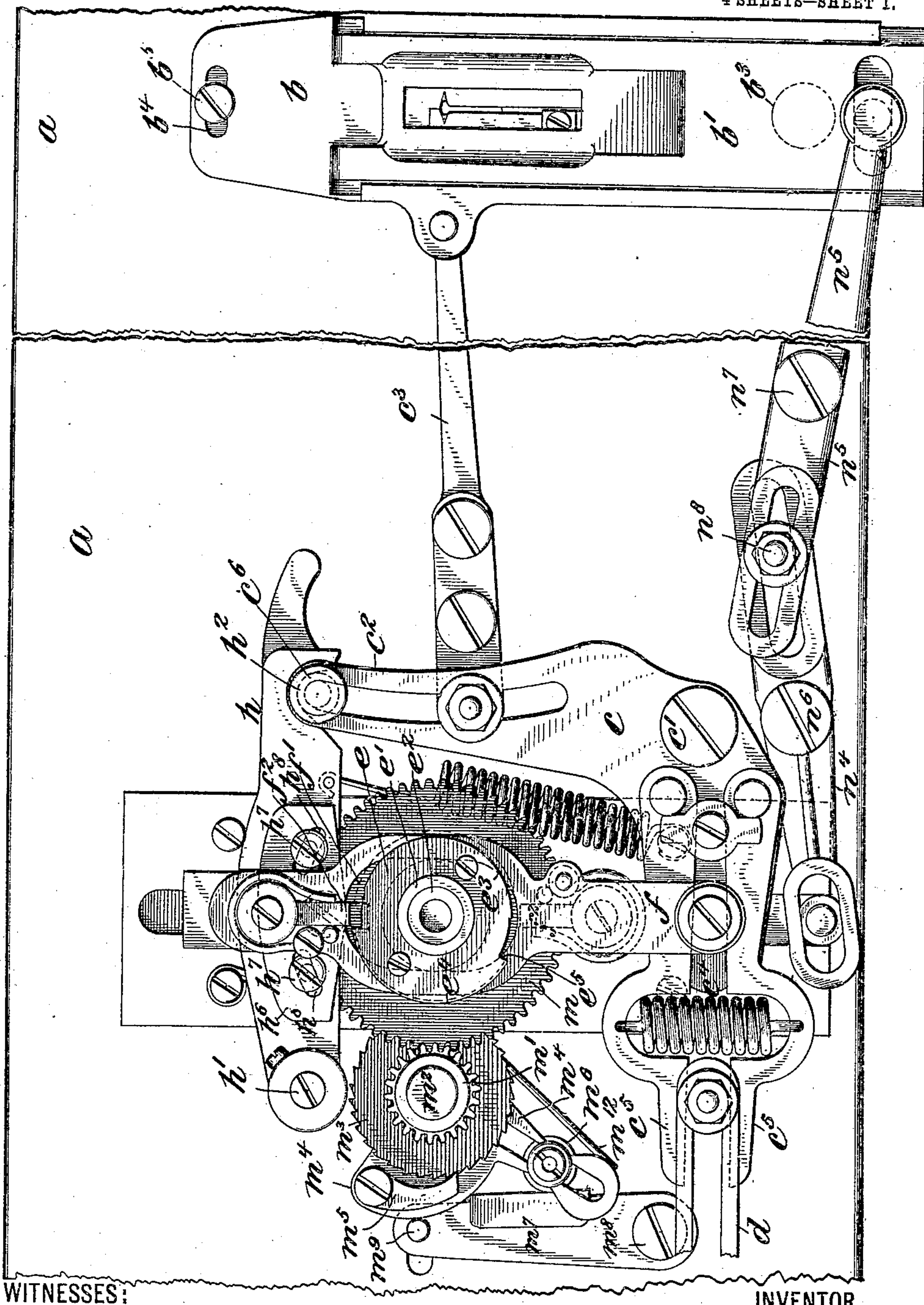


908,303.

D. MILLS.  
BUTTONHOLE SEWING MACHINE.  
APPLICATION FILED NOV. 9, 1896.

Patented Dec. 29, 1908.  
4 SHEETS—SHEET 1.

Fig. 1.



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INVENTOR

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4 SHEETS—SHEET 2.

Fig. 3.

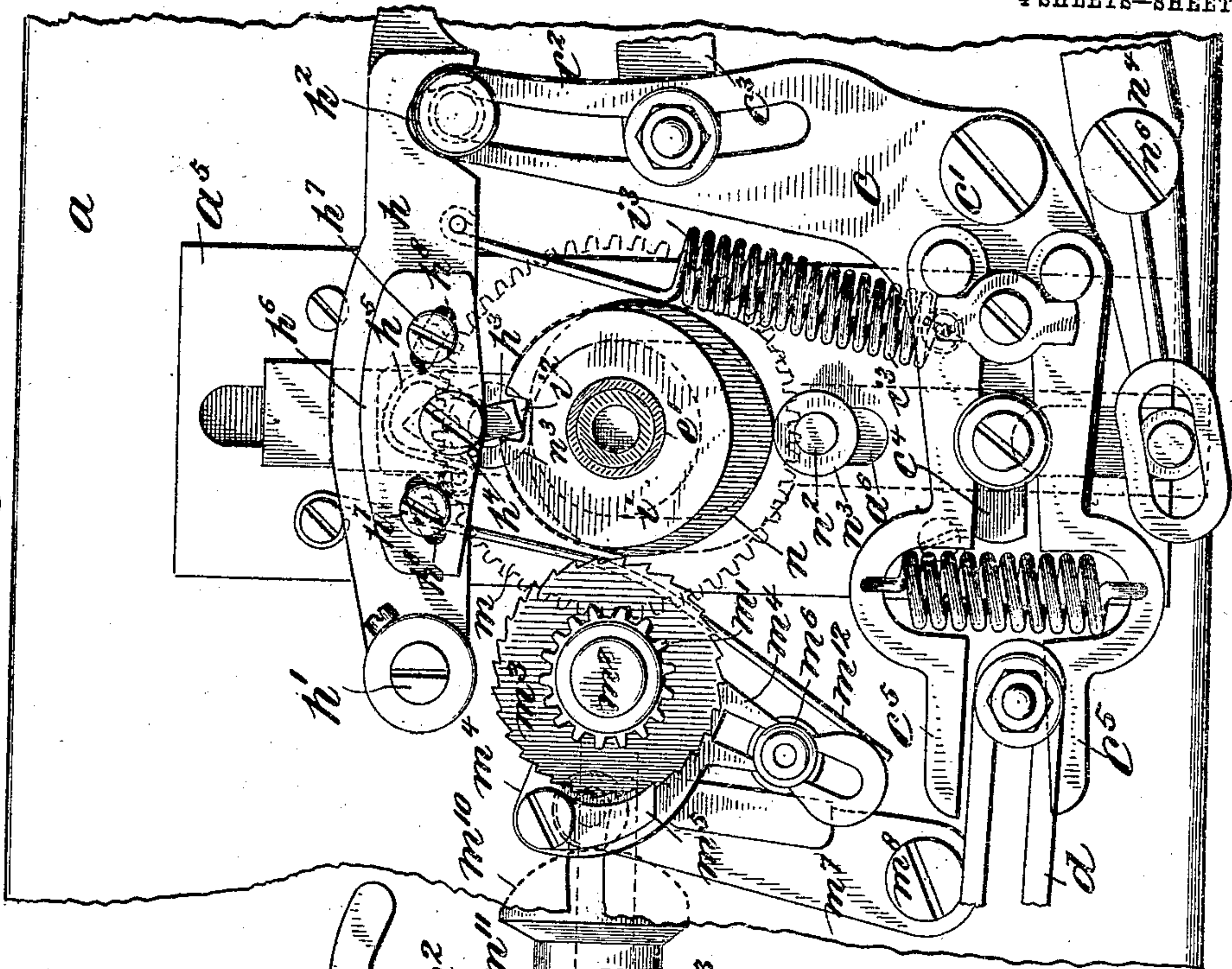
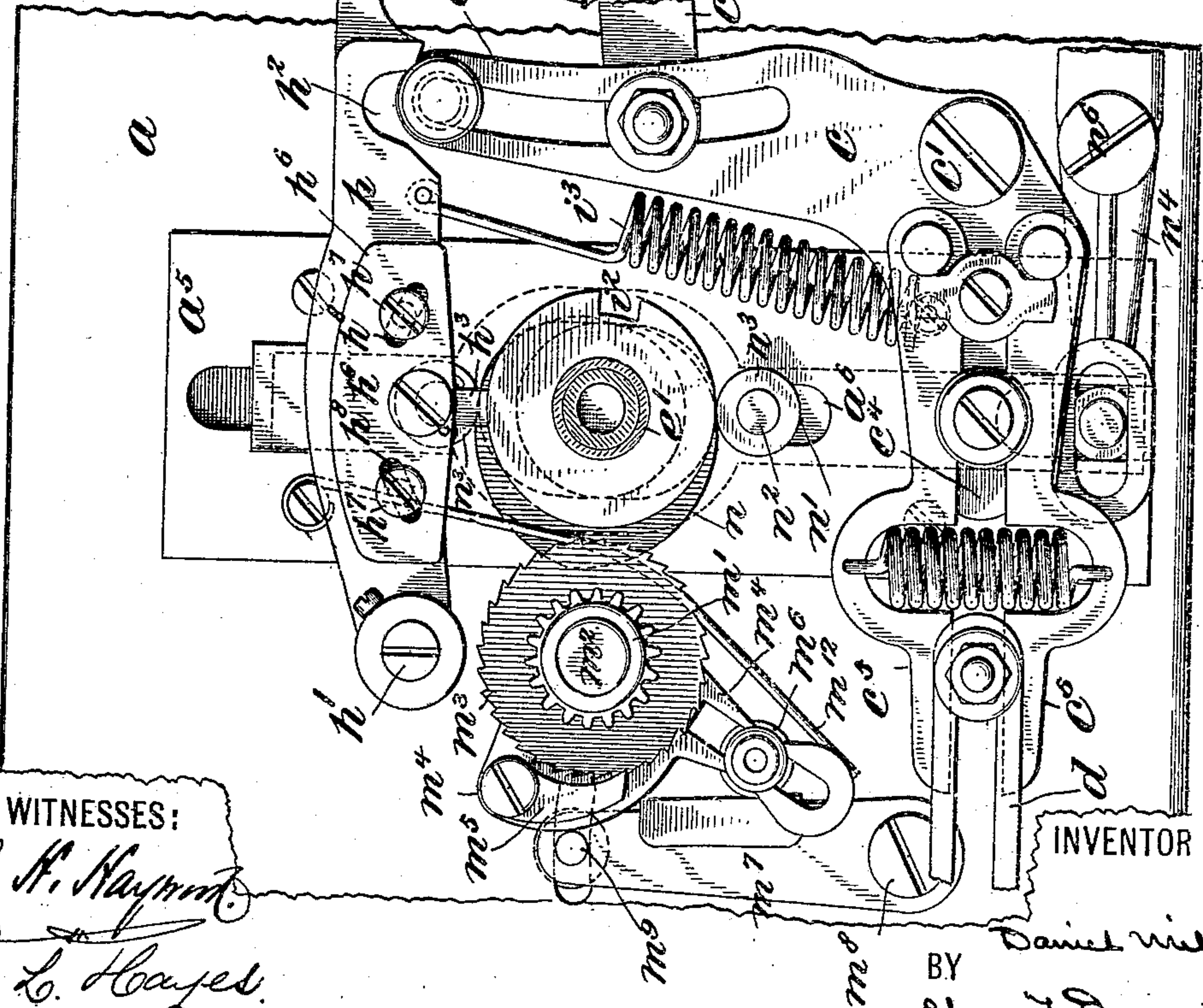


Fig. 4.



WITNESSES:

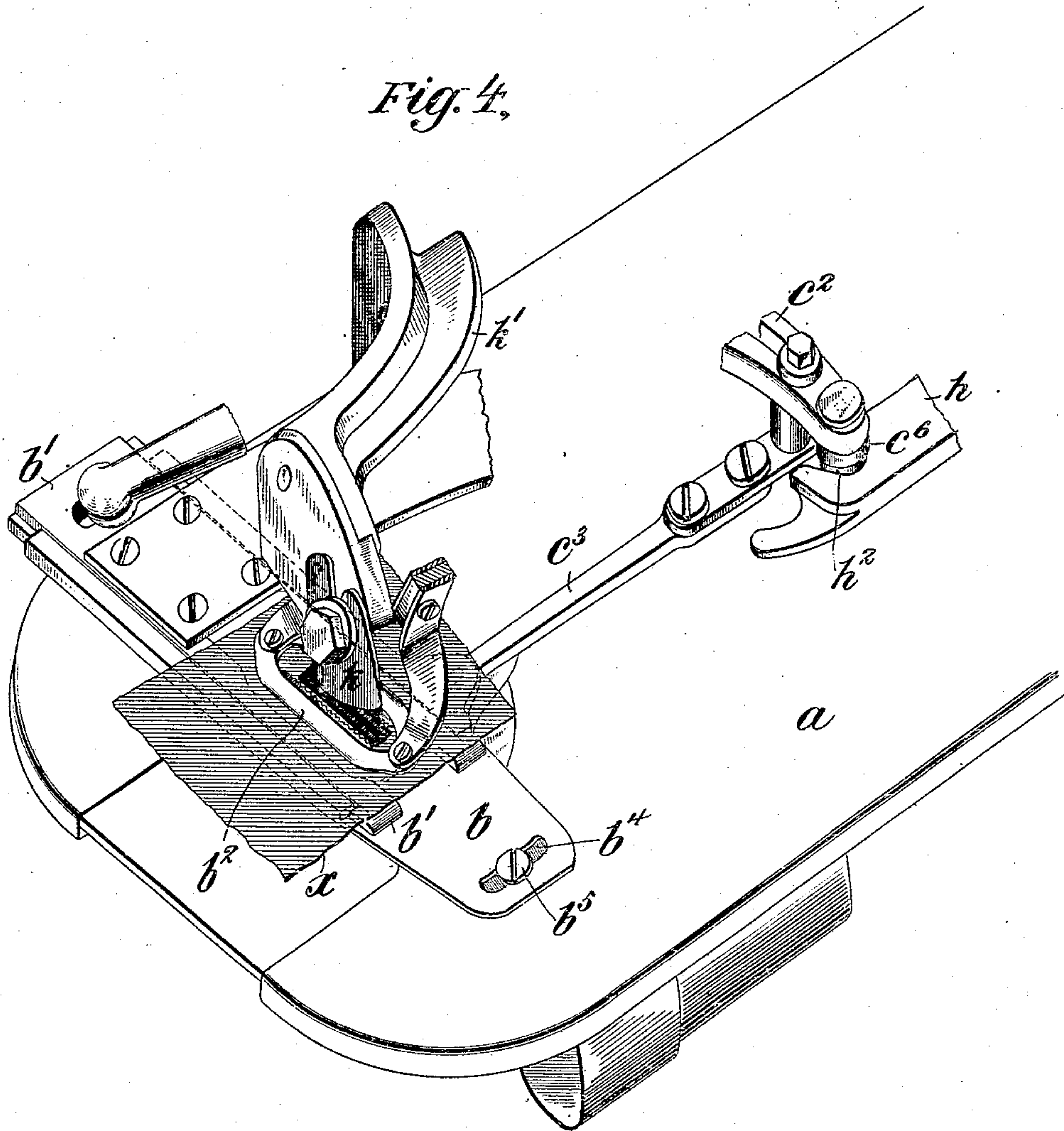
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*Fig. 4.*



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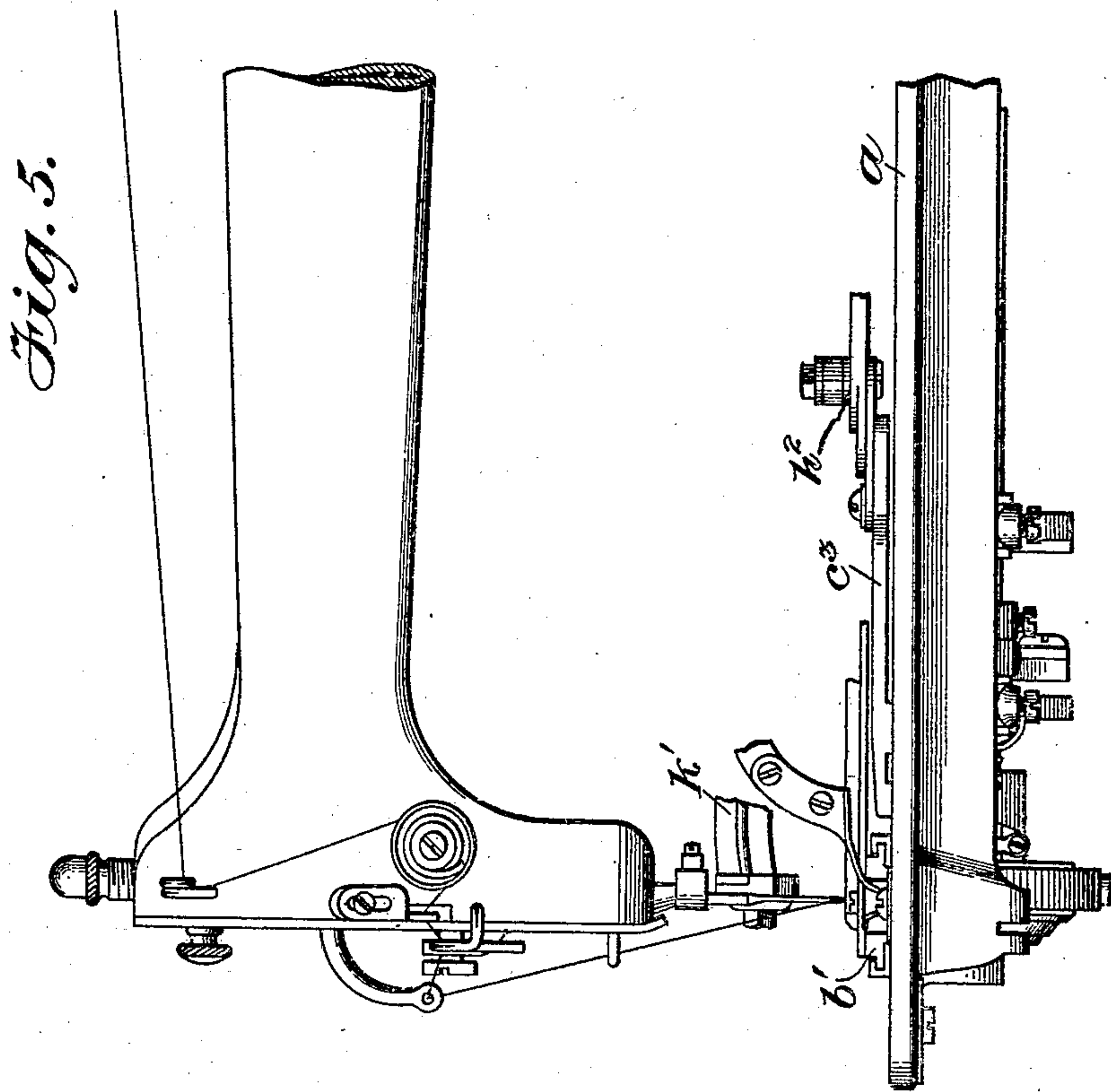
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# UNITED STATES PATENT OFFICE.

DANIEL MILLS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE STANDARD SEWING MACHINE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

## BUTTONHOLE-SEWING MACHINE.

No. 908,303.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed November 9, 1896. Serial No. 611,436.

*To all whom it may concern:*

Be it known that I, DANIEL MILLS, a citizen of the United States, residing in the city of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Buttonhole-Sewing Machines, of which the following description, taken in connection with the accompanying drawings, is a specification.

My present invention relates to mechanism for sewing and cutting button holes.

A mechanism embodying one practical form of my invention is illustrated in the accompanying drawings as being mounted directly upon a sewing machine so as to form a permanent part of the same, but it will be obvious, as will hereinafter appear, that the mechanism may be in the form of an attachment for connection with a machine, if so desired, without departure from my invention.

Heretofore, it has been the usual practice in this class of machines when cutting button holes with automatic cutting mechanism, to perform the cutting operation at a time when the machine is in action and usually at a few stitches before the completion of the hole. The cutting operation is performed at such time, for the reason that the middle or cutting line of the button hole will be presented or located immediately beneath the cutter at one end of each to and fro movement of the work-clamp when the latter is being moved lengthwise of the button-hole, but after the work-clamp has been moved to have the end of the button-hole stitched, either around or in a barred form, the middle or cutting line is then lost and the machine, when brought to a state of rest, would not leave the button-hole with its middle line in cutting position.

One of the principal objects of my present invention is to avoid the necessity of cutting the button-hole before the same is entirely completed as above stated, and enable the same to be cut at the will of the operator after the hole has been completely finished. This object I accomplish by providing automatically operating means for acting in combination with the work-clamp feeding mechanism, to arrest the work-clamp upon the completion of the sewing of a button-hole and hold the same in a position with the mid-

dle of the hole in proper position relative to the cutter to be cut.

Other objects and distinguishing features of my invention will be hereinafter set forth.

Referring to the drawings, Figure 1, represents a plan view of a portion of the bed-plate of a button-hole sewing machine, illustrating a part of the button-hole feeding mechanism, with my invention applied thereto. Figs. 2 and 3, represent plan views of a part of the mechanism shown in Fig. 1, with certain parts thereof removed, showing the relative positions of the parts at different times in the operation of the same, as will be hereinafter referred to, and Fig. 4, represents a perspective view of a portion of the bed-plate, work-clamp and its operating and locking mechanism, and a cutter, showing the work-clamp locked with a finished button-hole in cutting position, and the cutter in the act of cutting the hole. Fig. 5 is a fragmentary side elevation of the complete machine.

To explain in detail—*a* represents a portion of the bed-plate of an ordinary sewing machine. As herein illustrated, I have located a vibrator-plate *b* upon the bed-plate *a* adjacent to the front end thereof, upon which vibrator-plate the work-clamp is adapted to be supported and operated to properly guide the work held thereby relative to the stitching mechanism of the sewing machine for the sewing of a button-hole. The work-clamp may be of any suitable form or construction to properly hold and guide the work, but the same, as herein shown, consists of a lower plate *b'* which is supported to slide upon the plate *b* between the under-cut side walls thereof, and an upper plate *b''* which is supported to have a normal downward pressure, by means not herein shown, upon the lower plate *b'* so as to clamp and hold the work *x* interposed between the same.

The particular feeding mechanism as herein illustrated for giving the work-clamp its necessary longitudinal and vibratory movement to secure the proper stitching of the button-hole, is also fully illustrated and described in Letters Patent No. 783,060, granted to me February 21, 1905, and therefore the particular construction of such part of the mechanism herein does not form a



part of my invention as embodied in this application.

The vibrator-plate *b* is pivotally supported adjacent to one end thereof, at *b*<sup>3</sup>, upon the  
 5 bed-plate *a*, and at its opposite end is provided with an elongated slot *b*<sup>4</sup> to receive a headed screw *b*<sup>5</sup> by which latter the plate is guided and held from vertical movement upon the bed-plate. The mechanism for  
 10 operating this vibrator-plate *b* to give the work-clamp thereon its transverse or to and fro movement, consists of a vibrating elbow-lever *c* which is pivotally supported at *c*<sup>1</sup> upon a suitable bearing on the bed-plate *a*,  
 15 with one arm *c*<sup>2</sup> thereof having connection with the vibrator plate *b* through the medium of a connecting pitman *c*<sup>3</sup>, and its other arm *c*<sup>4</sup> being provided with two pivoted spring-controlled arms *c*<sup>5</sup>, *c*<sup>5</sup>, secured  
 20 thereon, which latter serve as an adjustable medium of connection between the lever *c* and its actuating lever *d*, so as to allow for the different lengths of vibration of the lever *c* as required for stitching the sides,  
 25 and barring the ends, of the button-hole, which variation of movement of the lever *c* and the connecting work-clamp is regulated by the former cams *e* as well understood by those skilled in the art. The actuating  
 30 lever *d*, only one end of which is herein shown, is adapted to be supported upon the arm of the machine and be operated from the upper driving shaft in a manner as clearly shown in my aforesaid Patent No.  
 35 783,060. For the purposes of my present invention however, any suitable means may be employed for operating the lever *c* to communicate a vibrating movement thereto.

The former cams *e*, (only one of which is  
 40 herein shown as they are both of like form and placed one above the other) are mounted upon a sleeve *e*<sup>1</sup> which is loosely supported to revolve about a vertical fixed stud *e*<sup>2</sup> located upon the bed-plate of the machine.  
 45 These former cams are in two concentric diameters, one portion being in one radius *e*<sup>3</sup> and the other portion in another radius *e*<sup>4</sup>, the two portions being united by a step *e*<sup>5</sup>. A slotted bar or yoke *f*, termed the former  
 50 yoke, is connected at one end thereof with the lever *c* and adjacent to its opposite end is provided with an elongated slot *f*<sup>1</sup> therein so as to embrace the said stud *e*<sup>2</sup> upon the bed-plate of the machine and be capable of  
 55 a longitudinal sliding movement relative thereto when operated by the lever *c*. This former-yoke is provided with two stop-fingers *f*<sup>2</sup>, *f*<sup>2</sup>, pivotally secured at one end thereto upon its upper and lower sides  
 60 respectively, and at opposite sides of the former cams, with their free ends extending in a normal laterally movable position in a direction in line with each other and across the axis of rotation of the former cams.  
 65 These stop-fingers alternately engage with

the former cams as the yoke *f* is reciprocated by the lever *c*, and, by reason of the shape of the former cams, control the vibrations of the work-clamp whereby the work will be properly presented to the stitching  
 70 mechanism of the machine for the sewing of the sides and ends of the button-hole as well understood by those skilled in the art. As to whether the end of the button-hole is rounded or barred depends upon the shape  
 75 of the former cams. One of the latter may be dispensed with if so desired, and only one be employed without departure from my invention.

According to my present invention, I have  
 80 provided an automatically operating stop-lever *h* for engaging with the vibrating lever *c* to arrest the movement of the same and thereby the connected work-clamp, at a  
 85 time when the button-hole has been completed and while the middle or cutting line of the button-hole is in cutting position immediately beneath the cutter device, and hold the work-clamp in such position until released by the operator after the hole has been  
 90 cut. The means for controlling this stop-lever *h* whereby it will be held in a position away from engagement with the lever *c* during the sewing of a button hole, and automatically engage with the same upon the  
 95 completion of a button-hole to hold the latter in cutting position, is as follows: The lever *h*, as herein shown, is pivotally secured at one end upon the bed-plate at *h*<sup>1</sup>, and adjacent to its opposite end is provided with a  
 100 notch or opening *h*<sup>2</sup> in one side thereof, which is adapted to receive a fixed stud *c*<sup>6</sup> located on the outer end of the arm *c*<sup>2</sup> of the lever *c*, as will be described. Upon the sleeve *e*<sup>1</sup> which carries the former cams, is secured a cam or disk *i* as shown in Figs. 2 and  
 105 3, (in which views the former cams and former yoke are omitted so as to show the parts located beneath the same) which is circular in form and provided with a notch *i*<sup>2</sup> in its periphery. During the sewing of a button-hole, this cam, which moves in unison with the former cams, is adapted to engage with the end of the finger *h*<sup>3</sup> secured upon the lever *h* and hold the latter in a position away  
 110 from engagement with the lever *c*, as clearly shown in Fig. 2, so as to leave said latter lever free to vibrate as described, but the said notch *i*<sup>2</sup> in the cam *i* is so timed relative to the several operating parts, that the instant  
 120 the stitching of a button-hole is completed, said notch will have been moved to a position to receive the finger *h*<sup>3</sup> on the lever *h* therein and so allow said lever to be moved into locking engagement with the lever *c* by  
 125 receiving the stud *c*<sup>6</sup> thereon into its opening *h*<sup>2</sup>, as shown in Figs. 1, 3 and 4. The finger *h*<sup>3</sup>, as herein illustrated, is secured upon a plate *h*<sup>6</sup> which is adjustably secured upon the lever *h* by means of two set-screws *h*<sup>7</sup>, *h*<sup>7</sup>,  
 130



which latter pass through elongated slots  $h^8$ ,  $h^8$ , in the plate  $h^6$  into the lever  $h$ . Said slots  $h^8$  are formed in the arc of a circle described from the axis of the cam  $i$  so that the  
 5 said plate  $h^6$  may be adjusted upon the lever  $h$  in a direction as allowed by the form of the slots  $h^8$  therein. Such adjustment of the plate  $h^6$  upon the lever  $h$  enables the position of the finger  $h^3$  to be adjusted so as to enter  
 10 the notch  $i^2$  in the disk  $i$  sooner or later to cause the work-clamp mechanism to be locked from movement as described, and thereby allow a greater or less number of stitches to be made at the end of a button-  
 15 hole as will be understood. In lieu of attaching the finger  $h^3$  upon the plate  $h^6$  and adjustably securing the latter upon the lever  $h$  as described, it will be obvious that the same result or adjustment of the finger  $h^3$   
 20 may be obtained by providing the lever  $h$  with a curved slot therein and securing said finger  $h^3$  directly to the lever  $h$  within the slot therein.

The stop-lever  $h$  is held in a normally yielding position with the finger  $h^2$  bearing against the cam  $i$ , so that said finger will be moved into the notch  $i^2$  as soon as the latter has been moved to a position to receive the same, by means of a spring  $i^3$  which, as herein  
 30 shown, is connected at one end therewith and at its opposite end secured to a suitable fixed support. This spring  $i^3$  after moving the lever  $h$  into locking engagement with the lever  $c$ , also movably holds the same in such  
 35 position.

The opening  $h^2$  in the stop lever  $h$ , as herein illustrated, is formed with outwardly diverging side walls as shown, which are adapted, in case the middle or cutting line of the  
 40 button-hole is not in cutting position immediately below the cutter when the lever  $h$  moves into engagement with the stud on the lever  $c$ , to direct the said stud  $c^6$  towards the center of the opening  $h^2$  as in Figs. 1 and 4.  
 45 When the stud  $c^6$  has been moved or drawn to such position at the center of the opening  $h^2$ , the work-clamp will have been moved therewith to locate the button-hole with its middle or cutting line in cutting position beneath the cutter  $k$  as clearly shown in Fig. 4, which view illustrates the finished button-  
 50 hole with the cutter in position beginning to cut the same. By this construction, it will be understood that the button-hole may be  
 55 cut after the hole has been completely finished and the machine ceased running.

Any suitable form of cutting device may be employed for cutting the button-hole after it has been located and held in cutting position  
 60 as described, the device as herein shown, consisting of a lever  $k'$  having a hinged connection at one end on a shaft (not herein shown) mounted in suitable bearings on the under side of the bed-plate, and at its oppo-  
 65 site end carrying the cutter  $k$  as shown.

The construction and operation of this particular form of cutting device is clearly illustrated and described in another application of mine now pending, bearing Serial Number 599,804.

The revolving sleeve  $e'$  upon which the former cams and the stop cam  $i$  are secured, is operated, as herein shown, by the same mechanism as illustrated and described in my aforesaid Patent No. 783,060, which is as  
 75 follows: A gear  $m$  is fixedly secured upon the cam carrying sleeve  $e'$  and meshes with a second gear  $m'$ , which latter is loosely mounted to rotate on a stud  $m^2$  projecting from the bed-plate of the machine and is connected  
 80 with a ratchet disk  $m^3$ , also mounted upon said stud, so as to rotate therewith. A lever  $m^4$ , loosely hinged or pivoted upon the stud  $m^2$  and provided with a pawl  $m^5$  for engaging with the ratchet  $m^3$ , is provided with a stud  
 85  $m^6$  projecting its under side in a position to engage with one end of an operating lever  $m^7$ , which latter is pivoted at one end upon the bed-plate at  $m^8$  and at its opposite end provided with a stud  $m^9$  projecting downward  
 90 through an opening in the bed-plate to a position where it is engaged by a cam  $m^{10}$  located on the lower driving shaft  $m^{11}$  of the machine. A spring  $m^{12}$  acting upon the lever  $m^4$  holds the same in operative engage-  
 95 ment with the rotating cam  $m^{10}$ . By this arrangement of parts, it will be understood that as the lever  $m^7$  is vibrated by the rotating cam  $m^{10}$ , the lever  $m^7$  will also be vibrated thereby and cause the pawl  $m^5$  to engage  
 100 with the ratchet  $m^3$  and give the same a partial rotation and then recede to engage with a preceding tooth of said ratchet. The ratchet  $m^3$  being thus rotated, communicates a like movement to the sleeve  $e'$  and  
 105 the cams secured thereon, through the gears  $m$  and  $m'$ .

The mechanism for operating the work-clamp to give the same its longitudinal movement upon the vibrator plate  $b$ , and in  
 110 a direction lengthwise of the button-hole, may be of any suitable construction, the same as herein shown, consisting of a heart-cam  $n$  secured upon the sleeve  $e'$  to be rotated therewith, and a bar  $n'$  supported to  
 115 slide upon the bed-plate beneath a plate  $a^5$  secured thereon, and provided with studs  $n^2$ ,  $n^2$ , projecting through elongated openings  $a^6$ ,  $a^6$ , in said plate, which studs are provided with anti-friction rolls  $n^3$ ,  $n^3$ , thereon for en-  
 120 gaging with the opposite sides of the heart-cam, whereby the slide bar  $n'$  will be operated and controlled by the heart cam to move longitudinally forward and backward and thereby give the work-clamp its longitudinal  
 125 movement through the medium of connecting levers  $n^4$  and  $n^5$ . These levers  $n^4$  and  $n^5$  are pivotally connected upon the bed-plate at  $n^6$  and  $n^7$  with their outer ends connecting with the slide-bar  $n'$  and the work-clamp  
 130



plate *b'* respectively, and their inner ends connecting with each other through the medium of a pivot-stud *n*<sup>8</sup>.

Another important feature of my invention consists in the means whereby I am enabled to operate the stitching mechanism of the machine at the completion of a button-hole, while the button-hole feeding mechanism remains inoperative, so as to fasten the thread or stitches at the end of the button-hole. This I accomplish as follows: At the completion of a button-hole and after the work-clamp has become locked from movement with the button-hole in cutting position, by the engagement of the stop lever *h* with the lever *c* as before described, it will be understood that a continued action of the machine would also cause the former and feed cams to continue to operate and cause damage to the mechanism if some provision was not made to prevent the same. In order to prevent an operative movement of the sleeve *e'* with the several cams thereon and at the same time allow the stitching mechanism to be operated to fasten the stitches, I have pivotally secured the finger *h*<sup>3</sup> at one end upon the stop-lever *h* with its free end held in a yielding laterally stationary position as shown in Fig. 2, by means of a stop-pin *h*<sup>4</sup> located upon the plate *h*<sup>6</sup> and a spring *h*<sup>5</sup>, as shown by dotted lines in Fig. 3; the said spring acting against one side of the finger *h*<sup>3</sup> so as to hold it against said stop-pin *h*<sup>4</sup>. By this arrangement of the parts, it will be understood that after the lever *c* and thereby the cloth-clamp has become locked from movement by the engagement with said lever of the lever *h*, a continued action of the machine will cause the cam *m*<sup>10</sup> on its lower shaft to give the sleeve *e'* with the several cams thereon a partial revolution, and push the engaging end of the finger *h*<sup>3</sup> sidewise against the pressure of the spring *h*<sup>5</sup> as shown in Fig. 3. When the parts have been thus moved to their limit as shown by the cam *m*<sup>10</sup>, the cam *i* with the sleeve *e'* and several connected parts are rotated backwards a like distance under the action of the spring *h*<sup>5</sup>. A slight forward and backward movement of the sleeve *e'* and supported cams is thus caused by the continued operation of the machine, while the work-clamp remains substantially stationary. The operator is thus enabled to operate the machine at the completion of a button-hole and by entering the needle in the same place for two or three stitches will form a knotted finish of the stitching. The advantage of this will be obvious.

Having thus set forth my invention as embodied in one practical form, I do not wish to be understood as confining myself to the particular construction or arrangement of the several parts as herein illustrated and described, as it will be obvious that the same

may be more or less materially modified without departure from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder and its feeding mechanism, and a button-hole cutter, of means, operating independently of the action of the stitch-forming mechanism, for automatically arresting the movement of the work-holder at a predetermined time and holding said work-holder stationary with the button-hole in cutting position relatively to the button-hole cutter, for the purpose set forth.

2. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder and its feeding mechanism, and a button-hole cutter, of means, operating independently of the action of the stitch-forming mechanism, controlled by the work-holder feeding mechanism for automatically arresting the movement of the work-holder at a predetermined time and holding said work-holder stationary with the button-hole in cutting position relatively to the button-hole cutter, for the purpose set forth.

3. In a button-hole sewing machine, the combination, with the stitch forming mechanism, the work-holder, the work-holder feeding mechanism including a movable part, and a button-hole cutter, of means operating independently of the action of the stitch-forming mechanism for automatically engaging said movable part of the feeding mechanism at a predetermined time and thereby arresting the movement of the work-holder and holding the same stationary with the button-hole in cutting position relatively to the button-hole cutter, for the purpose set forth.

4. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism including a vibratory part, and a button-hole cutter, of means operating independently of the action of the stitch-forming mechanism for automatically engaging said vibratory part of the feeding mechanism at a predetermined time and thereby arresting the movement of the work-holder and holding the same stationary with the button-hole in cutting position relatively to the button-hole cutter, for the purpose set forth.

5. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism including a movable part, and a button-hole cutter, of a work-holder stop device having means for locking engagement with said movable part of the feeding mechanism, and means operative for



maintaining said stop device inoperative during the sewing of a button-hole and causing locking engagement of the same with said movable part of the feeding mechanism upon the completion of the button-hole, for the purpose set forth.

6. In a button-hole sewing machine, the combination, with a stitch-forming mechanism, the work-holder, the work-holder feeding mechanism including a movable part, and a button-hole cutter, of a work-holder stop device having means for locking engagement with said movable part of the feeding mechanism, and means coöperative with the feeding mechanism for maintaining said stop device inoperative during the sewing of the button-hole and causing locking engagement of the same with said movable part of the feeding mechanism upon the completion of the button-hole, for the purpose set forth.

7. In a button-hole sewing machine, the combination, with a stitch-forming mechanism, the work-holder, the work-holder feeding mechanism including a movable part, and a button-hole cutter, of a pivoted work-holder stop device having means for locking engagement with said movable part of the feeding mechanism, and means coöperative with the feeding mechanism for maintaining said stop device inoperative during the sewing of the button-hole and causing locking engagement of the same with said movable part of the feeding mechanism upon the completion of the button-hole, for the purpose set forth.

8. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism including a movable part, and a button-hole cutter, of a work-holder stop device having means for locking engagement with said movable part of the feeding mechanism, the said stop device and the said movable part being provided one with a notch having diverging walls and the other with a part for entering said notch, and means operative for maintaining said stop device inoperative during the sewing of a button-hole and causing locking engagement of the same with said movable part of the feeding mechanism upon the completion of the button-hole, for the purpose set forth.

9. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism including a movable part, and a button-hole cutter, of a work-holder stop device having means for locking engagement with said movable part of the feeding mechanism, and means including a cam for maintaining said stop device inoperative during the sewing of a button-hole and causing locking engagement of the same with said movable part of the feeding mechanism upon

the completion of the button-hole, for the purpose set forth.

10. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism including a movable part, and a button-hole cutter, of a work-holder stop device having means for locking engagement with said movable part of the feeding mechanism, and means including a cam and a spring for maintaining said stop device inoperative during the sewing of a button-hole and causing locking engagement of the same with said movable part of the feeding mechanism upon the completion of the button-hole, for the purpose set forth.

11. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, and the work-holder feeding mechanism, of means operative to automatically arrest the movement of the work-holder upon the completion of a button-hole, and means coöperative with said feeding mechanism to prevent movement of the work-holder while the stitching mechanism continues to be operated, for the purpose set forth.

12. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism, and a button-hole cutter, of means operative to automatically arrest the movement of the work-holder upon the completion of a button-hole and hold the same with the button-hole in cutting position relatively to the cutter, and means coöperative with said feeding mechanism to prevent movement of the work-holder while the stitching mechanism continues to be operated, for the purpose set forth.

13. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism, and a button-hole cutter, of means operative to automatically arrest the movement of the work-holder upon the completion of a button-hole and hold the same with the button-hole in cutting position relatively to the cutter, and means including a yieldingly-held part coöperative with said feeding mechanism to prevent movement of the work-holder while the stitching mechanism continues to be operated, for the purpose set forth.

14. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism, and a button-hole cutter, of means operative to automatically arrest the movement of the work-holder upon the completion of a button-hole and hold the same with the button-hole in cutting position relatively to the cutter, and means including a rotary cam and a yieldingly-held part co-



operative with said feeding mechanism to prevent movement of the work-holder while the stitching mechanism continues to be operated, for the purpose set forth.

5 15. In a button-hole sewing machine, the combination with the stitch-forming mechanism, the work-holder, the work-holder feeding mechanism, and a button-hole cutter, of means, operating independently of the  
10 action of the stitch-forming mechanism, for automatically arresting the movement of the work-holder at a predetermined time and holding said work-holder stationary with the  
15 button-hole in cutting position relative to the button-hole cutter, and adjusting means for regulating the time of stopping of the work-holder by said stopping or arresting means, for the purpose set forth.

20 16. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, a work-holder, feeding mechanism for said work-holder, and a button-hole cutter, of a pivoted stop lever, and means for operating said lever independent of the action  
25 of the stitching mechanism whereby it will automatically arrest the movement of the work-holder at the completion of a button-hole and with the latter in cutting position relative to said cutter.

30 17. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, a work-holder, mechanism for operating said work-holder embodying a pivoted vibrating lever, and a button hole cutter,  
35 of a stop device, and means operating independently of the action of the stitch-forming mechanism for automatically operating said stop device whereby the same will engage with the vibrating lever at the completion  
40 of a button hole and arrest the movement of the connected work-holder with the button hole in cutting position relative to the cutter.

45 18. In a button-hole sewing machine, the combination with the work-holder or clamp, mechanism for operating said work-holder embodying a pivoted vibrating lever as a part thereof, and a button-hole cutter, of a stop-device, consisting of a pivoted lever having means for locking engagement with said  
50 vibrating lever, and means operating in combination with said operating mechanism for holding the stop-device out of locking engagement with the vibrating lever during the sewing of a button-hole, and moving  
55 the same into locking engagement therewith upon the completion of the button-hole.

60 19. In a button-hole sewing machine, the combination with the work-holder, feeding mechanism for moving said work-holder embodying a pivoted vibrating lever as a part thereof, and a button-hole cutter, of a movable stop-device having a notch therein to receive a projection upon said vibrating lever, the said notch being formed with diverging walls, means for holding said stop-  
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device away from engagement with the vibrating lever during the sewing of a button-hole, and means for moving the stop-device into engagement with said vibrating lever upon the completion of the button-hole, for  
70 the purpose set forth.

20. The combination in a button-hole sewing machine, with the work-holder, mechanism for operating said work-holder, and a button-hole cutter, of a movable stop-  
75 device for engaging with a part of said operating mechanism upon the completion of a button-hole, to arrest the movement of the work-holder with the button-hole in cutting position, a revolving cam for holding the  
80 stop-device away from engagement with a connecting part during the sewing of a button-hole, and means for moving said stop-device into position to arrest the movement of the work-holder upon the comple-  
85 tion of a button-hole, for the purpose set forth.

21. In a button-hole sewing machine, the combination with the work-holder, mechanism for operating said work-holder embodying a revolving former-cam and a vibrating  
90 lever, and a button-hole cutter, of a movable stop-device having means for locking engagement with said pivoted lever, a revolving cam operating with said former-  
95 cam and holding the stop-device away from engagement with said vibrating lever during the sewing of a button-hole, and means for moving the stop-device into locking engagement with said vibrating lever upon the  
100 completion of a button-hole, substantially as and for the purpose set forth.

22. In a button-hole sewing machine, the combination with the work-holder, mechanism for operating said work-holder embodying a revolving former-cam and a pivoted vibrating lever, the latter having a pitman connection with the work-holder, and a vertically operating button-hole cutter supported above the work-holder, of a movable stop-device having means for locking  
105 engagement with said vibrating lever, a cam operating with said former-cam for holding the stop-device away from engagement with said vibrating lever during the sewing of a  
110 button-hole, and a spring for moving the stop-device into locking engagement with said vibrating lever upon the completion of a button-hole, whereby the latter will be held in cutting position relative to said cut-  
115 ter, substantially as and for the purpose set forth.

23. In a button-hole sewing machine, the combination, with the stitching mechanism, a work-holder, and feeding mechanism for  
125 communicating a longitudinal and vibratory movement to said work-holder, of means operating in combination with said feeding mechanism to arrest the vibrating movement of the work-holder upon the comple-  
130



tion of a button-hole, and means for acting upon the said feeding mechanism to prevent the same from moving the work-holder while the stitching mechanism continues to be operated, for the purpose set forth.

24. In a button-hole sewing machine, the combination, with the stitching mechanism, the work-holder, mechanism for communicating a vibrating movement to the work-holder including a vibrating lever, and mechanism for communicating a longitudinal movement to said work-holder, including a revolving sleeve having a cam thereon, connections between said cam and the work-holder, and connections between said cam and the driving shaft of the machine, of a disk or cam having a notch therein secured upon said revolving sleeve, a movable stop-device having means for locking engagement with the said vibrating lever of the feeding mechanism, a pivoted spring-controlled finger for engaging with the said notched disk, and means for acting upon said stop-device at the completion of a button-hole, whereby it will be moved into locking engagement with the said vibrating lever, and the spring-controlled finger thereon be entered into the notch of said revolving disk, substantially as described and for the purpose set forth.

25. In a button-hole sewing machine, the combination with the stitch-forming mechanism, a work-clamp, and feeding mechanism for said work-clamp, of means for acting in combination with said feeding mechanism to automatically stop or arrest the movement of the same at the completion of a button-hole independent of the action of the stitching mechanism, and means whereby the said feeding mechanism may be caused to stop at different pre-determined times, for the purpose set forth.

26. In a button-hole sewing machine, the combination, with the work-holder and its feeding mechanism, of a stop-device, means for operating said stop-device whereby it will act in combination with the feeding mechanism to automatically arrest the movement of the work-holder at the completion of a button-hole, and means whereby the time of movement of the stop-device may be regulated, for the purpose set forth.

27. In a button-hole sewing machine, the combination, with the work-holder and its operating or feeding mechanism, of means operating in combination with said feeding mechanism to automatically arrest the movement of the same at the completion of a button-hole, consisting of a movable stop-device for engaging with a part of said feeding mechanism, provided with an adjustable finger supported thereon, and a revolving cam for regulating the position and movement of said stop-device through the medium of the adjustable finger thereon, for the purpose set forth.

28. In a button-hole sewing machine, the combination, with the stitch-forming mechanism, a work-holder, and mechanism for operating said work-holder, of means, operating independent of the action of the stitch-forming mechanism, for automatically arresting the movement of the work-holder upon the completion of a button-hole and preventing operative movement of the same while the stitching mechanism continues to be operated to fasten the thread at the end of the hole.

DANL. MILLS.

Witnesses:

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