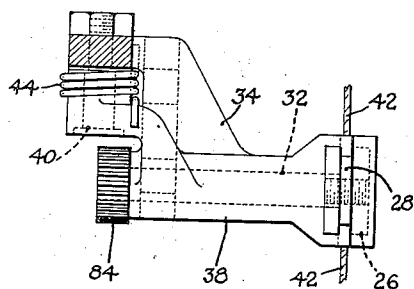


Fig. 11

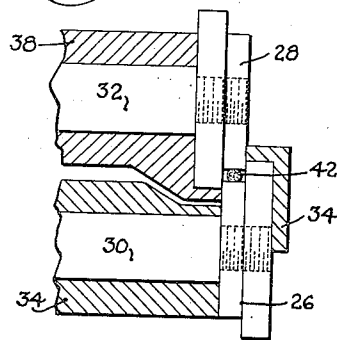


Fig. 12

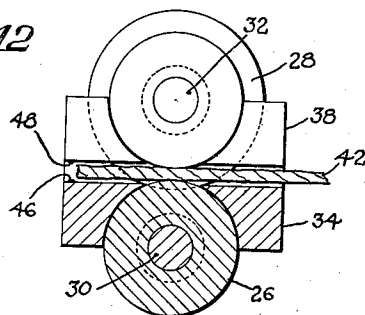


Fig. 9

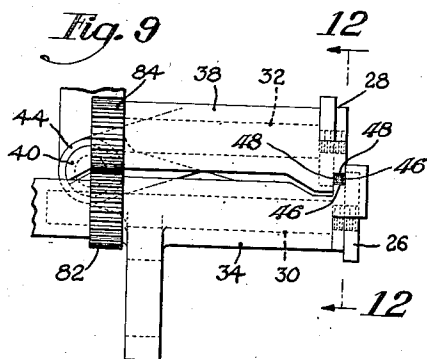
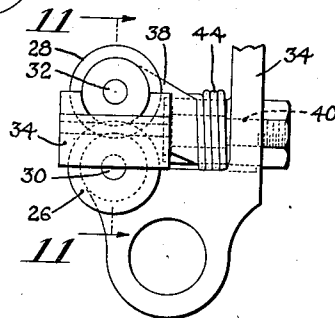


Fig. 10



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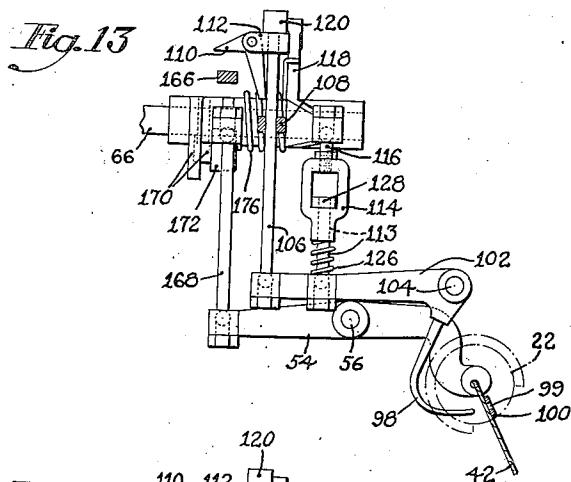
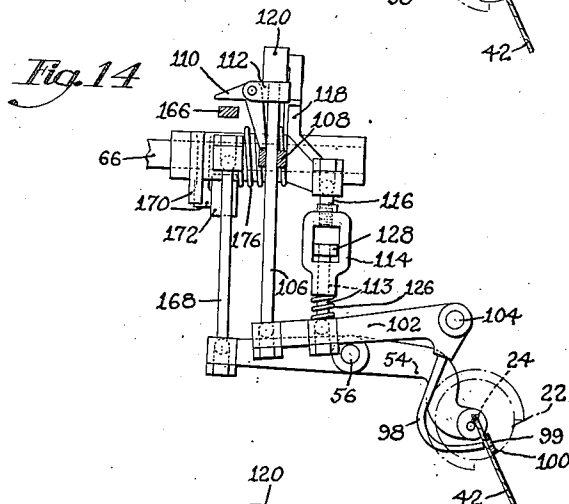
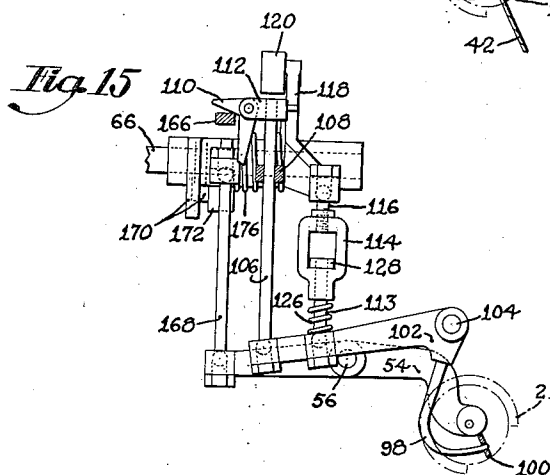
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LOCKSTITCH SEWING MACHINE

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8 Sheets-Sheet 6



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LOCKSTITCH SEWING MACHINE

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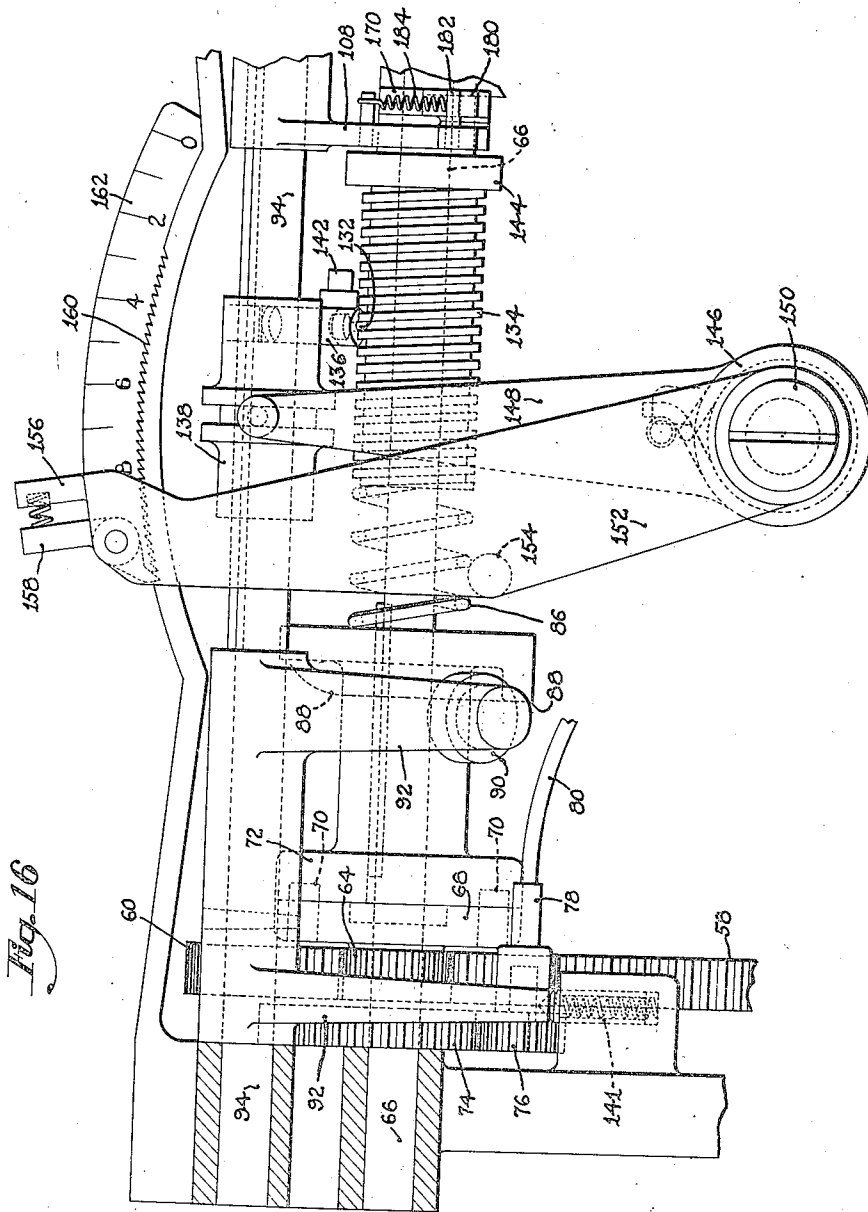


Fig. 16

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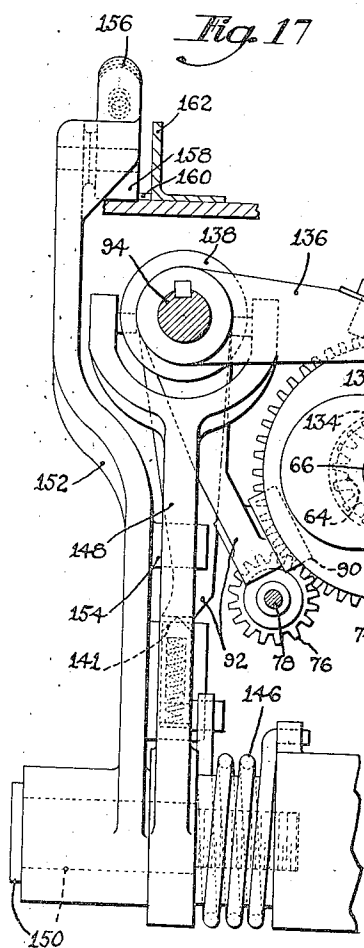
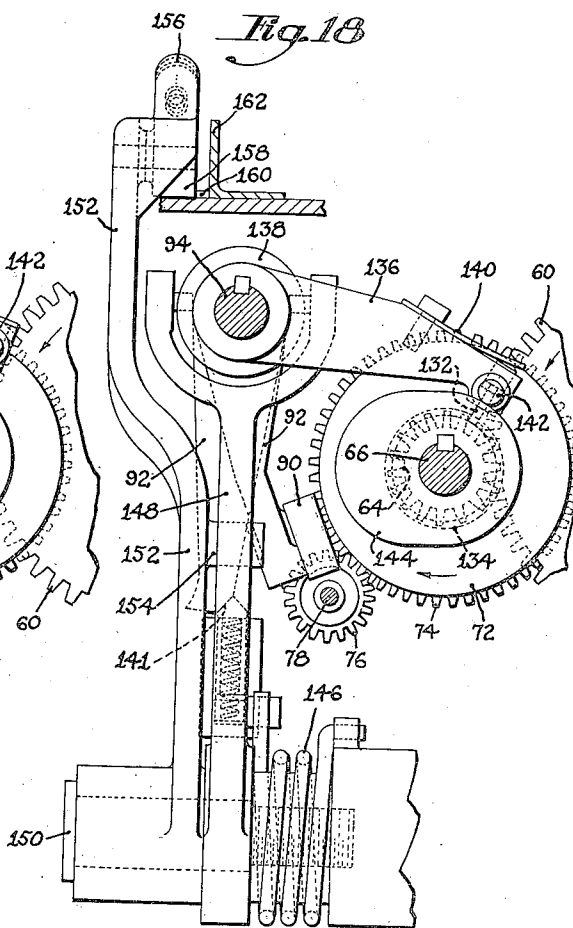
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LOCKSTITCH SEWING MACHINE

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8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

2,098,327

LOCKSTITCH SEWING MACHINE

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Application November 19, 1935, Serial No. 50,532

18 Claims. (Cl. 112—186)

The present invention relates to lockstitch sewing machines, and more particularly to devices for replenishing the supply of locking thread in a shoe sewing machine of the type illustrated and described in U. S. patents to French and Meyer No. 473,870 and Ashworth No. 1,169,909.

In this type of machine the supply of locking thread is contained in a thread or bobbin case supported within a shuttle or rotary loop taker for passing a loop of needle thread about the thread case. To replenish the supply of locking thread, it is ordinarily necessary to remove an empty bobbin from the thread case and introduce a newly filled bobbin. The manipulations required in replenishing the supply of locking thread have always resulted in loss of time and, since the supply of thread is relatively limited it often becomes exhausted in the middle of a seam, causing an irregularity.

The object of the present invention is to provide novel and improved means for replenishing the supply of locking thread in a lockstitch sewing machine in such a way that appreciable loss of time in the use of the machine will be prevented. A further object of the invention is to provide in a lockstitch sewing machine, locking thread replenishing means by which thread is automatically supplied whenever the end of thread is withdrawn from the thread case of such machine.

To replenish the supply of locking thread in a machine of the type referred to, it is not only necessary to introduce a quantity of thread into the thread case of the machine, but also to pass the end of thread through an opening in the thread case, so that it may be engaged properly with the work in forming the first stitch of a new seam. In accordance with the above objects, a feature of the present invention consists in providing mechanism for feeding thread into the thread case of a machine of the type referred to, until a sufficient supply has been added, the thread preferably entering and leaving the same opening in the outer wall of the thread case to eliminate the necessity of separately threading the machine. The thread being fed at a rapid rate while the machine is stopped, the supply may be replenished while the thread case is in operating position in the machine without substantial loss of time.

To insure that the thread may properly be engaged with the work at the beginning of each new seam, the thread feeding devices of the machine illustrated act with a continuous grip on the thread and the thread is severed between

the feeding devices and the thread case only after a sufficient length is drawn down against the work by the needle loop of the first stitch, thus eliminating the necessity of separate means for retaining the severed thread ends.

To further reduce the time required in replenishing the supply of locking thread in the present machine, a feeler rendered operative by the absence of thread in the thread case is provided to start the thread feeding devices in operation when the thread is completely withdrawn. This ordinarily occurs at the end of a seam in disengaging the work from the stitch forming devices, and adjustable means are also provided for regulating the length of time that the feeding devices are operated, so that a supply of locking thread may be added to the thread case corresponding to or slightly greater than that required in forming each seam.

These and other features of the invention consist in certain novel and improved constructions and arrangements of parts hereinafter described and particularly pointed out in the claims, the advantages of which will be readily understood by those skilled in the art.

In the accompanying drawings, Figure 1 is a view in front elevation of the upper portion of a machine embodying the locking thread replenishing means of the present invention; Figure 2 is a view in vertical section and on an enlarged scale of parts at the front of the machine in positions assumed just after starting the machine in operation; Figure 3 is a sectional view on a still further enlarged scale of the thread feeding devices of the machine; Figure 4 is a view similar to Figure 2 with the machine brought to rest after the seam has been completed; Figure 5 is a sectional view, similar to Figure 3, illustrating the parts in positions corresponding to Figure 4; Figure 6 is a view similar to Figure 2 illustrating the positions of parts, while replenishing the supply of locking thread; Figure 7 is a view similar to Figure 3 illustrating the feeding operation; Figure 8 is a detail view of the thread feeding rolls, the supporting frame member being shown partly in section and looking in the direction of the arrow 8 of Figure 6; Figure 9 is a side view of the parts shown in Figure 8; Figure 10 is a view of the parts shown in Figures 8 and 9, looking from the right; Figure 11 is a sectional view on an enlarged scale taken along the line 11—11 of Figure 10; Figure 12 is a sectional view taken along the line 12—12 of Figure 9; Figure 13 is a diagrammatic view of the thread feeler and cutter devices in positions correspond-

ing to those of Figure 2; Figure 14 is a view of the same parts in positions corresponding to those of Figure 4; Figure 15 is a view of the same parts in positions corresponding to those of Figure 6; Figure 16 is a view in front elevation and on an enlarged scale of a part of the mechanisms for actuating the thread feeding rolls; and Figures 17 and 18 are views in side elevation looking from the right of the same mechanisms while at rest, and while operating the thread feeding devices, respectively.

The machine illustrated in the drawings is a lock-stitch outsole shoe sewing machine similar to that of the Ashworth patent above referred to. The machine is actuated by a driving and stopping mechanism having a high speed clutch 4, and a low speed clutch. The low speed clutch comprises a constantly rotating driving member 6 and a driven member 8, rotating with the main sewing shaft 10 of the machine, and having operating connections to bring the sewing shaft to rest at a predetermined position.

The stitch forming and work feeding devices include a curved hooked needle 12, a curved awl 14, a shuttle or loop taker 16, a take-up 17, a work support 18 and a presser-foot 20. The loop taker acts in the usual way to receive a loop of needle thread and pass it around a thread case 22 supported within a central recess of the loop taker. The supply of locking thread is contained within the thread case and withdrawn as used until exhausted.

Unless close attention is paid to the amount of thread in the supply, it may become exhausted in the middle of a seam, causing an unsightly joint in the line of stitching where the new supply of thread is joined. The supply of locking thread is replenished in the Ashworth machine in the usual manner by introducing from the front of the shuttle a cop or a newly wound bobbin. In replenishing the supply of locking thread the work must be released from the machine, and carefully replaced to insure that the needle and awl, during succeeding stitches, will register with the perforations made after the supply was exhausted. Replenishing the supply also requires a certain amount of the operator's time for threading the end of the new supply properly and for adjusting the length of thread to insure proper formation of the next formed stitch.

To replenish the supply of thread in the thread case of the machine of the present invention, the locking thread is automatically inserted within the thread case 22 by feeding it through an opening 24 in the rear wall of the thread case while the thread case remains in operating position within the loop taker. To retain the thread in the case, the front of the case is enclosed by a removable cover 25 forming a completely walled enclosure except for opening 24. The opening 24 is located substantially at the center of the rear wall of the thread case and the thread, entering the opening, engages the inner surface of the thread case and forms itself into a more or less orderly coil therein. To insure that the thread will not become snarled or jammed in the opening, either while being inserted within the case or during sewing, only a sufficient supply of thread to complete a single shoe is fed at any one time, the feeding devices being stopped automatically when the desired length of thread has been fed.

The feeding devices act with a continuous grip on the thread whether feeding or not, and comprise a pair of rolls 26 and 28 secured to parallel

spaced shafts 30 and 32, respectively. The shaft 30 is rotatable in bearings formed in a frame 34 pivotally mounted on a horizontal stud 36 secured in the frame of the machine, the arrangement being such that the frame 34 is movable towards and from the rear face of the thread case. The shaft 32 for the upper roll is rotatable in bearings formed in a separate frame member 38 pivotally mounted on a rearwardly and downwardly extending screw stud 40 mounted in the frame 34. The screw stud 40, being spaced from the rolls 26, 28 is disposed with its axis at right angles to and between the axes of the shafts 30, 32 so that the rolls may be separated or brought together.

The thread, indicated at 42, which is being fed, passes between the rolls which engage it yieldingly through the force of a spring 44 coiled about a hub on the movable frame member 38. To prevent escape of the thread from between the rolls, they are provided with flanges at opposite sides of the thread to form a rectangular opening, a flange on upper roll 28 extending over the inner face of lower roll 26, and a flange on roll 26 extending over the outer face of roll 28.

To provide a guide for the thread between the rolls and the thread case, the frame 34 has an upward extension with right angularly disposed flat surfaces 46 along which the thread is conducted before and after engagement by the rolls, and the frame member 38 is constructed with corresponding surfaces 48, forming together with the surfaces 46 a rectangular passage slightly larger than the thread. When the rolls are separated by engaging the thread, the surfaces 46, 48 are correspondingly separated to accommodate variations in size of the thread.

The frame 34 is yieldingly forced towards the thread case, and the thread passage in the frame is in alignment with the opening 24 at the rear of the thread case so that during thread feed, the thread will certainly enter the thread case. Surrounding the stud 36 forming the pivot for the frame 34 is a coiled spring 50, one end of which bears against the frame, and the other against a fixed part of the machine. After the supply of thread has been fed to the thread case, the parts are in the positions indicated in Figure 2 with the thread extending from the opening in the thread case downwardly and rearwardly through the thread feeding devices to a suitable source of supply. A shoe, indicated at 52, then being placed in position on the work support 18 of the machine, the machine may be started and the first needle loop which is passed around the thread case forces the frame 34 a short distance rearwardly and draws down a bight of thread from the thread case to bring the locking thread against the upper surface of the work. As soon as the locking thread is brought in contact, with the work, the thread is severed between the thread feeding devices and the work. The seam is completed in the usual way, there being left within the thread case a short length of thread to insure proper formation of the last stitch in the seam. Thereafter, the machine is brought to rest and upon withdrawing the end of locking thread from the thread case, a new supply of locking thread is added preparatory to forming a new seam.

To sever the locking thread between the thread case and the work, a thread cutter is provided in the form of a lever 54 having its right end reversely bent and terminating in the form of a perforated lug engaging an angularly disposed surface of the frame 34. The inner edges of the 75

perforation in the thread cutter are sharpened and may be brought into registry with the passage in the frame members of the thread feeding devices, by movement of the lever 54 about a stud 56 mounted in frame member 34. When the feeding devices are being operated, the thread is fed through the perforation in the thread cutter and into the aligned opening 24 in the thread case. After completing the thread feeding operation and forming the first stitch of the new seam, the thread cutter lever is actuated to move the perforation in the cutter out of registry with the passage in the frame 34 and to sever the thread, the severed end being drawn from between the cutter and thread case. The thread cutter also acts as a tensioning device for the thread due to its position overlying the opening in the thread case and to the action of the spring 50, forcing the frame and cutter against the thread.

To operate the thread feeding devices, rolls 26 and 28 are rotated through connections to the constantly rotating low speed driving member 6. The driving member is constructed with gear teeth 58 meshing with a gear 60 (see Fig. 2) rotatably mounted on a fixed shaft 62. The gear 60 meshes with a spur gear 64 rotating loosely on a horizontal shaft 66 mounted in bearings in the machine frame. Rotating with the spur gear 64 is a clutch disk 68 (see Fig. 16) having pins 70 projecting from its right side to engage corresponding openings in a driven clutch member 72 slidable along the shaft 66 but keyed thereto. On the left end of shaft 66 there is secured a gear 74 engaging a pinion 76 on a shaft 78 rotatable within a fixed bearing in the machine. The pinion shaft 76 is connected with shaft 30 of roll 26 by a flexible shaft 80 extending between the two and the rolls 26, 28 are caused to rotate in opposite directions at the same speed by small gears 82, 84 at the left ends of the respective shafts. When the clutch member 72 is forced against the clutch disk 68, the shaft 66 is rotated and the rolls are rotated to feed thread into the thread case. When the clutch member 72 is separated from the clutch disk the rolls are brought to rest.

To actuate the clutch, the shaft 66 is surrounded by a coil spring 86 acting to force the clutch member 72 against clutch disk 68 and the clutch member 72 is provided with a radial flange having a side cam surface 88 for engagement with a cam roll 90 carried by one arm of a lever 92 secured to a horizontal rock shaft 94 arranged in parallel relation to the shaft 66. While the clutch member 72 is in engagement with the clutch disk 68, the cam roll 90 is outside of the flange having the cam surface 88. When the thread feeding devices are to be rendered inoperative, the shaft 94 is rocked, as hereinafter described, and the cam roll 90 is moved against the flange having the cam surface 88 and is then permitted to move inwardly towards the rotating shaft 66 past a recessed part of the cam surface 88 and, upon further rotation of the shaft 66, the cam roll 90 being held stationary, the clutch member 72 is moved lengthwise of the shaft 66 against the action of spring 86 to stop the feeding devices.

The thread feeding devices are rendered operative automatically by a feeler 98 actuated whenever the thread is completely withdrawn from the thread case. The feeler 98 is a hook shaped member, the end of which is arranged to enter a hole 99 formed in a rounded lug 100 integrally connected to the thread case in such

a position that thread extending between the opening 24 in the thread case and the work will pass diametrically across the hole. So long as the thread extends between the thread case and the work, the feeler is prevented from entering therein but, in the absence of thread, movement of the feeler within the hole causes the thread feeding clutch member 72 to be released.

The connections between the clutch actuating roll 90 and the feeler comprise a lever 102 (Figs. 10, 13 to 15) on which the feeler 98 is secured, the lever being fulcrumed on a pin 104 secured in the frame of the machine and, a link having a universal connection at its lower end with the lever 102 and slidable at its upper end through an opening in a short inclined arm of a bell-crank 108 (see Fig. 2) secured to shaft 94. As the feeler 98 passes through the hole in lug 100, the lever 102 being rocked in a counter-clockwise direction, a pawl 110 pivoted on a collar 112 secured to the upper end of link 106 engages the short arm of lever 108, rocking shaft 94 and withdrawing the cam roll 90 on lever 92 from engagement with the clutch member 72. The clutch member is then permitted to engage clutch disk 68 and the thread feeding devices are operated.

To permit free passage of the needle loop about the thread case, the feeler 98 is moved away from engagement with the thread during each cycle of operation of the machine (Fig. 13) by mechanism comprising a link 113 having a universal connection with the feeler lever 102 at its lower end and, at its upper end, passing loosely through an opening in a hollow block 114 rigid with a link 116. The upper end of link 116 is universally connected to an upwardly extending arm of a cam operated lever 118, the rearward arm of which carries a cam roll 120 engaging a cam 122 on a shaft 124 operating at the same speed as the main sewing shaft. A spring 126 is located between the block 114 and the upper surface of lever 102, and the link 113 is prevented from being withdrawn from the block 114 by a collar 128 secured to the upper end of link 113. During each rotation of cam 122, a projection 130 on the cam causes the lever 118 to be rocked and feeler 98 to be moved yieldingly against the thread. When the thread is in position between the feeler and lug 100 (see Fig. 14) the spring 126 is compressed without forcing the feeler through the hole, and the pawl 110 is not moved downwardly a sufficient distance to release the thread feeding clutch.

The driving and stopping mechanism acts to bring the machine to rest at a point where the projection 130 of cam 122 engages cam roll 120, thereby causing the feeler to be forced against the thread. If the end of the seam has been reached, the work is withdrawn from the machine and the short end of thread still remaining in the thread case is retracted. As soon as this occurs, the feeler enters hole 99 and the thread feeding devices are operated to replenish the supply.

To prevent the thread from becoming exhausted in the thread case before the end of the seam, the amount fed to the thread case is slightly in excess of that necessary. As soon as rotation of the thread feeding rolls is started by swinging the level 92 to disengage the cam roll 90 from cam 88, a pin 132 (see Fig. 18) is swung downwardly from the position of Figure 17 into engagement with a worm 134 secured to the shaft 66. The pin 132 is mounted in the end of an

arm 136 extending from a hub 138 slidable along, but keyed to, the shaft 94 on which lever 92 is mounted. To insure proper engagement of the pin 132 with the worm thread, the pin 132 is slidably mounted in the arm and acted upon by a leaf spring 140 so that the pin may yield as the arm 136 is swung towards the worm 134. The pin is held in engagement with worm 134 by a downwardly extending arm of lever 92 engaging a spring pressed detent 141 which is allowed to rise only when the clutch is operative (see Fig. 18). When the clutch is inoperative, the detent is held depressed so as to offer but a slight frictional resistance to tripping by the feeler 98. After engaging the worm, the pin 132 is moved lengthwise of shaft 94 towards the right of the machine as the thread is being fed to the thread case. When the pin reaches the right end of the worm, a roll 142 at the end of arm 136 is engaged by a cam 144 on shaft 66 to raise the arm 136 and return the cam roll 90 into engagement with the cam surface 88 of the clutch member 72, thus causing the thread feeding devices to be brought to rest. By this mechanism a predetermined length of thread is fed to the thread case before the feed rolls are stopped.

To regulate the length of thread fed to the thread case when different sizes of shoes are sewed, the position of pin 132 lengthwise of the shaft, as it engages the worm 134 is changed by shifting the hub 138 along the shaft 94. The hub 138 is normally held in extreme left hand position by a spring 146 coiled about a hub on the main frame below shaft 94. Rotatably mounted on the hub by a screw 150 is an arm 148, the upper end of which is forked and provided with inwardly directed pins engaging a groove in the hub 138. To support the arm 148 against the action of spring 146 in the desired position, a manually adjustable arm 152 is also mounted on the screw 150 and is formed with a lug 154 against which the arm 148 bears. The manually adjustable arm 152 is provided with a suitable handle 156 carrying a spring pressed pawl 158 engaging an arcuate rack 160 secured to the machine frame to hold the arm in adjusted position. Behind the rack 160 is a scale 162 provided with markings corresponding to shoe sizes, or to other suitable designations to assist the operator in determining the position at which the arm 152 is to be set.

The cam roll 90 may not be disengaged from the cam surface 88 of clutch member 72 before the next seam is again started by reason of the arrangement of the pawl 110 which is actuated by the feeler 98. When the feeler 98 enters the hole 99, (Fig. 15) the short arm of lever 108 and shaft 94 are rocked to disengage the roll from the clutch. As the feeler reaches the end of its movement, a horizontally extending arm of pawl 110 strikes a stationary finger 166 on the frame of the machine and swings it clear of the short arm of lever 108 so that when the shaft 94 is rocked at the end of the thread feeding operation, the feeler 98 will still remain in its actuated position. In starting the machine for the next seam, the first movement of the cam lever 108 brings the pawl 110 above the short arm of lever 108 (Fig. 13) where it is held due to the presence of the thread between the thread case and the work.

To actuate the thread cutter, the lever 54 is rocked about its fulcrum stud 55 on frame 34 by a link 168 universally connected at its lower end with the lever 54 and at its upper end with a three-armed cam operated lever 170 (see Fig. 2),

one arm of which carries a cam roll 172 engaging a cam 174 on the shaft 124. The cam roll 172 is held against cam 174 by a coil spring 176 coiled about the hub of lever 170 and tensioned between lever 170 and lever 118 so that cam roll 172 is also held thereby against cam 122. The cam 174 is provided with a projection 178 which acts to rock lever 170 in a direction to actuate the thread cutter just after a stitch is completely formed. During the first stitching cycle in a new seam, the thread cutter is thus actuated and thereafter is held in actuated position by the engagement of a horizontally extending arm of lever 170 with a latch 180 pivoted on downwardly extending arm of lever 108. The latch 180 is held in operative position against a pin 182 on the lever by a spring 184 also connected to the lever. When lever 108 is rocked by cam 144 and arm 136 at the end of the thread feeding operation, latch 180 is moved away from lever 170 and the lever returns the thread cutter to its original position in alignment with the opening in the thread case (see Figs. 6 and 7). The parts are held in these positions until a new seam is started and the operations again repeated.

The nature and scope of the invention having been indicated, and a particular embodiment of the invention having been specifically described, what is claimed is:—

1. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, and means engaging the thread outside the thread case for feeding thread lengthwise into the thread case to replenish the supply therein.

2. A lockstitch shoe sewing machine, having, in combination, a needle, a locking thread case having a thread opening in its outer wall, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle, and means engaging the thread outside the thread case for feeding thread lengthwise through the opening in the case to replenish the supply of thread therein.

3. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, devices outside the thread case acting with a continuous grip on the thread for feeding thread lengthwise into the thread case to replenish the supply of thread therein, and means for severing the thread between the feeding devices and the work.

4. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle, devices outside the thread case for feeding thread lengthwise into the thread case, and guiding means surrounding the thread between the thread case and the feeding devices to prevent lateral escape of the thread as it is being fed.

5. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, devices outside the thread case for feeding thread lengthwise into the thread case and a thread enclosing guide between the thread case and feeding devices movably mounted to permit the thread to be withdrawn from between the thread case and guide during sewing.

6. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle, devices outside the thread case for feeding thread lengthwise into the thread case, guiding means surrounding the thread between the thread case and the feeding devices, a movable frame on which the guiding means are mounted to permit the guiding means to move away from engagement with the thread case, and yielding means for pressing the guiding means against the thread case while the thread is being replenished and against the thread to provide a tension when the thread is being withdrawn between the thread case and the guiding means during sewing.

7. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle, devices outside the thread case for feeding thread lengthwise into the thread case, a thread cutter having a thread receiving perforation there-through, guiding means closely surrounding the thread between the thread cutter and the feeding devices, and a movable frame on which the cutter and guiding means are mounted to permit the thread to be withdrawn from between the thread case and cutter.

8. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, devices outside the thread case acting with a continuous grip on the thread for feeding thread lengthwise into the thread case to replenish the supply, a thread cutter between the thread case and the thread feeding devices, and means for actuating the cutter to sever the locking thread as the first stitch of a new seam is being completed.

9. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, devices outside the thread case acting with a continuous grip on the thread for feeding thread lengthwise into the thread case to replenish the supply, a thread cutter between the thread case and the thread feeding devices, means for actuating the cutter parallel to the surface of the thread case to sever the locking thread between the first stitch of a new seam and the thread feeding devices after the supply in the case has been replenished, and resilient means for yieldingly pressing the cutter against the thread case to provide frictional tension between the thread case and cutter when the thread is being withdrawn.

10. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, opposing rolls between which the thread passes for feeding the thread lengthwise into the thread case to replenish the supply, and means for regulating the number of revolutions imparted to the rolls when the thread is being replenished.

11. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, devices outside the thread case for feeding thread lengthwise into the thread case

to replenish the supply, and means rendered operative by the absence of thread leading from the thread case opening to cause the thread feeding devices to replenish the supply.

12. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, devices outside the thread case for feeding thread lengthwise into the thread case to replenish the supply, a clutch for operating the feeding devices, means for regulating the length of time the feeding devices are operated to insure the completion of a single shoe seam without exhausting the locking thread, a feeler engaging the thread between the thread case and the supply, and connections between the feeler and the clutch for causing the feeding devices to be operated when the end of the thread is withdrawn from the thread case in removing a sewn shoe from the machine.

13. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, opposing rolls between which the thread passes for feeding the thread lengthwise into the thread case to replenish the supply, relatively movable frame members rotatably supporting the rolls and forming a thread guiding passage between separable surfaces of the frame members, and means for yieldingly holding the frame members together with said rolls engaging the thread to maintain the thread passage at the smallest size in which easy movement of the thread is possible.

14. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, opposing rolls between which thread passes for feeding the thread lengthwise into the thread case to replenish the supply, bearings for the rolls, a frame for the roll bearings formed with a thread guiding passage, and a surface at the end of the passage disposed at an angle thereto, and a thread cutter movable along said surface of the frame to sever the thread between the rolls and the thread case.

15. A lockstitch shoe sewing machine having, in combination, stitch forming devices including a needle, a thread case and a loop taker for passing a loop of needle thread about the thread case, a cam shaft for actuating the stitch forming devices, rolls outside the thread case for feeding thread lengthwise into the case to replenish the supply of thread, a cutter for severing the thread between the feeding devices and the thread case at the beginning of a seam, and a cam driven from the cam shaft for actuating the cutter.

16. A lockstitch shoe sewing machine having, in combination, stitch forming devices including a needle, a thread case and a loop taker for passing a loop of needle thread about the thread case, a cam shaft for actuating the stitch forming devices, rolls outside the thread case for feeding thread lengthwise into the case to replenish the supply of thread, a cutter for severing the thread between the feeding devices and the thread case at the beginning of a seam, a cam driven from the cam shaft for actuating the cutter, and means for holding the cutter in actuated position during sewing of the seam.

17. A lockstitch shoe sewing machine having, in combination, a needle, a locking thread case,

a loop taker for passing a loop of needle thread about the thread case during each sewing cycle, a feeler for sensing the presence of thread between the thread case and the work, and means
5 for actuating the feeler during each sewing cycle away from the thread to permit free passage of the needle loop to the work.

18. A lockstitch shoe sewing machine having,

in combination, a needle, a locking thread case, a loop taker for passing a loop of needle thread about the thread case during each sewing cycle of the machine, and means for forming a coil of thread unsupported by a bobbin within the
6 thread case to replenish the supply therein.

ERASTUS E. WINKLEY.