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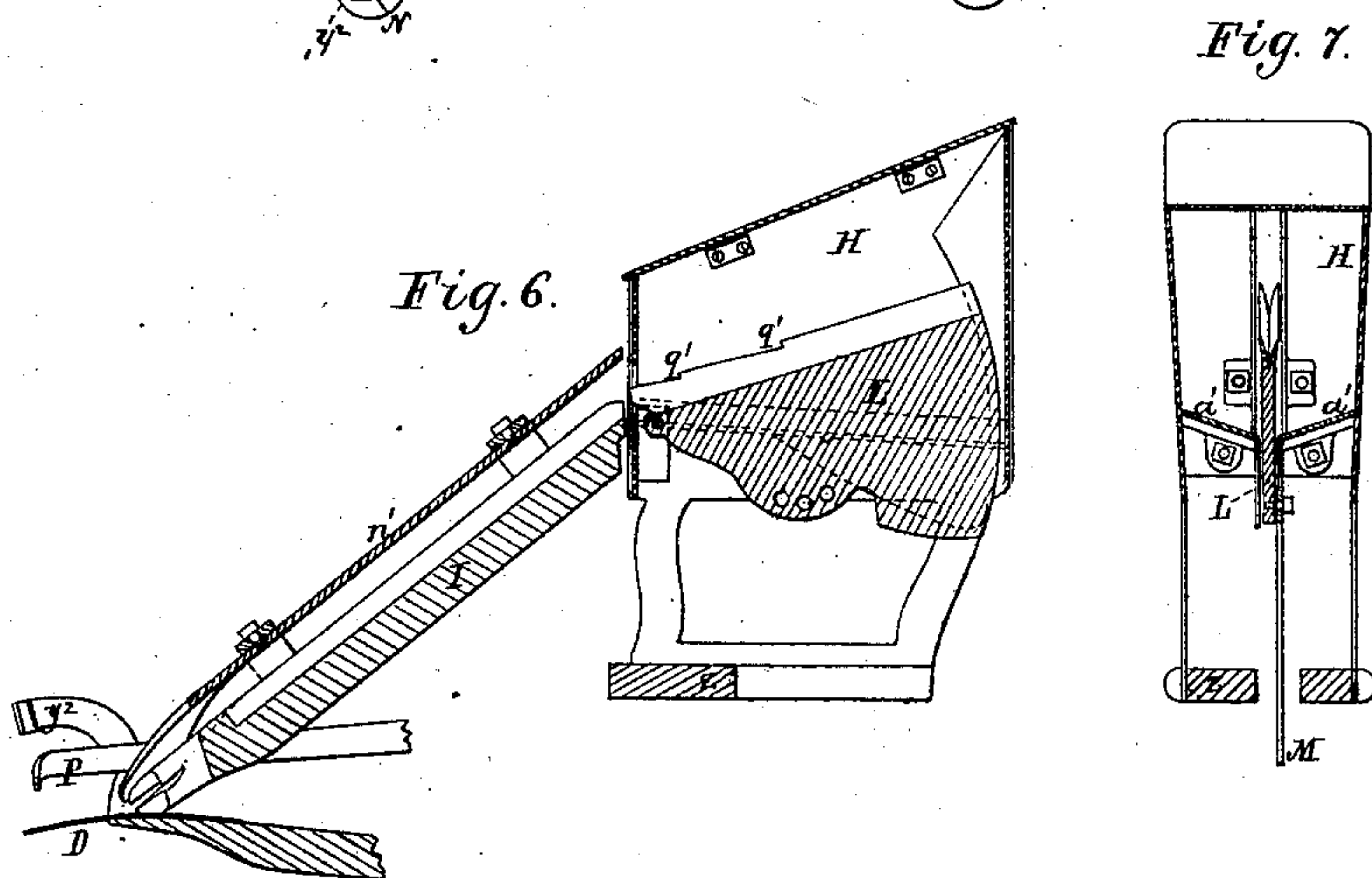
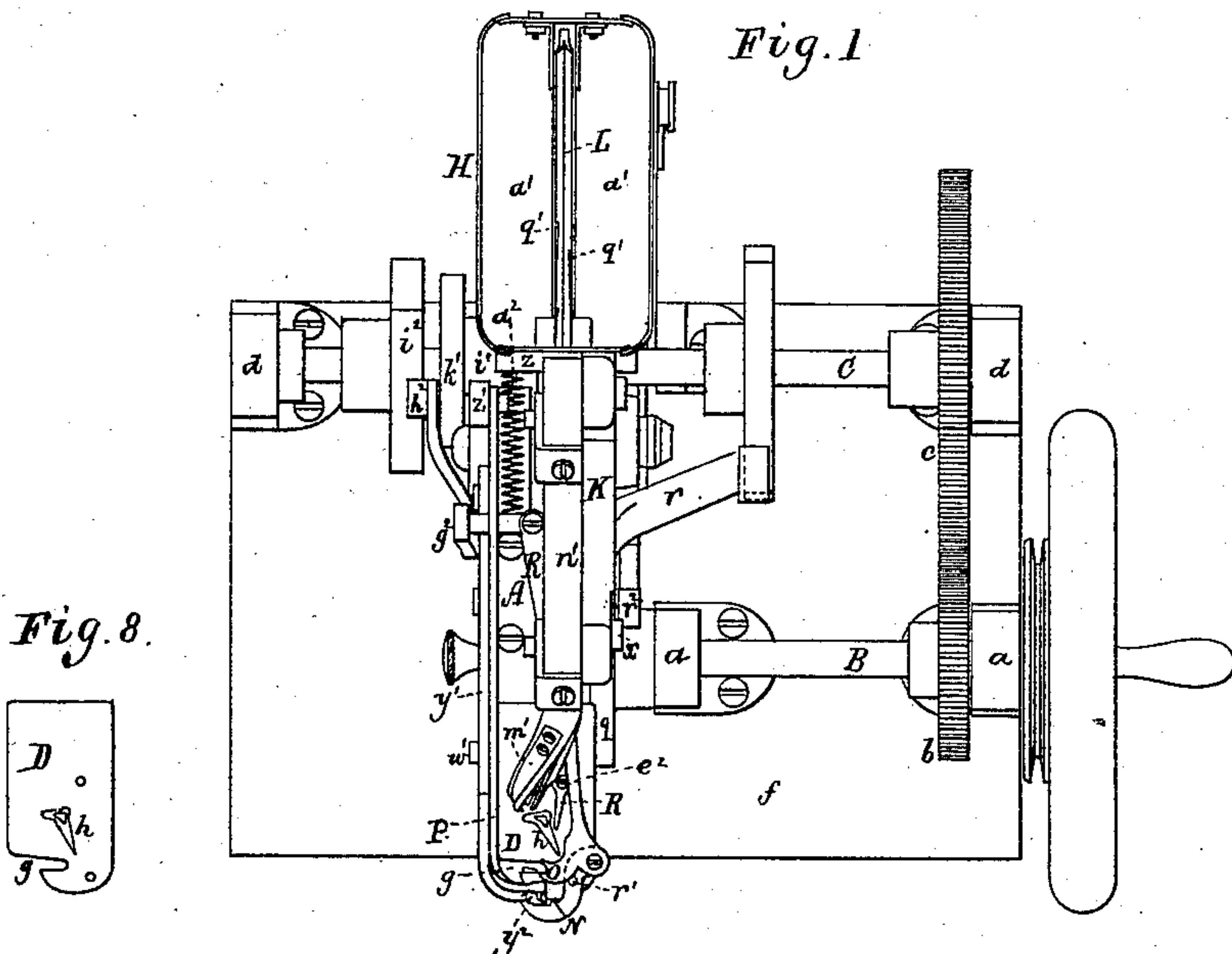
5 Sheets—Sheet 1.

J. KEITH.

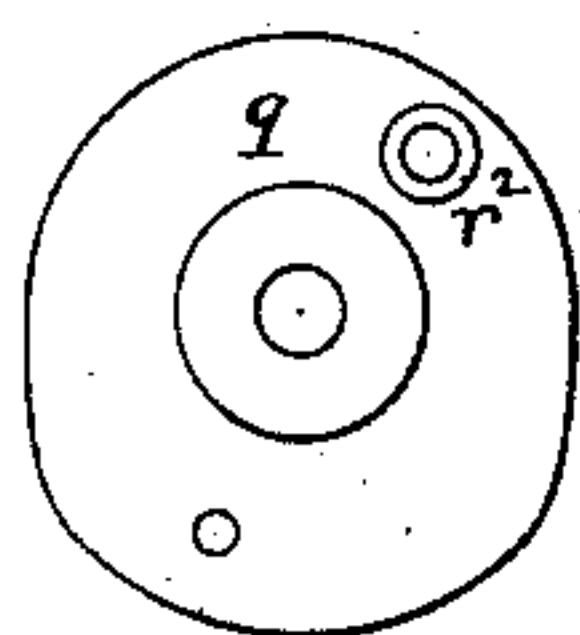
MACHINE FOR SEWING ON BUTTONS.

No. 365,440.

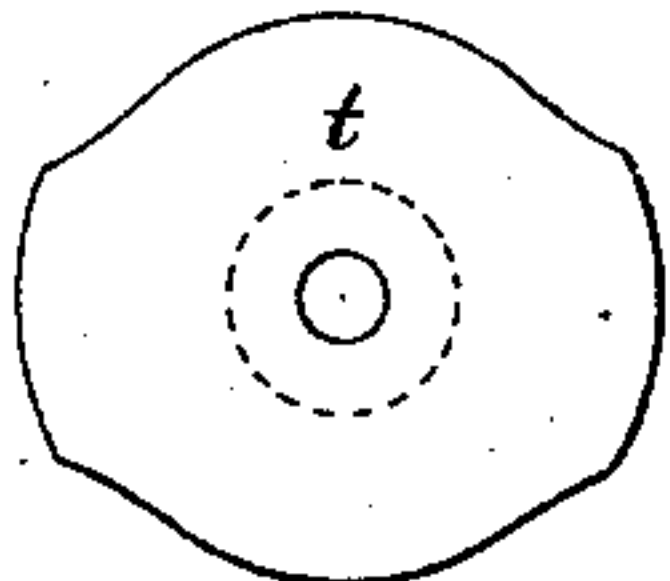
Patented June 28, 1887.



*Fig. 10.*



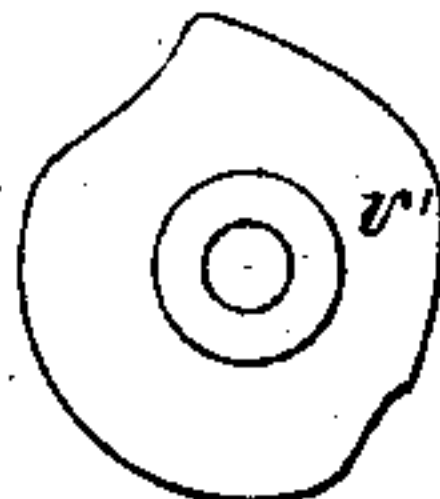
*Fig. 11.*



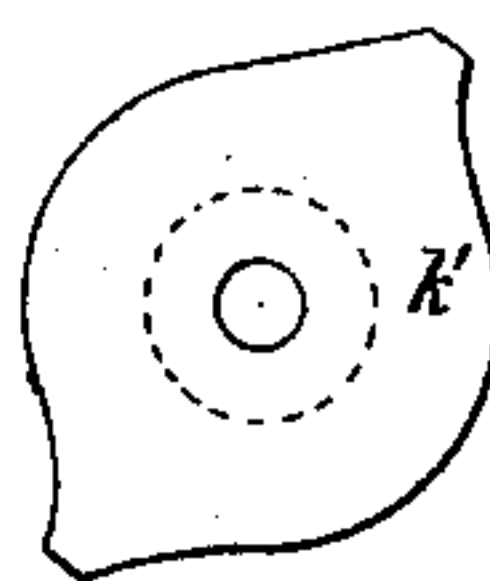
*Fig. 24.*



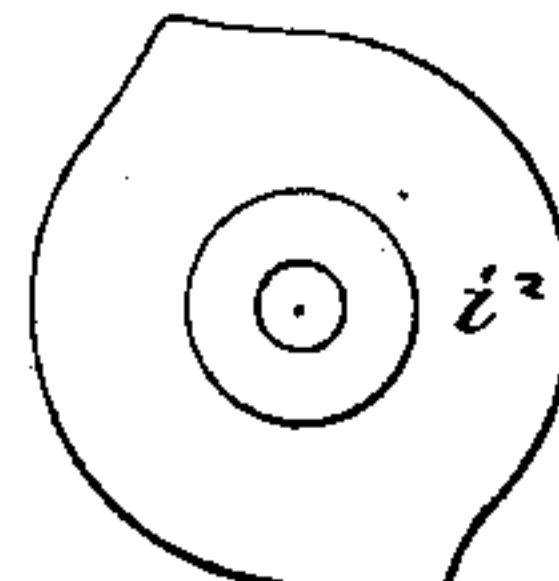
*Fig. 17.*



*Fig. 20.*



*Fig. 23.*



Witnesses.

S. N. Piper  
R. B. Torrey

Inventor.

Jeremiah Keith.  
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(No Model.)

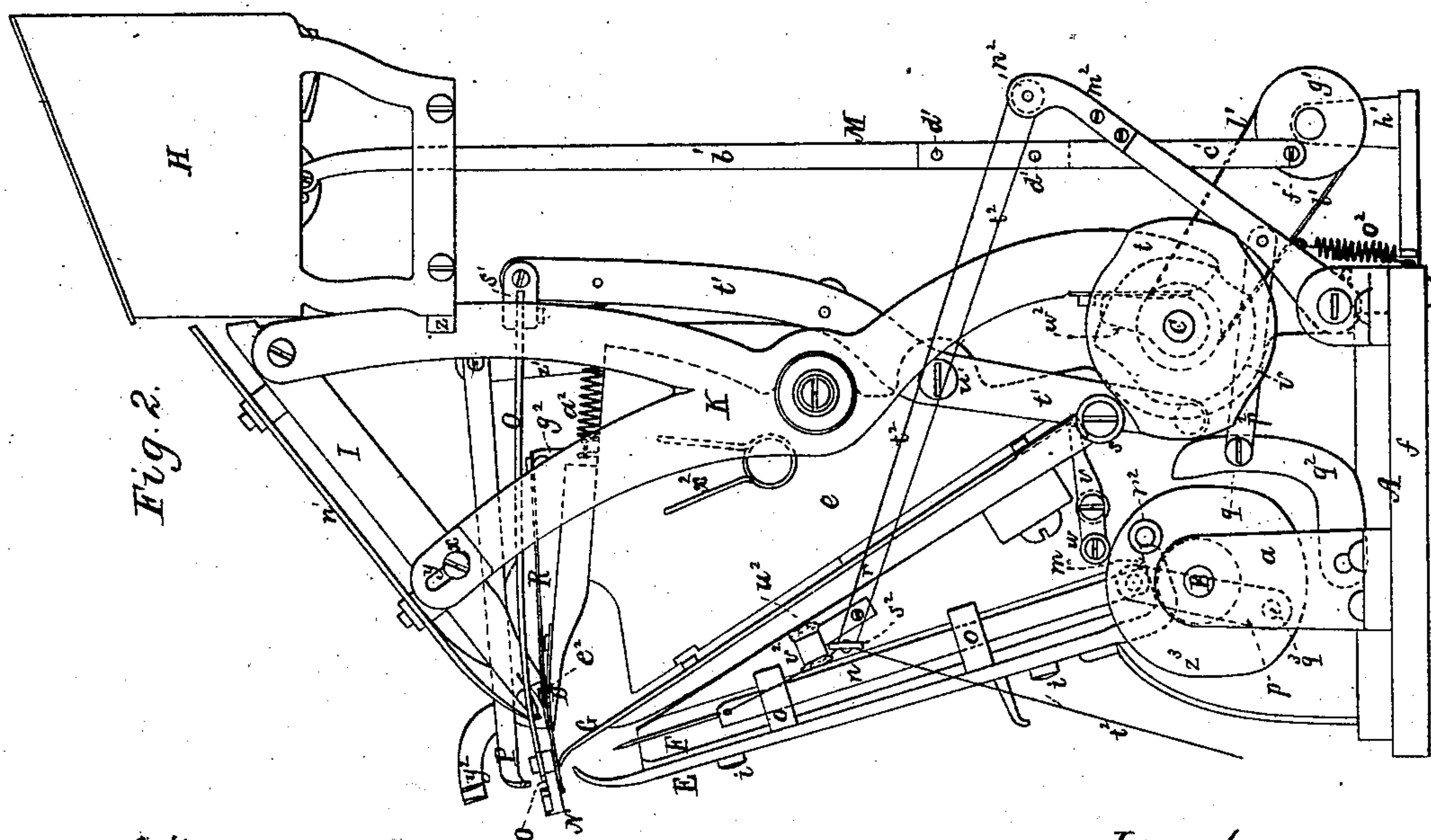
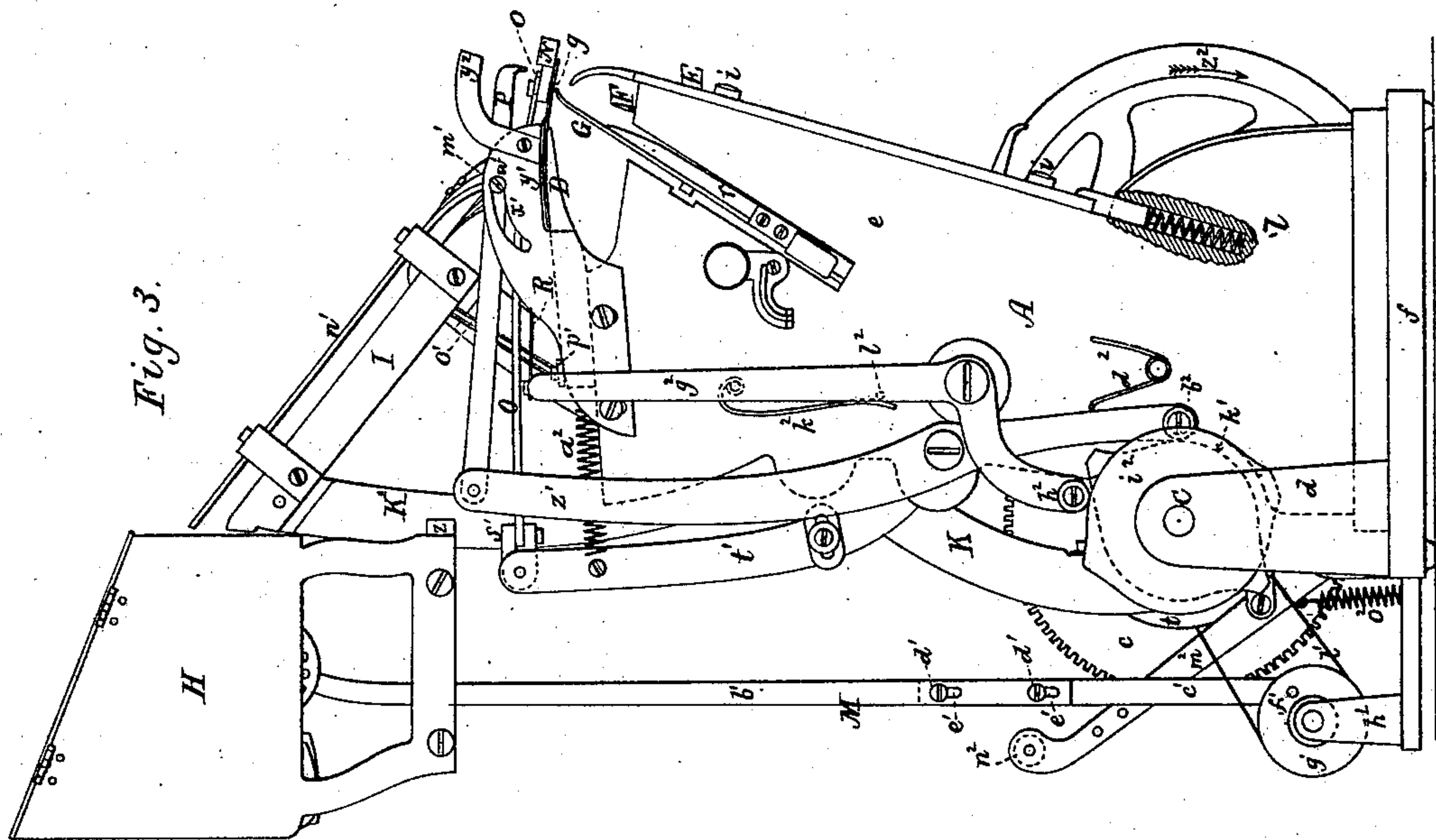
5 Sheets—Sheet 2.

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MACHINE FOR SEWING ON BUTTONS.

No. 365,440.

Patented June 28, 1887.



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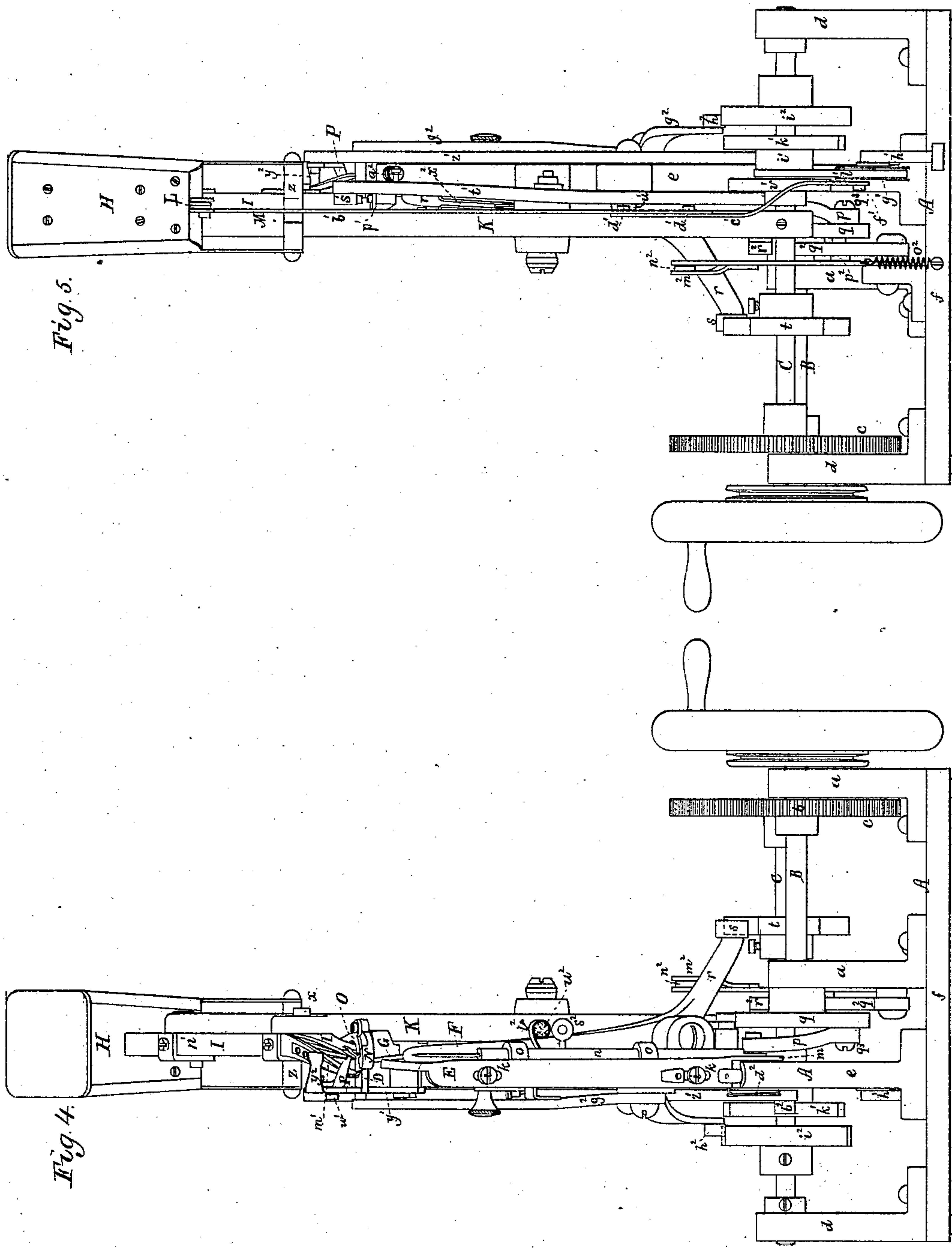
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J. KEITH.

MACHINE FOR SEWING ON BUTTONS.

No. 365,440.

Patented June 28, 1887.



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(No Model.)

5 Sheets—Sheet 4.

J. KEITH.

MACHINE FOR SEWING ON BUTTONS.

No. 365,440.

Patented June 28, 1887.

Fig. 13.

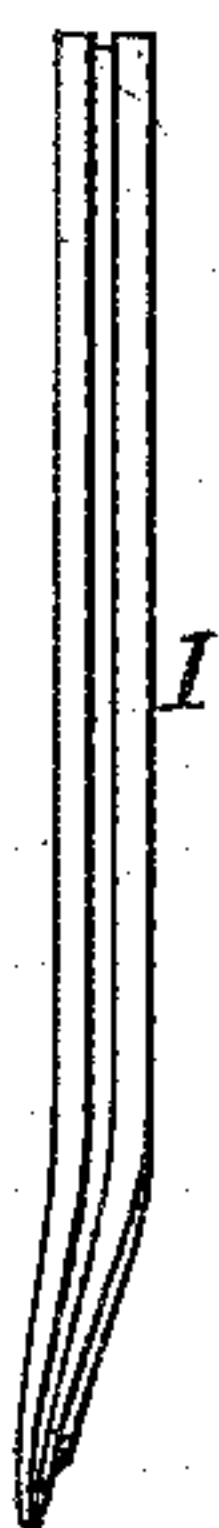


Fig. 9.

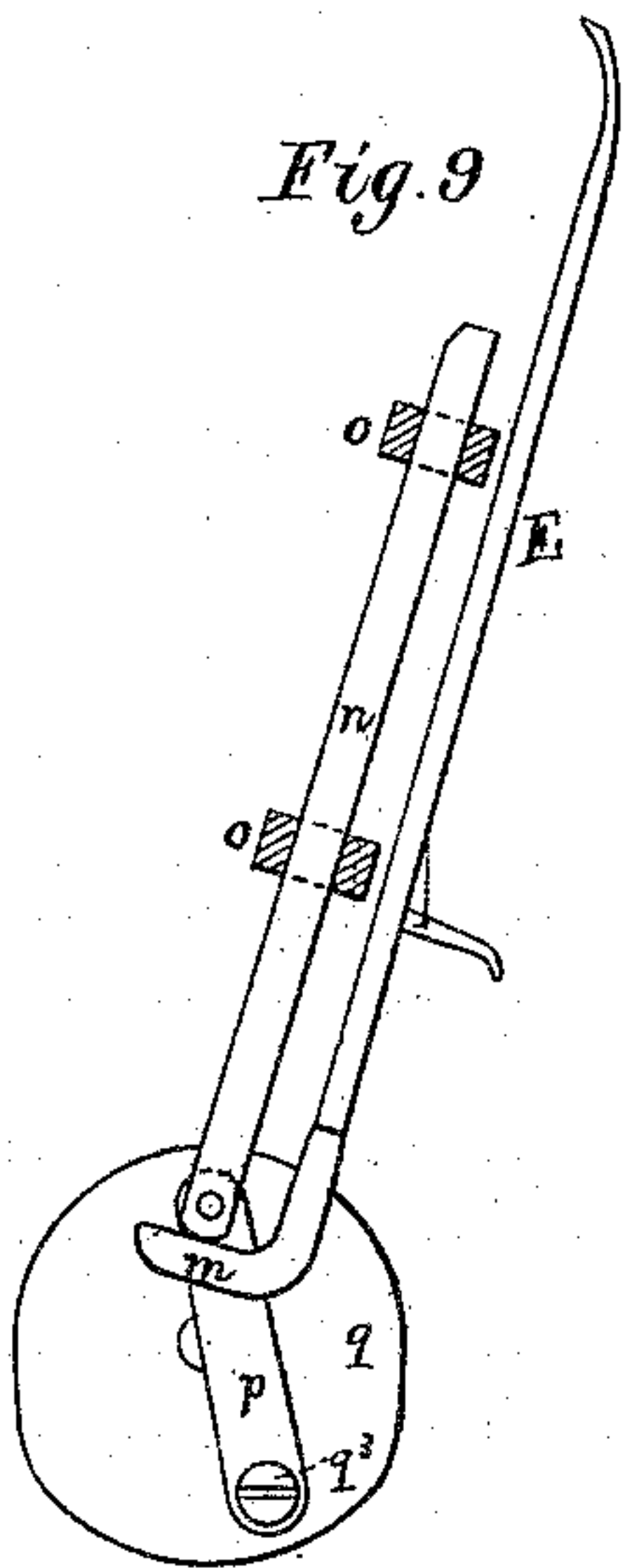


Fig. 12.

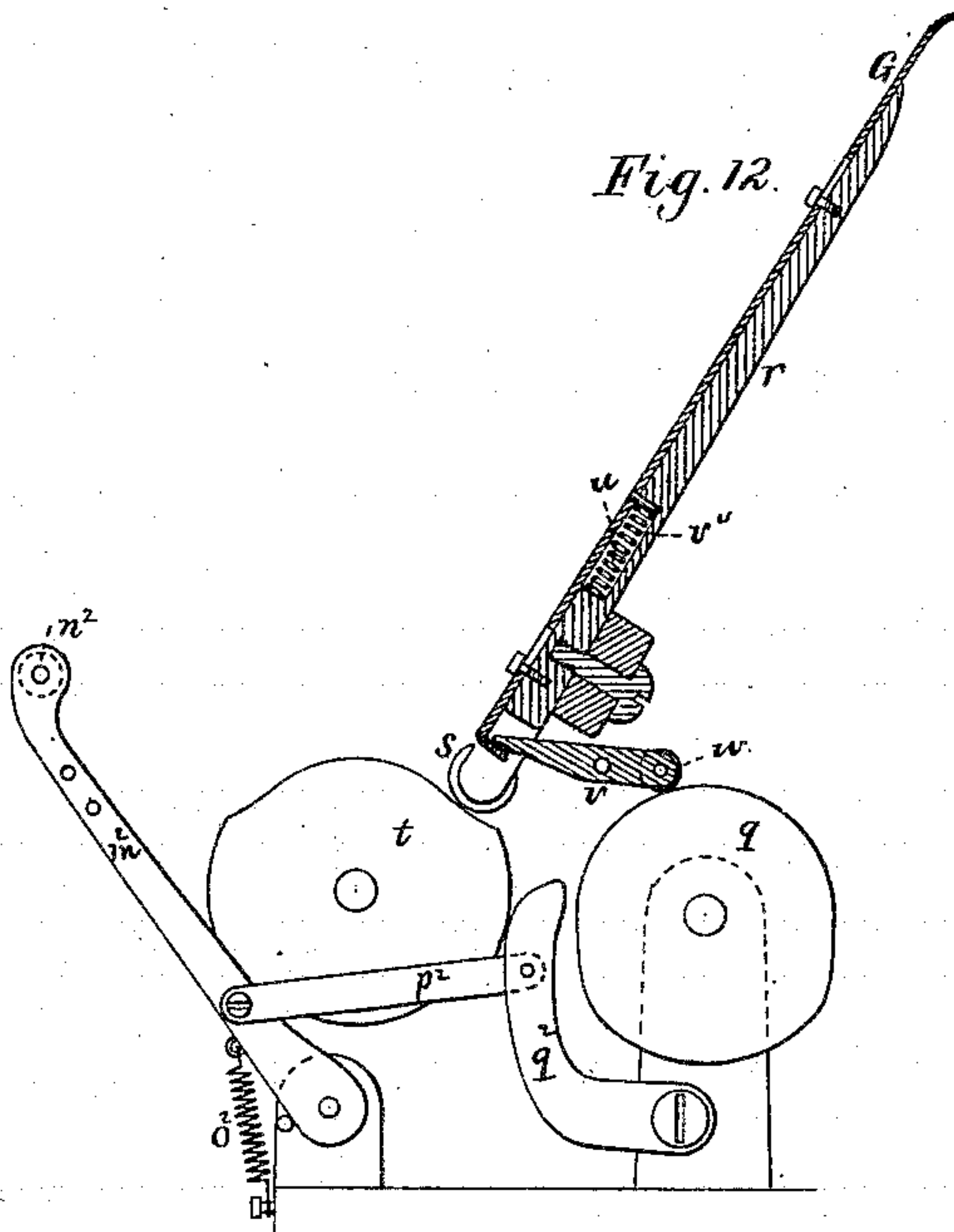


Fig. 14.

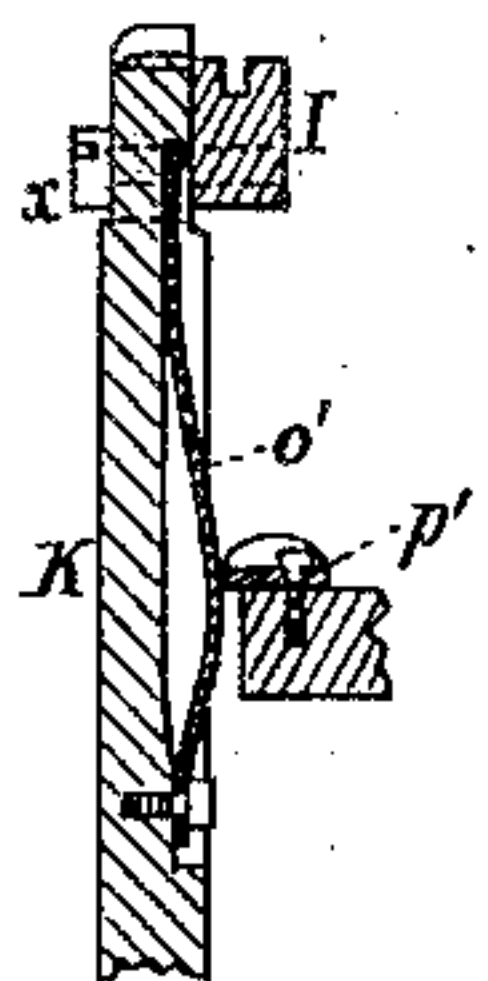


Fig. 16.



Fig. 19.

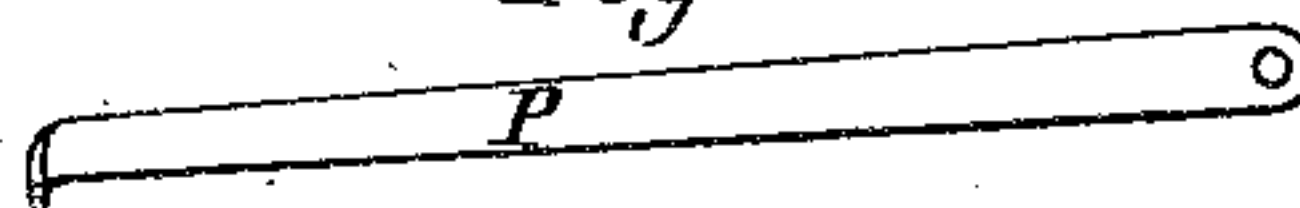


Fig. 18.

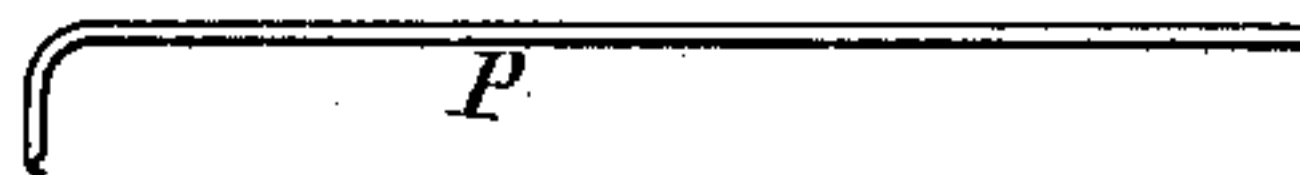


Fig. 15.



Fig. 25.

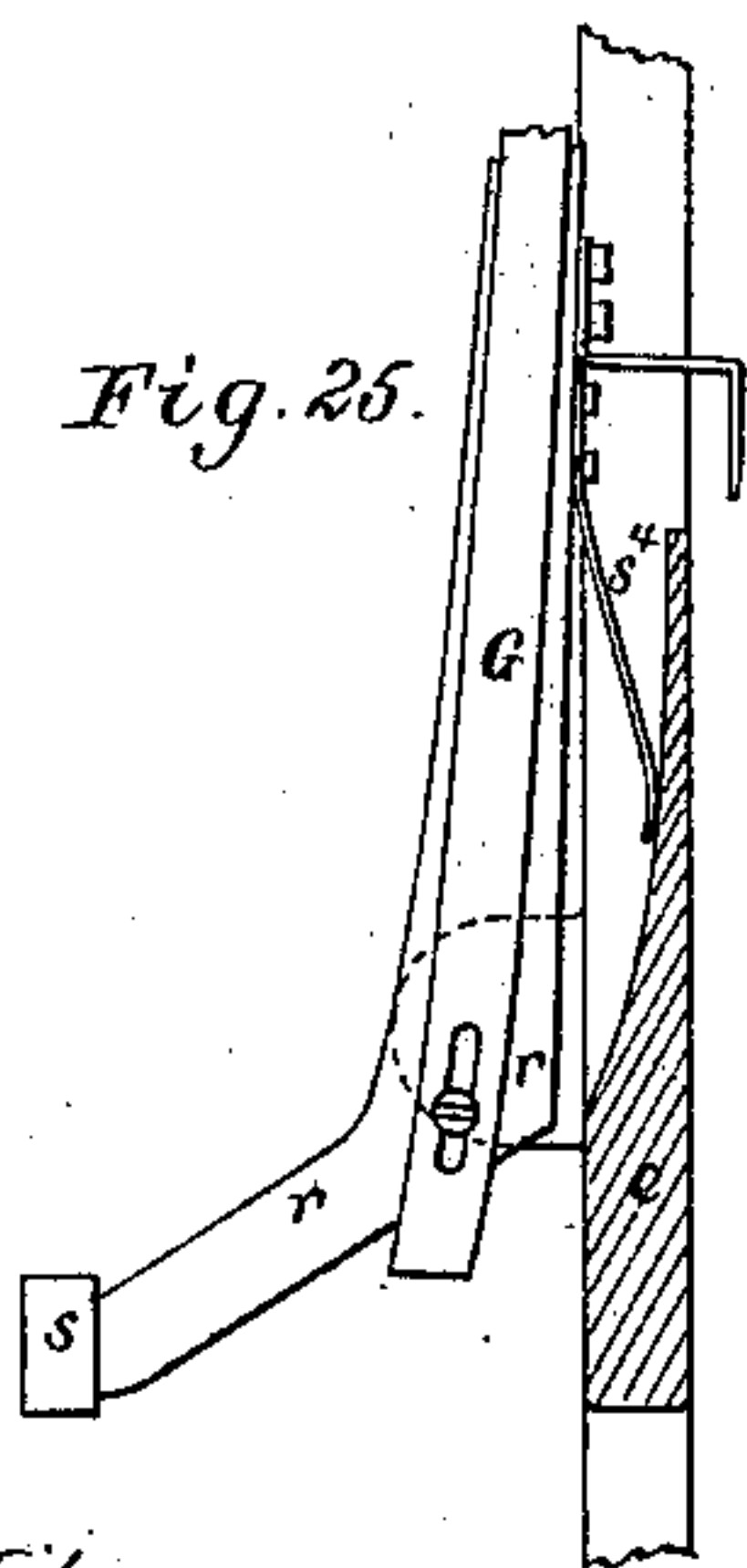


Fig. 21.

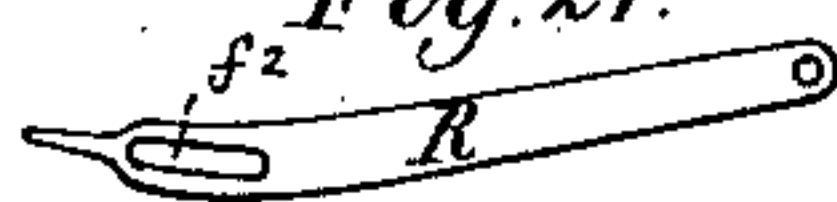


Fig. 22.



Witnesses

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*R. B. Torrey*

Inventor.

*Jeremiah Keith*  
*by R. H. Eddy atty.*

(No Model.)

5 Sheets—Sheet 5.

J. KEITH.

MACHINE FOR SEWING ON BUTTONS.

No. 365,440.

Patented June 28, 1887.

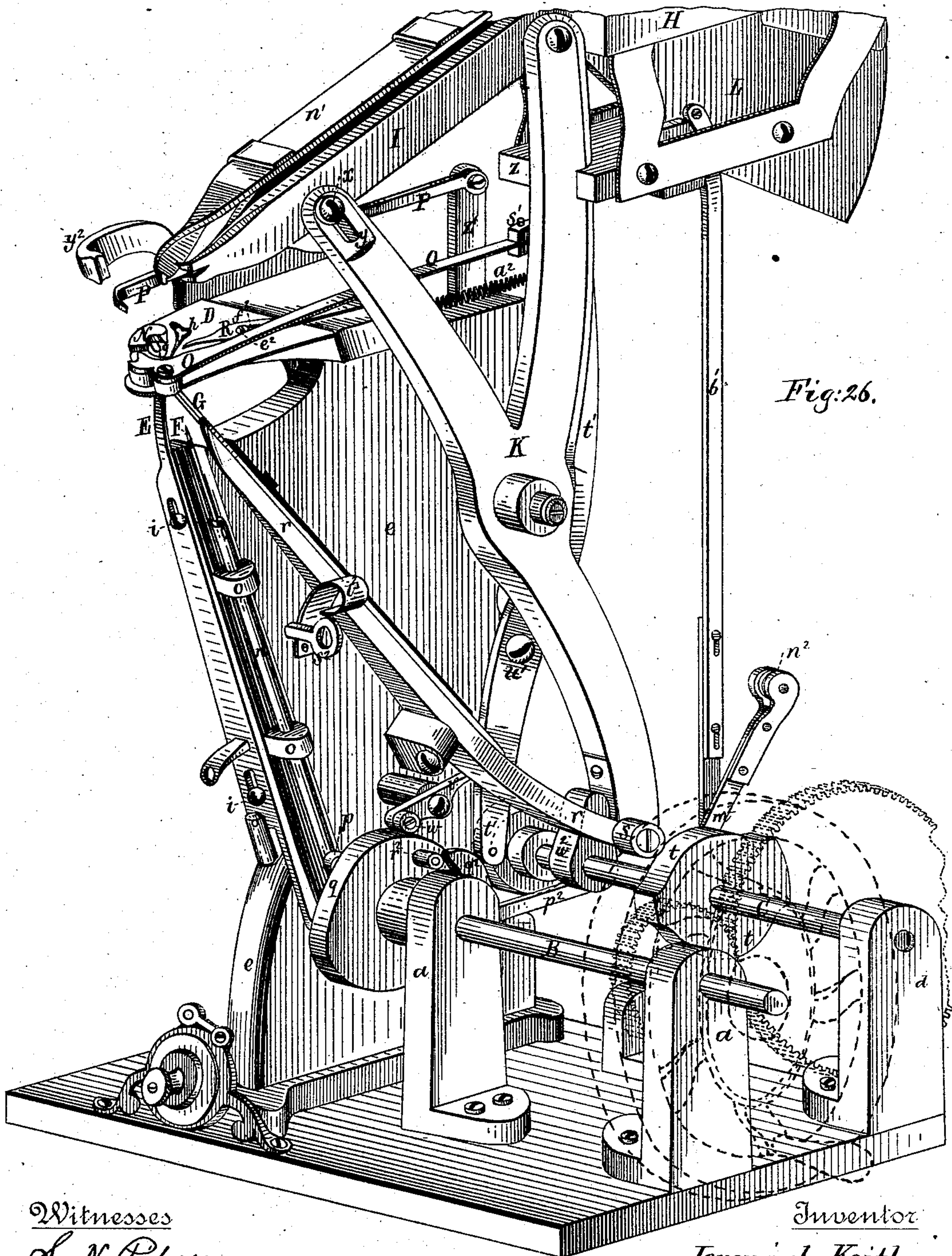


Fig. 26.

Witnesses

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Inventor

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By his Attorney

*R. U. Eddy*



# UNITED STATES PATENT OFFICE.

JEREMIAH KEITH, OF NORTH MIDDLEBOROUGH, MASSACHUSETTS.

## MACHINE FOR SEWING ON BUTTONS.

SPECIFICATION forming part of Letters Patent No. 365,440, dated June 28, 1887.

Application filed May 27, 1886. Serial No. 203,391. (No model.)

*To all whom it may concern:*

Be it known that I, JEREMIAH KEITH, of North Middleborough, in the county of Plymouth, of the Commonwealth of Massachusetts, have invented a new and useful Improvement in Machines for Sewing Eyed Buttons upon Cloth or other Material; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Figs. 2 and 3 opposite side elevations, Fig. 4 a front elevation, and Fig. 5 a rear elevation, of the machine. Fig. 6 is a longitudinal and median section of the hopper and its chute. Fig. 7 is a transverse section of such hopper. Fig. 8 is a top view of the work-supporter. Fig. 9 is a side view of the presser, the needle-bar, and the cam *q*. Fig. 10 is a side view of the cam *q*, fixed on the driving-shaft B. Fig. 11 is a side view of the cam *t*, fixed on the auxiliary shaft C. Fig. 12 is a vertical section of the feeder, the longer arm of its supporting-lever *r*, the auxiliary lever *v*, and the cam *q*, such figure also showing the thread-tightening mechanism and the cam *t*. Fig. 13 is a top view of the chute I without its cap. Fig. 14 is a section of the chute and the shorter of the upper arms of the tri-armed lever K, such section going lengthwise through the spring-catch *o'*, and also through its operative cam *p'*, hereinafter described. Fig. 15 is a top view of the primary button turner and holder N. Fig. 16 is a top view of the auxiliary button turner and holder O. Fig. 17 is a side view of the cam *v'*. Fig. 18 is a top view, and Fig. 19 a front elevation, of the loop-opener P. Fig. 20 is a side view of the cam *k'*. Fig. 21 is a top view, and Fig. 22 an edge view, of the loop-holder R. Fig. 23 is a side view of the cam *i'*, and Fig. 24 is a side view of the cam *w'*. Fig. 25 is an oblique section through the standard *e*, showing spring *s'* applied to lever *r*; and Fig. 26 is a perspective view of the device.

The nature of my invention is defined in the claims hereinafter presented.

The machine containing my said invention is for attaching buttons to cloth or other material, substantially in the manner or by the method set forth and claimed by me in the United States Patent No. 330,407, dated the 17th day of November, 1885, to which

reference may be had, such method consisting in forcing two loops of a thread in one and the same direction through the cloth or material and the button-eye and casting such loops successively in one and the same direction over the head of the button, or such head through them successively, the thread of each loop immediately after being cast over the head of the button being tightened around the eye or between it and the material. The essential features of the said machine are as follows, viz: the work-supporter, the presser, the eye-pointed needle, the work-feeder, the hopper, the hopper-chute, the mechanism for delivering the buttons from the hopper into its chute, the primary button turner and holder, the auxiliary button turner and holder, the loop-opener, the loop-holder or device for guiding the loop to the work and preventing the loop from accidentally working or flying over the button, and, lastly, the thread-tightening mechanism.

The frame for sustaining the operative parts of the machine is shown at A as supporting in bearings in two standards, *a*, extending upward from a base plate, *f*, the driving-shaft B, which has a spur-gear, *b*, fixed upon it, the said gear engaging with another such gear, *c*, fastened upon an auxiliary shaft, C, arranged as shown and journaled in two posts, *d*.

The work-supporter is represented at D as fastened to the upper part of a standard, *e*, erected on the base-plate *f*. Such work-supporter has in it a recess or mouth, *g*, to receive the needle in its upward movement through such supporter. It also has a groove, *h*, made in it to allow of depression of the thread-loop in order for the loop-holder to pass into the loop at the proper time.

The presser shown at E is arranged below the work-supporter, and slides upward and downward on the front edge of the standard *e*, it being held thereto by headed screws *i* going through slots *k* in the said presser. A spiral spring, *l*, arranged within the standard *e*, serves to force the presser upward against the work when such work is between the presser and the work-supporter, which it has to be in order for the buttons to be sewed to it. At its lower part the presser is bent inwardly or provided with a foot, *m*, (see Fig. 9,) against



the upper edge of which the lower end of the needle-bar is borne just before the said bar completes its downward movement. The needle-bar by its action against the foot depresses the presser out of contact with the work in order for such work to be fed forward.

The eye-pointed needle is shown at F, and extends upward from its carrier or bar *n*, which slides lengthwise of it in guides *o o*, projecting from the standard *e*. The needle-bar, by a link, *p*, is connected to a crank-pin, *q*, extending from one side of a cam, *q*, fixed on the driving-shaft B, the said link being jointed both to the crank-pin and needle bar. As the cam revolves, a reciprocating motion will be imparted to the needle-bar, so as to force the needle upward and draw it downward.

The work-feeder is represented at G. It slides upward and downward on the longer arm of a bent lever, *r*, fulcrumed to the standard *e*, and having on its shorter arm a friction-roller, *s*, that is borne against a cam, *t*, fixed on the auxiliary shaft C by a spring, *s*, secured to the lever *r*. (See Fig. 25.) The work-feeder is forced upward by a spring, *u*, arranged within a chamber, *v*, in the longer arm of the said lever *r*. At its lower end the feeder is hooked, so as to extend underneath the forward arm of an auxiliary lever, *v*, which, fulcrumed to the standard *e*, has its rear arm provided with a friction-roller, *w*, to bear against the periphery of the cam *q*. At the proper time the said cam, while revolving, will so operate the lever *v* as to cause it to depress the feeder out of contact with the work in order for the feeder to be moved backward thereon. It is the pointed upper end of the work-feeder which by coming in contact with the work operates to feed it along, the movements of the feeder being like those of an ordinary sewing-machine—that is to say, after advancing the work such feeder is drawn away from it and moved backward to take a fresh hold, thence upward, after which it is advanced and runs the work along the necessary distance.

The next portions of the machine to be described are the hopper and its chute. This hopper is shown at H and its chute at I, they being supported by a tri-armed lever, K, fulcrumed to the standard *e* and arranged as represented. The lower arm of the said lever bears against a cam, *w*, fixed on the shaft C. A spring, *x*, fastened to the standard *e*, and also to the shorter of the upper arms of the tri-armed lever K, serves to move such arm backward. The inclined chute near its upper end is pivoted to the longer of the two upper arms of such lever. A screw, *x*, goes through a slot, *y*, in the upper part of the other of such two arms and screws into the chute, the purpose being to enable the chute to move up and down a little relatively to such arm. The hopper is supported by being fastened to a bracket, *z*, projecting from the longer of the two upper arms of the lever K. The bottom of the hopper inclines each way toward its middle, as

shown at *a' a'* in Fig. 7—that is, toward the button-deliverer L, which is a narrow trough that is arranged within the hopper lengthwise thereof and pivoted thereto at its inner end.

A connection-bar, M, constructed in two separate parts, *b'* and *c'*, lapped on each other and connected by headed screws *d'* going through slots *e'* in one and screwed into the other of such parts, is at its upper end jointed to the deliverer L and at its lower end to a crank-pin, *f'*, projecting from a grooved wheel, *g'*, pivoted to a standard or post, *h'*. Around this grooved wheel and the hub *i'* of a cam, *k'*, fixed on the shaft C, an endless belt, *l'*, travels and gives rotary motion to the wheel *g'*, whereby a reciprocating vertical movement will be imparted to the deliverer L. In moving downward through a mass of buttons in the hopper as the deliverer descends below such mass, buttons therefrom will slide down the inclines of the bottom of the hopper and directly over the deliverer. On the deliverer rising upward, more or less of the buttons will be caught by it with their eyes downward within it. The deliverer continuing to rise, these buttons will slide by their weight down it and into the chute, down which they will pass in succession, the lowermost one of the number resting with its eye in a position for the needle to pass upward through it. The chute is grooved to cause the button in descending through it to turn laterally, so as to bring the eye into the proper position for the needle to enter it when it is next forced upward. At the lower end of the chute I there is fixed to the chute a spring, *m'*, which, by bearing against the lowermost button, keeps the series in the chute from falling out of it and allows a button to be drawn out of the chute, as may be required.

Extending over the chute is a cap, *n'*, which, being fastened to the chute, serves to keep the buttons from being accidentally thrown out of it. After the needle has passed upward into the eye of the button the chute is drawn backward upon the work-supporter, so as to leave the button upon the needle and allow the loop-opener to advance between the needle and the thread extending from the eye thereof downward alongside of the needle.

The chute is provided with mechanism for holding it upward while it is retreating and allowing it to fall by its weight down upon the work-supporter, the purpose being to insure the lower button in the chute taking its right position for the needle to enter the eye of such button. This mechanism consists of a spring-catch, *o'*, which is arranged within and fixed to the smaller of the upper arms of the tri-armed lever K. (See Fig. 14.) In the advance of the chute the spring-catch *o'* extends underneath it, so as to support it upward off and above the work-supporter while the chute retreats far enough to carry the catch against a stationary cam or projection,



$p'$ , in a manner to cause it to press the catch backward, so as to allow the chute to drop with force upon the work-supporter.

In each side of the deliverer L, at the lower part thereof, are one or more triangular notches,  $q'$ . (See Fig. 6.) The notches are to insure the discharge from the deliverer of any buttons whose eyes may not be properly therein, as on crossing such notch or notches the buttons will be tipped thereby, so as to fall off the deliverer laterally thereof without going to the mouth of the chute and there stopping, so as to obstruct the buttons properly in such deliverer from passing into the chute.

The primary button turner and holder is shown at N, and is a hook or curved lever fulcrumed to the work-supporter, its shorter arm being jointed to the auxiliary button turner and holder O. The fulcrum of the piece N is represented at  $r'$ . The holder O at its rear end is jointed to a link,  $s'$ , which is jointed to the upper arm of a lever,  $t'$ , the purpose being to allow the holder O to swing or move a little in a vertical as well as a horizontal plane. The said lever, whose fulcrum is shown at  $u'$ , has to its lower arm a friction-roller that bears against the periphery of a cam,  $v'$ , fixed on the auxiliary shaft C. A spiral spring,  $a^2$ , is fastened at one end to the upper arm of the lever  $t'$  and at the other end to the standard  $e$ , the said spring being to draw the upper arm of the lever forward.

The loop-opener, as represented at P, is a lever hooked at its end over the work-supporter. Its fulcrum  $w'$  extends through a curved slot,  $x'$ , in a stationary plate,  $y'$ , projecting upward from the standard  $e$ . At its rear end the piece P is jointed to the upper arm of a lever,  $z'$ . The lower arm of the lever  $z'$  carries a friction-roller,  $b^2$ , that bears against the periphery of a cam,  $k'$ , fixed on the shaft C. A spring,  $d^2$ , fastened to the standard  $e$ , bears against the lower arm of the lever  $z'$  and forces it toward the cam  $k'$ .

The loop-holder or device for guiding the loop to the work and preventing such loop from accidentally flying over the button is shown at R. It rests on the work-supporter, and is connected thereto by a headed screw,  $e^2$ , that goes loosely through a slot,  $f^2$ , in the said piece R, the whole being to keep the piece R down upon the work-supporter and to allow of the said piece R being moved lengthwise of it thereon. At its rear end the piece R is jointed to the upper arm of a bent lever,  $g^2$ , whose lower arm carries a friction-roller,  $h^2$ , that bears against the periphery of a cam,  $i^2$ , fixed on the shaft C. A spring,  $k^2$ , secured to the upper arm of the lever  $g^2$ , bears against a stud,  $l^2$ , projecting from the standard  $e$ . The spring operates to move the said upper arm backward.

The next part of the machine to be described is the thread-tightening mechanism, which is shown particularly in Fig. 12 and in part in Figs. 4 and 5.

An arm,  $m^2$ , pivoted at its lower end to a

standard erected on the base plate, has in its upper part a grooved wheel,  $n^2$ . A spring,  $o^2$ , attached to the arm and the base plate, serves to retract the arm. A connecting-rod,  $p^2$ , is jointed at one end to the said arm and at the other to another arm,  $q^2$ , which, pivoted to the base-plate, or one of its standards, stands in rear of a friction-roller,  $r^2$ , pivoted to one side of the cam  $q$ . (See Fig. 2.) The thread shown at  $t^2$  passes upward from any suitable tension mechanism to and through an eye,  $s^2$ , extending from the standard  $e$ ; thence it goes to and around the grooved wheel  $n^2$ ; thence back through the said eye, and next against a sponge,  $u^2$ , supported in an eye,  $v^2$ , and saturated with wax, and next to and through a hole in the upper part of the needle-bar, and, finally, through the eye of the needle.

Projecting up from the plate  $y'$  is a forked arm,  $y^2$ , between whose prongs the point of the needle passes in rising upward. They support the needle against the action of the loop-opener, or the draft of the thread thereby, when it is being looped or drawn laterally from the needle by the said loop-opener.

The above completes the description of the main features or mechanical elements of the machine and their operative mechanisms. Their mode of operation may be thus explained: The hopper having been supplied with a charge of the buttons and the driving shaft put in revolution in the direction of the arrow  $z^2$ , the button-deliverer L will be forced upward within said charge, and gathering up one or more of the buttons thereof, with the eye of each extending within the deliverer, such button or buttons, by the action of gravity, will slide down it and be delivered into the chute, down which they will in like manner pass, the lowermost one being held within the chute by the spring  $m'$ , and in a position for the eye of such button to receive the needle. Next the hopper and chute are advanced, so as to carry the button-eye directly into the path of the needle. Next the needle is moved upward into or through the button-eye, carrying the thread with it through such eye. Next the chute and hopper are moved backward sufficiently to allow the loop-opener P to operate. Next such loop-opener is moved, so as to catch or hook upon the thread and draw it backward from the needle. Next the primary button turner and holder N swings around against the button and passes it through the loop. Next the needle descends through the button-eye and leaves the thread looped thereon, the thread being tightened thereon by the action of the thread-tightening mechanism. Next the feeder advances the work the necessary distance for the needle to next pass up through it, the button being held stationary or supported in the meantime by the button-turner N. Next the needle rises a second time up through the work and the eye of the button, and the button, while the needle is in the eye, is turned back to its first position by the auxiliary button-turner O, the primary button-turner at



the same time being moved aside to its first position in order to allow of the said movement of the button. Next the loop-opener is put in movement as before, and again seizes  
 5 the thread and draws it aside from the needle, after which the primary button-turner N swings around again and presses the button through the loop. Next the needle descends through the button-eye and leaves the thread  
 10 looped thereon, the thread being tightened upon the eye by the action of the thread-tightening mechanism. Finally, the feeder is put in operation and advances the work the distance for reception of another button, the  
 15 one connected to the work passing in the meantime through the recess or mouth *g* and off the work-supporter. At the proper times the presser is depressed to allow of the feeding of the work. Immediately after the thread has  
 20 been drawn laterally to form the loop the loop-holder R is advanced into the loop, so as to prevent it from accidentally flying over the button. The holder R is retracted after the loop is drawn tightly about the button.

25 I claim—

1. The combination of the work supporter D, presser E, eye-pointed needle F, work-feeder G, hopper H, chute I, button-deliverer L, primary button-turner N, auxiliary button-

turner O, loop opener P, loop-holder R, and the 30 thread-tightening arm *m*<sup>2</sup>, all arranged and provided with mechanism for supporting and operating them, substantially in manner and for the purpose as set forth.

2. In a machine for attaching buttons to 35 fabrics, the combination, with a receptacle slotted in the bottom, of a grooved and notched arm pivoted in the slot and having means for vibrating the arm to secure the entrance of the buttons within the slot, and a channel or 40 conduit for delivering the buttons to the attaching mechanism, substantially as described.

3. The combination of the furcated arm *y*<sup>2</sup>, extending up from the plate *y'*, with the machine, substantially as described, consisting 45 of the work-supporter, presser, eye-pointed needle, work-feeder, hopper, chute, button-deliverer, primary button turner, auxiliary button-turner, loop-opener, loop-holder, and the thread-tightening arm, arranged and pro- 55 vided with mechanism for supporting and operating them, essentially and for the purpose as set forth.

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Witnesses:

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R. B. TORREY.