

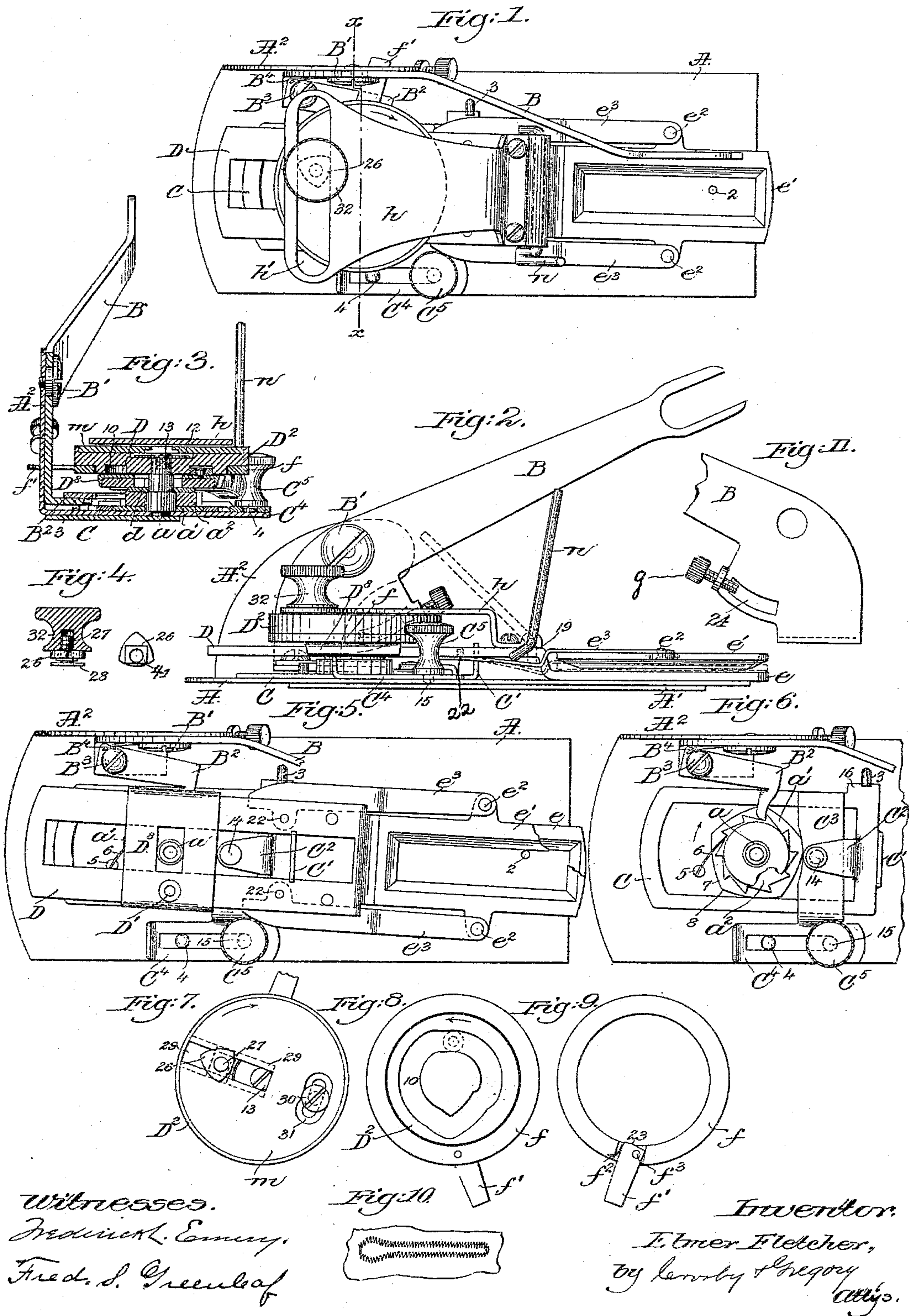
(Model.)

E. FLETCHER.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 412,081.

Patented Oct. 1, 1889.



UNITED STATES PATENT OFFICE.

ELMER FLETCHER, OF NEEDHAM, MASSACHUSETTS.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 412,081, dated October 1, 1889.

Application filed December 26, 1888. Serial No. 294,622. (Model.)

To all whom it may concern:

Be it known that I, ELMER FLETCHER, of Needham, county of Norfolk, State of Massachusetts, have invented an Improvement in
5 Button-Hole Attachments for Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object the production of a novel attachment for application to ordinary sewing-machines, and by which to stitch material for the production of button-holes.

15 The attachment herein described is especially devised to move the attachment and the fabric held by it under the needle-bar in such manner as to produce a button-hole such as described in United States Patent No.
20 389,840, granted to me September 18, 1888; but by changing the shape of the shaping-cam the said attachment may be readily adapted to stitching button-holes with both ends alike or of usual shape.

25 In this my present invention I have aimed to secure simplicity of construction and durability of parts, and this I have accomplished with but comparatively few parts.

30 The particular features in which my invention consists will be hereinafter described, and pointed out in the claims at the end of this specification.

Figure 1 is a top or plan view of a button-hole attachment embodying my invention;
35 Fig. 2, a side elevation thereof; Fig. 3, a section thereof in the line x , Fig. 1; Fig. 4, details of the clamping and adjusting nut forming the connection between the slotted plate (to be described) and the arm of the clamp.
40 Fig. 5 is a plan view of the attachment with the arm of the clamp and the slotted plate and cam removed. Fig. 6 is a detail in plan view, chiefly to show the rear end of the attachment and the cam-yoke and means for
45 moving it and holding it in adjusted position according to the length of the depth-stitch. Fig. 7 is a top or plan view of the cam and cam-plate thereon; Fig. 8, an under side view of the parts shown in Fig. 7. Fig.
50 9 shows the friction-ring detached, and Fig. 10 shows a piece of cloth stitched to form a

button-hole. Fig. 11 shows a detail hereinafter referred to.

A is the base-plate of the attachment; A' , a plate secured to its under side to take the
55 place of the usual shuttle-race slide when the latter is removed to apply the attachment to the machine, and A^2 is an upright of the base.

B is a lever having its fulcrum on a stud-
60 screw B' , and provided at its lower end with a pawl B^2 , (see Fig. 5,) pivoted at B^3 and acted upon by a spring B^4 . The lever B is forked at its other end in usual manner to be
65 actuated by the usual needle-bar nut or by a projection from the usual needle-bar of the machine.

The bed-plate has a needle-hole 2, and erected upon the said plate is a shouldered
70 stud or post a . (Shown clearly in Fig. 3.)

The bed-plate has a lip 3, a pin 4, and a split-
75 pin 5, and to the latter is secured a detent-spring 6. The stud a receives upon it, next to the bed-plate, the depth-stitch cam a' , the shape of which is best shown in Fig. 6, it hav-
80 ing, as represented, five like faces 7 on its periphery, separated by five seeming points or corners 8, the said cam being of such uniform diameter in every cross-section as to com-
85 pletely fill the slot or space between the sides of the yoke C, as shown in Fig. 6, the said cam in its step-by-step rotation derived from the
90 pawl B^2 acting on the teeth of the ratchet-wheel a^2 , fixed to or integral with the said depth-stitch cam and acted upon by the de-
95 tent 6 to avoid back motion. By making the depth-stitch cam of uniform diameter in any and every diametrical cross-section I am enabled to move the yoke positively without
100 any lost motion, which result could not be accomplished by a triangular cam or by a cam which was not of a uniform length in every diametrical cross-section. In its rotation the depth-stitch cam vibrates the yoke C and causes the projection C' of the said yoke (the
said projection being between the side bars of the shank D of the clamp) to vibrate the
said clamp. The projection C' , moved by the yoke, as described, acts in turn to convey its lateral motion to the clamp, and at the same
time this projection also serves as a fulcrum on which the shank of the cloth-clamp rocks

as the clamp is shifted to outline the shape of the button-hole. This latter movement is given to the clamp chiefly through the cam D^2 , it having a groove 10, in which enters a roller-stud D' of a bridge-piece D^8 , which embraces loosely the shank D of the cloth-clamp, to be described. The cam D^2 is fitted to turn on the stud a , just above the second shoulder from the bottom of the said stud. The cam D^2 is held down on the said stud by a friction-washer 12, which is held in place by a screw 13, (see Fig. 3,) which enters a threaded hole in the said stud. The ratchet-wheel a^2 has ten teeth, so that the depth-stitch cam a' is moved just far enough to enable it to move the yoke and cloth-clamp in one direction laterally, and then permit it to remain at rest for one descent of the needle, and then, when the needle rises from the material, move the yoke and cloth-clamp in the opposite direction and leave it at rest while the needle again descends through the material and rises therefrom, the said depth-stitch cam moving the clamp uniformly, which could not be done by a cam which was not of the same diameter in cross-section. The ratchet-wheel a^2 , it will be noticed, derives its motion directly from the pawl pivoted on the arm B and without the intervention of any other devices, thus simplifying the attachment, and the length of the pawl and the position of the stud a are such that the ratchet is turned by the pawl only after the needle-bar which actuates the lever B has risen sufficiently to remove the needle from the material, the pawl not acting to turn the ratchet until after the needle is fully out of the material. The yoke C has a lip C^2 , (shown best in Figs. 5 and 6,) provided with a hole which receives a fulcrum-pin 14 of a fulcrum-block C^3 , having, as shown, a slotted extension C^4 , which receives the guide-pin 4, and has extended through it the shank of the set-screw C^5 , which is used to hold the fulcrum-block in adjusted position, the nearer the fulcrum-pin 14 to the stud a the longer the depth stitch, and vice versa. The fulcrum-block crosses and overlaps the yoke C and aids in keeping it uniformly seated on the bed-plate. The yoke has an ear 16, which extends under the lip 3, which further aids in keeping the yoke seated on the bed-plate. The adjustment of the fulcrum-block carries with it the projection C' , which constitutes the fulcrum for the shank of the cloth-clamp, and as both fulcrums 14 and C' are adjusted in unison by one and the same operation it follows that the spaces between the rows of depth stitches at each side the center of the button-hole are at uniform distances apart in all sized button-holes along the straight edges of the button-hole slit, and thus, whatever may be the length of the depth stitch, the button-holes stitched by the use of the attachment are uniform and symmetrical, leaving just enough space for the cutting of the fabric after the stitching has been completed.

The stud a , above the ratchet-wheel a^2 and between it and the shank D of the cloth-clamp, is surrounded by a washer d , on which rests the slotted shank D . The shank D is bent downwardly at 19 (see Fig. 2) to form the under half e of the cloth-clamp, the said part e resting against the bed-plate and cut out to leave a space about the needle-hole, through which space the button-hole is stitched. The upper part of the clamp consists of an open foot e' , pivoted loosely by pins e^2 on spring-arms e^3 , attached by screws 22 to the shank D . The inner edges of the foot e' are downturned in usual manner to force the material down through the opening in the part e and against the bed-plate. The bridge-piece D^8 is slotted centrally and embraces the stud a , the width of the slot in the said bridge-piece being just sufficient to fit the said stud, so as to prevent any movement of the bridge-piece in the direction of the length of the bed-plate; but the said slot is enough longer than the diameter of the said stud to enable the shank D of the cloth-clamp to be moved laterally with relation to the said stud, as by the action of the cam D^2 on the roller-stud of the bridge-piece, one cam-groove 10, herein shown, being of such shape as to cause the cloth to be swung or moved about on the bed-plate and with such relation to the needle-hole 2 and the stitch-forming device of the sewing-machine as to enable the shape of the button-hole to be defined. The cam D^2 derives its intermitting rotation one step during each ascent of the needle-bar of the machine by, as herein shown, the action of a ring f , (shown separately in Fig. 9,) on which is pivoted a dog f' , acted upon by a spring f^2 , connected to the ring, the free end of the said spring acting on the said dog at a point between the center of the ring and the pivot f^3 , on which the said dog turns, the said spring normally acting to keep a part of the end 23 of the dog pressed against the periphery of the cam D^2 . The dog is extended outwardly through a slot 24 (see the detail, Fig. 11) in the lever B , the said lever having an adjusting-screw g , (see Fig. 11,) by which the effective length of the said slot may be regulated. The point of the said screw g meets the dog f' as the lever B is moved by the descending needle-bar, and the ring and dog are moved backwardly over the cam D^2 , held in place by the friction-washer 12; but as the needle-bar rises it moves the lever B in the opposite direction, and the said lever at the end of the slot meets the dog f' and causes it to firmly engage the periphery of the cam D^2 and rotate it for one step.

To effect the longitudinal movement of the clamp according to the length of the button-hole, I have provided the clamp or the shank thereof with a rigid arm h , slotted at h' transversely to the slot in the shank D , and in this slot I have placed a triangular cam 26, mounted loosely on a screw 27, having an oblong thin head 28, which slides in a groove 29,

made in a plate *m*, shown as countersunk into the upper face of the cam D^2 , and made adjustable with relation to the said cam by a screw 30 in a slot 31 of the said plate, the screw entering the cam D^2 . The triangular cam 26 has at its under side (see dotted lines, Fig. 7, and full lines, Fig. 4) a projection marked 41 in Fig. 4, which projection enters the upper side of the slot 29 in the plate *m* and prevents any rotation of the said cam 26 with relation to the said plate. The screw 27 has applied to it a thumb-nut 32, rotation of which in one direction enables the head of the screw to be moved in the slot 29 toward or from the center of the plate *m* and the center of rotation of the cam D^2 to thereby cause the cam 26, it acting as a crank-pin in the slot *h'*, to move the clamp a greater or less distance longitudinally during any one rotation of the cam D^2 . Adjustment of the plate *m* on the cam D^2 enables the slot 29 to be correctly located with relation to the cam-groove 10, and when over a correct position is secured there by the screw 30.

The clamp may be opened and closed at proper times by the usual lever *n*.

I claim—

1. In a button-hole attachment, the following instrumentalities, viz: the base-plate having a stud *a*, the slotted yoke C, the cloth-clamp having a shank D, engaged by a projection of the said yoke, the depth-stitch cam a' , uniform in cross-section at all points to fill from side to side the slot in the said yoke to thus move the same positively and prevent any lost motion, and a ratchet-wheel connected to it, both being movable together about the said stud, a lever B, a pawl B^2 , carried thereby and directly engaging the said ratchet-wheel, and means to move the cloth-clamp longitudinally, to operate substantially as described.

2. The base-plate having the stud *a*, the depth-stitch cam a' , uniform in cross-section at all points, and the ratchet-wheel a^2 , connected to the depth-stitch cam and both mov-

able upon the said stud, the slotted yoke C, having the projection C' , the said depth-stitch cam at all times filling the slot in the said yoke from edge to edge, the cloth-clamp having a slotted shank D engaging the said projection, and the cam D^2 , having a slot 10, and the bridge-plate having a roller-stud, combined with means for rotating the said cam-plate and the said depth-stitch cam and means to move the cloth-clamp longitudinally, substantially as described.

3. The base-plate, its stud *a*, the depth-stitch cam, the connected ratchet a^2 , the yoke C, moved by the said cam and having an ear C^2 and a projection C' , the fulcrum-plate C^3 , the stud 14, serving as a fulcrum for the yoke C, the cam D^2 , having a cam-groove 10, means to rotate it intermittingly, the cloth-clamp having the slotted shank D, means to move the cloth-clamp longitudinally, the bridge-plate, the roller-stud D' , mounted thereon, entering the said groove 10, means to rotate the said cam D^2 intermittingly, and means to effect the adjustment of the said fulcrum-block, substantially as described.

4. The base-plate A, having the stud *a*, the depth-stitch cam and its ratchet-wheel, means to rotate them, the yoke C, having the projection C' , the fulcrum-plate for the said yoke, the bridge-plate having a roller-stud, the cam D^2 , means to rotate it, the friction-plate co-operating with the said cam, the cloth-clamp having a slotted shank D, engaged by the said bridge-plate, the slotted plate *m*, secured to the cam D^2 , the adjustable screw therein having a cam thereon, and the slotted arm *h*, secured to the cloth-clamp, the combination being and operating substantially as described.

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

ELMER FLETCHER.

Witnesses:

G. W. GREGORY,
FREDERICK L. EMERY.