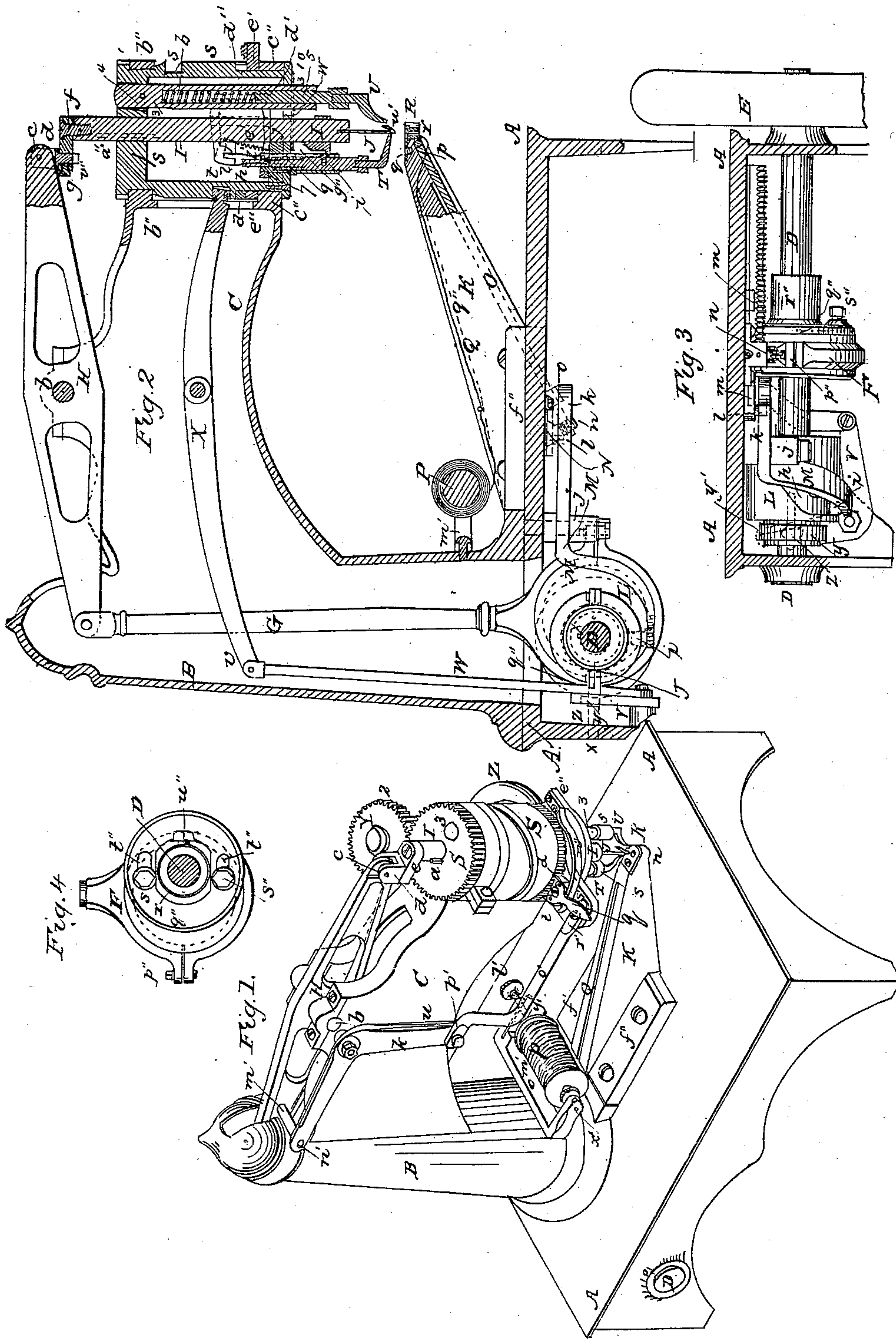


R. W. DREW.
Sewing Machine.

No. 33,677.

Patented Nov. 5, 1861.



WITNESSES
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REUBEN W. DREW, OF ABINGTON, MASS., ASSIGNOR TO A. B. ELY.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 33,677, dated November 5, 1861.

To all whom it may concern:

Be it known that I, REUBEN W. DREW, of Abington, in the county of Plymouth and State of Massachusetts, have invented certain Improvements in Machines for Sewing on the Soles of Boots and Shoes; and the same are fully described and represented in the following specification and accompanying drawings.

Figure 1 is a perspective view of my machine. Fig. 2 is a vertical section of a side elevation. Fig. 3 is a front view of the parts underneath the table. Fig. 4 is a view of the adjustable eccentric.

A patent has heretofore been issued to one Lyman R. Blake for a machine in which a rest was placed on the end of an arm to reach into the toe of a shoe; but it was not adapted to sewing around toes or heels, or otherwise around circles, or short corners, or angles, as no means were provided for revolving the needle as the work progressed round a curve, in order that the relative position of the needle to the seam might be preserved, nor of revolving the thread-guide correspondingly with the needle, besides other great deficiencies in practice.

My improvements, which are considerable in number and importance, have regard, among other things, to such a construction and arrangement of the parts that the lines of the arm shall be straight instead of in a curve; that the needle and its adjuncts, as well as also the thread-guide, may be continuously revolved and correspondingly changed in their position for the purpose of sewing circles, curves, and angles, as desired; that the throw of the eccentric or crank, and also the length of the needle-bar, may be altered and adjusted for different kinds and thicknesses of work; that the feed may form a guiding-point for the needle and space the stitches, and that the cast-off, as well as other parts, may conform to different thicknesses of material, while it also forms a support to the needle.

A is the body or frame. B is the standard; C, the goose-neck, having strapped to its end a hollow chambered revolving cylinder, S, through which passes the needle-bar, and in which are placed the devices for operating, by means of the needle-bar, the cast-off and feed.

D is the main shaft, and E the balance-wheel.

F is an adjustable eccentric on the shaft D,

G being the eccentric-rod, the strap of which is tightened up at p'' . The upper end of the eccentric-rod is pivoted at a to one end of a walking-beam, H, oscillating near the center of the goose-neck at b . To the other end of the walking-beam, at c , is pivoted a strap, d , with a projecting tongue or pin, v'' , on the under side. This pin v'' passes through one end of a small bar or cap-plate, e , and is confined at a greater or less altitude by a set-screw, g , for the purpose of graduating the length of the needle-bar when the throw of the eccentric is changed, so as to keep the lowermost point of descent of the needle unchanged. To the other end of this plate e the needle-bar I is hung and pivoted by means of the screw or bolt f . The needle-bar I, with a barbed needle, J, at its end, passes through the cylinder S, while by means of the feather a'' on its side, taking into a corresponding groove in the head of the cylinder, the needle-bar, with its accessories, revolves with the cylinder.

K is the arm, placed at an acute angle with the bed of the machine and fastened to it at f'' . This angle is such as to enable the rest R at the end of the arm to enter freely into the toe of the boot or shoe. The lines of the arm are straight instead of curved.

L is a cam-cylinder hung so as to be moved longitudinally on the main shaft D, and revolving with the shaft by means of the feather x on the shaft taking into a corresponding groove in the cylinder L. At the end and on a collar of this cam-cylinder is a strap, y , in which the cam-collar revolves. From the rear of this strap y projects a pin, z , extending through a slot, v , cut in the rear side of the machine-frame.

h is a slotted cam-groove cut in the cylinder L, in which plays a friction-roller, i .

M is a bent lever pivoted to the bed-plate of the machine at j , and having at one end the friction-roller i , running in the cam-groove h . By this means a lateral reciprocal motion as the cam L revolves is given to the other end of the lever M, which is slotted perpendicularly at k .

N is a straight ratchet or geared bar running in ways $m m$ across the under side of the machine, with its gear-teeth at an angle corresponding with that of the arm K, and having at one end a pin, l , projecting downward and into the slot k of the bent lever M. By this

means a reciprocal motion back and forth across the machine is given to the bar N.

O is a rod passing up through a supporting-box, o, and the lower side of the arm K, and having a gear-wheel, n, at the lower end, the teeth of which take into the teeth of the bar N. By this means the reciprocal motions of N oscillate or rotate back and forth the rod O. The upper end of O is geared, beveling at p, and these gear-teeth take into the gear-teeth of a circular thread-guide or whirl, r, inclosed in the rest R of the arm K. Thus while the needle is reciprocated up and down by the action of the eccentric, walking-beam, and needle-bar the thread-guide or whirl is reciprocated round and back for the purpose of presenting the loop to the needle by the action of the cam, bent lever, geared bar, and geared rod. On the top of the rest R is a small plate fastened down by a screw at q.

T is the cast-off, made with a circular eye embracing the needle at u', and U is the feeding-point, both being operated by the motions of the needle-bar. The feed-point U is made fast by a set-screw to a plunger, 5, which extends upward into a chambered feed-rod, 3, which is pivoted to the upper head of the cylinder at 4, and has a lateral play on this pivot. Within the chamber of the rod 3 is a spiral spring, 6, to press the feed-point to the work. On the opposite or back side of Fig. 2, upward from the plunger 5, extends a rod, d', with a pin, c', projecting backward near its top. j'' is a flat spring fastened to the cylinder at k'', and pressing the rod 3 and feeding device outward and away from the needle. The cast-off T, with its hollow point u', encircling the needle and materially strengthening and aiding it in drawing up the stitch, is made fast by a set-screw to a plunger, 8, which passes through a hollow rod, 7, fastened to the lower head of the cylinder S, and having a spiral spring, 9, in its upper part to press the cast-off to the work and adapt it to different thicknesses of material. At the upper end of the plunger 8 is a small notch, h'', into which the shoulder of the spring g' takes when it ascends.

10 is a thin slotted sliding plate on the under side of the lower head of the cylinder, surrounding both the swinging rod 3 and the needle-bar I, and held up to the cylinder by screws through slots at w''.

g' is a flat spring fastened to the lower head of the cylinder at i'' and projecting upward, and having a shoulder at g'.

f' is a small plate fastened on the side of the needle-bar I, having a quadrant-shaped pin projecting out from its rear, as shown by red lines at l'.

h' is a post rising from the lower head of the cylinder and standing on the back side of the needle-arm, to the top of which post, at b', is pivoted a lever, a', one end of which acts underneath and upon the pin c' to raise the feed-plunger 5. To the other end is fastened a small spiral spring, e', fastened at its other end to the cylinder at k''.

i' is a small screw or pin projecting from the plunger 8 of the cast-off, and sliding up and down in a slot, g'', of the hollow rod 7.

j' is a cam projection fastened to the needle-bar below the cylinder, and capable of being adjusted to any proper height, having a step and an incline, the one to strike against the pin i' and raise the cast-off plunger 8, the other to strike against the sliding plate 10, and by moving it inward give a side swing to the feed-bars 3 and 5 and feed-point U toward the needle.

When the needle-bar I descends the projection l'' strikes upon the top of one end of the lever a', forcing the other end upward against the pin c', and thus raises the feed-point. The lower edge of the plate f', striking against the top of the spring g' and pressing it back, releases its shoulder from the notch h'' in the cast-off plunger 8, and allows the cast-off to descend and rest upon the upper surface of the material. When the needle-bar ascends the step in the cam projection j' meets the pin i' and raises the cast-off till the shoulder of the spring g' takes into the notch h'' and holds it suspended till the needle again descends. At the same time (the pressure of the quadrant-shaped pin l'' upon the lever a' having been released) the feed-plunger descends, and the incline on j', striking against the sliding plate 10, moves inward the feed-point toward the needle, when it is ready for another descent of the needle-bar.

b'' and c'' are straps for supporting and holding the cylinder S to the goose-neck C, allowing it to turn freely round.

Y, Fig. 1, is a revolving standard bracketed to the goose-neck at the side and back of the revolving cylinder S. This standard has a gear-wheel, 2, on its top, meshing into the geared head 1 of the cylinder.

Z is a wheel at the bottom of the standard for handling and turning it by hand.

V is a bent lever pivoted to the lower back side of the frame at x', and having pivoted to it at one end the connecting-rod W, which extends up through the standard B, and is pivoted at its upper end at v, to a cross-beam, X, which oscillates at u upon bearings, and has at its farther end a friction-roller, t, which runs in a cam-slot, s, cut in the periphery of the revolving cylinder S. At the other end of the bent lever V is a slot, y', through which passes the pin z of the sliding cam-cylinder L.

As the cylinder S is revolved the cam-slot s, operating by the friction-roller t through the cross-beam X, the connecting-rod W, and the bent lever v, causes the sliding cam-cylinder L to move longitudinally upon the main shaft by means of the pin z in the slot y' of the lever V, and thus as the cam L revolves with the shaft, by means of the feather on the shaft through the cam-slot h, bent lever M, ratchet-bar N, and rod O, the thread-guide or whirl r is correspondingly revolved with the revolutions of the cylinder S and the needle-bar and needle, so that in this manner, while

the position of the barb of the needle is changed, the position or direction of the thread is correspondingly changed, each preserving to the other the same relative position to enable the needle to take the loop, and the operator to sew around corners and curves or angles.

Ordinarily, in the sewing of curves, &c., it is necessary to control this movement step by step as the work progresses, and for this reason I have adapted the standard Y, with its handle Z, that I may control the change and revolutions of the needle and thread-guide or whirl stitch by stitch; but in order that a regular change of the position of the needle and thread, in cases where a certain defined circle or part of a circle is to be sewed, as in the heels and round some toes of boots and shoes, &c., may be made automatically, I have devised the following mechanism:

k' is a bent lever on the outside of the goose-neck, pivoted to it at l' .

m' is a pin fixed in the rear end of the walking-beam H, and passing through a slot in the upper end of the lever k' at n' . To the other end of the lever k' , at p' , is pivoted, at one end of it, a rod, o' , having its other end pivoted at r' to a projection, s' , on a strap, e'' , passing round the cylinder S and moving loosely on it.

d'' is a circle of gear-teeth cut in the periphery of the cylinder S, or on an annular wheel secured thereto immediately above the strap e'' .

t is a forked dog with a handle, q' , pivoted on the projection s' of the strap e'' at v' , and having a spring, w' , so arranged that either or neither of the ends or teeth of the dog t may take into the gear-teeth d'' . In this way, the up-and-down motion of the walking-beam being communicated by the pin m' , through the bent lever k' and rod o' , to the dog t , the cylinder is revolved either way, or not at all, at will.

In a bracket fastened to the standard B at m'' is hung the spool P, in bearings at $x'' y''$, the latter being in a flat spring, n'' , set into the back of the bracket and parallel with the end. A set-screw, Z' , passes through the farther end of the bracket and strikes against this spring n'' and regulates the tension on the spool.

q'' is the thread passing through the channel Q and up through the thread-guide or whirl r .

I also use an adjustable eccentric, so as to change the throw of the eccentric or crank, &c.

o'' is an elongated shaft-hole of the eccentric F, the strap of the eccentric-rod being tightened up at p'' .

$q'' r''$ is a face-plate and collar on the main shaft D, having a set-screw, w'' , through the collar behind and opposite r'' , to secure it to the shaft. Through the face-plate are two slots, t'' , with set-screws s'' , to secure the eccentric to the face-plate at any position in the slots. With these slots and screws and the elongated shaft-hole of the eccentric I am enabled to change the position of the eccentric to the shaft, and to alter and adjust the throw of the eccentric as I may find desirable,

and adapt it to different thicknesses and quality of material, &c.

By means of the pin v'' in the cap-plate e of the needle-bar and the set-screw g , I am also enabled to alter and adjust the length of the needle-bar, so that while I alter the throw of the eccentric I am enabled to preserve unchanged the point to which the needle must descend to take the loop.

The feeding-point U, striking on and into the material in advance of the needle and feeding up the work, spaces the distance between the stitches and forms a guiding-point for the needle, impressing the place where it shall strike.

I am aware that tambouring-machines have been made in which the needle and the thread-guide could be revolved in one direction and to a certain extent; but as that, so far as I can learn, was done by means of a coiled spring or wound cord, the revolutions could proceed only in one direction and only to a limited extent, when it became necessary to unwind and begin again. Besides, these machines were not, as I can learn, provided with any feeding mechanism or cast-off devices.

With my machine I can revolve the needle or needle and thread-guide, as well as also the feed and cast-off, in either direction and to any extent, or proceed, after revolving, without any change by unwinding or otherwise, and preserve the relative position of each part to the other.

The method of forming the stitches in sequence is as follows: The thread having been carried up through the thread-guide, the shoe is placed on the arm, with the rest inside of it. A channel may have been previously cut or formed around the shoe in which the stitches lie, which is closed over after the shoe is sewed to conceal the seam. The needle is brought down through the sole, the upper, and the insole into the whirl. When the needle reaches its lowest point the whirl is thrown around and the thread is laid across the barb of the needle. The needle is now retreated, drawing up the loop with it. As soon as the needle is withdrawn the shoe is fed forward one stitch, and then the needle again descends. As the needle descends the loop is shed from the barb, and the cast-off descends until it reaches the work. The loop is now around the cast-off, and also around the needle. The needle takes another loop and ascends, (the cast-off preventing the previous loop from falling into the barb again,) and in ascending with a new loop carries it up through the former loop, and then the cast-off rises, and the needle, as it rises, also draws up the stitch. The shoe is fed forward again one stitch with the second loop around the needle, and thus the seam or series of stitches are formed.

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

1. So constructing and arranging the parts that the needle-bar of a sewing-machine can be continuously revolved in either direction

at the will of the operator as the stitching progresses.

2. So constructing, arranging, and combining the needle-bar and feed-bar, or their equivalents, in a sewing-machine that they can be continuously revolved either way and preserve their relative positions.

3. So constructing and arranging the thread-guide or whirl in a sewing-machine that it can be continuously revolved and present the thread to the needle in any desired position of the needle.

4. So constructing and combining the needle and thread-guide with each other that any change of position of the needle may be accompanied by a corresponding change of position of the thread-guide either way, or continuously in either direction.

5. In combination with a rotating needle-stock, so arranging and operating the feed that it shall form a guiding-point in advance of the needle and space the distances between the stitches.

6. So constructing the cast-off that it shall surround the needle and form a support to it while the stitch is being formed or drawn up.

7. So constructing the cast-off as that it may conform itself to the thickness of the work by means of a spring-pressure.

8. Operating the thread-guide *r* by means of the rod *O*, substantially as described.

9. The combination of the cam-cylinders *S* and *L*, or their equivalents, with their connections, substantially as and for the purposes described.

10. The combination of the adjustable eccentric with the adjustable pin *v''*, or its equivalent, for changing the throw of the needle-bar, so that the range of motion of the needle may be changed without changing the point to which it descends.

11. The combination of the adjustable eccentric described with its several operating parts for altering and adjusting the throw of the crank, substantially as described.

12. The mechanism for revolving the needle and the parts immediately connected therewith by hand, that the seam may be laid in any desired direction as the sewing proceeds, as in curves, angles, and lines as they occur in sewing on boot and shoe soles.

REUBEN W. DREW.

Witnesses:

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