

No. 645,742.

Patented Mar. 20, 1900.

A. H. ARMEN, Dec'd.

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**BUTTONHOLE SEWING MACHINE.**

(Application filed Feb. 23, 1899.)

(No Model.)

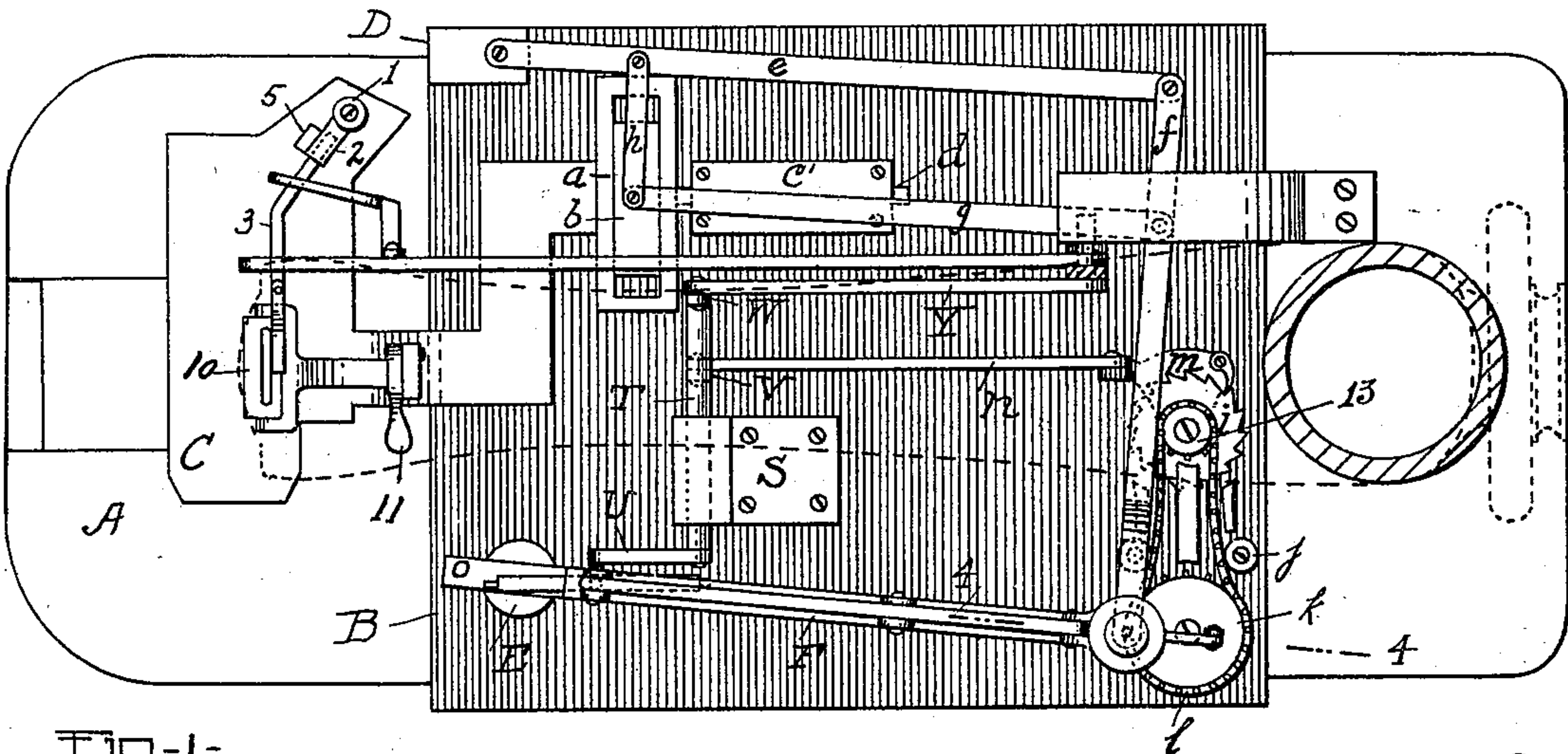


FIG-1-

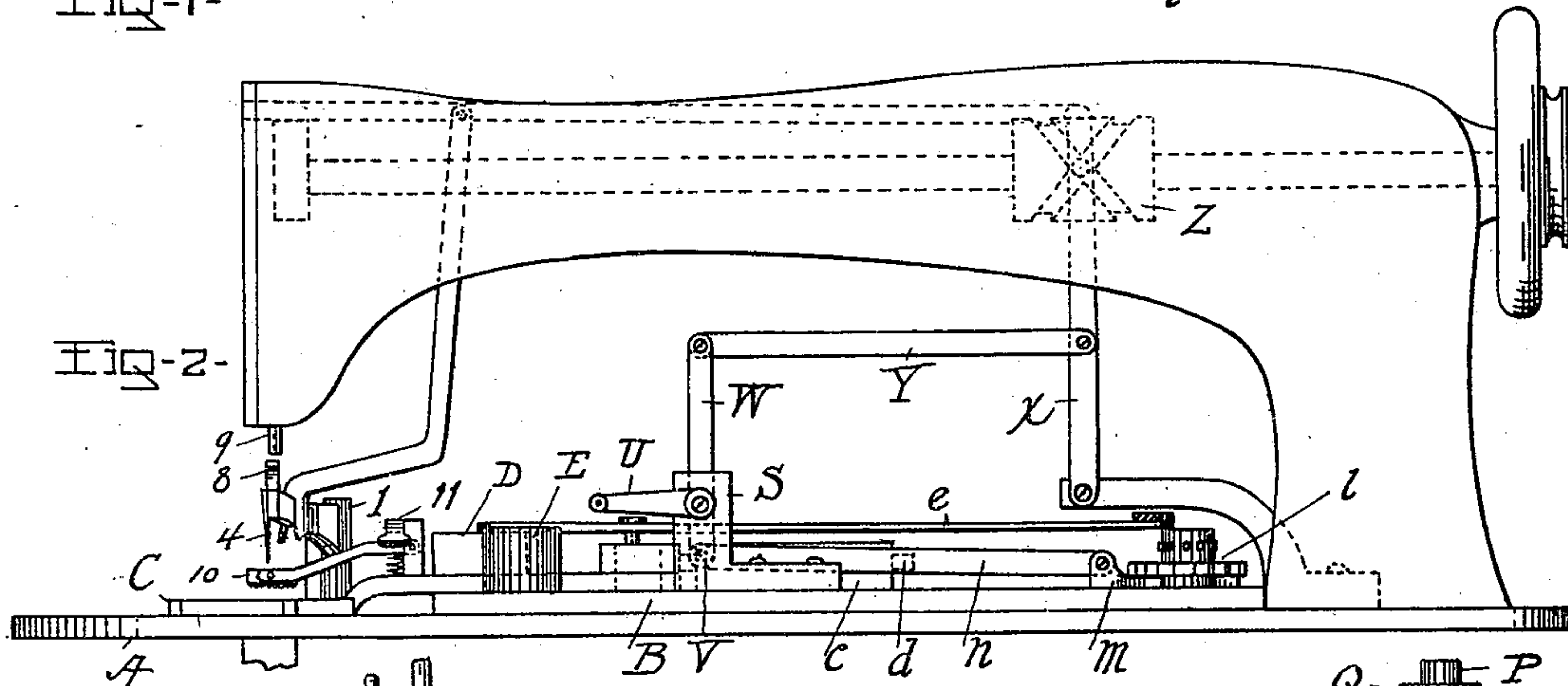


FIG-2-

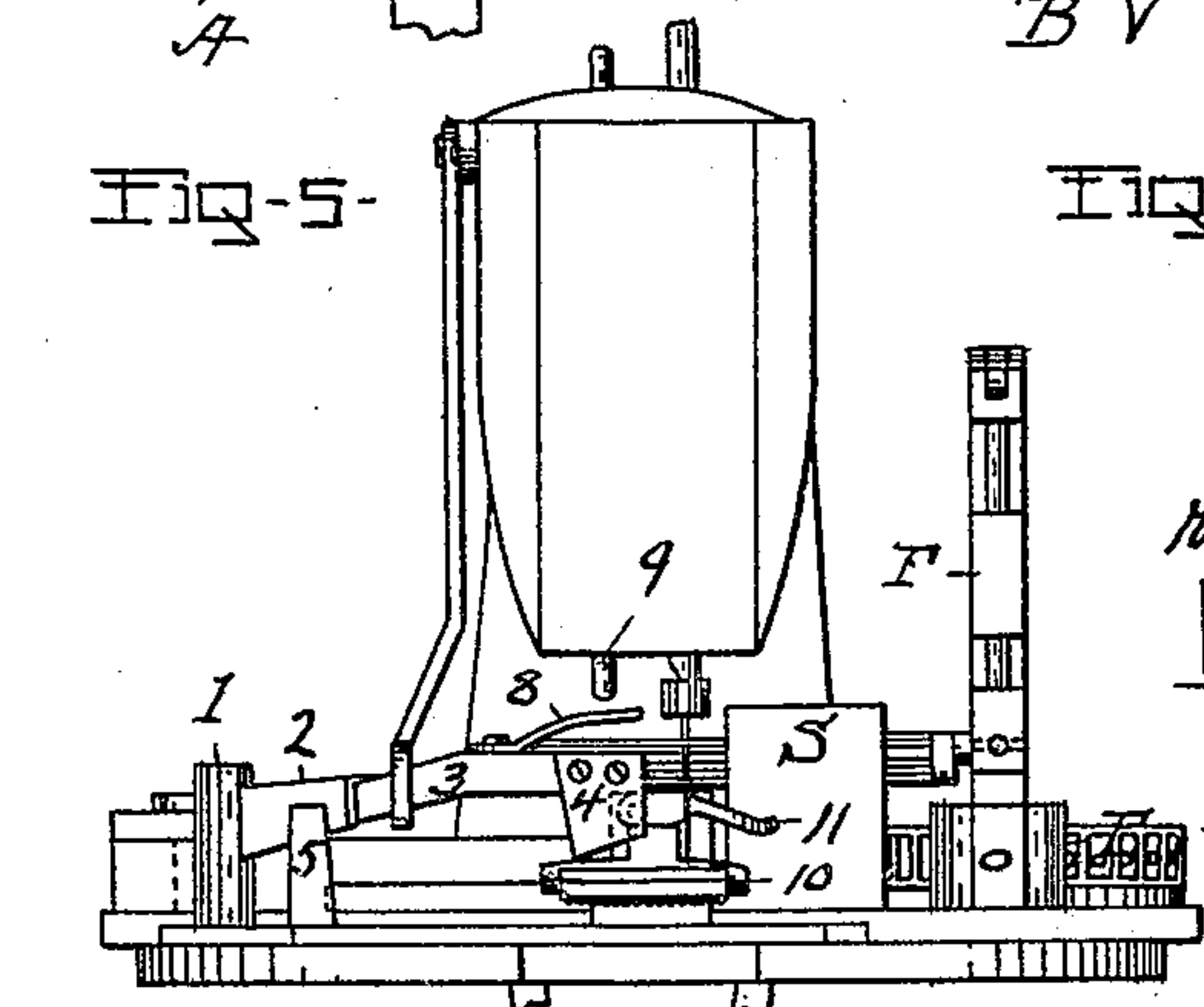
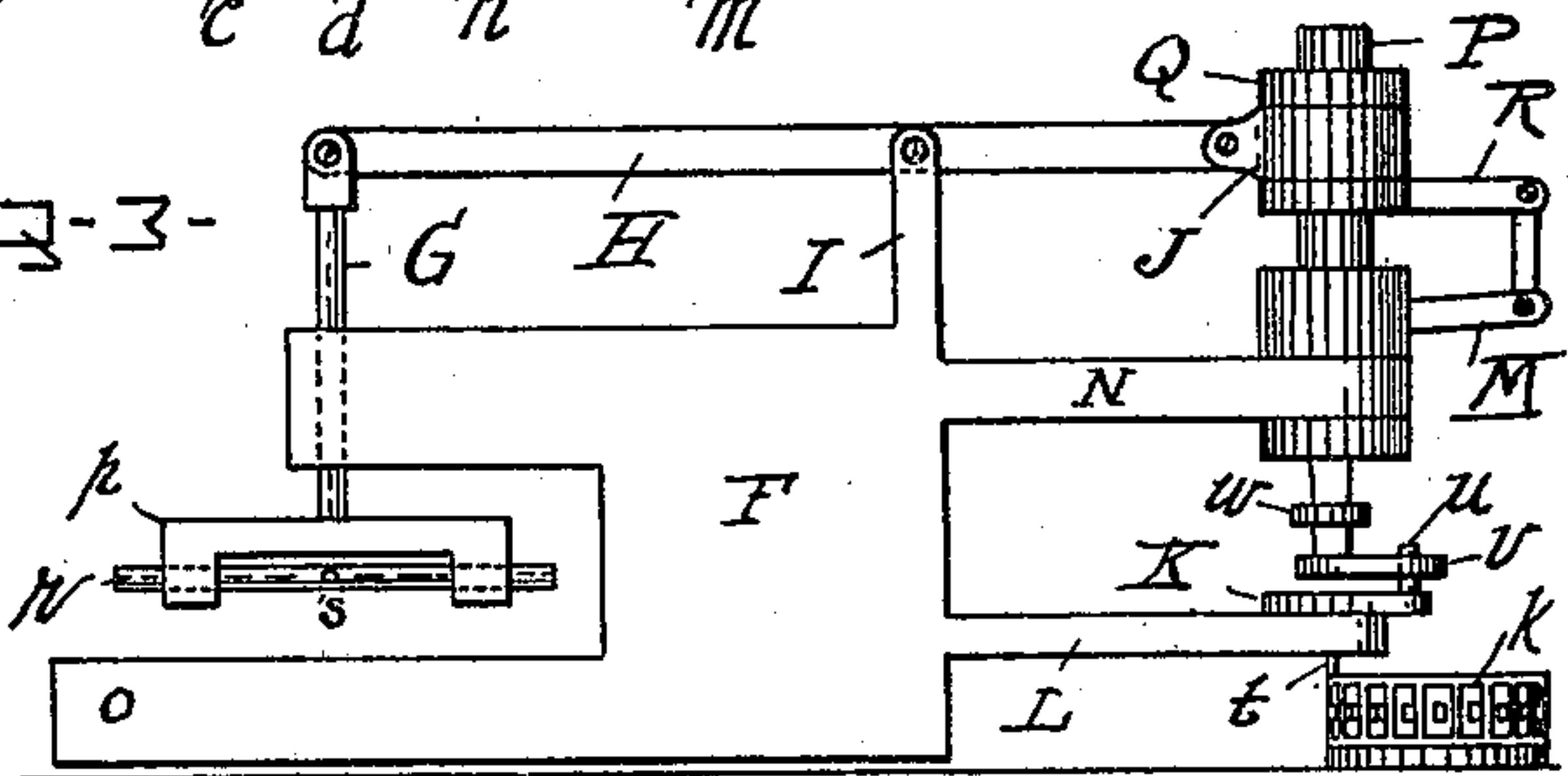


FIG-3-

FIG-4-



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## BUTTONHOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 645,742, dated March 20, 1900.

Application filed February 23, 1899. Serial No. 706,556. (No model.)

*To all whom it may concern:*

Be it known that I, ARAKELIAN H. ARMEN, (known also as ARMEN H. ARAKELIAN,) a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Buttonhole-Sewing Machines, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures herein.

Figure 1 of the drawings is a top plan view of the bed portion and attachment of my improved buttonhole-sewing machine with the horizontal arm which contains the needle-operating shaft removed. Fig. 2 is a side elevation of the machine with the pattern mechanism removed. Fig. 3 is a view in side elevation of the mechanism for operating the work-supporting plate. Fig. 4 is a vertical section on the broken line 4 4 in Fig. 1. Fig. 5 is a view in front end elevation of the machine.

This invention relates particularly to the means for actuating the work-supporting plate and to the means for cutting the buttonhole after the stitching operation is completed.

A is the base of the sewing-machine proper. B is the bed which supports various parts of the buttonhole attachment and which may be fixed upon the base of the machine in any known manner.

The horizontal bracket-arm 7 is erected from the base of the machine and supports the needle and needle-actuating mechanism in the usual manner, the several parts being common and well known in the art.

C is the apertured cloth-plate, and 10 is the cloth clamp or presser operated by the thumb-piece 11, all constructed in the usual well-known manner. The cloth-plate is provided with a rearward offset extension, which underlies the rectangular slideway-frame *a* and is provided at its end with a slide-block *b*,

fixed thereon and movable longitudinally in said slideway-frame. The slideway-frame *a* is provided with a rearwardly-projecting spindle *d*, which fits and is adapted to reciprocate longitudinally in the slide-box *c*, erected from the bed B. The lines of slide movements of the block *b* and the spindle *d* are at right angles to each other, whereby a universal movement may be imparted to the work-plate C in a horizontal plane, or a plane perpendicular to the needle.

The links *e*, *f*, *g*, and *h* are connected together to form a pantograph mechanism, one end of which is provided with a fixed pivotal connection with the bed at the corner D, and another part of which mechanism is connected with the slide-block *b* on the end of the cloth-plate, whereby universal movements may be imparted to the cloth-plate in a horizontal plane by the proper operation of the pantograph mechanism.

As a means for operating the pantograph mechanism to move the work-plate in accordance with a predetermined pattern I have shown a novel form of pattern mechanism comprising an endless carrier and a pin projecting therefrom at right angles to the plane of movement of the carrier and connected with the pantograph mechanism. The endless carrier comprises, preferably, a sprocket-chain *l*, which incloses a sprocket driving-wheel 13 and a guide-wheel *k*. Fixed upon one of the links of the chain is a pin *t*, projecting therefrom at right angles to the plane of movement of the chain, which pin is connected with the link *f* of the pantograph mechanism, as will be hereinafter more particularly described. It being understood that the pin *t* is connected with the link *f* of the pantograph mechanism, it will be readily seen that a movement will be imparted to the work-plate in a path corresponding to the path traversed by the pin, the ratio of movement being varied by means of the pantograph mechanism.

The sprocket-wheel 13 is fixed to the ratchet-wheel *i*, which is intermittently operated by the pawl *m*, which may be reciprocated in any known manner. As a means for reciprocating the pawl I have shown the same con-



5 connected by a link *m* with the arm V, depending from the rock-shaft T, having bearings in the block S, erected from the bed B. This rock-shaft is also provided with an upwardly-  
 10 projecting arm W, connected by the link Y with the lever X, fulcrumed at its lower end upon a bracket erected from the bed and having its upper end engageable with and adapted to be vibrated by the cam Z on the  
 15 needle-shaft, which cam is common in this class of machines. The operation of the sewing-machine will thus cause rocking movement to be imparted to the rock-shaft T, which movement will be imparted through  
 20 the link *n* to the pawl *m*, whereby intermittent movement will be imparted to the pattern mechanism. As the movement imparted to the work-plate corresponds with the movement of the pin *t*, the movement of the work-plate can be varied by causing the pin *t* to traverse paths of different forms.

25 If the sprocket-wheel 13 and the guide-wheel *k* were of equal and small diameter, the resultant effect upon the work-plate in the operation of the machine would be to produce a straight buttonhole, while if one of these wheels were larger than the other it would cause one end of the buttonhole to be larger than the other end.

30 As shown, the sprocket-wheel 13 is comparatively small, while the guide-wheel *k* is comparatively large, whereby I am able, by providing guides adapted to engage the outer side of the chain on opposite sides, to form a  
 35 buttonhole having approximately - straight side portions and terminating at one end in an enlarged circular portion or eyelet end. These exterior guides are preferably in the form of small rollers *j*, adapted to engage the  
 40 exterior of the chain on opposite sides and in close proximity to the large guide-wheel *k* and to maintain the side lengths of the chain between said small exterior guide-rollers *j* and the sprocket-wheel 13 approximately straight and parallel.

45 It will readily be seen that by the use of properly-located guides for the chain the pin *t* can be made to traverse a path of any desired form, and a corresponding movement  
 50 will be imparted to the work-plate.

If desired, the pin *t* could be erected directly from the disk or wheel *k*, in which case it would traverse a simple circular path.

55 To secure the formation of the buttonhole-stitch, it is necessary, while imparting to the work-plate a general movement according to the pattern desired, to also impart to the work-plate a succession of minor movements transversely of the general line of movement of the  
 60 plate, as is well understood in the art. I have shown more particularly in Figs. 3 and 4 mechanism adapted to impart to the work-plate these transverse minor movements.

65 F is a frame having at one end an arm O, inserted in a slideway in the block E, which is pivoted upon the bed and permits reciprocating pivotal and slide movements to be im-

parted to the frame F. The other end of this frame is provided with an arm L, having a pivotal connection with the pin *t* on the chain, 70  
 whereby said end of the frame is carried along the devious path traversed by the pin. This frame also carries an angle-lever M, provided with a fulcrum-support P, pivoted upon the  
 75 arm N of the frame, with its axis parallel with the pin *t*. One arm of this angle-lever is pivotally connected with a link *f* of the pantograph mechanism by means of the loop or eye  
 80 *w* on the end of said link, said lever-arm being provided at its end with a slotted plate *v*, the slot therein being elongated and adapted to receive and fit the pin *u*, erected from the  
 85 offset K on the upper end of the pin *t*. The other arm of the angle-lever M is connected by a short link with the arm R, fixed upon the sleeve Q, capable of reciprocating slide  
 90 movement on the fulcrum-support P. This sleeve is connected by means of the swivel connection J with one end of the lever H, fulcrumed upon the arm I of the frame, and  
 95 connected at its other end by a pivotal and swivel connection with the vertical slide-rod G, which has on its lower end the transverse slideway-frame *p*, in which is located the transverse slide-rod *r*, capable of reciprocating  
 100 slide movement therein. This transverse slide-rod has a loose screw connection at *s* with a horizontal arm U, fixed upon the rock-shaft T, whereby the rocking movements imparted to said rock-shaft impart to the sleeve Q, 105  
 through the lever H, vertical slide-rod G, and transverse slide-rod *r*, vertically-reciprocating movements in all positions of the frame F. The swivel and pivotal connection between the rod G and the lever H and the slide-rod  
 110 connection *r* between the rocking arm U and the rod G permit the frame to assume various positions without interfering with this reciprocating movement. The sleeve Q being thus  
 115 reciprocated causes similar movements to be imparted to the arm of this angle-lever M, connected with said sleeve, thereby causing the other arm of this angle-lever, with its attached slotted plate *v*, to be reciprocated approximately in horizontal lines, the elonga-  
 120 tion of the slot in the plate *v* accommodating the pin *u* to permit such movement, and this movement is likewise imparted to the work-plate through the pantograph mechanism by means of the connection of the latter with  
 125 this angle-lever at *w*, as hereinbefore described.

The pin *t* is fixed upon its carrier, as by rigidly connecting it with one of the links of the chain, so that as the pin traverses its devious 125  
 path it must turn on its axis and in completing its movement around said path must make a complete rotation on its axis, which will cause the offset K and the pin *u* to also perform a complete revolution upon the axis of 130  
 the pin. The pin *u* is so fitted to its elongated slot in the plate *v* that it causes said plate to accompany it in its revoluble movement, thereby causing a similar movement to be im-



parted to the connected lever M, fulcrum-support P, and sleeve Q, which are free to rotate relatively to the frame F. It will be seen that the plane of the lever M will thus at all times be at right angles to the carrier of the pin *t* and that the vibratory movements of said lever will thus at all times be at right angles to the general line of movement of the pin *t*, whereby the minor transverse movements imparted to the work-plate by reason of this vibratory movement of the lever M will also be at right angles to the general line of movement of the plate, it being immaterial whether the stitch-forming operation is being performed upon the straight side or the rounded or eyelet end of the buttonhole. I am thus able to insert zigzag stitches along a pattern-line in any desired form, it only being necessary to adapt the carrier for the pin *t* to the desired form.

As a means for cutting the buttonhole I have shown a cutter 4, fixed upon an arm 3, pivoted in the hollow arm 2, which has a fixed pivotal connection with the work-plate at 1. The arm 3, with its cutter, is thus made capable of both vertical and horizontal oscillating movements. The work-plate is provided with a stop 5, adapted to be engaged by the arm 2 to properly locate the cutter in position for the buttonhole to be cut, in which position the cutter is brought in line with and beneath the presser-bar 9, reciprocatingly operated by the needle-operating shaft in the usual manner. The arm 3, with the cutter, may be moved and maintained by hand or in any known manner out of the path of said presser-bar 9 during the operation of stitching the buttonhole and may be similarly moved and located by means of the stop 5 at the conclusion of the stitching operation beneath the presser-bar 9 in position to be depressed thereby to cut the buttonhole. The cutter-arm 3 is provided on its upper side with a spring 8, adapted to be engaged by the presser-bar 9 to operate the cutter and to compensate for any irregularities in pressure or resistance, as that due to variations in thickness or quality of the fabric. By locating the cutter upon the work-plate itself, to which is given a universal movement, the cutter can be accurately located in position to cut the buttonhole without regard to the exact location of the work-plate at the time of the cutting operation.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a buttonhole-sewing machine, the combination with the needle and stitch-forming mechanism; of a work-plate capable of universal movement in a plane perpendicular to the needle; a sprocket-chain; a sprocket driving-wheel and a guide-wheel both inclosed by said chain; a plurality of guides engageable with the exterior of said chain; between said chain-inclosed wheels; a pin mounted upon said chain and projecting therefrom at right angles to the plane of movement of the chain;

operating connections between said pin and work-plate; and means for operating said sprocket-wheel, substantially as described.

2. In a buttonhole-sewing machine, the combination with the needle and stitch-forming mechanism; of a movable work-plate; pattern mechanism comprising an endless movable carrier and a pin projecting therefrom at right angles to the plane of movement of the carrier; pantograph mechanism connecting said pin and work-plate; vibrating mechanism connected with said pantograph mechanism, means for intermittently operating said vibrating mechanism and pin-carrier, whereby zigzag movements are imparted to the work-plate along a general line indicated by the line of movement of said pin, substantially as described.

3. In a buttonhole-sewing machine, the combination with stitch-forming mechanism; the movable work-plate; a pin; and means for moving said pin along a path corresponding with the pattern of the work to be performed; of a frame having one end connected with said pin and carried thereby along the path of said pin; a lever; a fulcrum-support for said lever mounted upon said frame; a slotted connection between said pin and one arm of said lever; means for reciprocating said lever and a connection between said lever and work-plate, substantially as described.

4. In a buttonhole-sewing machine, the combination with stitch-forming mechanism; a movable work-plate; an endless carrier; a pin fixed upon said carrier; and means for moving the carrier so that the pin shall traverse a devious path corresponding with the pattern of the work to be performed and shall simultaneously turn on its axis; of a frame having one end pivotally connected with said pin and carried thereby along said devious path; a lever; a fulcrum-support for said lever rotatively mounted upon said frame with its axis parallel with said pin; an offset on the end of said pin; a slotted connection between said offset and said lever; means for reciprocating said lever; and a connection between said lever and work-plate, substantially as described.

5. In a buttonhole-sewing machine, the combination with a movable work-plate; an endless carrier; a pin fixed upon said carrier; and means for moving the carrier so that the pin shall traverse a devious path and shall simultaneously turn on its axis; of a frame having one end pivotally connected with said pin and carried thereby along said devious path, and its other end pivotally and reciprocatingly supported; an angle-lever M; a fulcrum-support P, for said lever rotatively mounted upon said frame on an axis parallel with said pin; a rotary and reciprocating sleeve Q, connected with one arm of said lever; an offset on the end of said pin; a slotted connection between said offset and the other arm of said lever; a connection between said



lever and work-plate; a lever H, fulcrumed  
upon said frame and swiveled at one end upon  
the sleeve Q; a reciprocating rod G, connected  
at one end with the lever H; a transverse  
5 slideway on the other end of said rod G; a  
transverse slide-rod r, movable in said slide-  
way; a crank-shaft having fixed bearings; a  
crank on said shaft connected with said rod  
r and movable approximately in line with the

rod G; and means for operating the crank-rod  
shaft, substantially as described.

In testimony whereof I have hereunto set  
my hand this 20th day of February, 1899.

ARAKELIAN H. ARMEN.

Witnesses:

WILLIAM ISENBERGH,  
JOHN W. RODDY.