J. GRAY.

Sewing Machine.

No. 19,532. Patented March 2, 1858.

Fig. 5

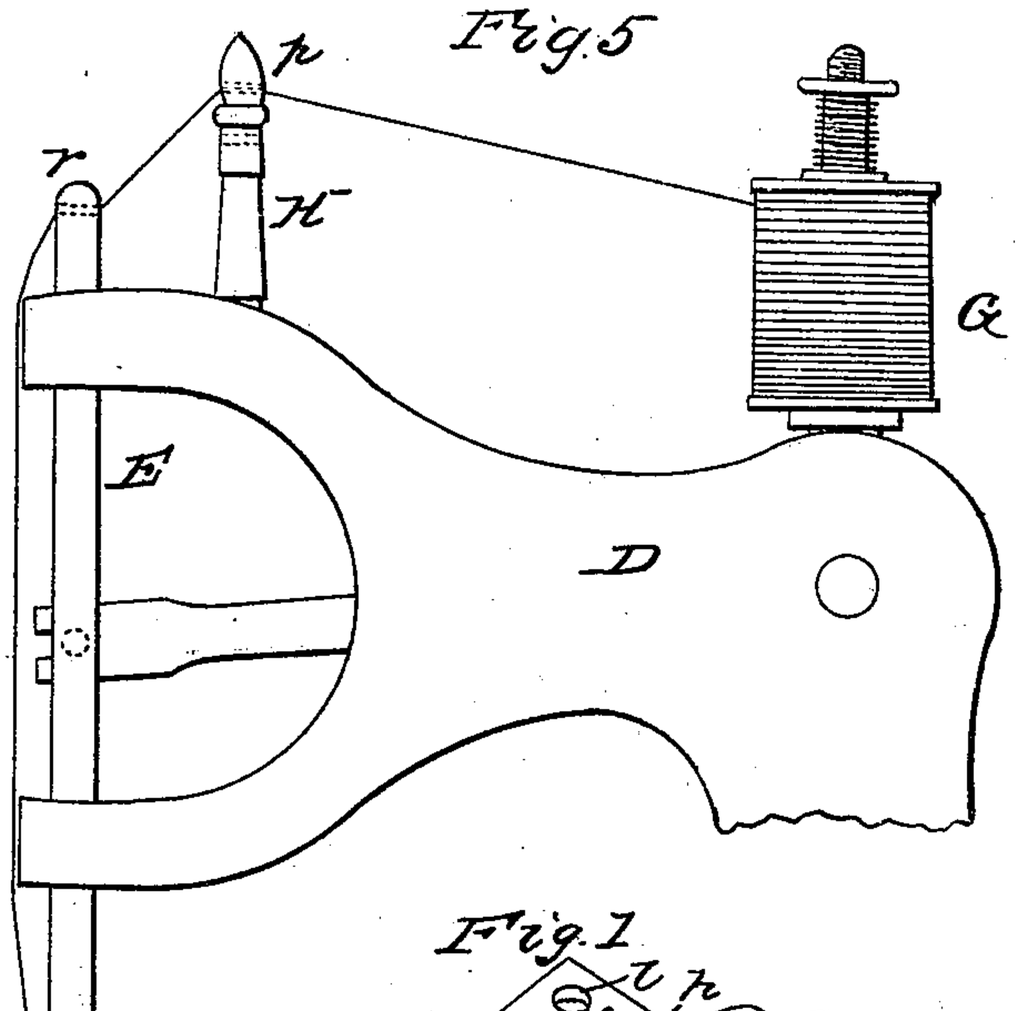


Fig. 1

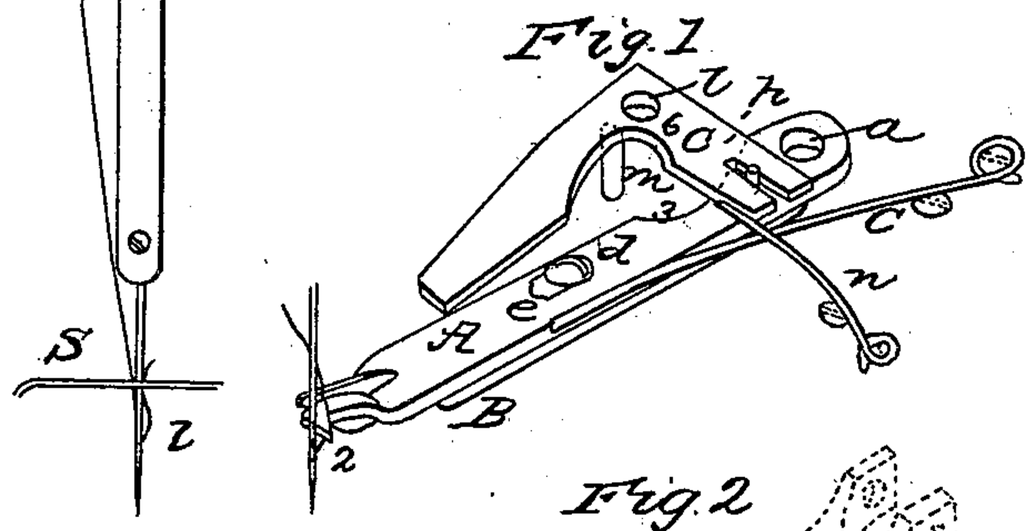


Fig. 2

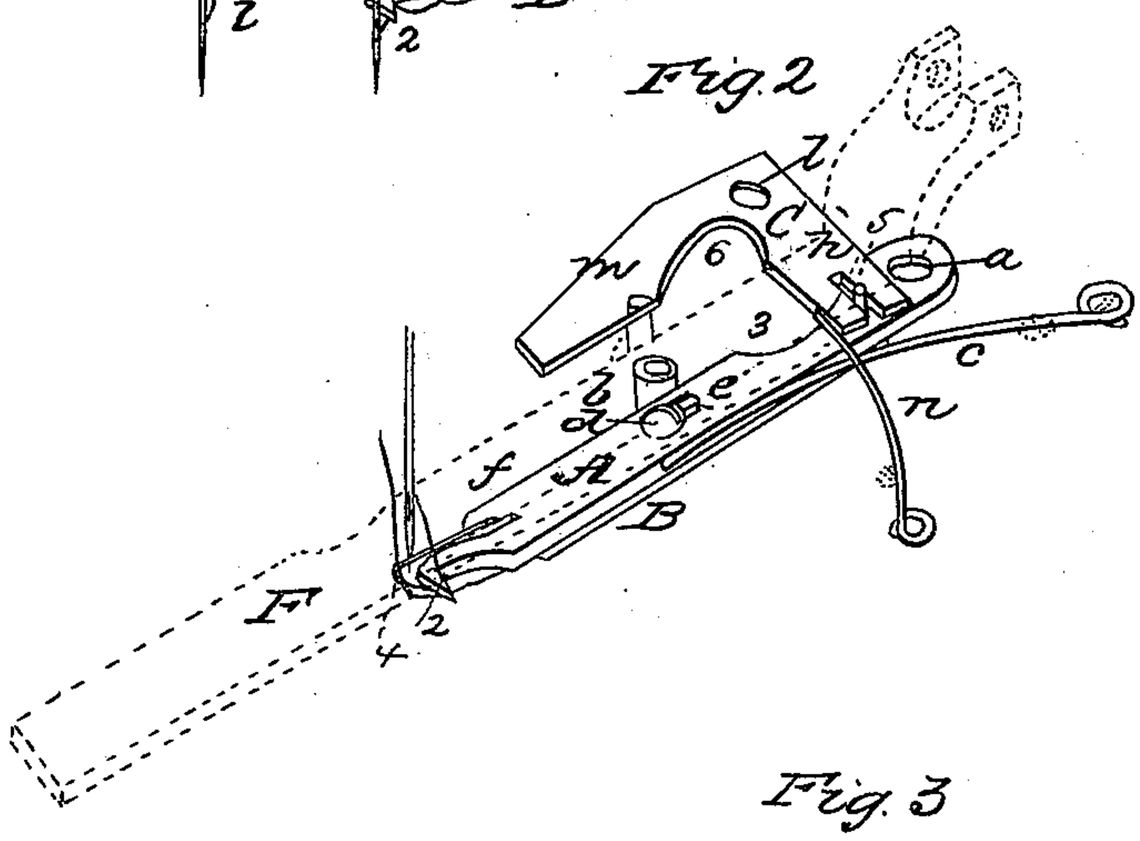


Fig. 3

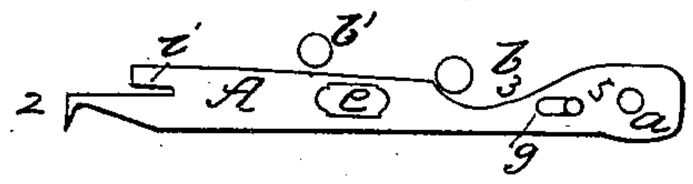
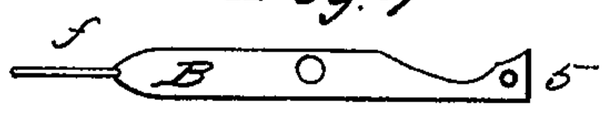


Fig. 4



UNITED STATES PATENT OFFICE.

JOSHUA GRAY, OF MEDFORD, ASSIGNOR TO HIMSELF AND GEORGE O. BRASTOW, OF SOMERVILLE, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **19,532**, dated March 2, 1858.

To all whom it may concern:

Be it known that I, JOSHUA GRAY, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1 and 2 are perspective views of the hook with my improvements attached; Fig. 3, a plan of the vibrating hook-arm; Fig. 4, a plan of the loop-distender; Fig. 5, an elevation of the needle-bar and part of the frame.

In machines which form what is termed the "loop-stitch" it is necessary to have some arrangement for opening and distending the loop to insure the needle striking through the loop at the succeeding stitch. Otherwise, if the machine does not work with very great accuracy, (as will be the case when worn,) the needle will not strike through the loop, and a stitch will be dropped.

My invention consists in an improved device for distending the loop to insure the entrance of the needle.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried out the same.

As the movements of the needle-bar and the feed device form no part of my present invention, they need not be particularly described.

Motion is communicated to the feed apparatus, and also to the hook and loop distender, from a straight bar, F, (shown in blue in Fig. 1,) which is moved back and forth horizontally beneath the bed-plate of the machine.

In the drawings, A is a vibrating arm, (detached in Fig. 3,) which is pivoted at *a* to the under side of the frame of the machine. It has at its outer end a hook, 2, which, as the arm is vibrated, passes between the thread and the needle, as in Fig. 1. This arm is operated by a pin, *b*, (seen in red in Figs. 2 and 3,) attached to the sliding bar F, when the bar is in one position. The pin rests in a curved indentation, 3, in the side of the arm. When the bar is moved along, the pin passes to the position *b'*, Fig. 3, and vibrates the arm against the resistance of a spring, *c*, Figs. 1 and 2, secured to the under side of the bed-plate. A flat bar, B, (detached in Fig. 4,) is secured to the under side of the arm A by a screw, *d*, passing through a slot, *e*, in the arm. This allows the piece B to slide back and forth longitudinally while it is carried with the arm in its vibrations. The outer end of this bar B is turned up at right angles, forming a pin, *f*, which slides in a slot, *i*, in the arm A. (This steadies and directs its movements.) A notch, 4, is formed at the outer end of the part *f*.

The manner in which the piece B is moved back and forth will now be explained. A pin, 5, Figs. 1 and 2, and in red, Fig. 3, attached to the piece B, passes up through a slot, *g*, in the arm A, and is embraced by a slot, H, in an arm, C, which is pivoted at its elbow, at *l*, to the bed-plate. As this arm is vibrated on its pivot *l*, it pushes forward the piece B into the position shown in Fig. 2, for the purpose of distending the loop. This arm C is vibrated by a pin, *m*, (shown in red, Figs. 1 and 2,) which is attached to an adjustable bracket secured to the sliding bar F, before spoken of as operating these parts. When the pin is in the position shown in Fig. 1, it rests in a curved recess, 6, cut in the arm C, which allows the slotted end of this arm to be forced back by a spring, *n*, and the piece B is retracted; but as the sliding bar moves the pin forward, as in Fig. 2, it slides along out of the recess 6, and vibrates the arm C, and thrusts out the end of the part *f* beyond the hook 2, the notch 4 catching the thread, as shown in the drawings. This takes place as the needle ascends, the movements of the parts in relation to each other being adjusted as is customary in machines of this class.

In Fig. 5 is illustrated the second part of my invention. D is the part of the frame which carries the needle-bar E, that plays up and down vertically in suitably guides in the end of the frame. The spool G is carried on a spindle rising from the top of the frame in the customary manner. A short standard, H, is secured to the top of the frame D, between the spool and the needle-bar, as shown in the drawings, through a hole, *p*, in the top of which the thread is passed, and thence through another hole, *r*, in the top of the needle-bar. It is then led down to the eye of the needle, as usual. The hole *p* is placed at such a height relative to the hole *r* that it shall be in a horizontal

plane passing through a point at or very near intermediate between the highest and lowest points to which the hole *r* is raised or lowered as the needle-bar is vibrated. The position of the standard H is such that the requisite amount of thread may be drawn off to form a stitch, the hole through its top or that through the needle-bar being made adjustable in position to vary the length of the stitch.

In lieu of using the standard H, the spool itself may be placed in the position of this standard, with its axis horizontal and transverse to the length of the part D, so that the surface of the spool from which the thread is drawn off may coincide, or nearly so, with the height at which the hole *p* is now placed, and the variations of the size of the spool or the quantity of thread on the spool may be compensated for by adjusting the height of the spool; but the method first described is that which I prefer for accuracy of work and convenience of construction.

The operation of the first part of my invention is as follows: As the sliding bar F, which operates the feed, is moved back and forth horizontally by its connection with the driving-shaft, the pin *b*, as before explained, vibrates the arm A (the needle having descended through the material, as in Fig. 1) and causes the hook 2 to enter between the needle and the thread. This hook holds on to the loop of the thread until the needle has been drawn up out of the way, when, as the sliding bar F proceeds in its movement, the pin *m* vibrates the arm C and thrusts forward the bar B, when the notch 4 catches the thread and distends the loop, as in Fig. 2, and holds it open till the point of the needle has entered the loop to form the next stitch. As the needle descends, the the long sliding bar is moved back again, and the bar B is retracted and the arm A is vibrated, as before explained. This arrangement of parts insures the loop being held open sufficiently wide and in the proper position for the needle to pass through it, and obviates the dropped stitches which so frequently occur in this class of machines.

The operation of the second part of my invention will now be explained. The thread being led through the holes *p* and *r*, and then being passed through the eye of the needle, (the spool having the proper amount of friction applied to it,) as the needle descends through the material operated on (S, Fig. 5) the thread is drawn off the spool, and when the needle begins to ascend, as in the position shown in Fig. 5, the thread is slackened and a loop commences to open, as at *t*, ready for the hook or shuttle to enter. As the needle-bar ascends to its highest position the hole *r* is raised above the plane in which the hole *p* lies, and the slack of the thread is taken up and the stitch is drawn tight. Thus a tension-spring of any kind may be dispensed with.

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

The within-described device for distending the loop, consisting, essentially, of the sliding bar B and the vibrating arms A and C, operating in the manner substantially as set forth.

JOSHUA GRAY.

Witnesses:
THOS. R. ROACH,
P. E. TESCHEMACHER.