

No. 627,114.

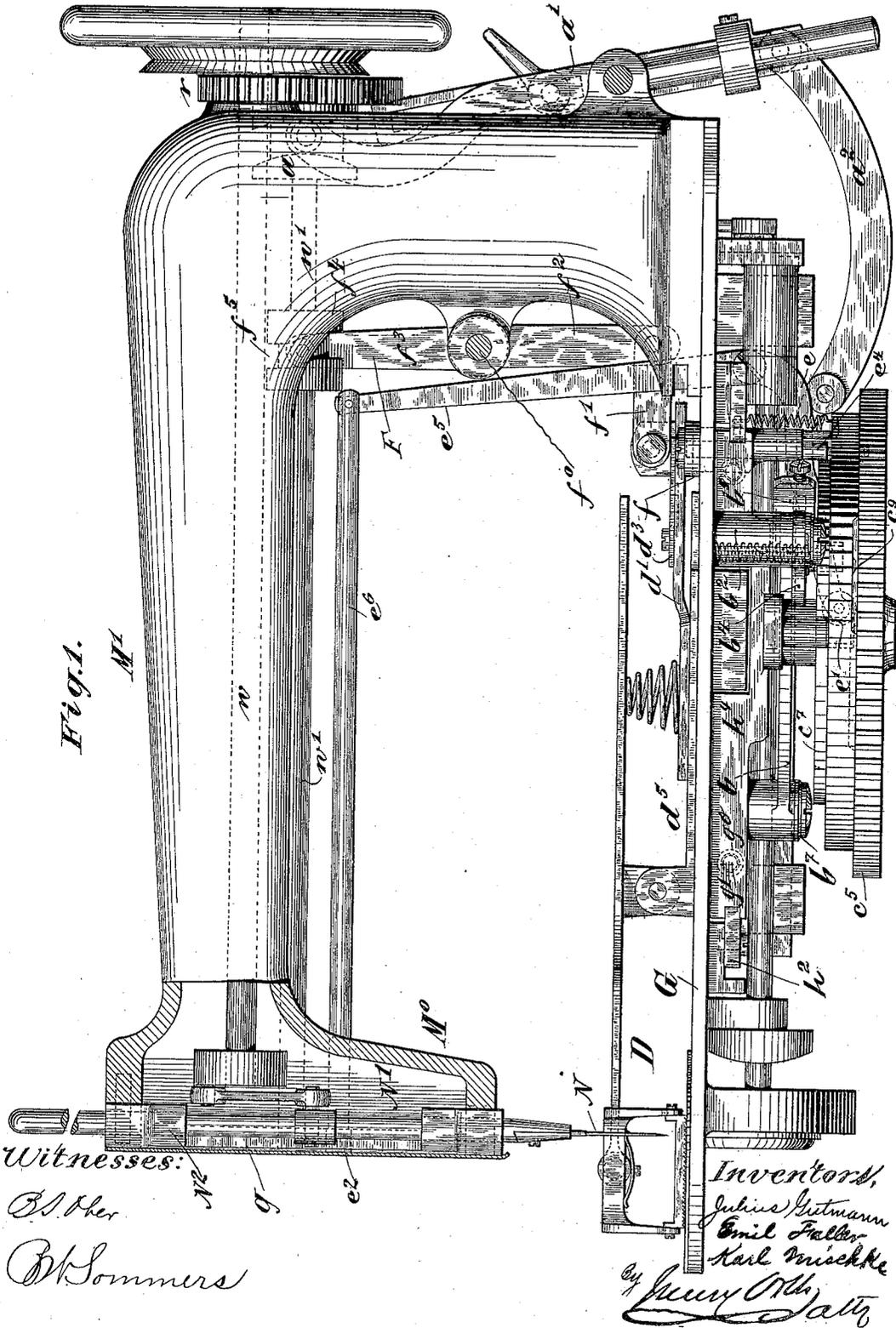
Patented June 20, 1899.

J. GUTMANN, E. FALLER & K. MISCHKE.
BUTTONHOLE SEWING MACHINE.

(Application filed Aug. 31, 1897.)

(No Model.)

8 Sheets—Sheet 1.



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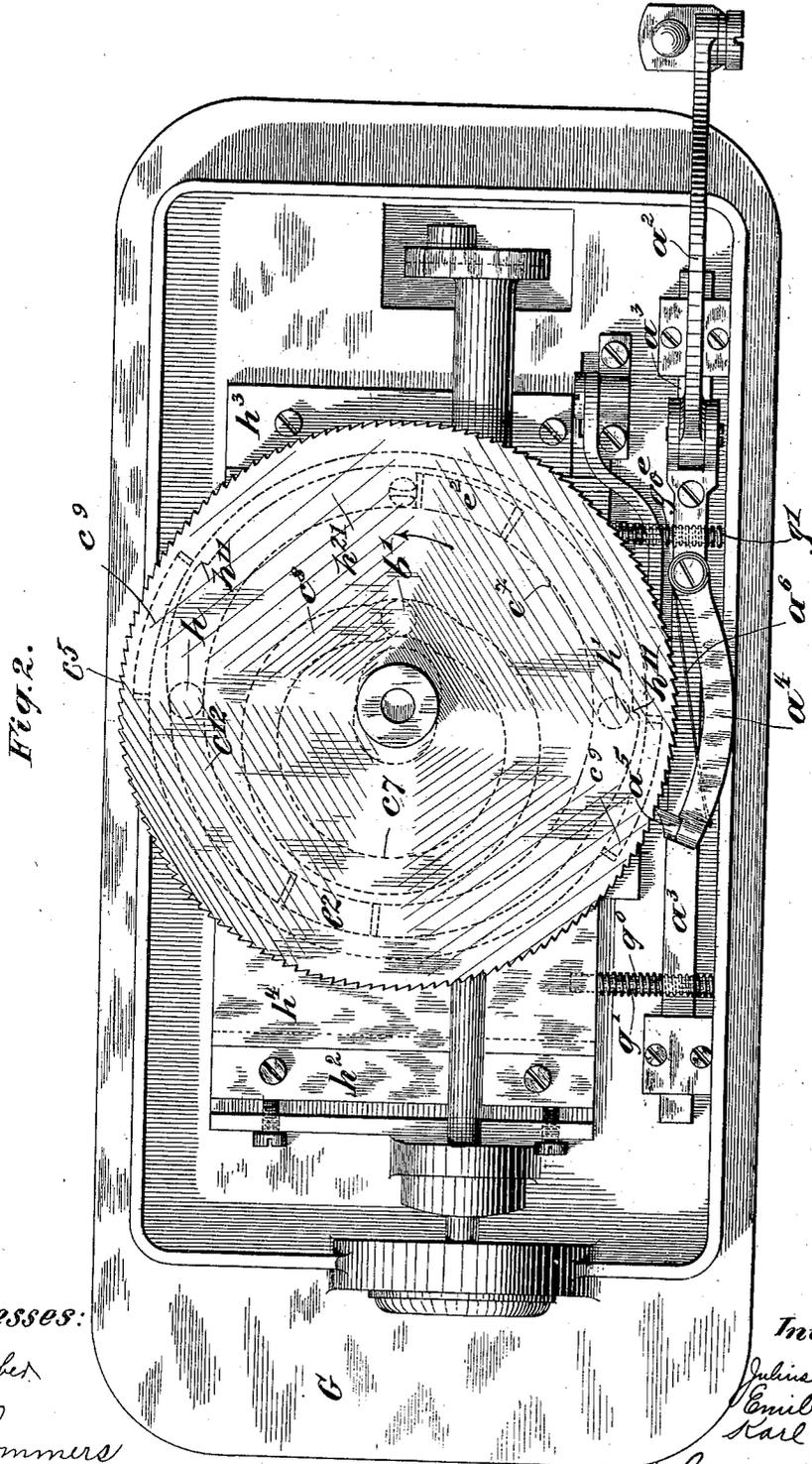


Fig. 2.

Witnesses:

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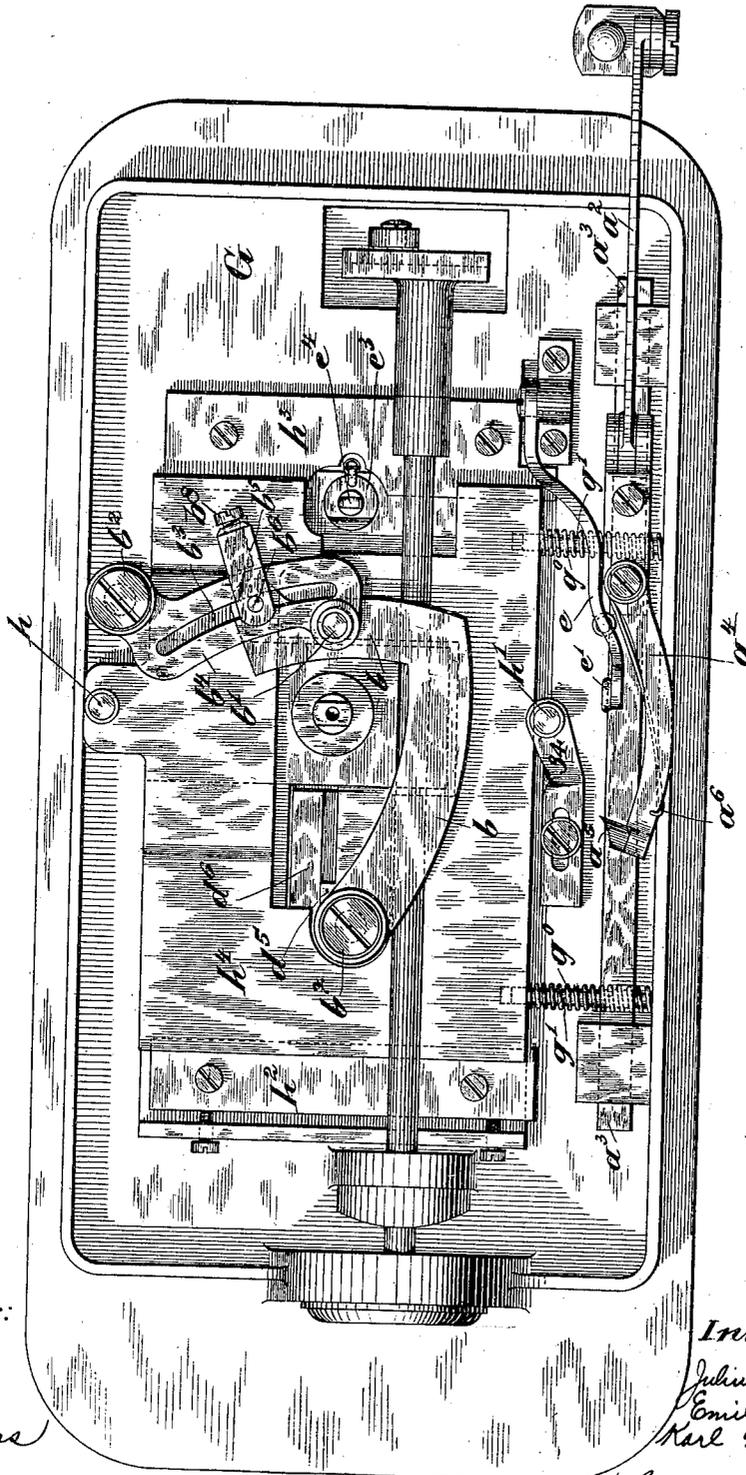
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(No Model.)

8 Sheets—Sheet 3.

Figs.



Witnesses:

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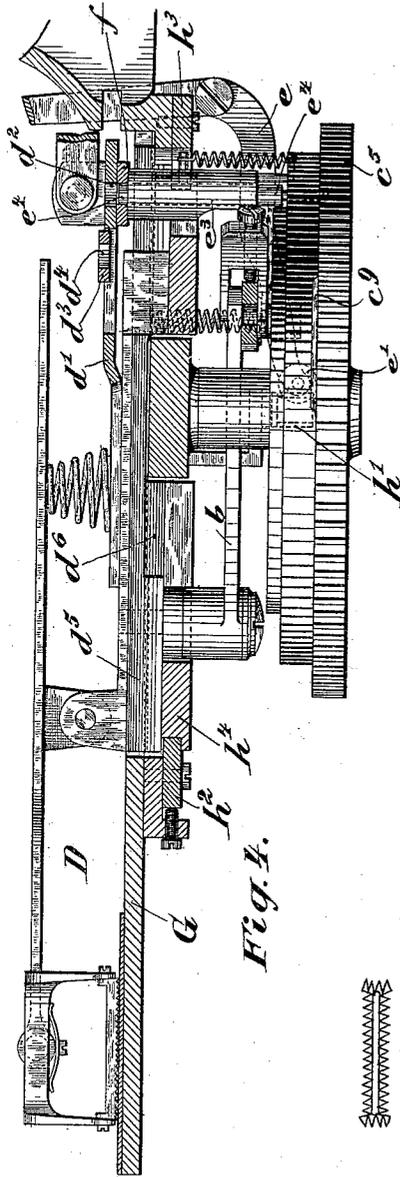


Fig. 4.

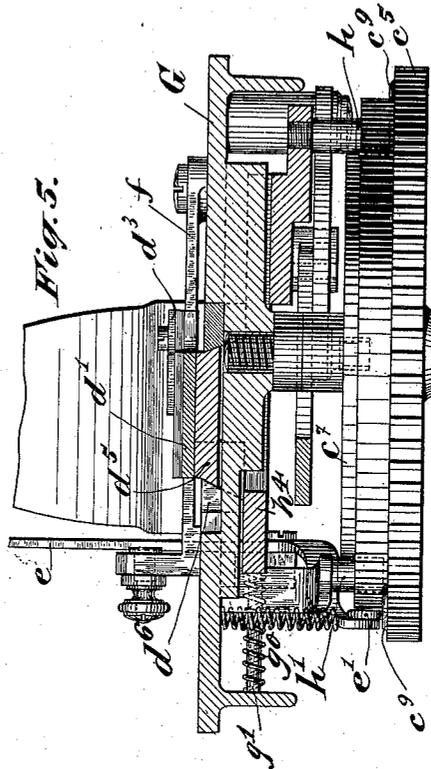


Fig. 5.



Fig. 5a.

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8 Sheets—Sheet 5.

Fig. 6.

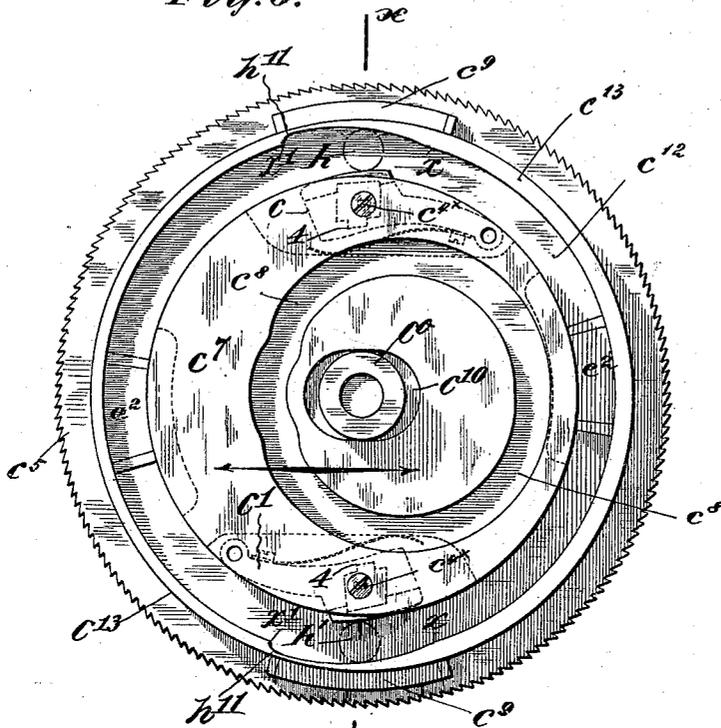


Fig. 7.

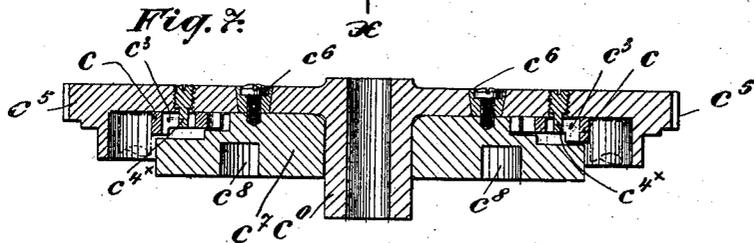
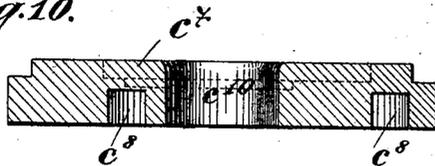


Fig. 10.



Witnesses:

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Fig. 8.

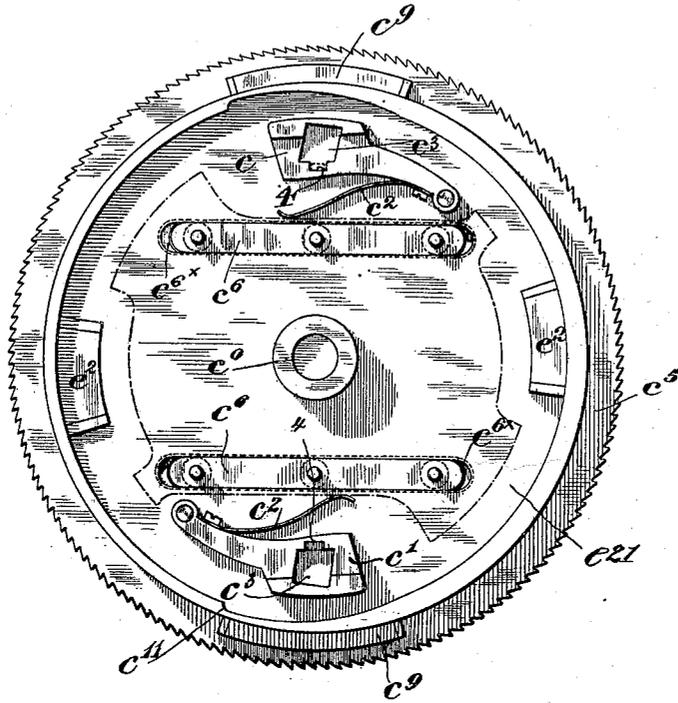
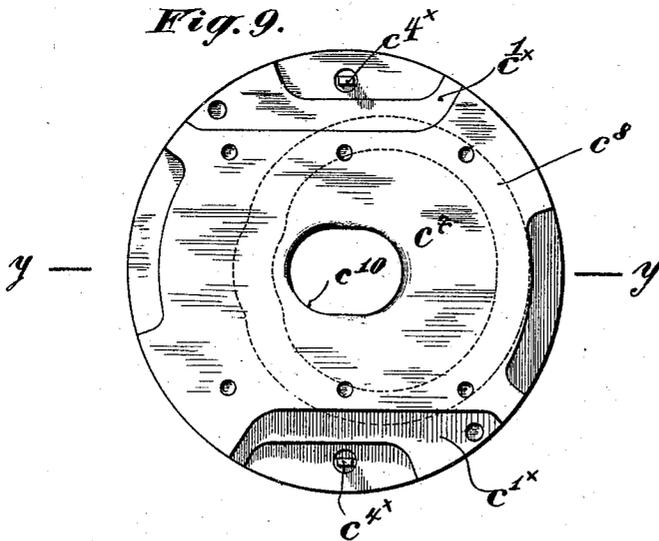


Fig. 9.



Witnesses:

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Fig. 11.

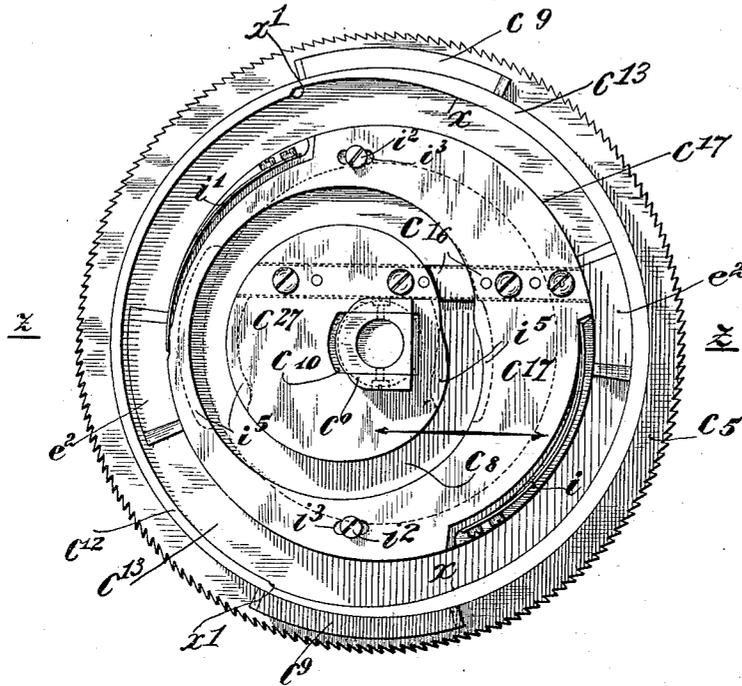


Fig. 12.

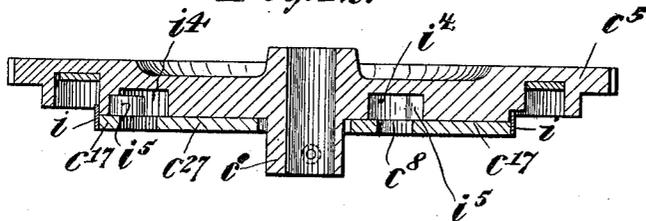


Fig. 15.



Witnesses:

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Fig. 13.

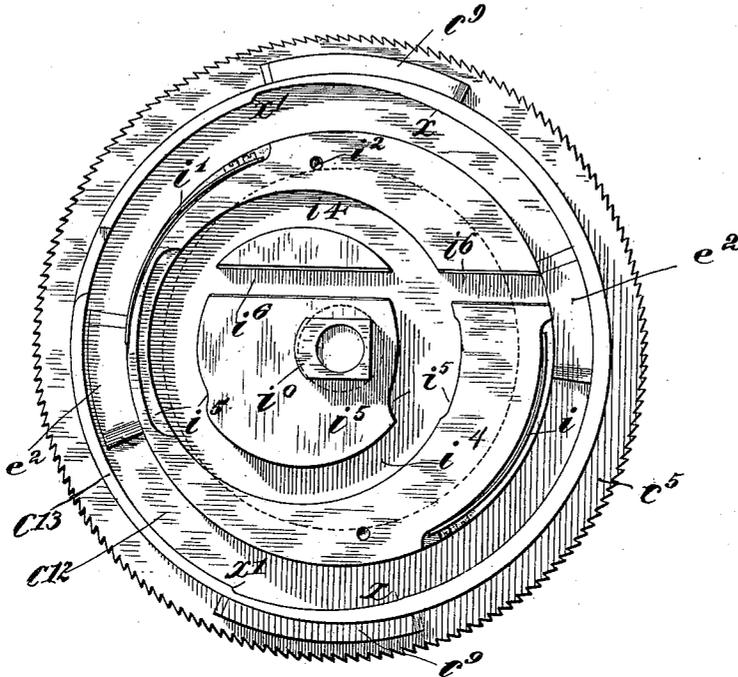
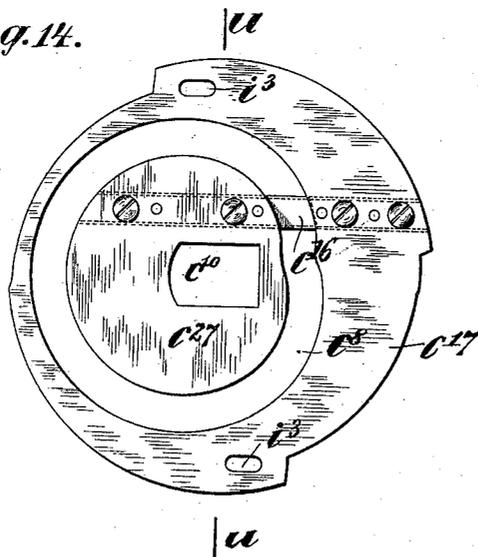


Fig. 14.



Witnesses:

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Attys

UNITED STATES PATENT OFFICE.

JULIUS GUTMANN, OF BERLIN, GERMANY, AND EMIL FALLER AND KARL MISCHKE, OF ZURICH, SWITZERLAND, ASSIGNORS TO THE FIRMA FABRIK FÜR SPEZIALNAHMASCHINEN ACTIEN-GESELLSCHAFT, (PATENTE JULIUS GUTMANN,) OF ZURICH, SWITZERLAND.

BUTTONHOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 627,114, dated June 20, 1899.

Application filed August 31, 1897. Serial No. 650,162. (No model.)

To all whom it may concern:

Be it known that we, JULIUS GUTMANN, residing at Berlin, Germany, and EMIL FALLER and KARL MISCHKE, residing at Zurich, Switzerland, have invented certain new and useful Improvements in Buttonhole-Sewing Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

Our present invention has relation to buttonhole-sewing machines of the Gutmann type organized to bind the edges of a buttonhole in the usual manner and bar the ends thereof by stitches laid parallel with said edges or substantially so.

Our said invention has for its object certain improvements on the machine shown and described in Letters Patent of the United States to Julius Gutmann, dated November 29, 1898, No. 615,165, whereby certain parts of the mechanism are materially simplified, as will hereinafter be more specifically pointed out.

In the accompanying drawings, Figure 1 is side elevation of a buttonhole-sewing machine organized substantially like the machine shown and described in the application for patent referred to and embodying our improvements. Figs. 2 and 3 are under side views of the bed-plate, the feed-wheel being removed in Fig. 3. Figs. 4 and 5 are longitudinal vertical and transverse sectional views, respectively, of a portion of the bed-plate and feed mechanism. Fig. 5^a is a stitch diagram. Fig. 6 is a top plan view of the feed-wheel. Fig. 7 is a cross-section thereof on line *xx* of Fig. 6. Fig. 8 is a top plan view of the feed-wheel, the cam-disk *c'* being removed. Fig. 9 is an under side view; and Fig. 10 a cross-section, of said disk *c'*. Figs. 11 to 15, inclusive, show a modified and preferred construction of the feed-wheel, Fig. 11 being a top plan view and Fig. 12 a section on line *zz* of Fig. 11 of said wheel. Fig. 13 is a top plan view of the feed-wheel with the cam-disk removed. Fig. 14 is a like view of the cam-

disk detached, and Fig. 15 is a cross-section thereof.

As shown in the aforementioned patent, the work-holder holds the work with the buttonhole lengthwise of the bed-plate, the needle-bar in binding a buttonhole edge reciprocating vertically and vibrating crosswise of the buttonhole, while said work-holder receives a progressive or feed motion lengthwise of said buttonhole. When the work-holder reaches the limit of the aforesaid feed motion, the vibration of the needle-bar is stopped and the work-holder receives a reciprocating motion lengthwise of the buttonhole, and simultaneously therewith a progressive motion crosswise of the buttonhole, whereby one end of said buttonhole is barred by stitches laid as above set forth. When said end is barred, the operation of binding is repeated, the direction of the progressive feed motion of the work-holder lengthwise of the buttonhole being reversed, and when the opposite edge is bound the barring operation is repeated, the direction of the progressive feed motion of the work-holder crosswise of the buttonhole being also reversed, the parts being again in the position from which they started, as fully described in the patent above referred to.

In Figs. 1 to 5, *G* indicates the bed-plate of the machine; *w*, the main driving-shaft, which has its bearings in the overhanging machine-arm and imparts to the needle-bar *N'* its vertical reciprocating motion; *w'*, the shaft which imparts to the needle-bar frame *N''* its vibrating motion, and *e*⁶ the stop-bar, carrying at its outer or left end a suitable stop-piece *e*², adapted to engage the needle-bar frame and stop its vibrations. The stop-bar is actuated periodically through a two-armed lever *e*⁵, having its fulcrum below the bed-plate *G*, Figs. 2 and 3, the lower arm *e* of which lever carries a roller *e'* in the path of cam projections *c*⁹ on the upper face of the feed-wheel *c*⁵, Fig. 5. The feed-wheel *c*⁵ receives progressive or feed motion from a pawl *a*⁵ on a pawl-arm *a*⁴, pivoted to a guide-slide *a*³, connected with a link *a*², that is reciprocated by a lever *a*¹, which latter receives a continuous vibrat-

ing motion from a cam-grooved sleeve a on the external shaft w' , that vibrates the needle-bar frame N^2 .

The feed-wheel c^5 has in its upper face a suitable cam-groove c^8 , the aforesaid cam projections c^9 , cam projections e^2 , and an annular groove c^{12} , the inner face of the outer wall of which is provided with gradually-deepening recesses h^{11} h^{11} , said grooves being formed as hereinafter described.

The work-holder D comprises a slide d^5 , that has motion lengthwise of the bed-plate or buttonhole in suitable ways d^6 in a cross-slide h^4 below said bed-plate, which cross-slide has motion crosswise of the bed-plate in or on guides h^2 h^3 , and to slide d^5 is pivoted the cloth-clamp or clamping-lever, which is held to its work by a coiled spring interposed between its left arm and the slide d^5 . To this slide d^5 is also secured a plate d' , that has near its left end a transverse slot d^2 , and to said plate is adjustably secured a smaller plate d^3 , in which is formed a transverse slot d^4 , similar to slot d^2 .

On its under side the slide d^5 has a post b^7 , which projects through a longitudinal slot in the cross-slide h^4 , by means of which post the slide d^5 is connected with the aforesaid feed-groove c^8 in the feed-wheel c^5 .

To the cross-slide h^4 is secured a pin h , which carries a roller, and at a suitable point or diametrically opposite pin h there is a second pin h' , which also carries a roller and is secured to an arm 34 , adjustable longitudinally of the bed-plate by means of a binding-screw passing through a suitable slot in said arm and screwing into said bed-plate.

The reciprocating motion hereinabove referred to is imparted to the work-holder slide d^5 from a lever F , fulcrumed at f^0 to the machine-arm, said lever F receiving a continuous vibratory motion from a sleeve f^4 , having a suitable cam-groove f^5 , which acts upon the arm f^3 of said lever F . The arm f^2 of lever f is connected by a link f' with the free end of a lever f , arranged transversely of the bed-plate, to which the opposite end is fulcrumed, and said lever has a longitudinal slot adapted to register with one or the other of the two slots d^2 d^4 in plate d' on slide d^5 .

In a suitable sleeve e^3 is loosely guided a pin e^4 , held to the face of the feed-wheel c^5 by a spring, Fig. 4, in the path of the projections e^2 e^2 thereon and hereinbefore referred to, which projections periodically lift the pin through the slot in lever f into one or the other of the two slots d^2 d^4 , thereby coupling the work-holder D with lever f , whereby said work-holder is reciprocated lengthwise of the bed-plate and buttonhole. The progressive motion in one direction crosswise of the bed-plate is imparted to the work-holder D , as heretofore stated, from the lower slide h^4 , acted on by springs g^0 g^0 , that tend to move the same in one direction and through the pin h on said slide and one of two recesses h^{11} in the inner

face of the outer flange c^{13} of the groove c^{13} in the feed-wheel c^5 above referred to. The said slide is moved in an opposite direction or against the stress of its springs g^0 through its said pin h and the other recess h^{11} . These recesses h^{11} are formed in the inner face of flange c^{13} at diametrically opposite points by diverging segments relatively to the axis of rotation of the feed-wheel, forming reverse inclines, so that as the feed-wheel revolves in the direction of arrow, Fig. 2, the pin h rides along the outward incline from x to x' of one recess h^{11} , allowing the springs g^0 to move the slide h^4 gradually across the bed-plate G . When, on the other hand, the pin h rides along the reverse or inward incline from x' to x of the other recess h^{11} , it will be moved in an opposite direction or against the stress of springs g^0 .

All of the mechanisms hereinabove described are in their general organization and operation the same as the corresponding mechanisms described in the aforesaid patent of Julius Gutmann, with such exceptions as are fully pointed out herein.

The progressive feed motion lengthwise of the bed-plate and buttonhole is imparted to the work-holder, as stated, from the eccentric portions of the cam-groove c^8 in feed-wheel c^5 through the medium of a lever b , pivoted to the post b^7 , hereinabove referred to, on the under side of the work-holder slide d^5 , which lever b is pivoted to a lever b^4 , fulcrumed on the under side of the bed-plate at b^2 , Fig. 3, and carries the pin b' , that projects into the aforesaid cam-groove c^8 . This mode of connecting the work-holder with the feed-wheel simplifies the mechanism materially.

The lever b^4 has a segmental slot b^8 , through which and the fork of a clamp b^5 passes the pin b^6 , by means of which lever b is connected with lever b^4 , the clamp b^5 being clamped to lever b^4 by means of a screw b^8 , whereby the amplitude of the progressive feed movements of the work-holder can be varied.

In barring a buttonhole end the vibration of the needle-bar, as has been stated, is stopped, while the work-holder receives a reciprocating motion lengthwise of the bed-plate and buttonhole through instrumentalities hereinabove fully referred to and at the same time a progressive motion crosswise of the bed-plate through instrumentalities also fully described. During the operation of barring the pin b' lies in one of the concentric portions of the cam-groove c^8 in feed-wheel c^5 , and in order that the work-holder may reciprocate lengthwise of the bed-plate appliances have to be provided whereby said work-holder is uncoupled from the feed-wheel during the operation of barring and again coupled thereto during the binding operation, as described in the patent of J. Gutmann above referred to. This involves rather complicated mechanism, and one of the objects of this invention is to dispense with said coupling

devices. To this end, and as more clearly shown in Figs. 6 to 10, we use a feed-disk c^7 , provided with the cam-groove c^8 , which disk and the circular flange c^{13} on feed-wheel c^5 form the circular groove c^{12} above referred to. The disk c^7 is connected with the feed-wheel c^5 by means of guide-rails c^6 , seated in parallel slots on opposite sides of the axis of said wheel, in which slots said rails are free to reciprocate, the slots and rails being preferably made with their sides converging upwardly to prevent vertical displacement, as shown in Fig. 7. The disk c^7 has an oblong axial aperture c^{10} , through which the hub c^0 of the feed-wheel passes, so that said disk can reciprocate on said hub.

It is obvious that when the work-holder slide d^5 is reciprocated as described the pin b' on lever b^4 , which, as above stated, lies in one of the concentric portions of the cam-groove c^8 and feed-disk c^7 , will cause the latter to reciprocate with the pin, together with the lever b , while said lever b^4 merely vibrates on its pivot b^3 .

The disk c^7 and feed-wheel c^5 are coupled and uncoupled by means of spring-actuated latches c and c' , pivoted to the upper face of the said feed-wheel on opposite sides of the hub thereof, and work in recesses c^x in the under face of disk c^7 , Fig. 9, the springs for said latches tending to throw them outwardly, the free end of said springs having bearing on the inner wall of the recesses c^x . (See Figs. 6 and 8.) The latches c and c' have an opening c^3 , in the inner wall of which is formed a recess 4, into which project studs c^{4x} on the under side of the disk c^7 , Figs. 6, 7, and 9, the opening c^3 in said latches being of such a diameter as to admit of the reciprocation of the disk c^7 when said latches are moved out of engagement with the studs c^{4x} . This is effected by the pin h on the lower slide h^4 , and by the pin h' on the under side of the bed-plate G , heretofore referred to, the arrangement being such that as soon as one edge of a buttonhole is bound the said pins will ride along the outer edge of the latches, which project into the aforesaid circular groove c^{12} in the feed-wheel, whereby said latches are moved inwardly out of engagement with the stud c^{4x} , at which moment the work-holder D d^5 is reciprocated for the production of barring-stitches, and as soon as one end of the buttonhole is barred said rollers again move out of contact with said latches, whereby they are again moved into engagement with the studs c^{4x} by their springs c^2 .

In Figs. 11 to 15 we have shown a modified and preferred construction of disk c^7 and means for coupling the same to and uncoupling it from the feed-wheel c^5 . In this construction the reciprocating disk is formed in two parts c^{17} and c^{27} , having their proximate faces so shaped as to form the cam-grooves c^8 , through which the progressive feed motion lengthwise of the buttonhole is imparted to the work-holder D d^5 . The said parts are

connected together by a slide-bar c^{16} , having endwise motion in a transverse groove i^6 in the upper face of the feed-wheel c^5 , and the part c^{17} is secured to said feed-wheel by means of screws i^2 , extending through transverse slots i^3 of sufficient length to permit the two-part disk to reciprocate with the work-holder in the direction of arrow, Fig. 11, under the action of pin b' on work-holder slide d^5 . The two-part disk c^{17} c^{27} is held against reciprocation by springs i^1 , secured to the feed-wheel, the stress of said springs being overcome by the power applied to the work-holder to reciprocate the same, which power is transmitted to the two-part disk by the aforesaid pin b' . In the upper face of the feed-wheel is formed a cam-groove i^4 of the same shape as the cam-groove c^8 between the two parts c^{17} and c^{27} of the two-part feed-disk; but at diametrically opposite points said groove is widened, as at i^5 , to enable the pin and its roller b' on the work-holder carrier d^5 , projecting into groove c^8 , to partake of the reciprocations of the work-holder.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. In a buttonhole-sewing machine, the combination with stitch-forming appliances comprising a reciprocating and vibrating needle-bar, the work-holder, a progressively-revolving feed-wheel, a cam-disk revolving with and reciprocating on said wheel, intermediate mechanism controlled by the cam-disk and imparting to the work-holder a progressive feed motion lengthwise of the buttonhole; of feed-changing appliances for changing the progressive motion of the work-holder lengthwise of the buttonhole to one crosswise thereof, and means for simultaneously reciprocating the work-holder lengthwise of the buttonhole and for stopping the vibration of the needle-bar, for the purpose set forth.

2. In a buttonhole-sewing machine, the combination with stitch-forming appliances comprising a reciprocating and vibrating needle-bar, the work-holder, a progressively-revolving feed-wheel, a cam-disk revolving with and reciprocating on said wheel, intermediate connections controlled by the cam-disk and imparting to the work-holder a progressive feed motion lengthwise of the buttonhole; of feed-changing mechanism for changing the progressive feed motion of the work-holder lengthwise of the buttonhole to one crosswise thereof, a continuously-reciprocating element, means for automatically connecting the same with the work-holder when its direction of feed is changed, and means for simultaneously stopping the vibration of the needle-bar, for the purpose set forth.

3. In a buttonhole-sewing machine, the combination with the work-holder, a progressively-revoluble feed-wheel, a feed-disk composed of two concentric parts forming between them a cam-slot, a bar connecting the parts of said disk and sliding in a rectilinear groove

in the feed-wheel, springs on said wheel having bearing on opposite edges of the cam-disk, and mechanism connected with the work-holder, one element of which mechanism is
5 provided with a pin projecting into the aforesaid cam-slot; of means for reciprocating the work-holder when the aforesaid pin passes into a concentric portion of the cam-slot in the cam-disk, and means for simultaneously
10 imparting to said work-holder a progressive feed motion crosswise of the buttonhole, for the purposes set forth.

In testimony that we claim the foregoing as

our invention we have signed our names in presence of two subscribing witnesses.

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EMIL FALLER.
KARL MISCHKE.

Witnesses to the signature of Julius Gutmann:

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W. HAUPT.

Witnesses to the signatures of Emil Faller and Karl Mischke:

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MORITZ VEITH.