2 Sheets—Sheet 1.

S. HENSHALL.

MACHINE FOR SEWING BOOTS AND SHOES.

No. 188,360. Patented March 13, 1877.

Fig. 1

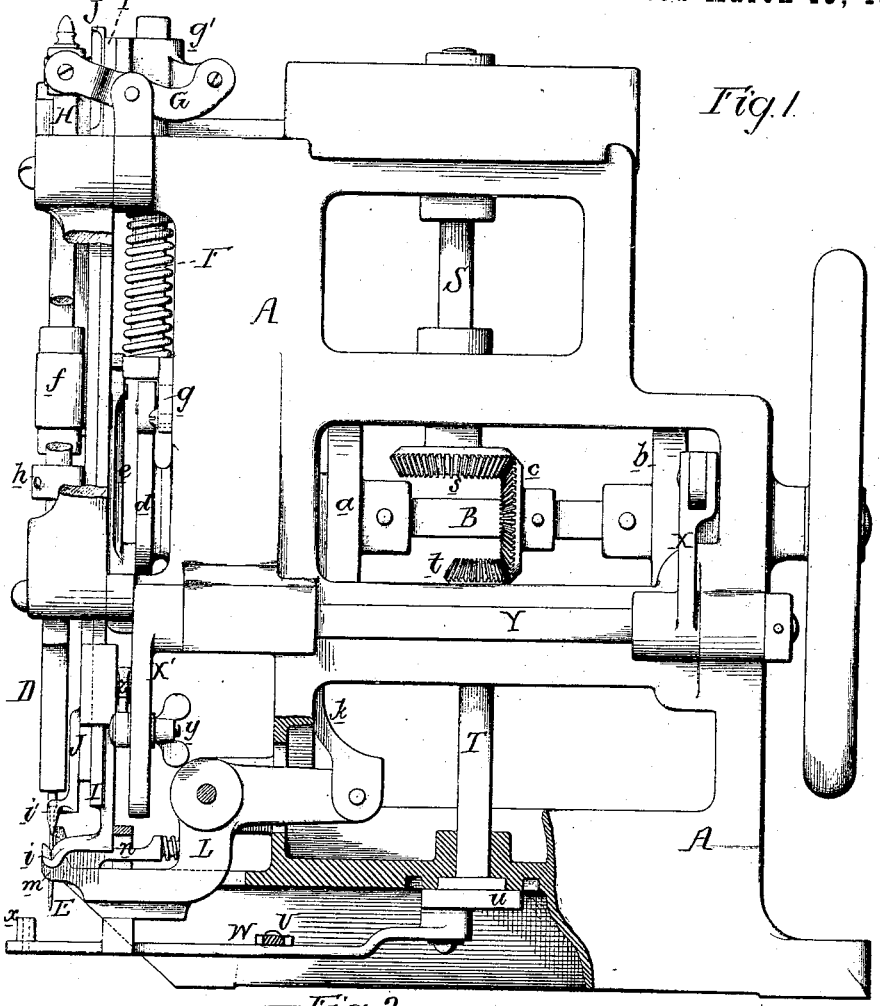
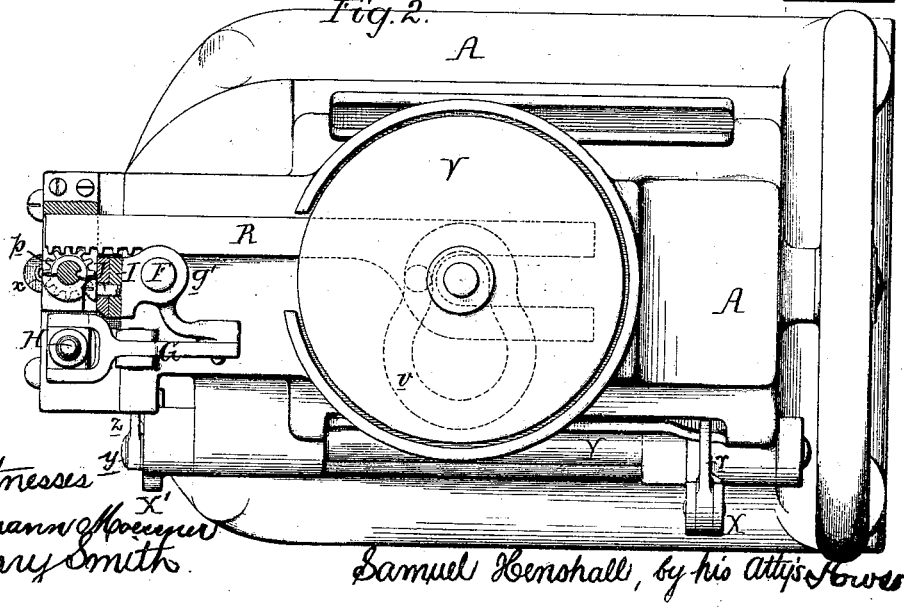


Fig. 2.



Witnesses
Hermann Moeller
Harry Smith.

Samuel Henshall, by his Attys Howson & Son

2 Sheets—Sheet 2.

S. HENSHALL.

MACHINE FOR SEWING BOOTS AND SHOES.

No. 188,360. Patented March 13, 1877.

Fig. 3.

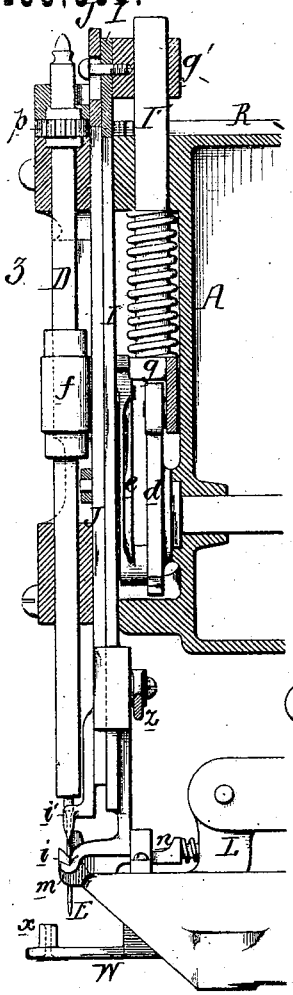


Fig. 4.

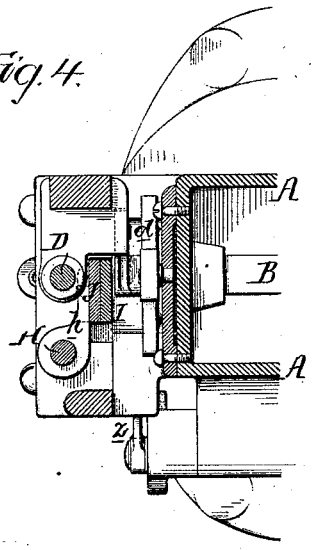


Fig. 5.

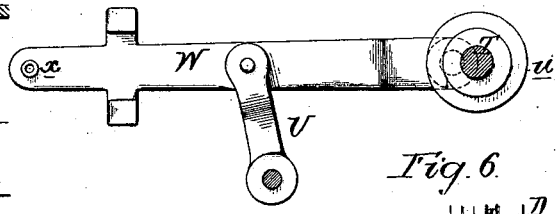


Fig. 6.

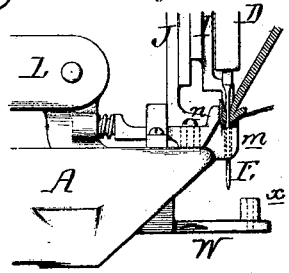


Fig. 7.

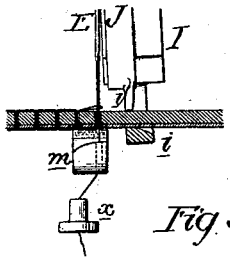


Fig. 8.

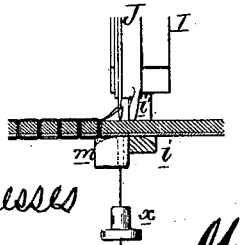


Fig. 9.

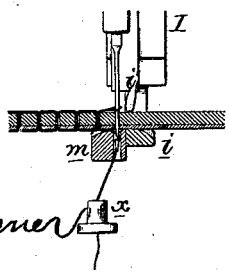
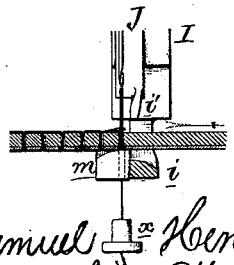


Fig. 10.



Witnesses
Hermann. Moessner
Harry Smith

Samuel Henshall
by his Attorneys
Howson & Sons

UNITED STATES PATENT OFFICE.

SAMUEL HENSHALL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR SEWING BOOTS AND SHOES.

Specification forming part of Letters Patent No. **188,360**, dated March 13, 1877; application filed December 16, 1876.

To all whom it may concern:

Be it known that I, SAMUEL HENSHALL, of Philadelphia, Pennsylvania, have invented certain Improvements in Machinery for Sewing Shoes, of which the following is a specification:

My invention relates to certain improvements in the sewing machine for which Letters Patent of the United States, No. 137,640, were granted to George Walters on the 8th day of April, 1873; and the main object of my improvements is to adapt said machine to the sewing of shoes—an object which I attain in the manner hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a side view, partly in section, of my improved shoe-sewing machine; Fig. 2, a plan view, partly in section; Fig. 3, Sheet 2, a longitudinal section of the front end of the machine; Fig. 4, a sectional plan of the front end of the machine; Fig. 5, a plan view of the looping-arm; Fig. 6, a side view of a portion of the machine; and Figs. 7, 8, 9, and 10, diagrams illustrating the formation of the stitch.

A is the frame-work of the machine, and B the driving-shaft, the latter carrying two scroll-cams, *a* and *b*, a bevel-wheel, *c*, and a cam-wheel, *d*, which serve to impart movement to the various working parts of the machine in the following manner: A crank-pin on the face of the cam-wheel *d* is connected, by means of a rod, *e*, to a slide, *f*, secured to the needle-bar D, the latter carrying a hooked needle, E, to which the required vertical reciprocating movement is thus imparted as the cam-wheel *d* revolves. The edge of the cam-wheel *d* acts upon an anti-friction roller carried by a slide, *g*, secured to the lower end of a spring-rod, F, carrying at its upper end a block, *g'*, to which is pivoted the upper end of a plate, I, the lower end of the latter extending down to a point adjacent to the base of the machine, and being provided with a jaw, *i*.

Immediately adjacent to the face of the plate I is arranged a similar plate, J, which carries at its lower end a jaw, *i'*, is guided by lugs on the plate I, and is vibrated with the same, as described hereafter, but is entirely independent of the said plate I in its vertical movement, as it is slotted vertically at the top where the pivot-pin passes through it, and receives its vertical movement from the block *g'*, through the medium of the lever G, vertical bar H, and connecting-plate *h*, the latter having a curved slot to permit the vibration of the plate.

It will thus be seen that vertical movements in opposite directions are imparted to the plates I and J, the latter falling when the other rises, and vice versa.

In the above-mentioned patented machine the work was supported by the bed in the same manner as in an ordinary sewing-machine; but in operating upon shoes this is not permissible, as it would interfere with the proper and easy manipulation of the shoe; hence I use for this purpose a projecting finger, *m*, which, in the present instance, forms part of a bell-crank lever, L, and is arranged in line vertically with the needle-bar, being perforated for the passage of the needle.

The bell-crank lever L, of which the finger *m* forms a part, is hung to a bracket on the frame of the machine, and its short arm is connected to a rod, *k*, the opposite end of which carries an anti-friction roller adapted to the groove in the scroll-cam *a* on the driving-shaft, this groove being of such a character that the movement hereinafter described will be imparted to the finger *m*.

The long arm of the bell-crank lever carries a spring lasting-arm, *n*, which has at the outer end a roughened block for bearing against the edge of the upper, and holding the same firmly against the sole when the shoe is being sewed, as shown in Fig. 6.

The bevel-wheel *c* on the driving-shaft imparts motion to two bevel-pinions, *s* and *t*, the former being carried by the lower end of a vertical shaft, S, and the latter by the upper end of a vertical shaft, T.

The shaft S carries at its upper end a disk, V, having in its under side a cam-groove, *v*, (see Fig. 2,) to which is adapted a pin on a sliding plate, R, the forked inner end of which embraces a collar on the shaft, while its outer end is provided with a rack adapted to the teeth of a pinion, *p*, connected to the needle-bar D, in such a manner that the latter can

slide freely in, but cannot revolve independently of, the said pinion.

The character of the cam-groove in the disk V is such that a half-revolution in opposite directions is imparted to the needle-bar during its vertical movement, as described hereafter.

The shaft T carries at its lower end a disk, *u*, having a crank-pin connected to the inner end of the looper-arm W, the latter having at the outer end an eye, *x*, for the passage of the thread, and being connected at any desired point to a radius-arm, U, pivoted to the base of the machine, so that a circular movement is imparted to the eye *x* at the outer end of the arm.

It will be observed that the relative size of the wheel *c* and pinion *t* is such that two revolutions of the shaft T, and, consequently, two operations of the looper-arm, are made during every revolution of the driving-shaft, and, consequently, during every complete up-and-down movement of the needle. This is done in order that the movement of the eye *x* around the end of the needle when the latter is down shall be abrupt, so as to draw the thread against the needle, and insure its being caught on the hook as the latter ascends.

The scroll-cam *b* on the driving-shaft B acts on a connecting-rod, *r*, attached at the outer end to the end of an arm, X, on the rear end of a rock-shaft, Y, the latter turning in bearings at the side of the frame, and carrying at its front end an arm, X′, to a segmental slot in which is adapted a bolt, *y*, having a thumb-nut, and connected to the outer end of a rod, *z*, the inner end of which is connected to the plate I, to which a vibrating motion is thus imparted, the extent of vibration being governed by the position of the bolt *y* in the slot of the arm X′.

The operation of the machine is illustrated in Figs. 7, 8, 9, and 10, and is as follows: Supposing the needle E to be elevated, the finger *m* depressed, and the jaws *i i′* drawn back to their fullest extent, and closed on the work, the jaws now move forward, carrying the work with them, and the needle descends, laying the thread which was caught on its hook down on the face of the work in the form of a loop, as shown in Fig. 8, down through which and through the work the needle passes. Before the needle commences to pass through the work, however, the operation of the machine causes the raising of the finger *m*, which thus supports the work when the pressure of the needle is exerted upon it. The needle descends, and a loop of thread is wrapped around it by the eye *x* of the looper, and catches on its hook. As the needle rises it is caused to turn half-way round, its hook being thrown back, as shown in Fig. 9, so that as it rises and passes through the work, and the loop on the top of the same, the latter will not catch on the hook, but will be cast off, the needle continuing its upward movement, and during this movement having a reverse rotary motion imparted to it, so as to bring its hook again to the front, as shown in Fig. 10.

Such a movement is then imparted to the plates I and J that the jaws *i* and *i′* are caused to open and release the work, which is then supported by the finger *m*, while the jaws move backward and close on the work, in the manner shown in Fig. 7. As soon as the jaws have closed and commence to move forward, the finger *m* is depressed, so as to be out of the way and not interfere with the free feeding of the work; but as soon as the jaws have reached the limit of their forward movement the finger ascends and supports the work during the operation of the needle, as above described.

If the thickness of the upper which is being sewed to the sole varies, the lasting-arm *n* is at liberty to yield longitudinally to accommodate itself to such a difference in thickness, the spring which acts upon the arm causing it to keep the edge of the upper in its proper position without interfering with this longitudinal movement.

It will be observed in Figs. 1, 3, and 6 that the lower jaw *i* is recessed, while the upper jaw has a sharp V-shaped edge. By this means the lower jaw affords a firm bearing for the edge of the sole, while the upper jaw enters into the thread-slot cut in the sole, and thus serves as a guide for feeding the shoe to the machine, and insures the proper laying of each stitch in the slot, which it has a tendency to open for this purpose.

I claim as my invention—

1. The combination of the feeding-jaws *i i′* and the movable finger *m* with devices whereby the said finger is depressed when the jaws are in the act of feeding.

2. The combination of the spring lasting-arm *n* with the finger *m*, the two presenting a recess for the reception and guidance of the upper and sole, as set forth.

3. The combination of the finger *m*, bell-crank lever L, connecting-rod *k*, and scroll-cam *a*.

4. The combination of the feeding-jaws *i* and *i′* with the supporting-finger *m*, in advance and independent of said jaws, whereby the manipulation and feeding of the work is facilitated, as set forth.

5. The combination of the spring-rod F and its block *g′*, and the vibrating plate J, with the lever G, bar H, and connecting-plate *h*, as set forth.

6. The combination of the needle-bar D and pinion *p*, connected together as described, with the sliding plate R and its rack, and the disk V, with the cam-groove *v*.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL HENSHALL.

Witnesses:
HERMANN MOESSNER,
HARRY SMITH.