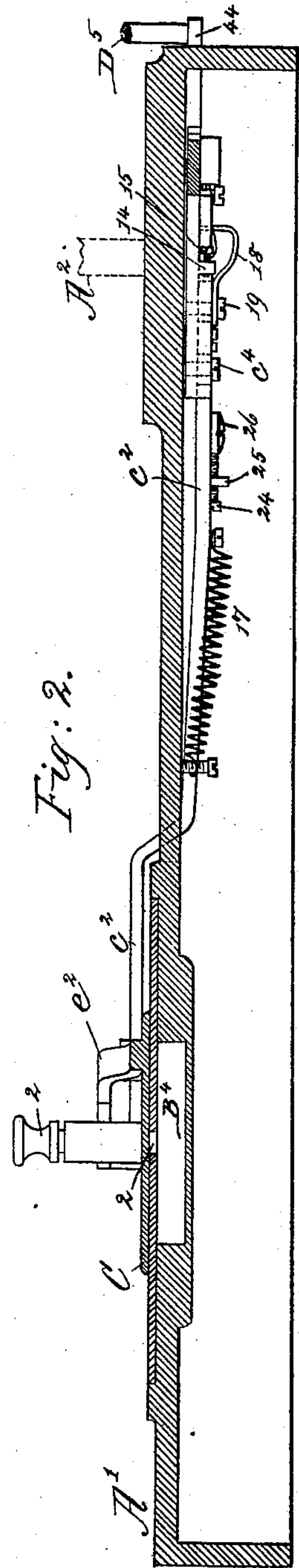
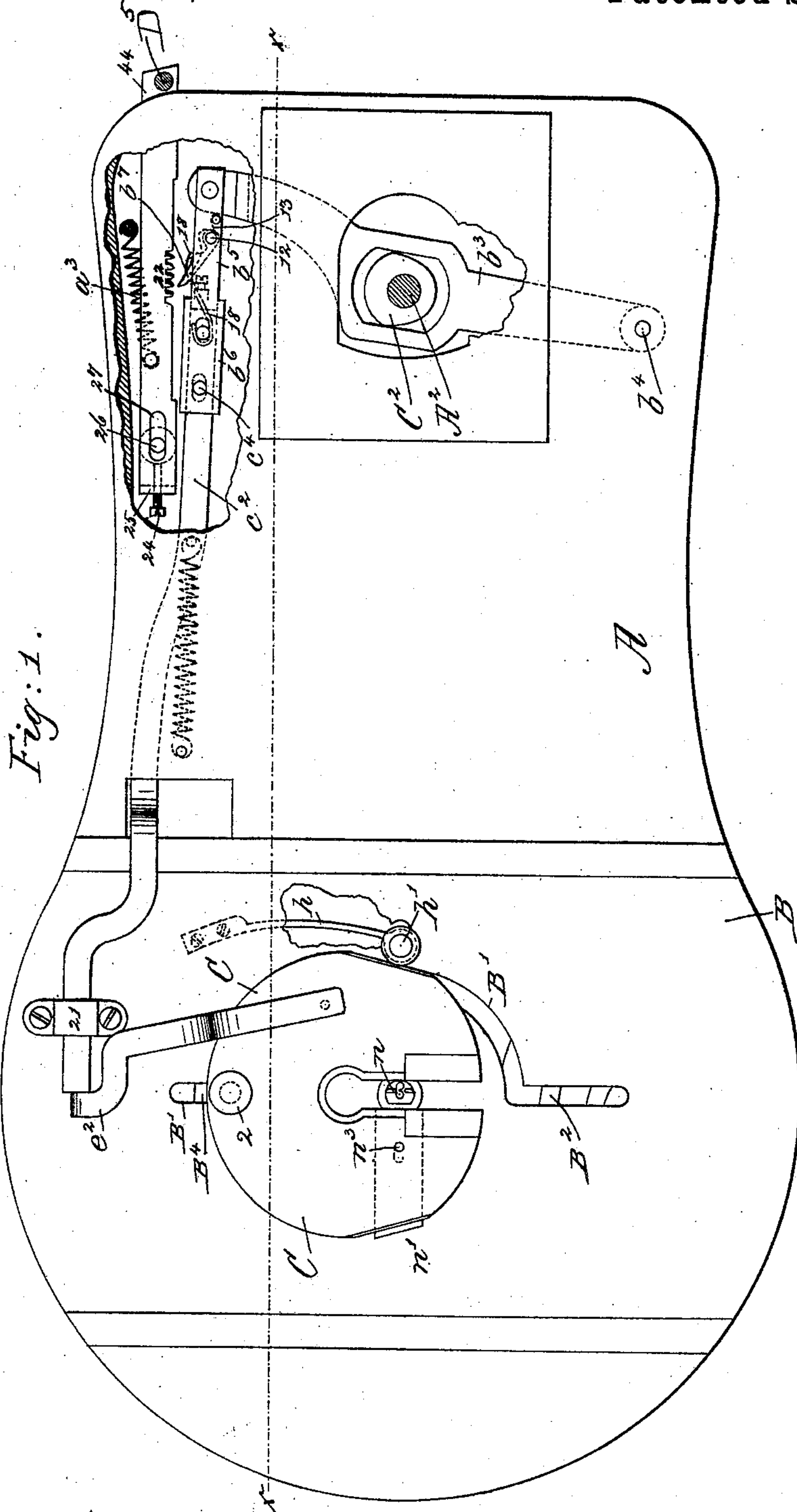


A. L. COOMBS.

BUTTON HOLE SEWING MACHINE.

No. 389,547.

Patented Sept. 18, 1888.



Witnesses.  
Arthur Gifford.  
John F. C. Franklin

Inventor:  
A. Lincoln Coombs,  
by Crosby & Gregory, attys

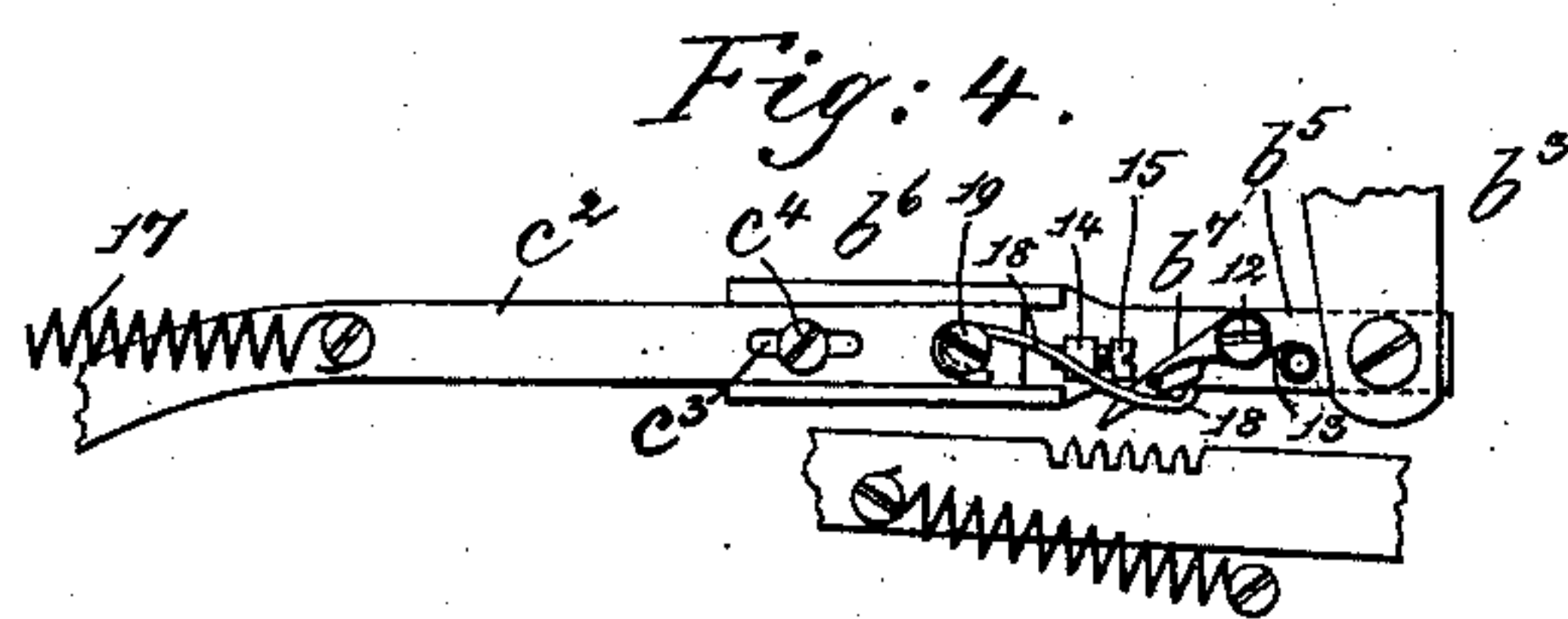
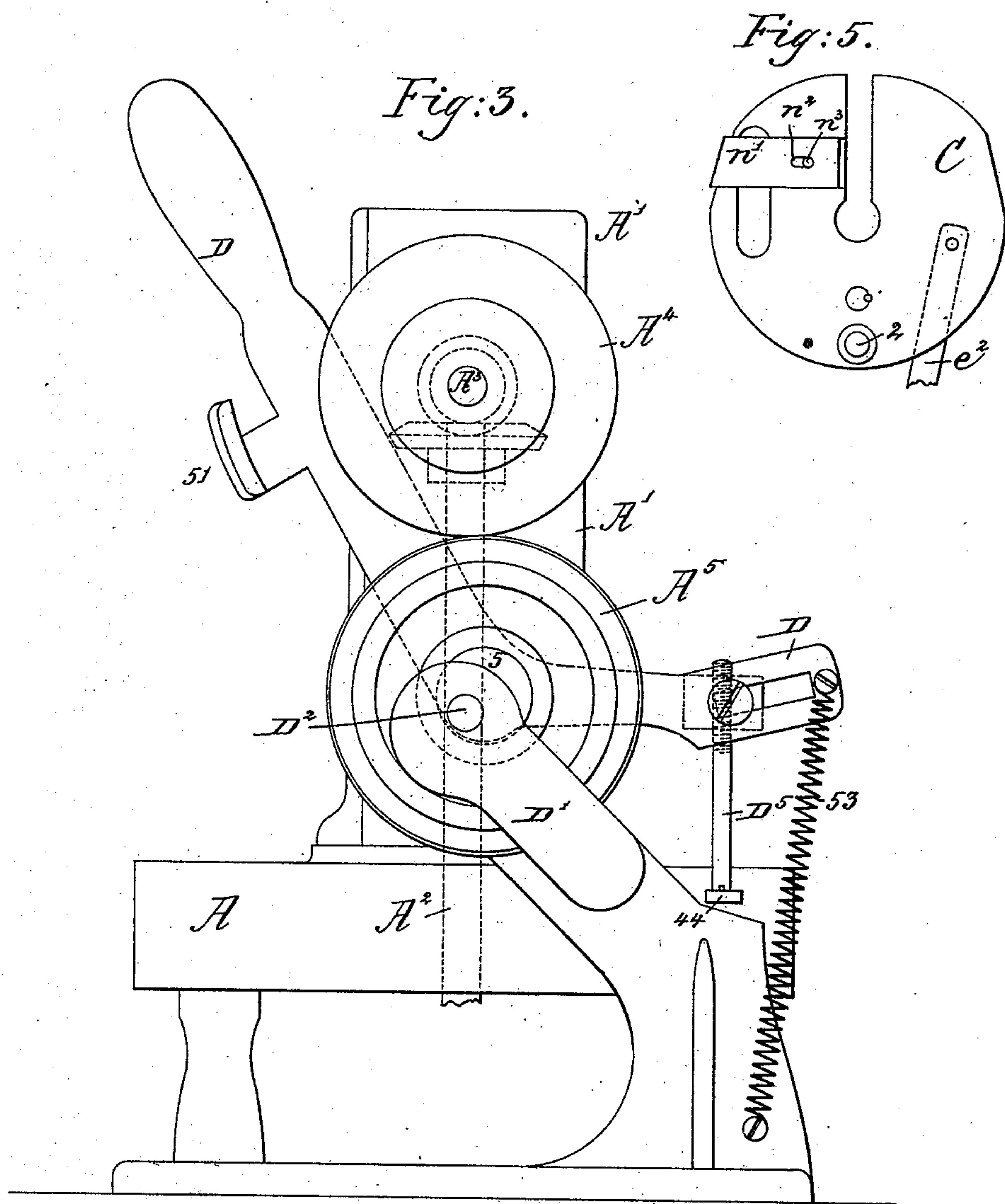
(No Model.)

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# UNITED STATES PATENT OFFICE.

A. LINCOLN COOMBS, OF CLIFTONDALE, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SINGER MANUFACTURING COMPANY OF NEW JERSEY.

## BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 389,547, dated September 18, 1888.

Application filed January 16, 1886. Serial No. 188,745. (No model.)

*To all whom it may concern:*

Be it known that I, A. LINCOLN COOMBS, of Cliftondale, county of Essex, and State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve that class of button-hole-stitching machines wherein the cloth or other material is carried by a clamp, and the needle-bar, besides reciprocating, is moved laterally to penetrate the material back of the edge of the slit to be stitched and then to descend over the edge, my improvements consisting in providing such class of machines with means whereby the cloth-clamp may be automatically vibrated as the small end of the button-hole slit is reached to be finished, such vibration of the clamp, coupled with the usual motion of the needle, enabling the small end of the slit to be "barred," as it is called, by stitches extended from outside to outside of the stitching covering the side edges of the button-hole slit, and, the barring completed, the machine is automatically stopped.

My invention is herein embodied in connection with a machine having stitch-forming and cloth-clamp-moving scrolls, substantially such as represented in United States Patent No. 123,348, dated February 6, 1872, to which reference may be had.

In accordance with my invention the machine below the bed-plate is provided with a vibrating lever having jointed to it a pawl-carrying slide, upon which is pivoted a pawl which is acted upon by a spring, the normal tendency of the spring being to cause the pawl to engage the teeth of a holding-bar and move it to release a pivoted lever, upon which is mounted a rotating belt-wheel, and let it drop from contact with a friction-pulley fast on the main shaft. The pawl-carrying slide is loosely connected with a slide-bar, one end of which is extended upward through a hole in the bed-plate and placed in such position as to co-operate with a normally-extended arm attached rigidly to the cloth-clamp, the said arm being brought within the range of move-

ment of the said slide-bar as the last side of the button-hole slit is stitched to its end ready to be barred. The inner end of this slide-bar has a finger which controls the time of engagement of the pawl referred to with the holding-bar referred to. The slide-bar is reciprocated uniformly by the vibrating lever while both sides of the slit and its large end are being overstitched; but as soon as the arm of the clamp comes within the range of movement of the slide-bar the latter acts upon the said arm and vibrates the clamp, as will be described, to enable the barring to be done, the number of stitches in the bar being controlled by the number of teeth in the holding-bar, to be described.

The particular features in which my invention consist will be herein described, and specifically pointed out in the claims at the end of this specification.

Figure 1 is a plan view of the bed-plate of a sewing-machine of the kind referred to, the said figure showing the base part of the usual cloth-clamp with my improved arm attached to it, the figure also showing the devices added by me to vibrate the said clamp, as described, and to operate the releasing-bar, the bed-plate being partially broken out to better show some of the devices below it. Fig. 2 is a section of Fig. 1 in the dotted line *xx*. Fig. 3 is a rear end view of a sewing-machine provided with my improvements, to show the driving mechanism employed with it, said driving mechanism not, however, being of my invention. Fig. 4 is an under side view of the slide-bar, the pawl-carrying slide, the pawl, and part of the lever for moving the same; and Fig. 5 is an under side view of the clamp-base.

The bed-plate A, the upright arm A', the main shaft A<sup>3</sup>, the friction-pulley A<sup>4</sup> thereon, the lever D, having the hub 5, the belt-pulley A<sup>5</sup>, mounted on the said hub, the stud D<sup>2</sup>, held by the yoke D', and the upright shaft A<sup>2</sup>, driven from the main shaft A<sup>3</sup> by bevel-gears on each, are shown in Fig. 3; but as the said devices are not of my invention they need not be therein specifically described. The shaft A<sup>2</sup> has fast to it at its lower end the cam C<sup>2</sup>.



The bed-plate A, the cover B, provided with the slot B' to receive the pin 2, carried by the base of the clamp C, and the two scroll-cams B<sup>2</sup> B<sup>4</sup> are common to the patent referred to.

The lever D, (see Fig. 3,) has at one end a foot, D<sup>5</sup>, made as a screw, and therefore adjustable with relation to the said lever, the said foot being adapted to bear upon a holding-bar, 44, kept pressed toward the said holding-bar by a spring, 53.

The lever b<sup>3</sup>, pivoted to the under side of the bed-plate at b<sup>4</sup>, has a central opening within which acts the cam C<sup>2</sup>, secured to the lower end of the upright shaft A<sup>2</sup>, and vibrates the said lever continuously. The lever b<sup>3</sup> has pivoted to its forward end the pawl carrying slide b<sup>5</sup>, the outer end of which is flanged or turned up to form three sides of a box and constitute a guide, b<sup>6</sup>, for the reception of the inner end of the slide-bar c<sup>2</sup>, the latter having a slot, c<sup>3</sup>, which is entered by a screw, c<sup>4</sup>. The pawl-carrier has a pawl, b<sup>7</sup>, pivoted upon it at 12, and a spring, 13, acts on the back of the pawl. The pawl-carrier has a lug, 14, in which is placed an adjusting-screw, 15, the turning of the said screw in or out altering the length of the effective stroke of the said slide-bar to accommodate for the length of the bar-stitch to be made, that depending upon the size of the button-hole and the class of work being done, the end of the said adjusting-screw acting directly against the end of the said slide-bar.

The slide-bar c<sup>2</sup>, near its inner end, is provided with a pawl-controller, 18, made, as herein shown, of wire and secured to the slide-bar by a screw, 19. The slide-bar c<sup>2</sup> is normally held with its end extended through the guide 21 and so as to strike against the arm c<sup>2</sup> as the last side of the button-hole is stitched to its small end. The slot c<sup>3</sup> permits lost motion between the slide-bar and the screw c<sup>4</sup> of the pawl-carrier, and the screw 15 determines how much of this lost motion shall be permitted.

Now, when the pawl-carrier is moved backward or away from the clamp C the screw c<sup>4</sup>, striking one end of the slot c<sup>3</sup>, draws the slide-bar c<sup>2</sup> back with it against the spring 17; but as soon as the direction of movement of the lever b<sup>3</sup> and pawl-carrier is reversed, should the movement of the slide-bar be checked in the least, so as not to respond to the spring 17—as, for instance, by the end of the said slide-bar meeting the arm c<sup>2</sup>—then the pawl-carrier will have a slight movement while the slide-bar c<sup>2</sup> and pawl-controller 18 remain at rest, and as a result thereof the pawl is permitted to turn on its pivot and engage one of the teeth 22 at the edge of the holding-bar 44, and the latter bar will be moved by the pawl b<sup>7</sup> during the remainder of its stroke, and as the pawl so engages the holding-bar the screw 15 strikes the end of the slide-bar, and thereafter for the remaining stroke of the pawl-carrier b<sup>5</sup> and pawl the slide-bar is moved posi-

tively, and, by its outer end against the arm c<sup>2</sup>, vibrates the clamp C for a short distance about its pin 2 and against the stress of the usual spring, h, which carries the roll h'.

The number of teeth at the edge of the holding-bar 44 equals the maximum number of stitches which it is desired to make to finish or bar the end of the button-hole.

The screw 24 in a lug, 25, of the holding-bar 44 may be turned to adjust the position of the bar and its teeth with relation to the pawl b<sup>7</sup>, so that the whole number of teeth may be engaged one after the other by the said pawl; or the bar may be so adjusted that less than the whole number of teeth may be engaged before the end of the said bar 44, outside the bed-plate A, will be withdrawn from below the foot D<sup>5</sup> of the lever D, to thereby permit the spring 53 to turn the said lever on the fulcrum-pin D<sup>2</sup> and cause the removal of the periphery of the pulley A<sup>5</sup> from contact with the periphery of the pulley A<sup>4</sup> and permit the brake-shoe 51, carried by the said lever, to meet the pulley A<sup>4</sup> and stop the rotation of the needle-bar-moving shaft A<sup>3</sup>.

The screw 24 bears against the screw 26, extended through the slot 27 of the holding-bar, and by turning in the said screw 24 the number of teeth 22 which must be engaged by the pawl b<sup>7</sup>, one after the other, before the holding-bar is pulled from under the foot D<sup>5</sup> is lessened. The foot, by its friction on the bar 44, prevents movement of the latter except it is positively drawn by the pawl.

The base C of the clamp will be provided with clamping-jaws and devices substantially such as commonly used in the Union button-hole machines or clamping-jaws substantially such as shown in the patent referred to.

The clamp-base C is made to travel in usual manner against the usual needle throat-piece, n, as a guide and to permit the clamp to be moved laterally when occupying the position shown in Fig. 1 by the action of the slide-bar c<sup>2</sup> against the rigid arm c<sup>2</sup> of the clamp-base. I have provided the under side of the said clamp-base at one side its straight slot with a slide block or plate, n', fitted into the under side of the clamp-base and flush with its under side, the said block or plate having a slot, n<sup>2</sup>, which is entered by a pin, n<sup>3</sup>, in the base.

By means of the block n, the clamp C, when the bar c<sup>2</sup> meets the arm c<sup>2</sup>, as in Fig. 1, is permitted to move laterally at a point opposite the stationary throat-piece attached to the cover B.

I claim—

1. The clamp-base C, provided with the arm or projection, the slide-bar to co-operate with and vibrate the said clamp, its pawl-controller, and the pawl-carrying slide and its pawl, combined with the bar 44, provided with teeth to be engaged by the said pawl, the number of teeth engaged by the pawl determining the number of stitches made in the barring, substantially as described.



2. The clamp-base C, provided with the arm or projection, the slide-bar to co-operate with and vibrate the said clamp, its pawl-controller, and the pawl-carrying slide and its pawl, combined with the holding-bar provided with a series of teeth to be operated by the said pawl and with means to adjust the range of movement of the said holding-bar according to the number of stitches to be made in barring the end of the button-hole, substantially as described.

3. The clamp C, provided with the arm or projection  $e^2$ , the slide-bar slotted to receive the screw  $c^4$ , and the pawl-carrying slide-bar having a pawl and a lug, and screw 15, to operate against the end of the said slide-bar  $C^2$ ,

combined with a lever to move the said pawl-carrying slide-bar, the adjustment of the screw 15 varying the extent of vibration of the clamp, substantially as described.

4. The plate B, its stationary throat, and the clamp-base provided with the loose block or plate  $n'$  and the arm  $e^2$ , combined with the slide-bar and means to reciprocate it to vibrate the clamp, substantially as described.

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

A. LINCOLN COOMBS.

Witnesses:

G. W. GREGORY,  
F. CUTTER.