

Dec. 16, 1924.

1,519,652

F. ASHWORTH

LOCK STITCH SEWING MACHINE

Filed Jan. 9, 1922

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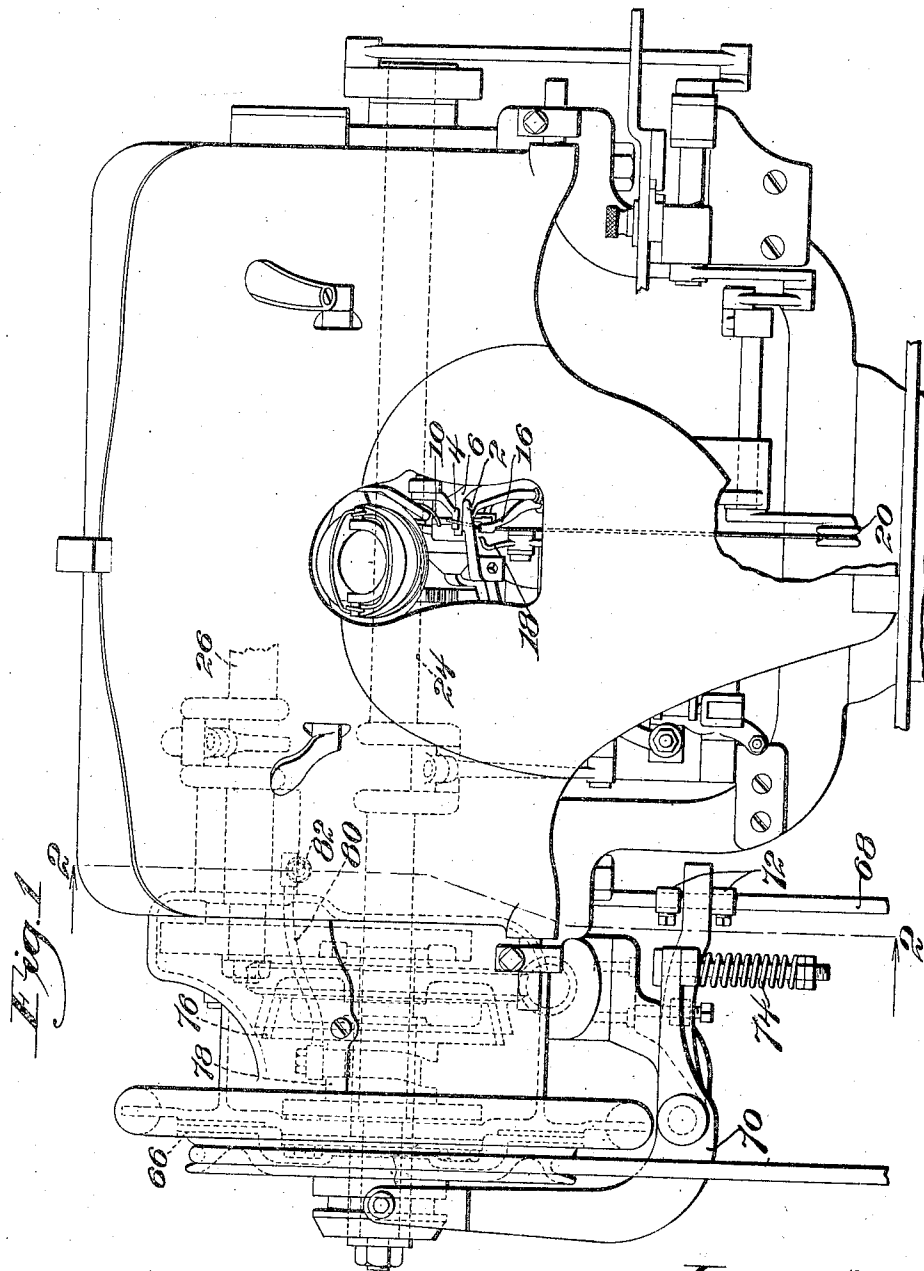


Fig. 1

Witness
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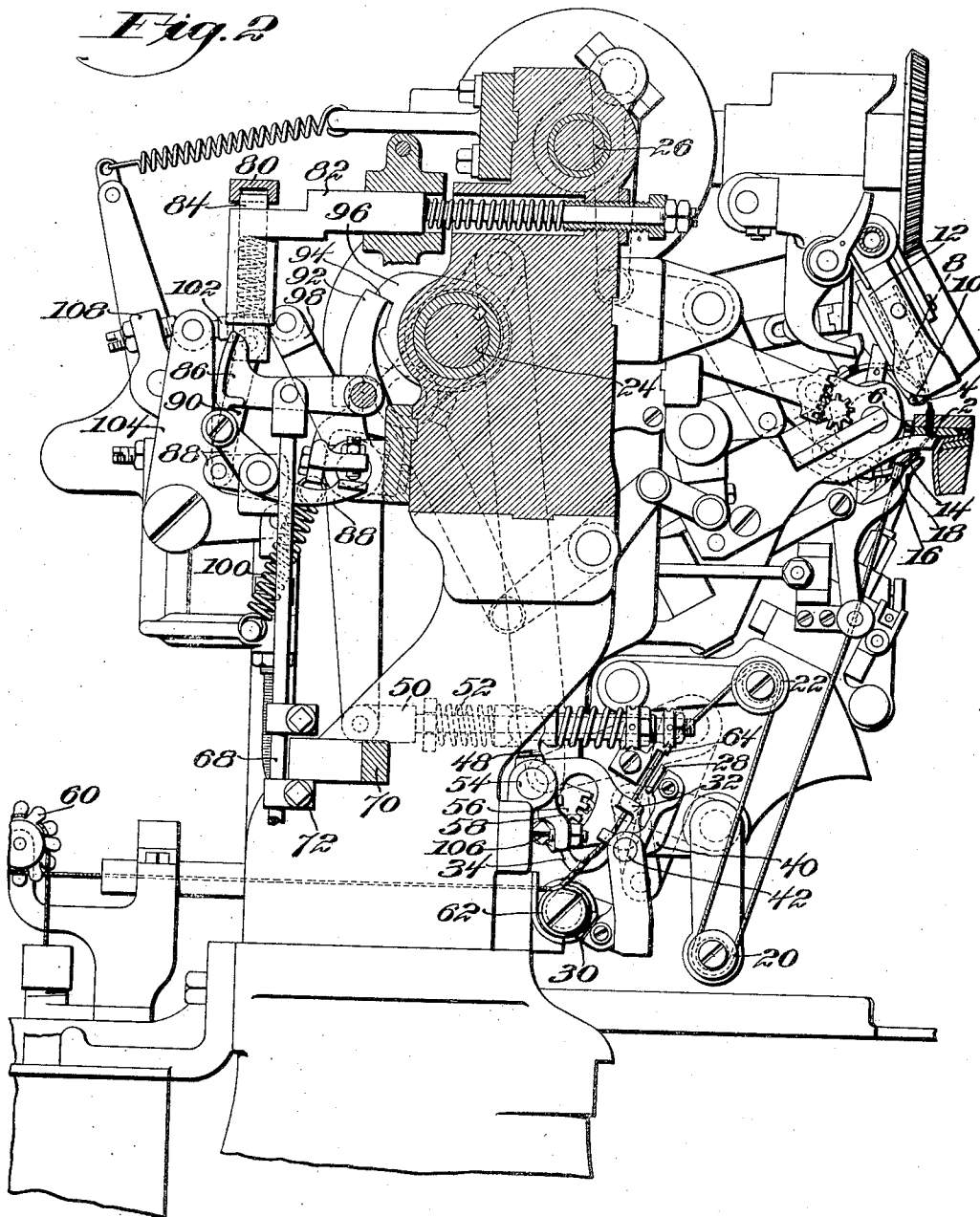
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Fig. 2



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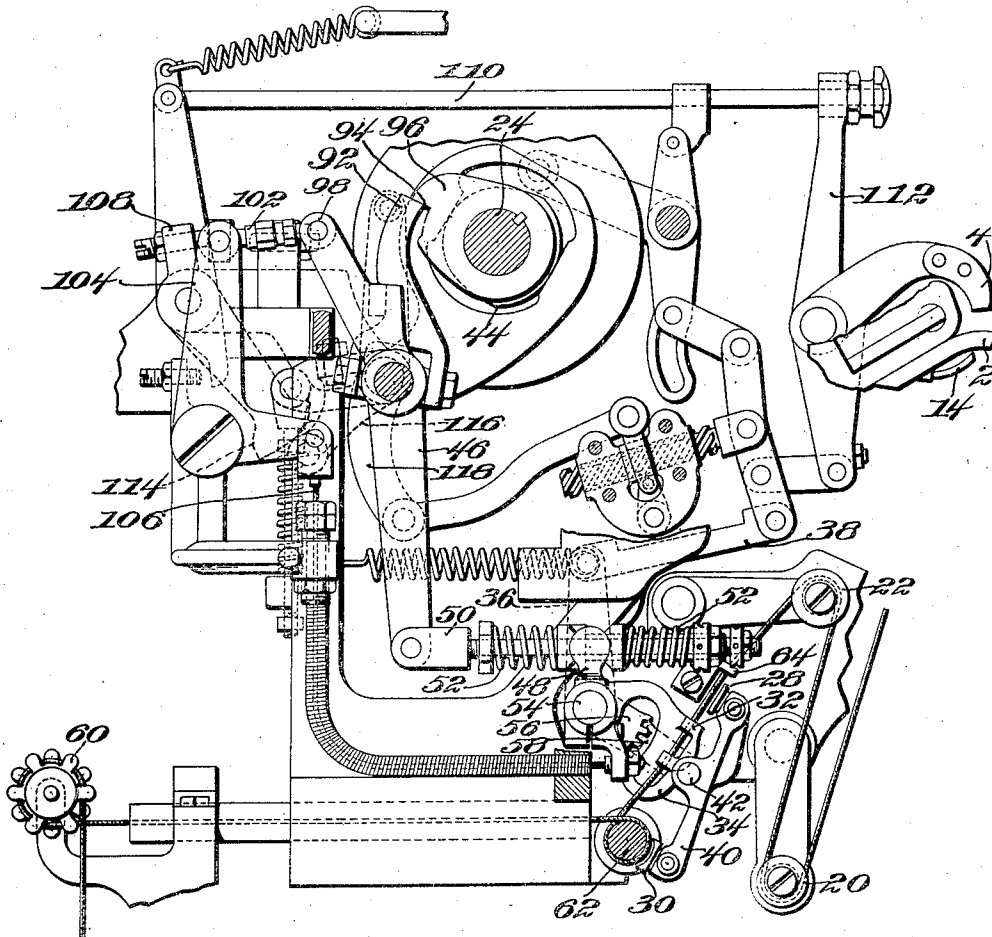
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LOCK STITCH SEWING MACHINE

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Fig. 3



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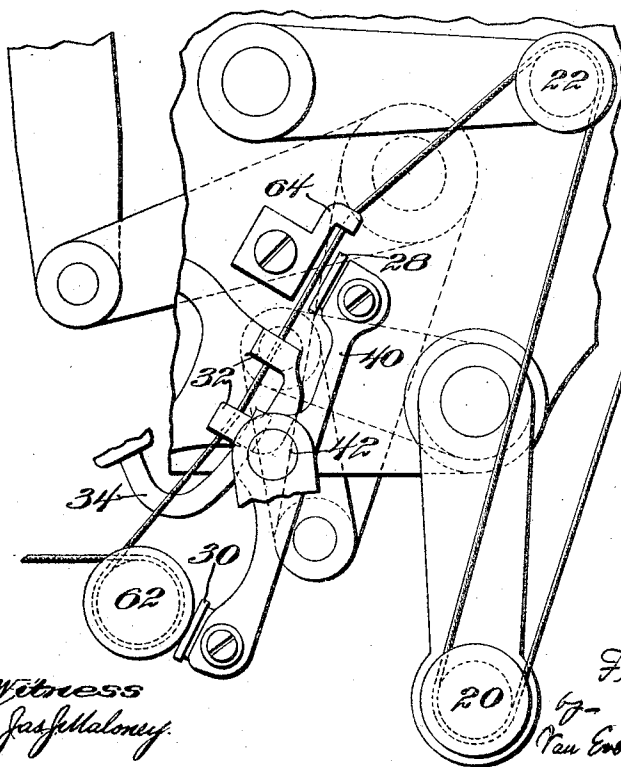
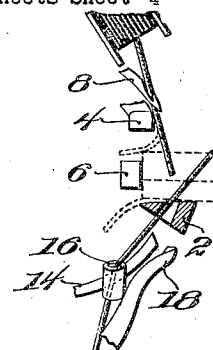
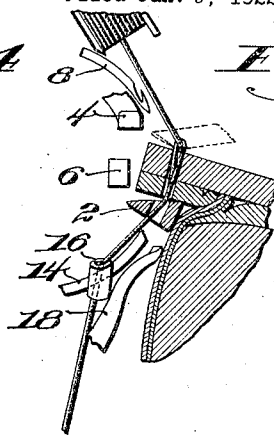
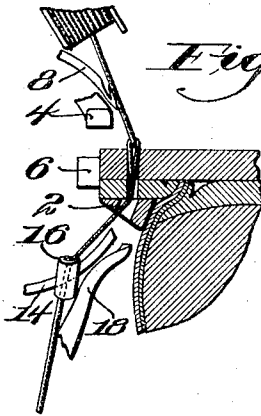
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F. ASHWORTH

LOCK STITCH SEWING MACHINE

Filed Jan. 9, 1922

4 Sheets-Sheet 4



Inventor
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UNITED STATES PATENT OFFICE.

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LOCK-STITCH SEWING MACHINE.

Application filed January 9, 1922. Serial No. 527,871.

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 Lock-Stitch 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.

The invention relates to lock stitch outsole shoe sewing machines.

Outsole sewing machines in commercial use are usually provided with mechanism which operates to stop the machine at a definite point in the stitch forming cycle upon the completion of the sewing. These stop mechanisms have usually stopped the machine after the take-up has completed about one half of its taking up stroke and it is necessary, therefore, for the operator to draw some four to six inches of thread from the thread supply after the machine has stopped so as to provide thread for the first movement of the take-up upon again starting the machine. This involves a waste of needle thread due to the excess of such thread which is usually drawn from the needle thread supply and also a greater waste of shuttle thread due to the fact that the operator usually moves the work to draw off the required length of needle thread before cutting either of the threads. Furthermore, the long free end of the needle thread hangs over the edge of the work support so that it will be gripped between the work support and the succeeding shoe placed thereon by the operator with a resulting breakage of the thread by the take-up upon starting the machine unless the operator is careful to hold the work lightly against the work support during the formation of the first stitch.

It has also been proposed to stop certain machines after the take-up has drawn the lock of the last stitch down into the work and thus completed the setting of this stitch. While this eliminates the danger of breaking the thread when starting the machine it involves the drawing off and waste of excess thread to permit the convenient and simultaneous severing of both threads at the com-

pletion of the sewing or as an alternative the inconvenience and loss of time incident to successively severing the threads on opposite sides of the work.

The present invention eliminates the waste, inconvenience and loss of time incident to the use of these prior constructions by the provision of means acting to stop the machine at the completion of the sewing when the bight of the last needle loop has been drawn down nearly but not quite to the surface of the work. This leaves the last needle loop projecting slightly from the surface of the work with the shuttle thread drawn snugly through its bight and close to the surface of the work. The operator may, therefore, readily shift the work slightly to give the requisite length of shuttle thread for starting the next seam and then sever both threads above the work with a single stroke of his knife. The supply leg of the severed needle loop will be withdrawn from the last needle hole upon removal of the work and will furnish a short free end above the work support which will be gripped between the work and support when the succeeding shoe is positioned preparatory to starting the next seam. When the machine is started practically no thread is drawn with the take-up until the first stitch is completed and is about to be set and the operator may press the work firmly against the work support before starting the machine and thus accurately place the initial stitches in the proper position in the work. The present construction thus eliminates the objectionable features of the prior constructions referred to while retaining the advantages of both and also has the further advantage of permitting both threads to be simultaneously severed on the same side of the work by a single cutter in the hand of the operator or otherwise operated.

The invention is illustrated in the accompanying drawings in which Fig. 1 is a front elevation of a lock stitch sewing machine in which a preferred form of the invention has been embodied, Fig. 2 is a vertical sectional elevation on line 2-2, Fig. 1, Fig. 3 is a detailed elevation showing the mechanism for operating the thread locks and presser foot and Figs. 4, 5 and 6 are diagrammatic views showing the manner in which the threads

may be severed and the work removed at the completion of the sewing without waste of thread or loss of time.

The machine shown in the drawings is an outsole lock stitch sewing machine having substantially the same general construction and mode of operation as the machine shown and described in Patents Nos. 1,169,909, dated February 1, 1916 and 1,233,539, dated July 17, 1917. This machine is provided with a work supporting table 2, a presser foot 4, an end gage 6, a curved hook needle 8, a loop spreader 10, a rotary loop taker or shuttle 12, an awl 14, a looper 16, a thread finger 18, a take-up 20 and an auxiliary take-up 22, all of which are actuated from the main shaft 24 and supplemental shaft 26 through mechanisms fully shown and described in the above patents. The machine is also provided with front and rear thread locks 28 and 30 and with an interposed thread pull-off which is similar to the pull-off of said patents and comprises two thread guides 32 and an oscillating pull-off finger 34 adapted to act on the thread between the guides. The pull-off finger is mounted and actuated as in the above patents and the lever 36 on which the guides are mounted is connected by a link 38 with the presser foot mechanism so that the length of the thread pulled off will vary with the thickness of the work as in the machine of said patents. The thread locks are carried on a lever 40 secured to a rock shaft 42 and operated to alternately engage the locks with the thread by a cam 44 on the shaft 24. The cam is embraced by a yoke on one arm of the lever 46, the other arm of which is yieldingly connected with a lever 48 through a link 50 and springs 52. The lever 48 is secured to a rock shaft 54 which carries a segment 56 engaging a segment 58 on the rock shaft 42 which carries the thread lock lever. The thread leads from the wax pot about a tension wheel 60 about a guide roll 62 with which the rear thread lock 30 cooperates through the guides 32 of the thread measuring device through a guide 64 on the plate with which the front thread lock cooperates and over the auxiliary and main take-ups to the looper.

The machine is also provided with a driving and stopping mechanism similar to that of the patents above referred to and also with mechanisms similar to those of said patents which are rendered active upon stopping the machine to unlock and raise the presser foot and to disengage the active thread lock so that the shoe may be readily removed. These mechanisms are similar to the mechanisms shown and described in Patent No. 1,233,539 and need be but briefly referred to. During the sewing the machine is driven through a frictional driving clutch 66 which is held in engagement by the

treadle rod 68 through a two-part lever 70, the parts of which are yieldingly connected by the spring 74 and one end of which is embraced by collars 72 secured to the rod. When the treadle is released at the completion of the sewing the main driving clutch is disengaged and the mechanism for stopping the machine is rendered active. This mechanism comprises the normally inactive slow speed driving clutch 76, the timing cam 78 for controlling the engagement and disengagement of the clutch, the clutch lever 80 which is oscillated idly by the cam during the sewing, the spring pressed slide 82 carrying the spring pressed locking pin 84 which is adapted to connect the lever with the slide and is held out of engagement with the lever during the sewing by a cam lever 86 connected with the treadle rod and engaging one arm of a bell crank lever 88, the other arm of which is connected by a link 90 with the pin. When the treadle is released the upward movement of the treadle rod and cam lever 86 releases the locking pin so that it is free to engage a hole in the cam lever when this hole is brought into register with the pin and thus arrest the movement of the lever so that the cam 78 will first engage the slow speed driving clutch at a definite point in the rotation of the shaft 24 and will thereafter disengage the clutch at another definite point in the rotation of the shaft. When the slow speed clutch is disengaged the final stopping position of the shaft is determined by a stop dog 92 arranged to engage a stop shoulder 94 on a cam 96 which is secured to the shaft. The stop dog is pivoted on the hub of a lever 98 so that it may move laterally into and out of the path of the cam 96 and the dog is held out of the path of the cam during the sewing against the pull of the spring 100 by an arm of the lever 88 which engages a laterally projecting arm on the dog. When the lock pin enters the hole in the slow speed clutch lever after the treadle has been released the arm of the lever 88 releases the dog 92 so that it is free to move laterally into the path of the cam 96 when permitted to do so by the rotation of the cam. The cam 96 is provided with a rise immediately in front of the stop shoulder 94 so that the dog is swung outward just before the shaft reaches its final position. This movement of the dog rocks the lever 98 to unlock and raise the presser foot and to release the active thread lock. To this end the lever 98 is connected by a link 102 with one arm of a bell crank lever 104, the other arm of which is connected through a cable 106 with the lever 48 through which the thread lock lever is rocked. The end of the link 102 also engages an adjustable screw carried by a lever 108, the upper end of which is connected by a rod 110 with the

presser foot lifting arm 112. The lever 108 is also provided with a depending cam arm 114 which rocks a lever 116 arranged to engage and operate the lever 118 through which the presser foot lock is released.

In embodying the present invention in the above machine the stopping mechanism is so constructed and arranged that it stops the machine at the point in the stitch forming cycle when the take-up has so nearly completed the taking up of the needle loop that the bight of the loop is drawn down nearly but not quite to the surface of the work as indicated in Figs. 2, 4 and 6. At this point in the stitch forming cycle under normal sewing conditions the take-up is about to draw the bight of the last needle loop down into the work and set the stitch against the resistance offered by the rear thread lock which is in engagement with the thread and the presser foot is locked in engagement with the work by its operating cam and the presser foot lock. Mechanism is, therefore provided which is rendered active in stopping the machine for unlocking and raising the presser foot and for releasing the active thread lock in order that the work may be readily removed and these mechanisms preferably have the construction and mode of operation above indicated and more fully described in the patents above referred to. By stopping the machine after the take-up has nearly completed its taking up stroke the bight of the last needle loop is left projecting slightly above the surface of the work and the shuttle or locking thread is drawn snugly through the bight and close to the upper surface of the work, as indicated in Fig. 4. Since the presser foot has also been lifted and the thread lock released the shoe may be readily moved by the operator and the needle thread will draw freely through the thread controlling devices to accommodate such movement. It will usually be found that a tipping movement such as indicated in Fig. 5 will be sufficient to draw off enough locking thread to insure the proper starting of the next seam and after such thread has been drawn off both threads may be quickly and conveniently severed substantially at the point of engagement of the locking thread with the bight of the needle loop by a single stroke of a knife indicated in dotted lines in Fig. 5. After the threads have been thus severed the thread on the supply side of the loop will draw down through the last needle hole as the work is removed and will project up through the slot in the work support. When the next shoe is placed in position on the work supporting table this short free end of the needle thread will be clamped between the work and work support so that the proper looping of the needle during the first stitch forming cycle will

be ensured. When the machine is started the thread lock will reengage the thread and the take-up will have a slight downward movement to complete the taking up stroke which was interrupted when the machine was stopped. The elasticity of the thread between the thread lock and the work will be amply sufficient to permit this movement of the take-up without danger of breaking the thread although its free end is firmly clamped between the work and work support. The operator may, therefore, accurately position the shoe to properly locate the first stitches of the seam and after the sewing has been completed and the machine stopped he may quickly and conveniently sever both threads without the waste of thread incident to withdrawing the shoe to a position where both threads may be conveniently severed or the inconvenience and loss of time incident to first severing the shuttle thread above the work and thereafter moving the work to draw the requisite amount of needle thread through the work support before severing the needle thread on the under side of the work.

While it is preferred to employ the construction and arrangement of parts shown and described in applying the invention to the machine of the patents above referred to it will be understood that this construction and arrangement is not essential to the broader features of the invention and may be varied or modified as found desirable or best suited to the construction and mode of operation of the machine to which it is to be applied.

What is claimed is:

1. A lock stitch sewing machine having, in combination, stitch forming mechanism including a hook needle, a looper, a loop taker and a take-up, and mechanism for stopping the machine upon the completion of the sewing with the locking thread held in the bight of the last needle loop outside the surface of the work.

2. A lock stitch sewing machine having, in combination, stitch forming mechanism including a hook needle, a looper, a loop taker and a take-up, and mechanism for stopping the machine upon the completion of the sewing with the bight of the last needle loop projecting slightly from the surface of the work.

3. A lock stitch sewing machine having, in combination, stitch forming mechanism including a hook needle, a looper, a loop taker and a take-up, and mechanism for stopping the machine upon the completion of the sewing when the take-up has drawn the bight of the last needle loop and the locking thread held thereby close to the surface of but not into the work.

4. A lock stitch sewing machine having, in combination, stitch forming mechanism

including a hook needle, a looper, a loop taker, a take-up and a thread lock, mechanism for stopping the machine upon the completion of the sewing when the take-up has drawn the bight of the last needle loop and the locking thread held thereby close to the surface of but not into the work, and normally inactive mechanism rendered active in stopping the machine for releasing the thread lock.

5. A lock stitch sewing machine having, in combination, a work support, a presser foot, stitch forming mechanism including a hook needle, a looper, a loop taker, a take-up and a thread lock, mechanism for stopping the machine when the take-up has drawn the bight of the last needle loop and the locking thread held thereby close to the surface of but not into the work and normally inactive mechanism rendered active in stopping the machine for releasing the thread lock and for lifting the presser foot.

FRED ASHWORTH.