

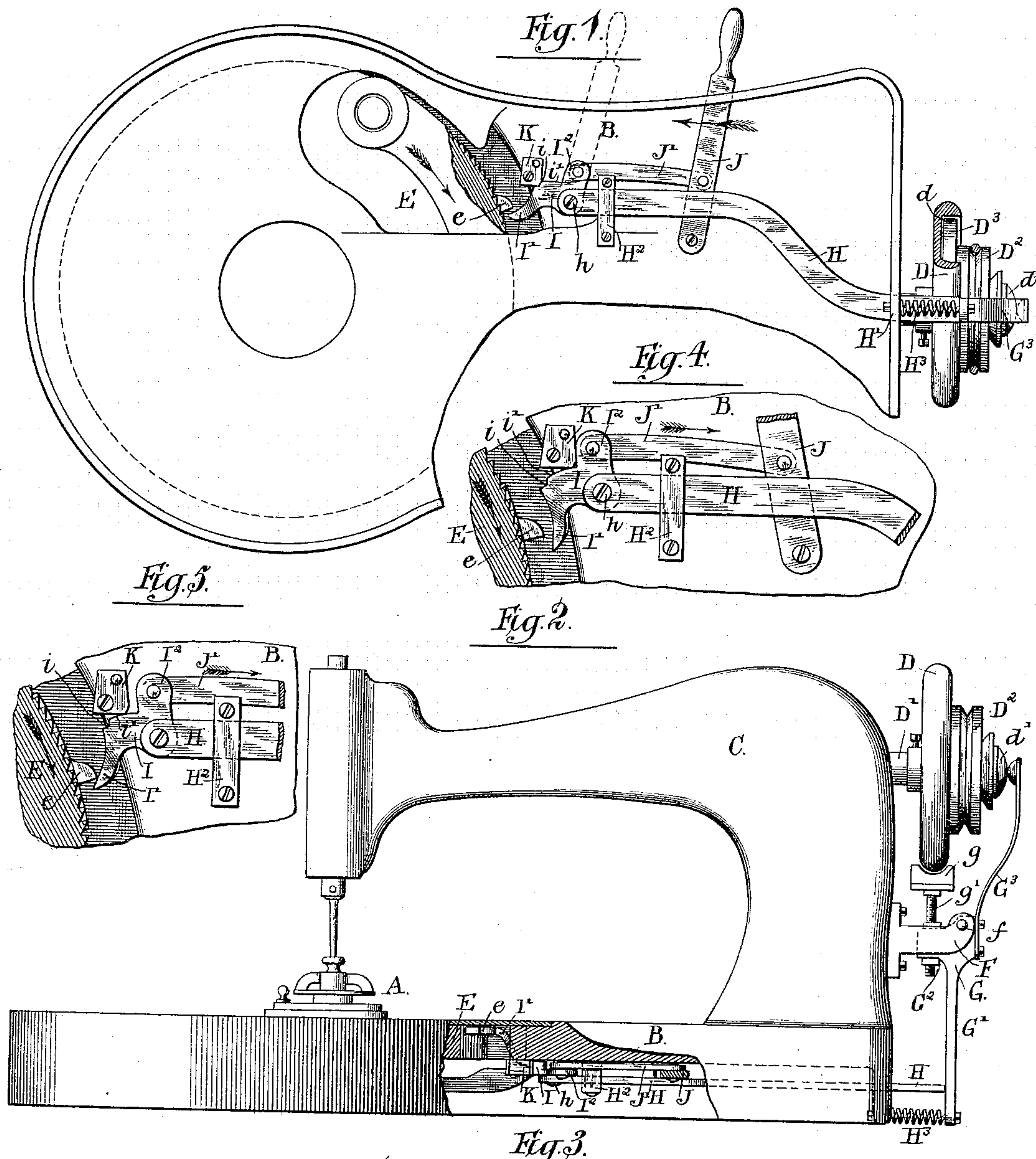
(No Model.)

E. D. LUDLOW.

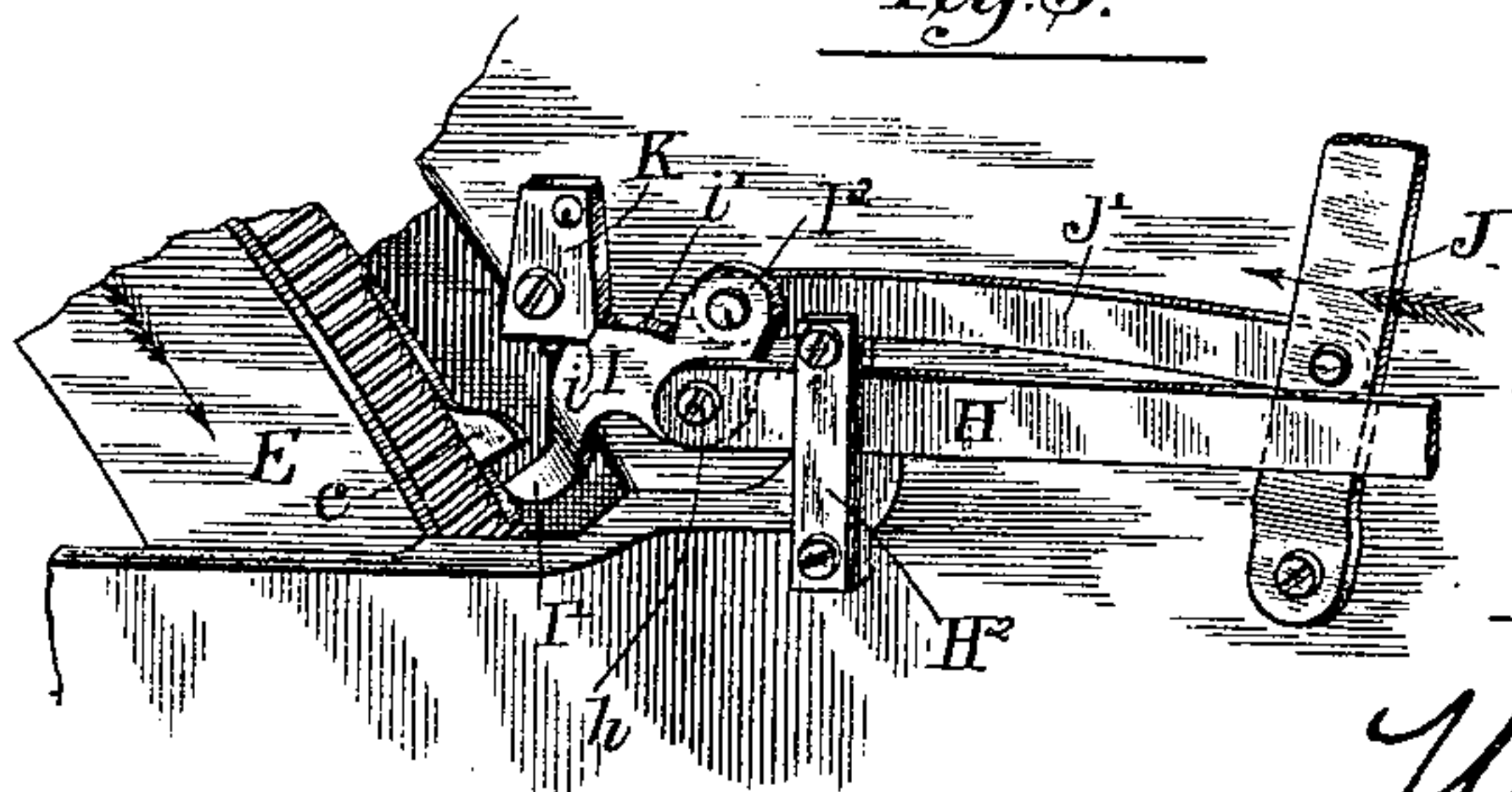
STOP MECHANISM FOR BUTTON HOLE SEWING MACHINES.

No. 329,753.

Patented Nov. 3, 1885.



Witnesses:  
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C. C. Poole



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by:-

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# UNITED STATES PATENT OFFICE.

ERASTUS D. LUDLOW, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO  
GEORGE M. LUDLOW, OF SAME PLACE.

## STOP MECHANISM FOR BUTTON-HOLE SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 329,753, dated November 3, 1885.

Application filed May 12, 1885. Serial No. 165,187. (No model.)

*To all whom it may concern:*

Be it known that I, ERASTUS D. LUDLOW, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Stop Mechanisms for Button-Hole Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in stop mechanisms for button-hole sewing-machines of that class in which at the completion of a button-hole the driving-power is automatically disconnected from the machine, and simultaneously therewith a brake is automatically applied to the balance or driving wheel; and the invention consists in the matters hereinafter described, and pointed out in the appended claims.

The devices embodying my invention are herein illustrated in connection with a well-known form of button-hole sewing-machine, in which a clamp for holding the material to be operated upon is actuated by a single rotating cam-plate. Said devices may, however, be equally well applied to a button-hole sewing-machine of the kind in which said clamp is operated by means of two rotating cam-plates in connection with a central ring-wheel—such, for instance, as is shown and described in Letters Patent of the United States granted to D. W. G. Humphrey June 13, 1871, and February 6, 1882; and also to other machines in which the necessary feed-motion is imparted to the said clamp by rotating devices which move continually in one direction while the button-hole is being worked.

The invention may be more fully understood by reference to the accompanying drawings, in which—

Figure 1 is a view of the under side of the bed-plate or top of the machine, showing those parts only with which the present invention is directly related. Fig. 2 is a side elevation, partly in section, of the same. Fig. 3 is a detail perspective view of the novel part of the stop mechanism. Figs. 4 and 5 are detail views showing changed positions of the same, as will be hereinafter set forth.

In the machine shown in the drawings, A, Fig. 2, indicates the clamp-plate or cloth-clamp for holding the work to be operated upon, said clamp being located above and adapted to slide upon the top plate, B, of the machine.

C is the overhanging goose-neck of the machine, and D the balance-wheel secured upon the horizontal driving-shaft in the usual manner.

The said cloth-clamp A is actuated by means of the rotating cam-plate E in a manner which is well known, and which need not be herein described. The driving or balance wheel D is, as shown, actuated through the medium of a pulley, D<sup>2</sup>, which is suitably grooved to receive the driving-belt of the machine. The said pulley is rotatably mounted on the end of the shaft D in such manner as to be movable longitudinally of said shaft, and is provided with a disk, D<sup>3</sup>, having its inner surface adapted to frictionally engage the recess *d* in the outer face of the wheel D, so that the said pulley and wheel together form a clutch mechanism adapted to give motion to the machine when the disk upon the pulley is thrown into contact with the said wheel, and to become disengaged, so as to cause the stoppage of the machine, when the said pulley is released from pressure.

F is a bracket attached to the goose-neck C of the machine, and G is a bent lever journaled upon the said bracket by means of a pivot-pin, *f*, and provided with a depending vertical arm, G', and with a short horizontal arm, G<sup>2</sup>, extending inwardly beneath the driving-wheel D. The said lever G is provided, also, with a third upwardly-projecting arm, G<sup>3</sup>, made of spring metal, and adapted to bear at its upper end upon the pulley D<sup>2</sup>, so as to thrust said pulley toward the wheel D when the lower arm of the lever G is thrown outwardly.

H is a slide-bar supported in bearings H<sup>2</sup>, and adapted to slide freely in a longitudinal direction, said bar being constructed to rest against the inner surface of the lever-arm G', and being actuated so as to move said arm by devices hereinafter described. The said lever-arm G' is held in contact with the end of the slide-bar H by means of a spiral spring, H<sup>3</sup>, which tends to retain the upper end of



the spring-arm  $G^3$  at the outer limit of its movement and the pulley  $D^2$  free from pressure. The horizontal arm  $G^2$  of the lever  $G$  is provided with a brake-shoe,  $g$ , adapted to engage the wheel  $D$  when the lower end of the lever-arm  $G'$  is thrown inwardly by the action of the spring  $H^3$ , said brake-shoe, as herein shown, being adjustably supported from the said arm  $G^2$  by means of a threaded rod,  $g'$ .

The clutch and brake devices above described are constructed to operate substantially in the manner set forth in Letters Patent No. 315,952, issued to myself and G. M. Ludlow upon the 14th day of April, 1885.

The novel parts of the stop mechanism embodying my invention are constructed as follows: The inner end of the slide-bar  $H$  terminates at a point adjacent to the periphery of the cam-plate  $E$ , and to the said end of the bar is pivoted a lever or dog,  $I$ , having upon it an arm,  $I'$ , extended toward the said cam-plate and terminating in position to engage a projection,  $e$ , rigidly attached to the latter. The said dog is also pivotally connected with a hand-lever,  $J$ , by means of a connecting-bar,  $J'$ , pivoted to the lever and to an arm,  $I^2$ , upon the dog in such manner that when the lever is moved the dog will be rotated about the pivot  $h$  connecting it with the slide-bar  $H$ . The dog  $I$  also is provided with a notch,  $i$ , adapted to engage a stationary stop or projection,  $K$ , secured to the under surface of the top plate,  $B$ , of the machine, the said stop  $K$  and notch  $i$  being so arranged relatively to the pivot  $h$  connecting the dog with the slide-bar  $H$  that when the said stop  $K$  is engaged with the notch  $i$  the slide-bar will be held from inward movement by the action of the spring  $H^3$ . For the purpose last mentioned it is obviously not essential that the said notch  $i$  and the part of the stop  $K$  engaged therewith should be located in the exact position indicated in the drawings, it only being necessary that a line passing through the said notch  $i$  to the pivot  $h$  should make an obtuse angle with the slide-bar.

The parts being constructed as above described, it is obvious that when the dog  $I$  is rotated so as to cause the disengagement of the stop  $K$  from the notch  $i$  the slide-bar  $H$  will be allowed to move inwardly under the action of the spring  $H^3$ . It is obvious, also, that this movement of the dog may be accomplished either by the contact of the projection  $e$  upon the cam-plate with the arm  $I'$  of the dog or by moving the hand-lever  $J$  toward the left, as shown in the drawings, so that the slide may be released and the brake applied so as to stop the machine either when the stop  $e$  encounters the lever-arm  $I'$  or when the hand-lever  $J$  is moved.

The cam-plate  $E$  is constructed in the machine shown to make one complete rotation during the stitching of each button-hole, and the stop  $e$  is located in position to encounter the lever  $I'$  at the moment the button-hole is completed. When the slide-bar is held from

inward movement, under the action of the spring  $H^3$ , by the engagement of the notch  $i$  of the dog  $I$  with the stop  $K$ , the clutch will be engaged and the machine running. The cam-plate  $E$  at such time turns in the direction indicated by the arrow in Figs. 1, 2, and 3, the stops  $e$  being shown in said figures as about to engage the arm  $I'$ . When the stop strikes the arm, the dog  $I$  is turned upon the pivot  $h$ , so as to release the notch  $i$  from engagement with the stop  $K$ , and the slide-bar and dog are then thrown forward by the spring  $H^3$  into the position shown in Fig. 4, with the stop  $K$  resting at the angle between the arm  $I^2$  of the dog and an edge or surface,  $i'$ , thereof, the hand-lever  $J$  in this movement being thrown laterally to the left from its first position by the action of the dog through the medium of the connecting-bar  $J'$ . When the parts rest in the position shown in Fig. 4, the clutch is released and the brake applied, so as to hold the machine motionless. The machine is started by throwing the slide-bar  $E$  longitudinally toward the lever-arm  $G'$  into the position shown in Figs. 1, 2, and 3, this movement of the slide-bar being accomplished, through the medium of the lever  $J$  and dog  $I$ , in the following manner: The surface  $i'$  of the dog  $I$  before referred to is so located with reference to the pivot  $h$  and the stop  $K$  as to move closely past said stop when the slide-bar and dog are thrown forward in stopping the machine, and the said surface  $i'$  rests in contact, or practically so, with the said stop when the machine has been stopped and the parts are in the position shown in Figs. 1, 2, and 3. This engagement of the dog  $I$  and the stop obviously prevents any rotary movement of the dog when the lever  $J$  is thrown to the right, or in the direction of the arrows in Figs. 4 and 5 of the drawings, and the obvious effect of drawing upon the arm  $I^2$  of the dog in the direction indicated will be to move the dog bodily to the right, so as to carry the slide-bar in the same direction, the said slide-bar of course being held by the bearing  $H^2$  from any lateral movement under the pressure upon the pivot  $h$ , caused by the action of the surface  $i'$  upon the stop  $K$  when the dog is moved as described. The dog and lever will be moved by the lever  $J$  in the manner described until the notch  $i$  comes opposite the stop  $K$ , when the said stop will slip into the notch, and the slide-bar will be held by the engagement of the notch with the stop until the dog is again moved by the action of the stop  $e$ , or of the lever  $J$ , in case it is desired to stop the machine during the stitching of a button-hole. It is obvious that after the stop  $e$  has encountered the arm  $I'$  of the dog  $I$ , and the latter has been released from the stop  $K$  and thrown by the action of the spring  $H^3$  into the position shown in Fig. 4, the movement of the stop  $e$  will be arrested while the said stop is still in position to be encountered by the arm  $I'$ , when said arm is swung toward the cam-plate  $E$  in again starting the machine. The presence of the said stop in



the position indicated will not, however, prevent the dog being moved as last described, for the reason that when the arm  $I^2$  of the dog is drawn away from the stop K by the lever J the slide-bar H will be allowed to move slightly by the yielding of the spring  $H^3$ , and the end of the arm  $I'$  thereby permitted to pass the end of the said stop  $e$ . This movement is clearly illustrated in Fig. 5, in which the dog is shown as partially drawn back and the arm  $I'$  as engaged with the stop  $e$ . It will be readily seen from the said figure that when the arm  $I^2$  is moved in the direction of the arrow in said figure the dog will be turned about the point of the stop  $e$  as a fulcrum, so as to carry the slide-bar H backward until the arm  $I'$  is free from the said stop, when the backward movement of the said slide-bar will be continued by the action of the surface  $i'$  of the dog upon the stop K, as before described. The movement of the dog so as to enable the arm  $I'$  to be released from the stop  $e$ , as above set forth, is greatly facilitated by so constructing the said arm  $I'$  that it stands at an angle with reference to bar H, or the adjacent peripheral part of the cam-plate E, when it is in position to engage the stop  $e$ , as clearly shown in the several figures of the drawings. It will be seen that the engagement and disengagement of the stop K with the notch  $i$  of the dog is permitted by a slight yielding of the slide-bar, permitted by the spring  $H^3$ , in the same manner that the said slide-bar yields to permit the movement of the arm  $I'$  past the stop  $e$  when the parts are in the position shown in Fig. 5.

From the construction above set forth it will be observed that I have provided a device whereby the machine will be automatically stopped at the completion of each button-hole, and may also be either stopped or started at any moment desired by hand. This device also is exceedingly simple and inexpensive, may be readily applied to any machine, and is little liable to get out of order. It may be further stated that the mechanism shown is adapted for attachment beneath the top plate of the machine, where it is protected from injury and is entirely out of the way of the operator.

The use of the lever J, arranged as shown, is not essential to the operation of the other parts of the device described, inasmuch as any means acting upon the arm  $I^2$  or other part of the dog and tending to move it in the manner set forth will produce the same result. The said arm  $I^2$  may, for instance, be itself prolonged to form a lever, as indicated in dotted lines in Fig. 1, with substantially the same result in the operation of the parts as is obtained by the use of the device in the particular form shown, and above set forth.

It is entirely obvious that a stop device similar to that described may be actuated by a stop or projection similar to the stop  $e$  located upon any rotating part of the machine which moves while the button-hole is being

worked; and my invention is not, therefore, limited to the use of such stop device in connection with a cam-plate, or as applied to the particular machine herein illustrated.

It is of course obvious that the stop devices described may be used with any suitable clutch mechanism, and that a friction-brake may or may not be used in connection with the clutch, as is found convenient or desirable.

I claim as my invention—

1. The combination, with a clutch mechanism, a cloth-clamp, and a rotating part of the mechanism for actuating the clamp, provided with a stop or projection,  $e$ , of a longitudinally-movable slide-bar connected with the clutch device, a spring applied to move the slide-bar in a direction to disengage the clutch, a dog, I, pivoted to the slide-bar and provided with a notch,  $i$ , and with an arm,  $I'$ , adapted for engagement with the stop  $e$ , a stationary stop, K, engaged with said dog, and means for actuating the said dog, substantially as and for the purpose set forth.

2. The combination, with a clutch mechanism, a cloth-clamp, and a rotary part of the mechanism for actuating the clamp, provided with a stop or projection,  $e$ , of a longitudinally-movable slide-bar connected with the clutch mechanism, a spring applied to move the slide-bar in a direction to disengage the clutch, a dog, I, pivoted to the slide-bar and provided with a notch,  $i$ , an arm,  $I'$ , adapted to engage the stop  $e$ , and an arm,  $I^2$ , a stationary stop, K, adapted to engage the dog, and a hand-lever, J, connected with the arm  $I^2$  of the dog, substantially as and for the purpose set forth.

3. The combination, with a clutch mechanism, a cloth-clamp, and a rotating part of the mechanism for actuating the cloth-clamp, provided with a stop or projection,  $e$ , of a longitudinally-movable slide-bar connected with the clutch mechanism, a spring applied to move the slide-bar in a direction to disengage the clutch, a dog, I, pivoted to the slide-bar and provided with an arm,  $I'$ , adapted to engage the stop  $e$ , a stationary stop, K, and means for actuating the dog, said dog being provided with a notch,  $i$ , and a cam-surface,  $i'$ , adapted to engage the said stop K, substantially as and for the purpose set forth.

4. The combination, with a clutch mechanism, a cloth-clamp, and a rotating cam-plate provided with a stop or projection,  $e$ , of a longitudinally-movable slide-bar connected with the clutch device, a spring applied to move the slide-bar in a direction to disengage the clutch, a dog, I, pivoted to the slide-bar and provided with a notch,  $i$ , and with an arm,  $I'$ , adapted for engagement with the stop  $e$ , a stationary stop, K, engaged with said dog, and means for actuating said dog, substantially as and for the purpose set forth.

5. The combination, with a clutch mechanism, a cloth-clamp, and a rotating part of the mechanism for actuating the clamp, provided with a stop or projection,  $e$ , of a longitudi-



nally-movable slide-bar connected with the clutch device, a spring applied to move the slide-bar in a direction to disengage the clutch, a dog, I, pivoted to the slide-bar and provided  
5 with a notch, *i*, and with an arm, I', adapted for engagement with the stop *e*, a stationary stop, K, engaged with said dog, and means for actuating said dog, said arm I' having an angular position with reference to the said  
10 slide-bar H, substantially as and for the purpose set forth.

6. The combination, with the balance or driving wheel of a button-hole sewing-machine, a clutch mechanism comprising a disengaging-spring, and a rotating part of the mechanism for actuating the clamp, provided with a stop or projection, *e*, of a slide-bar for holding said clutch mechanism in an engaged or operative position, a dog, I, pivoted to the  
20 slide-bar and provided with a notch, *i*, and with an arm, I', adapted for engagement with the stop *e*, and a stationary stop, K, for holding said dog with the arm I' in position for engagement with the stop *e*, substantially as  
25 described.

7. The combination, with the driving or balance wheel of a button-hole sewing-machine, a clutch mechanism comprising a disengaging-spring, a brake connected with and actuated by the clutch mechanism and a rotating part of the mechanism for actuating the cloth-clamp, provided with a stop or projection, *e*, of a slide-bar for holding said clutch mechanism in an engaged or operative position, a dog, I, pivoted to the slide-bar and provided with a notch, *i*, and with an arm, I', and a stationary stop, K, constructed to hold the dog in position for the engagement of the arm I' with the stop *e*, whereby, upon completion of a button-hole, the clutch mechanism will be  
30 automatically disengaged and the brake applied to the balance-wheel, substantially as described.  
35

In testimony that I claim the foregoing as my invention I affix my signature in presence  
45 of two witnesses.

ERASTUS D. LUDLOW.

Witnesses:

C. CLARENCE POOLE,  
OLIVER E. PAGIN.