

(Model.)

4 Sheets—Sheet 1.

J. H. PALMER.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 302,018.

Patented July 15, 1884.

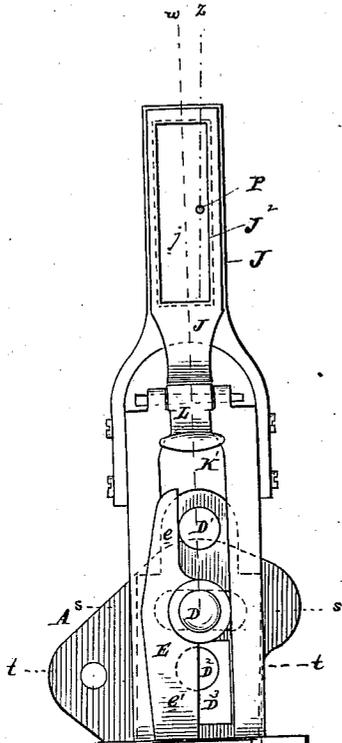


Fig 1

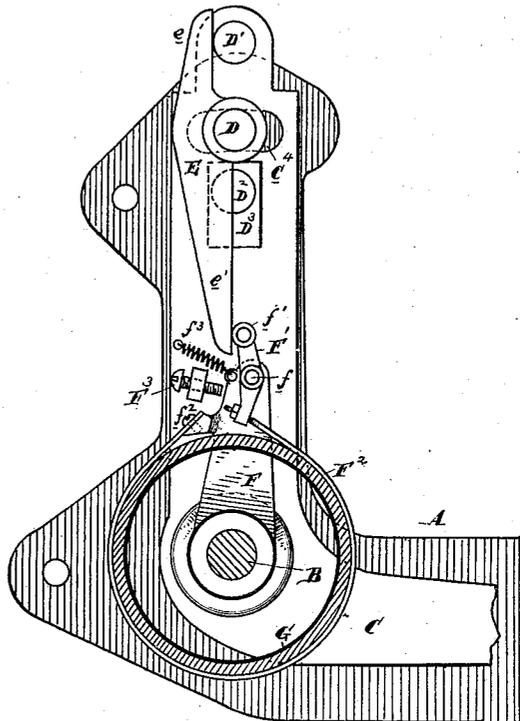
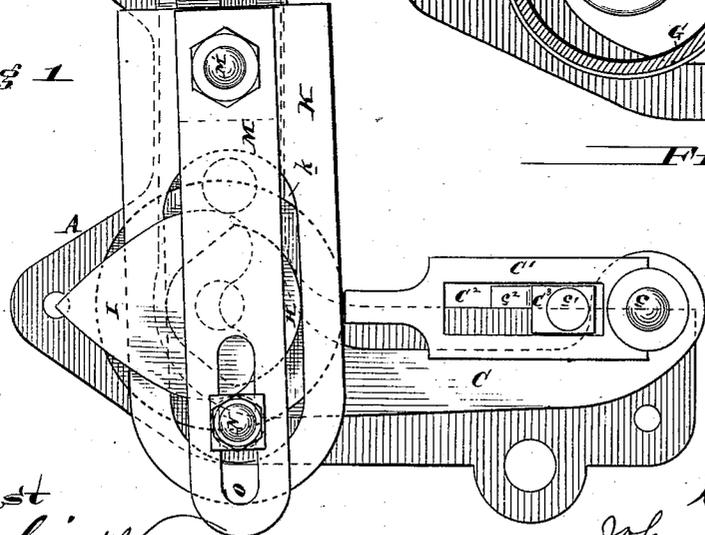


Fig. 2



Attest
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(Model.)

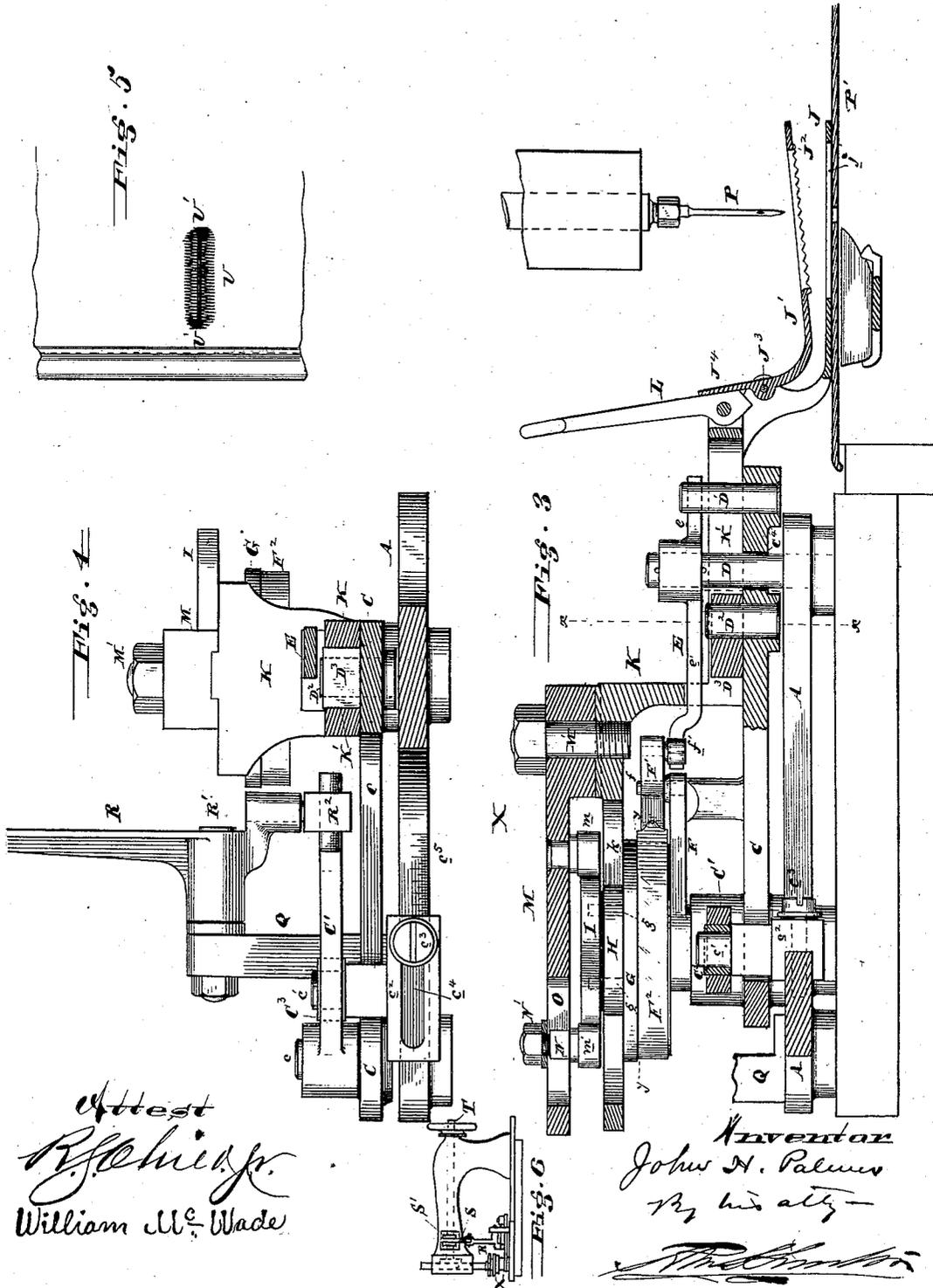
4 Sheets—Sheet 2.

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BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 302,018.

Patented July 15, 1884.



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4 Sheets—Sheet 3.

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BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

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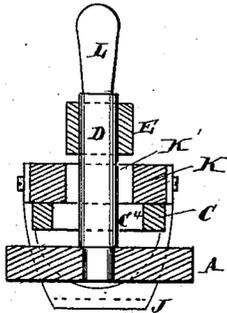


Fig. 7

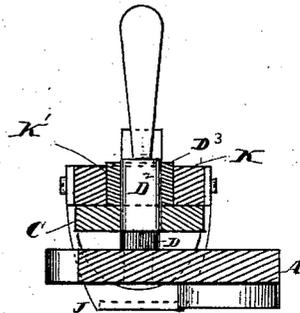


Fig. 8

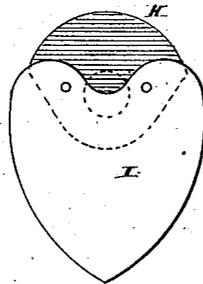


Fig. 9

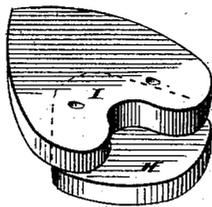


Fig. 10

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(Model.)

4 Sheets—Sheet 4.

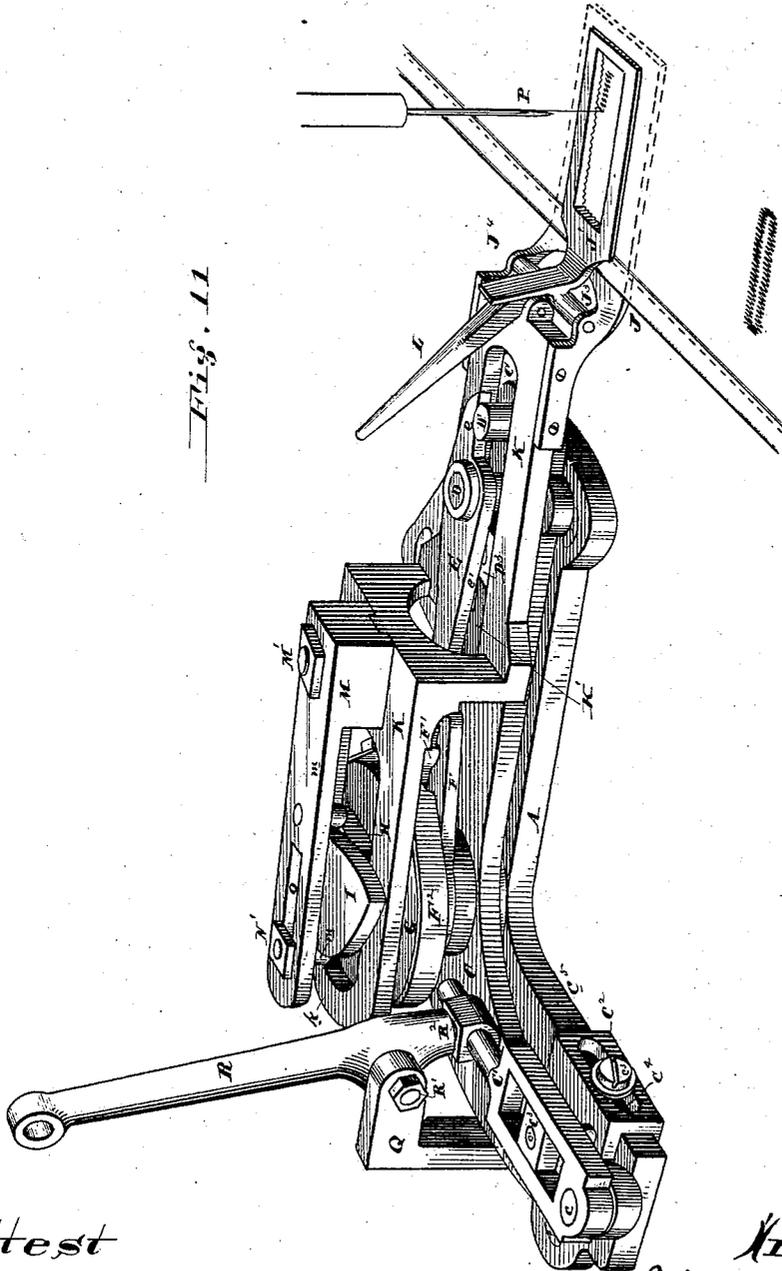
J. H. PALMER.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 302,018.

Patented July 15, 1884.

Fig. 11



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UNITED STATES PATENT OFFICE.

JOHN H. PALMER, OF PHILADELPHIA, PENNSYLVANIA.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 302,018, dated July 15, 1884.

Application filed April 13, 1883. (Model.)

To all whom it may concern:

Be it known that I, JOHN H. PALMER, of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Button-Hole Attachments for Sewing-Machines, of which the following is a specification.

My invention has reference to button-hole attachments for sewing-machines; and it consists in certain combinations of elements whereby the cloth is vibrated under the needle during its reciprocation, the said cloth being vibrated from a fixed point, and in many details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

Heretofore in button-hole attachments and sewing-machines the cloth or clamp for holding the cloth has been moved under the needle in two directions by devices guided in suitable ways, the said devices being made to move at right angles to each other; or the needle has been made to move laterally in place of moving the cloth, in which case only one movement is given to the cloth. In my machine the material to be operated upon is held in a suitable clamp or vise, supported by one arm of a cranked lever, or at one end of a straight bar, the said cranked lever or straight bar having a fulcrum upon which it vibrates at a convenient distance from the end bearing the clamp or vise. Connected with the cranked lever or straight bar, preferably upon the upper surface, is a sliding vibrating lever, having its fulcrum attached to the first-mentioned lever or bar, the said fulcrum also serving as a guide by which the sliding vibrating lever can move in a direction parallel to its own length, the parallel movement being communicated in the following manner: At convenient positions upon the sliding vibrating lever are attached two studs and rollers having contact with opposite points of a rotating cam of requisite formation, the cam being caused to rotate by intermittent movements of suitable duration and length, by means of a clutch or other suitable mechanism actuated by the first-mentioned lever or bar, around the fulcrum of which the cam rotates. The sliding

vibrating lever is caused to vibrate or oscillate upon its fulcrum by means of a second cam attached to the first cam, or to the toothed or friction clutch. Each part of this machine, by reason of the arrangements above mentioned, receives its motion from the vibration of the first-mentioned cranked lever or straight bar, which has its fulcrum securely fixed to a suitably-arranged base or support.

In the drawings, Figure 1 is a plan view of my improved button-hole attachment for sewing-machines. Fig. 2 is a sectional plan of part of same on the line *yy* of Fig. 3. Fig. 3 is a side elevation of my device with part in section. Fig. 4 is a sectional elevation of same on line *xx* of Fig. 3. Fig. 5 shows a completed button-hole; and Fig. 6 shows button-hole attachment as applied to a sewing-machine. Fig. 7 is a cross-section on line *ss* of Fig. 1. Fig. 8 is a similar cross-section on line *tt* of Fig. 1. Fig. 9 is a plan view of the feed-cams. Fig. 10 is a perspective view of same, and Fig. 11 is a perspective view of the entire attachment.

A is the base-plate or support, and carries a stud, B. Pivoted to this stud is a straight or cranked lever, C, which may receive its motion from the sewing-machine by any suitable mechanism. To vibrate lever C, I pivot to one end of it, at *c*, a lever, C', having a slot, C², in which a slide, C³, works, the said slide being pivoted to an adjustable fulcrum, *c'*, carried by a block, *c*², furnished with a slot, *c*⁴, through which a bolt, *c*³, is passed to secure it firmly to the base-plate A. The throw of crank C may be regulated by the above-described device at once by gage *c*⁵. The lever C' may be vibrated by a lever, R, pivoted on a pin, R', secured to standard Q, and connected with lever C' by a universal joint, R². The other end of lever C is slotted, as at C⁴, to allow the passage of a stud, D, secured to base-plate A, and on each side of said slot are secured pins D' and D², the latter of which carries a block or roller, D³. Loosely pivoted on stud D is a lever, E, having a short arm, *e*, which rests against the pin D', and a long arm, *e'*, which actuates the clutch mechanism, and is adapted to impart the requisite motion to the cloth-vise.

Pivoted to stud B is an arm, F, which carries on its end a lever, F', pivoted at f , and on its outer end provided with a roller or pin, f' , against which the long arm of lever E works. 5 The inner arm of lever F' is secured to the friction-band F², which encircles the friction-wheel G, also pivoted to the pin or stud B, and provided with pins g . The other end of the band F² is secured at f^2 to the arm F. A screw, F³, on lever C adjusts the amount of throw of arm F in one direction, and thus limits the total throw of the said arm. This arm F is drawn against the said screw by a spring, f^3 . The lever E oscillates the lever 10 F', tightening the band F² on the wheel G, and upon the further movement of the said lever E the arm F is swung around, extending spring f^3 , and turning the wheel G and the cams H and I, which are set upon the pins 15 g , or otherwise secured thereto.

Any other form of clutch mechanism may be used in lieu of that just described.

The cam H is formed of two segments of circles of different diameters, said segments being connected by straight edges, which latter move the cloth to form the ends of the button-hole. The difference between the diameters of the concentric parts of this cam controls the distance apart of the two rows of 25 stitches forming the two sides of the button-hole. This cam H works in the slot k of the sliding vibrating lever K, which is slotted also at K' and works on the cranked lever C, being guided thereon by block D³ and its pin D²; hence this bar is carried by said lever C, and in addition to the vibration imparted by the motion of said lever C, it is also vibrated by the cam H. The end of this sliding vibrating lever K is provided with the lower jaw, J, of the clamp, which is provided with an aperture, 30 j , sufficient to take in the completed button-hole.

Pivoted at J³ to the end of this sliding vibrating lever is the other jaw, J', having an aperture and teeth, J², to fit the jaw J. The upper part of said jaw J' is provided with spring-extension J¹, which is pressed out when clamping the cloth by a lever, L.

To the upper part of the sliding vibrating lever K is secured by bolt M' a plate, M, carrying the fixed roller m and the adjustable roller m' , made adjustable in a slot, O, by stud N and nut N'.

The heart-shaped cam I, secured to the cam 35 H, works between said rollers to reciprocate the sliding vibrating lever K uniformly in both directions upon lever C, independently of its lateral or vibratory movement. By this means the button-hole is worked first up one side, then by the straight part of cam H around the end U', and then back down the other side, and the other straight edge of cam H completing the other end U'. This button-hole attachment X, as a whole, is attached 40 to a sewing-machine in any suitable manner, varying with the different machines. One

method is shown in Fig. 6, in which the lever R is rocked by a bar, S, worked by an eccentric, S', upon the sewing-machine shaft T.

P is the sewing-machine needle.

$z z$ in Fig. 1 represent the center line, and $w w$ the amount of lateral throw.

The action of this machine is as follows:

The cloth or material to be operated upon is secured in the clamp J J', and placed conveniently under the needle P of a sewing-machine with which the button-hole machine X is connected, to act synchronously. At each stitch or descent of the needle P the sliding vibrating lever K moves from one terminus of its vibratory movement to the other, the distance of such vibration being adjustable through the movable fulcrum C³, connected with an intermediate lever, R, placed between the sewing-machine and the button-hole machine. This vibration by the cams I H in unison with the needle and thread of the sewing-machine forms the stitches along the sides and around the ends of a button-hole. At the same moment of vibration the sliding vibrating lever K, to which the clamp or vise J J' is securely attached, is advanced or retired one interval of its movement by cam I. This movement regulates the distance between the stitches, and is adjustable by regulating the distance traveled at each vibration of the friction-wheel G and cam I. Upon the completion of half a revolution of the cam H at each end of the parallel movement of the sliding vibrating lever K and its vise or clamp (consequently at each end of the button-hole) the cam H communicates an oscillating movement to the sliding vibrating lever K. This forms the rounded ends U' of button-hole U and distance between rows of stitching, and is adjustable either by tapering the cam H or by using cams of varying sizes, the length of button-hole being regulated by the same method.

The sliding vibrating lever K may be moved forward at each single vibration, if desired, in place of each double vibration, as is preferable.

I do not limit myself to the exact construction shown, as it may be modified in various ways without departing from my invention.

I am aware of the patents granted to Hallenbeck, April 3, 1883, No. 275,200, and Thomas, January 14, 1879, No. 211,435, and claim nothing therein set forth or claimed, for in those patents there are no pivoted bars or levers used to move the cloth, and in no sense is there a cloth carrying or sliding vibrating bar supported upon an oscillating lever, but instead are found two separate and distinct motions at right angles to each other imparted to two blocks or slides, to one of which the cloth is secured or clamped.

In this application I make no claim, specifically, to the friction-band device for converting reciprocatory into intermittent rotary

motion, as that forms subject-matter of another pending application, Serial No. 121,390, and filed February 20, 1884.

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

1. In a button-hole attachment for sewing-machines, an oscillating lever pivoted at one end, in combination with mechanism to oscillate it, and devices by which the cloth is attached to said lever and moved forward a short distance at each alternate vibration or oscillation of said lever, and then automatically passed across and back again to form the end of the button-hole, substantially as and for the purpose specified.

2. In a button-hole attachment for a sewing-machine, an oscillating lever, in combination with mechanism to oscillate said lever, a sliding vibrating lever supported by said oscillating lever, and provided with means to clamp the cloth, and mechanism, substantially as described, to move said sliding vibrating lever forward or backward a short distance with each alternate vibration thereof, substantially as and for the purpose specified.

3. In a button-hole attachment for a sewing-machine, an oscillating lever, in combination with mechanism to oscillate said lever, a sliding vibrating lever supported by said oscillating lever, and provided with means to clamp the cloth, and mechanism, substantially as described, to move said sliding vibrating lever backward or forward a short distance with each alternate vibration, the said mechanism being controlled by the oscillating lever, substantially as and for the purpose specified.

4. In a button-hole attachment for a sewing-machine, an oscillating lever, mechanism to oscillate said lever, and adjusting devices to regulate the amount of said oscillation, in combination with a sliding vibrating lever actuated by said oscillating lever, and provided with means to clamp the cloth, and means, substantially as described, to move said sliding vibrating lever forward or backward a short distance with each alternate vibration thereof, substantially as set forth.

5. In a button-hole attachment for a sewing-machine, an oscillating lever, and mechanism to oscillate the said lever, in combination with a sliding vibrating lever provided with means to clamp the cloth, means, substantially as described, to move said sliding vibrating lever forward or backward a short distance with each alternate vibration thereof, and mechanism to regulate the amount of said intermittent movement, substantially as and for the purpose specified.

6. In a button-hole attachment for a sewing-machine, an oscillating lever pivoted at one end, and means to oscillate it, in combination with a sliding vibrating lever supported by said oscillating lever, and provided with means to clamp the cloth, cam mechanism to

move said sliding vibrating lever forward or backward a short distance with each alternate vibration thereof, and a cam to oscillate said sliding vibrating lever upon the oscillating lever independently of its regular vibratory movement for the purpose of forming the ends of the button-hole, substantially as and for the purpose specified.

7. In a button-hole attachment for a sewing-machine, an oscillating lever and means to oscillate it, in combination with a sliding vibrating lever vibrated by said oscillating lever, and provided with means to clamp the cloth, cam mechanism to move said sliding vibrating lever forward or backward intermittently a short space with each alternate vibration thereof, and mechanism to oscillate said sliding vibrating lever independently of vibratory movement and during the completion of the forward movement and starting of the backward movement, or vice versa, substantially as and for the purpose specified.

8. In a button-hole attachment for a sewing-machine, an oscillating lever and means to oscillate it, in combination with adjusting devices to regulate the amount of said oscillation, a sliding vibrating lever provided with means to clamp the cloth and carried by said oscillating lever, cam mechanism to move said bar forward or backward intermittently a short space with each alternate vibration of said sliding vibrating lever, and adjusting devices to regulate the amount of said intermittent movement to said vibrating bar, substantially as and for the purpose specified.

9. The combination of oscillating lever C, sliding vibrating lever K, stud D², and its block, lever C', adjustable pin c', block C², cams H and I, and mechanism, substantially as described, for imparting intermittent rotary motion to said cams, substantially as set forth.

10. The oscillating lever C, in combination with a sliding vibrating lever provided with means to clamp the cloth, and supported and vibrated by said oscillating lever, slotted lever C', slide-block C², and adjustable fulcrum-pin c', substantially as and for the purpose specified.

11. The combination of base-plate A, stud B, lever C, stud D, lever E, pins D' D², block D³, sliding vibrating lever K, carrying the cloth-clamp, and having slots K' k, rollers m m', cams H and I, and means actuated by lever E to rotate said cams, substantially as and for the purpose specified.

12. The combination of base-plate A, stud B, lever C, lever C', having slot C², adjustable fulcrum c', stud D, lever E, pins D' D², block D³, sliding vibrating lever K, carrying the cloth-clamp, and having slots K' k, rollers m m', cams H and I, and means actuated by lever E to rotate said cams, substantially as and for the purpose specified.

13. The combination of base-plate A, stud B, lever C, stud D, lever E, pins D' D², block

D³, sliding vibrating lever K, carrying the cloth-clamp, and having slots K' k, rollers m m', cams H and I, wheel G, band F², arm F, lever F', spring f³, and adjusting-screw I³, substantially as and for the purpose specified.

5 14. The combination of base-plate A, stud B, lever C, stud D, lever E, pins D' D², block D³, sliding vibrating lever K, carrying the cloth-clamp, and having slots K' k, rollers m

m', cams H and I, wheel G, band F², arm F, lever F', spring f³, and adjusting-screw I³, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

JOHN H. PALMER.

Witnesses:

R. M. HUNTER,

ISAIAH MATLACK.