No. 829,350. PATENTED AUG. 21, 1906.

L. ONDERDONK.

EDGE FINISHING MACHINE.

APPLICATION FILED JUNE 4, 1901.

4 SHEETS—SHEET 1.

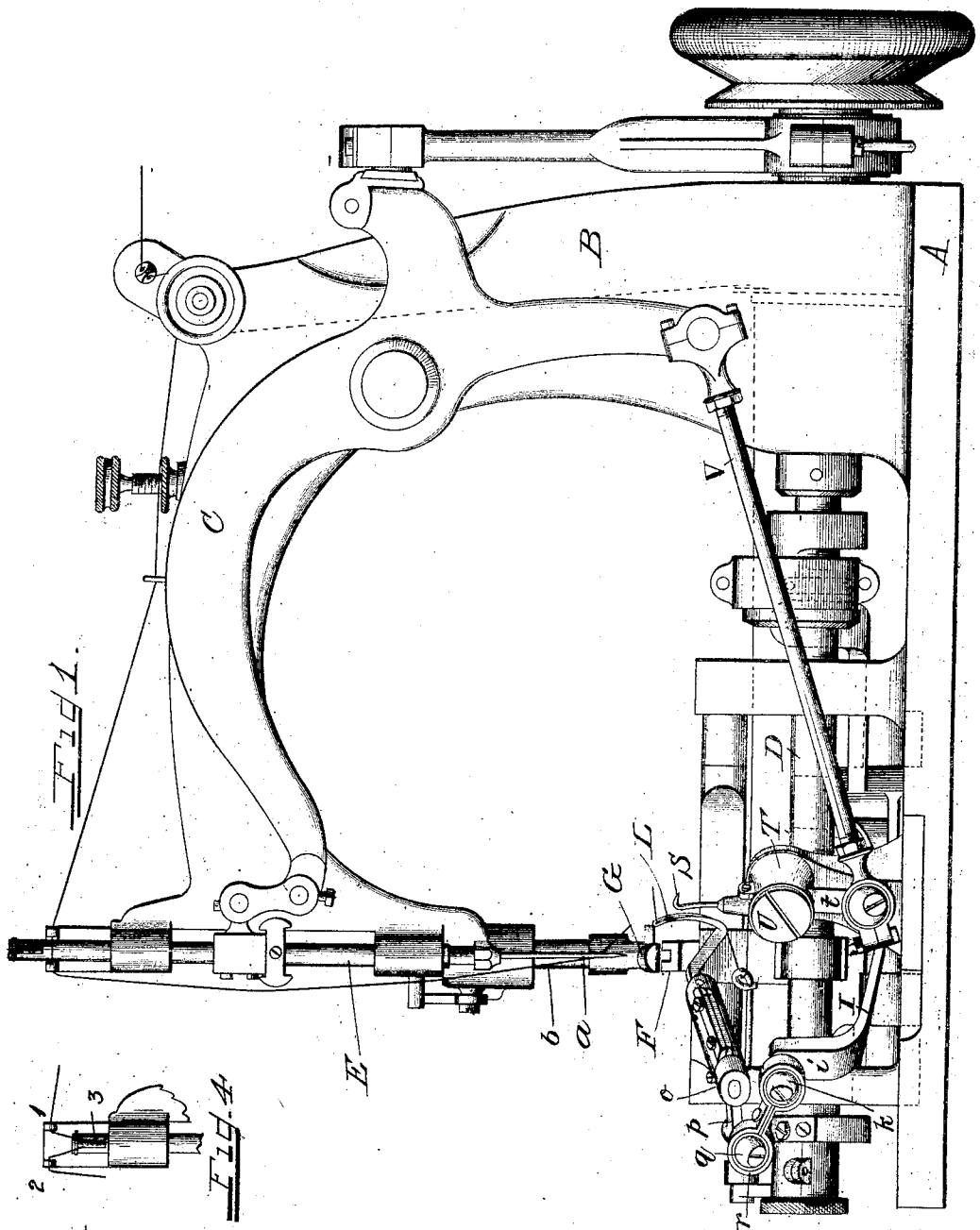

Fig. 1.

Fig. 4.

Witnesses

J. B. Weir

Ira L. Perry

Inventor

Lansing Onderdonk

by T. S. Blackwell

Atty.

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4 SHEETS—SHEET 2.

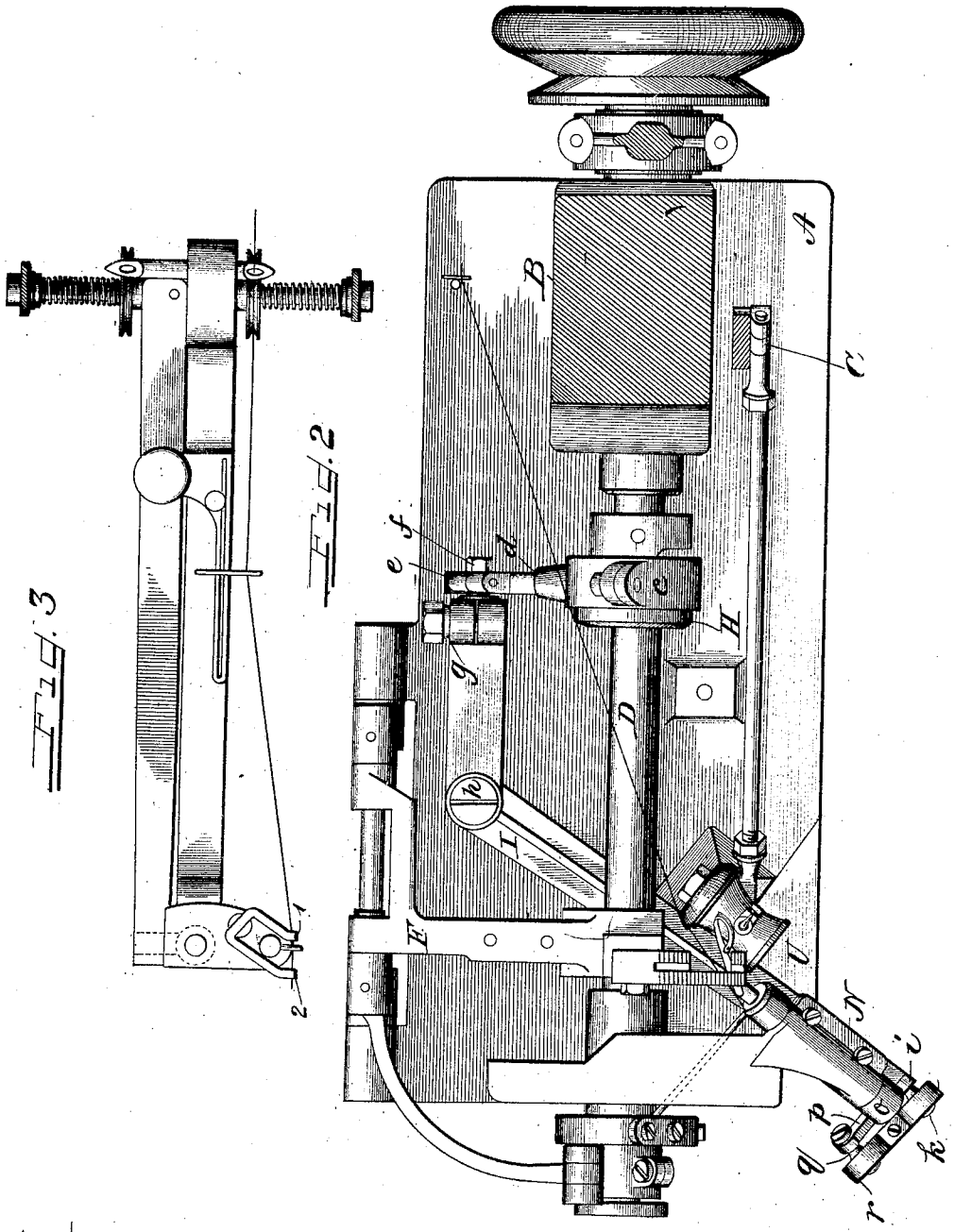

Fig. 3.

Fig. 2.

Witnesses

J. B. Weir

Ira A. Perry.

Inventor

Lansing Onderdonk

by C. D. Stuntevant

Atty

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4 SHEETS—SHEET 3.

Fig. 5.

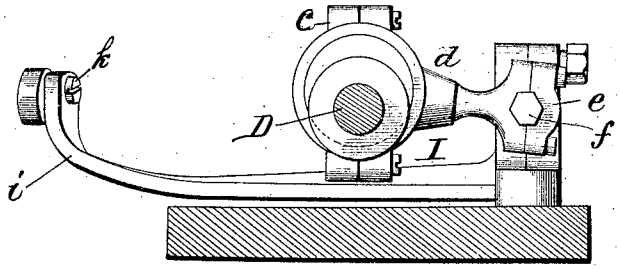


Fig. 6

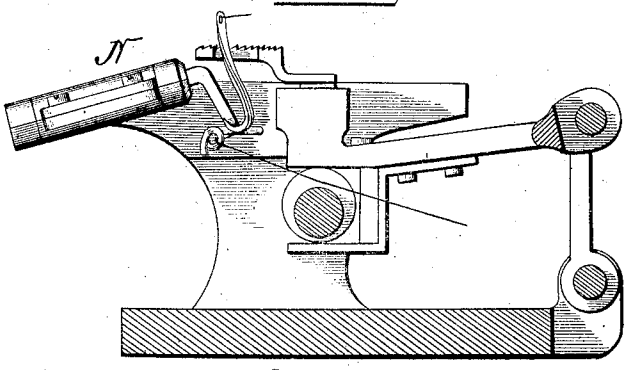


Fig. 7.

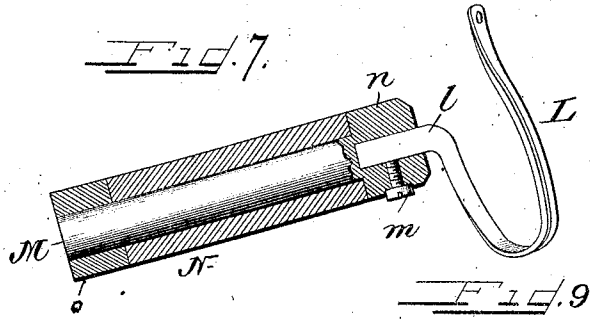


Fig. 8

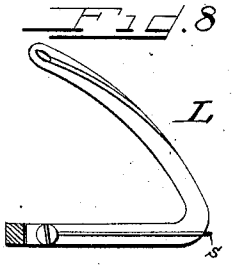
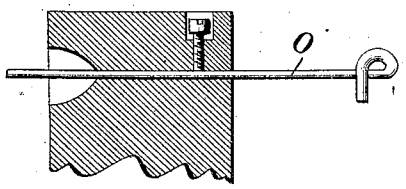


Fig. 9.



Witnesses

J. B. Weir.

Ira O. Perry.

Inventor

Lansing Onderdonk

by C. L. Sturtevant

Atty

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4 SHEETS—SHEET 4.

Fig. 10.

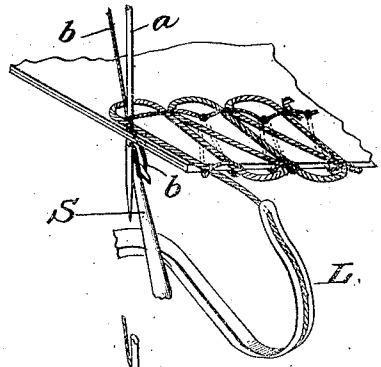


Fig. 11.

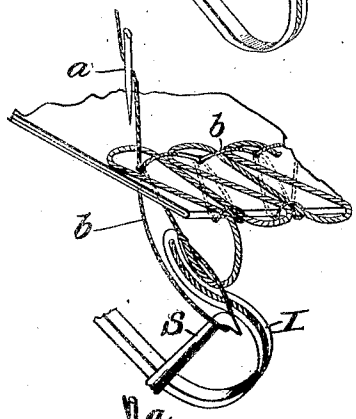


Fig. 12

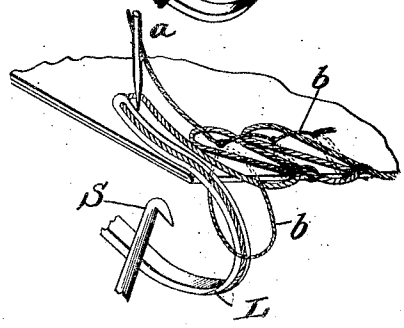
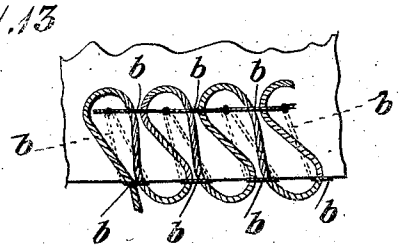


Fig. 13



Witnesses

J. B. Klein

Ira O. Perry

Inventor

Lansing Onderdonk

by C. L. Sturtevant

Atty

UNITED STATES PATENT OFFICE.

LANSING ONDERDONK, OF NEW YORK, N. Y., ASSIGNOR TO THE UNION SPECIAL SEWING MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

EDGE-FINISHING MACHINE.

No. 829,350. Specification of Letters Patent. Patented Aug. 21, 1906.

Application filed June 4, 1901. Serial No. 63,079.

To all whom it may concern:

Be it known that I, LANSING ONDERDONK, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Edge-Finishing Machines, of which the following is a description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in sewing-machines, and particularly to machines for finishing the edges of fabrics, the object being to provide a sewing-machine making a stitch which shall be ornamental, elastic, and serviceable in binding or finishing the edges of cut knit goods or other fabrics, which machine shall be capable of running at a high rate of speed with minimum amount of noise and friction and in which the movements of the stitch-forming implements shall be simple forward and backward short movements with no complex, sidewise or oscillatory movements.

The invention consists in the matters hereinafter described, and referred to in the appended claims, and it is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a sewing-machine embodying my invention, the work-plate being removed. Fig. 2 is a plan view of the same with the bed-plate and parts above the same removed. Fig. 3 is a top plan view of the gooseneck and tension devices for the upper thread. Fig. 4 is a detail view of the thread pull-off and upper end of the needle-bar. Fig. 5 is a detail view, partly in section, of the driving connections for operating the thread-carrying looper. Fig. 6 is a sectional view showing the feed-dog-operating mechanism and the looper-supporting journal. Fig. 7 is a sectional enlarged view of the looper-supporting shaft and journal. Fig. 8 is a detail view of the looper. Fig. 9 is a detail sectional view of the guiding eye and controller for the looper-thread. Figs. 10, 11, and 12 are views illustrating in succession the steps in the formation of the stitch; and Fig. 13 is an illustration of the stitch made on this machine.

In the drawings, A represents the bed-plate, B the gooseneck, C the needle-lever, D the driving-shaft, E the needle-bar, F the feed-dog bar, and G the presser-foot, of a Union Special sewing-machine of usual construction.

The novel features of the present machine reside in the mechanism for forming the stitches, and this will now be described, the needle *a* forming one of the coöperative elements, it being driven in the usual manner from the needle-lever C and carrying the thread *b*.

Upon the driving-shaft D is arranged the eccentric H, embraced by the eccentric-strap *c*, to which is secured the rod *d*, having a head *e* at its opposite end clamped over a ball-stud *f*, clamped to an upright on the short arm *g* of the lever I, pivoted at *h* to the bed of the machine and extending diagonally across the bed of the machine beneath the shaft D and having an upturned forward end *i*, to which is screwed a ball-stud *k*.

The tread-carrying looper L is preferably of the shape shown in the various figures, and its shank *l* is secured by the set-screw *m* into the enlarged head *n* of the shaft M, which is journaled in the clamp-bearing N, formed with or attached to the machine-bed. At its opposite end from the head *n* the shaft M is provided with a collar *o*, formed with an arm or projection *p*, into which is screwed the end of a ball-stud *q*, a link *r* embracing this ball *q* and also the ball on the stud *k*, before referred to. The positions of the various parts are shown in Fig. 1, and as the lever I swings on its fulcrum the looper L will oscillate, and all joints being free there will be no bind. This looper L has an eye in its point and has a spring *s* at the heel, whereby it is more easily threaded. (See Fig. 8.) An adjustable thread-eyelet O for the lower thread coöperates with the looper to regulate the slack in the lower thread and the amount pulled off from the spool.

To make the stitch illustrated in Fig. 13, another element coöperating with the needle and looper is provided by me—namely, what may be called a "needle-loop" spreader or carrier, which passes into the needle-loop below the fabric and draws it to one side and spreads it to allow the looper to carry its own thread through said needle-loop. This spreader or loop-carrier S is mounted in a socket on the sleeve T, pivoted in the conical stud U, secured to a lug on the machine-

frame, and projecting downwardly from said sleeve T is an arm *t*, having a ball-joint connection with the pitman V, driven from the needle-lever extension.

The manner in which the stitch is formed on this machine is illustrated in Figs. 10 to 12, inclusive, and is as follows: The needle *a* passes down through the fabric and throws out a loop, the spreader S oscillates forward and catches the loop, drawing it to one side and enlarging it, as shown in Fig. 11, the looper L carrying its thread oscillates forward and passes through the loop, carrying its own thread up over the edge of the fabric and forming a loop, as shown in Fig. 12, through which the needle in its next descent passes, making the stitch shown in Fig. 13.

The looper is preferably of the shape shown in order to properly engage the spread needle-loop, and yet carry its own thread up over the edge in position to be engaged by the needle, and the path of the looper is at all times in front of the needle and oscillates back and forth on its axis without any sidewise or other complex movements. So, also, the spreader S has a simple forward and backward oscillation on its axis just sufficient to spread the needle-loop to allow the looper to pass through it on its way up over the edge of the fabric. The controller for the upper thread comprises the stationary thread-eyelets 1 2 on the machine-gooseneck and the hook 3, traveling up and down with the needle-bar in a plane between the stationary eyelets. In order that the thread-carrying looper may properly pass through the needle-loop spread by the spreader and pass the needle diagonally relative to the line of feed, and thus carry its thread back of the path of the needle, in order that the needle may properly engage the looper's thread, the axis of the thread-carrying looper is doubly inclined—that is, one incline being relative to the line of feed and the other incline relative to the plane of the throat-plate endwise. The axis of the spreader is such that the spreader will travel sufficiently diagonal relative to the axis of the thread-carrying looper that it will engage the needle-thread, carrying it across the path of the looper, the thickness of the spreader spreading the loop of the needle-thread sufficiently for the thread-carrying looper to pass through it. The double incline of the thread-carrying looper insures a more positive placing of its thread in position where the needle will engage it in its descent than possible traveling only on one incline. The spreader also acts as a take-up. It is constructed to take up the slack thread of the first stitch in making the second. Also the thread-carrying looper is capable of wholly taking up its thread in substantially the same manner—that is, the slack thread of the first stitch on the succeeding stitch by the heel of the thread-carrying looper passing by a stationary thread-eyelet located about midway between the two extremes of the looper's throw at the heel, or, in other words, so arranged that the heel of the looper passing by the thread-eyelet a little more on the upstroke than on the back stroke, or vice versa, according to the time it is desirable to draw the thread or set the stitch. The arrangement on the needle-bar is only secondary.

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

1. In a sewing-machine, the combination with a reciprocating needle, a thread-carrying looper with means for oscillating said looper in front of the needle from a point below the fabric over the edge thereof to lay its thread in position to be engaged by the needle, and a loop-spreader with means for oscillating it entirely below the fabric to cause it to engage the needle-loop below the fabric and carry it to a point where the looper in its upward movement will pass therethrough, said looper being mounted upon an oscillating support whose axis is inclined relative to the line of feed, and also to the plane of the throat-plate, whereby the thread-carrying looper may properly pass through the needle-loop spread by the spreader, and pass the needle diagonally relative to the line of feed, and thus carry its loop into the path of the needle.

2. In a sewing-machine, the combination with a reciprocating needle, a thread-carrying looper with means for oscillating said looper in front of the needle from a point below the fabric over the edge thereof to lay its thread in position to be engaged by the needle, and a loop-spreader with means for oscillating it entirely below the fabric to cause it to engage the needle-loop below the fabric and carry it to a point where the looper in its upward movement will pass therethrough, said looper being mounted upon an oscillating support whose axis is inclined relative to the line of feed, and also to the plane of the throat-plate, whereby the thread-carrying looper may properly pass through the needle-loop spread by the spreader and pass the needle diagonally relative to the line of feed, and thus carry its loop into the path of the needle, said spreader being also mounted on an oscillating support whose axis is inclined to the line of feed; substantially as described.

3. In a sewing-machine, the combination with a reciprocating needle, a thread-carrying looper with means for oscillating said looper in front of the needle from a point below the fabric over the edge thereof to lay its thread in position to be engaged by the needle, and a loop-spreader with means for oscillating it entirely below the fabric to cause it to engage the needle-loop below the fabric and carry it to a point where the looper in its upward movement will pass therethrough,

said looper being mounted upon an oscillating support whose axis is inclined relative to the line of feed, and also to the plane of the throat-plate, whereby the thread-carrying looper may properly pass through the needle-loop spread by the spreader and pass the needle diagonally relative to the line of feed, and thus carry its loop into the path of the needle, said spreader being also mounted on an oscillating support whose axis is inclined to the line of feed, the axis thereof being also diagonal to the axis of the thread-carrying looper; substantially as described.

4. In a sewing-machine, the combination with a reciprocating needle, a thread-carrying looper, and a spreader, said thread-carrying looper being mounted upon a suitable oscillating support, whose axis is inclined relatively to the line of feed and relative to the plane of the throat-plate, whereby said thread-carrying looper may pass through the needle-loop spread by the spreader and pass the needle diagonally relative to the line of feeding, and lay its thread back of the path of the needle that its loop may be engaged therewith, said spreader being also arranged upon an axis diagonal to the line of feed and diagonal also to the axis of the looper, whereby it will engage the needle-thread and carry it across the path of the looper; substantially as described.

5. In a sewing-machine, the combination with a reciprocating needle, a thread-carrying looper, and a spreader, said thread-carrying looper being mounted upon a suitable oscillating support, whose axis is inclined relatively to the line of feed and relative to the plane of the throat-plate, whereby said thread-carrying looper may pass through the needle-loop spread by the spreader and pass the needle diagonally relative to the line of feed, and lay its thread back of the path of the needle that its loop may be engaged therewith, said spreader being also arranged upon an axis diagonal to the line of feed and diagonal also to the axis of the looper, whereby it will engage the needle-thread and carry it across the path of the looper, said thread-carrying looper being provided with an offset; substantially as described.

6. In a sewing-machine, the combination with a reciprocating needle, a driving-shaft, a looper coöperating with said needle to form stitches and mechanism for operating said looper, comprising an oscillating support for said looper arranged entirely in front of the needle, the axis of said support being inclined relative to the line of feed and also to the plane of the throat-plate, with means for oscillating said support, comprising a lever pivoted to the machine-frame, and operatively connected with the driving-shaft, said lever extending across the machine-frame and connected by a link-and-crank connection with the front end of the looper-support; substantially as described.

7. In a sewing-machine, the combination with a reciprocating needle, a driving-shaft, a looper coöperating with said needle to form stitches, and mechanism for operating said looper, comprising an oscillating support for said looper arranged entirely in front of the needle, the axis of said support being inclined relative to the line of feed and also to the plane of the throat-plate, with means for oscillating said support, comprising a lever pivoted to the machine-frame, extending diagonally across the bed of the machine to the front thereof, having a ball-and-link connection with the looper-supporting shaft, and at its opposite end or short arm arranged with an eccentric connection to the driving-shaft; substantially as described.

8. In a sewing-machine, the combination with a reciprocating needle, a driving-shaft, a looper coöperating therewith to form stitches, an oscillating shaft supporting said looper, the axis of said support being inclined relative to the line of feed and also to the plane of the throat-plate, a bearing-sleeve for said shaft attached to the machine-frame, a lever pivoted to the machine-frame and operatively connected with the driving-shaft, a crank projecting from the looper-supporting shaft, and a ball-and-link connection between the crank and the pivoted lever; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LANSING ONDERDONK.

Witnesses:
WM. H. BOYER,
C. L. STURTEVANT.