

(Model.)

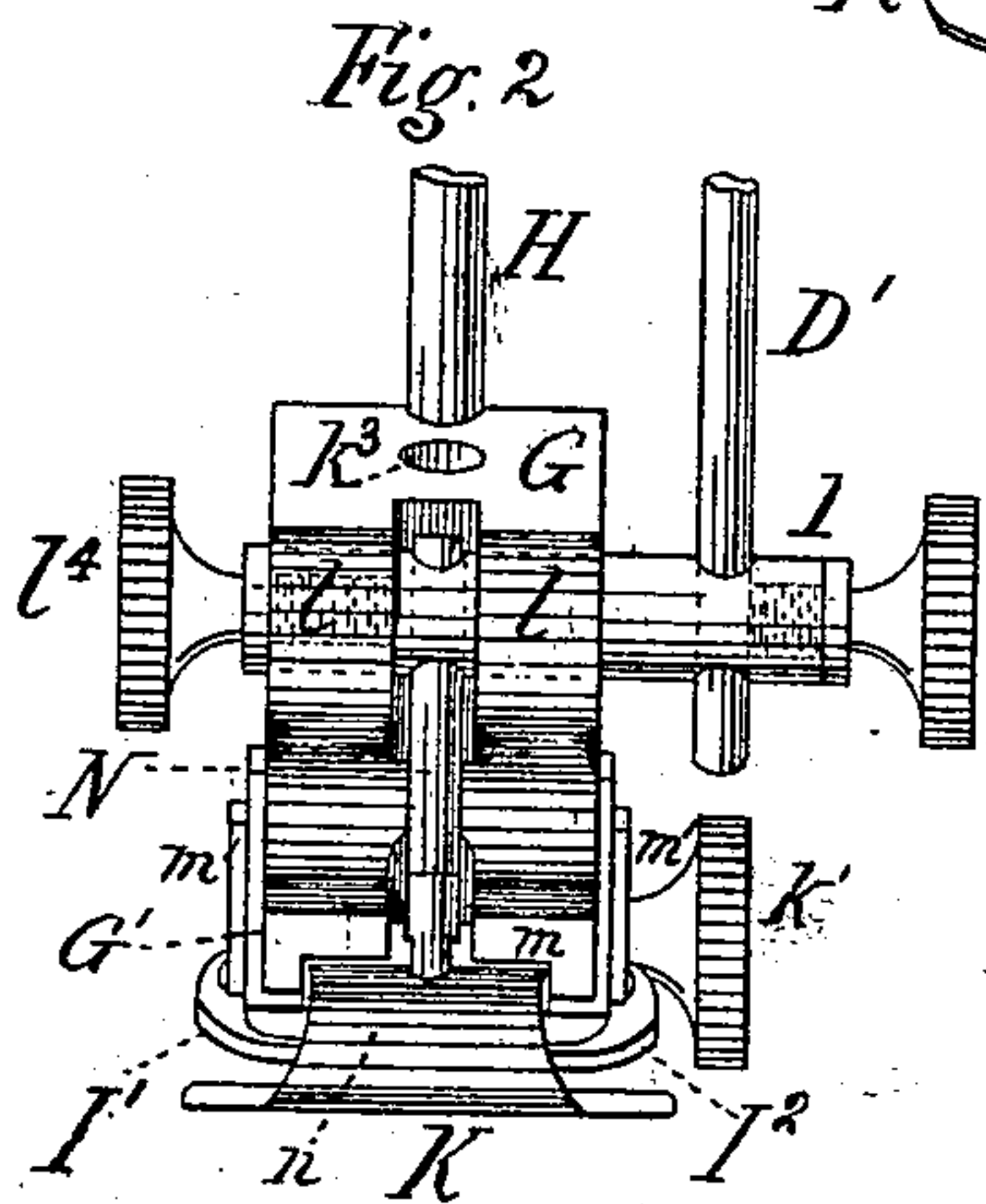
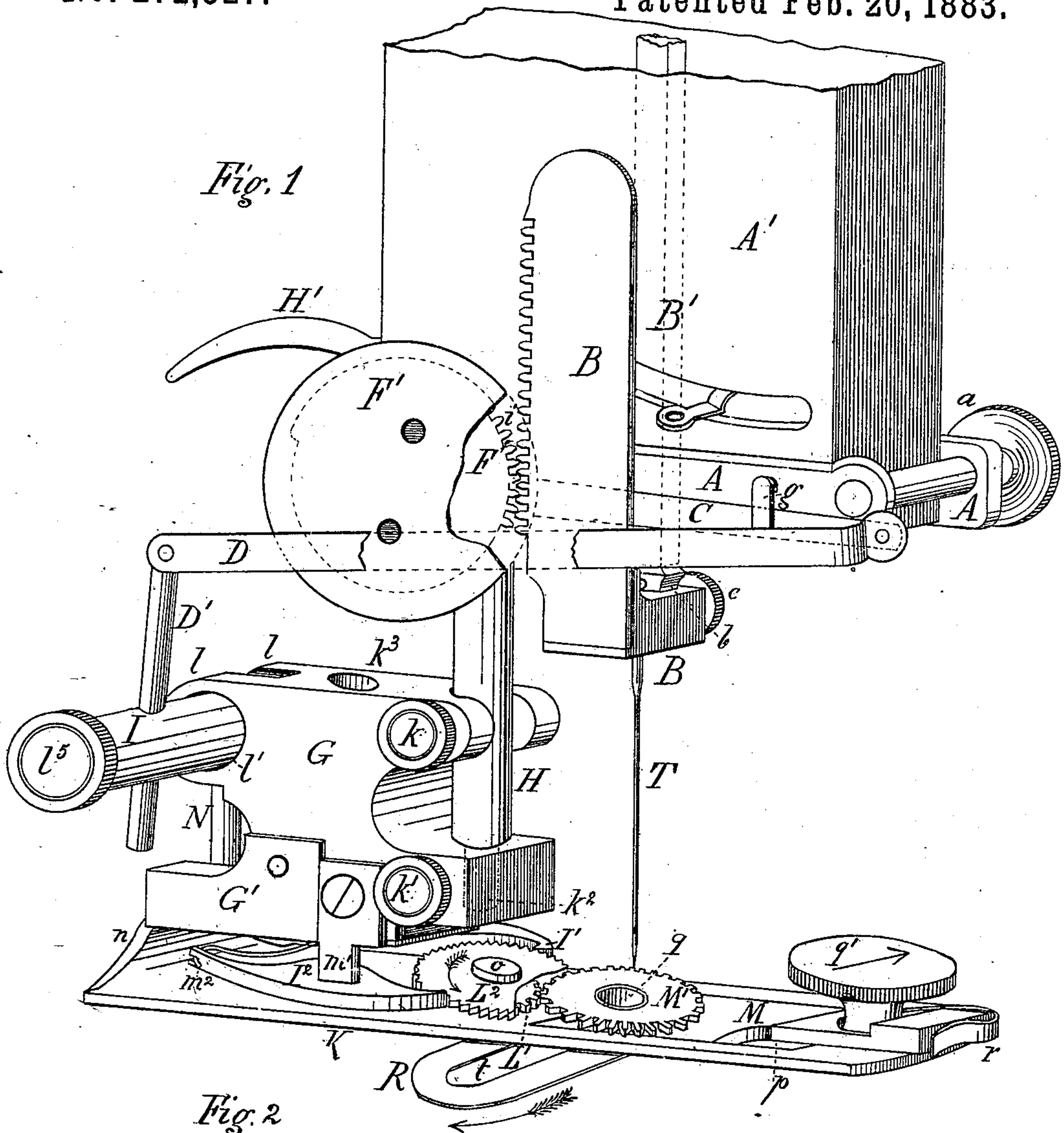
2 Sheets—Sheet 1.

J. W. CAMERON.

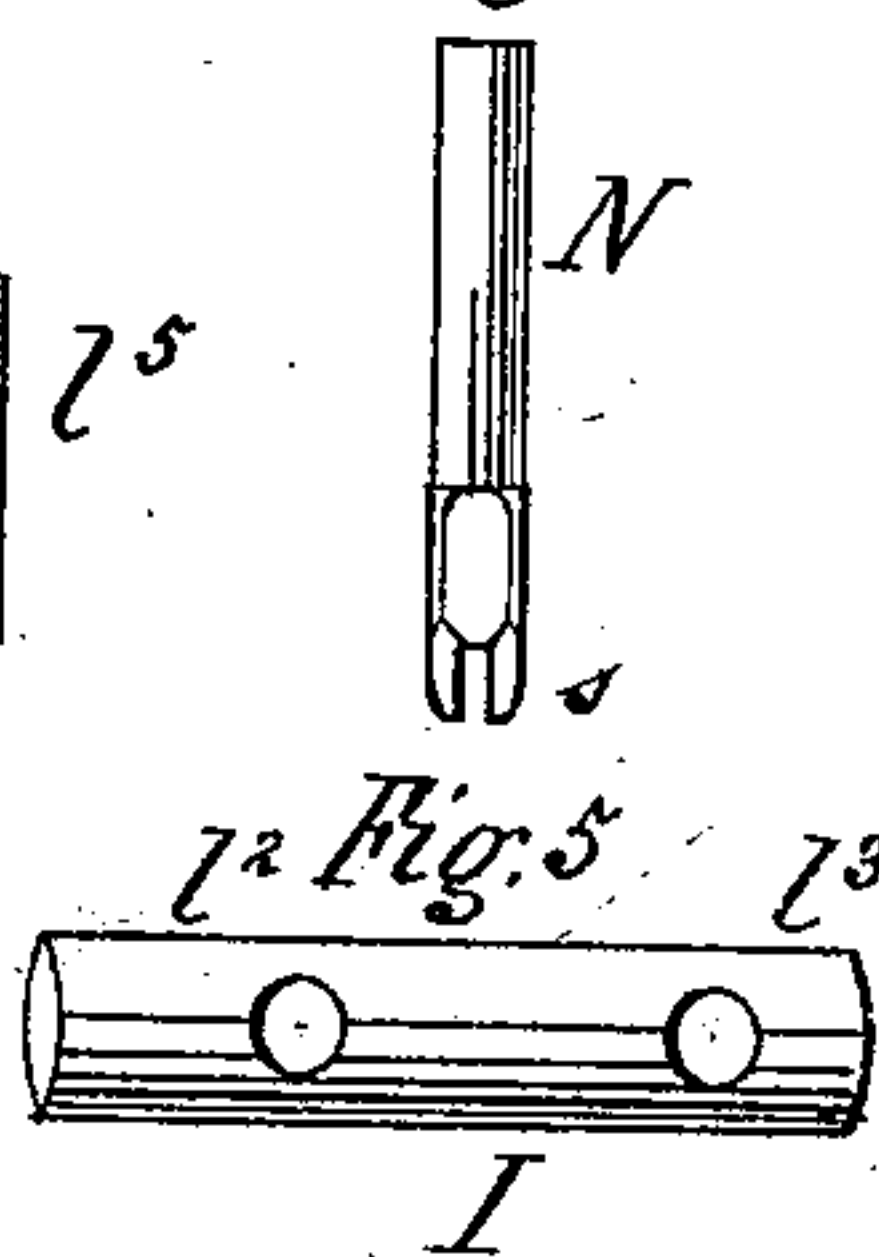
BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 272,527.

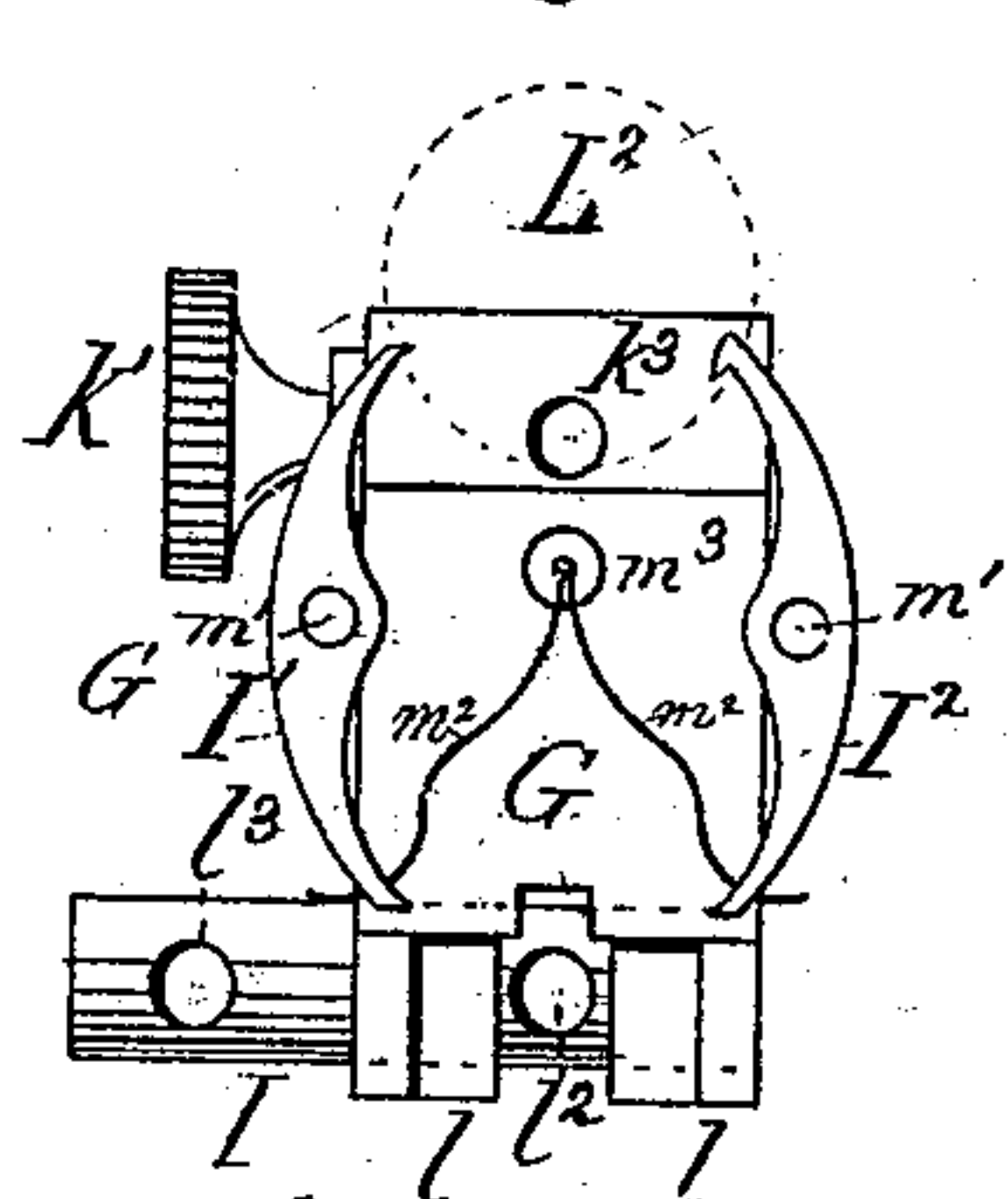
Patented Feb. 20, 1883.



*Fig. 4*



*Fig. 3*



WITNESSES  
Wm. A. Lowe  
Jacob J. Storer.

James W. Cameron, INVENTOR  
by Jacob J. Storer ATTORNEY.

Model.)

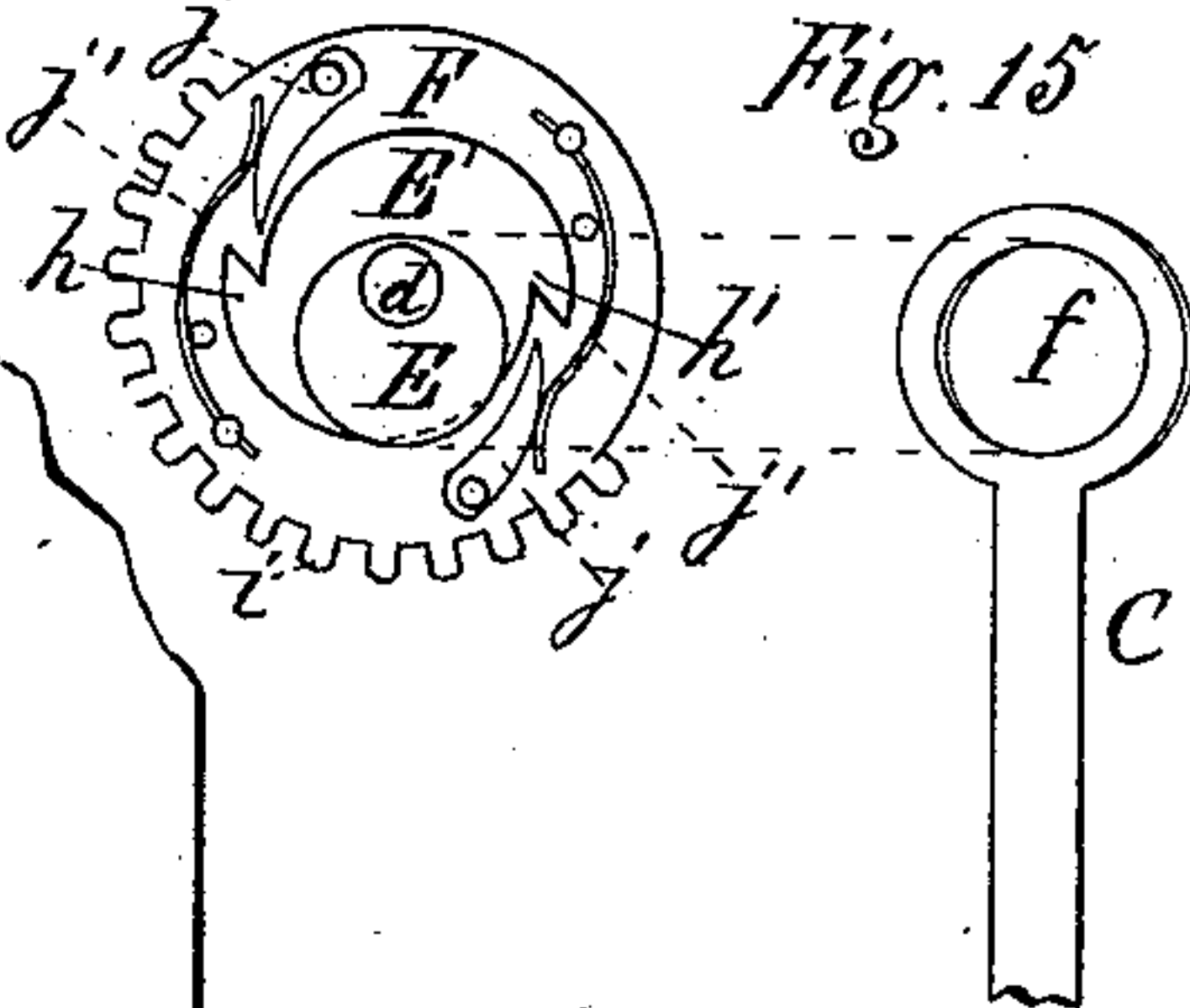
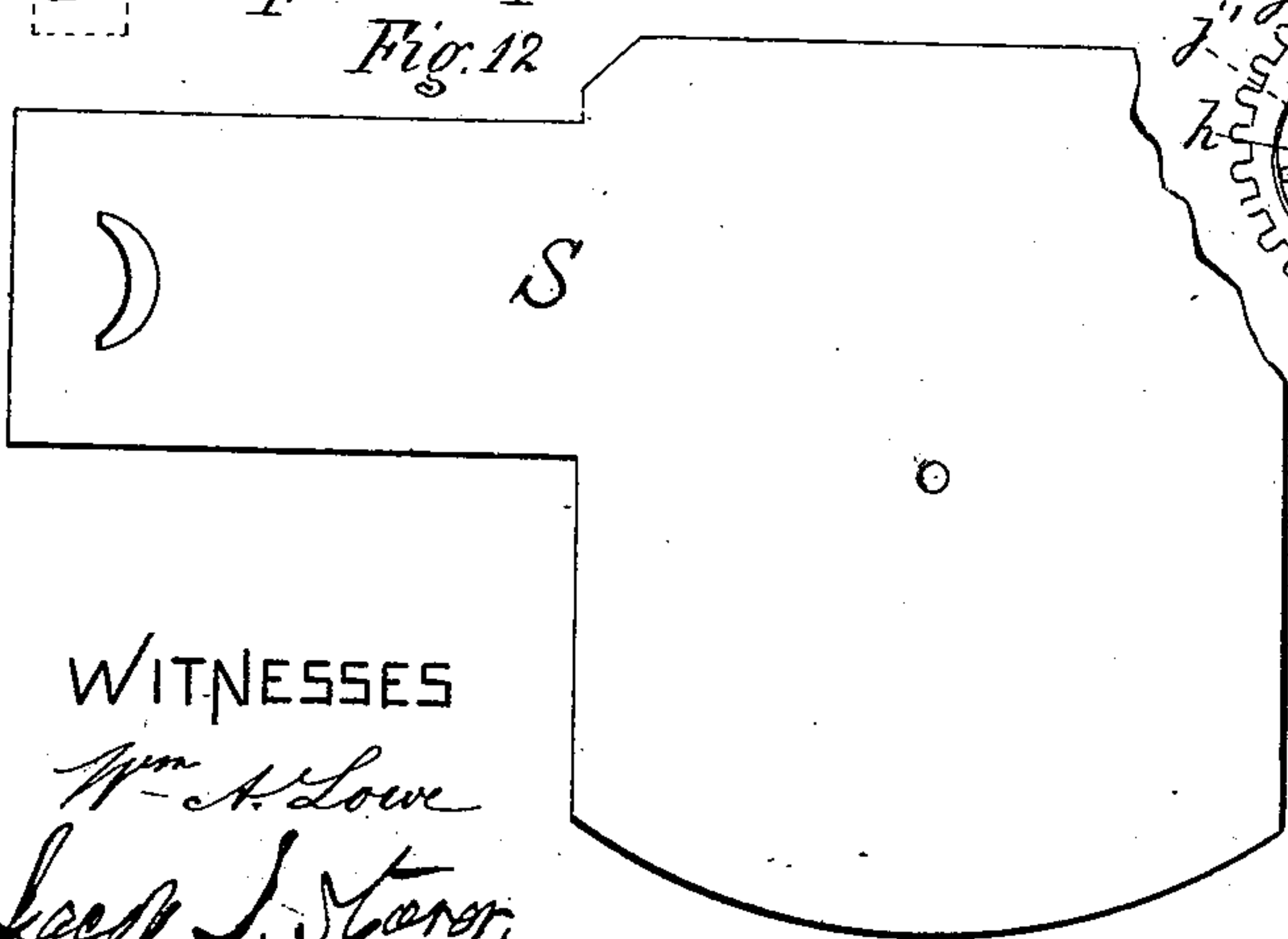
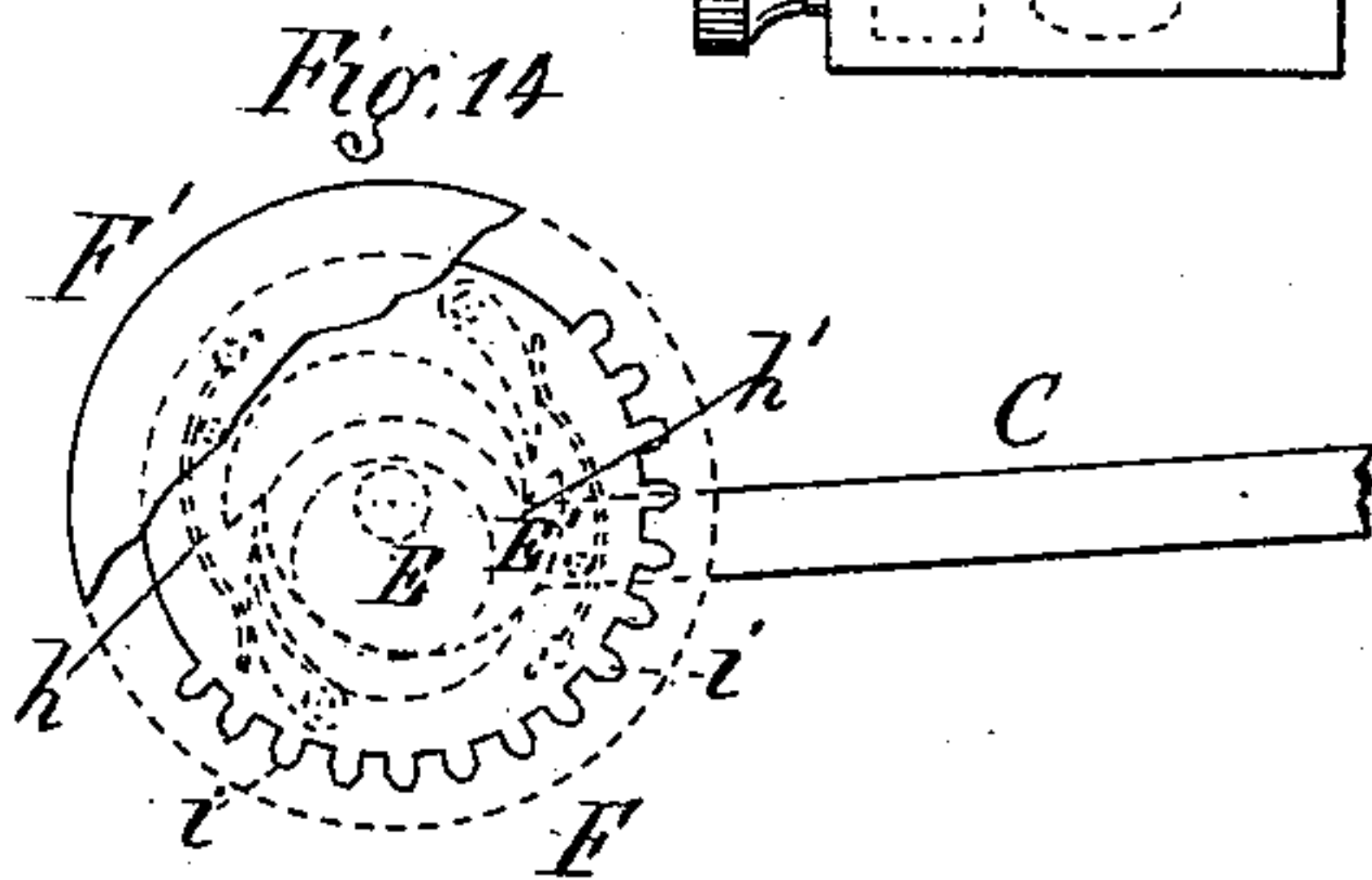
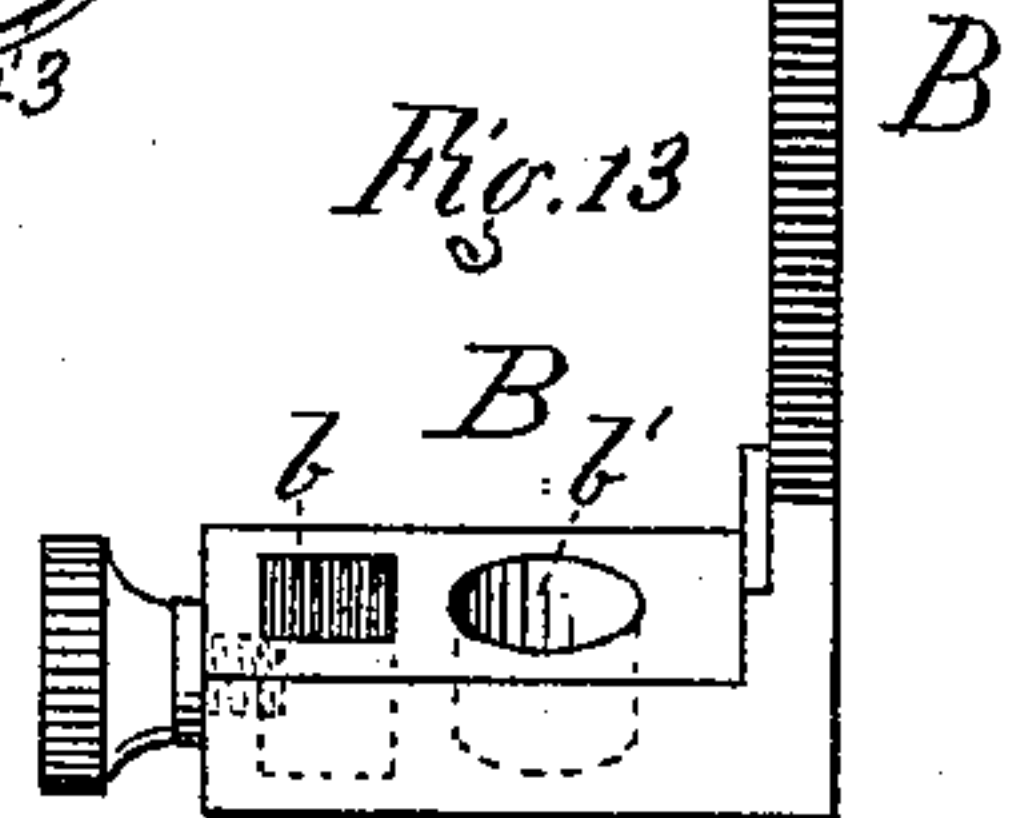
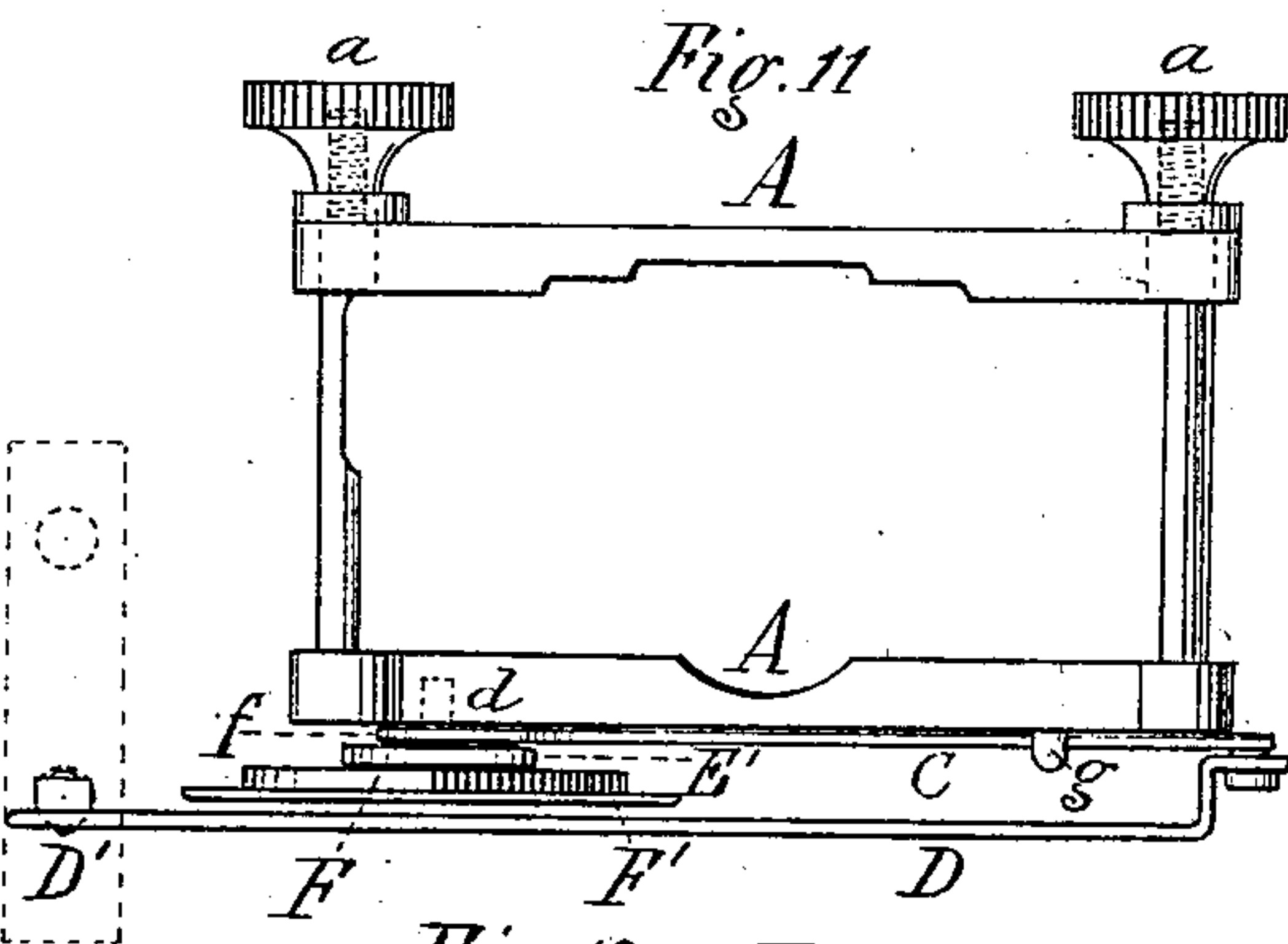
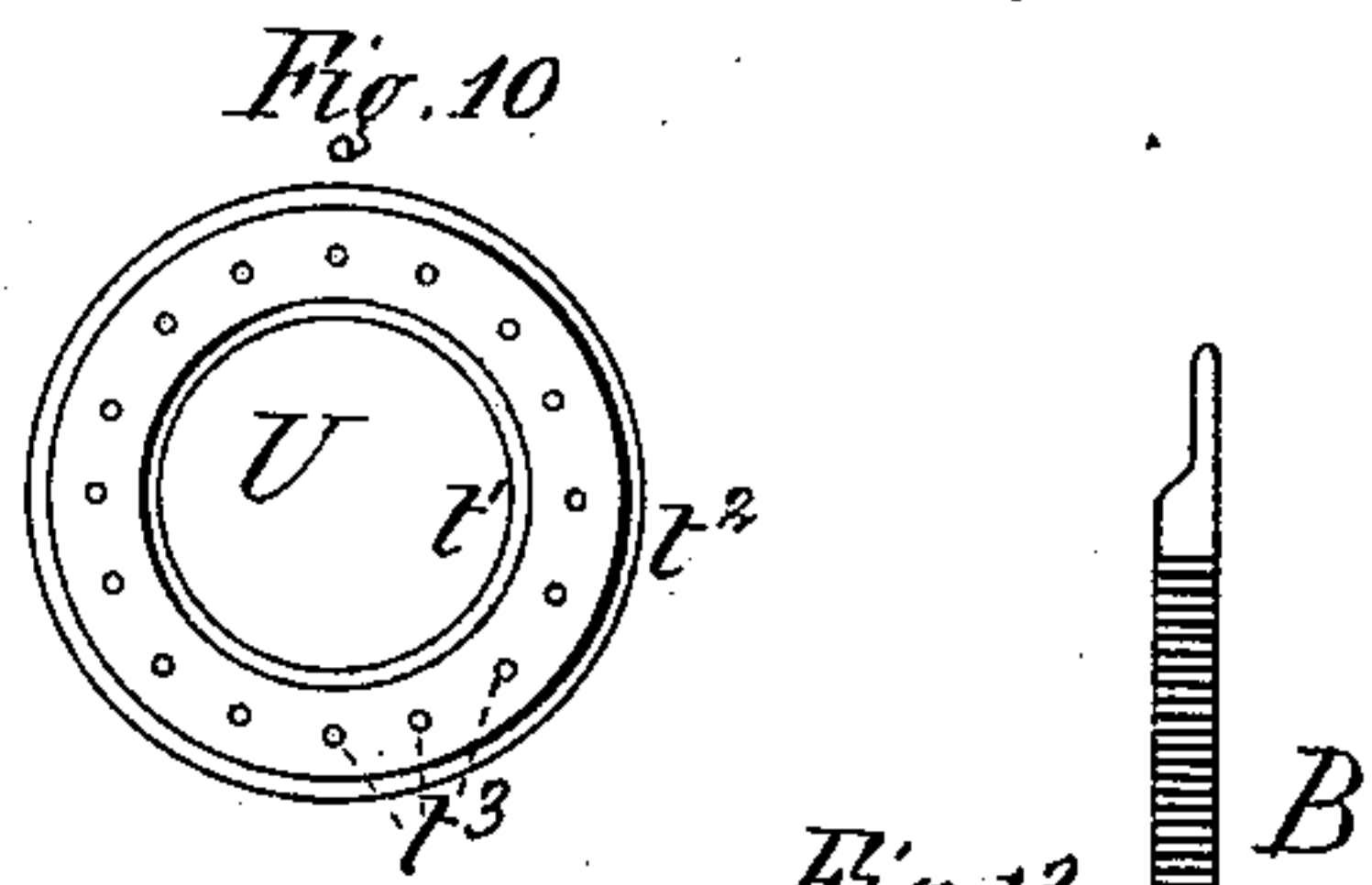
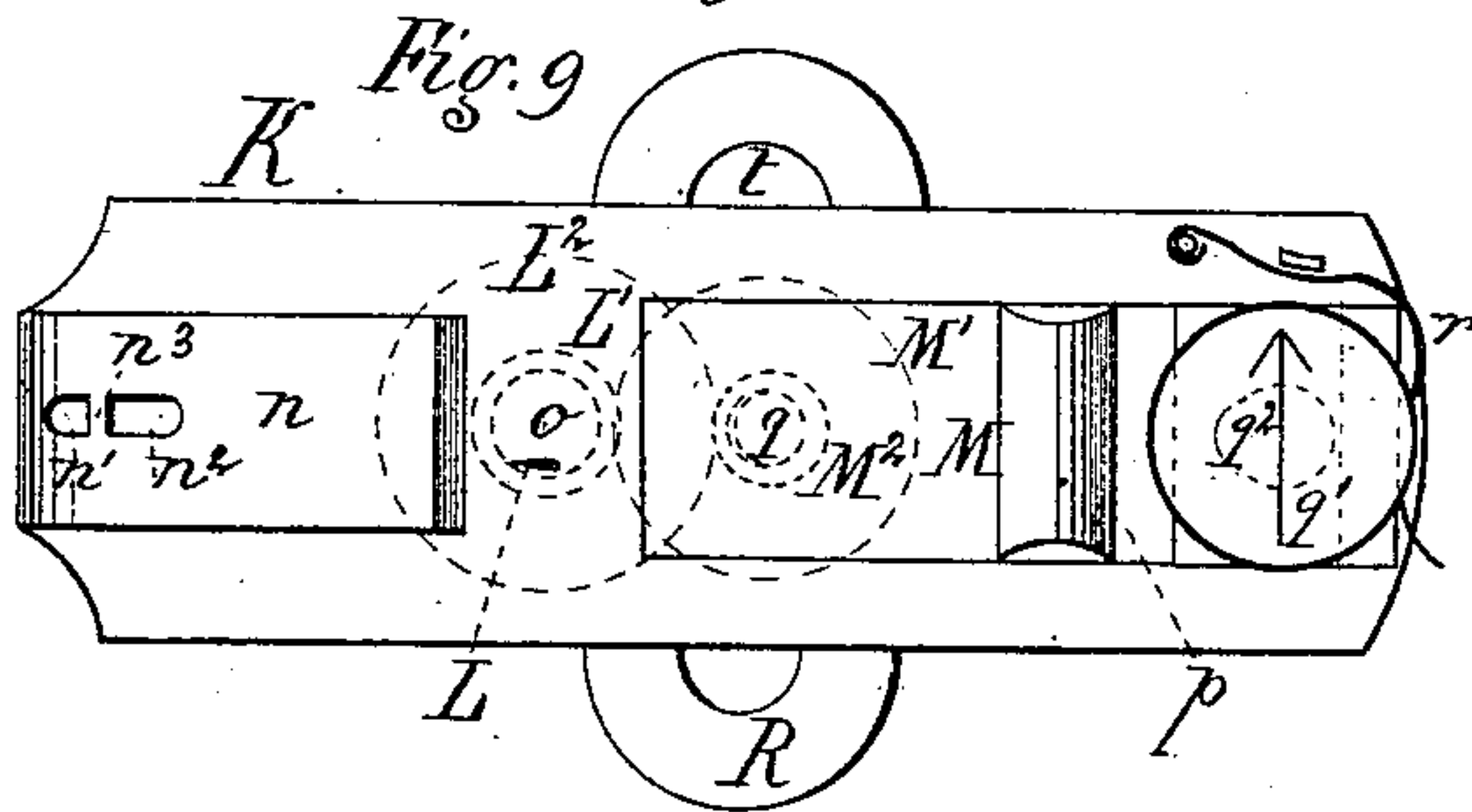
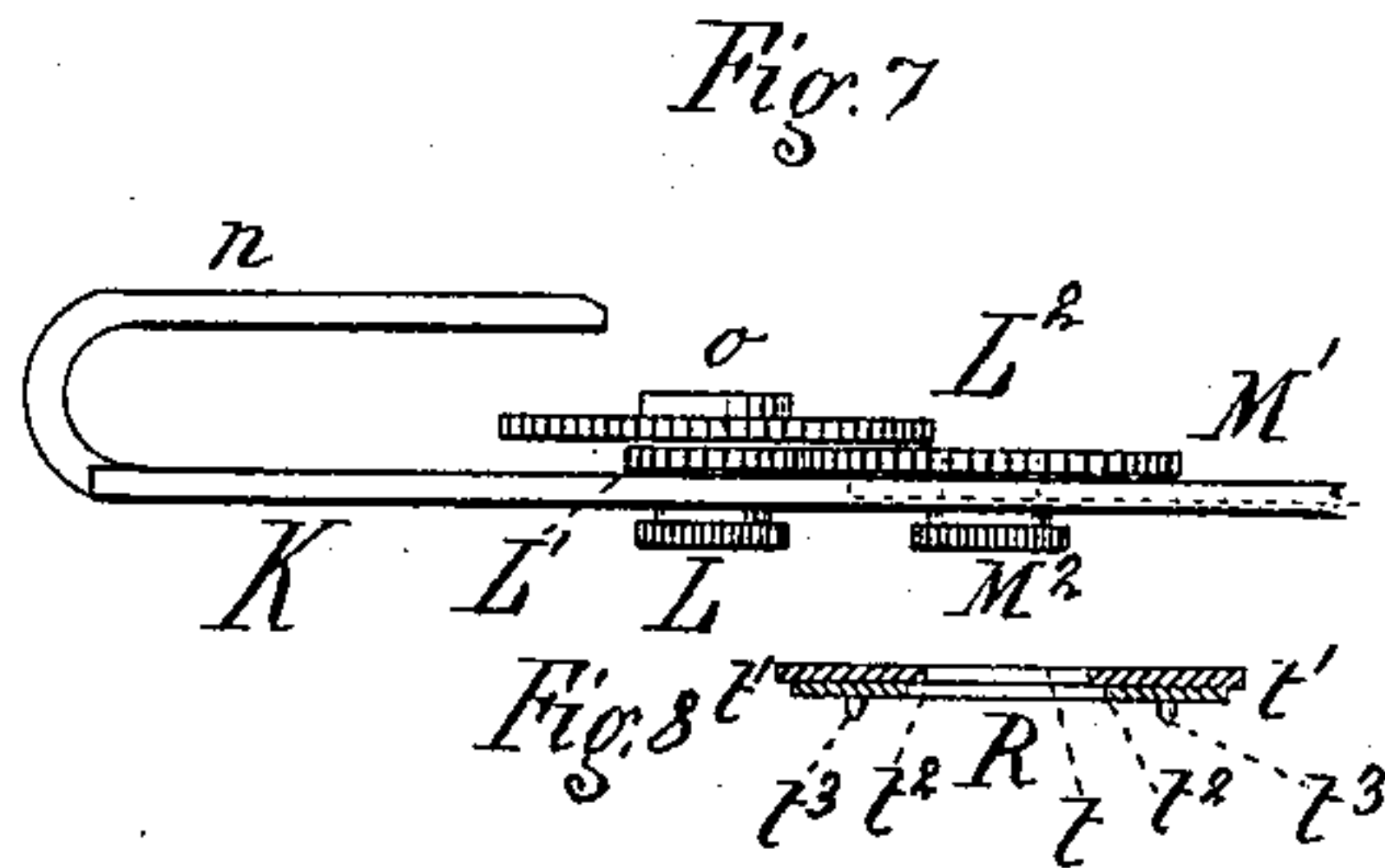
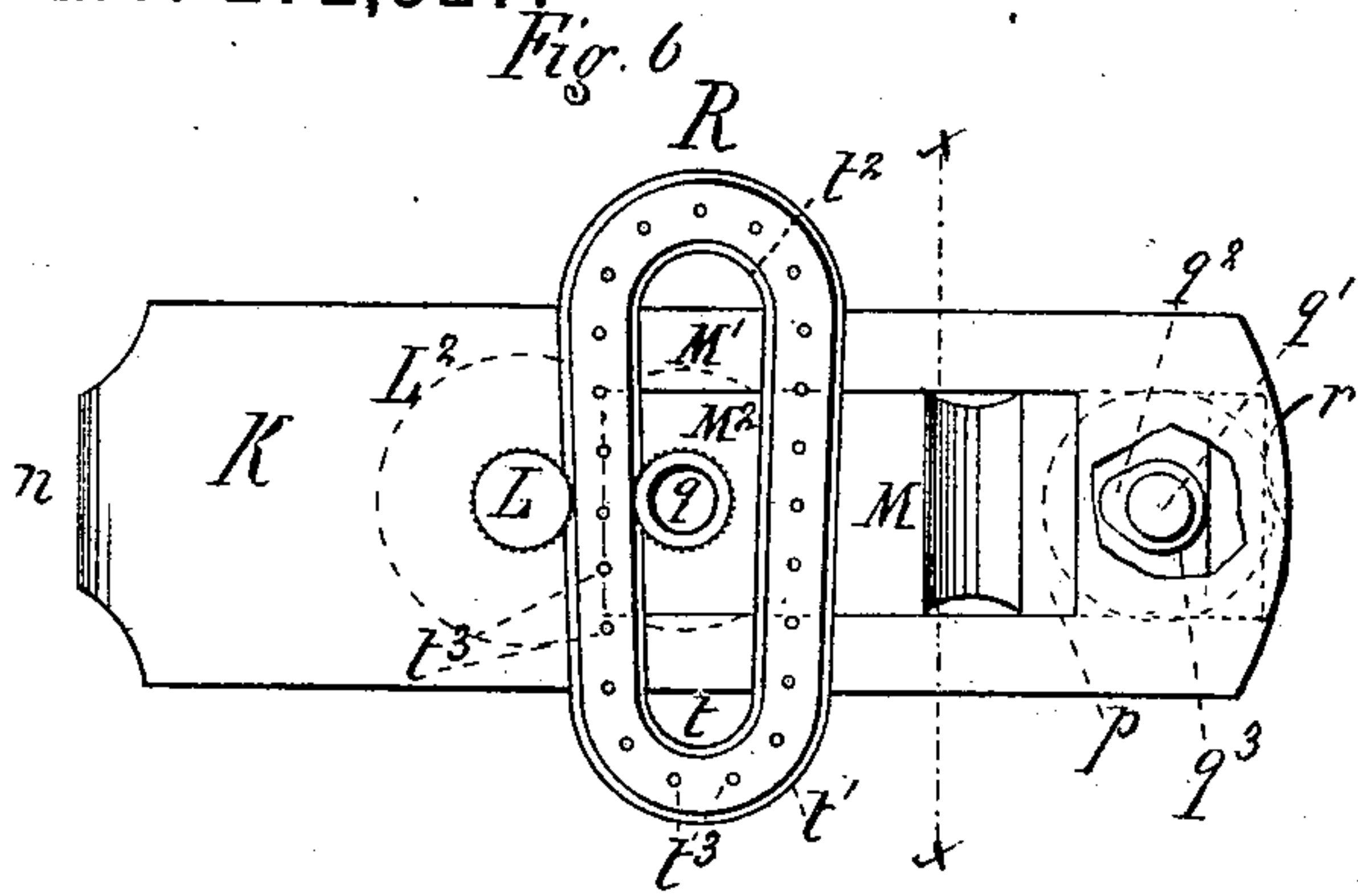
2 Sheets—Sheet 2.

J. W. CAMERON.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 272,527.

Patented Feb. 20, 1883.



WITNESSES

Wm. A. Lowe  
Jacob S. Storer

INVENTOR  
James W. Cameron  
by Jacob S. Storer  
ATTORNEY



# UNITED STATES PATENT OFFICE.

JAMES W. CAMERON, OF NEW YORK, N. Y., ASSIGNOR TO JOHN H. ROBERTS,  
EMILY SEYMOUR, AND J. BURROWS HYDE, ALL OF SAME PLACE.

## BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 272,527, dated February 20, 1883.

Application filed June 5, 1882. (Model.)

*To all whom it may concern:*

Be it known that I, JAMES W. CAMERON, a citizen of the United States of North America, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Button-Hole Attachments to Sewing-Machines, of which the following is a specification.

The object of this invention is to furnish a button-hole attachment for sewing-machines, adapted to be applied to most of the sewing-machines now in use without requiring any alteration to be made in them, and designed for stitching continuous complete button-holes, eyelets, or irregular lines.

The invention consists of certain mechanism adapted to be attached to the head of a sewing-machine to be used in connection with the machine for stitching button-holes, the said mechanism embracing a revolving form-plate for determining the shape of the button-hole or eyelet to be worked, novel devices for lengthening or shortening the stitches and adjusting the bite thereof, and novel devices for holding and moving the form-plate, all of which will be hereinafter fully explained.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is an enlarged perspective view of the attachment applied to a sewing-machine. Fig. 2 is a rear elevation of a portion of the device embracing the foot-carrying head and foot-operating devices. Fig. 3 is a plan of the under side of the carrying-head with attachment. Fig. 4 is a reduced side elevation of the vertical arm of the rock-shaft. Fig. 5 is a reduced plan of the rock-shaft. Fig. 6 is a plan with parts broken away to exhibit other parts of the reverse of the reciprocating foot, showing a button-hole form-plate in position. Fig. 7 is a side elevation of a portion of the same broken off on line  $x'x'$ , Fig. 6. Fig. 8 is a cross-section of the button-hole form-plate. Fig. 9 is a plan of the reciprocating foot with button-hole form-plate attached. Fig. 10 is a plan of an eyelet-hole form-plate. Fig. 11 is a plan of the clamping portion of the device with attached parts. Fig. 12 is a plan of the throat-

plate. Fig. 13 is a perspective view of the needle-bar rack. Fig. 14 is a rear elevation, with parts broken away to exhibit other parts of certain of the parts transmitting motion from the needle-bar rack to the reciprocating foot. Fig. 15 is a front elevation of portion of the same.

A clamp, A, secured by thumb-nuts  $a$  about the head  $A'$  of the sewing-machine, supports portions of my improved attachment in place.

The rectangular needle-bar rack B, having vertical holes  $b b'$  through its horizontal portion, is secured on the end of the needle-bar  $B'$  by the screw  $c$ , the end of said needle-bar being inserted in the hole  $b$ , while the hole  $b'$  serves as a guide for the thread used when operating the machine. The vertical portion or plate of the rack B is thus brought in front of the machine-head, as shown in Fig. 1, with its toothed edge vertical and looking rearward.

Projecting from the face of the front bar of the clamp A, and at one end thereof, is a stud,  $d$ , over which is set the eye  $f$  of the eccentric-rod C, that extends through and is supported by the clamp-hook  $g$ , and has pivoted to its outer end the link D, to the free end of which is pivoted the arm  $D'$  of the rock-shaft I. An eccentric, E, is fitted over the stud  $d$ , within the rod-eye  $f$ , and eccentrically fixed on the outer face of this eccentric E, and nearly covering it, is a ratchet,  $E'$ , having two opposite teeth,  $h h'$ , as shown in Figs. 14 and 15. Over the stud  $d$ , above the ratchet  $E'$ , is next placed a pinion, F, toothed only along about half of its periphery, as shown at  $i$ , and having pivoted on its outer face opposite dogs  $j j$ , actuated by springs  $j' j'$ , said dogs being designed to engage at suitable times in the teeth of the ratchet  $E'$  to give motion to the eccentric E. The teeth of the pinion F mesh with the teeth of the rack B, which latter thereby transmits a reciprocating motion from the needle-bar  $B'$  for actuating my improved device. A circular plate or cap,  $F'$ , secured on the stud  $d$ , and having its edge extending over the toothed edge of the rack B, serves to hold the eccentric E, ratchet  $E'$ , and pinion F, respectively, in place, and, to better assure the constant engagement of the said pinion-teeth



with the said rack-teeth, so that when the said rack B moves up and down synchronously with the needle-bar B', the pinion F and eccentric and ratchet E E' are thereby rotated half round and back again, whereby a reciprocating movement is imparted to the eccentric-rod C and by the latter transmitted through the link and arm D D'.

The carrying-head G is rigidly secured upon the upper end of the presser-foot bar H by set-screw *k* and by the holding of its lower extremity by a set-screw, *k'*, in a socket, *k*<sup>2</sup>, in said head G, as shown in Fig. 1, so that said head G projects rearward from said bar H.

An oil-hole for applying oil to certain of the parts is represented at *k*<sup>3</sup>. This head G has projecting rearward from its upper face two lugs, *l l*, in the horizontal perforations *l'* of which rests loosely the rock-shaft I, that has holes *l*<sup>2</sup> *l*<sup>3</sup>, respectively, made through it, near its opposite ends, at right angles to its axis, and has thumb-screws *l*<sup>4</sup> *l*<sup>5</sup> inserted axially through each end, as shown. An angle-plate, G', secured over the bottom of the head G, forms a socket, *m*, for the attachment of the reciprocating foot K.

Projecting downward from each side of the head G are rigid lugs *m'*, on whose ends are pivoted the dogs I' I<sup>2</sup>, which are actuated by springs *m*<sup>2</sup> *m*<sup>2</sup>, that are secured on stud *m*<sup>3</sup>, fixed in the bottom of the plate G'.

The reciprocating foot K consists of a flat metal plate, whose rear end is reduced in width and turned upward and forward, as shown at *n*, and has formed in it two holes, *n'* *n*<sup>2</sup>, separated by a cross-bar, *n*<sup>3</sup>, as clearly seen in Fig. 9. Vertically through said foot K is passed a stud, *o*, that is adapted to revolve, and carries rigidly fixed on its lower end a pinion, L, that forms a portion of the holding and moving device of the form-plate R, and in the upper end of this stud *o* is a pinion, L', over which is a ratchet-wheel, L<sup>2</sup>, both of which are rigidly fixed on said stud *o*. A rectangular opening, *p*, formed in said foot K, and extending forward from about its center, is designed for the reception of the adjustable slide M, that carries on its inner end the gear-wheel M' and pinion M<sup>2</sup>, that form a portion of the holding and moving device of the form-plate R, said wheel M' and pinion M<sup>2</sup> being held together—the one on the upper face and the other on the under face of the slide M, and so as to revolve together—by a sleeve, *q*, through which the needle T reciprocates when the machine is in operation. The outer end of the slide M is slightly turned upward, and made to rest on the face of the foot K, as shown in Fig. 1, and said slide M is held in position and adjusted toward or from the head G by means of a thumb-nut, *q'*, that passes vertically down through the slide into the foot K, and has on its end a cam, *q*<sup>2</sup>, that plays in a depression, *q*<sup>3</sup>, in said foot. Hence, on turning the nut *q'* in one direction, the cam *q*<sup>2</sup> engages against one end of the depression *q*<sup>3</sup> and forces the slide M rearward with its wheel and pinion M' M<sup>2</sup> in contact with

the pinion L' and form-plate R, respectively, when the latter is in place, while on turning the said nut *q'* in the opposite direction the slide M is drawn outward, so that wheel and pinion M' M<sup>2</sup> are respectively disengaged from the pinion L' and form-plate R, so that the latter may be removed from between the pinions M<sup>2</sup> L'. A spring, *r*, secured on the end of the foot K, presses against the end of the slide M, and thereby serves to hold the pinion M<sup>2</sup> in contact with the form-plate R'. The end *n* of the foot K being properly inserted in the head-socket *m*, the springs *m*<sup>2</sup>, engaging against the rear ends of the dogs I' I<sup>2</sup>, hold the forward ends of the latter engaged in the teeth of the ratchet-wheel L<sup>2</sup>. The vertical arm N is then entered through the hole *l*<sup>2</sup> of the rock-shaft I, with its lower end, *s*, straddling the cross-bar *n*<sup>3</sup> of the foot K, and entering the holes *n'* *n*<sup>2</sup>, as shown in Fig. 2, (which form of connection prevents loss of motion between the rock-shaft I and foot K,) and said arm N is secured in place by turning the thumb-screw *l*<sup>4</sup>, and the arm D of the rock-shaft I is secured in the hole *l*<sup>3</sup> of the said rock-shaft I by the screw *l*<sup>5</sup>.

The button-hole form-plate R has a central opening, *t*, and rabbeted outer and inner edges, *t'* *t*<sup>2</sup>, as shown, and is provided on its lower face with points or studs *t*<sup>3</sup>, for the purpose of securely holding and moving with it the cloth or other material to be operated upon. The shape of the said form-plate edges permits of the engagement of the peripheries of the pinions M<sup>2</sup> L' against the opposite sides of the narrow portion of the said plate R in order to move the same, while the broader portion or flange of said plate R engaging over the said pinions M<sup>2</sup> L', between them and the slide M, serves to hold said plate R up in place.

To apply the device to a sewing-machine, the ordinary needle-clamp, presser-foot, and throat-plate are first removed, and then the operator moves the presser-bar lever H', and thereby raises the presser-foot bar H, when the device is fixed in place, as hereinbefore set forth. The throat-plate S, especially adapted to this improved attachment, is then substituted for the ordinary throat-plate of the machine, and the material to be operated upon is placed over the throat-plate in the usual manner. Then the presser-bar lever H' is operated to force the presser-foot bar H down, whereby the foot K is suitably set upon the work. The needle T being fixed in place and the device being in position, as shown in Fig. 1, and the sewing-machine being put in operation, the needle-bar rack B reciprocates up and down with the needle-bar B', and thereby imparts a semi-rotary rocking motion to the pinion F, and consequently, through the medium of the dogs and springs *j j'*, to the eccentric E, whereby the eccentric-rod C is given a horizontal reciprocating motion that is in turn imparted to the link and arm D D', and by the latter to the rock-shaft I, and thence through the arm N to the foot K, whereby the latter is made to reciprocate back and forth. As the



dogs I' I<sup>2</sup> are engaged in the teeth of the ratchet-wheel L<sup>2</sup>, and on its opposite sides—one dog being adapted to push, and the other to pull the said wheel around—it follows when the foot K makes a forward movement that dog I' pulls the said wheel L<sup>2</sup> around for the distance of one or more teeth, and that when the foot K makes a rearward movement the dog I<sup>2</sup> pushes the said wheel L<sup>2</sup> an equal distance around, and in the same direction as indicated by the arrow, Fig. 1. Thus an intermittent rotary motion is imparted through the stud o to the pinions L L', and the latter, meshing with the gear-wheel M', causes it, as well as the pinion M<sup>2</sup>, to rotate in the opposite direction, and the form-plate R, being held between the pinions L' M<sup>2</sup>, is consequently caused to move in the direction of its arrow (Fig. 1) and to turn in the same direction as its ends pass between said pinions. In the meanwhile needle T, carrying the thread, (not shown,) operates in the usual manner, reciprocating up and down through the sleeve q<sup>3</sup>. The height of the stitches is determined by the length of the back-and-forth reciprocations of the foot K, and the length of these reciprocations is regulated by the adjustment of the arm D', for, in lengthening the throw of said arm D', by inserting it partly through the rock-shaft I, the reciprocations of the foot K are lengthened, while on shortening the throw of said arm D' by further withdrawing it from the said rock shaft I, the reciprocations of the foot K are shortened. The length of the stitches is also dependent upon the throw or length of the reciprocations of the foot K, for, assuming the length of the ordinary stitch to be measured by the distance through which the form-plate R is moved when the wheel L<sup>2</sup> is turned the distance of two teeth at each reciprocation of the foot K, it follows, when the throw of said foot K is shortened by the adjustment of the arm D', that the wheel L<sup>2</sup> will be turned but one tooth at each reciprocation of the foot K, and when the throw of the foot K is lengthened that the wheel L<sup>2</sup> will be turned three or more teeth at each reciprocation of said foot, and hence the form-plate R will be moved through a greater distance between the downward movements of the needle.

The eyelet form-plate U (shown in Fig. 10) can be substituted for the button-hole form-plate R in the device when it is desired to work eyelets in the material to be operated upon, and the center spaces or openings of the button or eyelet holes are determined by the size of the openings in said form-plates.

For working irregular lines, such as are formed on the button-hole edge of ladies' shoes, a long form-plate with indented or irregular edges may be used in place of the button-hole form-plate. The curves in the ends of the openings on the button-hole form-plate R insure the strong and sufficient barring of the button-hole ends, and the curve at the outer end of said plate is preferably made larger for

the purpose of forming in the material to be operated upon what is known as an "eyelet-ended button-hole."

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

1. In a button-hole attachment to a sewing-machine, the combination, with an eccentric-rod and a reciprocating foot and their connecting and connected devices, of a vertical needle-bar rack, adapted to be fixed on the machine needle-bar, and a pinion fixed in a vertical position and adapted to be engaged with said rack for the purpose of transmitting the reciprocating motion of the needle-bar to the said foot.

2. In a button-hole attachment to a sewing-machine, the combination, with the clamp A, provided with stud d, and holding the attachment to the head of the machine, and the rack B, adapted to be fixed on the machine needle-bar, of the eccentric E, ratchet E', pinion F, provided with dogs j and springs j', and eccentric-rod C, all arranged substantially as herein shown and described, whereby the vertical reciprocating motion of the machine needle-bar is converted into a horizontal reciprocating motion, as set forth.

3. In a button-hole attachment to a sewing-machine, the combination, with the eccentric-rod, adapted and arranged to transmit motion from the needle-bar of the machine, and a foot-carrier provided with a rock-shaft, of a link and arm, substantially as herein shown and described, whereby the motion of the needle-bar is transmitted to the rock-shaft, as set forth.

4. In a button-hole attachment to a sewing-machine, the combination, with the clamp A, adapted to be secured on a machine-head, rack B, eccentric E, ratchet E', dogs j, springs j', pinion F, eccentric-rod C, carrier G, provided with dogs I' I<sup>2</sup> and springs m<sup>2</sup>, and adapted to be secured to the presser-foot bar and rock-shaft I, of the vertical rock-shaft arm N, all arranged and operated substantially as herein shown and described, whereby the foot of the attachment is supported and reciprocated, as set forth.

5. In a button-hole attachment to a sewing-machine, the combination, with the rock-shaft I, adapted to receive motion by suitable mechanism from the machine needle-bar, and reciprocating foot K, carrying devices for forming a button-hole, of the rock-shaft arm N, substantially as herein shown and described, whereby motion is transmitted from the needle-bar to the said foot to reciprocate the latter, as set forth.

6. In a button-hole attachment to a sewing-machine, a horizontal reciprocating foot in combination with and supporting a button-hole form-plate and its actuating mechanism, substantially as herein shown and described.

7. The combination, with the foot F, provided with the slide M and button-hole form-plate R, of pinions L L' and ratchet-wheel L<sup>2</sup>, fixed on stud o, and gear-wheel M' and pinion



M<sup>2</sup>, fixed on sleeve *q*, substantially as herein shown, and for the purposes described.

8. In a button-hole attachment to a sewing-machine, the combination, with the foot-slide  
5 M, wheel M', and pinion M<sup>2</sup>, of the sleeve *q*, all adapted for the passage of the needle in its reciprocation, substantially as herein shown and described.

9. In a button-hole attachment to a sewing-  
10 machine, as a means for holding and moving the button-hole form-plate, the combination, with the foot K and its pinions L L', of the slide M, nut and cam *q'* *q*<sup>2</sup>, spring *r*, and wheel and pinion M' M<sup>2</sup>, substantially as herein  
15 shown and described.

10. In a button-hole attachment for sewing-  
machines, the combination, with the reciproca-  
ting foot, of an adjustable slide moving on said  
foot and carrying a gear-wheel and pinion  
20 adapted to operate for holding and moving

the button-hole form-plate, substantially as herein shown and described.

11. The combination, with the presser-foot  
bar of a sewing-machine, of the button-hole-  
attachment carrier G, a reciprocating foot, K, 25  
attached thereto, and mechanism, substantially  
as herein shown and described, for operating  
said foot from the needle-bar of the machine,  
said foot and carrier being supported and their  
vertical movements controlled by said presser- 30  
foot bar, as set forth.

In testimony that I claim the foregoing as  
my invention I have signed my name, in pres-  
ence of two witnesses, this 1st day of June,  
1882.

JAMES W. CAMERON.

Witnesses:

JACOB J. STORER,  
FRANCIS CAROLAN.