

(No Model.)

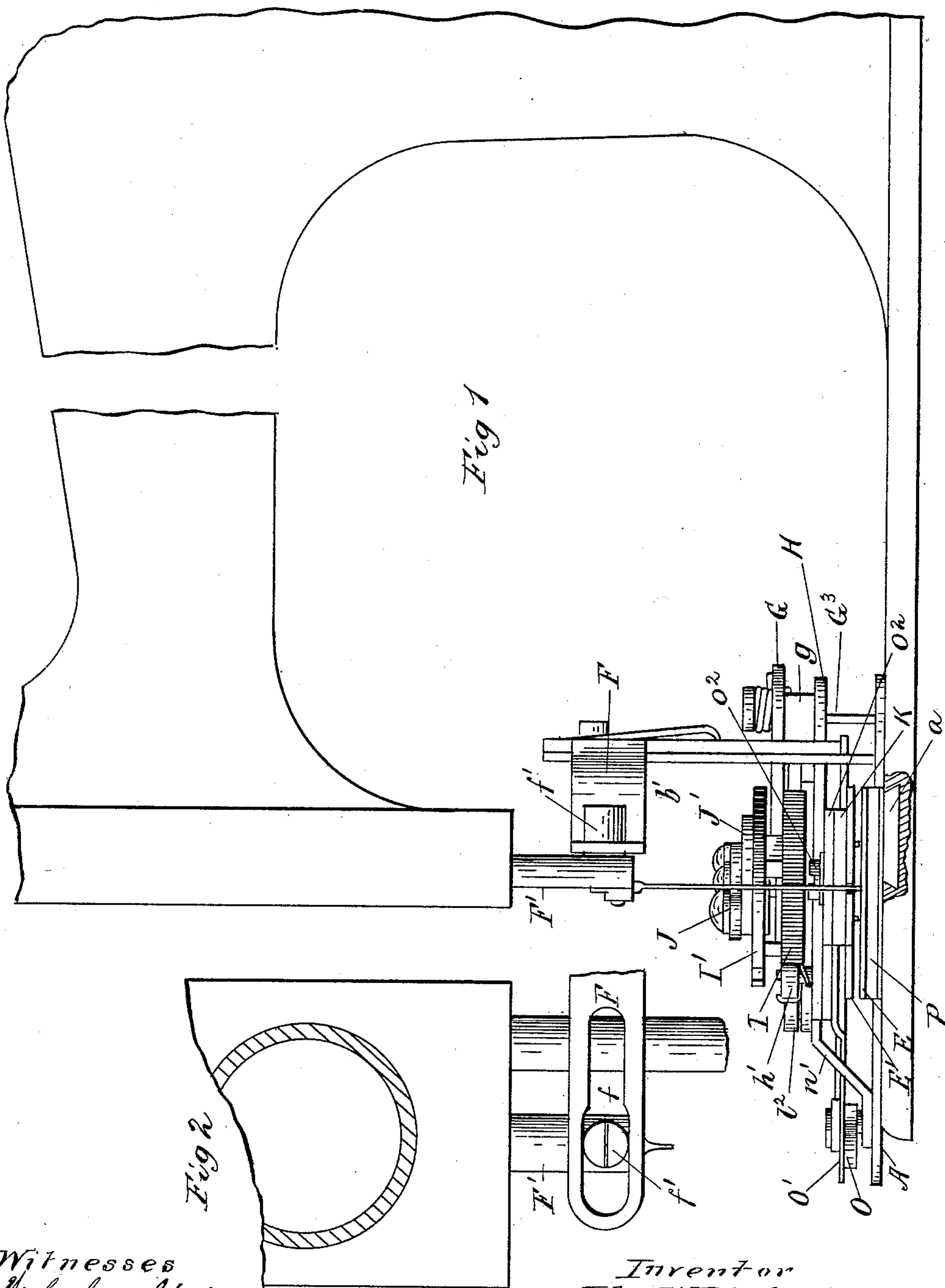
J. W. BLODGETT.

4 Sheets—Sheet 1.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 360,649.

Patented Apr. 5, 1887.



Witnesses
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(No Model.)

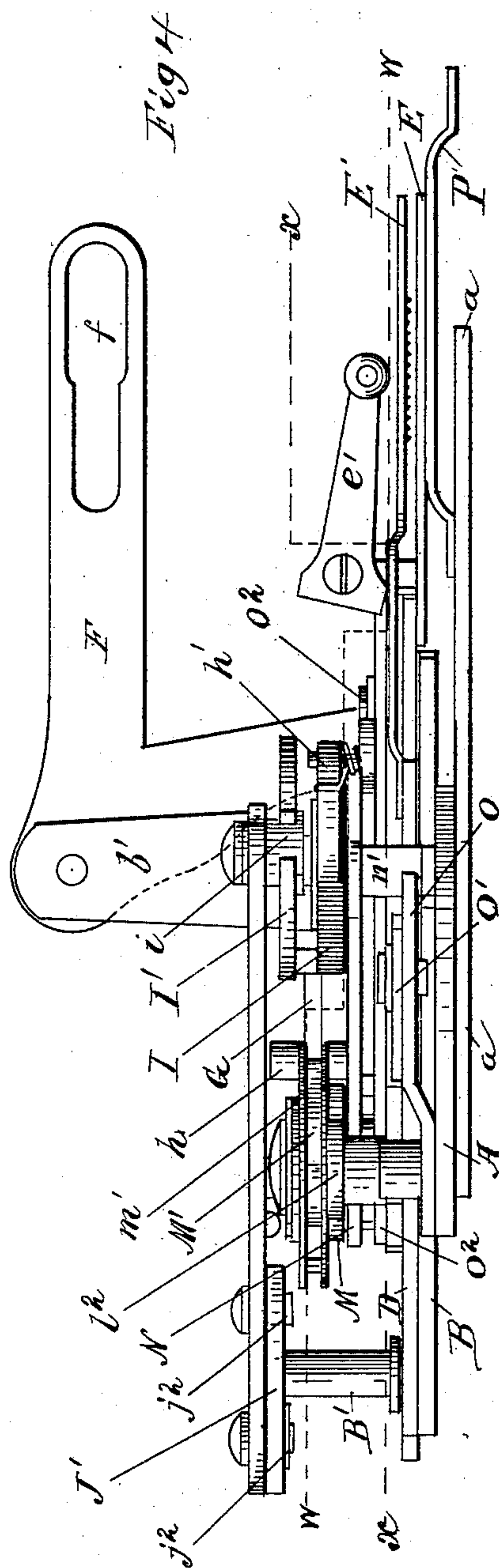
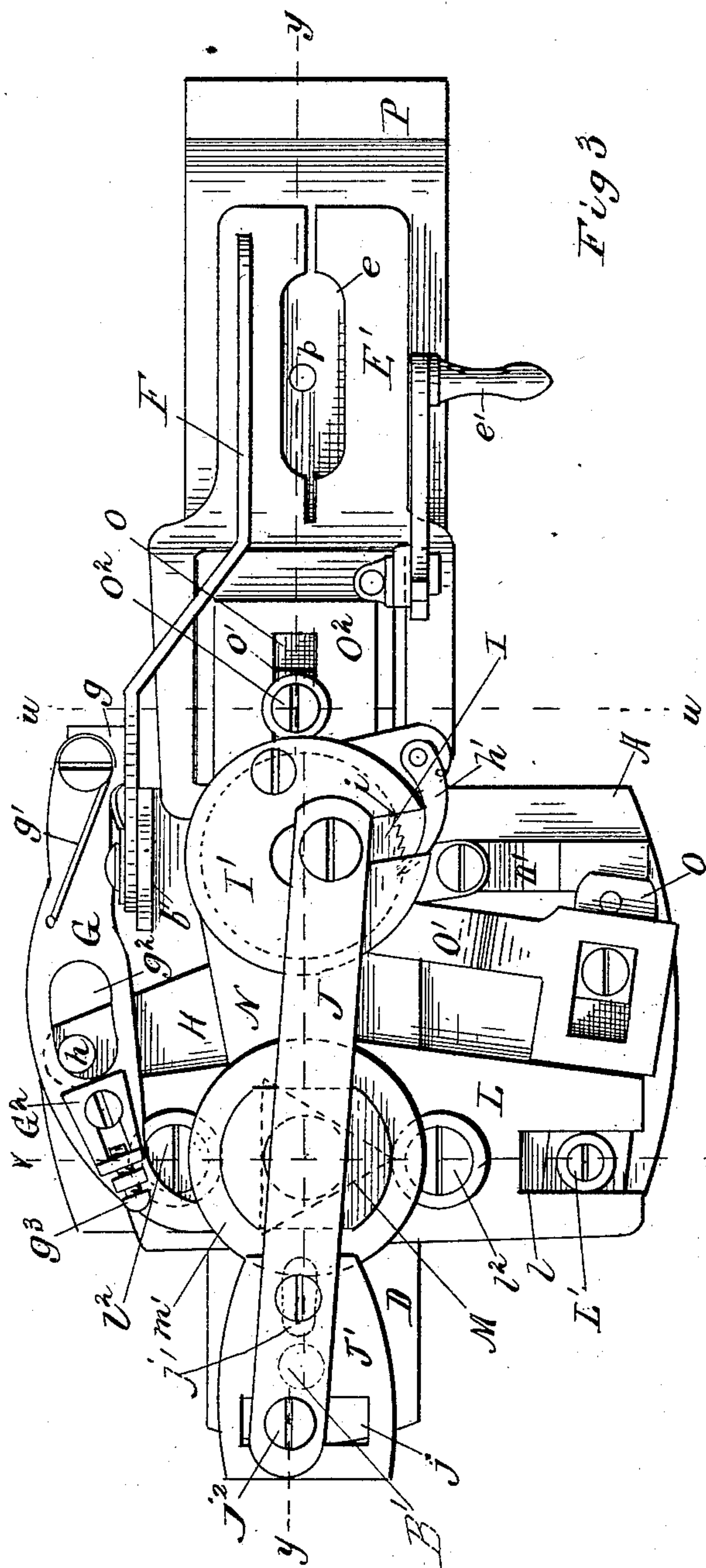
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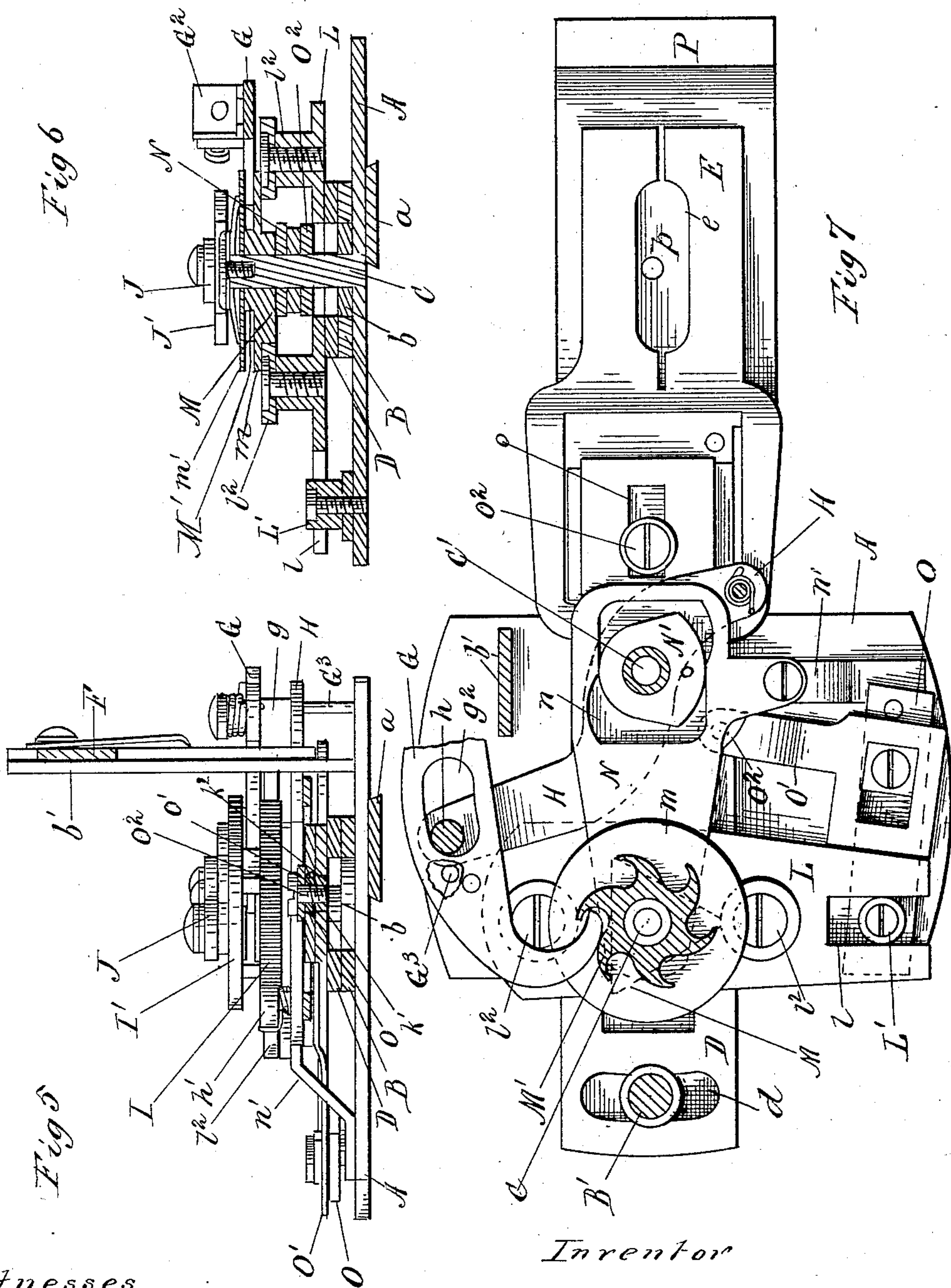
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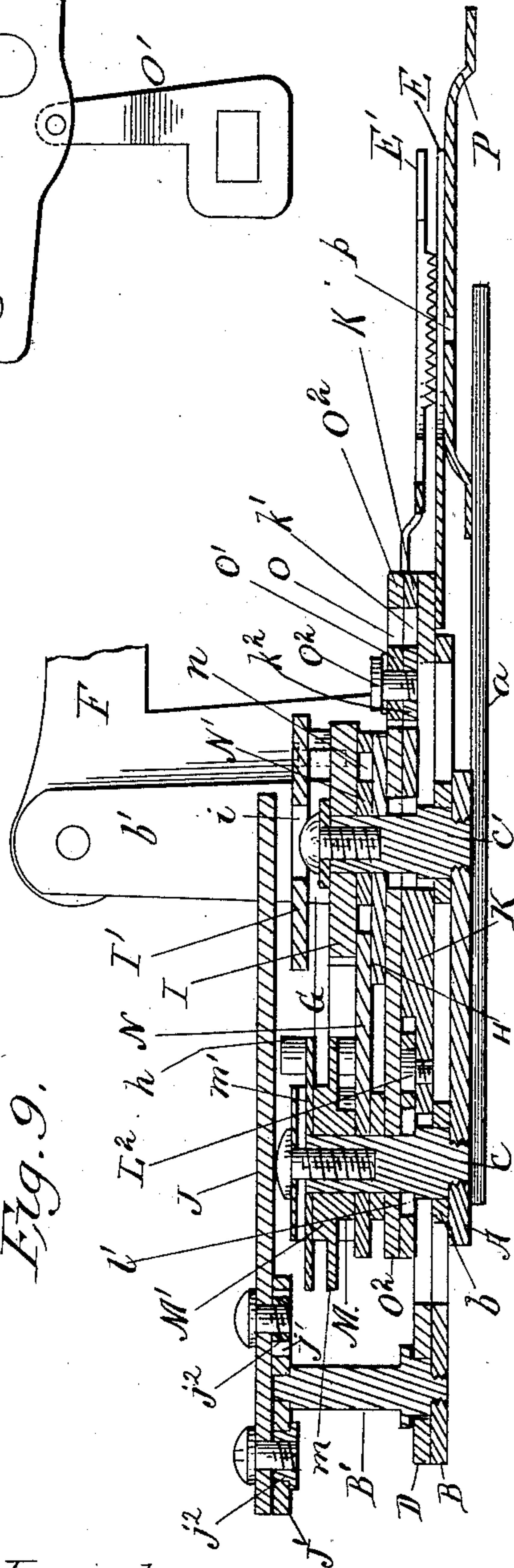
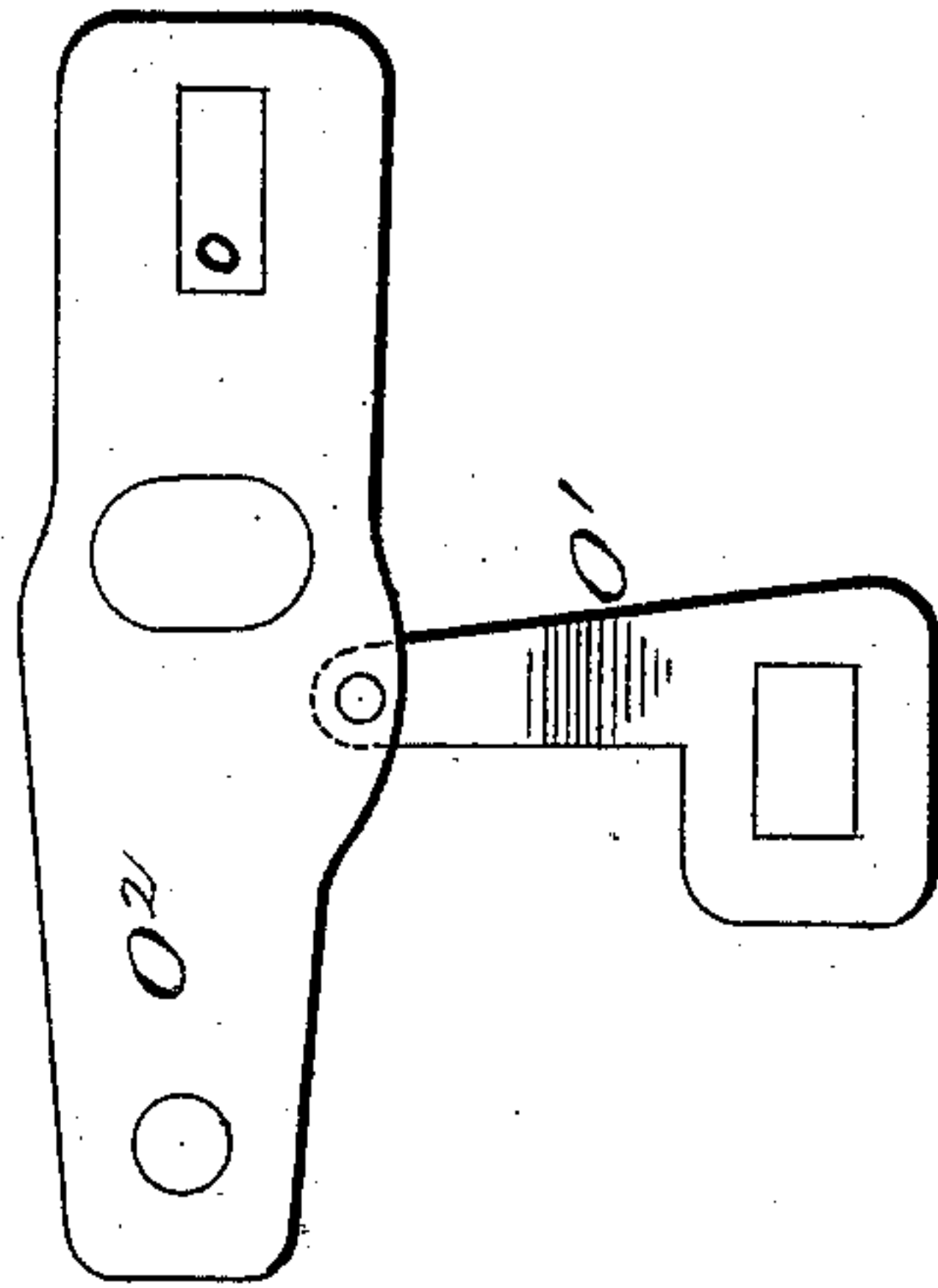
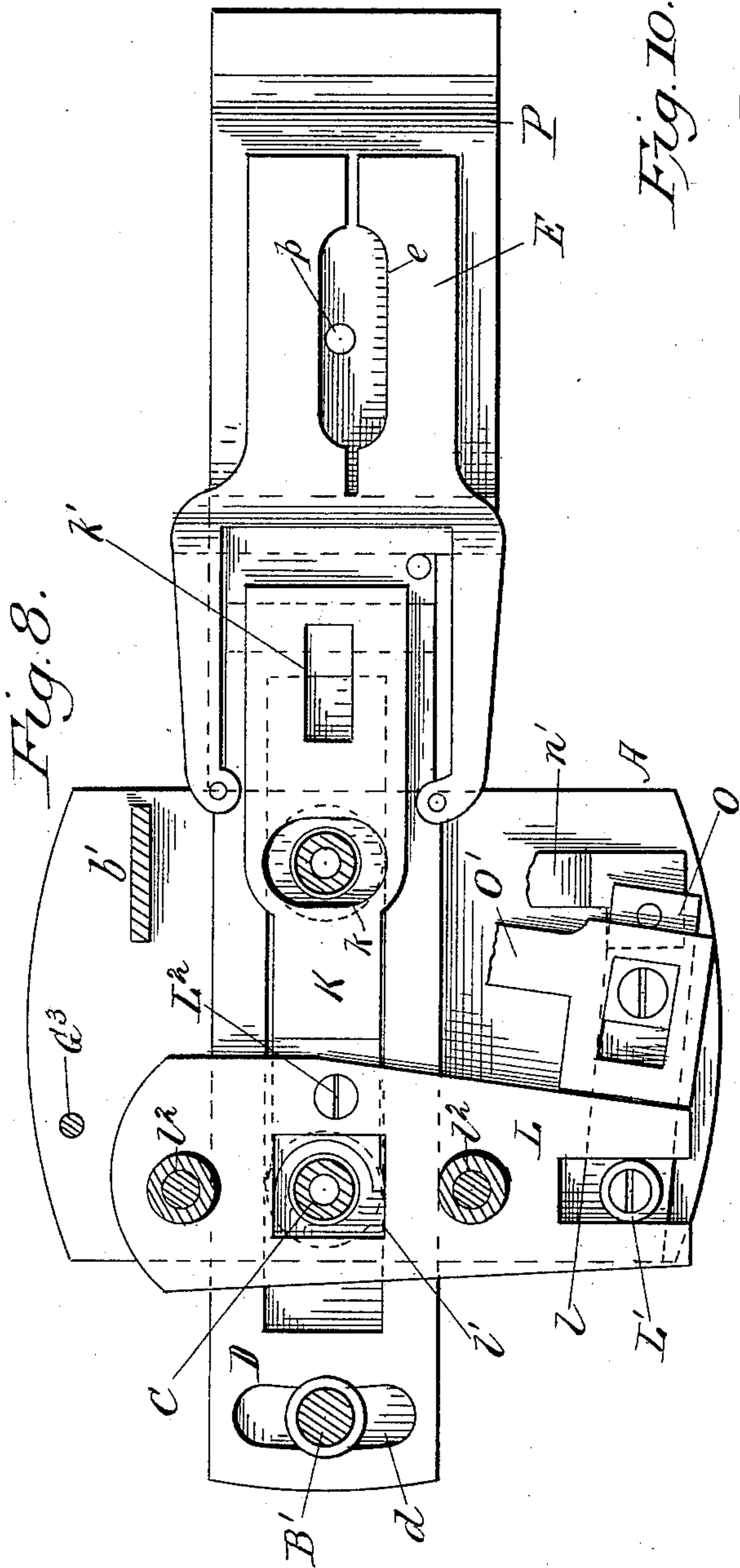
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UNITED STATES PATENT OFFICE.

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BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 360,649, dated April 5, 1887.

Application filed September 7, 1885. Serial No. 176,440. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. BLODGETT, a citizen of the United States, residing at Highwood, in the county of Lake and State of Illinois, have invented a certain new and useful Improvement in Button-Hole Attachments for Sewing-Machines, of which the following is a full description, reference being had to the accompanying drawings, in which—

10 Figure 1 is an elevation showing my attachment applied; Fig. 2, a side view showing the connection between the needle-bar of the machine and the lever which operates the attachment; Fig. 3, a plan view of the attachment
15 detached; Fig. 4, an elevation of the same; Fig. 5, a sectional view taken on the line *u u* of Fig. 3; Fig. 6, a sectional view taken on the line *v v* of Fig. 3; Fig. 7, a sectional view taken on the line *w w* of Fig. 4; Fig. 8, a sectional
20 view taken on the line *x x* of Fig. 4; Fig. 9, a sectional view taken on the line *y y* of Fig. 3, and Fig. 10 a detail plan view of one of the plates detached.

25 Like letters refer to like parts in all the figures of the drawings.

My invention relates to button-hole attachments for sewing-machines; and it has for its object to produce a device which shall be automatic in its action and possess superior advantages in point of simplicity, durability,
30 and general efficiency, while at the same time provision is made for the regulation of the various operations to cause them to conform with button-holes of various sizes and finish.

35 To these ends my invention consists in certain novel features, which I will now proceed to describe, and then particularly point out in the claims.

40 In the drawings, A represents the bed-plate of the machine, which is constructed to receive the remaining parts, and is adapted to be attached to the cloth-plate of the sewing-machine in any suitable manner, the means shown in the present instance consisting of a dove-
45 tailed plate, *a*, which fits within a corresponding groove in the cloth-plate.

B indicates a plate mounted to reciprocate longitudinally upon the bed-plate A, it being slotted for almost its entire length, and guided

50 by means of anti-friction rollers *b*, mounted upon posts C and C', attached to the bed-plate A.

Upon the plate B is mounted a similar plate, D, connected to the plate B by means of a post, B', extending through a slot, *d*, in the plate D, so as to cause the plate D to move longitudinally along with the plate B, while at the same
55 time the plate D is capable of oscillation across its line of reciprocation, the said oscillatory motion being imparted to the plate in the manner hereinafter described.

60 To the forward end of the plate D is attached the cloth-clamp, consisting of a lower plate or jaw, E, and an upper plate or jaw, E', both plates being slotted, as shown at *e*, to allow sufficient space for the button-hole, and the
65 upper plate being provided with teeth to clamp the cloth and hold it firmly in position. The upper plate, E', is held away from the lower plate, E, by means of its own elasticity, and is depressed to clamp the cloth by means of a
70 suitable cam-lever, *e'*, pivoted on a post or support on the lower plate, as shown in Figs. 3 and 4.

F indicates the lever which actuates the device. This lever is pivoted upon a post, *b'*,
75 mounted on the bed-plate A, and is slotted, as shown at *f*, to engage a pin, *f'*, on the needle-bar F' of the machine, as shown in Figs. 1 and 2 of the drawings. A block, *g*, pivoted to one
80 arm of the lever F, has pivotally mounted upon it a hook-pawl, G, thrown normally inward by means of a suitable spring, *g'*, and provided with a slot, *g''*. In this slot is arranged a pin,
85 *h*, on one end of a lever, H, pivoted on the post C', and having its other end provided with a spring-pawl, *h'*, adapted to engage with the teeth of a ratchet-wheel, I, which is also
90 mounted on the post C'.

I' indicates a disk attached to the upper side of the ratchet-wheel I, and slotted at *i* to receive one end of the pitman J, which is adjust-
95 ably connected to the said disk by means of a screw passing through the pitman and taking in a flanged block which slides in the slot, the flanges of the said block being drawn up against the bottom of the disk when the screw is tightened to clamp the block in position. The opposite end of the pitman J is connected

with the post B' on the reciprocating plate B, so that the intermittent rotary motion imparted to the ratchet-wheel I and disk I' by means of the lever F, slotted hook-pawl G, and lever H, with its spring-pawl, will, by means of the pitman J, cause an intermittent reciprocating motion of the plate B and the parts attached thereto. The length of this reciprocating motion may be regulated to cause it to correspond to the length of the button-hole by adjusting the pitman J within the slot *i*, so as to move it farther from or nearer to the center of the said disk, as may be desired. The length of each step of the reciprocation, and consequently the distance apart at which the stitches will be located, is regulated by means of a plate, G², mounted on the hook-pawl G, and capable of adjustment by means of an adjusting-screw, g², so as to be projected to a greater or less extent over the slot g². This plate by its adjustment may be caused to increase or diminish the length of the said slot, thereby increasing or diminishing the throw of the lever H, and consequently regulating the distance which it moves the ratchet-wheel and the parts operated thereby at each vibration of the lever.

It being well known that the rate of speed of a crank-and-pitman connection decreases as the crank reaches the limit of its stroke in each direction, it is obvious that some means should be provided for overcoming this difficulty and rendering the speed of reciprocation of the plate B equal at all points of its travel, thus equalizing the stitches along the entire length of the button-hole. For this purpose I connect the pitman J to the post B' on the plate B in the following manner:

J' indicates a plate attached to the top of the post B', and provided with a transverse slot, *j*, and a longitudinal slot, *j'*. The pitman is provided with suitable guide-blocks, j², which slide within the slots. It will be seen that as the pitman J approaches the end of its stroke in each direction it will approach a position in line with the line of travel of the plate B. In doing so the guide-block j², which travels in the transverse slot *j*, will move in an arc of a circle, and since the slot *j* is a straight slot the plate J' will be carried farther away from the point of attachment of the pitman J to the disk I'. The plates B and D move in unison with the plate J'. This motion produced by the action of the guide-block on the straight slot is in addition to the ordinary throw of the pitman, and increases as the throw of the pitman decreases, thereby causing the distance which the plate B is fed at each step to be equal at all times. The necessity for this equalizing device arises from the fact that the disk I' is rotated to an equal extent at each stroke of the machine. This movement of the disk would, if no equalizing device were employed, move the plate J' and the plates B and D, which move in unison therewith, to a somewhat greater or less extent at each stroke, ac-

ording to the relative position of the pitman and disk. The motion produced by the guide-block on the straight slot is, as just stated, in addition to the ordinary throw of the pitman, and is greatest when this latter is the least, and inversely proportionate to the same throughout.

K indicates a guide-plate, which is mounted in a slot in the breast-plate D, as shown in Figs. 8 and 9 of the drawings. This guide-plate is recessed at its rear end, to allow the passage of the post C, and is slotted transversely, as shown at *k*, the post C' passing through the slot, being pivoted at its forward end, as hereinafter described. It will thus be seen that this guide-plate is capable of oscillation transversely to the line of movement of the plate B.

L indicates a plate, which is transversely reciprocated, as hereinafter described, being slotted at one end at *l* to receive a guide-roller, L', suitably mounted on the bed-plate, and being also slotted, as shown at *l'*, the post C passing through this latter slot. The plate L is connected to the guide-plate K by means of a screw or pin, L², so as to impart its motion to the said plate K, and consequently to the oscillating plate D.

The plate L is actuated as follows: Between two projections, l², on said plate is arranged a triangular cam, M, which is mounted on the post C, and attached to or formed in one piece with the said cam is a ratchet-wheel, M', having six teeth, and with which the hook-pawl G engages. A flange, *m*, attached to or forming part of the ratchet-wheel and cam, extends outward beyond the same, below a disk, m', projecting similarly above, so that the two form a guide and support to hold the hook-pawl in a proper position to engage with the ratchet-wheel.

It is obvious from the description that when the device is in operation, by reason of the construction set forth, a reciprocating movement transversely to the length of the attachment in each direction will be imparted to the plate L, and consequently an oscillating movement to the plate D and the cloth holder, at each upward movement of the needle-bar—*i*. e., at one upward stroke of the needle the said parts are moved in one direction transversely, and at the next upward stroke they will move in the opposite direction. The reciprocating motion of the plate L imparts the oscillating movement to the plate D of the cloth-holder through the medium of the guide-plate K, which is mounted, as hereinbefore described, in a slot in the said plate, and is connected to the plate L by means of the screw or pin L². This enables the machine to make the over-seaming-stitch necessary in the manufacture of button-holes.

The traverse motion or "change" motion, which is necessary when the machine in its operation has finished one side of the button-hole in order to throw the parts over into a

proper position to finish the opposite side or edgethereof, is attained by the following mechanism:

N indicates a plate pivoted on the post C, and extending forward past the post C', it being provided with a cam-slot, *n*, through which the post passes.

N' indicates a cam arranged within the cam-slot *n*, the said cam being mounted on the post C', and connected to the ratchet-wheel I, so as to be operated thereby. The plate N is connected by a suitable link, *n'*, to an arm, O, pivoted on the bed-plate A, as shown in Figs. 7 and 8. For convenience, this arm is shown in the present instance as pivoted to the post which supports the guide-roller L'; but it may of course be otherwise mounted.

O' indicates a connecting-arm, which is adjustably connected at one end to the arm O, so that its point of connection with the arm O may be located at will at a point farther from or nearer to the fulcrum of the said arm. The other end of the connecting-arm O' is pivoted to a plate, O², which is itself pivoted on the post C and extends forward over the forward end of the guide-plate K, which is pivoted to it, as hereinafter described. The plate O², it will be understood, is slotted at the point where the post C' passes through it, so as to allow the said plate to vibrate when in operation.

From the above description it will be seen that when the pitman J has reached the end of its stroke in one direction, and one side of the button-hole has been finished, the cam N' will act upon the plate N and throw the same over to the opposite side. This movement will also be imparted to the plate O² through the link *n'*, arm O, and connecting-arm O', the extent of the movement of this latter plate being of course regulated by the position of the point of connection between the arms O and O'. Since the plate O² is connected to the guide-plate K, this latter will also be thrown over, at the same time carrying with it the plate D and the cloth-holder, thus bringing the button-hole into proper position for the sewing of the other side.

It will be noticed that the studs *l*² on the plate L are arranged at a distance apart greater than the distance from any one apex of the triangular cam M to the center of the opposite side. Owing to this construction, the operating-lever will be raised by the needle-bar to a distance sufficient to lift the needle clear of the cloth before the cam M causes the plate L to traverse from one side to the other, which traversing motion would be greatly impeded if not entirely impracticable while the needle is in the cloth. Owing to the slot *g*² in the hook-pawl G, the feed-lever H is not actuated until the operating-lever has moved the hook-pawl a distance equal to the length of the slot, so that the feed motion does not begin until the needle is clear of the cloth. It will thus be seen that the cloth-clamp is stationary during

the whole time that the needle is in the cloth, its various movements only taking place when the needle is clear and the cloth free to move.

The connection between the guide-plate K and plate O² is as follows: The plate K is provided at its forward end with a slot, *k'*, and the plate O² with a similar slot, *o*, the walls of which are beveled to receive a correspondingly-beveled block or box, *o'*. A box, *k*², is arranged in the slot *k'*, both of these boxes being capable of sliding longitudinally in their slots for the purposes of adjustment, and a screw, *o*², passes loosely through the box *o'* and screws into the box *k*², as shown more particularly in Figs. 5 and 9 of the drawings. It is obvious that these parts may be adjusted to any point of the slots and there clamped by tightening the screw. Now this screw forms the pivot of the guide-plate K during the oscillation imparted to it, as hereinbefore specified, the plate O² of course remaining stationary except when the traverse or change motion occurs. It will therefore be seen that by moving the said pivot back toward the pin L², which actuates the guide-plate K, a longer sweep will be given to the cloth-plate at the end of the plate D, thus producing a longer overseaming-stitch, while by moving the said pivot in the opposite direction a shorter overseaming-stitch will be produced. This is the case, because in so doing the fulcrum upon which the plates act is moved nearer to or farther from the pivot where the moving-power is applied.

A stop, G³, is secured to the base-plate A, to limit the movement of the feed-lever H, this stop being so located that the lever is held against the same by the wall of the slot in the pawl G during the passage of the needle through the material. The stop thus prevents the lever from being carried too far by its own inertia, and also serves to hold it stationary, to prevent any accidental movement of the same at the period indicated.

A feed-guard, P, is attached to the bed-plate of the button-hole attachment, or, as shown in the present instance, to the dovetailed plate *a*, by which the attachment is secured to the machine. The central portion of this feed-guard, which is immediately over the regular feed device of the machine, is raised somewhat, as shown in Figs. 4 and 9 of the drawings, so as to be out of the way of the said feed device, and to hold the cloth clear of the same, the guard thus having an arched shape. A hole, *p*, is formed in the feed-guard to permit the passage of the needle, thus making it the needle-plate.

Obviously, the ordinary movement of the regular feed device of the sewing-machine will now cause no interruption to the work of the attachment, for the feed device cannot come in contact with the cloth; hence there is no necessity for removal or displacement. This feed-guard may be of any form suitable for the purpose, and the location and attachment

may be changed, provided always that it protects the fabric from the action of the ordinary feed.

It may be made a separate piece, if desired, and attached to the bed-plate or some other suitable part when the button-hole attachment is applied. In the present instance it will be noticed that it is the fabric support and needle-plate of the attachment which is the construction I prefer, because of its simplicity and convenience.

From the above description the operation of my machine will be readily understood. The length of each step of the feed motion may be regulated by means of the stitch-regulator G^2 , which will determine the distance apart at which the stitches are to be located. The entire length of the feed may be regulated to correspond to the length of the button-hole by properly adjusting the connection between the pitman J and the disk I'. By means of the stitch-equalizer the distance which separates the several stitches along the entire length of the button hole will be equalized in the manner hereinbefore pointed out, and the traverse or change motion at each end of the feed may be regulated by adjusting the connection between the arms O and O'. The length of the overseaming-stitch may be regulated by adjusting the pivot-screw o^2 , as hereinbefore pointed out.

It is obvious that various mechanical modifications in the details of construction and arrangement may be made without departing from the principle of my invention, and I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore described and shown in the drawings.

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

1. The combination, with the feed-plate and the oscillating plate mounted thereon, of the operating-lever, the slotted pawl pivoted thereto, the feed-lever provided with a pin to engage the slot, and with a pawl and a ratchet-wheel operated by the said pawl, and provided with a pitman connected to the feed-plate, substantially as and for the purposes specified.

2. The combination, with the feed-lever H and the parts operated thereby, said feed-lever being provided with a projection, h , of the slotted pawl G, connected to the operating-lever and provided with an adjustable plate, G^2 , which may be extended over the slot to regu-

late the stitches, substantially as and for the purposes specified.

3. The combination, with the feed-plate B, having attached to it a plate, J', provided with a transverse slot, j , and a longitudinal slot, j' , of the pitman J, having one end connected to the intermittently-rotating ratchet-wheel I, and the other end provided with guide-blocks to slide in the slots j, j' , substantially as and for the purposes specified.

4. The combination, with the feed-plate and the slotted plate mounted thereon and carrying the cloth-clamp, of the guide-plate arranged within the slot in the said plate and the transversely-reciprocating plate connected to the said guide-plate, substantially as and for the purposes specified.

5. The combination, with the slotted plate D, of the guide-plate K, arranged within said slot, the pivoted plate O^2 , connected to the guide-plate, the pivoted arm O, connected to the plate O^2 by the connecting-arm O' , and the pivoted plate N, connected to the pivoted arm and provided with a cam-slot, in which is arranged a suitable cam, N' , substantially as and for the purposes specified.

6. The combination, with the slotted plate O^2 , of the slotted guide-plate K, an adjustable pivot connecting the two, the reciprocating plate L, for actuating the guide-plate, and the oscillating plate operated by the guide-plate, substantially as and for the purposes specified.

7. In a button-hole attachment for sewing-machines, the combination, with the feed-lever provided with a pin and the mechanism operated thereby, of the actuating-lever and the hook-pawl G, provided with a slot, g^2 , with which the said pin engages, the said slot being of sufficient length to allow the needle to clear the cloth before the feed-lever is actuated, substantially as and for the purposes specified.

8. In a button-hole attachment for sewing-machines, the combination, with the triangular cam, of the transversely-reciprocating plate provided with fixed studs arranged at a greater distance apart than the radial diameter of the cam, substantially as and for the purposes specified.

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