No. 677,391. Patented July 2, 1901.

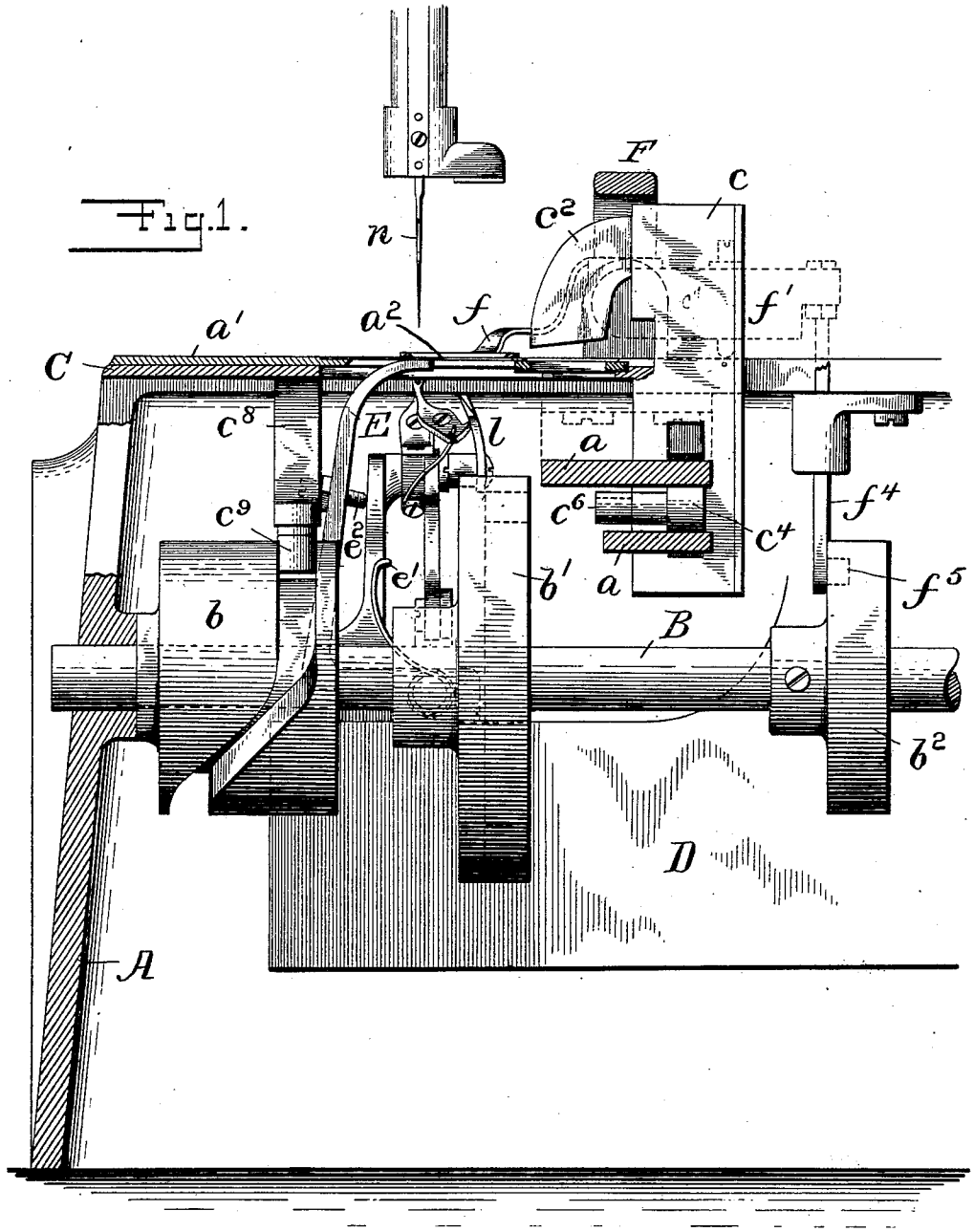
E. B. ALLEN.

BUTTONHOLE SEWING MACHINE.

(Application filed Aug. 3, 1900.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

F. N. Rochrich

C. M. Sweeney.

INVENTOR:

Edward B. Allen

BY

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 677,391. Patented July 2, 1901.

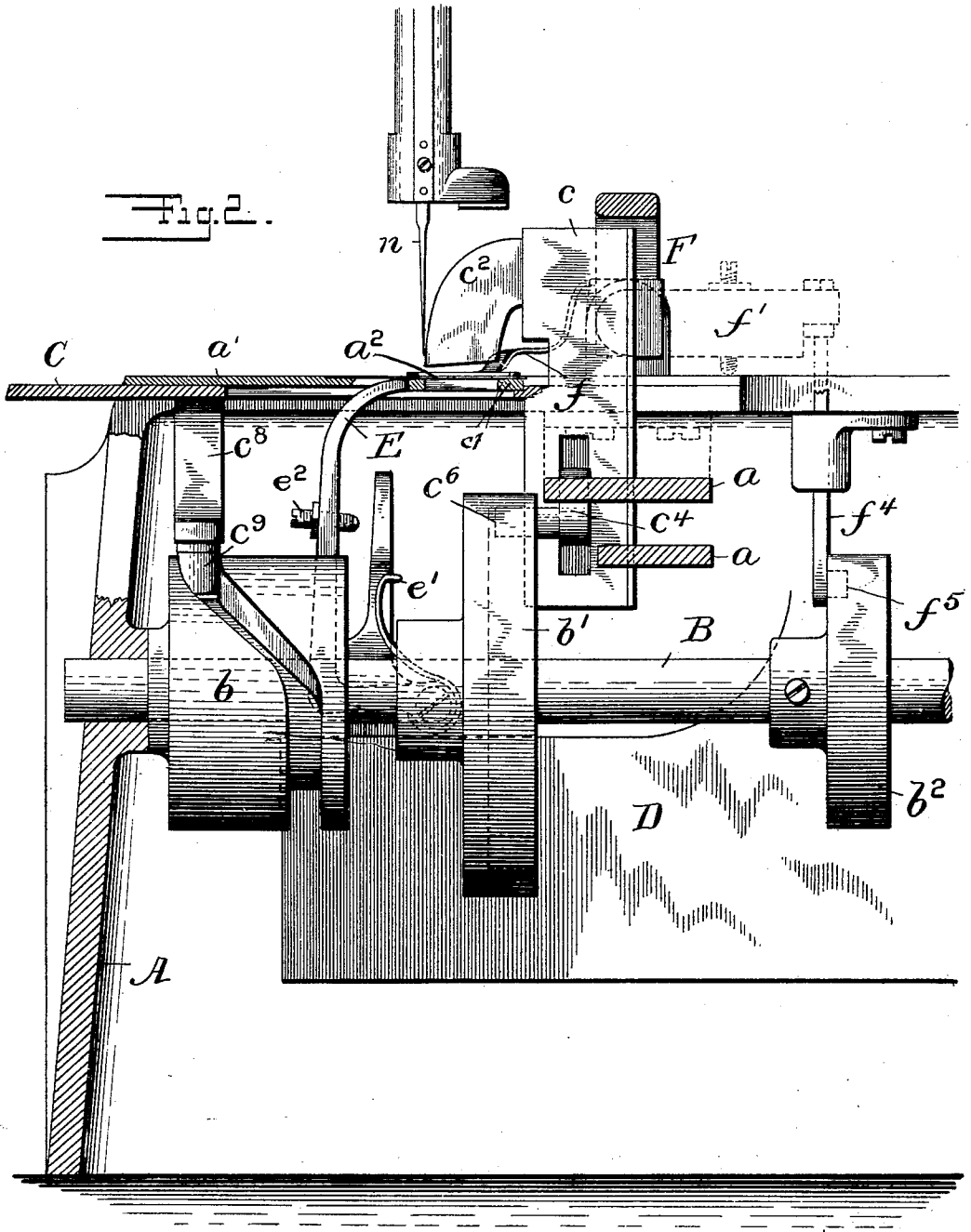
E. B. ALLEN.

BUTTONHOLE SEWING MACHINE.

(Application filed Aug. 3, 1900.)

(No Model.) 4 Sheets—Sheet 2.

Fig. 2.



WITNESSES:

F. N. Roehrich

C. M. Smeltzer.

INVENTOR:

Edward B. Allen,

BY Henry Galvert.

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 677,391. Patented July 2, 1901.

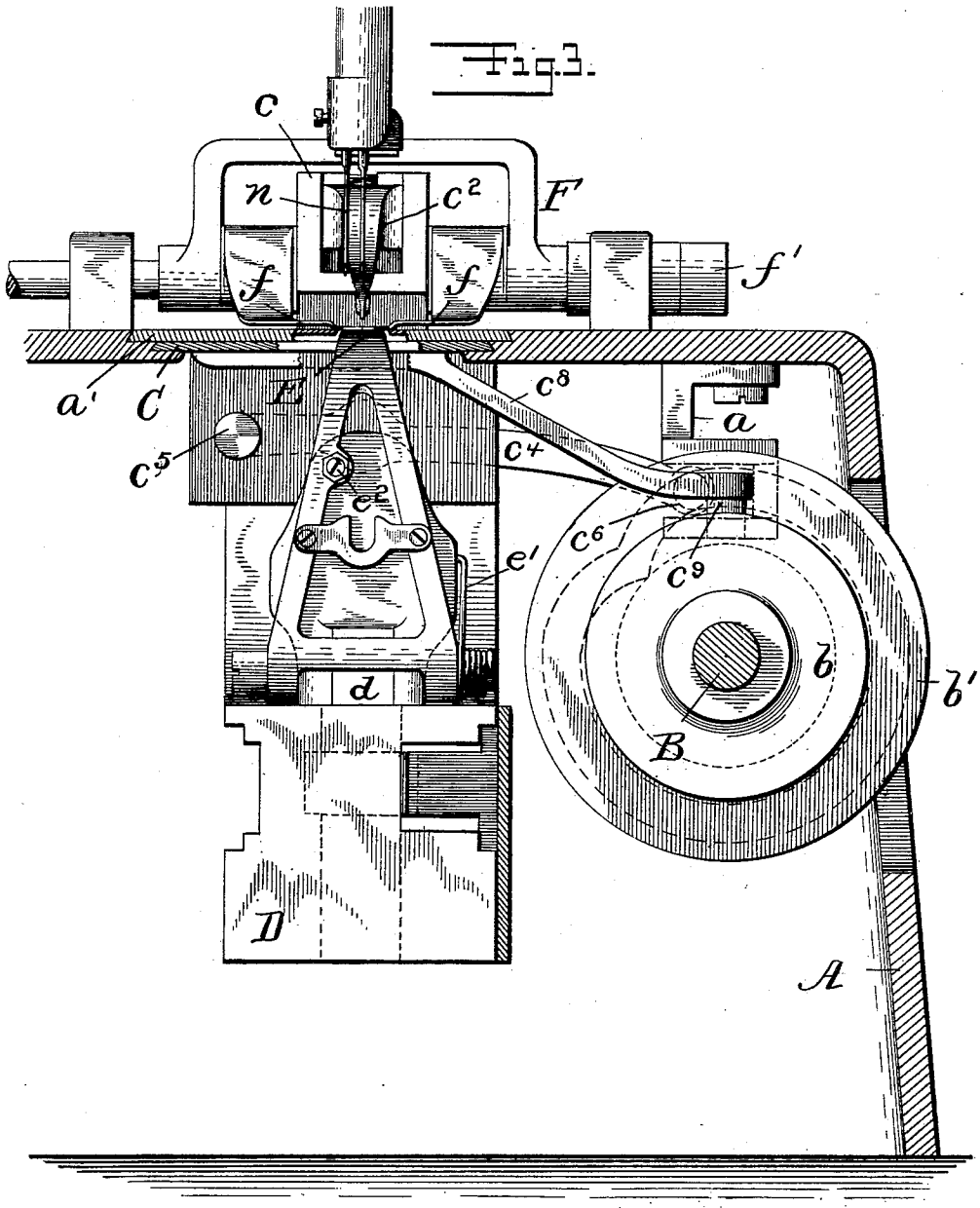
E. B. ALLEN.

BUTTONHOLE SEWING MACHINE.

(No Model.) (Application filed Aug. 3, 1900.)

4 Sheets—Sheet 3.

Fig. 3.



WITNESSES:

F. N. Rockrich

L. M. Sweeney.

INVENTOR:

Edward B. Allen,

BY Kemp & Calver,

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 677,391. Patented July 2, 1901.

E. B. ALLEN.

BUTTONHOLE SEWING MACHINE.

(No Model.) (Application filed Aug. 3, 1900.) 4 Sheets—Sheet 4.

Fig. 5.

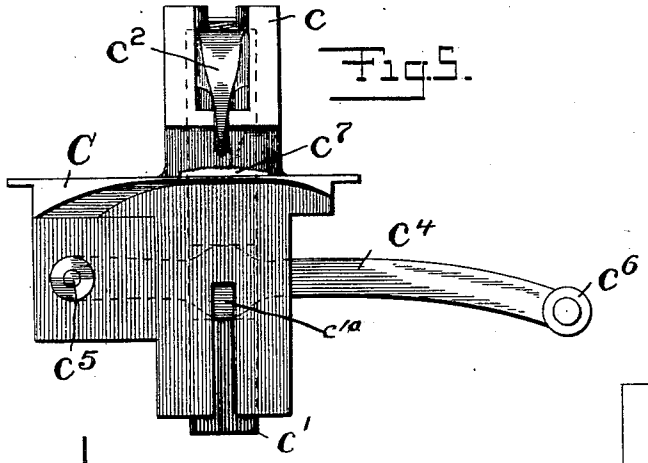
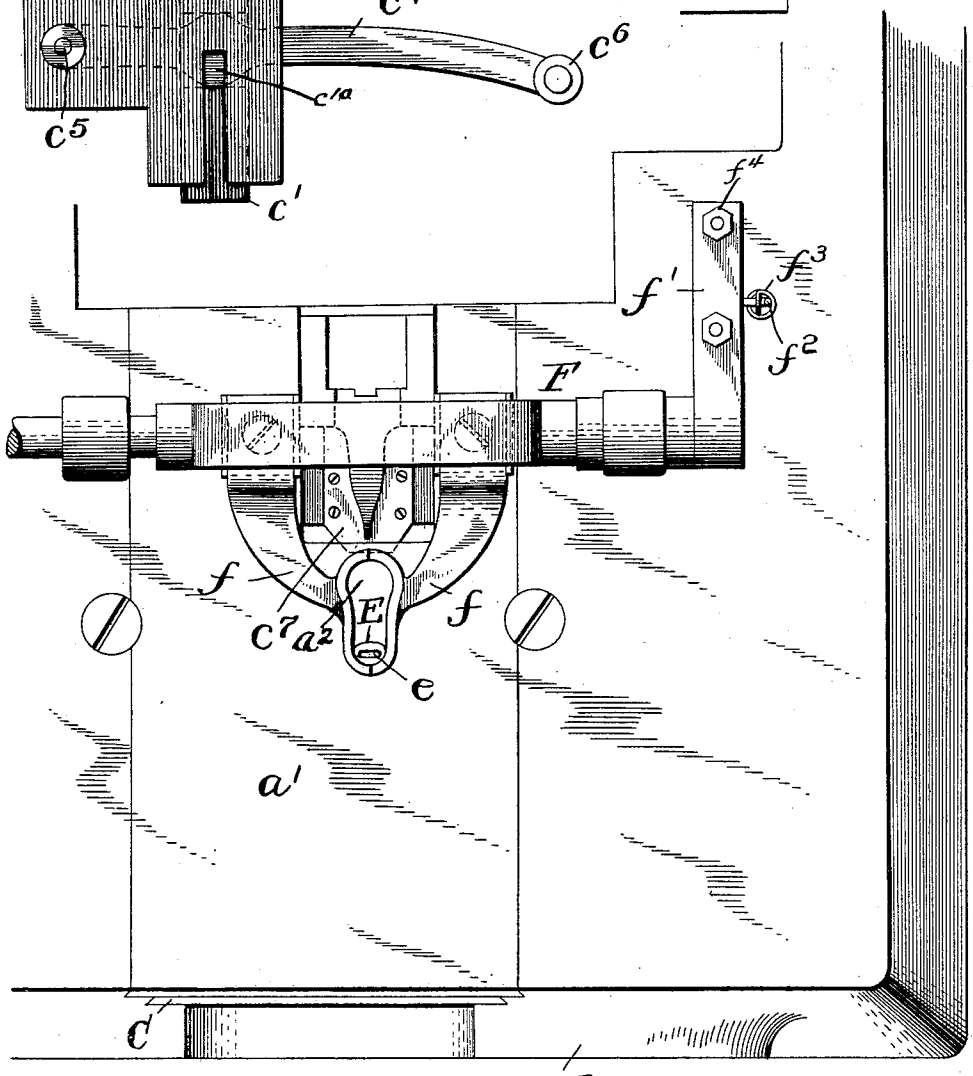


Fig. 4.



WITNESSES:

F. N. Boehrisch

C. M. Sweeney

INVENTOR:

Edward B. Allen,

BY Henry Calvert,

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, OF NEW JERSEY.

BUTTONHOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 677,391, dated July 2, 1901.

Application filed August 3, 1900. Serial No. 25,778. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Buttonhole-Sewing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of buttonhole-sewing machines in which an automatic cutter is employed and in which the buttonhole-slits are cut when the work is in stitching position beneath the needle or needles of the machine; and the invention has for its object to provide means whereby the cutting devices may be brought into cutting position beneath the needle or needles without displacing or disturbing the looping mechanism of the machine. To this end the invention comprises a movable throat-plate which supports the work immediately beneath the needle or needles and which is provided with a needle hole or slot, said throat-plate preferably having a hinged or pivotal mounting and being yieldingly held in working position by a spring, so that it may be displaced or pushed out of the way by the cutter throat-plate or die, constituting the lower member of the cutting devices, when the said cutting devices are advanced to cut the work held in stitching position in the clamp, and so that the needle throat-plate will be automatically returned to its normal or working position by said spring when the cutting devices are moved out of the way.

In the accompanying drawings, Figure 1 is a sectional elevation of a portion of a buttonhole-sewing machine embodying the invention with the needle throat-plate in stitching position and with the cutting devices removed to their inoperative position. Fig. 2 is a similar view with the cutting devices in cutting position and with the needle throat-plate displaced from its normal position. Fig. 3 is a sectional elevation taken at a right angle to Figs. 1 and 2. Fig. 4 is a plan view showing the cutting devices and work-clamp, and Fig. 5 is a detail view of the cutting devices and of the sliding plate on which they are mounted.

Referring to the drawings, A denotes the base or a portion of the work-frame of a buttonhole-sewing machine, which in general construction may be of any ordinary or suitable character, but in which the stitching mechanism will preferably be mounted for periodical rotation in stitching around the eyes of the buttonholes and may be caused to travel to space the stitches about the buttonholes.

B denotes a rotating shaft suitably connected with the main driving-shaft of the machine, so as to perform one rotation for each buttonhole to be stitched, said shaft being provided with cams b b' b^2.

C is a sliding plate on which the cutting devices are mounted, said plate, as herein shown, having a fixed hollow standard or post c, in which a bar or stock c' is fitted to slide vertically, and c^2 is the cutter, suitably attached to said bar or stock and operated to cut the buttonholes by means of a lever c^4 of the second order, pivoted at its inner end on the pin c^5, supported by a depending part of the standard or post c. The lever c^4 is provided at its outer or free end with a pin c^6 to enter a groove in the cam b', said lever having a loose connection between its ends with the cutter-carrying bar or stock c' by means of the rounded portion c^{10} of said lever working in a suitable notch in the said cutter-carrying bar or stock.

To the sliding plate C is attached the lower cutting member, herein shown as a comparatively thin throat-plate or die c^7, having an opening to receive the cutter c^3, which passes down into said throat-plate or die in cutting. The sliding plate C is provided with a rigid arm c^8, having a pin or roller-stud c^9 arranged to enter the groove of the cam b, which thus serves to move the said sliding plate and the cutting devices mounted thereon toward and from the stitching mechanism at suitable intervals.

D denotes a portion of the stitching-frame of the machine and which will preferably be movable relative to the base or work-frame A. Mounted on the stitching-frame D is a (preferably rotary) standard d, which serves as a support for the looping mechanism l, cooperating with the needle or needles n, but

which looping mechanism is omitted from Figs. 2 and 3 of the drawings for clearness of illustration. Pivotally mounted on the looper-supporting standard d is a lever E, the upper end of which is provided with a slot or opening e for the passage of the needle or needles, and which thus serves as a needle throat-plate to support the work around the needle or needles. Connected with the hinge or pivot of the throat-plate-carrying lever E is a spring e', one part of which engages the standard d, so as to serve to hold said lever and throat-plate in the working or stitching position, (shown in Fig. 1,) but which spring will yield when the cutting devices advance to the cutting position, (shown in Fig. 2,) the throat-plate or top of the lever E being engaged and pushed away from beneath the needle or needles by the lower cutting device or die c^7 as the cutting devices advance toward the stitch-forming devices to cutting position. When the cutting devices are moved away from the stitching devices after a buttonhole-slit has been cut, the spring e' restores the throat-plate lever to its normal place to bring the throat-plate to working position, the movement of said lever under the influence of said spring being limited by a stop consisting, as herein shown, of the adjustable screw e^2, tapped in said lever and abutting against the standard d.

When the cutting devices are removed to their inoperative position away from the stitching devices, they carry the cutter-operating lever c^4 and its attached pin or stud c^6 away from the cam b', by which said lever is actuated, and to hold the said lever in such position that the pin or stud c^6 will register with the groove of the said cam when the cutter is moved to cutting position the work-frame or base A is provided with a rigid bracket a, having a slot in which the outer end of the lever c^4 closely fits, said slot being of sufficient extent so that the end of the pin or stud c^6 will enter the groove of the cam b' before the said lever is disengaged from said bracket, and the said pin being of sufficient length so that when the cutting devices begin to recede said lever will enter the slot in the said bracket a before the said pin entirely leaves its cam-groove, and thus said pin will always be retained in position to register with its cam-groove even when entirely removed therefrom.

The work-clamp herein shown comprises a stationary work-plate a', supported on the base or work-frame A and having a suitable buttonhole-opening a^2 beneath and corresponding in shape to the opening in the clamping-foot f, mounted on a rocker F, having an arm f' provided with a hook f^2, to which is attached a spiral spring f^3, the lower end of which is suitably connected with some part of the base or frame A, so that said spring will have a tendency to lift the foot f to open the clamp. To the arm f' of the rocker F is also attached a rod f^4, provided at its lower end with a pin or roller-stud f^5, entering a groove of the cam b^2, which will be so timed as to close the clamp when the work has been inserted and just before the cutter is advanced to cut a buttonhole-slit. The arm f' is preferably provided with an adjustable stop-screw (shown in dotted lines in Figs. 1 and 2) which serves to limit the downward movement of said arm when the clamp-frame F is rocked to open the clamp.

The operation of the invention will be readily understood from the foregoing. When the work has been placed in clamping position and the machine is started, the shaft B performs a single rotation, first closing the clamp, next advancing the cutting devices to the stitching devices, and in so doing displacing the movable throat-plate without in any manner disturbing the non-tilting looping devices, next depressing the cutter to cut a buttonhole-slit, and then raising said cutter, and finally removing the cutting devices from the stitching devices and permitting the spring e' to restore the throat-plate to working position in readiness for the stitching operation.

I am aware that it is not new, broadly, in buttonhole-stitching machines to cut the buttonhole-slits when the work is in stitching position but this has heretofore been effected in some machines by so mounting the looping devices that they could be tilted out of the way when the cutting devices, comprising a cutter and a block or anvil coöperating therewith, were advanced to cutting position beneath the needle or needles. This construction is, however, more or less objectionable, as the pivotal mounting of the support for the looping devices is liable to result in a displacement of the said looping devices relative to the needles, as the looping devices may not always be accurately returned to their proper working positions, (particularly after the machines have become somewhat worn by use, so that the joints are loose,) and thus skipped stitches are liable to occur. In the present invention the use of a thin open die into or through which the cutter descends enables the cutting devices to be brought beneath the needle or needles without requiring the displacement of the looping devices, as has heretofore been done in bringing a thick cutting block or anvil beneath the needles, and thus I am enabled to employ non-tilting or relative stationary looping devices which are not displaced from their working positions when cutting the work in stitching position, and the accurate working positions of the looping devices are in the present invention never disturbed. The present invention is therefore not to be understood as being limited to the details herein shown and described, as these may be varied widely without departing from the essence of the invention.

I claim—

1. In a buttonhole-stitching machine, the combination with a stitch-forming mechan-

ism comprising non-tilting looping devices, of upper and lower cutting devices movable in unison horizontally toward and from the stitch-forming devices, automatic means for shifting said cutting devices horizontally and for causing the same to perform their cutting function, a needle throat-plate independent of said cutting devices, automatic means for displacing said throat-plate from working position when the said cutting devices are shifted toward the stitch-forming devices to cut a buttonhole-slit in stitching position, and automatic means for restoring said throat-plate to its working position when the cutting devices are removed from the stitching devices.

2. In a buttonhole-stitching machine, the combination with stitch-forming devices, of upper and lower cutting devices movable in unison toward and from said stitch-forming devices, automatic means for shifting said cutting devices toward and from said stitch-forming devices and for causing them to perform their cutting function, a needle throat-plate separate from or independent of said cutting devices, a spring for yieldingly holding said throat-plate in its normal or working position and for restoring it to said position after it has been displaced, and means for displacing said throat-plate from working position when the cutting devices are moved toward said stitch-forming devices.

3. In a buttonhole-stitching machine, the combination with stitch-forming devices, of upper and lower cutting devices movable toward and from said stitch-forming devices, automatic means for shifting said cutting devices toward and from said stitch-forming devices and for causing them to perform their cutting function, a movable needle throat-plate separate from or independent of said cutting devices, and a spring for yieldingly holding said throat-plate in its normal or working position and for restoring it to said position after it has been displaced, said yielding throat-plate being arranged to be engaged by the lower member of the said cutting devices so as to be displaced from working position thereby when the cutting devices are shifted toward the said stitch-forming devices.

4. In a buttonhole-stitching machine, the combination with stitch-forming devices, of two cutting members movable toward and from said stitch-forming devices and comprising a lower member consisting of a thin open throat-plate or die down into which the upper member or die descends, automatic means for operating said upper member, a movable needle throat-plate separate from or independent of said lower cutting member, automatic means for displacing said needle throat-plate from working position when the cutting members are shifted toward the said stitch-forming devices, and automatic means for restoring said needle throat-plate to its normal or working position when the said cutting members are removed from the said stitch-forming devices.

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

EDWARD B. ALLEN.

Witnesses:
HENRY CALVER,
HENRY J. MILLER.