

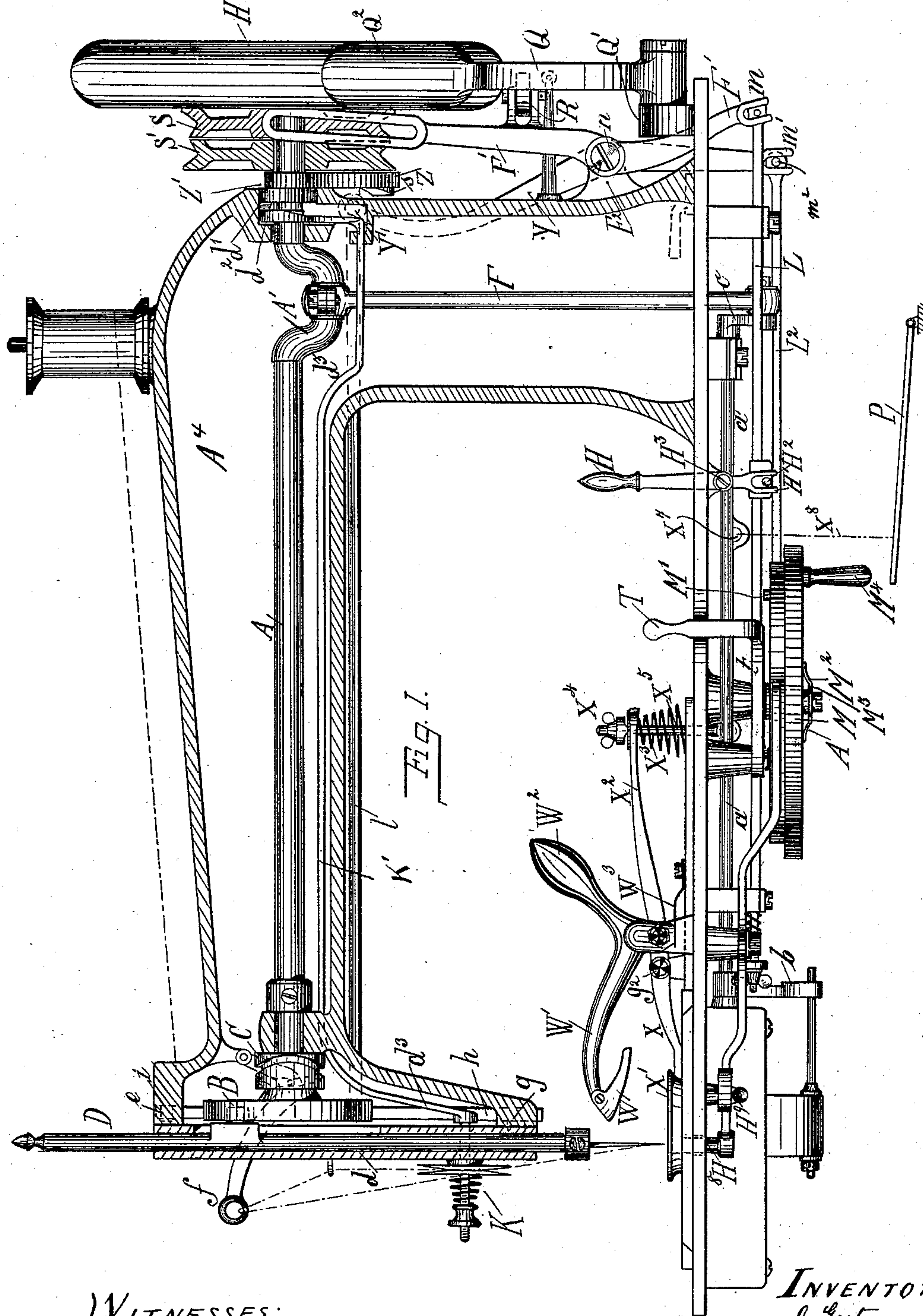
(No Model.)

4 Sheets—Sheet 1.

**J. GUTMANN.**  
**SEWING MACHINE.**

No. 539,914.

Patented May 28, 1895.



11 WITNESSES:  
Marion Hall  
Charles Schroeder

INVENTOR  
by J. Gutmann  
Gusiel Wiegman  
ATTORNEYS.

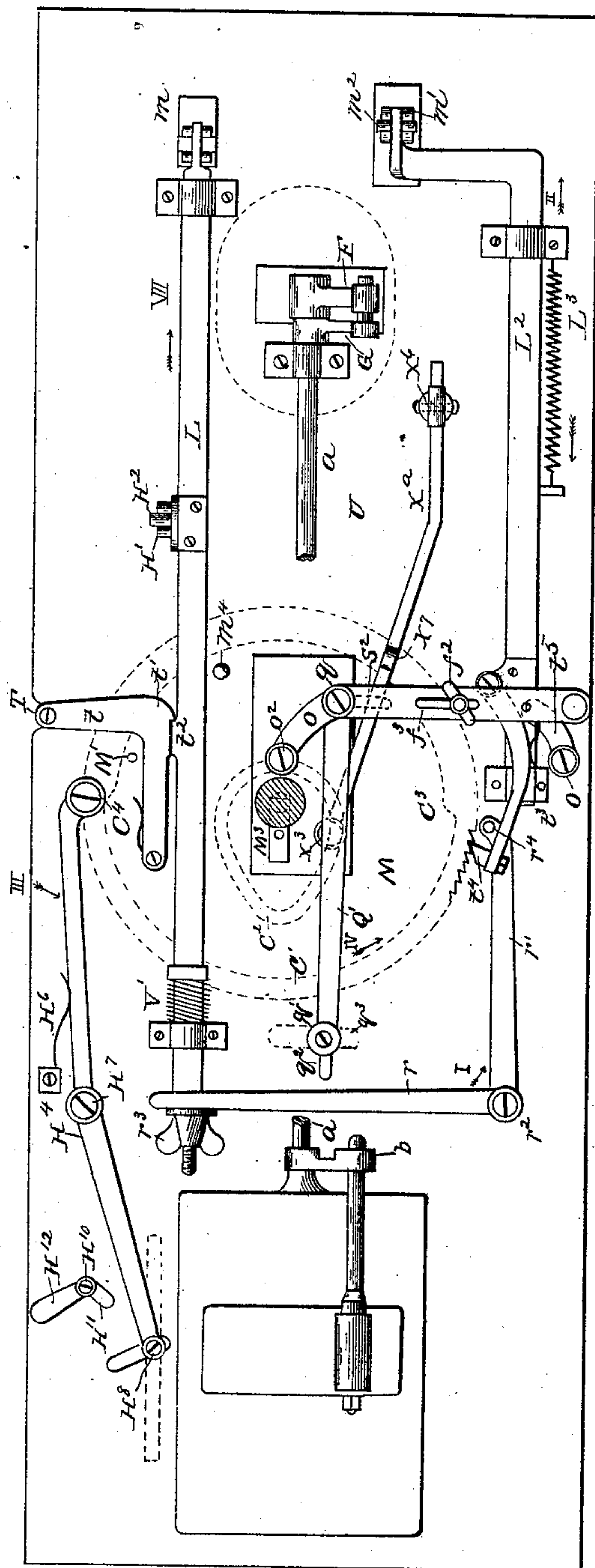
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4 Sheets—Sheet 2.

J. GUTMANN.  
SEWING MACHINE.

No. 539,914.

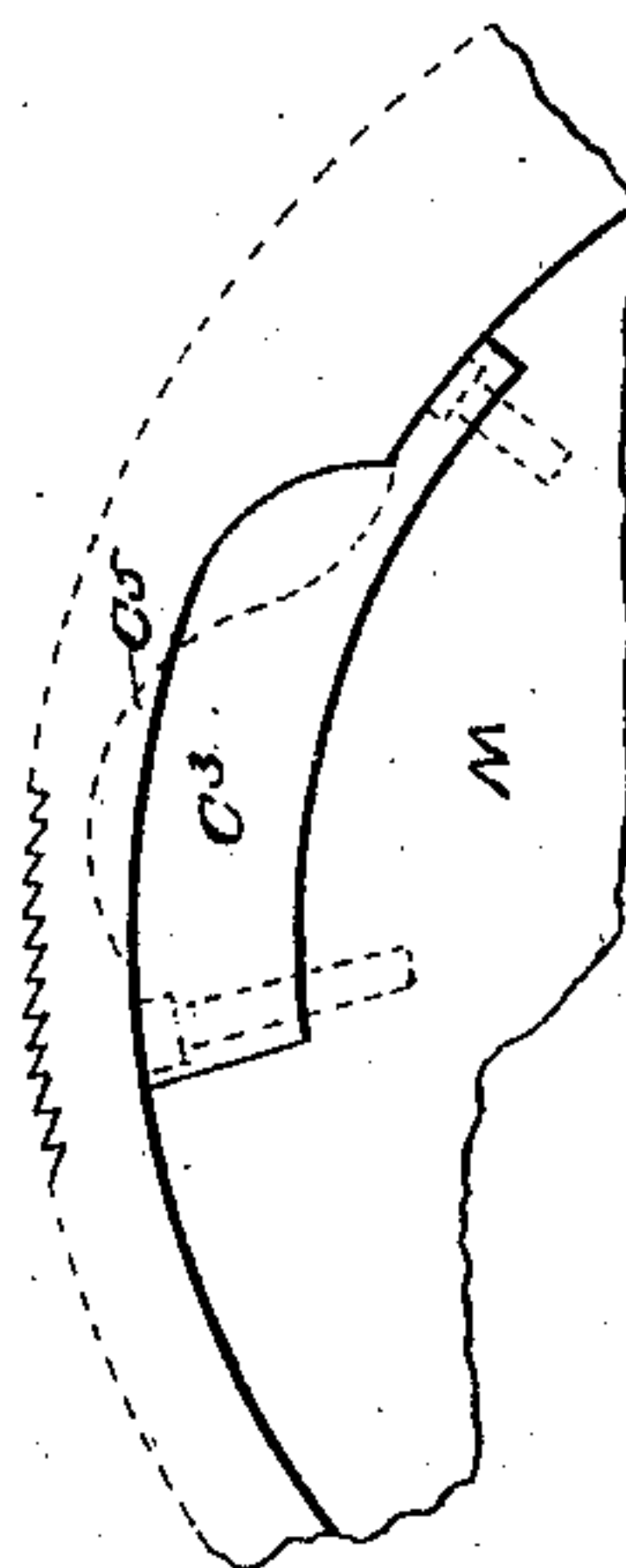
Patented May 28, 1895.



ИЗДАНИЕ



五五八



IX-11



Witnesses:

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C. A. Weed-

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(No Model.)

4 Sheets—Sheet 3.

J. GUTMANN.  
SEWING MACHINE.

No. 539,914.

Patented May 28, 1895.

Fig. III.

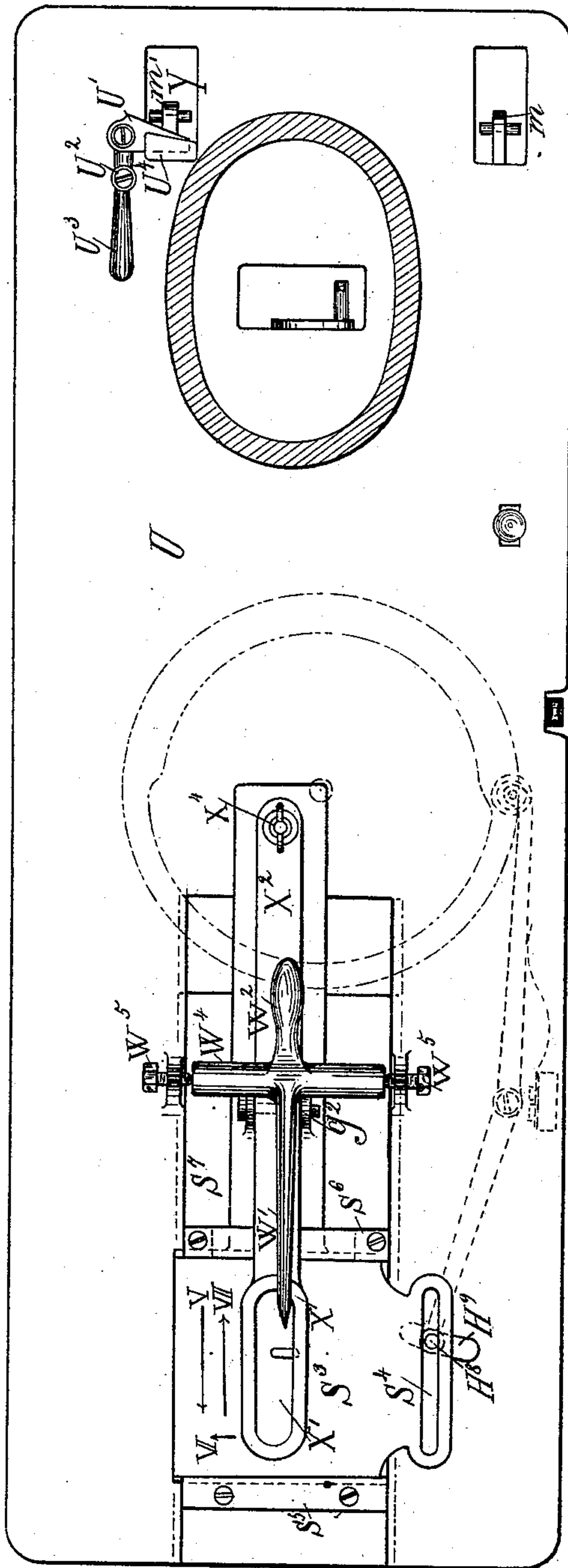


Fig. VII.

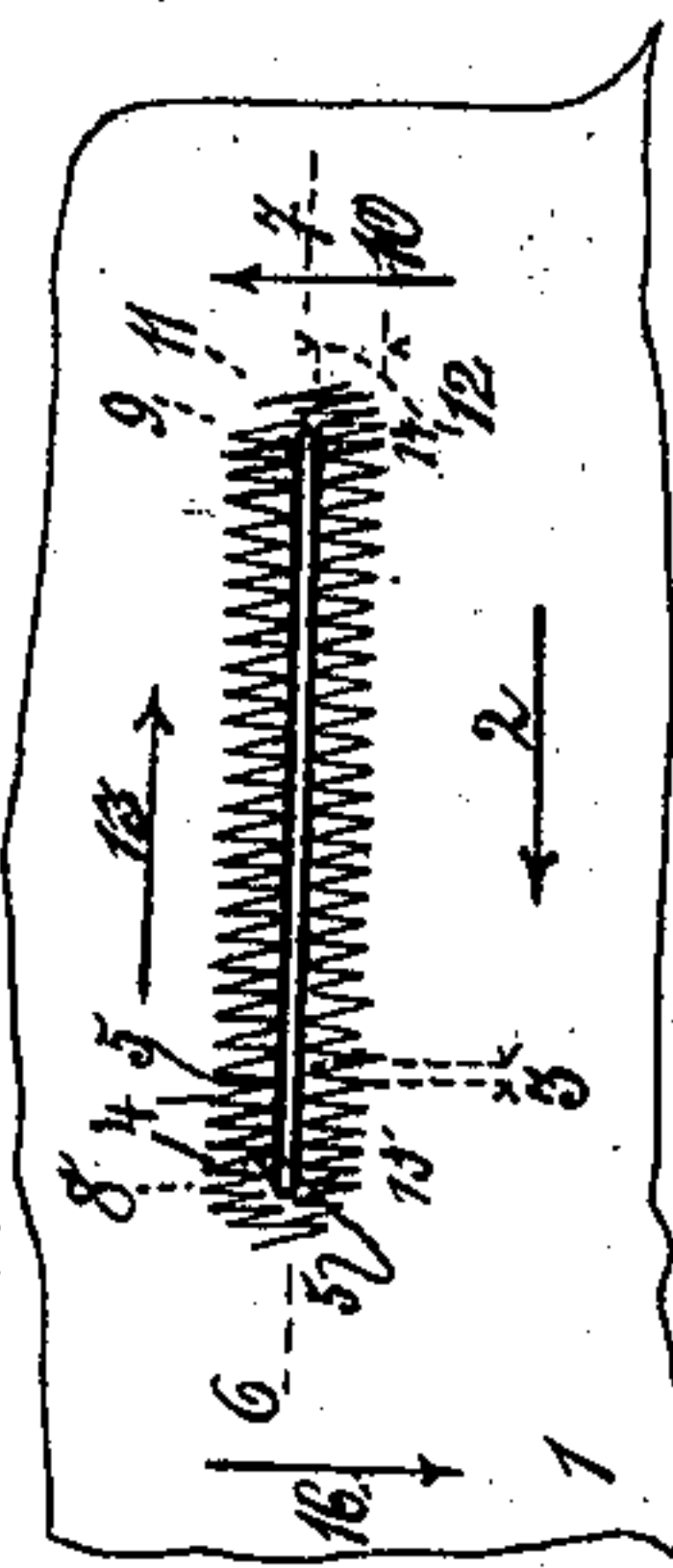
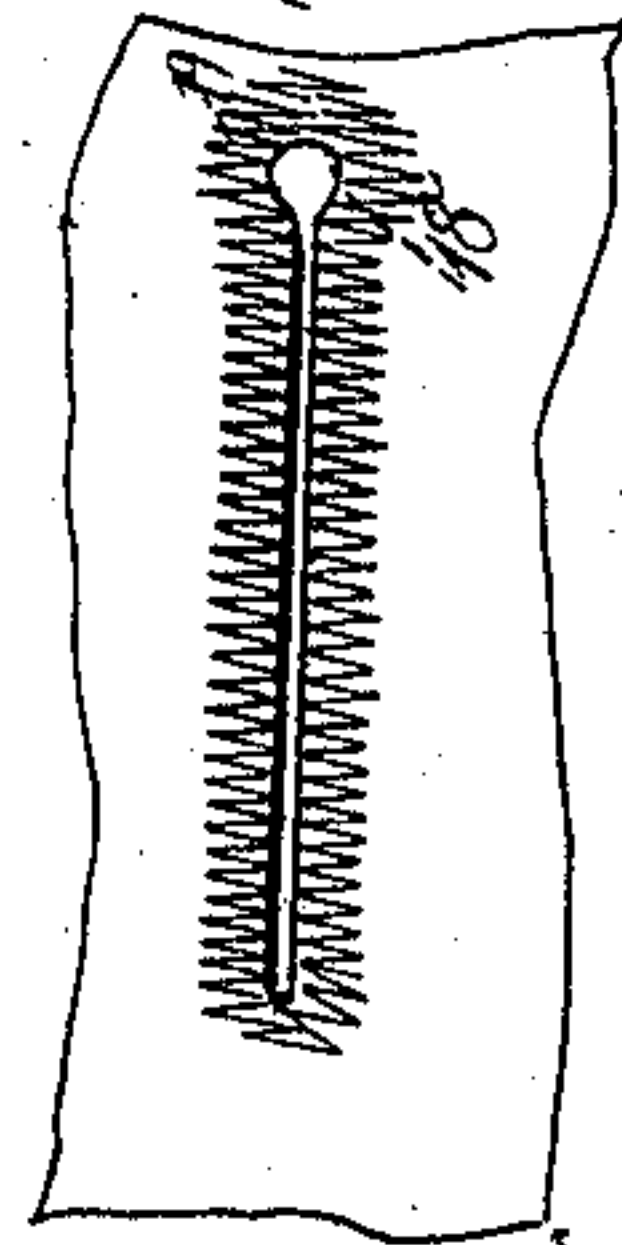


Fig. V.

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(No Model.)

4 Sheets—Sheet 4.

J. GUTMANN.  
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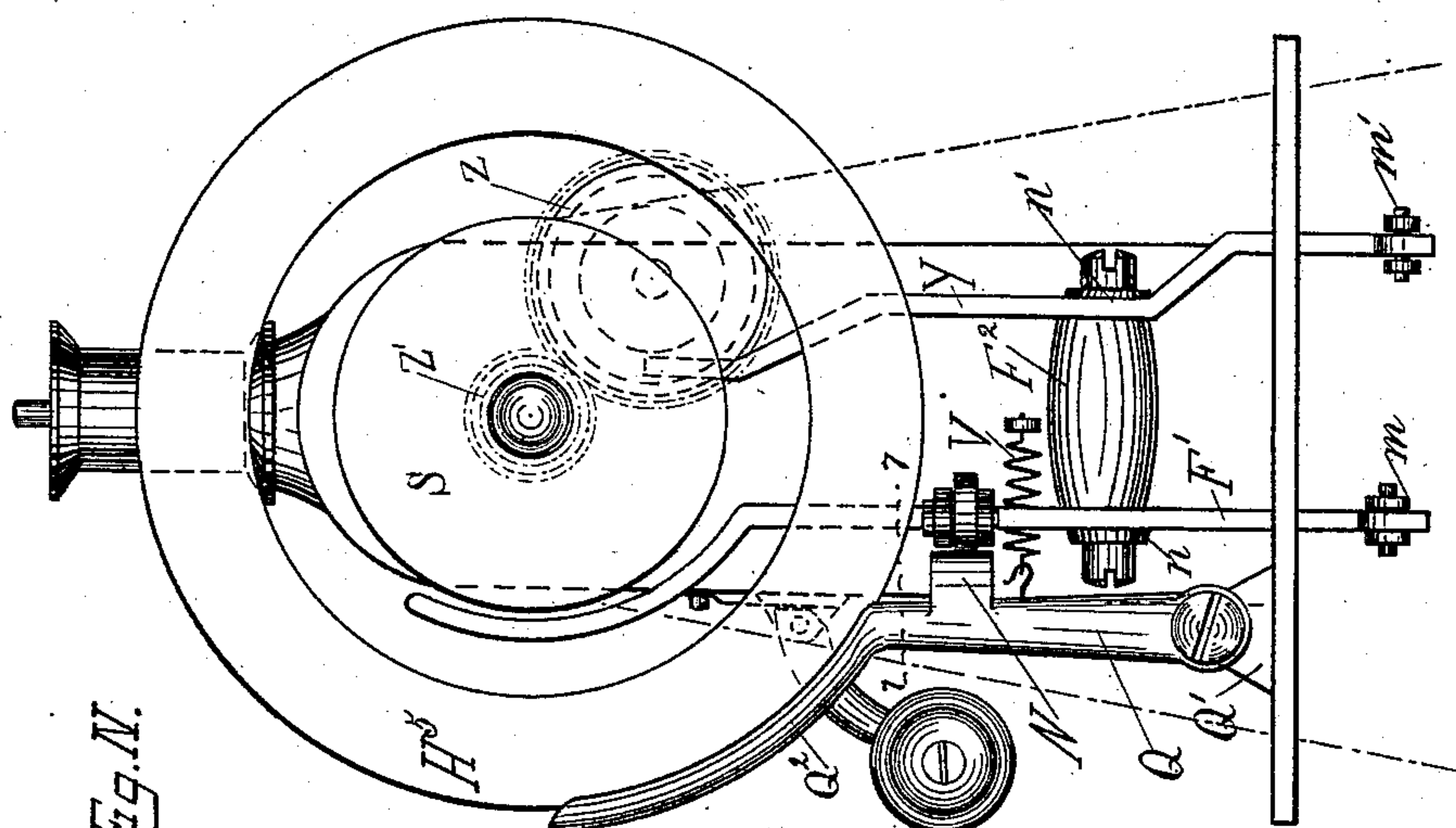


Fig. N.

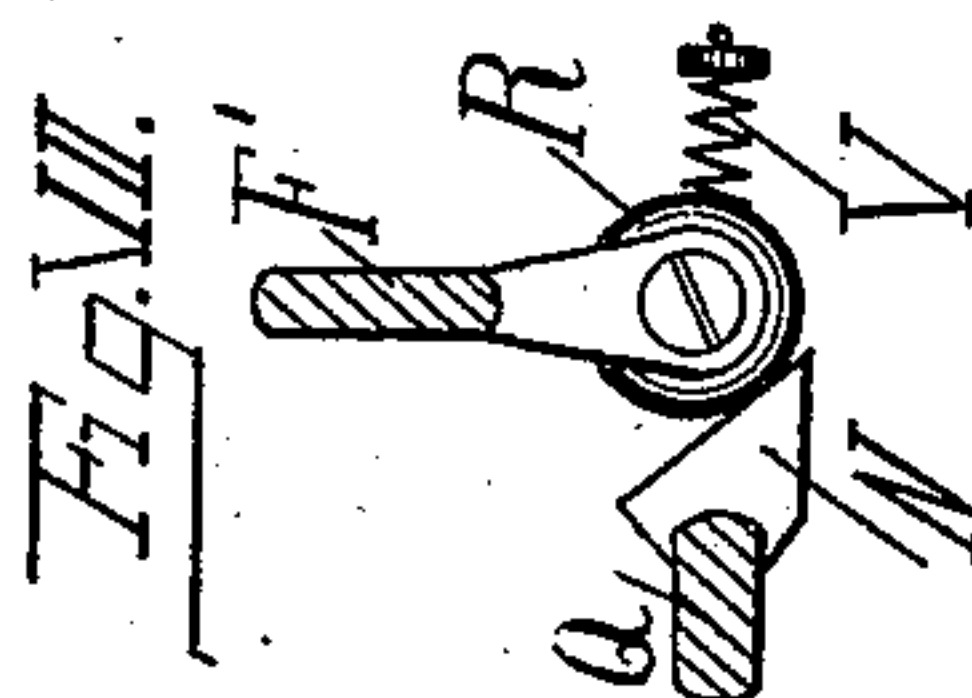


Fig. VII.

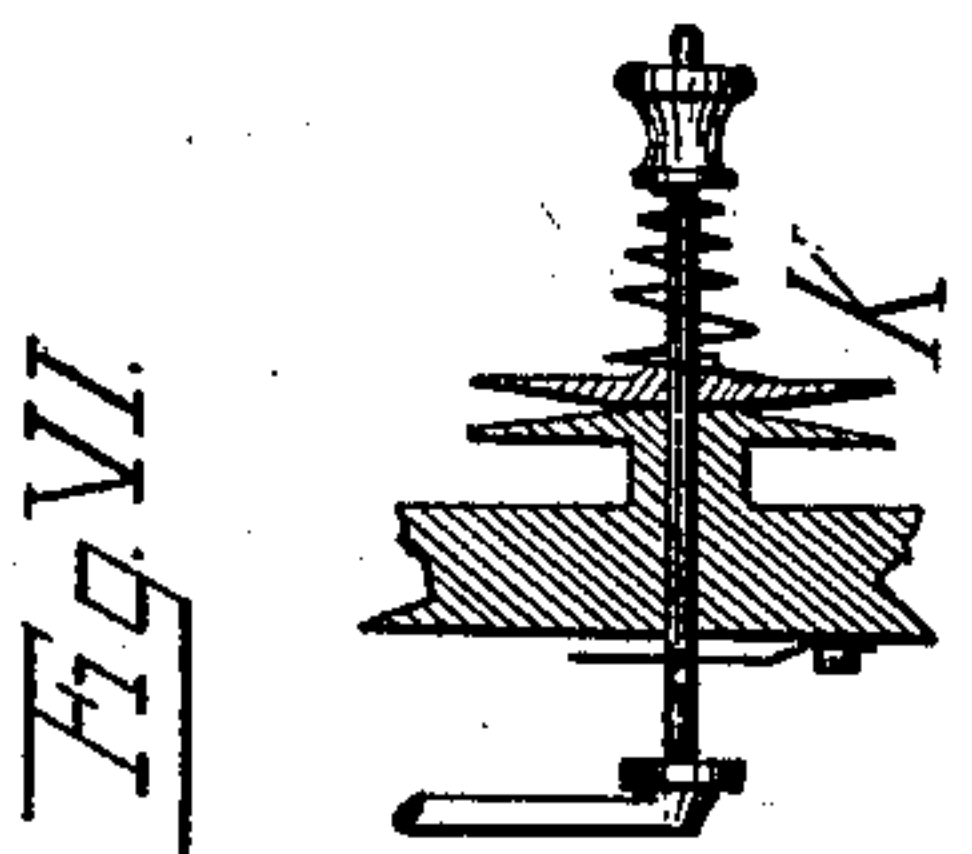


Fig. VI.

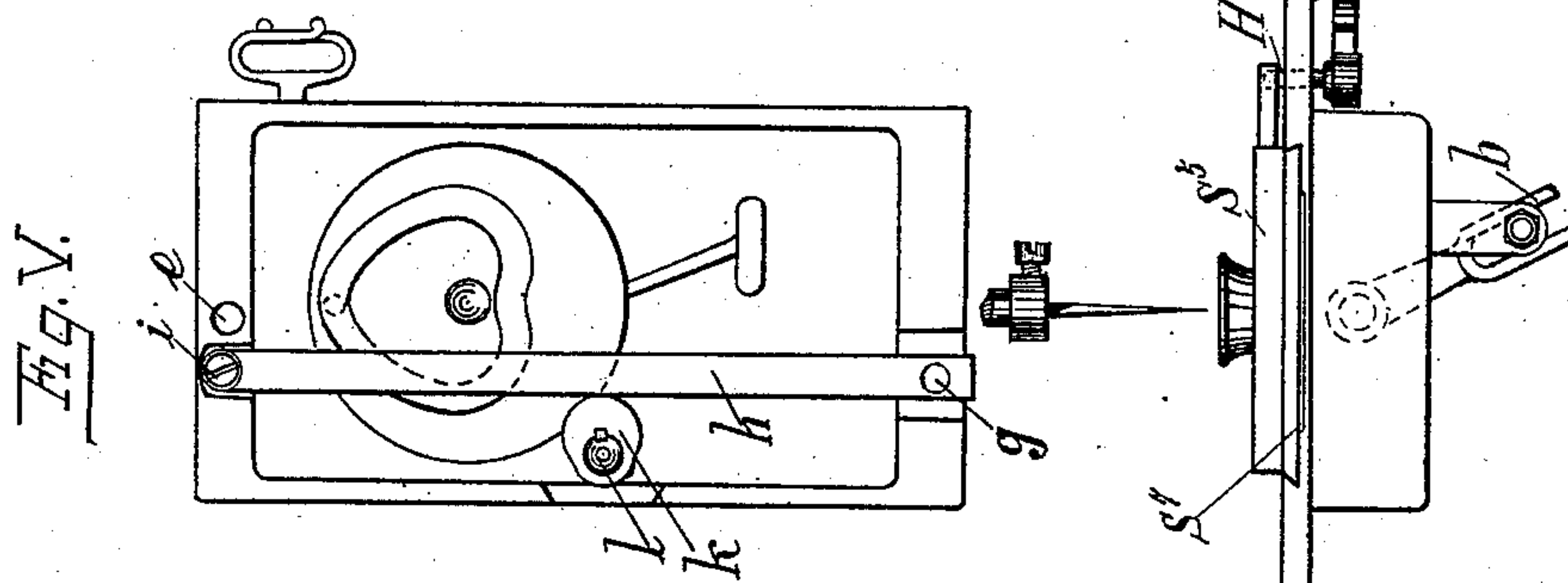


Fig. V.

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# UNITED STATES PATENT OFFICE.

JULIUS GUTMANN, OF BERLIN, GERMANY.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,914, dated May 28, 1895.

Application filed August 25, 1891. Serial No. 403,664. (No model.)

*To all whom it may concern:*

Be it known that I, JULIUS GUTMANN, a subject of the King of Prussia, and a resident of the city of Berlin, Germany, have invented  
5 certain new and useful Improvements in Buttonhole Sewing-Machines, of which the following is a specification.

This invention relates to a sewing-machine for making button-holes, and especially to a  
10 machine for making button-holes of the following kind: The button-hole is made with or without an eye and with the threads locked at the end, by shifting the fabric in the direction of the length of the same, first in one  
15 direction, for making one edge of the button-hole, and then it is shifted transversely to the width of the button-hole, and then moved back longitudinally in the opposite direction to the beginning, where the stitches are again  
20 locked, and then the fabric is cut open between the two rows of stitches.

The button-hole produced by my new machine is absolutely straight and remains securely clamped until the button-hole is finished. The fabric travels in the longitudinal  
25 direction of the button-hole and at the ends only travels transversely a distance equal to the width of the button-hole, while the needle swings as it reciprocates.

30 In the accompanying drawings, Figure 1 is a side view of the mechanism of my improved buttonhole sewing-machine, the supporting arm of the machine being shown in longitudinal section. Fig. 2 is a plan view of the under side of the base-plate of the sewing machine and the mechanism thereon, parts being broken out and the cam being shown in dotted lines so as not to obscure the levers beneath the same. Fig. 3 is a top view of the  
35 base-plate of the sewing-machine, the supporting-arm being shown in horizontal section. Fig. 4 is a rearend view of the sewing-machine. Fig. 5 is a front end view showing the fabric presser and holder and means for swinging the reciprocating needle. Fig. 6 is a detail view of the thread-tension and mechanism for actuating the same. Fig. 7 is a horizontal sectional view on the line 7 7, Fig. 4. Figs. 8, 9, and 10 are detail views of the  
40 cams. Fig. 11 shows a buttonhole made on my machine; and Fig. 12 also shows a button-

hole made on the machine, but having an enlargement or eye at one end.

Similar letters and numerals of reference indicate corresponding parts.

Referring to Figs. 11 and 12, the fabric 1, in which the button-hole is to be made, is held in a suitable stretching device or frame, which is moved in the direction of the arrow 2, which movement takes place successively, and at  
55 each of said movements the cloth is moved in the direction of the arrow 2 a distance 3 corresponding to the width of two stitches, the size of said stitches being adjusted as may be desired. The needle makes a double lock-  
60 stitch and moves laterally in relation to the length of the button-hole—that is, it first passes through the fabric at 4, then at 5, then at 4, and then at 5, and so on; or, in other words, it alternately passes through the fabric  
65 along the outer and inner edges of the stitched part, on each side of the button-hole slit. The stitches are all approximately at right-angles to the longitudinal axis 6—7 of the button-hole. When by successively moving the  
70 cloth 1 in the direction of the arrow 2 the upper side of the button-hole has been finished from the point 8 to the point 9 and the needle alternately swings from the points 4 to 5, and every time the needle is swung,  
75 the fabric 1 is moved in the direction of the arrow 2 a distance equal to 3. Then a slight movement of the fabric in the direction 10 takes place, and as the needle continues to pass through the fabric, a number of stitches  
80 are formed around the end of the button-hole. After the fabric has been moved a distance 12, which is slightly greater than the length 4 5 of each stitch, then the return movement of the fabric takes place in the direction of  
85 the arrow 13 from the point 14 to the point 15. The fabric is then moved from 15 toward 8 in the direction of the arrow 16, whereby the stitches formed around the other end of the button-hole are finished. A clear space  
90 of fabric remains between the inner edges of the two rows of stitches, which clear space can be cut by means of a knife or other suitable implement to complete the button-hole.

The button-hole shown in Fig. 12 is like the one described, only it is provided at one end with an eye 18, around which the stitches 19



are carried. In order to make the button-hole in the manner described, it is necessary that the fabric in which the button-hole is to be made be guided absolutely automatically. 5 Further, that the needle must automatically make the stitches parallel with each other; and, finally, that the machine is automatically stopped when the button-hole is finished and can be stopped at any time whenever desired, a brake being provided to suddenly 10 check the further movements of the parts.

In the horizontal part of the main arm  $A^4$  of the sewing-machine the crank-shaft A is journaled and carries at its front end a disk B, 15 provided with the usual cam-groove, in which the roller on the reciprocating needle-bar D passes, so that when the shaft A is rotated the needle-bar will be reciprocated. Directly behind the disk B a collar C is fixed on the shaft 20 A, which shaft is provided in its periphery with a cam-groove, and into said groove in the collar C a pin passes from the pivoted take-up lever  $f$ , whereby the movements of said take-up lever are fully governed.

25 The crank  $A'$  of the crank-shaft A is connected by a connecting-rod F with a crank  $c$ , on a shaft  $a$  journaled on the under side of the base-plate U and provided on the end opposite the one having the crank  $c$  with a fork 30  $b$ , which serves for operating the shuttle. In place of the shuttle mechanism any other device for locking the stitches can be used, and any other device can be used for producing the stitches.

35 The end-plate  $d$  in which the needle-bar D is reciprocated is pivoted at the point  $e$  to the head on the end of the main arm  $A^4$  and is connected by an adjusting-screw  $g$  with a rod  $h$ , the upper end of which is pivoted at 40  $i$  to the head on the end of the main arm  $A^4$ . A cam-disk  $k$  rests against the edge of the bar  $h$  and is keyed upon one end of a shaft  $l$  mounted in the main arm  $A^4$ , so that when said shaft  $l$  is rotated the plate  $d$  and the reciprocating needle-bar D together swing on 45 the pivot  $e$  of said plate. The cam-disk  $k$  makes a single rotation during the time that the shaft A makes two rotations, and the said disk  $k$  is so mounted that when the point of its longest diameter rests against the bar  $h$  a stitch is made by the needle and another stitch is made when the part of its shortest diameter rests against the bar  $h$ , and so on. In all cases two stitches are made for each 50 rotation of the shaft  $l$  and cam  $k$ . The crank-shaft A is driven by a belt, shown in dotted lines and passed over the fixed belt-pulley S adjacent to the fly-wheel  $H^5$ , which fly-wheel serves also as a hand-wheel for starting and 60 stopping the machine and as a wheel upon which the brake-lever can act. Adjacent to the fixed belt-pulley S the loose pulley  $S'$  is mounted on the shaft A, and between said loose pulley  $S'$  and the end of the main arm 65  $A^4$  are mounted the cog-wheels Z and  $Z'$ , of which the latter is fixed on the shaft A and

the former keyed on that end of the shaft  $l$  opposite the one carrying the cam-disk  $k$ . As the shaft  $l$  must rotate half as fast as the shaft A, for the reasons above given, the di- 70 ameters of the wheels  $Z'$  and Z are as one is to two. The belt-shifter  $F'$  is pivoted by a pivot  $n$  to a lug  $F^2$  of the main arm  $A^4$  of the machine, and by means of said belt-shifter the belt is either shifted upon the pulley S or 75  $S'$ . The driving-belt which is shown in dotted lines in Fig. 4 runs over the pulley on an adjacent shaft operated by suitable transmitting devices from a motor or driven by 80 means of the usual pedals and connecting-rod. In lateral projections of the belt-shifter a wheel R is mounted, that rests against the inclined cam N of a lever Q pivoted to a lug  $Q'$  of the base-plate U. Whenever the belt- 85 shifter  $F'$  guides the belt upon the fixed pulley S the roller R, acting on the inclined cam N, presses the lever Q outward; but when the belt-shifter shifts the belt upon the loose pulley  $S'$  and the machine is to be stopped, the roller R slides off the inclined cam  $n$  and 90 permits the spring V connected with the fixed part of the machine frame and with the lever Q to press the upper curved brake-shoe part  $Q^2$  of said lever Q against the rim of the hand-wheel  $H^5$ , thus stopping the rotation of the 95 shaft A very promptly and rapidly. As soon as the machine is again started and the belt-shifting lever  $F'$  is moved so as to guide the belt upon the driving-pulley S the roller R again acts on the inclined cam N and presses 100 the lever Q and the brake-shoe part  $Q^2$  of the same from the pulley  $H^5$ . The belt-shifting lever  $F'$  is provided at its lower end with a fork  $m$  engaging a pin at one end of a bar L, guided to slide longitudinally on the under 105 side of the base-plate U, that end of the bar L opposite the one connected with the belt-shifting lever being surrounded by a spring  $V'$  bearing against a fixed guide on the under side of the base-plate and against a collar on 110 said bar L. A lever H is pivoted on a lug  $H^3$  of the base-plate U, and the lower forked end  $H'$  of said lever H engages a pin  $H^2$  projecting from a piece fastened on said bar L, so that by means of said lever H said bar L can 115 be moved in the direction of its length and the belt-shifter operated. Said bar L is provided on one edge with a tooth or projection  $t^2$ , that can be engaged by the tooth  $t'$  of an angle-latch  $t$ , pivoted on the under side of the 120 base-plate U and provided with an arm T projecting upward through a notch in the edge of the base-plate U. A spring acts on the angle-latch  $t$  and keeps the tooth  $t'$  of the same engaged with the projection  $t^2$  on the bar L. 125 When the tooth  $t'$  of the angle-latch  $t$  and the teeth or projections  $t^2$  on the sliding-bar L are engaged, as shown in Fig. 2, the spring V' is compressed and the belt runs over the fixed pulley S. If now the upwardly-projecting 130 part T of the angle-latch  $t$  is pulled out, the teeth  $t'$  and  $t^2$  are disengaged, and the spring



V' expands and presses the bar L in the direction of the arrow VIII, whereby the belt-shifting lever F' is moved in such a manner as to shift the belt from the fixed pulley S upon the loose pulley S'. When the machine is to be started again, the lever H is moved in such a manner as to move the bar L in the inverse direction of the arrow VIII, and said bar is then again locked in place by the angle-latch t.

The cog-wheel Z on the shaft l is provided on one side with a cam s that can act on the lever Y, pivoted at n', Fig. 4, to a projection of the arm A<sup>4</sup>, which lever Y is provided at its lower end with a form m', the shanks of which embrace a pin m<sup>2</sup> projecting from the end of the L-shaped bar L<sup>2</sup>, guided on the under side of the base-plate U. The front end of the bar L is connected with an angle-lever r r', pivoted at r<sup>2</sup> to the under side of the base-plate U, which angle-lever r r' can be adjusted on the end of the bar L by means of the thumb-screw r<sup>3</sup>. The free end of the arm r' of the angle-lever r r' is provided with a pin r<sup>4</sup>, that rests against a pawl t<sup>3</sup> pivoted to the end of the sliding-bar L<sup>2</sup>. The tooth t<sup>4</sup> of the pawl t<sup>3</sup> is adapted to engage the teeth of a ratchet-wheel M, mounted to turn on the under side of the base-plate U, so that when the bar L is moved toward the right, that is, in the direction of the arrow VIII, for the purpose of stopping the machine, the angle-lever is turned in the direction of the arrow I, Fig. 2, and the pin r<sup>4</sup> moves the pawl t<sup>3</sup> and its tooth t<sup>4</sup> in the direction from the rim of the ratchet-wheel M, so as to disengage them. A spring t<sup>5</sup> acts on the pawl t<sup>3</sup>, to keep the tooth t<sup>4</sup> of the same engaged with the teeth of the ratchet-wheel M. The cam s acting on the lever Y jointly with the spring L<sup>3</sup> attached to the base-plate U and to the lever L<sup>2</sup>, reciprocates the bar L<sup>2</sup>, said spring L<sup>3</sup> serving to draw the bar L<sup>2</sup> in the direction of the arrow II and to keep the roller Y' on the upper end of the lever Y pressed against the cog-wheel Z and cam s. It thus follows that for each rotation of the cog-wheel Z the bar L<sup>2</sup> and pawl t<sup>3</sup> are reciprocated and the ratchet-wheel M is rotated a distance equal to a number of teeth.

On the upper face of the ratchet-wheel M a cam C' is formed, against which one end of the lever H<sup>4</sup>, pivoted at H<sup>7</sup> to the under side of the base-plate U, is pressed by the spring H<sup>6</sup> acting on said lever. The pin H<sup>8</sup> on that end of the lever H<sup>4</sup> opposite the one resting against the cam C' passes through an inclined slot H<sup>9</sup> in the base-plate U and into the longitudinal slot S<sup>4</sup> of the fabric-holding plate S<sup>3</sup>. Said fabric-holding plate S<sup>3</sup> is movable transversely, that is, at right-angles to the length of the button-hole being formed, and is mounted between the guides S<sup>5</sup> and S<sup>6</sup> of the frame S<sup>7</sup> of the fabric-holder, said frame being mounted movable in the direction of the length of the button-hole. The lever H<sup>4</sup> serves to shift the fabric-holder in the direction of the width of the button-hole, and the

distance that the fabric-holder is shifted depends upon the width of the button-hole to be made and the length of the stitch.

The lever H<sup>19</sup> is mounted to turn on a pin H<sup>10</sup> on the under side of the base-plate U and is provided with a stop-lug H<sup>11</sup>, by means of which lever the throw of the lever H<sup>4</sup> provided by the spring H<sup>6</sup> can be checked and thus the distance that the fabric-holding plate S<sup>3</sup> is shifted transversely controlled. By a proper adjustment of the lever H<sup>19</sup> the width of the button-hole can be regulated, as the cam C' on the ratchet-wheel M is constructed for the greatest possible width of the button-hole. The ratchet-wheel M is also provided with a cam-groove C<sup>2</sup>, into which a pin o<sup>2</sup> passes, that projects from one end of a lever O pivoted at o on the under side of the base-plate. Upon said lever O an adjustable piece S<sup>2</sup> is secured, to which the connecting-rod Q<sup>4</sup> is pivoted at q. From the free end of the connecting-rod Q<sup>4</sup> a pin q' passes through a longitudinal slot q<sup>2</sup> in the base-plate U, and through a transverse slot q<sup>3</sup> of the fabric-frame S<sup>7</sup>, so that when said lever O swings it serves to move the fabric-frame S<sup>7</sup> and fabric-holder S<sup>3</sup> in the direction of the length of the button-hole to be made. In order to permit of such movements, the slots q<sup>2</sup> and q<sup>3</sup> are arranged at right-angles to each other. By means of the thumb-screw f<sup>2</sup> passing through the longitudinal slot f<sup>3</sup> of the piece S<sup>2</sup>, the connecting-rod Q<sup>4</sup> can be adjusted as may be desired and the throw of said connecting-rod increased or decreased as may be necessary. The throw or stroke of the reciprocating bar L<sup>2</sup> is adjusted by means of the adjustable wedge-shaped piece U' pivoted on the end of the lever U<sup>3</sup> mounted to turn on the pivot U<sup>2</sup> on the under side of the base-plate U, said wedge-shaped piece being guided by the guide U<sup>4</sup> on the under side of the base-plate. The lower end of the lever Y strikes against the wedge-shaped piece U<sup>2</sup> and can make a greater or less stroke, as it strikes said wedge-shaped piece a greater or less distance from the end of the same. By means of said wedge-shaped piece the number of stitches that are required for the button-hole can be increased or decreased.

The fabric-holder S<sup>3</sup> is provided with a fabric-clamp X having a longitudinal opening X', within which the needle reciprocates and swings laterally. Said fabric-clamp is pivoted at g<sup>2</sup> to a lug on the top of the base-plate and is provided with an arm X<sup>2</sup>, that is pressed upward by the helical spring X<sup>3</sup> surrounding a rod X<sup>5</sup>, provided at its upper end with a suitable thumb-nut X<sup>4</sup>, by which the tension of the spring can be adjusted according to the thickness of the fabric. The rod X<sup>5</sup> passes through an aperture in the base-plate and is connected at its lower end with one end of a lever X<sup>a</sup> which at X<sup>6</sup> is pivoted to the under side of the base-plate and is provided with an eye X<sup>7</sup>, intermediately of its ends. The lever



X<sup>a</sup> is pivoted to the base plate by any suitable pivot or hinge, but as shown is encircled by a sleeve, said sleeve being pivoted to swing between two arms or supports so as to adapt said lever to swing up and down. A cord or wire X<sup>8</sup> is fastened, to said eye X<sup>7</sup> and is connected with a foot-lever P. By depressing the foot-lever P the rod X<sup>5</sup> is pulled downward and the fabric-clamp X is raised to permit of inserting or removing the fabric. Above the fabric-clamp the knife W for cutting open the button-hole is arranged, and the same is provided with an arm W' having a handle W<sup>2</sup>, on which latter a spring W<sup>3</sup> acts in such a manner as to normally keep the knife in raised position. The axis W<sup>4</sup> of the knife and handle is adjusted between two screws W<sup>5</sup> W<sup>5</sup> on the plate U, so as to permit of adjusting the knife as may be necessary. By means of the handle W<sup>2</sup> the knife W is pressed upon the fabric between the two rows of stitches of the button-hole to cut through the fabric.

For the purpose of automatically stopping the machine when a button-hole is finished, the ratchet-wheel M is provided with the pin M', which, as the ratchet-wheel rotates in the direction of the arrow IV, Fig. 2, strikes against the angle-latch t and disengages the tooth t' of the same from the tooth or projection t<sup>2</sup> on the sliding-bar L, thus permitting the spring V' to act and to throw the mechanism out of gear. A spring M<sup>2</sup> on the pivot of the ratchet-wheel M bears against the under side of the said ratchet-wheel and prevents the latter from rotating too freely on its pivot. A handle M<sup>4</sup> projecting downward from the ratchet-wheel M permits the adjusting of said ratchet-wheel by the handle, as may be necessary.

When a button-hole is to be made the fabric-frame S<sup>7</sup> is brought into the extreme position to the right from the operator, so that it can move in the direction of the arrows V and VI. When the machine is started the button-hole is first stitched on the side 8, Fig. 11. Every time the driving-shaft makes two revolutions the shaft l makes one revolution, and two stitches are formed during the time that the fabric remains perfectly at rest. After said two stitches have been made the action of the cam s of the wheel Z upon the lever Y and rod L<sup>2</sup> and of the tooth t<sup>4</sup> of the pawl t<sup>3</sup> upon the ratchet-wheel causes said ratchet-wheel to be turned a distance equal to a greater or less number of teeth, in the direction of the arrow IV. The number of teeth caught each time by the tooth t<sup>4</sup> depends upon the adjustment of the wedge-shaped stop U'. After one side of the edge of the button-hole has been finished the part C<sup>3</sup> of the cam C' begins to act, and by means of the lever H<sup>4</sup> shifts the fabric-holder a distance corresponding to the adjustment of the lever H<sup>10</sup>. Thereby the fabric is shifted a distance slightly greater than the width of

the button-hole, and a cam-groove C<sup>2</sup> now causes the fabric-frame and fabric-holder to be moved in the direction of the arrow VII, and now the stitches 14 to 15 are produced. When the button-hole is finished the part C<sup>4</sup> of the cam C' is adjacent to the end of the lever H<sup>4</sup>, and the pin M' strikes the latch t and disengages the same from the bar L, whereby the machine is stopped. When the cam parts C<sup>4</sup> and C<sup>3</sup> act on the roller H a displacement of the stitches takes place, and as during this time the fabric is not being moved forward in the direction of the length of the button-hole, the stitches cross each other and lock the threads at the end of the button-hole.

In case larger button-holes are to be made, the leverage of the adjustable piece S<sup>2</sup> is increased for the purpose of giving the connecting-rod Q<sup>4</sup> a greater stroke. In case the width of the stitch is to be changed, the screw g is changed correspondingly on the plate d. In case the width of the button-hole is to be decreased, the lever H<sup>19</sup> is so adjusted that the stroke of the lever H<sup>4</sup> is decreased. If the number of stitches in the button-hole are to be increased, the wedge-shaped slide U' is so adjusted that the pawl-tooth t<sup>4</sup> grasps a less number of teeth of the ratchet cam-wheel M at each stroke.

A thread-tension K, Figs. 1 and 6, is connected with the rod K', the opposite end of which is acted upon by a cam-groove d' in a cam-disk d<sup>2</sup> mounted on the main shaft A, so that every time a stitch is made the thread is loosened correspondingly. If by means of the above described machine button-holes are to be made that are provided at the end with an eye 18, (Fig 2,) the cam-piece C<sup>3</sup> is removed from the ratchet-wheel M and replaced by the cam-piece C<sup>5</sup>, which acts on the lever H<sup>4</sup> in such a manner that the fabric-holder first moves backward and then forward.

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

1. In a button hole sewing machine, the combination, with a needle, mechanism for operating the same, a fabric holding frame, and a fabric holder on said frame, of a cam wheel provided with ratchet teeth, levers operated by said cam wheel and adapted to move said fabric holding frame and fabric holder, the former longitudinally of the other and the latter transversely of the former, a reciprocating bar having a pawl adapted to engage said ratchet teeth, a cam wheel driven from the main shaft of the machine and adapted to operate said reciprocating bar, an additional reciprocating bar, an angle lever operated by the latter, and a pin on the angle lever adapted to throw off said pawl from the ratchet teeth when desired, substantially as described.

2. In a button hole sewing machine, the combination with a needle and mechanism for operating the same, a cam wheel provided with ratchet teeth on its edge, a reciprocating bar, a rocking lever pivoted at its lower end to



said bar, mechanism for operating said lever and the bar from the driving mechanism of the machine, a pawl on said bar for engaging the ratchet teeth and rotating the cam wheel,  
5 a spring actuated trip device for throwing off the pawl from the ratchet teeth, and an adjustable wedge shaped stop against which said lever impinges for limiting the stroke of

said reciprocating bar, substantially as described. 10

In witness whereof I have hereunto set my hand in presence of two witnesses.

JULIUS GUTMANN.

Witnesses:

W. BINDEWALD,  
PAUL FISCHER.