HELEN A. BLANCHARD.

Sewing-Machine.

No. 161,471. Patented March 30, 1875.

Fig. 1.

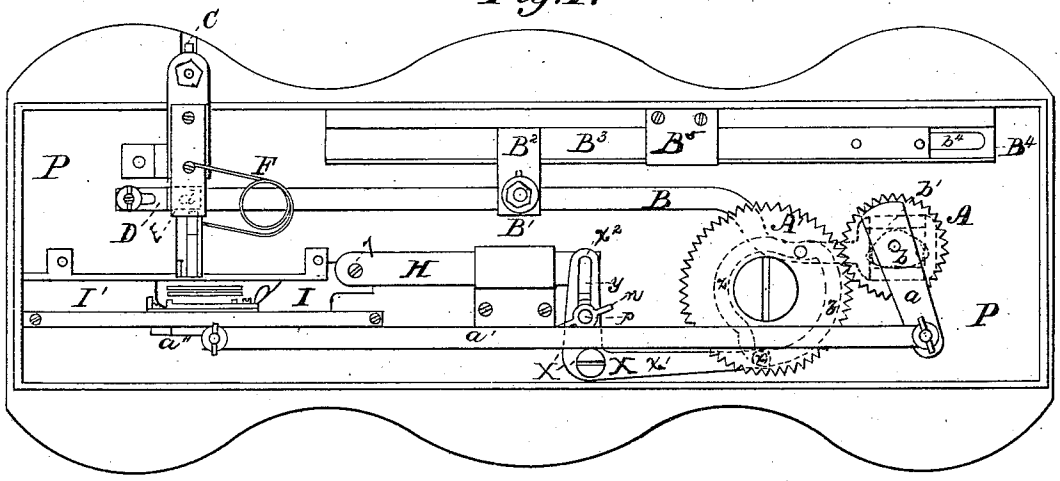


Fig. 2.

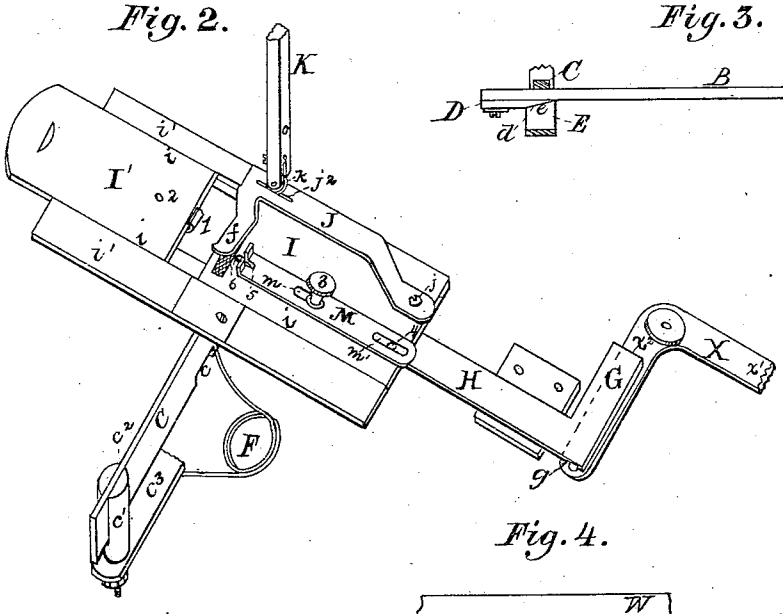


Fig. 3.

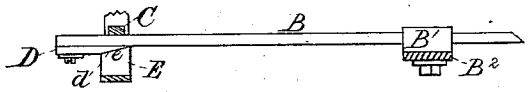


Fig. 5.

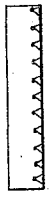
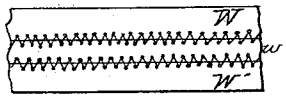


Fig. 4.



WITNESSES=

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HELEN A. BLANCHARD, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **161,471**, dated March 30, 1875; application filed September 16, 1874.

To all whom it may concern:

Be it known that I, HELEN A. BLANCHARD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Sewing-Machines, of which the following is a specification:

The object of this invention is akin to that of my Patents No. 141,987, dated August 19, 1873, and No. 152,721, dated July 7, 1874—viz., the production of a machine which shall be adapted to form an overstitch for either fine or coarse work, or perform the ordinary work of a sewing-machine.

My present invention relates particularly to that class of machines employing a four-motion feed, having a reciprocating motion at right angles to the line of the feed, in order to place the material so that the needle will descend through and then outside of the edge of the work, or through the work alternately on parallel lines, carrying the thread back and forth.

My invention consists in the means employed for effecting the reciprocating motion of the feeding devices at right angles to the line of the feed, and for varying the degree of its movement; also, in a spring presser-foot, attached to and moving with the reciprocating feed-plate, and controlled by a presser-bar, in the lower end of which is a friction-roller, under and against which the spring presser-foot moves as the feed-plate reciprocates.

In the accompanying drawing, Figure 1 is a bottom-plan view of a machine embodying my invention. Fig. 2 is a perspective view of the reciprocating feed-plate, having the adjustable gage and spring presser-foot attached thereto, and showing, also, the lower end of a presser-bar, carrying a friction roller or wheel, under and against which the spring presser-foot moves. In this view the bed-plate is removed, for the purpose of showing the arrangement of the feed-bar, and the lever which reciprocates the feed-plate. Fig. 3 shows the devices for regulating the depth of the feed to suit fine or coarse work. Fig. 4 is a representation of two rows of the stitches produced by my invention.

A is a gear-wheel on the lower end of a vertical shaft, deriving rotary motion from the shaft which drives the needle-bar in a Singer sewing-machine, being connected with said shaft by bevel-gears. To the under face of this wheel is fixed a crank-arm, *a*, to which is pivoted one end of a rod, *a'*, the other end of which is pivoted to the shuttle-carrier *a''*. Back of this gear-wheel, and adjoining it on the same shaft, is a cam, *b*. (Shown in dotted lines in Fig. 1.) This cam is surrounded by a frame, b^1, on the end of bar B, which has an adjustable swiveling fulcrum, B^1 the other end of said bar passing through a notch, *c*, in the feed-bar C. To the under side of this end of bar B is attached an adjustable piece, D, having an inclined face, *d*, opposite and impinging upon the inclined face *e* of a stationary stud, E, supported by a bracket on the under side of bed-plate P. The outer end of feed-bar C fits loosely in an open slot or notch, c^2, in a swiveling pin or stud, c^1, which is also supported by a bracket on the under side of the bed-plate. This arrangement allows the feed-bar both to rise and fall, and move back and forth longitudinally. The bar B, which passes through notch *c* in the feed-bar, is caused, by the revolution of cam *b*, to both vibrate on its swiveling fulcrum, and to move back and forth longitudinally through a notch or slot in said fulcrum, and through the notch *c* in the feed-bar C, and when the longitudinal motion of said bar B causes the inclined adjustable piece D to slide up the inclined face *e* of stud E, the wedge-like action causes feed-bar C to rise, being pressed upward by bar B, and when the inclined piece D slides down the inclined face *e* of stud E, the feed-bar will be drawn downward by the spring F. It will be readily seen that the position of adjustable piece D regulates the height to which the feed-bar can rise, and consequently the distance the feed-teeth can penetrate the material being sewed. The vibratory motion of bar B on its fulcrum B^1 causes the longitudinal motion of the feed-bar through notch c^2 in the swiveling pin or stud c^1, and the motion of the toothed feeding-surface in the opening in the feed-plate, which motion feeds the material forward intermittently. Consequently the position of the adjustable fulcrum B^1 regulates the length of the stitches in a forward direction. The nearer said fulcrum is ad-

justed toward the feed-bar the shorter will be the stitches in the direction of the seam. A′ is a gear-wheel of larger size than wheel A, and gearing therewith. The upper face of wheel A has cut into it a cam-groove, *z*, in which fits a roller, *x*, on the end of arm x^1 of bell-crank lever X, pivoted at X′, and having in its other arm, x^2, a longitudinal slot, *y*. Through this slot *y* projects a pin, *p*, screw-threaded on its outer end, to receive a thumb-nut, *n*, and having a rectangular swiveling head fitting into and sliding in a groove or way, *g*, in the arm G, which projects at a right angle from bar H, which is firmly connected to the reciprocating feed-plate I. By means of the thumb-nut the pin *p* can be secured at any point in the slot *y*. The revolution of wheel A^1 and its cam-groove *z*, it will be seen, will cause the bell-crank lever X to oscillate on its pivot X′, and the point at which pin *p* is fixed in slot *y*, and its swiveling head in groove or way *g*, will regulate the extent of the reciprocations communicated to feed-plate I through bar H. It will be noted that the gear-wheel A′ moves at one-half the rate of speed of wheel A, and that there is a corresponding difference of speed of movement imparted by its cam mechanism or attachments over that imparted by wheel A and its cam mechanism. The adjustable swiveling fulcrum B^1 is supported by plate B^2, rigidly attached to the under side of a bar, B^3, which slides in a race or groove, B^4, formed in the under side of bed-plate P, being supported therein by a bearing-plate, B^5. From the race or groove B^4 a slot, b^4, is cut upward through the bed-plate P, and through this slot a clamp-screw is connected with bar B^3, and by means of said clamp-screw bar B^3 can be moved back and forth and secured at any point. The cam *b* and cam-groove *z* are timed with relation to each other in such a manner as to produce the proper relative action of the parts which they actuate, as will be readily understood. J, Fig. 2, is the spring presser-foot, which is firmly attached by screw *j* to reciprocating feed-plate I. In the top of the presser-foot is a shallow groove, j^2, in which fits the edge of a friction-wheel, *k*, mounted in a slot in the lower end of presser-bar K. This presser-bar is mounted in the end of the arm of a sewing-machine, and is operated by any of the ordinary devices. When lowered the said bar presses the foot *f* of the spring presser-foot down upon the material being sewed, and when the bar is raised the spring presser-foot rises by its own elasticity, lifting its foot *f* off the material. The spring presser-foot is made of spring-steel, or an equivalent elastic material.

I I′ are the two parts of the reciprocating feed-plate. Its longitudinal edges *i i* are beveled, and project under the beveled edges of guide-plates *i′ i′*, between which it slides when reciprocated by the action of the parts before described. In order to afford ready access to the shuttle, which moves in a race beneath the feed-plate, said plate is divided into the two parts I I′, which are secured together by the spring-catch 1, attached to the under side of I′, and operated by a button, 2, which extends from the spring upward through a hole in I′, projecting slightly above the surface, and being rounded off, so as not to obstruct the passage of the work. When the button 2 is depressed, the spring-catch is disconnected from a shoulder, over which it takes on the under side of I, and then I′ may be slid out, as shown in Fig. 2.

M is an adjustable sewing-gage, attached to the face of feed-plate I, so as to move with said plate in its reciprocations. The gage is adjusted and fastened in place by means of slots *m m′*, and clamp-screw 3, and guide-pin 4. The gage is provided with an open slot, 5, in its forward end, to allow the passage of the needle at opposite points in the reciprocations of feed-plate I, which is provided with a corresponding slot, 6.

The parts, as hereinbefore described, are arranged to sew the zigzag or over stitch, (shown in Fig. 4,) in which the piece *w* is sewed upon and covers the joint between W and W′, or may make a button-hole or binding stitch over the edge and outside of the material, as in Fig. 5.

The operation is as follows: When the material is placed, the presser-foot lowered, and the other parts in proper position, the motive power is applied, and the needle descends through the material. As the needle then rises the action of bar B on the feed devices, as before described, causes the material to be fed forward, while at the same time the cam-groove *z*, through bell-crank lever X and bar H, causes the feed-plate I to move in its guides at right angles to the line of feed a suitable distance, as adjusted, and there rest until the needle again descends through the material, the forward and lateral movement of the material causing the second penetration of the needle to be made at a point in the material in a diagonal direction from the point of its first penetration. When the needle again rises the material is fed forward as before, but is moved laterally back on a line with its original position, and there remains until penetrated by the needle, and so on, the cam *b* and cam-groove *z* being so timed as to produce the proper relative actions of the feed devices and the reciprocating feed-plate.

In order to arrange the machine to do ordinary straight sewing, it is only necessary to disconnect the bar H from feed-plate I by removing screw 7, when the said feed-plate will remain stationary instead of reciprocating. It will, however, be found more convenient to remove the spring presser-foot from the feed-plate, and attach an ordinary presser-foot to the presser-bar K.

In this application I have not described or shown any of the parts of a sewing-machine which overhang the bed-plate except the lower end of a presser-bar, nor the motive devices,

because in the parts not shown I claim no invention, and it will be fully understood by the general description that they correspond to same parts in the Singer sewing-machine.

Having now described my invention and explained its operation, I claim and desire to secure by Letters Patent—

1. The combination of gear-wheel A, having cam-groove *z*, bell-crank X, having a stud working in said cam-groove, bar H, and plate I, substantially as and for the purpose specified.

2. The combination of the laterally-reciprocating plate I, spring presser-foot J j^2, secured thereto, and presser-bar K *k*, substantially as and for the purpose specified.

3. The combination of plates I and I′, adapted to be reciprocated in the guide-plates *i* and *i′* of the spring connecting-hook 1, and the button 2, whereby said plates may be securely locked together or unlocked to afford access to the shuttle, substantially as set forth.

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

HELEN A. BLANCHARD.

Witnesses:
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