

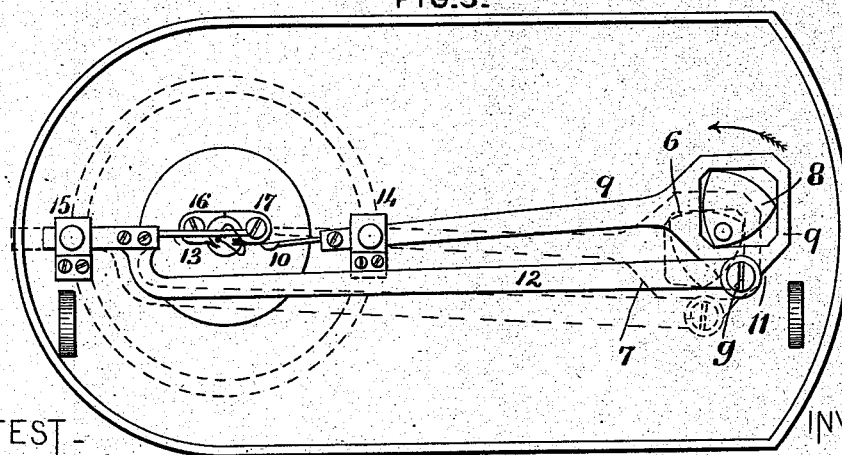
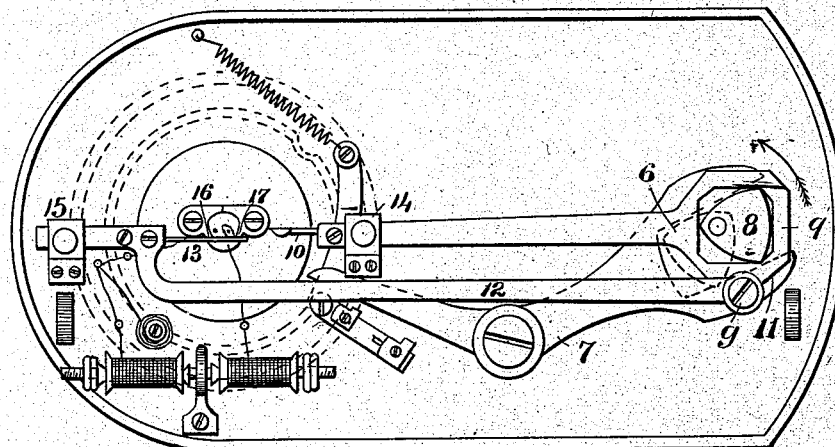
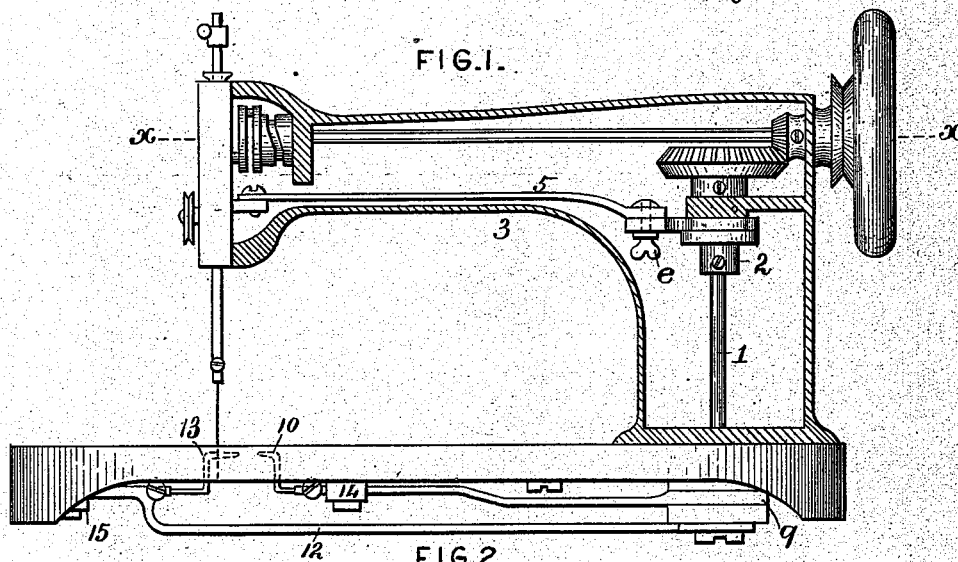
(No Model.)

2 Sheets—Sheet 1.

T. F. HAGERTY.
BUTTON HOLE SEWING MACHINE.

No. 382,763.

Patented May 15, 1888.



ATTEST—
J. Henry Kaiser
Harry L. Ames

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FIG. 4.

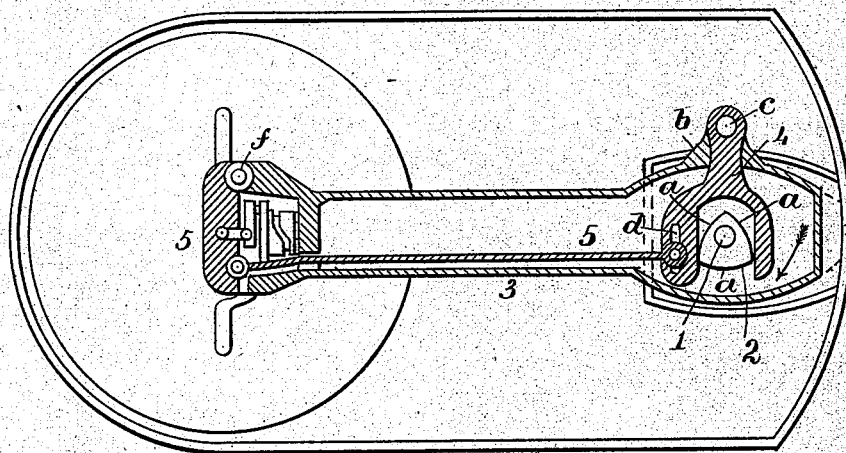


FIG. 5.

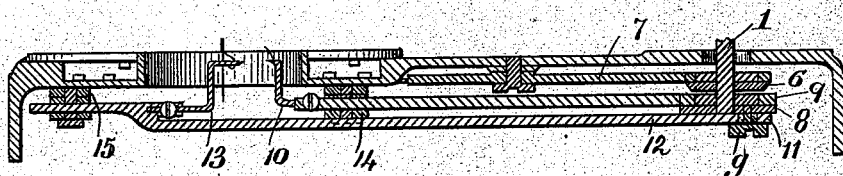
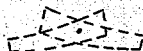


FIG. 6.



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THOMAS F. HAGERTY, OF SAN FRANCISCO, CALIFORNIA.

BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 382,763, dated May 15, 1888.

Application filed August 20, 1886. Serial No. 211,392. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. HAGERTY, of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Button-Hole Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters marked thereon.

My invention relates to that class of button-hole sewing-machines having, first, a reciprocating needle-bar contained within a pivoted carrying-frame, the latter receiving a lateral vibratory motion from the upright gear-shaft of the machine, whereby during the sewing-operation the needle is caused to pass alternately through the slit of the button-hole and the edge of the cloth bounding said slit; secondly, a cloth-clamp moving within a fixed path about a slotted guide-button attached to the base-plate of the machine beneath the reciprocating needle, said clamp being designed to spread the unsewed button-hole and feed the bounding edges in such a manner beneath the needle that the latter shall first sew one side of the button-hole, then the eye at a greater rate of speed, and, finally, the second side at the initial speed; thirdly, mechanism for imparting variable motion to said cloth-clamp, and fourthly, mechanism for forming the loops and completing the stitches.

My invention comprises a novel means for vibrating the frame which carries the needle-bar; also, a novel means of actuating the lever which operates the feed-wheel; also, a novel arrangement of looping-levers and mechanism for operating the same, all as hereinafter more fully set forth and shown.

Figure 1 is a front elevation of a sewing mechanism which includes my said invention, with side plate being removed, illustrating the mechanism for vibrating the frame which carries the needle-bars, and the means for attaching the loopers and feed-levers in place. Fig. 2 is an inverted plan view showing the mechanism for operating the loopers and the feeding-lever. Fig. 3 is an inverted plan view illustrating in detail the operation of the loopers during the process of forming the stitch. Fig. 4 is a horizontal sectional view taken in the line *xx* of Fig. 1, and showing the mechanism

employed for vibrating the frame which carries the needle-bar. Fig. 5 is a central vertical longitudinal sectional view taken through the bed-plate of the machine, and showing the position of the looper-levers and the manner of attaching them to the bed-plate. The overhanging arm, the vibrating needle-bar-carrying frame, the feeding-wheel, having heart-shaped cam-groove, the thread-nipper, and the spring take-up are of well-known construction, and form no part of my invention.

By reference to the drawings, Fig. 1, it will be seen that the vertical shaft 1 has attached to its upper end, below the larger beveled gear-wheel, an eccentric, 2, constructed with three equally-curved sides, *aaa*, as shown in Fig. 4. Referring to Fig. 4, it will be seen that to the rear side of the overhanging arm 3 a projection, *b*, is cast, to which a bifurcated strap, 4, is secured by means of a screw, *c*. On the front side of the strap 4 a slot, *d*, is provided. A rod, 5, is attached to the strap 4 at the slot by means of the thumb-screw *e*. Fig. 1. The other end of the rod 5 is pivoted to the carrying-frame, the carrying-frame being pivoted vertically to the head of the machine, as shown at *f*, Fig. 4. By means of this construction of eccentric and strap I obtain a quick shipping motion equivalent to that produced by a cam of the usual construction, and it can be run at a higher rate of speed without the stroke produced by a cam.

It will be seen by reference to Fig. 4 that to make a narrow row of stitches the thumb-screw *e* is unloosed and moved toward the back of the slot, and to make a wide row it is moved forward and secured.

By reference to the drawings, Fig. 2, the construction and operation of the feeding mechanism is shown. It will be seen that to the lower end of the vertical shaft 1, as shown in dotted lines, an eccentric, 6, having three equally-curved sides, is attached, and that to the bed-plate of the machine a forked lever, 7, is secured, the forked end spanning the eccentric 6, while the free end engages a shipper and pawl similar in construction and operation to that shown in a patent issued to Philip Diehl June 9, 1885, No. 319,801. In the case of the patent referred to a cam of the usual construction is used to actuate the feeding-lever. In the case of my invention I prefer to use the

eccentric 6, as it enables the machine to be run at a higher rate of speed without the usual blow produced by the cam. I do not confine myself to this arrangement of pawl and shipper, as I cause the lever 7 to act upon the periphery of the wheel direct, or by means of a pawl engaging teeth upon the rim of the feed-wheel or to act upon an auxiliary wheel engaging the feed-wheel.

By reference to Figs. 2 and 3 the mechanisms employed for forming the loops are shown, and differ from the patent issued to me January 26, 1886, No. 335,029, in the following particulars: In the case of the patent referred to I found that as the needle moved at twice the rate of speed that the parts under the bed-plate of the machine moved, that the action of the looper-points were tardy when entering the loop cast off from the needle, and that there was a liability to skip stitches unless more pause was given to the needle, and also that inasmuch as the crank-pin which actuated the looping-levers was in continual motion the loop impaled upon the detainer-point was liable to escape before the needle entered it. To obviate this difficulty, I employ the mechanism as shown, which consists of an eccentric, 8, having three equally-curved sides, a strap, 9, having a square opening at one end to receive the eccentric 8, and its other end tapering and extending to receive the short looper-point 10. The strap 9 has a lug, 11, provided on its side, to which a lever, 12, is attached by means of a body-screw, *g*. To the other end of the lever 12 I attach the thread-carrying looper-point 13. The strap 9 and the lever 12 are both attached at their ends to the bed-plate of the machine by means of pivoted boxes 14 and 15 of the usual construction. The action of the looper-points 10 and 13 differ from the patent referred to only in the point of time and in the path they travel.

Fig. 2 shows the thread-carrying looper-point 13 after having passed in a nearly-straight path through the loop on a line with the center of the machine. A further movement of the eccentric 8 in the direction of the arrow will have tilted the looper-point 13 until it assumes the position, as shown in Fig. 3, where it has carried its thread around the detainer-point 17. A further movement will have carried it out of the loop and have brought the looper-point 10 to a position in front of the needle, where it will enter the loop cast out, tilt, and assume a position behind the needle-hole after having impaled its loop upon the detainer-point 16.

By my arrangement of eccentric 8 and strap

9 the loopers are made to pass quickly through the loop cast out from the needle while it is at rest. During the time the needle is active and about to return the loopers are slowly tilting into position without any forward movement, thus permitting the needle to enter the loop with safety.

The advantages gained by the construction of my device are, that I am enabled to produce all the movements requisite to operate a button-hole machine by the employment of three eccentrics and straps—one for the feed movement, one for the looping devices, and one to vibrate the needle-bar-carrying frame, each having a different pitch but timed to act in harmony, thus dispensing with the cams employed in many machines of this class, which enables me to run the machine at a high rate of speed.

Fig. 6 shows the path traveled by the looper-points around the needle-hole during the operation of making the stitch. The stitch is the same as that described in the patent last referred to.

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

1. The combination, with the reciprocating needle, needle-bar, frame which carries the needle-bar, and means to operate the said parts, of the vertical shaft 1, eccentric 2, strap 4, rod 5, thumb screw *e*, eccentric 8, strap 9, link 12, eccentric 6, forked lever 7, swiveled boxes 14 and 15, looper-points 10 and 13, and detainer-points 16 and 17, substantially as and for the purpose herein set forth.

2. The combination, in a button-hole machine, of the needle-bar, its pivot-carrying frame, and the looping and feed mechanism, with means for operating said parts, as described, consisting of the vertical shaft 1, having the eccentrics 6 and 8 arranged beneath the bed-plate, and the eccentric 2 at the upper part of said shaft, the strap-levers 4, 9, and 7, the rod 5, the link 12, and the detainer-points 16 and 17, all arranged for co-operation, substantially as herein set forth.

3. The combination, with the reciprocating needle, needle-bar, and means for operating the same, of the vertical shaft 1, eccentric 8, strap 9, lever 12, pivoted boxes 14 and 15, looper-points 10 and 13, and detainers 16 and 17, substantially as and for the purpose herein set forth.

THOMAS F. HAGERTY.

Witnesses:

J. HENRY KAISER,
HARRY L. AMER.