2 Sheets—Sheet 1.

W. B. BARTRAM.

Button Hole Sewing Machine.

No. 62,520. Patented March. 5, 1867.

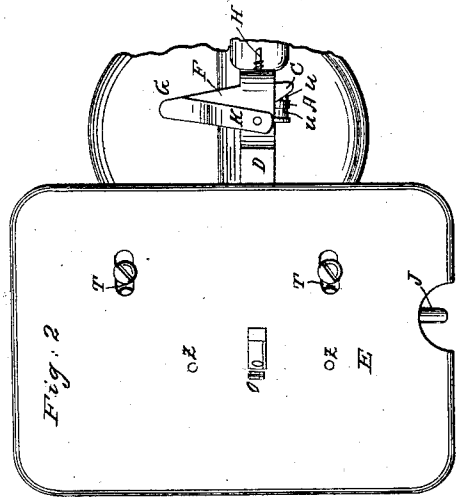

Fig. 2.

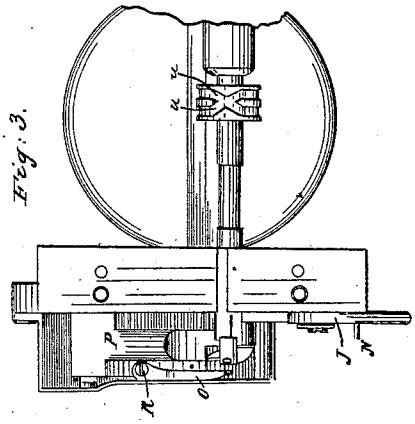

Fig. 3.

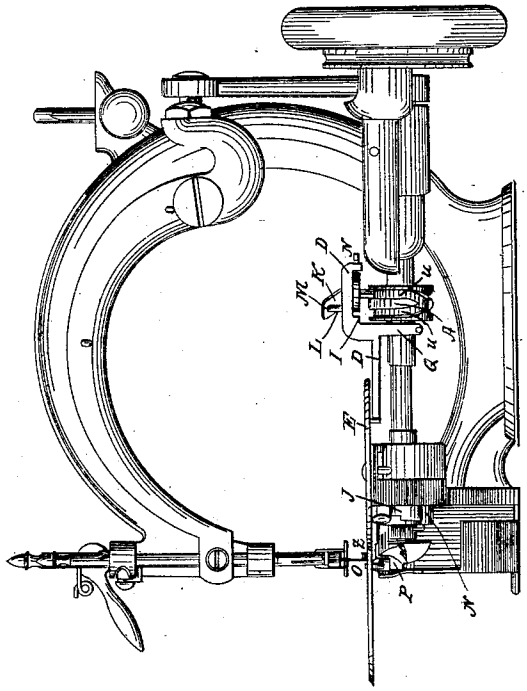

Fig. 1.

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2 Sheets—Sheet 2.

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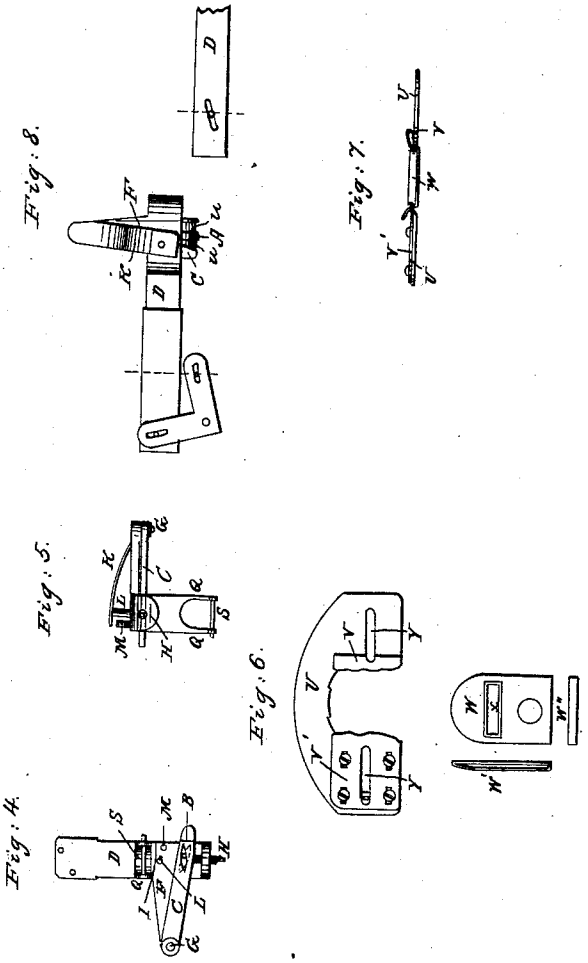

Fig: 8.

Fig: 7.

Fig: 5.

Fig: 6.

Fig: 4.

Inventor:
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By his atty. R. D. Smith.

UNITED STATES PATENT OFFICE.

W. B. BARTRAM, OF NORWALK, CONNECTICUT.

IMPROVEMENT IN BUTTON-HOLE SEWING-MACHINES.

Specification forming part of Letters Patent No. **62,520**, dated March 5, 1867.

To all whom it may concern:

Be it known that I, WALKER B. BARTRAM, of Norwalk, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a Willcox & Gibbs sewing-machine with my improvements attached. Fig. 2 is a plan view of the table of the same. Fig. 3 is a plan view of the machine with table removed. Fig. 4 is a plan view of the bottom of the switch-bar and jog-bar. Fig. 5 is an elevation of the switch-bar and jog-bar. Fig. 6 is a plan view of the clamp-plate. Fig. 7 is an edge view of the same with the parts in position. Fig. 8 exhibits two methods of moving the table-plate in a direction at right angles to the movement of jog-bar.

My invention relates to that class of sewing-machines which produce a zigzag stitch by means of mechanism which imparts to the material being stitched a lateral reciprocation, at the same time that it is moved forward by the ordinary feed; and it is shown in this application as adapted to the well-known Willcox & Gibbs sewing-machine, though I do not wish to be understood as confining myself in the use of these improvements to machines of that precise construction.

For convenience, the word "cloth" will hereinafter be used to designate any material which may be stitched upon my machine.

That others may understand the construction and operation of my improvements, I will particularly describe them.

Fig. 1 represents a Willcox & Gibbs sewing-machine, the stitching mechanism of which is unchanged. My devices attached thereto are for the purpose of producing a lateral reciprocation of the cloth in addition to its ordinary forward-feed motion, and to hold the cloth in position upon the table while moving laterally.

To produce the lateral movements of the cloth, I cause the table E, upon which said material rests, to reciprocate, by means of a switch-cam, A, placed upon the main driving-shaft of the machine, a switch, B, and switch-bar C, attached to a jog-bar, D, which extends from one edge of the table E above the driving-shaft, as shown in Fig. 1.

The switch-cam A is a cylindrical block having a cam-groove, *a*, cut into its face. This groove *a* passes twice around the cylinder A, and for about three-fourths of the distance in planes parallel to each other, and at right angles to the axis of the driving-shaft. Within the remainder of the distance it crosses itself, as shown in Fig. 1, so as to make the groove continuous. If, now, the switch B, which is a piece of metal with a diamond-shaped horizontal section, and concave longitudinally upon the face which rests upon the cam A, be pivoted to the switch-bar C, and then placed in the cam-groove *a*, it is evident that the switch and switch-bar will be moved in the direction of the length of the driving-shaft at each revolution of the cam A—the first revolution moving the switch-bar in one direction, the second revolution moving it in the opposite direction. During three-fourths of one revolution, the switch B will rest in one of the planes referred to, and will then be suddenly transferred to the other by the oblique portion of the groove; then, during the last fourth of the next revolution, it will, in like manner, be suddenly transferred to the place of beginning.

In order to transmit this intermittent motion of the switch to the table and cloth, it is only necessary to connect the table and switching apparatus together, and this is accomplished, where the feeding-dog O moves in a direction at right angles to the line of the driving-shaft, through the medium of a jog-bar, as at D, rigidly secured to the table, and when the ordinary feed is not at right angles to the driving-shaft, by the addition of a rock-shaft, or any of the well-known devices for changing the direction of rectilinear motion. Two methods are shown in Fig. 8.

In the Willcox & Gibbs machine, the feeding-dog O moves in a direction at right angles to the axis of the driving-shaft, and as the material being stitched is moved forward by said dog, it will also be moved sidewise by the jog-bar, so that the needle will pass down through the cloth at a point at one side of the line in which the previous stitch was made. As the dog O acts again, the jog-bar will move the cloth sidewise again, but in a direction opposite to its former sidewise move-

ment, and the result of these two movements in directions at right angles to each other will be a zigzag or herring bone-stitch.

But it is necessary that the length of this lateral movement produced by the switch-cam and jog-bar should be under control, so that the lateral length of the stitch may be greater or less, as required. This purpose is accomplished as follows: The switch-bar C is pivoted at its outer end G to the end and lower side of the lateral arm F, which projects from the side of the jog-bar just over the switch-cam. Its swinging motion upon the pivot G is regulated, in respect to the jog-bar, by a set-screw, H, which is inserted through a toe upon the outer end of the jog-bar, in such a manner that the switch-bar, as it moves in one direction, will come in contact with said screw, and at every movement in the opposite direction it will come in contact with a shoulder, I, formed on the jog-bar opposite to the screw H.

It is evident that the switch and switch-bar must move the same distance laterally at every revolution of the switch-cam; and if the distance between the screw H and shoulder I be less than the extent of this movement, then the jog-bar will be forced to yield and be moved by the switch-bar at every reciprocation made by it; and that the less the distance between the screw H and the shoulder I, the greater will be the movement of the jog-bar, because it will be moved through a larger part of the movement of the switch-bar.

By moving the screw H in or out, the distance between the shoulder I and the end of said screw is diminished or increased, and the lateral length of the stitch is controlled.

The shoulder I always brings the table E to the proper position to cause the needle to strike through the line which forms the edge of the button-hole, (or over the edge, if the slit be cut before stitching,) and the stop formed by the end of the screw H determines the distance of the outer edge of the row of stitches from the edge of the slit or button-hole; or, if the stitching is done for the purpose of felling, it determines the distance of one edge of the seams from the other.

The peculiarity of button-holes preferred for shirt-bosoms, &c., is the square or barred ends produced by carrying the thread from the outer edge of the row of stitches on one side of the button-hole to the outer edge of the row of stitches on the other side of the same, thus making the end stitches twice the usual length laterally. This double throw of the plate is repeated two or three times, giving the button-hole a square finish at the ends, which is considered very desirable.

It is preferable that the operation of barring should be under the control of the operator, so that the button-hole may be terminated and the bar worked at any moment, which could not be done by automatic machinery without rendering it objectionably complex.

When the bar is to be made the speed of the machine should be slackened, and at the proper moment the forward feed is stopped by raising the lever of the eccentric feed-controller J as high as possible. At the moment of stopping the feed, the operator's finger is placed upon the spring K and depressed. Attached to the lower side of the spring K is the wedge shaped stud L, which, when the spring K is depressed, is protruded through a hole in the jog-bar, and its wedge-shaped end interposed between the switch-bar C and the shoulder I, so that the office of the shoulder I is for the time performed by the stud L, and the jog-bar is during that time moved as much farther than usual as the distance the face of the stud L is in advance of the shoulder. This advance should be sufficient to double the throw of the jog-bar, and sometimes a little more, so that the needle will pass from the outer edge of one row of stitches to the outer edge of the opposite row. This graduation is attained by means of the stop-screw M, which permits more or less of the wedge L to be thrust in front of the shoulder I, and, therefore, determines with the utmost exactness the increase of the throw of the jog-bar.

When the screw H is set, the screw M should be set to correspond.

The stop-pin N is placed in one of a series of holes provided for it in the frame of the machine, so as to determine the movement of the feed-controller J, and enable the operator to return the controller to the proper point without difficulty after it has been raised up to stop the motion of the feeding-dog O. The feeding-dog O is pivoted at its rear end R to the feed-bar P, so that while its front end is reciprocated back and forth in the ordinary manner by the feed-bar P, it may also move upon its pivot R in obedience to the reciprocating movements of the table E and jog-bar D, and while the material being stitched is moved back and forth laterally by the switch-cam and jog-bar, it is also moved forward by the feeding-dog O. The jog-bar is kept down in position by means of the fork Q and pin S, which passes through the ends of the fork and beneath the main shaft. The plate E is retained upon the bed-frame of the machine by the screws T T, which pass through slots in said plate and into the said frame, but are not screwed down so tight as to obstruct the plate in its reciprocations.

It is sometimes necessary to use some kind of movable frame or guide. This is particularly required if the stitching is to pass over the cloth in a line oblique to the direction of the threads, or if the goods be such as draw, as stockinet. The clamp which I employ for the purpose, and which is exhibited in this application, consists in a plate, U, the central portion of which is cut away, as shown in Fig. 6. The serrated plates V V′, the latter of which is adjustable, are attached to the two sides of this opening in the central part of the plate U. The stretching-slide W, of which side

and end views are seen in Fig. 6 at *w'* and *w''*, is fitted to slide between the serrated edges of V and V', and clamp the cloth between them, as is shown in Fig. 7, the edges of W being grooved for the purpose, and the plate V' being adjusted according to the thickness of the material to be secured. When the cloth is to be strained and clamped it must be so placed that the position of the button-hole to be worked shall be exposed through the slot X. Through the plate U are two narrow slots, Y Y, in line with each other. When the plate U is placed upon the table of the machine for the purpose of stitching a button-hole, it is placed so that the two pins Z Z shall stand up in said slots Y Y, and act as guides for said plate as it is moved by the feeding-dog O, and also compel it to partake of the lateral movements of the plate E, produced by the cam and jog-bar.

In ordinary felling no clamp is required, though, if the goods be very thin, a friction-plate similar to that patented to me May 15, 1866, No. 54,670, may be desirable; but in making a zigzag or herring-bone stitch upon cloth which has much body or stiffness no other appliance will be required than the ordinary guide and presser-foot, unless an implement such as the hemmer or feller be used to turn the edge of the seam.

In stitching eyelet-holes a cylindrical guide is placed upon the table and passed through the center of the eyelet. The regular action of the feeding-dog O causes the cloth to revolve about this guide, while the stitching mechanism stitches a circular row about its center.

If the eyelet is cut before stitching, the cylindrical guide should be large enough to fill the hole so cut; but if the stitching is done before cutting, then the guide may be a simple pointed stud, around which the cloth is caused to revolve.

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

1. Reciprocating the plate E on a straight line at right angles to the line of movement of the forward feed by means of the switch-cam A, switch B, and jog-bar D, constructed, arranged, and operating as and for the purpose set forth.

2. In combination with the sewing mechanism of a Willcox & Gibbs sewing-machine, the switch-cam A, switch B, arm C, jog-bar D, or their equivalents, and the plate E, for the purpose set forth.

3. The combination of the switch-cam A, switch B, switch-bar C, and jog-bar D, substantially as and for the purpose set forth.

4. The combination of the switch B, jog-bar D, shoulder I, and set-stop-screw H, or its equivalent, for the purpose set forth.

5. The combination of the switch B and jog-bar D with the set-screw H and stud L, or their equivalents, for the purpose set forth.

6. The feeding-dog O, pivoted to the feed-bar, as described, in combination with the reciprocating plate E, substantially as and for the purpose set forth.

7. The guide-plate U, in combination with the straining-slide W and the serrated plates V V', substantially as and for the purpose set forth.

WALKER B. BARTRAM.

Witnesses:
HENRY B. FANTON,
HENRY B. FANTON, Jr.