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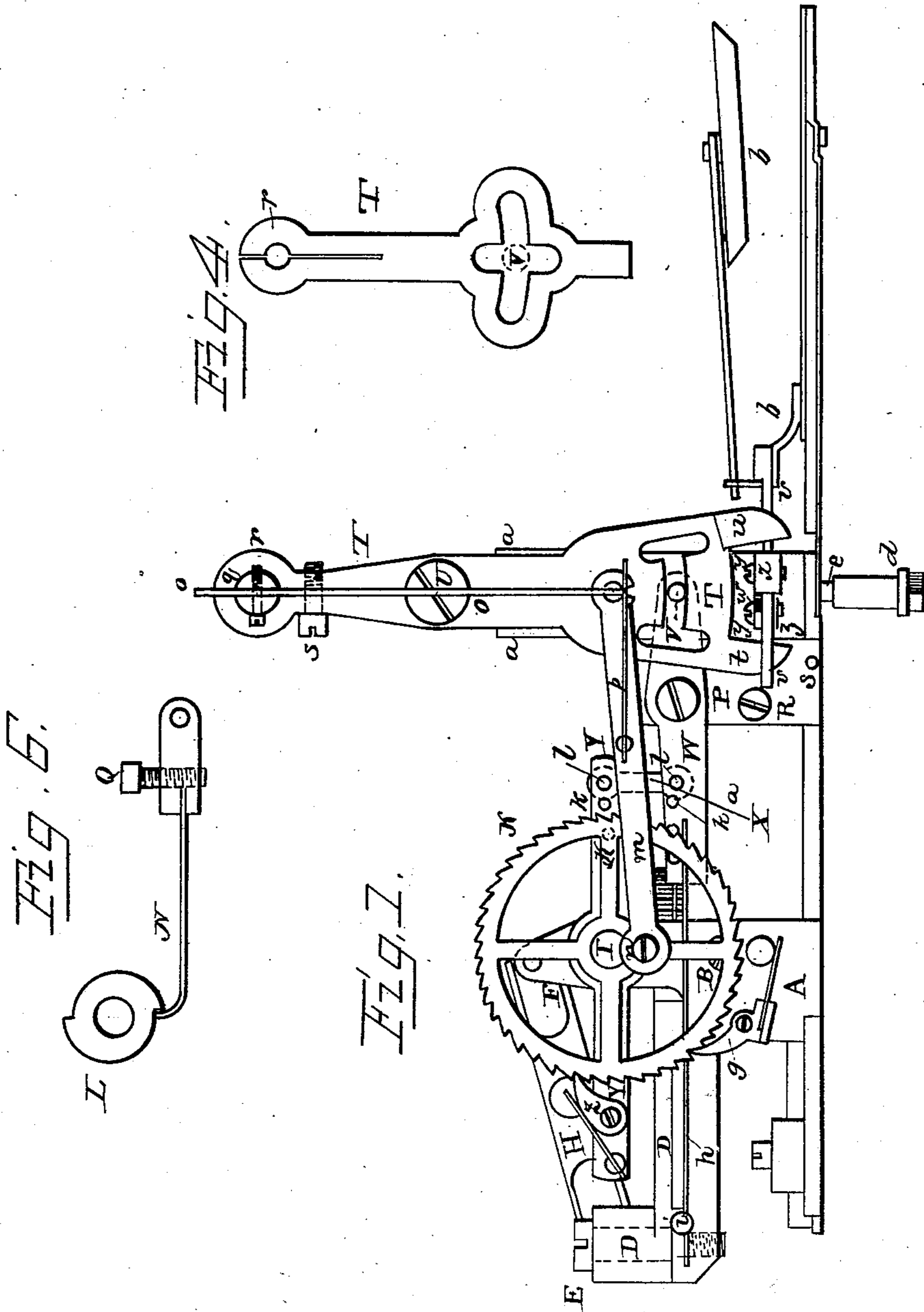
3 Sheets—Sheet 1.

J. McCREARY & D. R. SMITH.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 260,885.

Patented July 11, 1882.



WITNESSES
H. L. Curran
R. M. Smith.

INVENTORS,
John McCreary
David R. Smith
by A. L. Smith, Attorney

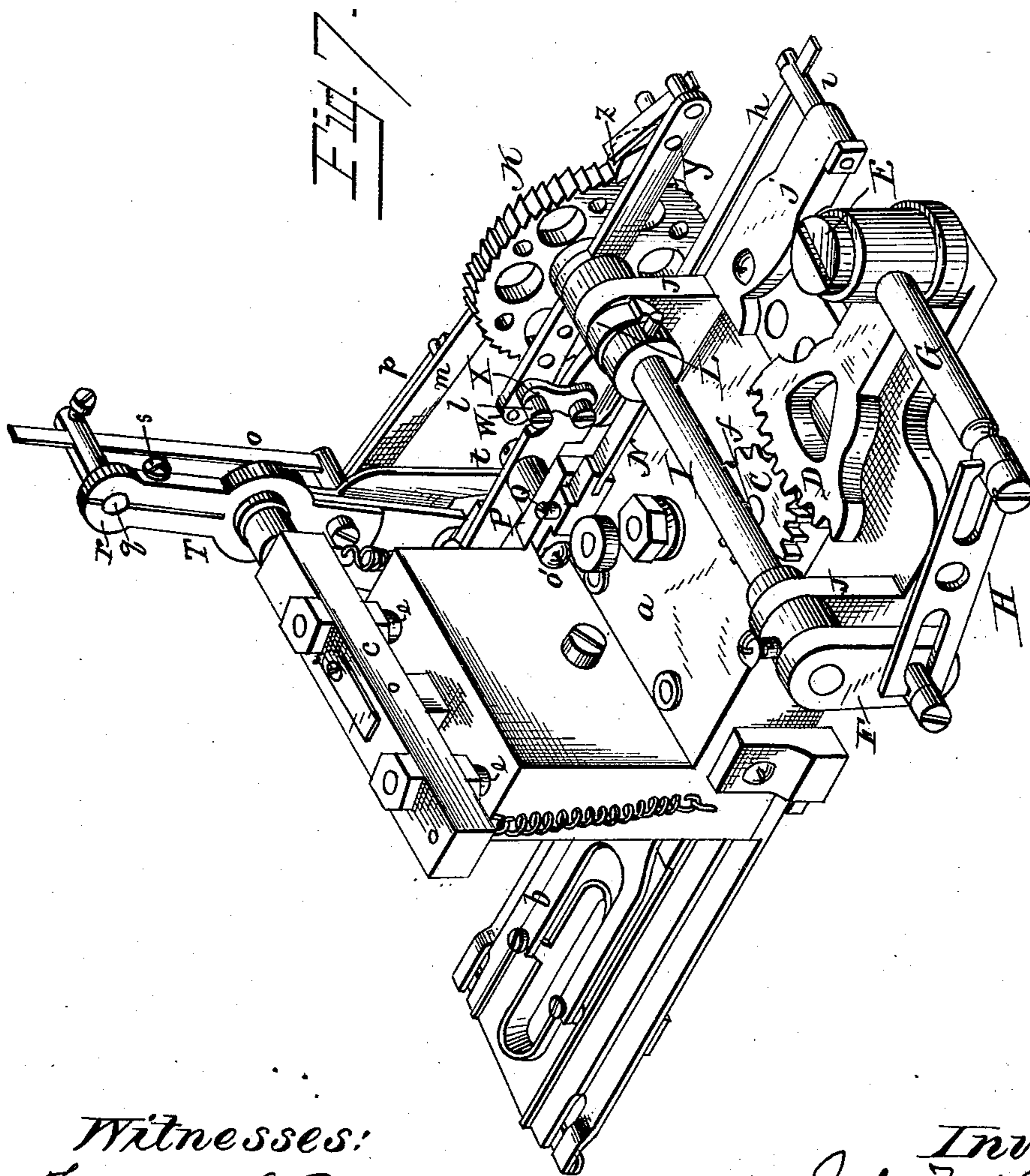
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Witnesses:
Frank L. Ourand,
R. R. Smith

Inventors:
John M. Creary,
David R. Smith,
by A. L. Smith,
Attorney

UNITED STATES PATENT OFFICE.

JOHN McCREARY, OF COHOES, AND DAVID R. SMITH, OF TROY, N. Y.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 260,885, dated July 11, 1882.

Application filed March 15, 1882. (Model.)

To all whom it may concern:

Be it known that we, JOHN McCREARY and DAVID R. SMITH, the former of Cohoes, county of Albany, and the latter of Troy, county of Rensselaer, State of New York, have invented new and useful Improvements in Button-Hole Attachments for Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of a button-hole attachment having our improvements. Fig. 2 is a plan view of the same. Figs. 3, 4, 5 and 6 are detail views hereinafter described; and Fig. 7 is a perspective view of our improved button-hole attachment, showing the arrangement of the parts.

Our invention relates to that class of button-hole attachments in which the cloth plate or clamp and its actuating rack-plate have a lateral movement or vibration imparted to them at the ends of the button-hole by means of a rock-shaft or axle, for causing the button-hole to be stitched or "barred" at the ends, and moving the material operated upon into position adapting the button-hole to be stitched upon the opposite side to that previously operated upon, at the same time vibrating the rack-plate actuating the cloth-clamp into position for reversing the direction of its movement, the devices employed for the above purposes and for actuating the rack-plate being similar to those employed in what is known as the "Universal" button-hole attachment, illustrated in Letters Patent granted to S. Rockwell, February 4, 1879, No. 211,932, or to S. J. Baird, August 6, 1878, No. 206,768. In these the rock-shaft referred to is operated for "bar-ring" the ends of the button-hole and vibrating the cloth-clamp and its actuating rack-plate by hand by the attendant; and the object of our invention is to cause said shaft to be rocked automatically at the ends of the button-hole by connecting it with an operative part of the machine or button-hole attachment, and with means for gaging the length of the button-hole, whereby when the machine is set or adjusted to stitch a button-hole of any given length it will operate to form or stitch the sides and ends of the same without atten-

tion on the part of the operator beyond the proper placing in the cloth-clamp of the material to be operated upon, as hereinafter explained.

Parts of what is known as the "Universal" button-hole attachment are shown in Figs. 1, 2 and 3, of which parts *a* is the casing or frame. *b* is the vibrating and sliding clamp for holding the garments. *c* is a transverse horizontal bar connected with a parallel plate, *d*, by two vertical sliding rods, *e*.

The transverse horizontal bar *c* receives, when the machine is in operation, an upward motion, once for every stitch, and moves upward while the needle is above the cloth, serving, through a pendent pivoted pawl, to operate a ratchet-wheel, and thence, through suitable gears, cam or eccentric, and rack-plate, to impart the necessary vibratory and longitudinally-reciprocating movements to the cloth-clamp in a manner that is well known, and need not therefore be described herein.

The downward or return motion is produced by springs which keep the plate *d* on the face of the driving-cam.

The devices (not shown) for actuating the cloth-clamp *b* are so constructed and arranged, in connection with the vertical rock-shaft or axle *f*, that a half-revolution of the latter, moving alternately in opposite directions, acts upon the cloth-clamp and its actuating rack-bar, vibrating them laterally at the ends of the button-hole for causing the latter to be stitched or barred at said ends and moving the rack-bar into position to reverse the direction of its movement and that of the cloth-clamp, the latter, with the material being operated upon, being at the same time moved into position, for causing the button-hole to be stitched upon the opposite side to that previously operated upon.

The axle *f* is generally moved or driven with a hand-lever manipulated by the operator. Our invention connects the driven axle *f* with the transverse bar *c* in such a manner that the required motion is derived from the latter and the movement of the former rendered automatic.

Of the details of our invention, *A* is the frame, secured to casing *a* by screws *B*.

A pinion, *C*, attached to the axle *f*, is driven

by a segment, D, which vibrates about a stud, E, secured to the frame.

A crank, F, through a connecting-rod, H, and arm G, communicates motion to the segment or rack D, one half-revolution of the crank causing the segment to move in one direction, and the other half-revolution of the crank causing the return movement of the segment in the contrary direction.

I is a double-cranked ratchet-wheel shaft, revolving in one direction only in bearings J, projecting from the frame A.

To one end of shaft I is secured the crank F, and to the other extremity is fastened the ratchet crank-wheel K.

L is a double cam secured to shaft I by a set-screw M.

The spring N is hinged by the stud *o'* to the stud-stand P, and is adjusted by turning the adjusting-screw Q.

In working at moderate speed the double cam L and spring N are not required; but at high speed said cam and spring prevent the parts from being carried by momentum beyond their proper position at the end of each half-revolution of the shaft.

The stud-stand P is secured to the casing *a* by a screw, R, and a steady-pin, S.

T is a slotted lever, pivoted and vibrating freely on a stud, U, formed upon or secured to one end of the bar or cross-head *c*, from which it receives a vertically-reciprocating movement. This lever is provided in its lower expanded end with a horizontal slot, curved in the arc of a circle of which the stud U is the center, and terminating at its ends in vertical or radial slots, giving to the slot as a whole a form resembling the letter H, as shown.

A pin, V, on the lever W enters said slot, and while resting within the horizontal portion thereof receives a vertical movement from and corresponding to the vertical movement of the lever T.

The lever W vibrates upon a horizontal stud on the stand P, and is connected by an adjustable link, X, with one arm of the lever Y, pivoted on the axle I, and provided with a pawl, Z, for actuating the ratchet-wheel K.

A pawl, *g*, is hinged to the frame A, and engages the teeth of the ratchet-wheel to prevent any backward motion.

A spring, *h*, projects from the extremity of the lever W, sliding freely in a slot in an oscillating guide, *i*, and serves to retain the lever W in a horizontal or suitable position when the slotted lever T is disengaged from the pin V.

The guide *i* has a suitable bearing in the projecting arm *j* of frame A.

The throw of pawl Z is regulated by moving the link X from or toward the shaft I, for which purpose a number of screw-holes, *k*, and movable bearing-studs *l* are provided.

Inasmuch as each thrust of the pawl Z corresponds to one stitch, the greater the throw

of that pawl the quicker a half-revolution will be given to the shaft I and the fewer will be the stitches in the end of the button-hole.

The rod *m* connects the crank-pin *n* of the ratchet crank-wheel K with a bearing on the lower extremity of a flexible rod or spring, *o*.

For convenience in connecting and disconnecting, one end of rod *m* is made in the form of a hook, and is retained in place by the spring *p*.

The flexible rod *o* is secured at its upper end in an adjustable clamping-stud, *q*, attached to the upper arm of the slotted lever T.

The adjustable clamp-stud *q* is held firmly in its proper position by a clamp, *r*. The loosening of the screw *s* permits the stud *q* to be turned, the tightening of said screw securing the stud in the desired position.

The length of the vibration of the slotted lever may be regulated by moving the flexible rod *o* up or down through the clamp-stud *q*.

t and *u* are projections extending downward from the lever T, one on each side of the tappet-arm *v*.

The tappet-arm *v* proceeds from the sliding clamp *b*, to which it is firmly secured by rivets, and, forming a right angle, passes between the projections *t* and *u*, and when the machine is in operation moves with the clamp *b* a distance equal to and determining the length of the button-hole.

w and *x* are movable tappets, secured by screws *y* and nuts *z* to the arm *v*. The screws *y* passing through a longitudinal slot in the arm *v*, the tappets may be moved in either direction to regulate the length of the button-hole. These tappets are so arranged that the nearer they are set to each other on the arm *v* of the cloth-clamp the shorter will be the button-hole, and vice versa, the length of the button-hole being governed by the distance which the tappets move before coming into contact with the projections on the lever T.

Beginning on either side of the button-hole, with the sliding clamp moving toward either end, when near that end, one of the tappets, *w* or *x*, comes in contact with one of the projections, *t* or *u*, and the flexible rod *o*, yielding to the pressure of the tappet on the projection, the lever T will be caused to engage the pin V in the horizontal portion of its slot, and thus to set the several parts of the device in motion to form one end of the button-hole.

In forming either end, after the slotted lever T engages the pin V, the double-cranked ratchet-wheel shaft I, moved by the pawl Z, makes a half-revolution, and the rod *m*, acting through the flexible rod *o*, draws or pushes the slotted lever T to the opposite side, when the pin V is disengaged from said lever by entering one of the vertical slots therein, which permits the vertical vibration of the lever T without actuating the pin V and lever W. While the pin V thus rests in the vertical portion of the slot the shaft *f* remains at rest until the side of the button-hole being operated

upon is completed, when, by the action of the other tappet, *w* or *x*, the lever T is again crowded laterally until the horizontal portion of the slot engages the pin V and sets the parts in motion, reversing the movement of shaft *f* and forming the other end of the button-hole.

The proportions, position, and adjustment of the parts must be such that one end of a button-hole is formed during each half-revolution of the shaft I—that is to say, the segment or rack D must move or drive the axle *f* around the required number of degrees to form one end of the button-hole, which in this application of our invention is one-half of one revolution, while the shaft I and parts attached to it make one-half of one revolution. The pin V being then disengaged from the lever T, the segment D and shaft I remain at rest until the intervening side of the button-hole is made, when the lever T again engages the pin V, giving another half-revolution to the shaft I and the return movement to segment D and axle *f*, during which movement of the axle *f* the second end of the button-hole is made. The pin V and the several parts through which motion is communicated from it to the axle *f* then remain at rest while the button-hole is completed and until the lever T again engages the pin V.

The slotted lever T may have the form exhibited in Fig. 4, in which case the two cranks of the ratchet-wheel crank-shaft I must be set at right angles to each other, whereas if the other form were used they would be opposite one to the other. In using the form shown in Fig. 4 both tappets must project from the same side of the tappet-arm.

Having now described how our invention may be carried out in practice, what we claim as new is—

1. In a button-hole attachment for sewing-machines, the combination, with the cloth-clamp provided with suitable projections, and the rock-shaft by means of which said clamp is shifted laterally, of intermediate mechanism, substantially as described, adapted to be connected with and operated by a moving part of the attachment, and to be thrown into opera-

tion at suitable intervals by the projections carried by the cloth-clamp, substantially as set forth.

2. The combination, with rock-shaft *f* and rotating shaft I, of intermediate mechanism adapted to rock the former on the rotation of the latter, the ratchet-wheel mounted on said shaft I, and mechanism for imparting an intermittent rotary movement to said ratchet-wheel, substantially as described.

3. The combination, with the cloth-clamp provided with adjustable projections or tappets, of the rock-shaft *f* and mechanism for actuating the same, adapted to be thrown into action by said tappets, substantially as described.

4. The combination, with the rock-shaft *f*, the double-cranked shaft I, mechanism for connecting said shafts, and the ratchet-wheel for actuating the shaft I, of the vertically-reciprocating slotted lever and intermediate devices connecting said lever and ratchet-wheel for actuating the latter, substantially as described.

5. The vertically-reciprocating slotted lever and the double-cranked ratchet-wheel shaft having a yielding connection therewith, in combination with tappets attached to and moving with the cloth-clamp for moving said lever into engagement with the ratchet-wheel-actuating devices, substantially as described.

6. The double-cranked ratchet-wheel shaft I, in combination with the double cam and the adjustable spring-stop, arranged and operating substantially as described.

7. The combination, with the rock-shaft *f*, of the double-cranked ratchet-wheel shaft I, mechanism connecting said shafts, levers W and Y, slotted lever T, and adjustable tappets connected to and moving with the cloth-clamp, arranged and operating substantially as and for the purpose described.

In testimony whereof we have hereunto set our hands this 11th day of March, A. D. 1882.

JOHN MCCREARY.

DAVID R. SMITH.

Witnesses:

EDWARD MCCREARY,
J. LEONARD WHITE.