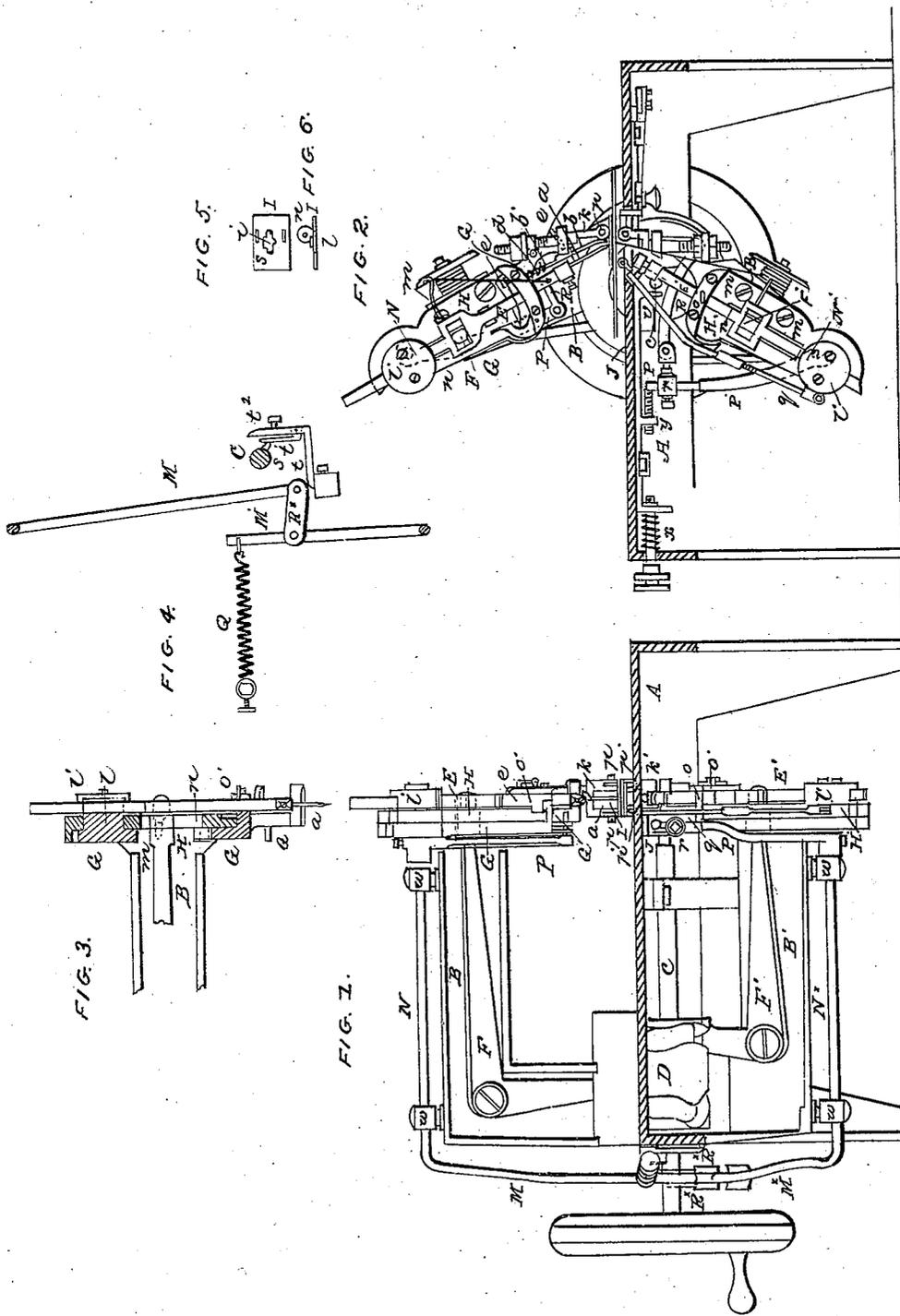


J. HARRISON, Jr.
Sewing Machine.

No. 13,616.

Patented Oct. 2, 1855.



UNITED STATES PATENT OFFICE.

JAMES HARRISON, JR., OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **13,616**, dated October 2, 1855.

To all whom it may concern:

Be it known that I, JAMES HARRISON, JR., of the city and county of Milwaukee, and State of Wisconsin, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a machine with my improvements, represented with a part of its bed-plate cut away to show the working parts. Fig. 2 is a front elevation of the same, also representing the bed-plate partly cut away to show the working parts. Fig. 3 is a longitudinal section of one of the needle guide-plates. Fig. 4 is a detail view of a portion of the machine. Fig. 5 is a top view of the top clamping-plate, which holds the material to be sewed; and Fig. 6 is a longitudinal section of the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to that description of sewing-machines in which the seam is formed by the interlacing of two threads, which are carried through the material to be sewed, from opposite sides thereof, in the form of loops by two needles arranged obliquely to the material and operating by turns, each to pass its loop through the loop previously passed through the material by the other, such machine being generally known as the "Avery Sewing-Machine."

The object of one part of this invention is to give the cloth or other material to be sewed the movement known as the "feed movement" independently of the needles, instead of by the needles, as in the Avery sewing-machine; and for this purpose this part of my invention consists in giving the needles such a movement that both are for a time withdrawn from the cloth to leave it free to be acted upon by suitable feeding mechanism, and in providing a third or supplementary needle to catch the loop which is last passed through the material before the withdrawal of the needles, and retain it until after the feed movement has taken place and until the next loop is passed through it.

The object of the other parts of my invention is to provide means of holding the mate-

rial to be sewed, which admit of its being liberated before and during the feed movement; also, means of causing the interlacings of the two threads, when the seam is formed, to be always close to or as close as desirable to one surface of the material, whatever may be the thickness of the material and notwithstanding any variations in its thickness.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A B B' is the framing of the machine, close under the bed-plate B of which are secured the bearings for the horizontal main shaft C, which carries a cam, D, to operate two elbow-levers, F F', which drive the two sliding needle-bars E E'. This cam is so constructed that the lower needle, *a*, passes through the cloth or other material to be sewed (which is represented in Fig. 2 by a double blue line) as quickly as possible after the loop of the thread of the upper needle, *a*, has been formed, and is withdrawn as quickly as possible after the upper needle, so that nearly one-fourth of the revolution of the main shaft may be performed before the point of the upper needle next enters the cloth, thus leaving the material entirely free of the needles during so much of the revolution; but before the lower needle is withdrawn the supplementary needle *b* enters its loop to retain it and hold it in readiness for the upper needle, *a*, to pass through it on its next movement to pass through the cloth.

The supplementary needle *b* is attached to or forms part of a bar, *b'*, which slides in a guide at the side of and nearly parallel with the needle-bar E, said guides being in the same plate, G, as the guide of the said needle-bar, and the said supplementary needle is connected by a hook at its upper end with an elbow-lever, *c c*, which is pivoted to the guide-plate G. This bar *b'* is fitted to its guide in the guide-plate G in such a manner that it is allowed to vibrate or move sidewise a limited distance, and has wound round it a spring, *d*, which gives it a downward pressure, and which by reason of its upper end being extended sidewise and caused to press under the guide-plate G on the side next to the needle-bar E, as shown in Fig. 2, has a tendency to throw the point of the supplementary needle *b* always away from the needle *a*. The above tendency is controlled by a screw, *e*, (see Fig. 2,) which is

screwed into the fixed plate H, to which the guide-plate G is attached, and which regulates the position of the point of the supplementary needle when the latter is free of the cloth. During the whole time, or nearly so, that the needle *a* is in the cloth the supplementary needle is lifted up by reason of the swelled part *f* of the needle-bar E having thrown aside the upper and raised the lower arm of the elbow-lever *c c*, to which the supplementary needle is attached; but as the needle *a* is withdrawn from the cloth and the swelled part *f* of the needle-bar leaves the lever *c c*, the supplementary needle is forced down by its spring *d* until it passes close behind the lower needle, *a'*, and between the said needle and its thread in the same manner as the needle *a* would do if descending at the same time, and its point passes through the cloth, as shown in Fig. 2, and then it remains stationary until the lower needle has been withdrawn and left its thread in the form of a loop around it. The feed movement, which is in the direction of the arrow shown near the cloth in Fig. 2, is in no way interrupted by the supplementary needle, as that is allowed to move with the cloth, by which it is drawn toward the needle *a*, which on its next descent, which takes place while *b* remains in the cloth, passes close to it and through the open part of the loop, between *b* and where the loop leaves the cloth, *b* being withdrawn from the loop by the action of the swelled part *f* of the needle-bar E on the lever *c c* at the same time the needle *a* enters it. In order to insure the proper action of the supplementary needle in receiving the loop from the needle *a'* and giving it to the needle *b*, a slight movement laterally to the line of the sewing is necessary, and for this purpose there is a small oblique guide-piece or projection, *s*, on the back side of the hole *i*, through which the needles pass in the top one of the clamps I I', which hold the cloth during the sewing operation. The supplementary needle at the time of entering the loop and the cloth, when it has to pass behind the needle *a'*, passes opposite the right-hand end of this guide-piece, which is the least prominent part; but during the feed movement of the cloth it is drawn along the face of this projection, and thus thrown a little forward to place it directly in line with the needle *a*, so that the latter shall pass through the center of the loop.

The feeding mechanism, as I do not intend to claim it as a part of this invention, needs no particular description. Suffice it, then, to say that it consists of a toothed spring-dog, *j*, attached to a sliding bar, J, below the table A, and moved by a cam, J', on the main shaft C, which serves the purpose of raising the dog as well as of moving the feed-bar longitudinally by coming in contact with a projection, *v*, on its under side, the bar being returned, to be in readiness to repeat its action, by a spring, *x*. There may be other feeding mechanism which would serve the purpose.

The clamps I I', between which the cloth is

held to be sewed, consist of two flat plates, which are jointed each by knuckle-joints *p p'* to one of two forked rods, *k k*, which are rigidly attached one to each of the guide-plates G G', in which the needle-bars E E' slide. These guide-plates swing each on a center near the end farthest from the needle, as shown in Fig. 2, being attached to the fixed framing of the machine in the following manner, which is illustrated in Figs. 1, 2, and 3.

H H' are two plates secured by screws *m m*, respectively, to the two heads B B' of the framing, having circular openings in them to receive large pivots *l*, (see Fig. 3,) which form parts of or are secured to the guide-plates G G', and which constitute the centers on which the guide-plates swing. The external form of the fixed plates H H' is shown in Fig. 2, as also are the slots *n n'*, through which work the levers F F', by which the needle-bars are driven. The form of the guide-plates G G', which are behind the plates H H', is nearly the same as that of the fixed plates H H'; but they have openings not only for the passage of the levers F F' through them, but also for the heads B B' of the frame-work, and at the ends nearest the plane of the sewing they extend a little beyond the ends of the fixed plates, as shown at *o o* in Fig. 2, and from thence extend forward and contain shallow grooves to receive the ends of the fixed plates. The parts *o o* of the guide-plates contain grooves to form guides for the needle-bars, and so do the pivots *l l* as the needle-bars swing with the guide-plates, the said grooves in *o o* being covered and closed in front by plates *o' o'*, and those in the pivots by caps *l' l'*, which fit over the said pivots and are secured there-to by screws. The object of attaching the clamps I I' to the guide-plates of the needle-bars and giving a swinging movement to the guide-plates is to allow the clamps to accommodate themselves to different or varying thicknesses of material without adjustment, and at the same time to preserve the proper crossing-point of the needles. The swinging movement of the clamps also allows the material to be liberated or their hold upon it to be loosened during the feed movement, all of which will be presently explained. The face of the bottom clamping-plate, I', which is the plane in which I desire the interlacing of the loops to be performed, in order never to show anything but a single thread on the upper surface of the material, forms a plane which nearly bisects or is nearly parallel with a plane bisecting the angle formed by the lines of motion of the needles, and is kept in that position during the vibrating motion of the guide-plates by connecting the plate I' at one end by a rod, *q*, to the side of the fixed plate H'. The lower point of attachment of the rod *q* and the center of the pivot *l* thus both being fixed points and being equidistant with the upper point of attachment and the center of the joint *p p'*, and the rod *q* being of the same length as from the center *l* to the center *p*, the plate I' must have a

parallel movement. The upper clamp, I, being suspended in one transverse line, accommodates itself to any variation in the thickness of that part of the cloth which is at any time passing under it. The pressure given to the clamps I I' to confine the cloth is slightly yielding, being produced by a spring, Q, acting on two levers, M M', at the rear extremities of two shafts, N N', which rest in bearings *w w*, attached to the heads B B' of the framing, the front ends of the said shafts carrying arms P P', which are respectively connected by links R R with the guide-plates G G'. These levers M M', which, with their shafts and spring and the main shaft C, are shown in Fig. 4, are connected together by a pair of links, R², for the purpose of controlling the relative movements of the two guide-plates, and through them of the two needles *a a'* and clamps, as it is necessary that the relation between the movements should be very correctly preserved to keep the crossing-point of the needles, which is the point of interlacing of the threads, always in the plane of the lower surface of the material or of the face of the clamp I'. The position of this plane varies as the thickness of material varies, descending with an increased and rising with a diminished thickness, and in order to make the crossing-point of the needles follow it, it is necessary that the lower needle, needle-bar, guide-plate, and clamp shall have a lateral movement considerably greater than the upper ones, and therefore the point of connection between the levers M M' is much nearer to the shaft or fulcrum of the lower lever, M', than to the shaft or fulcrum of the upper lever to produce such relative movements. As it is not easy to fix the relative effective lengths of the levers exactly, owing to accidental deviations in the lengths of the various connections, a means of regulating the relative movements of the guide-plates G G' is provided by furnishing the connection between the links R' and the arm P' with a sliding piece, *r*, which is attached to the arm by a binding-screw, and is movable to vary the effective length of the arm. The rods *k k'*, which connect the clamps with the guide-plates G G', and the rod *g*, which connects the lower clamp with the fixed plate H', are also variable by screws and nuts to adjust the clamps higher or lower. The opening or slacking of the clamps to release the cloth or relax their pressure upon it during the feed movement is produced by a wiper-stud, *s*, on the main shaft C (see Fig. 4) acting on an angle-piece, *t*, attached to the lever M. The amount of movement given to the clamps is regulated by a hinge-piece, *t'*, which is attached at the angle-piece, and has its position relatively thereto regulated by a screw, *t''*, the said wiper-stud acting upon the angle-piece by impinging against the hinge-piece.

The control of the feed to make it always proportionate in the inverse ratio to the thickness of the material being sewed, or of that part of the material passing between the clamps, is

effected by the upper end of the arm P', which serves as a stop to arrest the feed-bar J when the said bar is returned by the spring *x* after the cam ceases to act on the projection *v*. The length of the feed may be increased or diminished by a screw, *x*, which is attached to the feed-bar, and which comes in contact with the arm P to arrest the backward movement of the feed-bar.

The machine may be made much more simple than is represented in the drawings by making the shafts N N' serve as the pivots upon which the guide-plates G G', clamps I I', and needle-bars E E' swing, thus dispensing with the arms P P' and links R R'. In that case, to control the feed by the thickness of the cloth, some other suitable stop must be attached to the guide-plate G'.

Having thus fully described my invention, I will proceed to state what I claim as new and desire to secure by Letters Patent.

1. In combination with the giving of the two needles *a a'* such a movement as will cause both at once, during every revolution or stroke of the machine, to be withdrawn from the cloth for a sufficient time to effect the feed movement, I claim the employment of a supplementary needle, *b*, arranged and operating, substantially as herein described, to supply the plate of the needle *a*, which operates first after the feed movement, and to retain the loop in the thread which has been put through the cloth by the needle which last leaves the cloth before the feed movement until the first-named needle operates to pass through the said loop, substantially as herein described.

2. The attachment of the clamps I I', which hold the material to be sewed to two swinging guide-plates, G G', or their equivalents, which serve also as guide-plates for the needle-bars, and thereby cause the needles and the clamps to swing together, substantially as herein described, whereby the clamps are enabled to accommodate themselves to different or varying thicknesses of material, and to be opened to slacken their hold upon the material during the feed movement, and the needles are enabled to be kept in a proper or desirable relation to the clamps.

3. The connection of the two swinging guide-plates G G' or their equivalents in any manner, substantially as herein described, whereby one of them is caused to have a movement so much greater than the other that the relative movements of the needles and clamps shall be such that the needles in all positions of the clamps will cross each other in the plane of or as near as is desired to the plane of the face of one of the clamps, which is the plane of one surface of the material, as herein fully set forth.

JAS. HARRISON, JR.

Witnesses:

R. WILLSEN,
NOAH M. HARRINGTON.