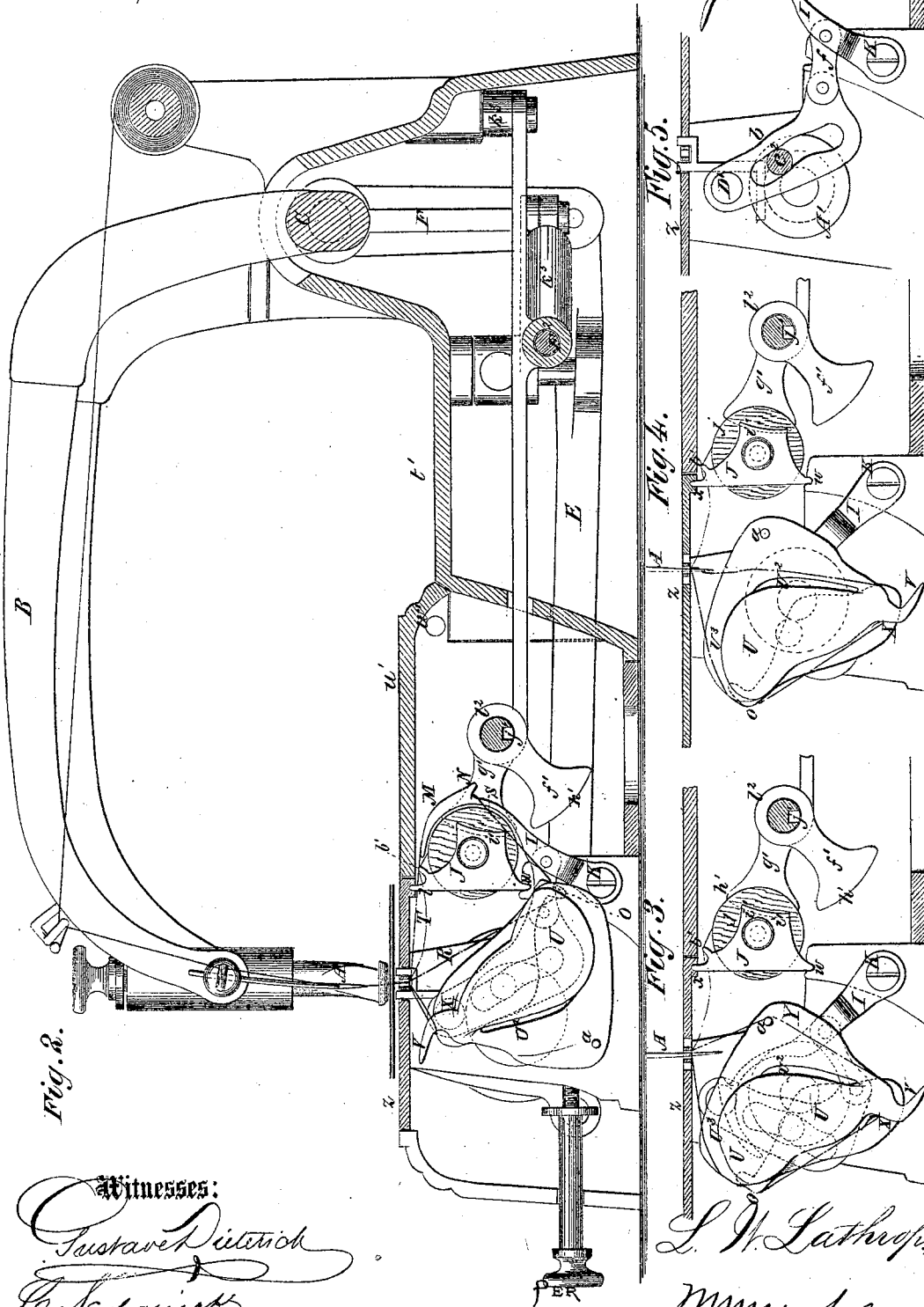


L. W. LATHROP.
Sewing-Machines.

No. 139,067. Patented May 20, 1873.



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Fig. 6.

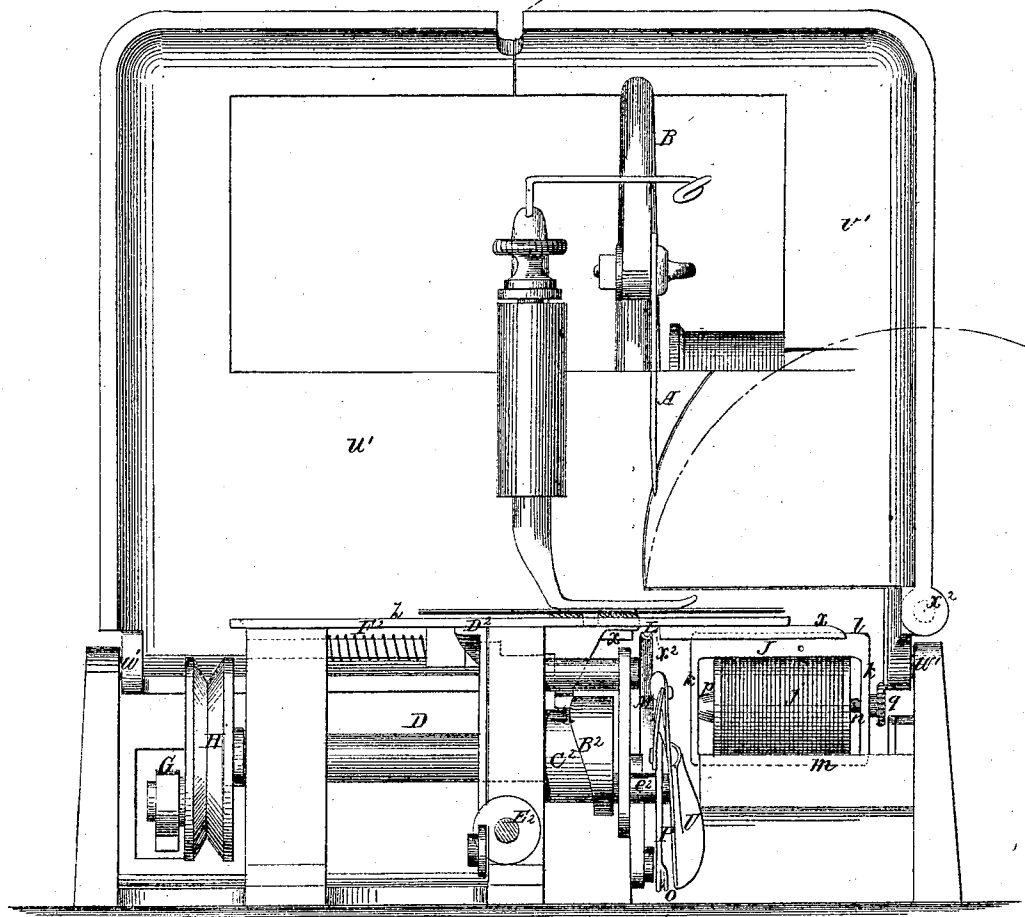


Fig. 7.

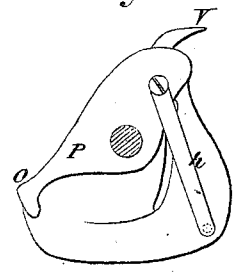


Fig. 8.

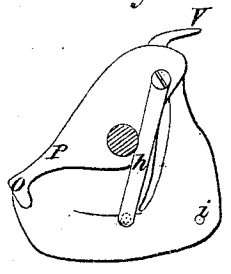


Fig. 9.

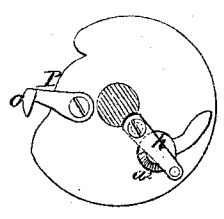
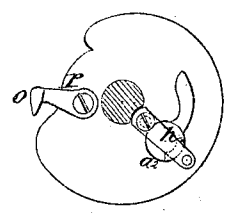


Fig. 10.



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UNITED STATES PATENT OFFICE.

LEBBEUS W. LATHROP, OF PHILADELPHIA, PA., ASSIGNOR TO LATHROP
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IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **139,067**, dated May 20, 1873; application filed
October 19, 1872.

To all whom it may concern:

Be it known that I, **LEBBEUS WISNER LATHROP**, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Sewing-Machines, of which the following is a specification:

My invention relates to improvements in sewing-machines; and it consists, first, in a combination of a rotary looper and an oscillating looper with a spool-carrier and needle, the rotary looper being so constructed that the loop will not only be extended so that a commercial spool may be employed for introducing the locking-thread to avoid the winding of bobbins for shuttles, now necessary in the common lock-stitch machines, also much of the friction due to shuttle-machines, but it is also so contrived that a chain-stitch, also a combined lock and chain stitch, can be made. In carrying out this part of the invention I employ two loopers for taking the loop of the upper thread when the needle has carried it through the cloth, and thus open it widely and hold it open for the passage of the spool. One of these loopers is a long curved oscillating or vibrating arm, engaging one part of the loop and carrying it away across the path of the spool, while the other is a rotary looper, arranged in the plane of the oscillating one, and engages part of the loop and carries it downward in a manner to make a large opening, and it is provided with a plate which is bulged outward at right angles to the plane of its movement, and has a guide-groove to occupy the thread after the oscillating looper ceases to hold it taut, and until it is drawn taut again by said looper in making the next stitch, to prevent the thread from kinking or snarling.

The second part of the invention consists in an adaptation of the revolving loop-opener, and application of a shifting-pin thereto, for so adjusting the loop, as it is opened for passing the locking-thread spool through it, that a chain-stitch will be formed by the upper thread, the lower thread being dispensed with; also so that a combined chain and lock stitch can be made, the lower thread being included. In carrying out this part of the in-

vention a projecting pin is applied to the revolving looper, which carries the thread downward, as before stated, and acts upon the portion between the cloth and the oscillating looper, and carries it beyond the needle side-wise in such manner that the latter passes down through the loop at the next movement and delivers the thread to the oscillating looper, so that a chain-stitch is formed, and if the under thread is included, at the same time a combination lock and chain stitch is formed. This projecting pin is so applied to the looper, or a plate attached thereto, that it may be readily shifted into or out of the working position. In this case it consists of a spring-bar, with a point, *a*, projecting from one end, pivoted at the other end to the bulged plate employed for preventing the thread from kinking, so that the said point may either be brought to a hole through said plate by turning the bar on its pivot, or moved away from said hole, and when adjusted to said hole it will project through said plate from the rear side to the working side and engage the thread as required.

The third part of the invention consists in an arrangement of operating-gear for working the loopers; also the feed, the revolving looper, together with the bulged plate for holding the discharged loop to avoid kinking, being mounted on the rotary shaft which imparts motion to the rocker of the needle-arm by a wrist-pin projecting from a disk on the end of said shaft, while the other looper, being pivoted to the frame at one end below said shaft, is oscillated by a slotted pendulum or lever pivoted to the frame above the shaft, and worked by the wrist-pin which passes through the pendulum, to the swinging end of which the looper is connected by a rod or link, and the feed is worked by a cam on the side of the aforesaid disk opposite to the one which works the loopers. The arm which works the oscillating looper may be pivoted on the wrist-pin by a slotted hole and have the end, now pivoted to the frame, engage with a cam-slot in the side of the disk to work the oscillating looper.

The fourth part of the invention consists in a construction of the metal case of the ma-

chine or cover for the working parts in sections, and jointing them together in such manner that by swinging the jointed parts the work below may be exposed readily at any time for inspection, oiling, and adjusting, while the plate on which the sewing is done remains stationary. This plate is supported upon brackets rising up from below, and the top of the case is formed around it in two parts, jointed to the main stationary part and swinging away from it, one in a horizontal plane from the front and the other part in a vertical plane on a joint between the needle and the needle-arm pivot.

Figure 1 is partly a plan view and partly a horizontal section. Fig. 2 is a longitudinal section, showing the positions of the loopers when the spool is passing through the loop. Fig. 3 is a partial horizontal section, showing the mode of forming the combined lock and chain stitch. Fig. 4 is a partial horizontal section, showing the position after the spool has passed through the loop. Fig. 5 is a section showing the arrangement of devices for working one of the loopers. Fig. 6 is a front elevation of the improved machine, with the case raised to show the working parts below. Figs. 7 and 8 are rear views of the rotating looper and the attachment for preventing the thread from kinking; also the attachment for making the chain-stitch. Figs. 8 and 9 are similar views of the said rotating looper and plate, with a modified arrangement of the chain-stitch attachment.

Similar letters of reference indicate corresponding parts.

In this example the needle A is mounted on an arm, B, which oscillates on a rocker, C; but it may have a rectilinear motion, as when attached to a vertically-reciprocating bar working in guides or bearings. This rocker is worked by the short crank-shaft D, to which it is connected by the bar E, arm F, and wrist G. The said shaft is arranged parallel with the line in which the work moves, and nearly under the line of the seam, with a driving-pulley, H, at the rear end, by which motion is imparted to it by a belt from the main driving-pulley, to be worked by the foot-treadle. This shaft also imparts the motion to the loopers, the feed, and the spool-driver. The looper I, which is the one that first takes the thread in opening the loop and carries it away across the path of the spool-carrier J, is a long curved finger, pivoted to the frame of the machine at K, nearly under the needle. Near the upper end it has a large curve to the left, about a quarter of a circle, marked M, and the outer face of this curved part is grooved, as shown at L, Figs. 1 and 6. At or about the base of this curved and grooved part M is a long and sharp point, N, projecting from the front side toward the right, which is to take the thread from the side of the needle by passing between it and said needle, as indicated in Fig. 2, as soon as the eye of the needle passes down below said point and has returned a short dis-

tance. The thread thus taken on the point falls into the groove L above the point, to be carried away to the right of the needle across the path of the spool, to extend the loop for the spool to pass through. As soon as the looper I has thus taken the thread and passes out of the way, stretching it away from the eye of the needle in a horizontal line, or nearly so, the revolving looper O, which is a short piece mounted on an arm, P, on shaft D, and having a notch in the end and front side, comes down upon the thread between the looper I and the needle, carrying said thread downward nearly in a direct line from the eye of the needle, as shown at R, Fig. 2, to a point below the spool-carrier. This looper arrives at the lowermost point (shown in Fig. 2) at the time the looper I arrives at the end of its movement to the right, thus opening a wide loop in a kind of triangular shape, of which the line R represents the base and S T the sides. The spool-carrier then goes through from front to rear and delivers its locking-thread. The looper I then swings back, delivering its thread to a notch, X, following the looper O about the distance of a quarter of its circular path behind it, and the looper O continues to hold its thread until it comes near the needle again, as indicated in Fig. 4. This return movement of looper I slackens the thread so that it is liable to kink or become entangled with the moving parts; consequently a plate, U, is employed with the looper O in such relation to it as to engage the part R of the thread in a guide-groove, U², between it and the plate Y at this time, and take up and hold this slack until the part U³, where the groove U² vanishes in the front face, and the notch X come nearly to the positions represented in Fig. 2, when the loop escapes from the groove over the bulge to the horn V. The looper I arrives back to the left ready to start forward again to take a new loop at the time the notch X takes the thread, and is going out with the new loop at the time the old loop is being cast out of the guide-groove U² over the bulge, and takes up the slack as fast as it is cast off over said plate and the horn. While the looper I is beginning to take a new loop the spool-carrier moves to the front again. Said plate U is of an irregular form in outline, and bulged outward toward the front of the machine, and is provided with this horn-shaped piece V at the end where the loop finally escapes. These operations form the ordinary lock-stitch, and they are all employed in making the chain-stitch with the addition thereto of the pin a, which is thrust out through the plate Y to engage the thread after it drops into the notch X and carry it forward to the right of the needle, so that the latter will come down through the loop and deliver the thread to the looper I, so that when the old loop is finally cast off it will be over the new loop, in the ordinary way of making chain-stitches. When this pin is used the under thread is omitted; but this action upon the thread by the pin a

does not interfere with the introduction of the locking-thread, so that, it being included at the same time, a combined lock and chain stitch is formed, which is very desirable for embroidery, as well as other uses. The looper I is worked by a slotted pendulum, *b*, pivoted to the frame above the shaft D, at D', and worked by the wrist-pin e^2 , passing through its slot, the said looper being connected to it by a link, *f*. This wrist-pin also carries the looper O, its arm or plate P being attached to it. The bulged plate U and the plate Y are connected together and to the wrist-pin e^2 . The projecting pin *a* is a part of a spring arm or finger, *h*, pivoted to the plate P of the looper O at the rear side, to swing to or from the hole *i*, through which the said pin will be caused to project when brought to it by the spring-arm; but when it is not to be used the arm is pushed back to withdraw it, and then turned away from the hole; or, if preferred, the spring-arm may be nearly sprung back by a cam, a^2 , with a handle for operating it, as shown in Figs. 9 and 10. The spool-carrier by which the binding-thread spool *j* is carried is composed of the two end pieces *k*, connected together by the side pieces *l m*, which are a little longer than the spool, so as to admit the latter between the end pieces, where it is secured by a spindle, *n*, one of whose pivots is received in a socket, *p*, while the other receives the point of a thumb-screw, *q*, in a small socket in its end, the said screw screwing through the end plate. This thumb-screw may also produce the tension on the spool by forcing the spindle against a disk of woolen cloth or other elastic material placed in the socket *p*. The lower side piece *m* of the spool-carrier is fitted to work in the guide-ways *w*, while the upper side piece *l* works in the guide-way X in the under side of the plate. This guide-way X is notched at *x*, where the thread is drawn under it by the looper L to allow it to rise in the said notch high enough to let the spool-carrier or the piece *l* thereof pass under it without coming in contact with it; and the guide-way *w*, for the lower side of the carrier, is made in two parts, with a space between them, through which the looper can pass in extending the loop for the spool to pass through, and returning the looper again. A bar, *b'*, is arranged on the spool-carrier with the side piece *l*, to form a slotted guide for the thread, as seen in Figs. 1 and 2. The thread passes over bar *b'* and under the side piece *l*.

To carry the spool and its carrier through the loop without coming in contact with the thread at all, a driver for the spool-carrier, having two points of connection with the said carrier, and capable of taking hold at one point while disconnected at the other, is employed, the said points of connection being at the ends of the carrier, and the time of the disconnection being when the ends are passing the looper, the connections being at the ends opposite the ones passing the looper.

To accomplish this a reciprocating driver, e^2 , having also an oscillating motion, is employed, which driver is provided with two radial arms, *f'* and *g'*, about as far apart as the length of the spool-carrier, which arms are set about ninety degrees apart circumferentially, and have segmental grooved ends *h'*, which, in the oscillatory movement, come to and pass along the concaved ends *i'* of the carrier, receiving them into the grooves, so as to impart the necessary reciprocating motion.

The oscillating motion is imparted to the driver by the spiral way *j'*, on which it reciprocates, and the adjustment is such that one arm takes hold of the carrier just before the other lets go, and each lets go just before arriving at the looper, and the open space between the ways *w* and the movements of the looper and shuttle-driver are in such relation to each other that the looper always stands ready to be passed by the detached arm and the spool-carrier end from which the arm is detached at the time of such detachment. In this case a cylindrical way, with a spiral groove, *j*, is represented; but it is obvious that an angular way, with a spiral twist, will work as well; or the way may be grooved and the rib or flange placed in the hub of the driver.

I find a very simple method of fitting the driver to the spiral way to be in centering a tube somewhat larger than the way upon it, and then casting the space within said tube surrounding the way full of Babbitt's or other composition anti-friction compounds. This gives the exact spiral form required for the inner walls of the hole of the driver for working on the way without fitting.

The reciprocating motion is imparted to the driver by the swinging levers k^1 and k^2 and the connecting-rods E and F², the lever k^1 being pivoted to the frame at k^3 , and the lever k^2 at k^4 .

The rod F² is connected to the free end of lever k^2 by a pivot-joint, and to the lever k^1 by a tube, k^5 , in which it has a slight reciprocating motion.

The case or top of the machine, which is made of cast metal, is made in three separate pieces, *t'*, *u'*, and *v'*, the piece *t'* being permanently fixed with the frame of the machine, the piece *u'* being hinged to piece *t'* at *w'*, so that it can swing vertically, and the piece *v'* being hinged to piece *u'* at *x'*, to swing horizontally away from the positions they occupy when covering and protecting the loopers and spool-carriers, and protecting the cloth from them to admit of the most ready and convenient access to the said parts when required for inspecting them and for oiling and other purposes. The swinging parts *u'* and *v'* are fitted to the plate *z*, so as to shut around it, and when opening leave it in position.

The disk A', to which the wrist-pin e^2 is connected, has a cam, B², on the rear side for working the feed, and its hub e^2 constitutes a cam for lifting the feed before it is actuated

by cam B², so that the looper's motions and feed-motions are all obtained from the shaft D by very simple and efficient contrivances.

The length of the stitch is regulated by the wedge D², adjusting-screw E², and the spring F², and a parallel motion of the feed-plate is obtained by having the bar of the feed-plate work on an incline.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the needle and spool-carrier, of the oscillating looper I and revolving looper O, the latter having the thread-guide U² and bulged plate U, substantially as specified.

2. The combination, with the oscillating looper, revolving looper, thread-guide, and the bulged plate, of the shifting-pin *a* and plate Y, for making the chain-stitch, substantially as specified.

3. The arrangement of the driving-shaft D, oscillating looper, revolving looper, pendulum, wrist-pin, and feed-cams, substantially as specified.

4. The top of the case, composed of the fixed parts *t'* and hinged parts *u'* and *v'*, substantially as specified.

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