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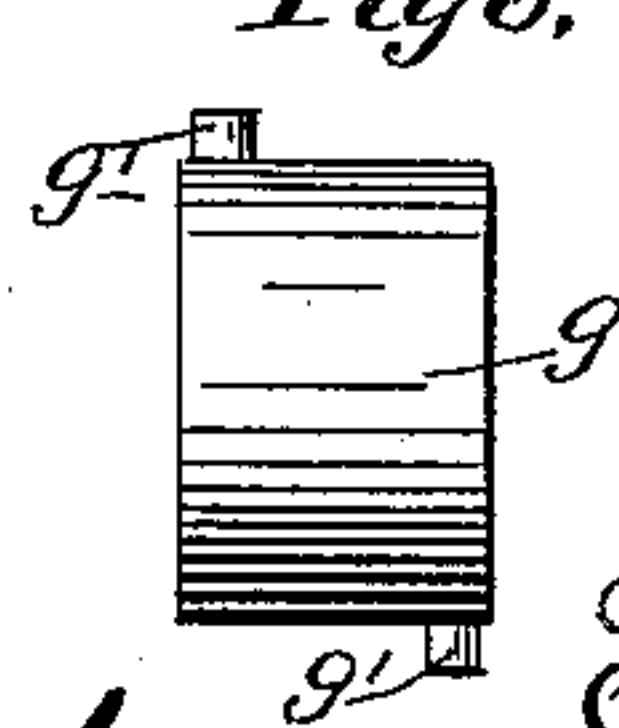
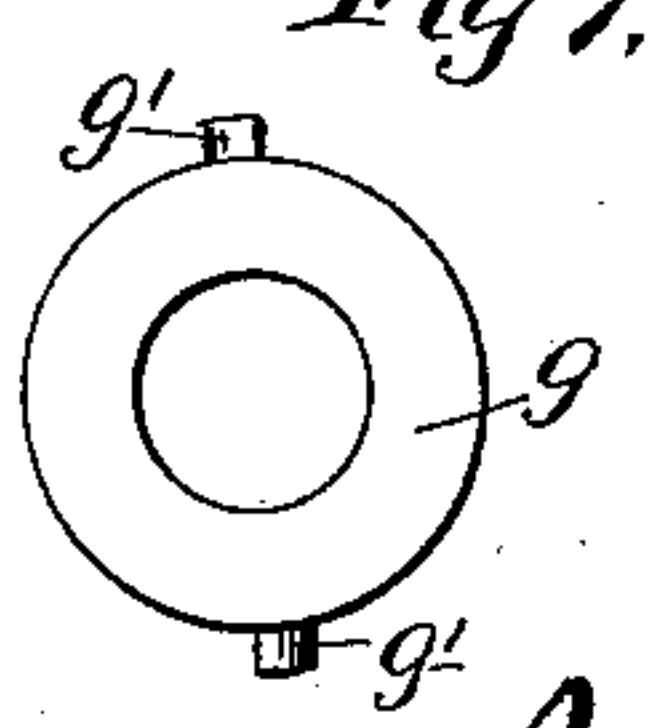
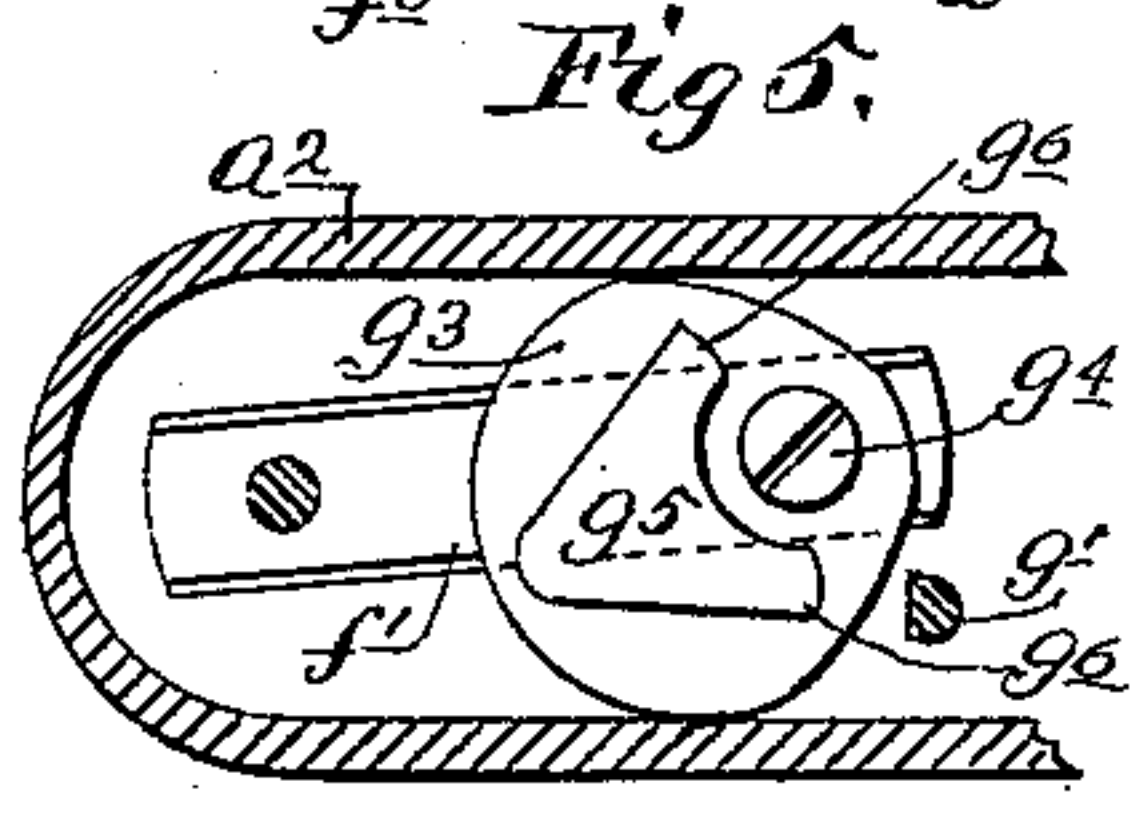
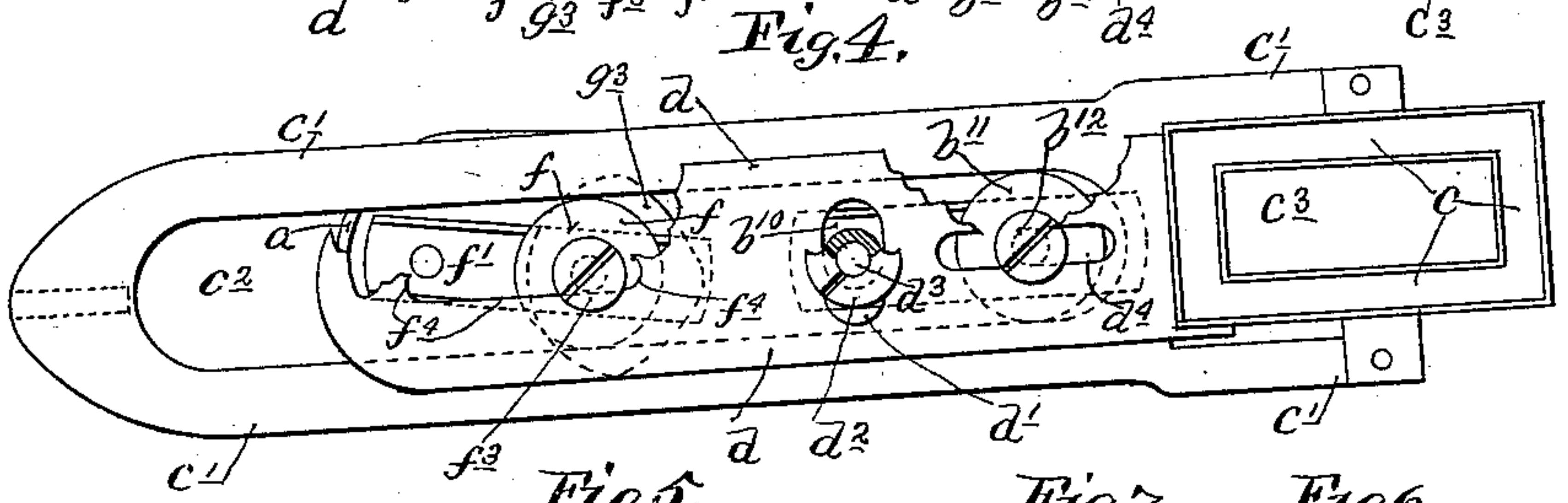
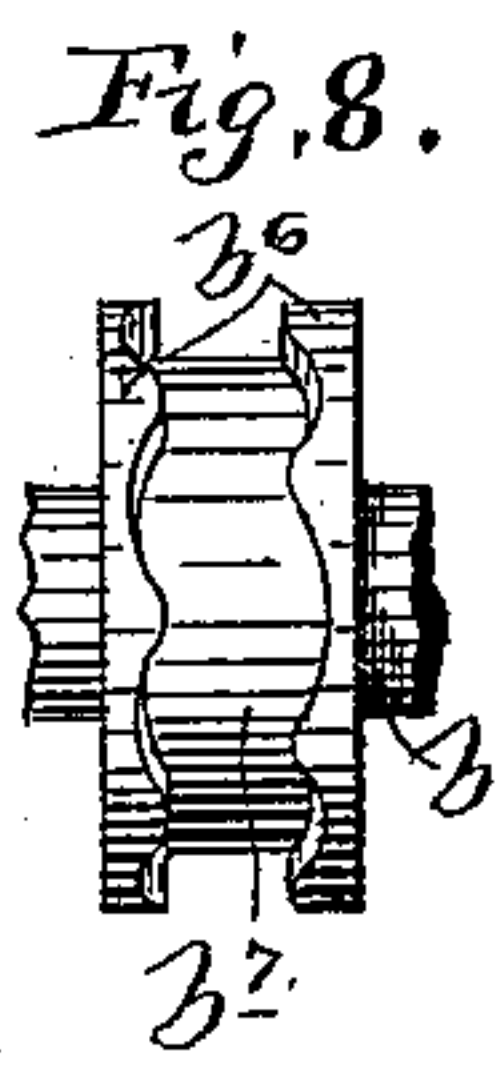
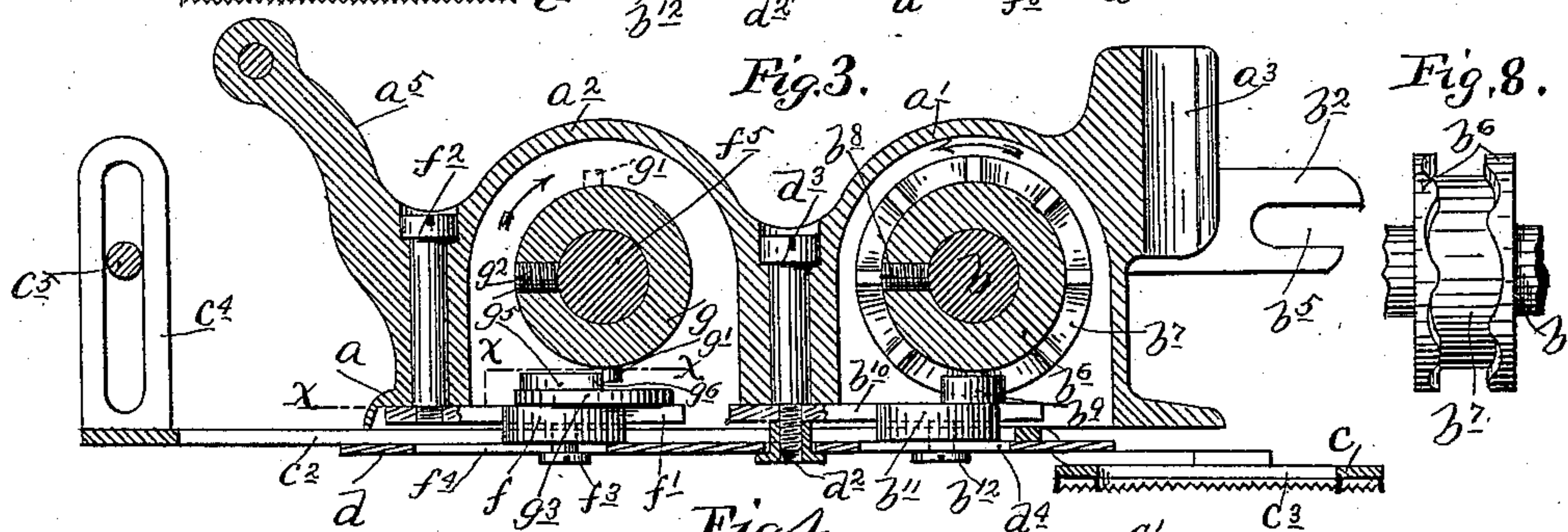
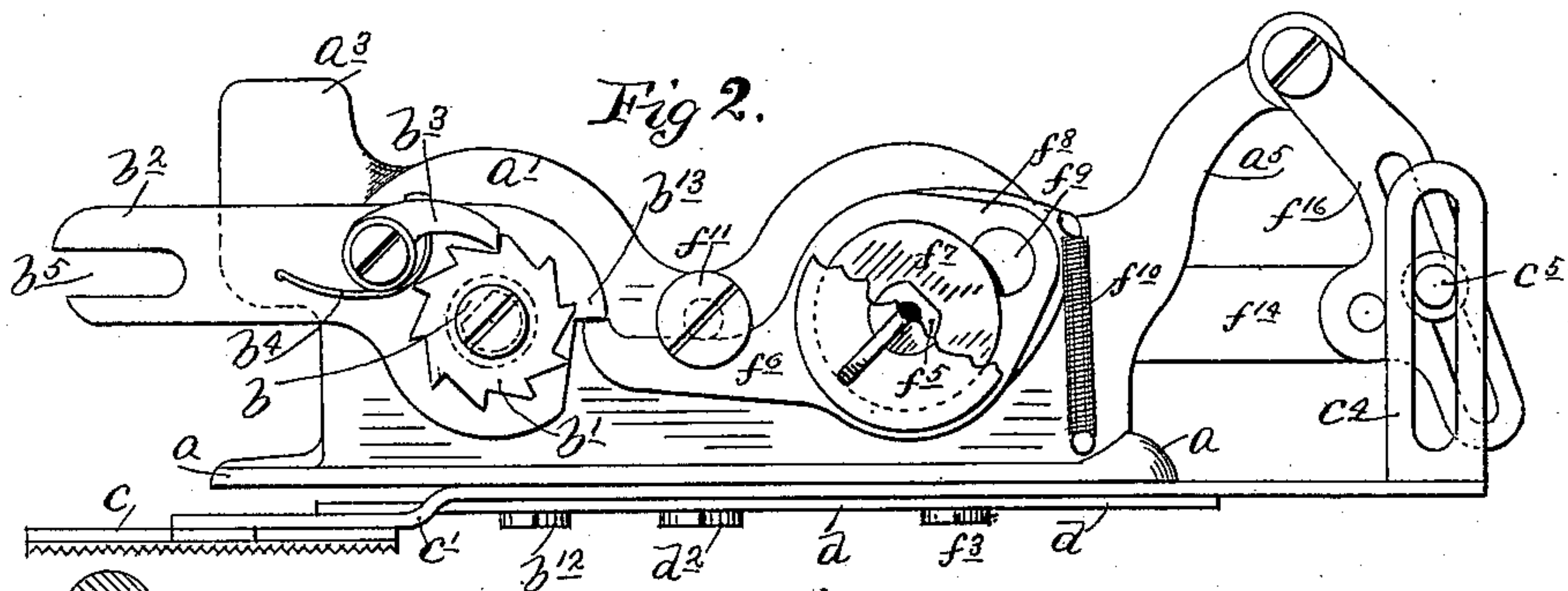
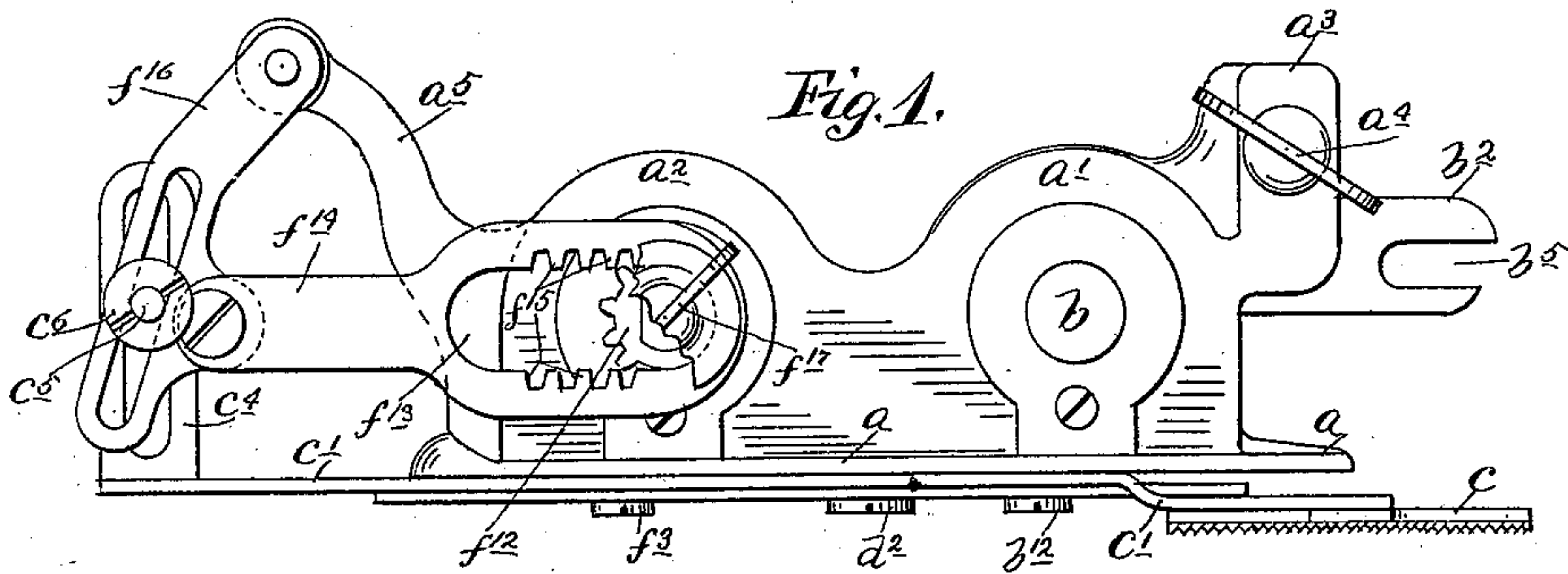
2 Sheets—Sheet 1.

J. D. SCHOONMAKER.

BUTTONHOLE ATTACHMENT FOR SEWING MACHINES.

No. 549,539.

Patented Nov. 12, 1895.



Witnesses  
C. F. Kilgore  
D. D. Merchant

Inventor.  
John D. Schoonmaker  
By his Attorney,  
Jas. F. Williamson

(No Model.)

2 Sheets—Sheet 2.

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Fig. 9.

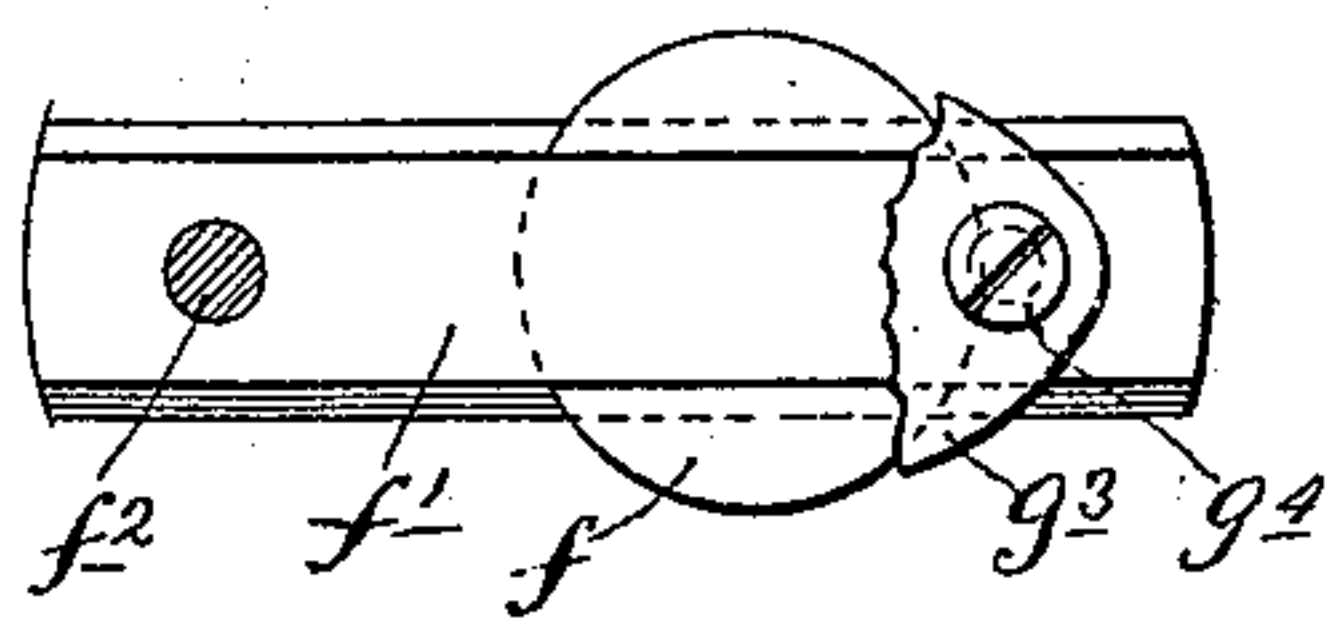


Fig. 10.

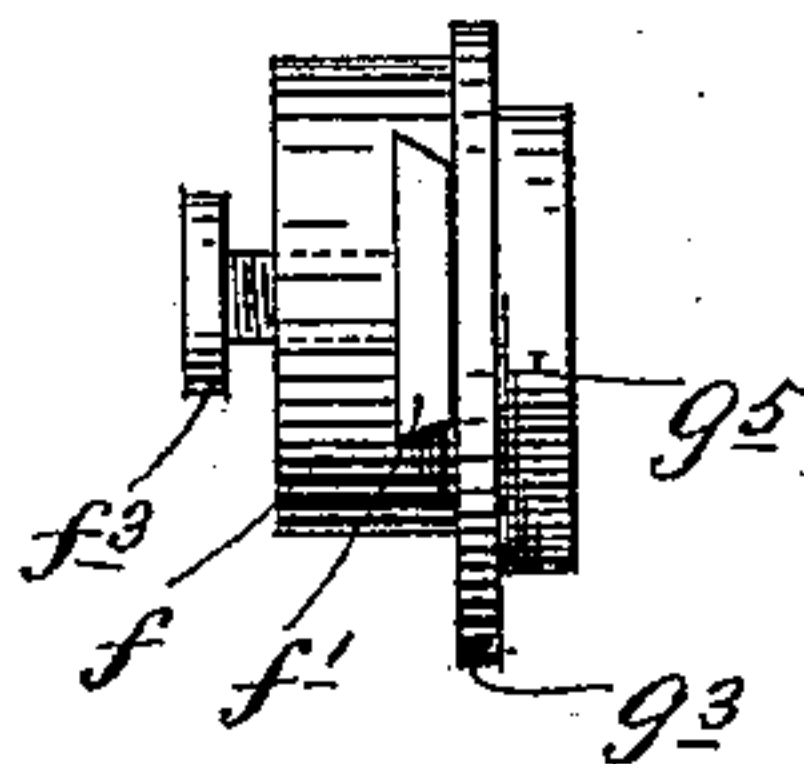


Fig. 11.

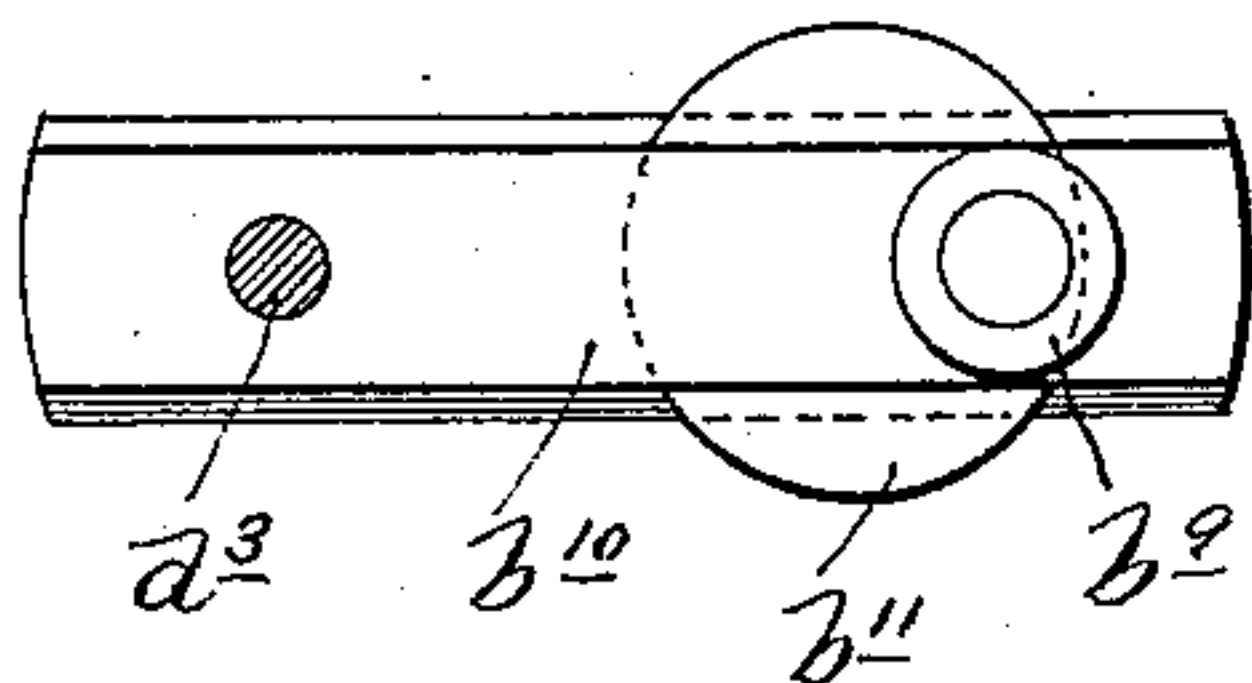
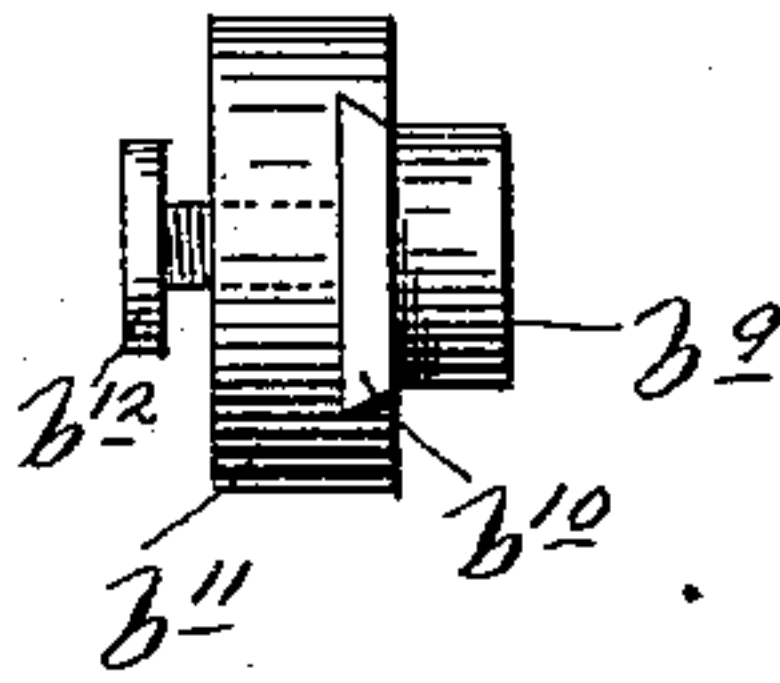


Fig. 12.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## BUTTONHOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 549,539, dated November 12, 1895.

Application filed February 9, 1895. Serial No. 537,804. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN D. SCHOONMAKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Buttonhole Attachments for Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide a sewing-machine attachment which shall be especially adapted for working buttonholes, but also capable of use for tacking pockets, crotches, or other seams, and which attachment shall also be of an improved and simple construction.

To these ends my invention consists in certain novel features, which will be hereinafter fully described, and be defined in the claims.

In its general design and also in its uses the sewing-machine attachment herein shown is similar to the attachment disclosed and claimed by me in my pending application, Serial No. 497,448, filed January 19, 1894, entitled "Buttonhole attachment for sewing-machines." The mechanism of the attachment herein shown is exactly like that shown in the said pending case in all respects, with the exception of the construction for making the lateral shift of the fulcrum for the cloth-clamp slide, as required at the opposite ends of the said cloth-clamp slide's longitudinal feed for shifting the cloth from one to the other side of the buttonhole and holding the same there under the longitudinal and vibratory feed movements until the opposite end of the buttonhole is reached. For this lateral shift of the slide-fulcrum at the limits of the buttonhole I herein show and describe a different construction from that employed in the said pending application.

My improved attachment is illustrated in the accompanying drawings, wherein, like letters referring to like parts—

Figure 1 is a side elevation of the device with some parts broken away. Fig. 2 is a side elevation on the reverse side from that shown in Fig. 1 with some parts broken away. Fig. 3 is a longitudinal vertical section with the

parts in the position shown in Fig. 1. Fig. 4 is a bottom plan view of the device with some parts broken away. Fig. 5 is a horizontal section on the irregular line  $xx$  of Fig. 3 for showing the fulcrum shifting or switching device, and Figs. 6 and 7 are respectively an elevation and an end view showing the switching cam-lug roller detached. Fig. 8 is a detail showing the zigzag cam-channel in the vibratory cam-wheel. Figs. 9 and 10 are views respectively in plan and end elevation showing one of the cross-heads, the pivoted lever carrying the same, and the shifting-block pivoted to said lever, a portion of said shifting-block being shown as broken away in said Fig. 9; and Figs. 11 and 12 show another cross-head, respectively in plan and end elevation, mounted on its pivoted carrying-lever.

$a$   $a'$   $a^2$  represent, respectively, the bed and the body portions of the main frame of the device, which parts are constructed integral with each other. The body portions  $a'$   $a^2$  constitute casings for the vibrating and the switching cam-wheels, respectively, as will hereinafter more fully appear. The forward end of the casing  $a'$  is provided with jaws  $a^3$ , one of which is fitted with a jam-screw  $a^4$  for clamping the device to the presser-foot bar of the sewing-machine. The casing  $a^2$  has formed integral therewith a rearwardly-extending arm  $a^5$ , for a purpose which will later appear.

In the casing  $a'$  is journaled the shaft  $b$ , one end of which projects outward beyond the casing and has fixed thereto a ratchet-wheel  $b'$ . On the said shaft  $b$ , between the casing  $a'$  and the ratchet-wheel  $b'$ , is loosely pivoted the lever  $b^2$ , having a spring-held pawl  $b^3$   $b^4$ , operative on the said ratchet-wheel  $b'$ . The lever  $b^2$  is bifurcated or provided with an open-ended notch  $b^5$  at its forward end for engagement over the needle set-screw to secure the same to the needle-bar of the sewing-machine. Under the action of the needle-bar the lever  $b^2$  will receive an up-and-down rocking motion and through the pawl  $b^3$  and the ratchet-wheel  $b'$  will impart a step-by-step rotary motion in a constant direction to the said shaft  $b$ . On the said shaft  $b$ , within the casing  $a'$ , is fixed a cam-wheel  $b^6$ , having a peripheral zigzag cam-channel  $b^7$ , which cam-wheel  $b^6$  is



shown as fixed to the shaft  $b$  by a set-screw  $b^8$ . The peripheral cam-channel  $b^7$  of the cam-wheel  $b^6$  is engaged by a projection  $b^9$  of a pivoted lever  $b^{10}$ , and as the said channel is zigzag, as shown in Fig. 8, the said wheel  $b^6$  will impart to the said lever  $b^9 b^{10}$  a laterally swinging or vibratory motion. On the said lever  $b^{10}$  is a cross-head  $b^{11}$ , which may be secured in any desired adjustment thereon by a set-screw  $b^{12}$ .

$c c'$  is the cloth-clamp slide, of which the part  $c$  is the clamp proper for operating on the cloth and the part  $c'$  is the body of the slide and is constructed with a large longitudinal slot  $c^2$  extending its entire length. The cloth-clamp  $c$  is provided with an oblong needle-passage  $c^3$  for permitting the necessary play of the clamp in respect to the needle. The slide  $c'$  works between the bed-plate  $a$  of the frame and a retaining or bottom plate  $d$ . The said bottom plate  $d$  is provided with a lateral slot  $d'$ , through which works the stem of a headed nut  $d^2$ , which engages the screw-threaded lower end of a long bolt  $d^3$ , working through the body of the frame and forming a pivot for the lever  $b^{10}$ . The retaining-plate  $d$  is provided with a longitudinal slot  $d^4$ , through which works the stem of a headed set-screw  $b^{12}$ , the stem of which is tapped into the cross-head  $b^{11}$  and works through the same against the lever  $b^{10}$  for holding the cross-head in any desired position on the said lever. The set-screw  $b^{12}$  co-operates with the nut  $d^2$  to hold the retaining-plate in its proper position relative to the cloth-clamp slide  $c c'$  and the frame of the machine. When the parts are thus in working position the cross-head  $b^{11}$  engages or works in the slot  $c^2$  of the slide, and when the said slide is properly pivoted at its rear end, as will presently appear, serves to impart thereto the laterally swinging or vibratory motion. The said rear end fulcrum is afforded by a cross-head  $f$ , which is adjustable on a lever  $f'$ , pivoted to the lower end of the long screw  $f^2$ , seated in the rear end of the frame, and which cross-head  $f$  is securable in any desired position on the said lever  $f'$  by a set-screw  $f^3$ , working through a longitudinal slot  $f^4$  in the retaining-plate  $d$  and tapped through the cross-head  $f$ , so as to jam against the lever  $f'$ . The said cross-head  $f$  engages with the slot  $c^2$  of the cloth-clamp slide  $c c'$  rearward of its center and forms the fulcrum on which the said slide swings in its vibratory motion. The said set-screw  $f^3$  co-operates with the parts  $d^2$  and  $b^{12}$  to hold the retaining-plate  $d$  in its proper working position.

In the casing  $a^2$  is mounted a shaft  $f^5$ , which projects beyond the casing at both ends. On the projecting end of the said shaft  $f^5$ , which corresponds to the ratchet-wheel end of the shaft  $b$ , is located a loosely-pivoted rocking lever  $f^6$  and a co-operating clutch device  $f^7$ ,  $f^8$ , and  $f^9$ . Of the said parts  $f^7$  is a disk rendered rigid with the shaft  $f^5$ .  $f^8$  is a strap or ring loosely surrounding the said disk, and  $f^9$  is a clutch-lug which works through a pas-

sage in the ring  $f^8$  and is carried by the rocking lever  $f^6$ . The passage for the lug  $f^9$  is intercepted by the circle of the disk  $f^7$ , and the lug  $f^9$  is cut away on one side. Hence, on the rocking of the lever  $f^6$  downward at its forward end, the lug  $f^9$  will be made to clamp the ring  $f^8$  tightly against the disk  $f^7$  and thereby turn the shaft  $f^5$  forward one step every time the lever  $f^6$  is rocked downward at its forward end. A spring  $f^{10}$  tends to rock the lever  $f^6$  in the reverse direction, or otherwise stated, to pull the rear end of the same downward, and in this motion of the said lever  $f^6$  the lug  $f^9$  will be turned within its seat or passage in the ring  $f^8$ , so as to clear the disk  $f^7$  and loosen the ring  $f^8$ . This permits the clutch to slip on the return stroke of the lever  $f^6$ , so as to get its bite for the next step on the disk  $f^7$ . The forward end of the lever  $f^6$  underreaches a lug or shoulder  $b^{13}$  of the lever  $b^2$ , and hence the clutch-lever device will be operated directly from the lever  $b^2$  and indirectly from the needle-bar, and will impart a step-by-step motion to the said shaft  $f^5$  within the rear casing  $a^2$ . A stop  $f^{11}$  serves to limit the return stroke of the lever  $f^6$ , and thereby fixes the throw of the said lever and the length of step of rotary movement imparted to the shaft  $f^5$ . On its opposite end the shaft  $f^5$  is provided with the segmental pinion  $f^{12}$ , which is made fast to the shaft. This pinion works within an enlarged longitudinal slot  $f^{13}$  of a double-rack pitman  $f^{14}$ , having rack-teeth  $f^{15}$  cut on the facing edges of said slot  $f^{13}$ , as shown in Fig. 1, but having no teeth at the opposite ends of the said slot. The said rack-pitman  $f^{14}$  is pivotally connected at its rear end to a slotted lever  $f^{16}$ , which is pivoted at its upper end to the rearwardly-extending arm  $a^5$  of the frame. The clamp-slide  $c'$  has at its rear end an upwardly-extended slotted arm  $c^4$ , and the said parts  $c^4$  and  $f^{16}$  are connected by a pivot-rod  $c^5$  and jam-screw  $c^6$  through their respective slots, which connection may therefore be adjusted to vary the stroke of the lever  $f^{16}$  in its effect on the arm  $c^4$  and the slide  $c'$ . From the intermittent or step-by-step rotary motion of the shaft  $f^5$ , therefore, a step-by-step longitudinal feed-motion may be imparted to the slide  $c'$  through the double-rack pitman  $f^{14}$  and its connections  $f^{16} c^4 c^5 c^6$ , as just above noted. The rack-pitman is held in position with respect to the pinion by a suitable washer and thumb-screw, as shown at  $f^{17}$ .

All the devices so far described are exactly like those shown in my above-referred-to pending case, and will operate substantially in the same way for imparting to the cloth-clamp slide its longitudinal and vibratory feed motions. The longitudinal feed is automatically reversible by the segmental pinion  $f^{12}$ , turning from one set of the said rack-teeth  $f^{15}$  to the other at the opposite limits of the slide's movement; and while this turn of the said segmental pinion is being made through the toothless part of the slot



$f^{13}$  the cloth-clamp slide  $c\ c'$  will not receive any longitudinal motion. During this pause the cross-head  $f$ , which forms the fulcrum for the vibratory movement of the cloth-clamp slide, will be shifted, and in exactly the time required for the proper co-operation with the vibratory movement of the slide to work around the end of the buttonhole. The means for imparting this lateral shift to the said cloth-clamp slide constitutes my present improvement and will now be described.

On the shaft  $f^5$  in the rear casing  $a^2$  is mounted a cam-wheel  $g$ , provided with a pair of diametrically - opposite peripheral cam lugs or studs  $g'$ , which lugs stand in staggered relation to each other, or, in other words, are located near opposite margins of the cam-wheel. The cam-wheel  $g$  is fixed to the shaft  $f^5$  by set-screw  $g^2$ , or in any other suitable way. To the pivoted lever  $f'$ , below the cam-wheel  $g$ , is eccentrically pivoted a disk or shifting block  $g^3$  by means of a set-screw  $g^4$ , or in any other suitable way. The shifting-block  $g^3$  is provided with a raised triangular surface  $g^5$ , with the large end of the triangle facing the pivot-stud  $g^4$ . The ends of this triangular surface adjacent to the pivot  $g^4$  form striking-shoulders  $g^6$  for co-operation with the studs  $g'$  on the cam-wheel  $g$ . The shifting-block  $g^3$  is of such size that it will snugly fit its seat in the frame, as shown in Fig. 5, but may be turned thereon under the action of the lugs  $g'$  and the shoulders  $g^6$ . The wheel  $g$  turns constantly in one direction, as shown by the arrows in Fig. 3, and the shifting-block  $g^3$  stands related thereto, as shown in Figs. 3 and 5. Hence whenever the wheel  $g$  makes a half-turn one of the lugs  $g'$  on the wheel will come in contact with one of the shoulders  $g^6$  on the shifting-block  $g^3$  and turn the same in its seat until the shoulder  $g^6$  will clear the lug  $g'$ . The turning of the shifting-block  $g^3$  in this manner will shift the pivot  $g^4$  and the forward end of the lever  $f'$ , which lever  $f'$  will carry with it the cross-head  $f$ , which forms the fulcrum for the cloth-clamp slide. The said shifting-block  $g^3$  is shown in one of its extreme positions in Figs. 3, 4, and 5, which is the position into which it was thrown by the left-hand member of the lugs  $g'$  on the wheel  $g$  with respect to Fig. 6. After the right-hand member of the said lugs  $g'$  of the wheel  $g$  operates on the right-hand shoulder  $g^6$  of the shifting-block  $g^3$ , which it is shown as about to do in Fig. 5, the said cam  $g^3$  will be returned toward the left into its opposite extreme position, and thereby the cross-head or fulcrum  $f$  for the cloth-clamp slide  $c'$  will be brought into its opposite extreme position. The wheel  $g$  makes a half-turn while the cloth-clamp slide makes its complete travel in one direction. While the shifting-block  $g^3$  is rocking from one to the other of its extreme positions the cloth-clamp slide is free from any longitudinal motion and the needle is working around the end of the buttonhole, as above noted. By the time the

segmental pinion turns through the toothless part of the pitman-slot  $f^{13}$  the shifting-block  $g^3$  will have been given its movement and the cross-head  $f$  or fulcrum for the vibrating cloth-clamp slide  $c\ c'$  will have been shifted laterally as required, to make the needle operate on the opposite side of the buttonhole during the return longitudinal feed movement of the said cloth-clamp slide.

When the shifting-block  $g^3$  is in either of its two extreme positions, the pivot  $g^4$  thereof will be so nearly in the line of strain which falls on the lever  $f'$  from the fulcrum or cross-head  $f$ , under the vibratory movement of the cloth-clamp slide, that the said shifting-block will not be moved by said vibrating action of the cloth-clamp slide. To further insure this result of maintaining its set position the shifting-block  $g^3$  may be so shaped with respect to its seat that it will bind slightly therein when in its extreme or set position, and will move freely into or out of its set position.

It is obvious that with the switching mechanism above described, the cloth-clamp slide may be shifted laterally at the opposite ends of its longitudinal travel, as required for properly working the buttonhole.

If it is desired to use this machine for tacking, the cross-head or fulcrum  $f$  may be thrown backward until its center is in line with the axis of the screw-bolt  $f^2$ , which forms the pivot for the lever  $f'$ , in which event no lateral movement will be imparted to the said fulcrum or cross-head  $f$  under the swinging or shifting movement of the lever  $f'$ .

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

1. In a sewing machine attachment, the combination with a cloth clamp slide mounted for both longitudinal and lateral movements, of a longitudinal feed device for said slide operative from the needle-bar, and a switch for laterally shifting said slide at the extremes of its longitudinal movement, comprising a cross-head working in a slot in said slide, a shifting-block working in a seat in the frame, and eccentrically connected to parts movable with said cross-head, and a wheel receiving motion from said needle-bar, provided with driving lugs, in staggered arrangement, alternately operative on said shifting-block to shift said cloth clamp slide, substantially as described.

2. In a sewing machine attachment, the combination with a cloth clamp slide, mounted for both longitudinal and lateral movement, of a longitudinal feed device for said slide, operated from the needle-bar, and a switch for laterally shifting said slide at the extremes of its longitudinal movement, comprising a pivoted lever having a cross-head working in a slot in the slide, a shifting-block eccentrically pivoted to said lever and working in a seat in said frame, a wheel receiving rotary motion from the needle bar and forming part of the longitudinal feed device of said cloth clamp slide, and driving lugs on said wheel



in staggering relation to each other and operative alternately on said shifting-block to shift said cloth clamp slide, substantially as described.

5 3. In a buttonhole working attachment for sewing machines, the combination with the cloth clamp slide  $c\ c'$ , having the longitudinal slot  $c^2$ , of the rotary wheel  $g$  receiving motion from the needle-bar having the studs  
10  $g'$  opposite and in staggered relation to each other, the cross-head or fulcrum  $f$  mounted on the pivoted lever  $f'$  and engaging the said slot of said slide, the shifting-block  $g^3$  having the shoulders  $g^6$ , and eccentrically pivoted to  
15 said lever  $f'$ , and means for imparting a reversible longitudinal feed to the said cloth clamp slide, under the action of the needle-bar, substantially as described.

4. In a buttonhole working attachment for  
20 sewing machines, the combination with the cloth clamp slide  $c\ c'$  having the slot  $c^2$ , of the

shaft  $f^5$  receiving a step-by-step rotary motion, in a constant direction, under the action of the needle-bar, the segmental pinion  $f^{12}$  on  
said shaft, the double rack pitman  $f^{11}$ , the  
25 racks of which alternately engage with said pinion, the connections  $c^4\ c^5\ c^6$  and  $f^{16}$  from said pitman to said slide, the lever  $f'$  having the cross-head or fulcrum block  $f$  engaging  
the slot  $c^2$  of said slide, the wheel  $g$  on the  
30 shaft  $f^5$ , having the opposite and staggered studs  $g'$ , the shifting-block  $g^3$  eccentrically pivoted at  $g^4$  to the lever  $f'$ , and the raised shoulders or lugs  $g^6$  on said shifting-block  $g^3$ ,  
35 for cooperation with the studs  $g'$  on the wheel  $g$ , all operating substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN D. SCHOONMAKER.

Witnesses:

NATHAN B. HYDE,  
LIZZIE WEEKE REED.