(No Model.) 3 Sheets—Sheet 1.

E. S. PRATT.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 332,676. Patented Dec. 15, 1885.

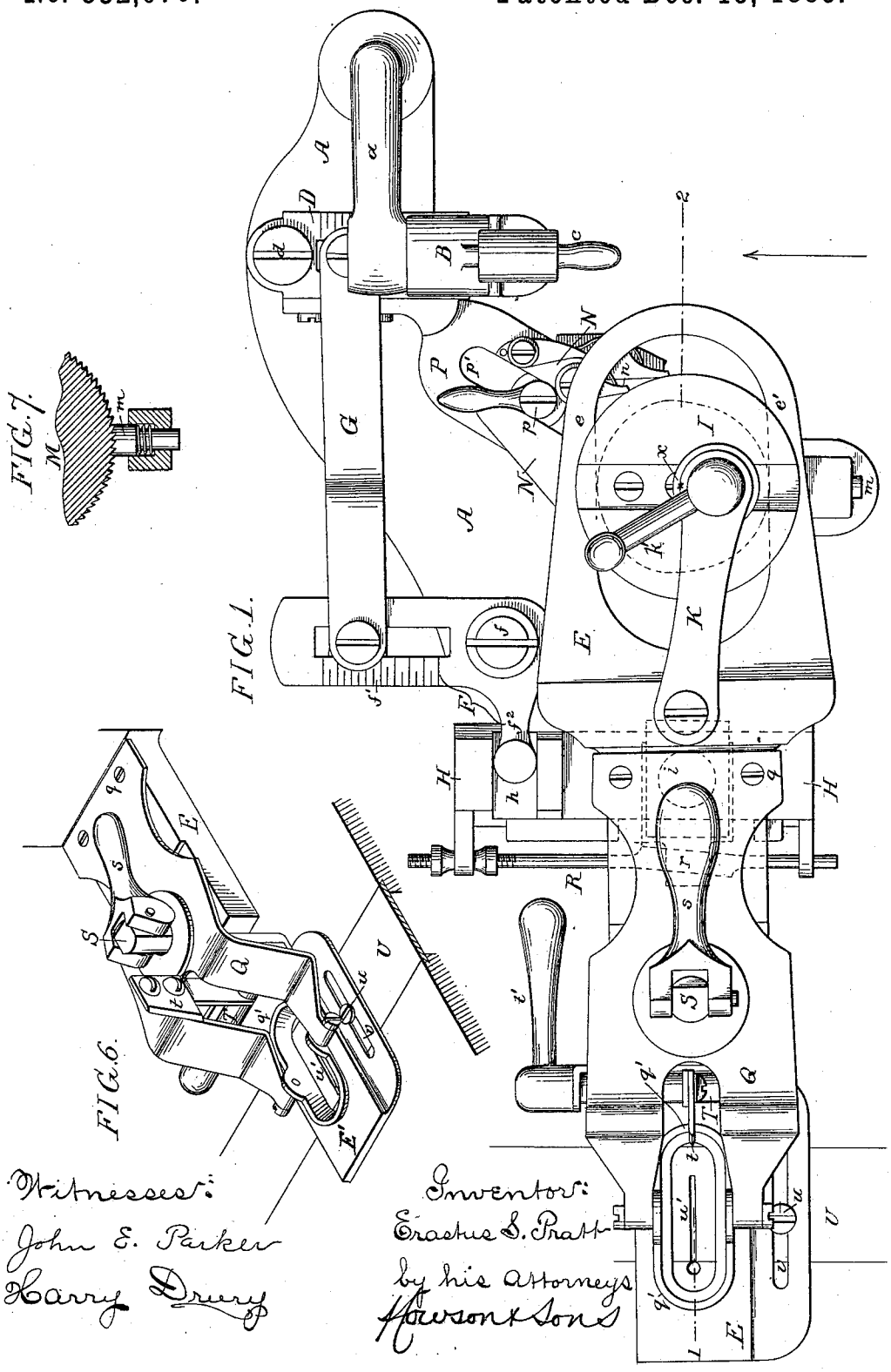

FIG. 7.

FIG. 1.

FIG. 6.

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Harry Drury

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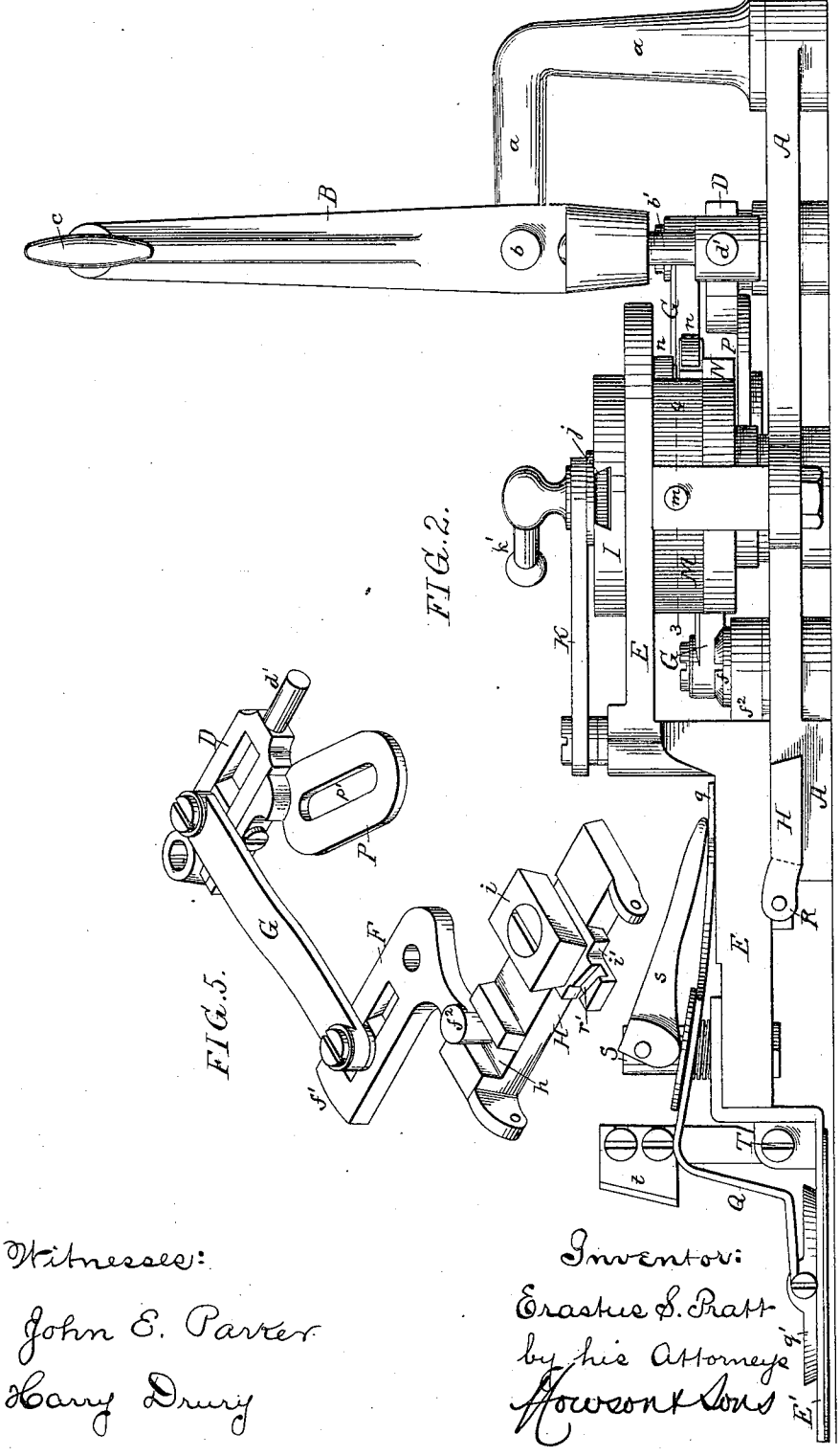

FIG. 2.

FIG. 5.

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(No Model.) 3 Sheets—Sheet 3.

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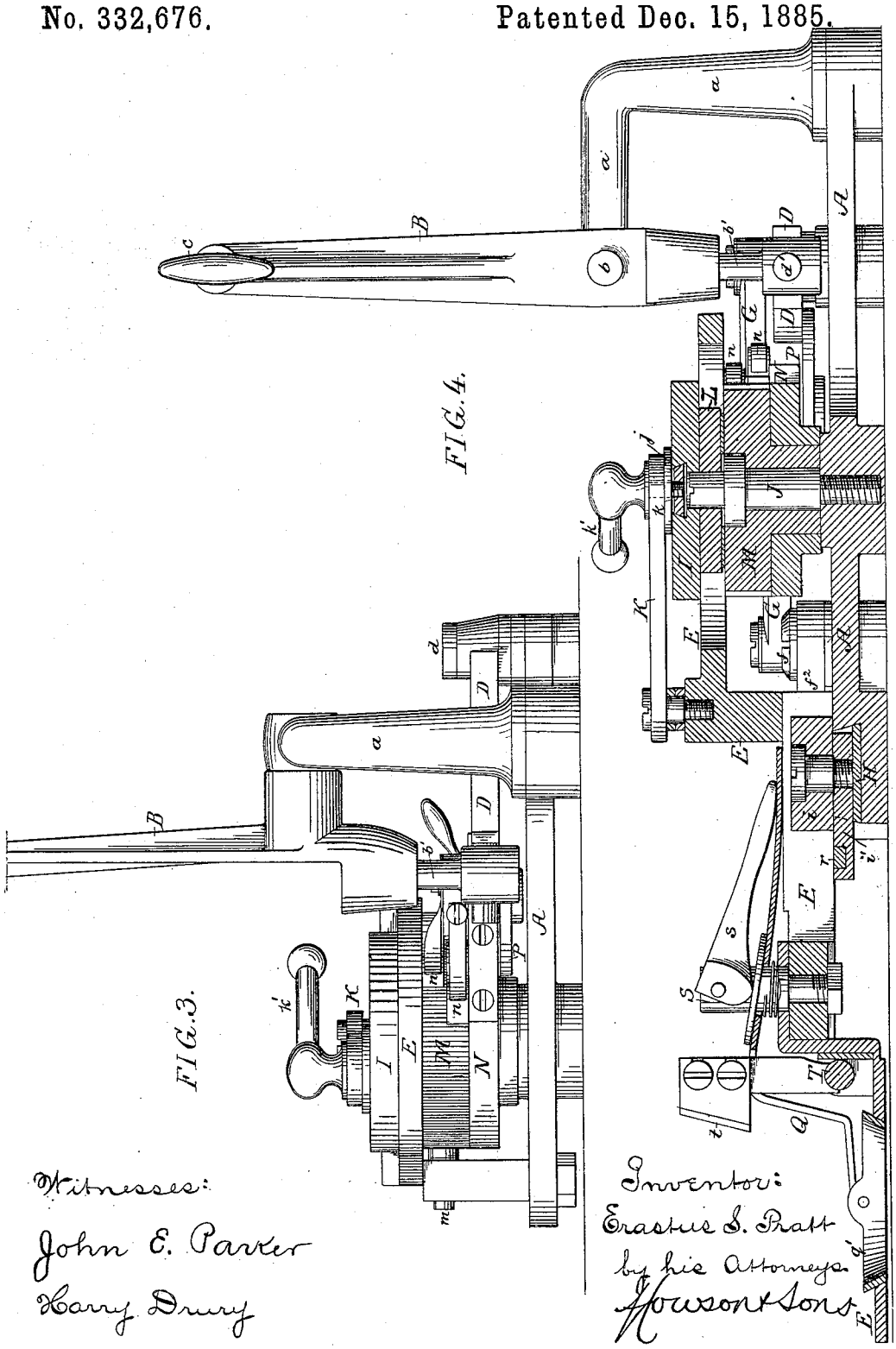

FIG. 4.

FIG. 3.

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UNITED STATES PATENT OFFICE.

ERASTUS S. PRATT, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE AMERICAN BUTTONHOLE, OVERSEAMING AND SEWING MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 332,676, dated December 15, 1885.

Application filed August 3, 1885. Serial No. 173,363. (No model.)

To all whom it may concern:

Be it known that I, ERASTUS S. PRATT, a citizen of the United States, residing in Brooklyn, Kings county, New York, have invented certain Improvements in Button-Hole Attachments for Sewing-Machines, of which the following is a specification.

My invention relates to that class of button-hole attachments for sewing-machines in which the material is held between a pair of clamps having a vibrating movement in one direction and an intermittent feed motion in the opposite direction, my invention consisting of certain improvements in the construction of the devices for imparting these movements to the clamp, and in the combination, with the clamp, of a device for cutting the button-hole.

In the accompanying drawings, Figure 1 is a plan view of my improved button-hole attachment for sewing-machines; Fig. 2, a side view, looking in the direction of the arrow, Fig. 1; Fig. 3, a rear end view; Fig. 4, a longitudinal section on the line 1 2, Fig. 1; Fig. 5, a detached perspective view of the mechanism for imparting a vibrating movement to the clamp-plate; Fig. 6, a detached perspective view of the clamp; and Fig. 7, a detached section on the line 3 4, Fig. 2.

A is the base of the attachment, secured to the bed of the sewing-machine in any suitable manner. Motion is imparted from the sewing-machine to the working parts of the attachment, in the present instance, through the medium of a lever, B, pivoted at *b* to an upright arm, *a*, at one end of the base-plate, the upper end of the lever being provided with a switch-pin, *c*, intended for adaptation to a double cam on the upper shaft of the machine. A lever, D, pivoted at *d* to the base A, is connected to the lever B through the medium of a universal connection consisting of a swiveled pin, *b'*, having a head, through which a pin, *d'*, on the lever D passes.

E is a plate carrying the cloth-holding clamp, this plate having both a lateral vibrating movement and an intermittent reciprocating movement.

The vibrating movement is effected in the following manner: The lever D is connected by a rod, G, to the arm *f'* of the bell-crank lever F, pivoted at *f* to the base of the machine, each lever being slotted, in order that the rod G may be adjusted nearer to or farther from the fulcrums of the levers, for a purpose described hereinafter. The outer end of the arm f^2 of the lever F is contained within a groove, *h*, in a sliding bar, H, fitting into a dovetailed recess in the base of the attachment, and carrying a swiveled block, *i*, which is adapted to a dovetailed slot in the plate E.

When the lever B is vibrated, a lateral reciprocating movement is imparted to the slide H through the medium of the above-described parts, and as the plate E is under control of the pivoted block *i* of the slide this vibrating movement must necessarily be transmitted to the said plate E, the fulcrum of which is at the point *x*, the latter being the axis of a stationary pin, J, secured to the base-plate.

The forward and rearward movement of the plate E is effected by a disk, I, secured by screws or otherwise to a ratcheted drum, M, on the post J. The disk I has a dovetailed slot, to which is adapted a block, *j*, into a threaded opening in which screws a stem, *k*, having an operating-handle, *k'*, and adapted to an opening near one end of a rod, K, the opposite end of which is connected to the plate E. Beneath the disk I and secured to the drum M is a cam, L, which is adapted to a slot in the plate E, the arms *e e'* of said plate bearing against the opposite faces of the cam.

An intermittent movement is imparted to the ratcheted drum M by means of the spring-pawls *n n*, which are secured to an arm, N, the latter being pivoted to the post J, and slotted for the reception of a pin, *p*, which is secured to an arm, P, projecting from the lever D. (See Figs. 1 and 5.) The pin *p* can be adjusted in a slot, *p'*, in the arm P, so as to regulate the throw of the arm N, and hence govern the extent of each movement imparted to the wheel M by the pawls *n*, a spring detent-pawl, *m*, Figs. 1, 3, and 7, preventing the wheel from moving backward. It will thus be seen that the extent of lateral vibration of the plate E while stitching each side of the button-hole is governed by the reciprocation of the slide

H, and this is regulated by the adjustment of the rod G on the levers D and F, the length of the stitches in the row on each side of the button-hole being thus determined. The length of each side row of stitches is determined by the extent of the longitudinal movement of the plate E, and this is governed by shifting the point of connection of the rod K and disk I nearer to or farther from the center of said disk. This adjustment also regulates, to some extent, the distance between the stitches of each row; but I rely mainly for this result upon the throw of the pawls *n* and the extent of the intermittent movements of the drum M, which is regulated by the adjustment of the pin *p* in the slot *p'* of the arm P. The cam L serves to impart to the plate E at each limit of its longitudinal movement a lateral movement independent of that due to the slide H, this lateral movement being for the purpose of shifting the cloth-clamp in respect to the needle, so as to form the rows of stitches on opposite sides of the button-hole, the block *i* serving as the fulcrum for this movement of the lever, and in order to vary the distance between the opposite rows of stitches, or, in other words, to vary the width of the button-hole, the plate *i'*, carrying the block *i*, is adjustable in its guides in the slide H, so as to be moved toward or from the cam L, this adjustment being effected by a transverse rod, R, carried by lugs on the slide, and having a cam, *r*, adapted to a slot, *r'*, in the plate. (See Figs. 1 and 5.)

The cloth-clamp is of the ordinary construction, and consists of the base E', forming part of the plate E, and a spring-clamp, Q, secured to the plate at *q*, and acted upon by a cam-lever, *s*, the fulcrum-pin of which is carried by a post, S, projecting from the plate E. The outer end of this spring-clamp Q is provided with a pivoted shoe, *q'*, adapted to an opening in the plate E', and having its lower edge serrated to engage with the cloth. In the rear of the opening in the plate E' is a shaft, T, adapted to suitable bearings on the plate, and secured to this shaft is a knife, *t*, for cutting the slit in the fabric for the button-hole, said shaft being supplied at its outer end with a suitable operating-handle, *t'*, which, when thrown back, will by its weight hold the knife up out of the path of the needle; or a spring may be used for this purpose, if desired. The plate E' has a longitudinal slot, *v*, for the reception of a pin, *u*, projecting from the shuttle-race cover-plate U, Fig. 6, which slides in dovetailed ways in the bed-plate of the sewing-machine. In this plate U is a slot, *w'*, which is directly in the path of the knife *t*, one edge of said slot serving as a shear-blade on the descent of the knife for the purpose of cutting the slit for the button-hole.

By using a cutting-knife carried by the same plate which carries the cloth-clamps, said knife must necessarily be at all times in line with the center of the said clamps, and hence must cut the button-hole exactly between the lines of stitches, as set forth in a separate application for patent filed by me on the 10th day of November, 1885, Serial No. 182,322. The novel feature of this part of my present application is the under plate, U, which moves laterally with the cloth-clamp, so as to afford a proper support for the cloth when cut by the knife.

The knife-blade is detachable for sharpening, repairs, or when it is desired to replace it with another of a different size.

Button-hole attachments have been heretofore constructed in which the movement of the needle-arm is transmitted to a slide carrying cloth-clamps, through the medium of a straight lever; but in such cases the vibrating movement of the slide for causing the stitch to be formed first on one side and then on the opposite side of the button-hole is in the direction of the length of the slide, while the movement of said slide necessary to cause the formation of stitches from one end of the button-hole to the other is in a direction transversely to the length of the slide. The devices for imparting this latter movement must therefore be placed at one side of the plate, so that as said devices are necessarily somewhat large the size of the attachment is unduly increased, whereas in my attachment the movement of the plate to cause the endwise movement of the button-hole is in the direction of the length of the plate, and can consequently be effected by devices acting on the rear end of said plate, the vibrating movement being in a direction transversely to the length of the plate, and being effected by the substitution of a bell-crank lever for the straight levers used in prior attachments.

I claim as my invention—

1. The combination, in a sewing-machine attachment, of the pivoted plate E, carrying the cloth-clamp, a vertical stud, J, devices carried thereby and acting upon the rear end of said plate for reciprocating the same in the direction of its length, a cam, I, also carried by said stud J, for vibrating the plate E on a pivot-pin, *i*, a transverse slide, H, carrying said pivot-pin *i*, the lever D, and means for vibrating the same, and the bell-crank lever F at the side of the slide E, one arm of said lever being connected to the lever D, and the other arm to the transverse slide H, all substantially as set forth.

2. The combination of the plate E and means for reciprocating the same in the direction of its length, the transverse plate H and means for reciprocating the same, and a block, *i*, adapted to a slot in said plate E and adjustable on the slide H, so as to be moved nearer to or farther from the fulcrum of said plate, all substantially as specified.

3. The combination of the plate E, a crank-wheel and connecting-rod for reciprocating the same in the direction of its length, a cam adapted to a slot in the plate, and serving to impart lateral vibration thereto, a slide, H,

guided transversely to the plate E, and carrying an adjustable pivot-pin therefor, a lever, D, and means for vibrating the same, and a bell-crank lever, F, one arm of which is connected to the lever D, and the other arm to the slide H, all substantially as specified.

4. In a button-hole attachment for sewing-machines, the combination of the cloth-clamp, the movable plate carrying the same, a knife mounted on and moving with said plate, and a sliding plate, U, connected to the clamp so as to move laterally therewith, all substantially as specified.

5. In a button-hole attachment for sewing-machines, the combination of the cloth-clamp, the movable plate carrying the same, a knife mounted on and moving with said plate, and a sliding plate, U, provided with a slot for the entrance of the knife, and connected to the clamp so as to move laterally therewith, all substantially as specified.

6. The combination of the plate E, the cam L, and the slide H, a plate, *i'*, guided in said slide and carrying a pivot-block, *i*, for the plate E, and an adjustable rod, R, having a cam, *r*, adapted to a slot, *r'*, in said plate *i'*, as set forth.

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

ERASTUS S. PRATT.

Witnesses:

HARRY SMITH,

HENRY HOWSON.