

W. W. ABBOTT.
SEWING MACHINE.

No. 66,440.

Patented July 9, 1867.

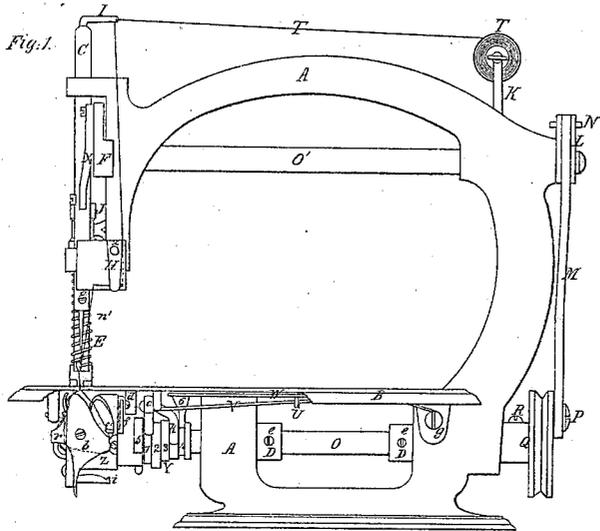


Fig. 2.

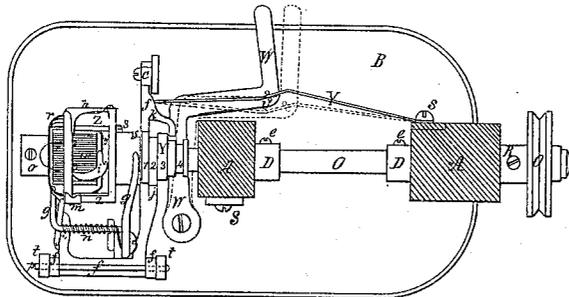


Fig. 3.

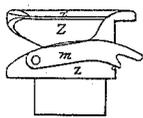


Fig. 4.

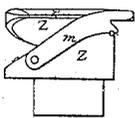


Fig. 5.

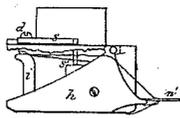


Fig. 6.

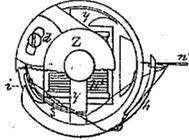


Fig. 7.

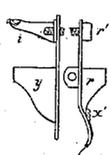


Fig. 8.

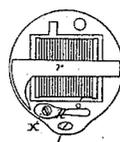


Fig. 9.

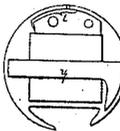
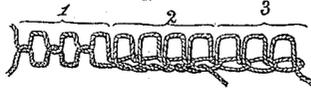


Fig. 10.



Witnesses.
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Letters Patent No. 66,440, dated July 9, 1867.

IMPROVEMENT IN SEWING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM W. ABBOTT, of the city of Boston, county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Sewing Machines; and do hereby declare that the following is a full and correct description of the construction and operation thereof, reference being had to the accompanying drawings, forming a part of this specification, in which the same letters in different views refer to like parts.

Figure 1 is a side view of the machine.

Figure 2 is an under side view of the same, a part of the standard A being removed.

Figure 3 is a side view of the cup with its plate down.

Figure 4 is a side view of same with plate up.

Figure 5 is a side view of the slotted cup and its hook, with the stationary take-up, and the elastic metallic take-up, just as said elastic metallic take-up leaves the needle-loop preparatory to its being drawn up into the fabric by the formation of the second loop.

Figure 6 is an end view of the same from the back side, with part of the cup cut away.

Figure 7 is a side view of front and back part of spool-case.

Figure 8 is a front view of front part of same.

Figure 9 is a back view of back part of same.

Figure 10 is a view of the lock-stitch and of the combination called the embroidery-stitch and of the single-chain stitch.

My improvements relate principally to that class of sewing machines which make the lock or shuttle-stitch from two common store spools of thread without re-winding, and which employ the feeding device of ordinary sewing machines; and consist in, first, an elastic metallic take-up below the bed-plate, giving all the advantages of other elastic substances, and enabling the operator to sew different thicknesses of fabric without extra change of tension or strain of thread, while it is more durable and more easily adjusted; second, in so arranging the machinery as to enable the operator to make either the lock-stitch or the combination of lock and single-stitch, called the embroidery-stitch or the single-chain stitch, at will; third, in the formation and action of a double feed-cam, so as to feed the fabric either forward or backward, at the choice of the operator.

A is the arm or frame of the machine, to which the table or plate B is attached by the screws S. Driving-shaft O and needle-shaft O' pass through said frame. C is the needle-bar passing through the head of arm A. E is the presser-bar, to which is attached a foot, as in other machines in common use, with spiral spring around the bar below where it passes through the head of the arm A, so as to produce the proper pressure on the fabric between said foot and the plate. J is the lifting-cam on the presser-bar, which raises it as needed. n' is the needle. a is screw holding the same in the needle-bar. X is the connecting-link uniting the needle-bar with crank F on the shaft O'. L is the crank, uniting shaft O' with arm M by the pin N. P is the screw which attaches arm M to pulley Q. R is the set-screw fastening the pulley Q to shaft O. Y is a sliding-collar on shaft O, provided with cams 1 2 3 (see figs. 1 and 2) for giving motion to the feed-bar. W is the lever, which is attached to plate B by a screw, l. b is a pin attached thereto, which moves the collar and reverses the feed. 4 is an annular groove formed on the periphery of the sliding-collar, which carries the feed cams to receive the pin b. e is the cheek-piece to regulate the length of stitch. V is the spring-wire operating on the feed to give it the proper movement. One end is secured to the machine by screw S. The other end is attached to the feed-dog. This spring is bent, as shown in fig. 2; passes between the pins U on the lever W. By changing the position of this lever, as shown in red and black lines, the direction of the force exercised by the spring on the feed-dog is changed. f f' f'' is the feed-frame, and j k are projections on feed-frame. j, being pressed by cam 2, gives the forward motion to feed-frame. k, when in contact with cam 3, gives the reverse motion to the feed-frame. Cam 1 is pressed against the feed-frame to give it the upper motion. 5 is a cam attached to the hub of cup Z for the purpose of giving the lever g a vibrating motion. g is a vibrating lever having a projecting arm, g', which, being vibrated by lever g, comes in contact with guard r of the spool-case, thus causing the spool-case to vibrate. n is a spiral spring which surrounds the projecting arm g'. Its force is exercised to press the lever g against cam 5. The feed-frame is suspended from the table or plate by means of a pivoting-

rod or shaft, *p*, which passes through the ears *f'* thereof, and through the lugs *t* on the under side of the table. *d* is a screw fastening the metallic take-up *s* to the back part of cup *Z*. *s'* is the pin attached to the spring or metallic take-up. *r* is the front part or guard of the spool-case. *y* is the back part of same. *i* is the stationary lip or take-up attached to the back part of the piece *y* of the spool-case. *o* is a forked plate secured to the under side of the table, and preventing the spool-case from revolving with cup *Z*. *Z* is a grooved and slotted cup. *T* is the upper spool and thread held to the frame by rod *K*. *H* is the tension-plate over which the thread *T* passes, and against which it is pressed by spring *X*. *v* is a screw for regulating the pressure of the spring upon the thread. *I* is the thread-guide attached to the needle-bar. *w* is the under spool. *D D* are collars on shaft *O*, held by screws *e*. Red lines on figs. 1, 5, and 6 represent the upper thread. Blue lines on figs. 1, 2, and 8 represent the lower thread. *H'* is the under tension-spring on spool-case. *X'*, a screw regulating the same. *r'* is a screw holding front and back portions of spool-case together.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

It will be observed that the elastic metallic take-up is attached to the cup and revolves with it, but may be placed in any other position, only that it must operate so as to control the slack thread from the upper loop, by an elastic hold of the same, releasing the loop in time to be drawn into the fabric by the formation of the next loop as it is drawn by the hook around the spool-case. The advantage of a metallic elastic substance, compared with leather, bristles, or any other yielding substance, is because of its superior durability and surety of action at proper time and place. The under spool is held on a screw passing through the ears of the front of the spool-case *r*; and the feeding of the fabric forward is similar to that of other machines in common use, by the means of a roughened feeding surface on the feed-frame, and by being pressed by a cam above the plate in contact with the cloth, and then pressing it against the presser-foot, and moving sufficiently in line with the plate as to cause the cloth to be carried enough to make the length of stitch. The feed-frame then drops down beyond the cloth, releasing it, while it moves back, forming the four motions, or up and down and forward and backward feed.

My improvement consists in moving cams for operating the feed-frame, so as to produce the forward or the backward feed of the cloth, at the will of the operator, by the simple movement of the lever which shifts the bearing-cams. This part of my improvement is not limited to this class of machines, but may be adapted to many others; and its advantage consists in simplicity and certainty of action.

It is well known that there are three stitches which are considered the best for different kinds of work, each having its peculiar advantage. First may be considered the lock or shuttle-stitch, which, for beauty and durability, is unsurpassed by any other. Second, and next best, is the single-chain stitch, which possesses great elasticity, and can be easily taken out if desired. The next is the combination of the lock and single-stitch, or what may be called an embroidery-stitch, enabling the operator to ornament garments by producing an interlaced stitch on one side, which may be of variegated colors to please the fancy. This stitch is very durable. My improvements consist in the arrangements of machinery enabling the operator to form on one machine either stitch, by a simple process, without the necessity of re-winding the thread, all of which I will further describe.

The movement of the pulley gives the required motion to the under shaft, causing the revolution of the cup *Z* which contains the spool-case *r y* which holds the spool *w*. There is attached to the cup by screws the hook *h*, which in its revolution catches the needle-loop that has been brought down through the fabric by the downward movement of the needle. This motion of the needle is produced by the revolution of the pulley *Q*, giving a circular motion to the lower end of the connecting-rod *M*, which is attached to the crank *L*, and produces a rocking movement which causes the shaft *O'* to partially revolve, thus giving to crank *F* a rocking motion that causes the needle-bar *C* to move up and down at each revolution of the pulley. The edge of the spool-case, as seen in figs. 7 and 9, is made to fit in the groove *Z'* in cup *Z*, which groove may be seen in figs. 3 and 4, and is prevented from turning with the cup by the fork *o* which is fastened on plate *B*, (see fig. 2.) As the hook revolves and takes hold of the loop of thread that has been formed by the movement of the needle below the fabric, and is being carried around the spool-case, it is spread by the wedged shape of the hook *h*, so as to cause the back portion thereof to pass into the slot on the cup back of the hook, and is then carried against and over the spool-case *r* and *y*. Now, by the action of cam 5 on the lever *g*, the vibrating arm *g'* is pressed against the end of guard *r*, thus holding the spool-case from contact with fork *o*, allowing a free passage for the loop between the upper end of spool-case and fork *o*, after which, by the action of the coiled spring *n* upon lever *g*, the arm *g'* is moved from guard *r*, thus causing the upper end of the spool-case to rest against fork *o*, allowing a free passage for the loop between guard *r* and arm *g'*. It will be seen that when the loop is carried a little beyond half its passage over the spool-case that it comes in contact with the stationary take-up or hook *i* which is attached to the spool-case, and that portion of the loop is so held as to allow the pin *s'* to come in contact with the thread close to and inside of the hook *i*, and by the continuous movement of the cup it winds up the extra slack of the loop, so as to take it off the hook *h*, and holds it long enough to prevent being again caught, as shown in figs. 5 and 6. As the pin *s'* passes beyond the range of thread it leaves the loop caught on hook *i*; and as the hook *h* catches the second loop it draws the first loop up into the fabric, and by its line of draught is relieved from the hook *i*. The cup has a slot in the side, back of the hook, allowing the back portion of the loop to pass down inside the cup, as seen in fig. 1. There is also attached to this cup a movable plate, *m*, which, as seen in fig. 3, is placed back from the edge of the cup, thereby causing the thread, in its passage over the edge, to change its position, so as to pass the thread over the point of the needle and above its eye, so that the point of the hook takes the next loop below the crossing of the thread on the needle, thereby forming the combination or embroidery-stitch, as it draws up the bite of thread from the under spool into the

fabric. By cutting off or leaving out the under thread, the crossing of this thread, as the loop passes over the spool-case and the succeeding loop, forms the single-thread or chain-stitch. The plate *m*, in fig. 4, is placed on the edge of the cup, causing the loop, in its movement, to be divided and pass each side of the needle grasping the bite of lower thread, forming the single-lock or shuttle-stitch. The under thread passes from the spool inside the case, between the under tension-spring *H'* and the upper end of the case, allowing the necessary tension to be given to the under thread, and is then passed through the end of the case to the cloth, as seen in fig. 8. The feed-frame *f f' f''* is moved by the cams 1, 2, and 3. Cam 1, being fastened permanently to the shaft, raises the feed above the plate to the cloth as it feeds the same. Cams 2 3 and groove 4 are attached to or are parts of the sliding-collar *Y*, being feathered on the shaft, so as to move freely with the line of shaft. When the lever *W* is in the position shown in black lines in fig. 2, the cam 2 comes in contact with projection *j* on the feed-frame *f f' f''*, and produces the necessary forward movement; the return motion being communicated by spring *V*. By changing the position of the lever *W* to that shown in red lines in fig. 2, the pin *b*, acting in the groove 4, moves the sliding-collar on the shaft, and also acting on the incline of the spring *V*, changes the direction of its pressure. In this position the cam 2 produces the backward motion and the spring *V* the forward motion.

I do not claim making the lock-stitch from two common store spools without re-winding of thread; neither do I claim an elastic take-up below the cloth when made of any other substance excepting metal; and I do not claim a reversible feed when produced by any method other than by movable cams, such having been done before.

I do not claim a reversible feed when either compound levers or double springs are employed; neither do I claim making an embroidery-stitch from two commercial spools when the loop of thread does not pass over a commercial spool, or when it is not formed by the combination of the lock and single-chain stitch.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. I claim the movable plate *m*, or its equivalent, in combination with the revolving cup *Z* and the hook *h*, when so constructed and arranged as to form the lock-stitch, the embroidery-stitch, and the single-chain stitch at the will of the operator, substantially as set forth and for the purpose described.
2. I claim an elastic metallic take-up upon the revolving cup *Z*, constructed and operating substantially as set forth for the purpose specified.
3. I claim the combination of a sliding-collar with cams 1, 2, and 3 and annular groove 4, with pin *b*, lever *W*, and spring *V*, and pins *U* for changing or reversing the feed motions of sewing machines, as described.
4. I claim the combination of the stationary take-up *i* with an elastic metallic revolving take-up *s*, as set forth for the purpose specified.
5. I claim the combination of a spool-case and a grooved and slotted cup with its hook and movable plate *m* for purposes specified, as described.

Witnesses:

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WM. W. ABBOTT.