

(No Model.)

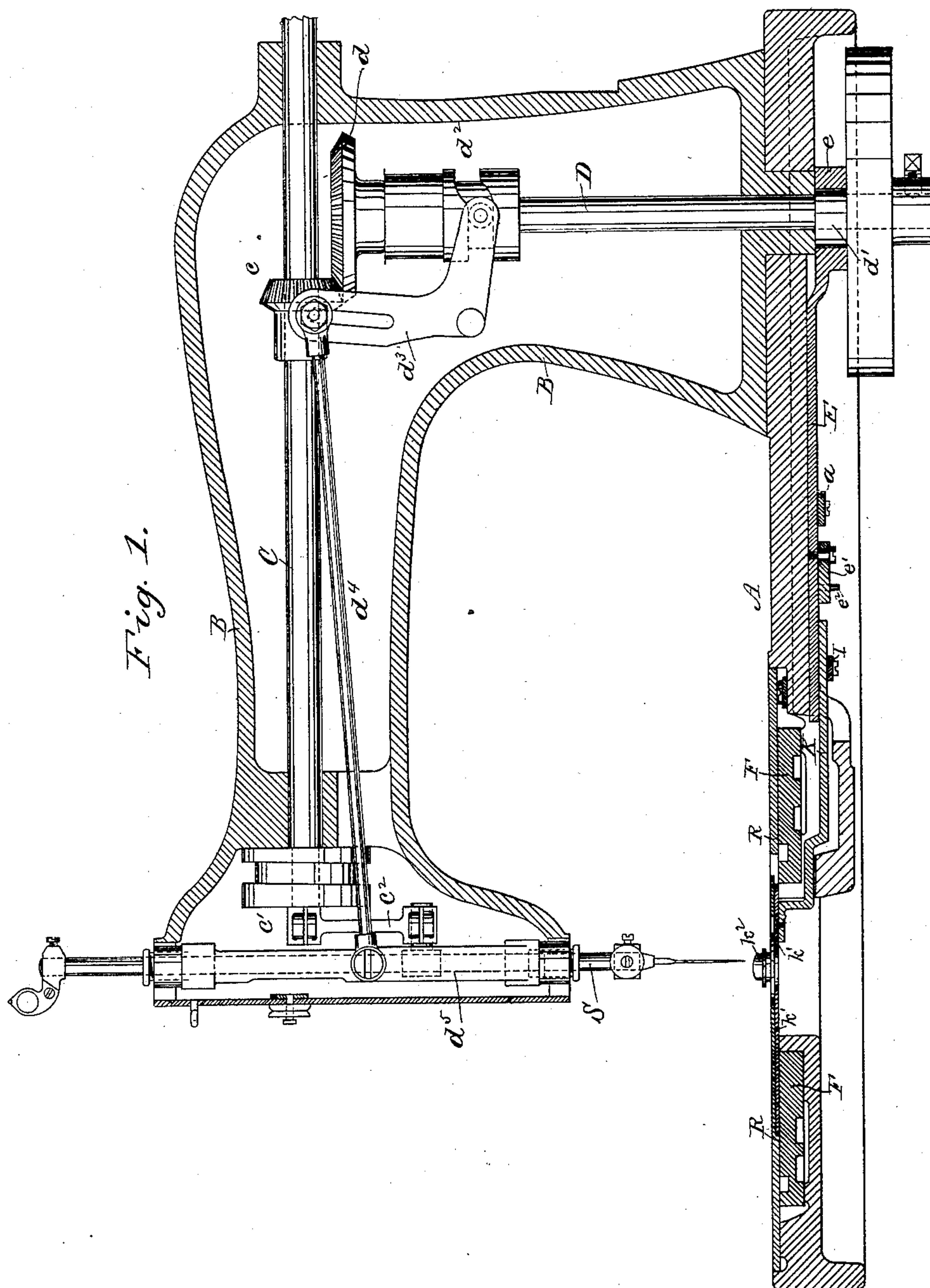
4 Sheets—Sheet 1.

J. G. GREENE.

BUTTON HOLE SEWING MACHINE.

No. 360,434.

Patented Apr. 5, 1887.



WITNESSES:

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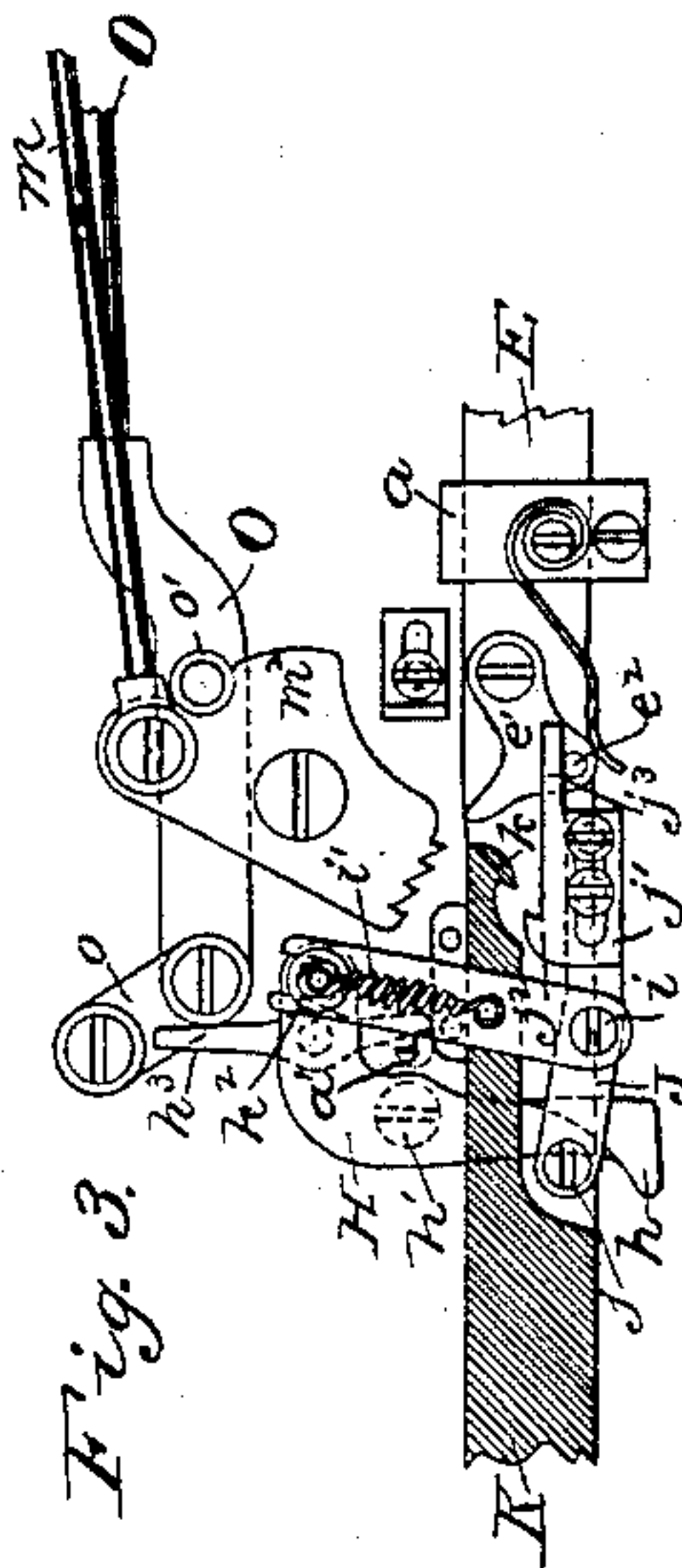
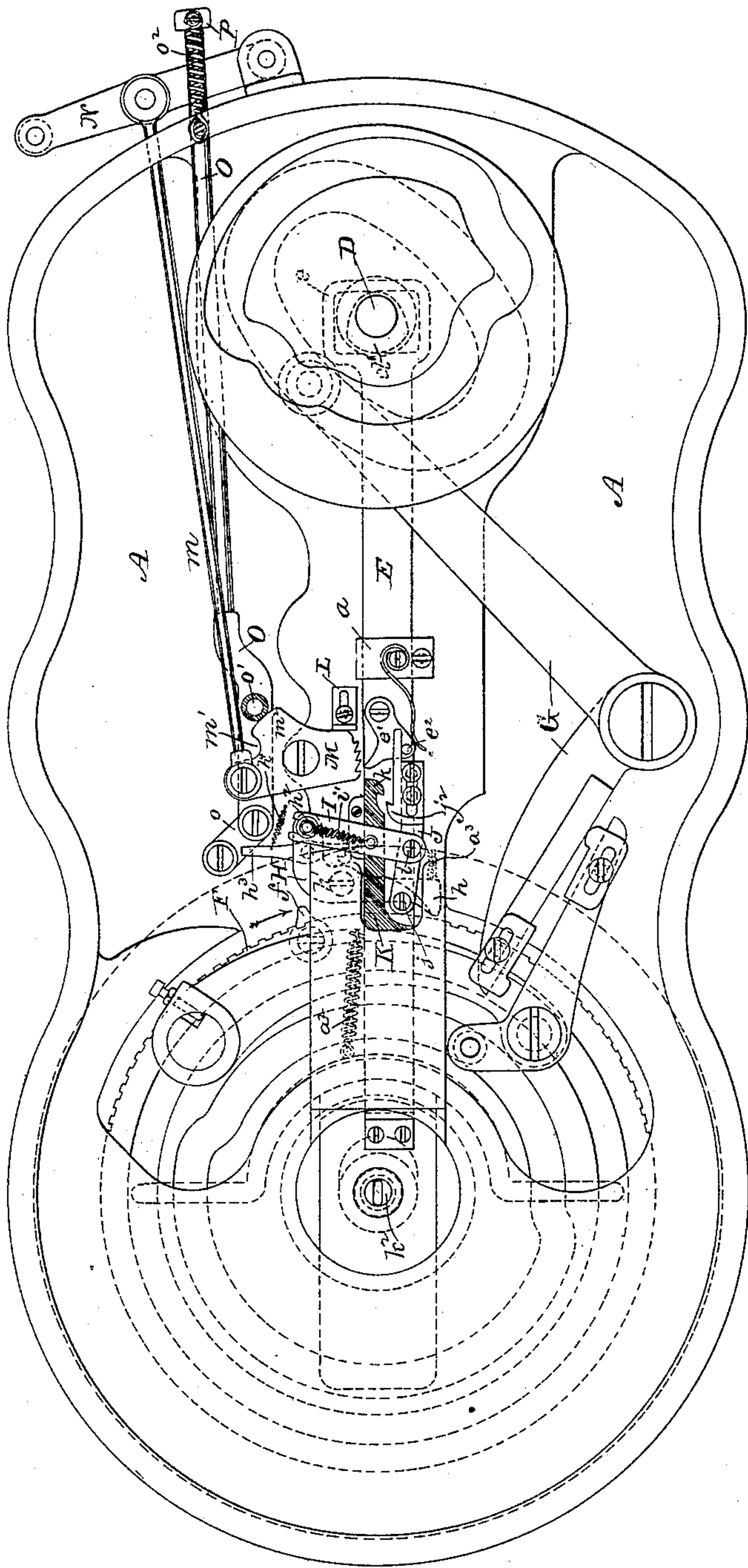
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Fig. 2.



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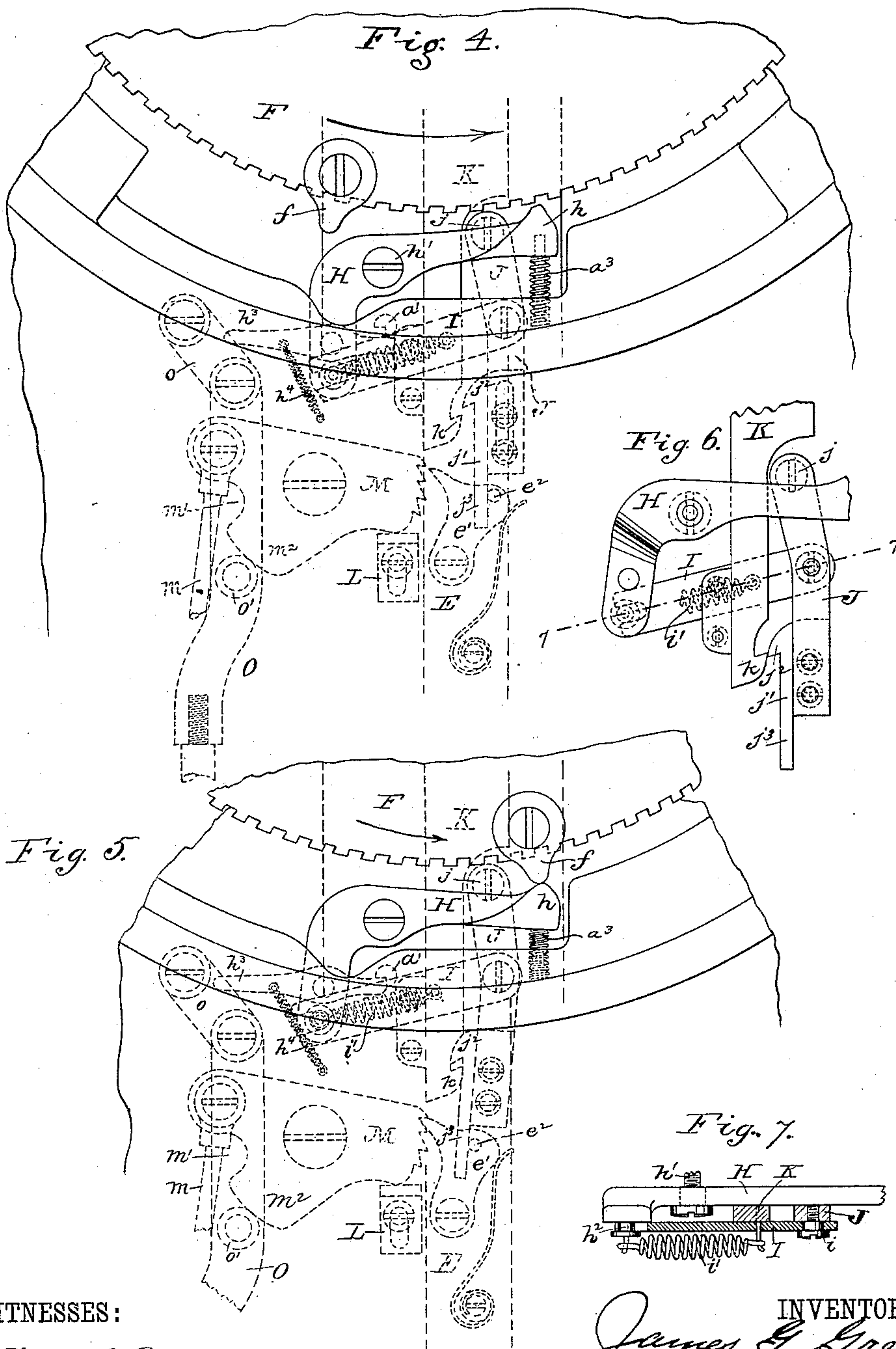
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(No Model.)

4 Sheets—Sheet 4.

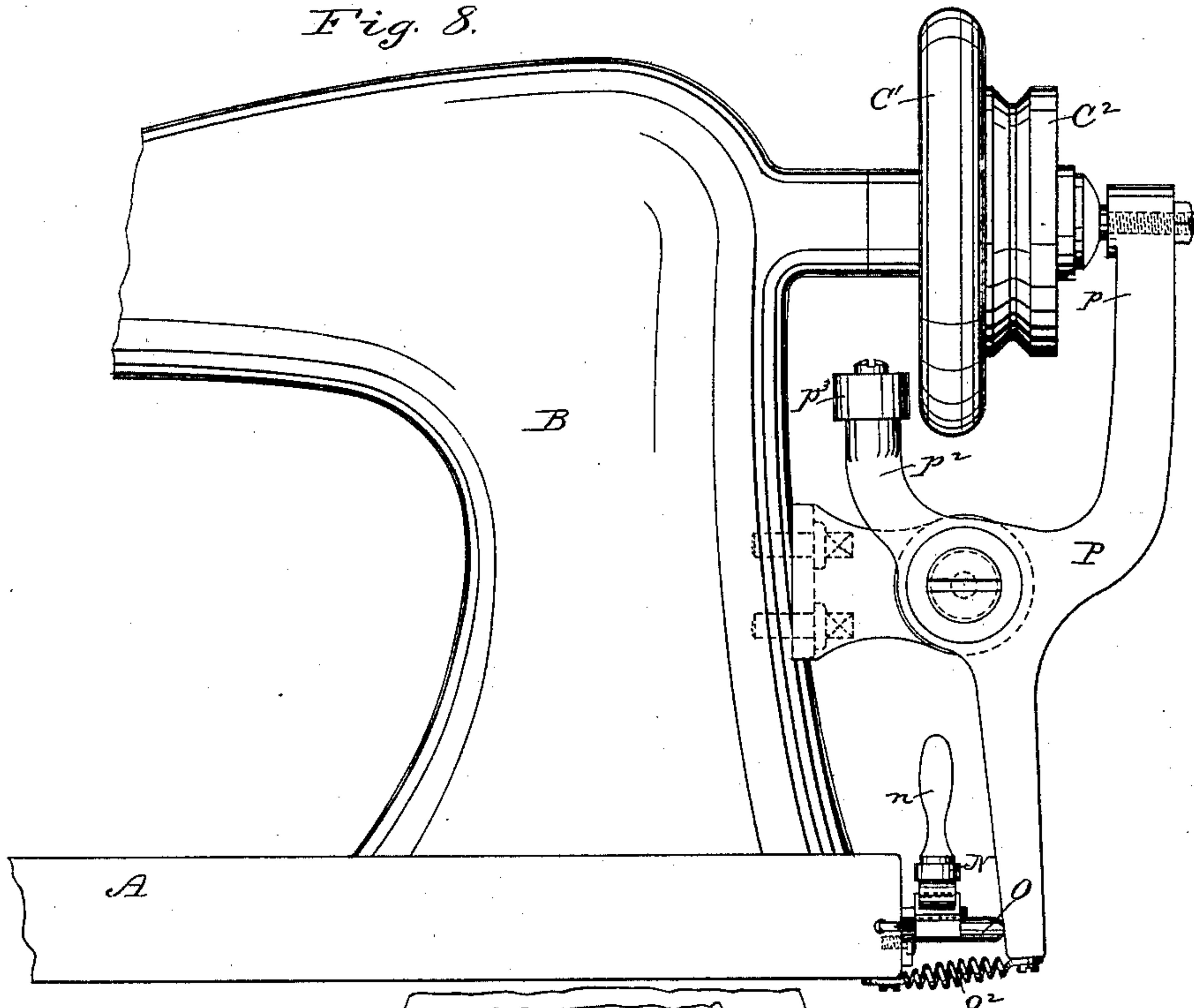
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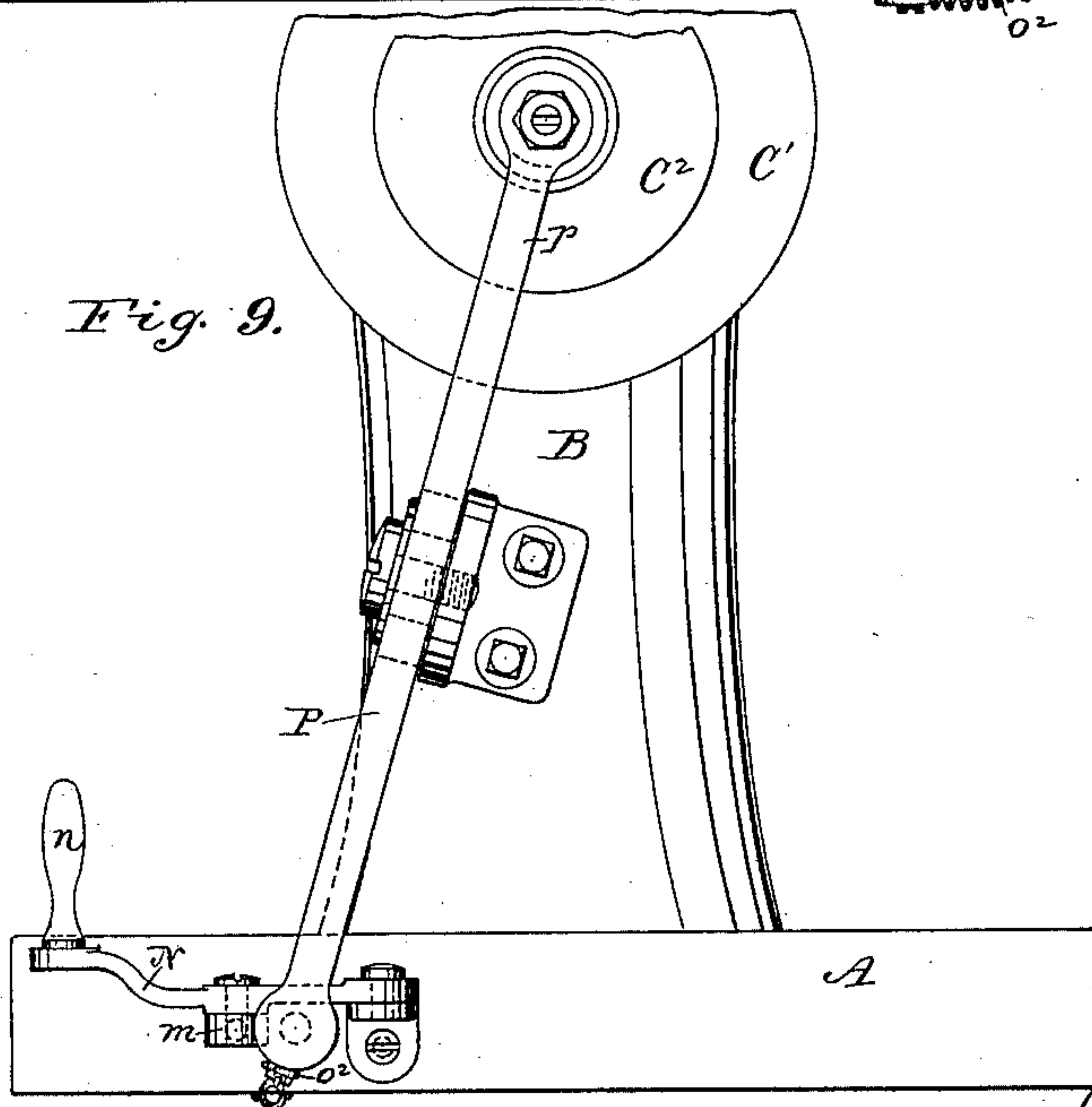
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*Fig. 8.*



*Fig. 9.*



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# UNITED STATES PATENT OFFICE.

JAMES G. GREENE, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY OF NEW JERSEY.

## BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 360,434, dated April 5, 1887.

Application filed May 25, 1886. Serial No. 203,217. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES G. GREENE, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Button-Hole Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is to provide a simple and effective mechanism for automatically barring the ends of eyelet button-holes which have been otherwise finished by a button-hole sewing-machine, and for automatically stopping the machine when the barring operation is completed, or, if desired, for stopping the machine when a button-hole is worked without barring the same.

In the drawings, Figure 1 is a sectional elevation of a "Singer" button-hole sewing-machine embodying my invention. Fig. 2 is a bottom view thereof. Fig. 3 is a detail of a portion of the mechanism shown in Fig. 2 with the parts in different positions. Figs. 4, 5, and 6 are detail plan views, on a larger scale, of part of the mechanism shown in Fig. 3; and Fig. 7 is a section on line 7 7, Fig. 6. Fig. 8 is a partial side elevation of the machine; and Fig. 9, a rear end view thereof, to show the stopping mechanism.

A denotes the bed-plate, and B the arm, of a Singer button-hole sewing-machine. Journaled in the upper part of the said arm is the driving-shaft C, connected by a bevel-gear, *c*, with a larger bevel-gear, *d*, on the upper end of a vertical shaft, D, the proportions of said gears being such that the shaft C will revolve twice while the shaft D revolves once, the said shaft D having a cam, *d*<sup>2</sup>, for operating a lever, *d*<sup>3</sup>, connected by a rod, *d*<sup>4</sup>, with a movable head, *d*<sup>5</sup>, in which the needle-bar S is reciprocated vertically by the crank-disk *c*<sup>1</sup> and link *c*<sup>2</sup>, thus reciprocating the needle horizontally, as is common with machines of this character.

Near the lower end of the shaft D is a cam, *d*<sup>1</sup>, embraced by a yoke, *e*, on the rear end of a reciprocating or sliding bar, E, resting on a bracket, *a*, attached to the bed-plate A.

F is the intermittingly-rotating feed-wheel, operated in the usual manner from the vibrat-

ing feed-lever G. The said feed-wheel is provided with a tappet or projection, *f*, adapted to engage the toe *h* of a lever, H, pivoted by a screw or pin, *h*<sup>1</sup>, to the bed-plate A, and having a pin, *h*<sup>2</sup>, embraced by the forked or slotted end of a link, I, attached by a screw or pin, *i*, to a lever, J, pivoted at *j* to the sliding bar E.

The pin *h*<sup>2</sup> of the lever H is connected by a spring, *i*<sup>1</sup>, with the link I, said spring thus holding the said pin in the fork of the said link, and serving as a yielding connection between the levers H and J. The lever J is provided with an adjusting plate or block, *j*<sup>1</sup>, having a hook, *j*<sup>2</sup>, and a tail-piece, *j*<sup>3</sup>, said hook being adapted to engage a similar hook, *k*, on a sliding bar, K, to the forward end of which latter is attached a plate, *k*<sup>1</sup>, carrying the button *k*<sup>2</sup>, by which the work-clamp is guided, said button being thus movable to and fro in a direction transverse to the feeding movement of the work-clamp, as described in my application, Serial No. 195,900, filed March 20, 1886, the slotted plate R being stationary, as is usual.

To the lever H is pivotally secured the holding-lever *h*<sup>3</sup>, to one arm of which is attached a spring, *h*<sup>4</sup>, connected with the bed-plate A, and the latter is provided with a stop or projection, *a*<sup>1</sup>, adapted to be engaged by the end of the other arm of the said holding-lever.

The reciprocating or sliding bar E is provided with a spring-pressed pawl, *e*<sup>1</sup>, having a pin, *e*<sup>2</sup>, engaged by the tail-piece *j*<sup>3</sup> of the plate or block *j*<sup>1</sup>.

M is a pivoted dog, having a series of teeth adapted to be engaged by the pawl *e*<sup>1</sup>, said dog being connected by a rod, *m*, with a hand-lever, N, having a handle, *n*, the movement of the said dog in one direction being limited by an adjustable stop, L, attached to the bed-plate. O is a rod, (formed in the present instance in two parts,) the forward end of which is connected by a link, *o*, with the bed-plate, and the rear end of which abuts against the brake and clutch or stopping lever P, said rod being provided with a pin or roller, *o*<sup>1</sup>, adapted to rest in a notch, *m*<sup>1</sup>, in the dog M. A spring, *o*<sup>2</sup>, attached to the lower end of the lever P and to the bed-plate, normally presses the lower



end of said lever and the rod O toward the forward end of the machine.

The driving-shaft C is provided with an ordinary clutch mechanism, consisting of a fly-wheel, C', fast on said shaft, and a loose driving-pulley, C<sup>2</sup>, having the usual frictional face for contact with the fly-wheel. The pulley C<sup>2</sup> is pressed in contact with the fly-wheel by the arm p of the lever P, the other arm, p<sup>2</sup>, of said lever having a brake device, p<sup>3</sup>, for stopping the fly-wheel when the driving pulley is released therefrom.

The operation of the above-described mechanism is as follows: When the machine is in motion, the sliding bar E is constantly reciprocated by the cam d', the said cam being so placed on its shaft that the movements thereof will be in opposition to the horizontal movements of the needle-bar and needle of the machine. The tappet or projection f is placed in such position on the feed-wheel that when the last side of the button-hole is completed said tappet or projection will engage the toe h of the lever H, moving said lever to the position shown in Fig. 5, so that the inner end of the holding-lever h<sup>3</sup> will be forced by the spring h<sup>4</sup> into the notch of the stop a', thus holding the parts in the position indicated by said figure after the projection f has passed said toe until the holding-lever is released from its stop, as will be explained. The movement of the lever H by the projection f will cause the link I and spring i' to move the free end of the lever J toward the sliding bar K, so that the hooks j<sup>2</sup> and k will be engaged, and thus the movements of the bar E will be imparted to the bar K to move the latter toward the right, Figs. 2 and 3, the return movements of the said bar being, in the present instance, effected by a spring, a<sup>2</sup>, (see dotted lines, Fig. 2,) attached at one end to the bed-plate or some other stationary part of the machine and at the other to a pin projecting from the side of the bar K.

The yielding connection of the levers H and J afforded by the spring i' permits the hooks of the lever J and bar K to adjust themselves to each other, should they not be in exact position for engagement when the lever H is first operated by the projection f.

The guiding-button k<sup>2</sup> being connected with the bar K, as above described, the movements of the said bar will be imparted to the said button, thereby reciprocating the work-clamp transversely to its feeding movement, so that barring-stitches will be formed across the end of the button-hole. The movement of the free end of the lever J toward the hook k of the bar K will release the pawl e', moving with the bar E, so that said pawl will engage the teeth of the dog M, and thus intermittently turn the said dog on its pivot until the pin or roller o' on the rod O reaches the notch m' in the said dog, thus permitting a slight forward movement of said rod by the spring o<sup>2</sup>, so that the end of said rod will strike the holding-lever h<sup>3</sup>, (see Fig. 3,) and thus release said lever from the stop a'. As soon as the holding-lever is

released from its stop the spring a<sup>3</sup>, pressing against the lever H, will move said lever slightly, to cause the link to move the lever J, and thus disengage the hooks j<sup>2</sup> and k, so that the reciprocating movements of the sliding bar K and the guiding-button k<sup>2</sup> will be suspended.

As the movements of the sliding bar E are in opposition to the in-and-out or horizontal reciprocating movements of the needle-bar and the needle, it results that long barring-stitches may be made entirely across the end of the button-hole, the length of the reciprocations of the bar K and of the button k<sup>2</sup> being regulated by changing the position of the plate or block j' on the lever J, so that there will be more or less lost motion between the sliding bars E and K.

The number of barring-stitches to be made in each button-hole is determined by the number of teeth of the dog M engaged by the pawl e' before the pin or roller o' falls into the notch m' of the said dog. With the adjustable stop L in the position shown in the drawings four stitches will be made, as there are four teeth of the said dog to be engaged by the said pawl; but by moving said stop toward the dog the number of barring-stitches may be lessened at will; or, if it is desired (as is sometimes the case) to stop the machine automatically without forming any barring-stitches, the stop L may be so placed that the pawl e' will engage but one tooth of the dog M before the pin or roller o' falls into the notch m'.

The forward end of the rod O being connected by the link o with the bed-plate A, said rod has a slight forward movement from the position shown in Fig. 2 to the position shown in Fig. 3 as the pin or roller o' falls into the notch m' of the dog M, this movement of the said rod (effected by the spring o<sup>2</sup>) being sufficient to unclutch the driving-wheel C<sup>2</sup> from the fly-wheel C' and to apply the brake device p<sup>3</sup> to the said fly-wheel and thus stop the machine. When the next button-hole is ready to be worked, the hand-lever N is moved to the left, Figs. 2 and 8, to turn the dog M to bring the pin or roller o' out of the notch m' and upon the projection m<sup>2</sup>, so that the parts will be held in their normal position while the button-hole is being worked in readiness for the next barring or stopping operation.

In this connection it may be observed that the cam d', the sliding bars E and K, the plate k', and the movable work-clamp guiding-button k<sup>2</sup> constitute a barring mechanism. The levers H and J, with their springs and minor parts, including the link I, constitute, in connection with the projection f on the feed-wheel, a tripping mechanism by which the barring mechanism is thrown into operation at the desired moment, while the clutch and brake or stopping lever P, the dog M, the pawl by which said dog is operated, and the connections between the said dog and the lever P constitute a stopping mechanism.

I do not wish to be understood as limiting my invention to the details of construction



herein shown, as it is obvious that many changes within the province of mechanical skill might be made without departing from the spirit of my invention.

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

1. In a button-hole sewing-machine, the combination, with the sliding bar E and its operating mechanism, of the hooked sliding bar K, 10 the feeding-wheel having the tappet or projection *f*, the lever H, the hooked lever J, and a yielding connection between the said levers H and J, substantially as set forth.

2. The combination, with the sliding bar E 15 and its operating mechanism, of the hooked sliding bar K, the plate *k'*, the movable guiding-button *k''*, the feeding-wheel having the projection *f*, the lever H, slotted link I, spring *i'*, and the hooked lever J, substantially as set 20 forth.

3. The combination, with the hooked sliding bar K, the lever H, the hooked lever J, and a yielding connection between said levers H and J, of the holding-lever *h''*, the spring *h'*, and 25 the bed-plate having a stop or projection *a'*, substantially as set forth.

4. The combination, with the rotating vertical shaft D and the cam *d'*, secured thereto, of the sliding bar E, having a yoke embracing 30 said cam, the hooked lever J, pivoted to said sliding bar, the hooked sliding bar K, the feeding-wheel having a projection, the lever H, adapted to be engaged by said projection, the link I, and springs *i'* and *a''*, substantially as set forth.

5. The combination, with the barring and tripping mechanisms, of the toothed dog M, a device, as stop L, for varying the position of 35 said dog, a stopping-lever, and connections between the latter and said dog, substantially as set forth. 40

6. The combination, with the sliding bar E, the spring-acted pawl *e'*, carried thereby, and the sliding bar K, having a tail-piece for holding said pawl out of action, of the toothed dog

M, the stopping-lever, and connections between 45 the latter and said dog, substantially as set forth.

7. The combination, with the pawl *e'* and its operating mechanism, of the toothed dog M, having the notch *m'* and projection *m''*, the connecting-rod O, having the pin or roller *o'*, the 50 spring *o''*, the link *o*, and the stopping-lever P, substantially as set forth.

8. The combination, with the dog M, having the notch *m'*, of the connecting-rod O, having 55 the pin or roller *o'*, the hand-lever N, and the connecting-rod *m*, substantially as set forth.

9. In a button-hole sewing-machine, the combination, with the stationary work-plate and a feeding-wheel, of an automatic barring mechanism, a tripping mechanism, and a device, as 60 projection *f*, carried by and moving with said feeding-wheel for operating said tripping mechanism to throw the barring mechanism into operation, substantially as set forth. 65

10. In a button-hole sewing-machine, the combination, with a stationary work-plate and a feeding-wheel having an operating device, as projection *f*, of a tripping mechanism thrown 70 into action by said operating device, and a stopping mechanism operated by a moving part of said barring mechanism, substantially as set forth.

11. In a button-hole sewing-machine, the combination, with the mechanism for working 75 an eyed button-hole, of an automatic barring mechanism and a stopping mechanism operated from the barring mechanism and capable of being varied so that a greater or lesser number of barring-stitches may be made before the 80 machine is stopped, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES G. GREENE.

Witnesses:

WM. H. INSLEE,  
PHILIP DIEHL.