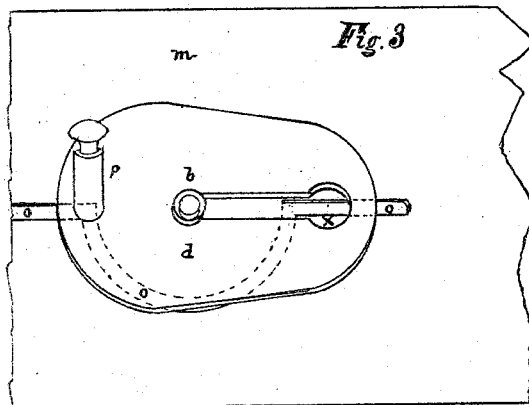
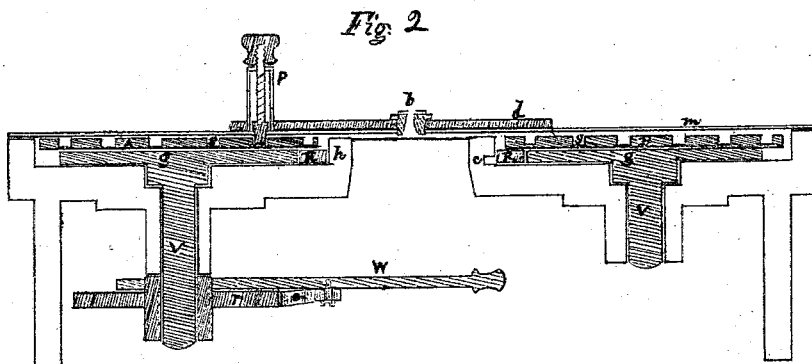
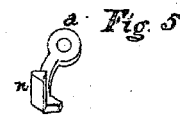
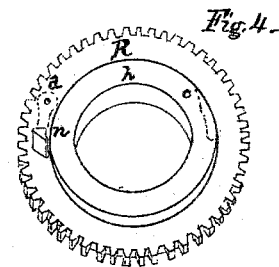
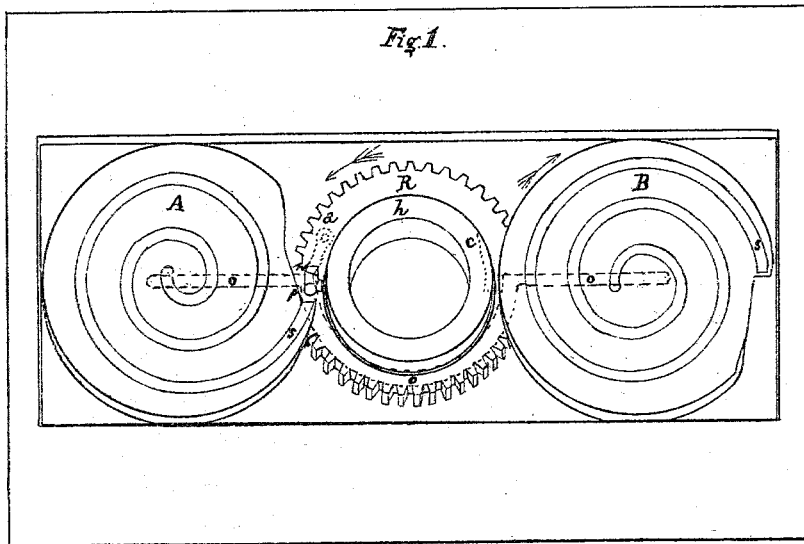


D. W. G. HUMPHREY.

Improvement in Button Hole Stitching-Machines.

No. 115,857.

Patented June 13, 1871.



Witnesses.

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# UNITED STATES PATENT OFFICE.

DANIEL W. G. HUMPHREY, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND EUGENE HUMPHREY, OF SAME PLACE.

## IMPROVEMENT IN BUTTON-HOLE-STITCHING MACHINES.

Specification forming part of Letters Patent No. 115,857, dated June 13, 1871.

I, DANIEL W. G. HUMPHREY, of Chelsea, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain Improvements in Button-Hole-Stitching Machines, of which the following is a specification:

My present invention is an improvement upon the machine patented by me October 7, 1862; and consists in a new device for feeding or moving along the clamp which holds the work to be stitched, and thus spacing the stitches regularly on the edges of the button-hole.

In my former invention I used a single feed-wheel, lying horizontally in a recess in the table under the slotted plate on which the clamp moved, and operated the clamp, in some respects, similar to my present mode. That device is very restricted in its range of work, and a change of feed-wheels is necessary to adapt the machine to fine, medium, and coarse stitching.

It is necessary, in stitching the round part or eye of the button-hole, to turn the clamp faster than it is moved when stitching the sides of the hole, in order not to take a disproportionate number of stitches in the eye of the button-hole. This accelerated movement of the clamp is accomplished in my former invention by a mechanism which is operated by a groove in the under side of the feed-wheel, and increases the throw of the lever which turns the wheel, and causes the ratchet on said lever to take more or less teeth at a throw, and thus to turn the wheel faster when stitching around the eye than when stitching the sides of the button-hole. This device is complicated, and liable to derangement in practical use, and is also restricted in its adjustment and harsh in its operation.

My present invention is a more simple and less expensive mode of attaining the desired result, and enlarges the range of the machine for practical work.

The following is a description of the parts and operation of my improvement, reference being had to the accompanying drawing.

Figure 1 represents my new feeding device in working position in its recess in the table of the machine, and is drawn half-size.

A and B are cams, having spiral grooves *s s*.

R is a toothed ring, having on one side a swinging arm, *a*, (more fully shown in Figs. 4 and 5,) which is riveted to its under side, and projects up through the ring at the point *n*; this ring turns upon the hub *h*, which is part of the bed or table of the machine. The hub *h* has a recess in one side at *c*, to allow said swinging arm or follower *a* to pass the clamp-pin after moving it around to that point, as hereinafter described. The cam B is the reverse of cam A, and both have gears on their under sides of the same diameter as the ring R, and which work in the teeth of said ring. The plate on which the clamp that holds the work to be stitched is moved, and which, when in working position, is screwed down to the table and covers said cams and ring, is not shown in Fig. 1; but the dotted lines *o o o* indicate the slot in said plate through which the clamp-pin projects down into the grooves in said cams.

Fig. 2 is a vertical section, cut down through the center of the cams A and B and ring R, and through the clamp and plate over the same when the several parts are all in proper working position.

*p* is the clamp-pin, in its hollow post; *d*, the base of the clamp; and *b*, the button on the plate *m*, on which the base of the clamp moves, and through which the upper needle descends and ascends in stitching the button-hole. *v v* are the shafts of the feed-cams A and B. *r* is a ratchet-wheel on the shaft of cam A; *e*, a ratchet attached to the reciprocating lever *w* for moving said wheel. Any suitable mechanism, whether a ratchet-wheel or friction-wheel, may be employed here for turning the feed-cams, and the throw of said cams may be restrained, if necessary, by the application of friction in any convenient manner.

Fig. 3 represents a section of the plate *m*, with the base of the clamp *d* in position ready to swing around the plate-button *b* to stitch the eye of the button-hole.

The practical operation of the described parts is as follows: After placing the clamp upon the plate, with its aperture *x*, Fig. 3, over the plate-button *b*, and pushing its edges under the flanges of said button until the pin *p* will go down through the slot *o* in the plate and into the groove *s* in the cam A, Fig. 1, then a

regular reciprocating movement is given to lever *w*, Fig. 2, which, through the ratchet *e* and wheel *r*, imparts an intermittent rotary motion to cam A, and, through the gear *g* under said cam, to the ring R, and through the ring R to the cam B, in the direction indicated by the arrows, Fig. 1; and, at the same time, the clamp carrying the work to be stitched is moved forward by the spiral groove *s* working against its pin *p*, and is guided by the slot *o* in the plate *m*, and the button *b*, and thus the stitches are regularly spaced on the side of the button-hole. Two and one-half revolutions of the cam A complete the feeding of the clamp for one side of the longest button-hole and deliver the clamp-pin onto the ring R, as shown in Fig. 1, when the follower *a* on said ring immediately acts against said pin and carries it through the circular part of the slot in said plate in one-half a revolution of said cams and ring, thus spacing the stitches around the eye of the button-hole uniformly and in the proportion of one to five on the sides. Now, when the clamp-pin comes in contact, after swinging around the eye, with the side of the slot in the plate over cam B, the follower *a* retreats into the recess of the hub *h* at *c* and passes said pin, while the outer point of the groove *s* in cam B passes under and around said pin and regularly feeds it toward the center of said cam, and thus spaces the stitches on the remaining side of the button-hole and completes the same.

By the use of separate feed-wheels or cams for spacing the stitches on the sides of the button-hole, and working, as shown, in conjunc-

tion with an intermediate ring for spacing the stitches around the eye, any desired proportion of stitches around the eye may be provided for by varying the form of the spiral grooves in the feed-cams, so that the clamp-pin shall be made to travel the length of the side of the button-hole and be delivered onto the ring to turn the eye in a greater or lesser number of revolutions of the cams to the half-revolution of the ring; and when the proper proportion of stitches is thus established between the eye and sides of the button-hole, the machine is adapted, without change of wheels, to stitch from the finest to the coarsest work, as a variation of the spacing of the stitches on the side of the button-hole, which may be effected as easily as a change of length of stitch in a common sewing-machine, will produce a proportionate variation in the spacing of the stitches about the eye of the button-hole. The spacing of the stitches, both on the sides and eye of the hole, is accomplished by this improvement in a more simple and reliable manner, and without varying the uniform movement of the feed-cams while stitching the button-hole.

I claim as my invention—

The two separate feed-cams for spacing the stitches on the sides of the button-hole, in combination with an intermediate ring for spacing the stitches around the eye of the button-hole, substantially as described.

DANIEL W. G. HUMPHREY.

Witnesses:

E. F. HALL,

EBEN HUTCHINSON.