

(No Model.)

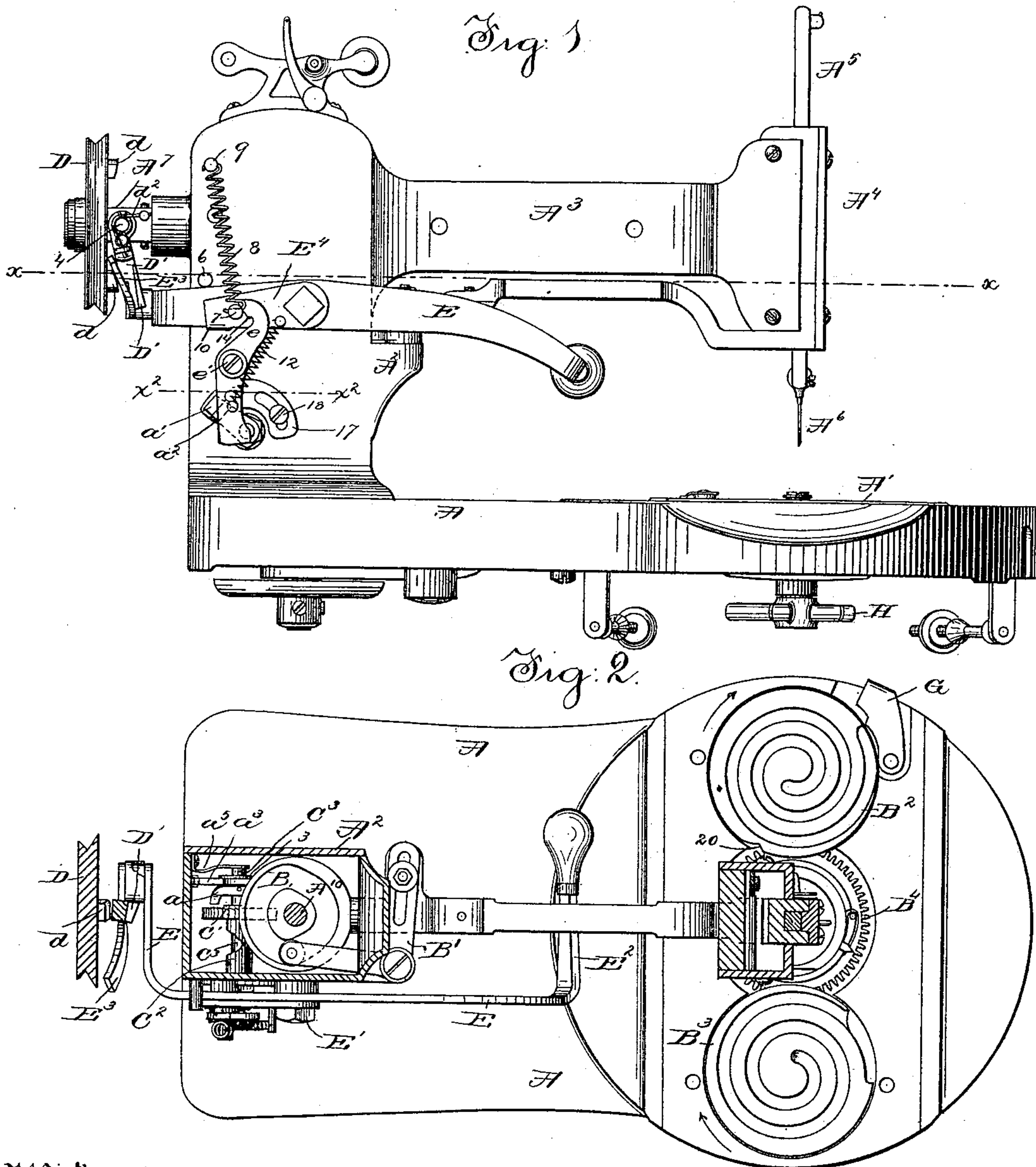
2 Sheets—Sheet 1.

H. H. CUMMINGS.

STOPPING MECHANISM FOR BUTTON HOLE STITCHING MACHINES.

No. 354,103.

Patented Dec. 14, 1886.



Witnesses

F. L. Emery.

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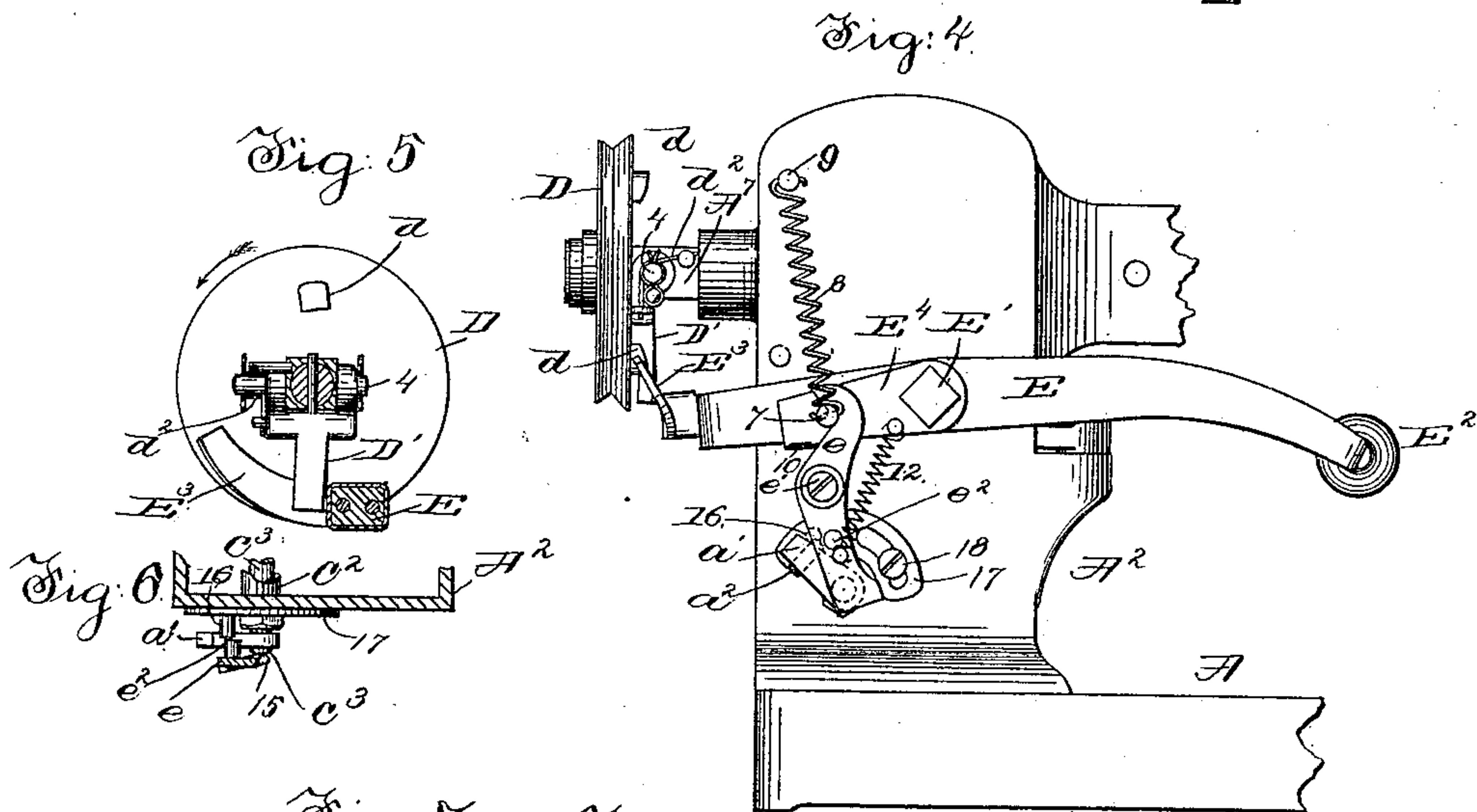
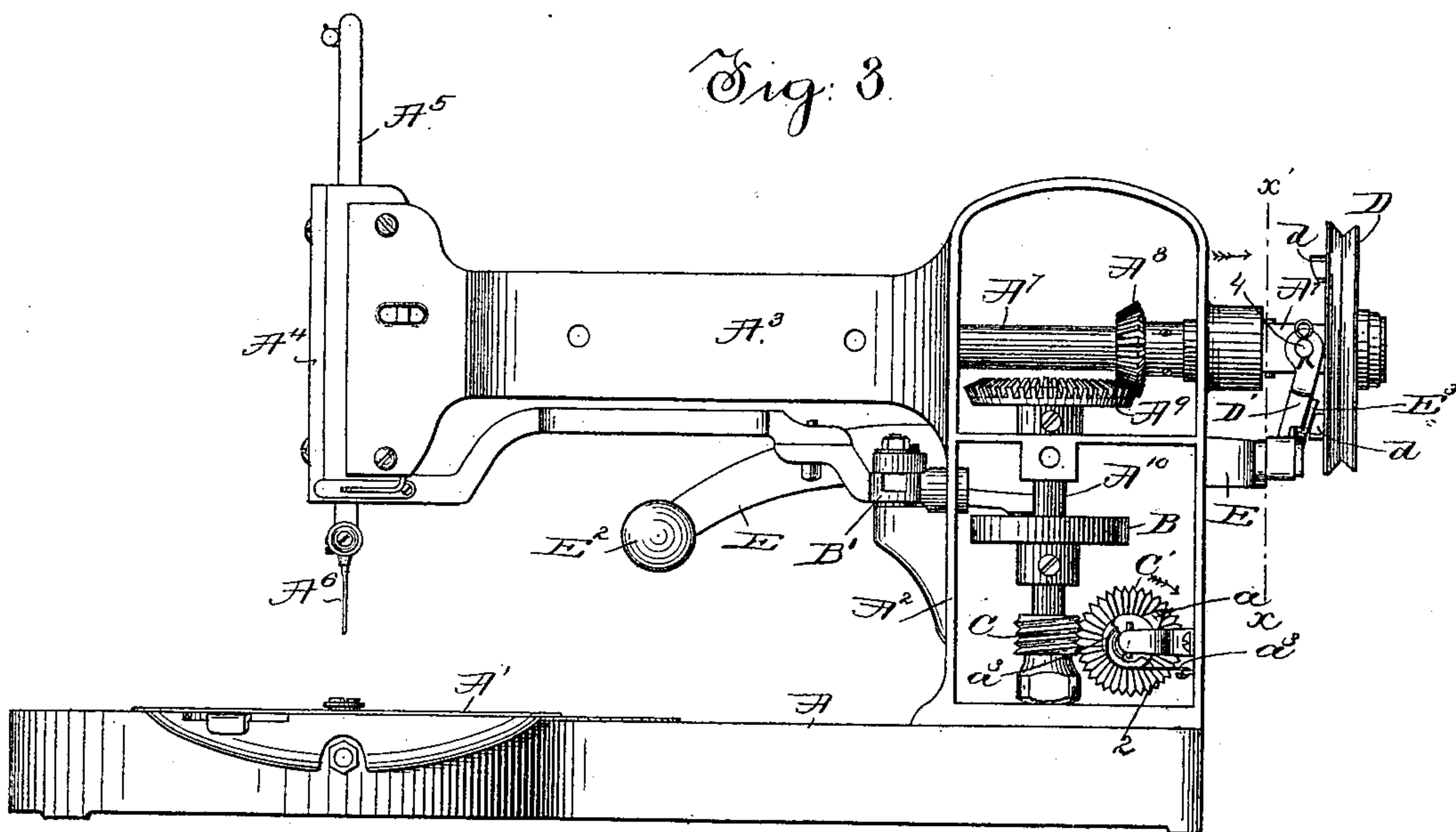
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H. H. CUMMINGS.

STOPPING MECHANISM FOR BUTTON HOLE STITCHING MACHINES.

No. 354,103.

Patented Dec. 14, 1886.



Witnesses  
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# UNITED STATES PATENT OFFICE.

HENRY H. CUMMINGS, OF MALDEN, MASSACHUSETTS.

STOPPING MECHANISM FOR BUTTON-HOLE-STITCHING MACHINES.

SPECIFICATION forming part of Letters Patent No. 354,103, dated December 14, 1886.

Application filed November 5, 1885. Serial No. 181,961. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY H. CUMMINGS, of Malden, county of Middlesex, State of Massachusetts, have invented an Improvement in Stopping Mechanisms for Button-Hole-Stitching Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In mechanism of the class referred to the cloth-carrying clamp has been made, at the completion of a button-hole, to strike a lever on top of the bed-plate and effect the disengagement of the clutch instrumental in driving the main shaft of the machine.

The object of my invention is to simplify the construction of the parts, and herein I have provided one of the rotating shafts of the machine with a worm-wheel that actuates a worm-gear containing a number of teeth, preferably equal to the greatest number of stitches to be taken in the longest button-hole to be stitched, the said worm-gear being mounted loosely on a hollow stud fixed to the machine-frame, receiving through it a short shaft having at one end a dog to engage teeth at the side of the worm-gear, and at its other end a tripping-arm, a spring normally acting to keep the dog in engagement with the worm-gear, so as to compel the rod and arm to rotate in unison with it, the said arm at the proper time—as at the completion of the button-hole—acting to move a hook and release one arm of a compound or double lever that controls a clutch co-operating with the belt-pulley mounted loosely on the main shaft of the machine and provided at its face with projections, the release of the said compound lever effecting the release of the belt-pulley and the stopping of the machine. The lever referred to is made as a compound lever, in order that the part thereof directly employed to operate the clutch may be moved independently while the hook is in operation, and holds one part of the said lever should the operator desire to stop the machine before completing the button-hole.

The features in which my invention consists will be hereinafter more fully set out in the claims at the end of this specification.

Figure 1 is a rear side elevation of a so-called "Union" button-hole-stitching machine, to which my invention is shown as ap-

plied, the compound lever being shown as in the position it will occupy after completing a button-hole, the belt-pulley being supposed to be free or loose on the main shaft, the usual cloth-clamp being omitted. Fig. 2 is a section of Fig. 1 below the dotted line  $x x$ , the cover-plate being removed to show the usual cloth-clamp-moving device below it, and in connection therewith the gage employed by me to indicate the proper position for the scroll-cams when the button-hole is to be started. Fig. 3 is a front side elevation of the machine shown in Fig. 1. Fig. 4 is a detail showing part of the machine with its hook holding the compound lever in the position it will occupy while the button-hole is being stitched. Fig. 5 is a section of Fig. 3 in the dotted line  $x' x'$ , looking to the right. Fig. 6 is a sectional detail to be referred to, taken in the line  $x^2 x^2$ , Fig. 1; and Figs. 7 and 8, details to be referred to.

The bed-plate A, its cover A', the upright A<sup>2</sup>, overhanging arm A<sup>3</sup>, movable head A<sup>4</sup>, needle-bar A<sup>5</sup>, needle A<sup>6</sup>, main shaft A<sup>7</sup>, bevel-gears A<sup>8</sup> A<sup>9</sup>, shaft A<sup>10</sup>, cam B, the lever B' for moving the head A<sup>4</sup>, the scroll-cams B<sup>2</sup> B<sup>3</sup> and the gear B<sup>4</sup>, and the stitch-forming mechanism (not shown) are and may be as common to button-hole-stitching machines now in use, such machines being known as the "Union;" but I wish it to be understood that I do not intend to limit my invention to the employment of the devices hereinafter to be described to only the sewing-machine shown, as with but slight changes the same may be adapted to other well-known sewing-machines.

The material containing the slit or button-hole to be stitched will be held between the jaws of a clamp, (not shown,) but substantially such as represented in United States Patent No. 123,348, February 6, 1872.

In accordance with my invention, I have provided the shaft A<sup>10</sup> with a worm, C, which engages and rotates a worm-gear, C', mounted loosely on a hollow stud, C<sup>2</sup>, fixed to the upright arm A<sup>2</sup>, the said stud having a shoulder and a washer at opposite sides of the worm-gear, to prevent the latter from being moved longitudinally. The stud C<sup>2</sup> receives through it a short shaft, C<sup>3</sup>, provided with a dog, a, pinned thereon near the front end of the said shaft, the rear end of the said shaft beyond the



upright arm  $A^2$  having fastened to it a tripping-arm,  $a'$ , provided, preferably, with an adjusting-screw,  $a^2$ . The shaft  $C^3$  at its front end, beyond the dog  $a$ , has connected with it one end of a clock-spring,  $a^3$ , the outer end of which is attached to the upright arm  $A^2$ , as shown in Figs. 2 and 3, the said spring acting normally to turn the shaft  $C^3$  and its attached dog and tripping-arm in a direction opposite that to which the said shaft is turned by the worm-gear when the pawl-like point of the dog  $a$  engages the ratchet-teeth 2 at the outer side of the worm-gear  $C'$ . (See Fig. 3.) A washer, 3, on the shaft  $C^3$  forms a guide or wall for one side of the spring  $a^3$ , and a spring,  $a^5$ , acting against the outer end of the shaft  $C^3$ , normally keeps the dog  $a$  in engagement with the ratchet-teeth.

The belt-pulley D, loose on the shaft  $A^7$ , has at its inner side clutch-pins  $d$ , which are engaged by the clutch arm or lever  $D'$ , having its pivot 4 inserted through a hub or part of the shaft  $A^7$  inside the upright  $A^2$ , the said clutch being acted upon by a spring,  $d^2$ , which normally acts to keep the free end of the said clutch pressed toward the belt-pulley, so as to enable the pins  $d$  of the latter to be engaged by the clutch, the latter acting to rotate the shaft  $A^7$ .

To disengage the clutch-lever  $D'$  from the said pins, I have provided a compound lever, composed, essentially, of a lever, E, mounted on a fulcrum,  $E'$ , one end of the said lever having a handle,  $E^2$ , the opposite arm having a shoe,  $E^3$ , which is so inclined or shaped that when the handle  $E^2$  is depressed into the position, Fig. 1, with the lever against the stop 6, the inclined face of the said shoe will be placed in position to be struck by the lower free end of the clutch arm or lever  $D'$ , moving the latter away from the belt-pulley and the pins or projections  $d$ , letting the said pulley run loosely on the main shaft. The other member of the compound lever E is a short lever,  $E^4$ , mounted loosely on the same fulcrum-stud  $E'$ , the said short lever  $E^4$  having a pin or stud, 7, that has connected with it a spring, 8, attached to a stud, 9, fixed on the machine-frame, the said spring acting normally to keep the compound lever in the position, Fig. 1, against the stop 6. When the handle  $E^2$  is lifted, as in Fig. 4, the shoe  $E^3$  is removed from the path or reach of the clutch-lever  $D'$ , permitting the latter, under the action of the spring  $d^2$ , to engage one of the pins or projections  $d$ , and thereafter the main shaft will be rotated in unison with the belt-pulley D and the stitching will be commenced. The elevation of the handle  $E^2$  of the lever E causes the depression of the short lever  $E^4$ , distending the spring 8, the said lever  $E^4$  having a lip, 10, at one edge, which extends laterally under the lever E. The pin or stud 7 of the lever  $E^4$ , when depressed, is caught by the hook  $e$ , pivoted at  $e'$  on the upright  $A^2$ , the said hook having a stud,  $e^2$ , at its inner side below its fulcrum  $e'$ , (see Figs. 6 and 7,) a spring, 12, normally acting to keep the hook  $e$  pressed toward the pin or stud 7 of the lever

$E^4$ , so as to clutch over the same whenever the lever  $E^4$  is depressed.

The number of ratchet-teeth in the worm-gear is preferably in excess of the number of stitches in the largest button-hole to be made, and corresponds in number with the teeth of the worm-gear.

The usual cloth-holding clamp being put in place, and the lever E moved to commence the stitching, the rotation of the worm-gear (the dog  $a$  at such time being in engagement with the said gear) will cause the rotation of the shaft  $C^3$  with the said gear, and the tripping-arm  $a'$  will be moved in unison with it until the said arm strikes the stud  $e^2$  of the hook  $e$  and releases the said hook from the pin or stud 7, permitting the spring 8 to lift the levers  $E^4$  and E and effect the release of the clutch-lever  $D'$  from the belt-pulley, leaving the latter loose on the main shaft.

As above stated, Fig. 4 represents the parts in the position which they will occupy when the stitching of a button-hole is commenced, and as the stitching progresses the tripping-arm  $a'$  travels to the left and downward, as viewed in the said figure, and when the button-hole is finished it has nearly completed a revolution with its shaft  $C^3$ , and it will strike the pin  $e^2$  on the pivoted hook  $e$  when it has again come around to a nearly vertical position, and thus the said pivoted hook will be moved in the proper direction to be released from the pin 7 to effect the unclutching of the pulley D from the clutch-lever  $D'$ , as above described.

Viewing Figs. 1, 4, and 7, it will be seen that the hook  $e$  has an inclined edge, 14, and that the said hook, below its fulcrum, is twisted or set in an inclined position, so that as the pin 7, under the rotation of the spring 8, travels along the inclined edge 14 of the hook, the lower inclined side, 15, of the said hook acts (see Fig. 6) upon the short shaft  $C^3$ , pushes the latter longitudinally toward the front of the machine against the stress of the spring  $a^5$ , and removes the dog  $a$  from the ratchet-teeth of the worm-gear, permitting the spring  $a^3$  to return the dog into its starting position, ready to be again engaged with the said ratchet-teeth whenever the handle is lifted to start the machine.

The position to which the spring  $a^3$  may turn the dog, and consequently the number of stitches which may be made before stopping the machine automatically, as described, depends upon the position of the stop 16 on the plate 17, held in adjusted position by the screw 18, (see Figs. 1 and 8,) the said plate being shown separately in Fig. 8.

To insure an even number of stitches at each side of the button-hole, the scroll-cams, which act to carry the cloth-clamp over the cover-plate  $A'$ , containing the usual slot, must occupy at starting a certain definite position; and to always insure the placing of the scroll-cams in this definite starting-point I have provided the scroll-cam  $B^2$  with a notch, 20, (see Fig.



2,) and I have pivoted near the said scroll-cam a gage, G, having a projection to engage the said notch when the said parts are brought together, the operator at such time moving the scroll-cam by the usual handle, H, and pressing the gage in with his thumb, the gage acting as a feeder to show the operator the correct position for the scroll-cam.

The position of the pin 4, which forms a fulcrum for the clutch-lever D', is such, with relation to the usual devices for reciprocating the needle-bar vertically, that the main shaft is always stopped in such position as to leave the needle-bar elevated with the needle above the usual cloth-clamp, so that the latter may be readily removed from the machine.

I claim—

1. The shaft A<sup>10</sup>, its attached worm and the worm-gear actuated by it and provided with teeth, and a short shaft provided with a dog to engage the said teeth, and with an arm, a', combined with a hook adapted to hold or release a lever operative in stopping or starting the shaft A<sup>7</sup>, substantially as described.

2. The shaft A<sup>7</sup>, the clutch-lever pivoted thereon, the belt-pulley loose on the said shaft and provided with pins or projections d, the shaft A<sup>10</sup> and gears to connect it with the shaft A<sup>7</sup>, the worm C, the worm-gear C', provided with ratchet-teeth 2, and a short shaft, C<sup>3</sup>, provided with the dog and arm a', and the lever E<sup>4</sup> and the shoe E<sup>3</sup>, combined with the hook e and springs 8 and 12, to operate substantially as described.

3. The shaft A<sup>7</sup>, its attached pivoted clutch-lever D', and the belt-pulley D, loose on the said

shaft and provided with the pins or projections d, combined with the lever E, its attached shoe E<sup>3</sup>, and the lever E<sup>4</sup>, its pin 7, the spring 8, and the hook e, to operate substantially as described.

4. The lever E<sup>4</sup>, provided with pin 7, and a spring, 8, to operate the lever, and a short shaft, C<sup>3</sup>, provided with the dog a and the arm a', and the worm-gear C', provided with ratchet-teeth 2, combined with a lever, e, having an inclined edge, 14, and an inclined side or face, 15, to act against one end of the said short shaft to release the dog from engagement with the ratchet-teeth of the worm-gear, substantially as described.

5. The worm-gear C', provided with ratchet-teeth 2, the short shaft C<sup>3</sup>, extended through said gear loosely and provided with a dog, a, and the arm a', and the regulating-plate 17, provided with a stop, combined with a spring, a<sup>3</sup>, to turn the said shaft in one direction when the dog a is disengaged from the ratchet-teeth of the worm-gear, substantially as described.

6. The scroll-cam B<sup>2</sup>, provided with a notch, 20, combined with the gage G, having the shoulder or projection to engage the said notch and determine the starting position of the said scroll-cam, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY H. CUMMINGS.

Witnesses:

G. W. GREGORY,  
C. M. CONE.