

No. 767,539.

PATENTED AUG. 16, 1904.

E. B. ALLEN.

BUTTONHOLE CUTTING AND STITCHING MACHINE.

APPLICATION FILED APR. 21, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

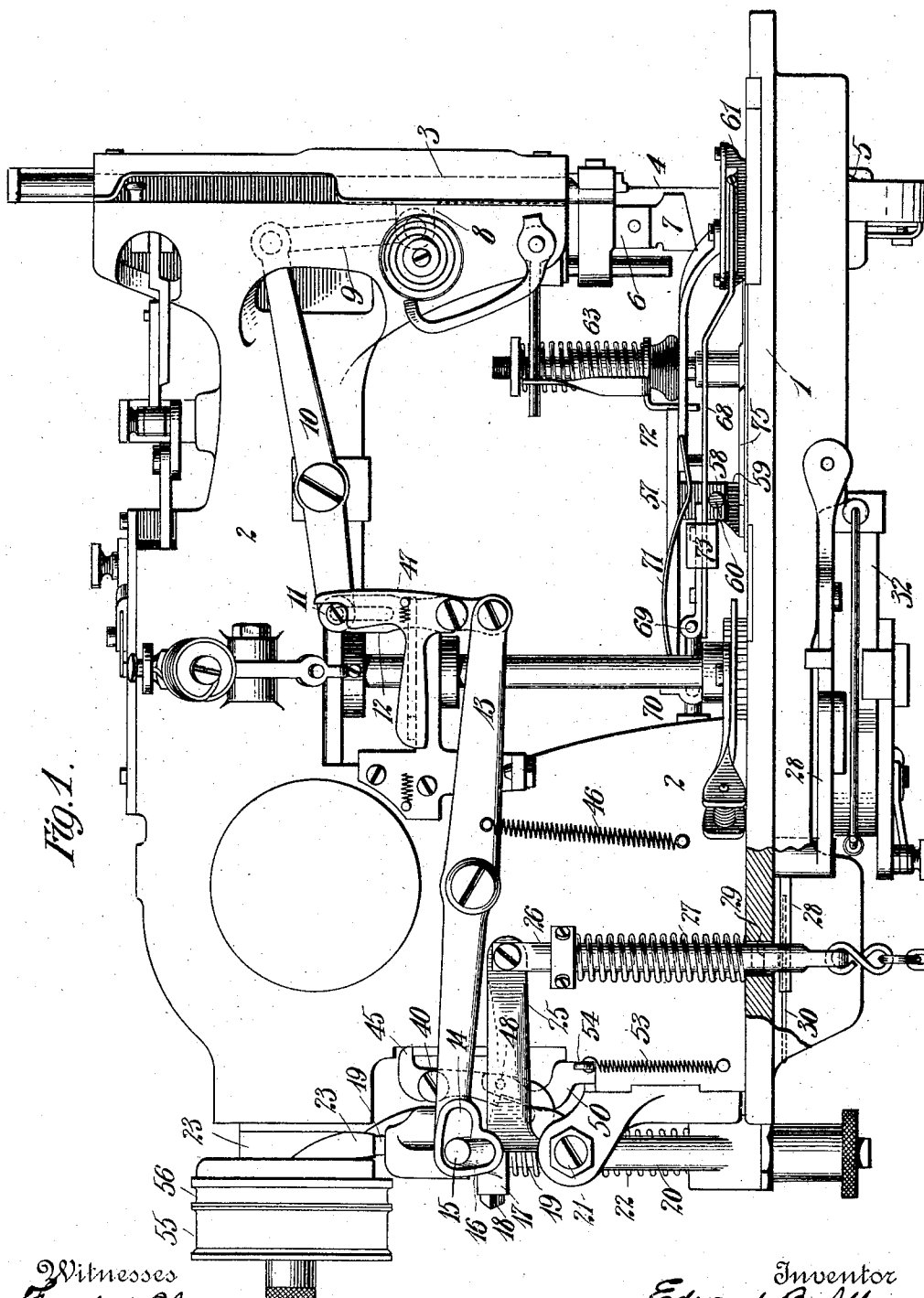


Fig. 1.

Witnesses
Thos. S. Allen
H. Komman.

Inventor
Edward B. Allen,
By His Attorney
Henry J. Miller.

No. 767,539.

PATENTED AUG. 16, 1904.

E. B. ALLEN.

BUTTONHOLE CUTTING AND STITCHING MACHINE.

APPLICATION FILED APR. 21, 1904.

NO MODEL.

3 SHEETS—SHEET 2.

Fig. 4.

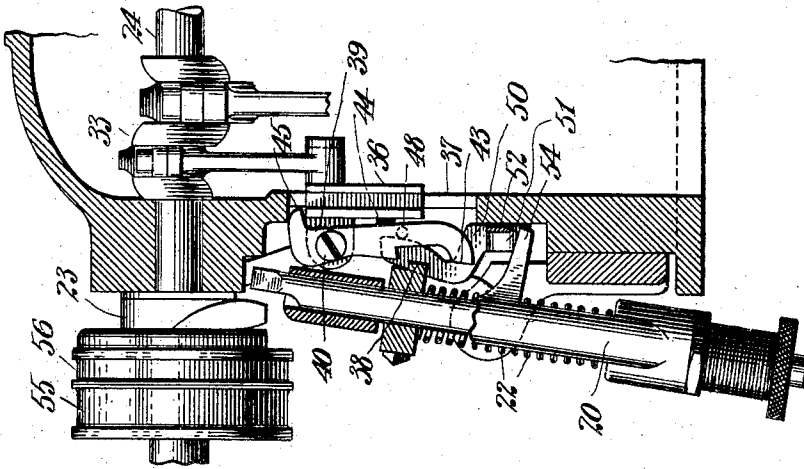


Fig. 3.

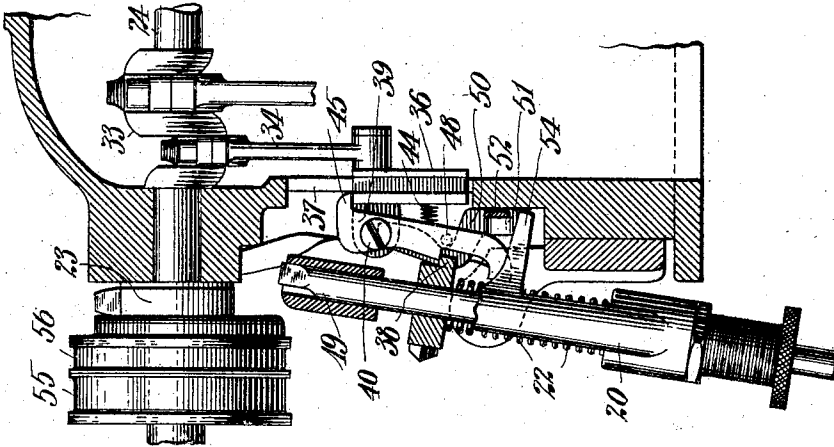
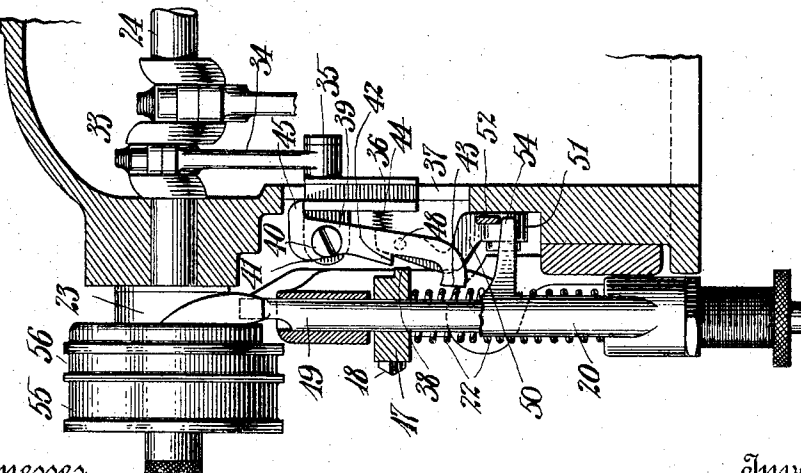


Fig. 2.



Witnesses
Frank S. Ober
H. Komemann.

Inventor
Edward B. Allen,
By his Attorney
Henry J. Miller.

No. 767,539.

PATENTED AUG. 16, 1904.

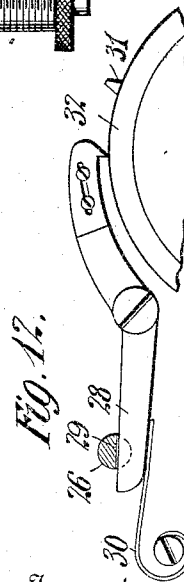
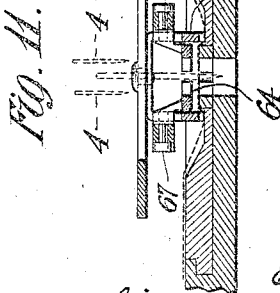
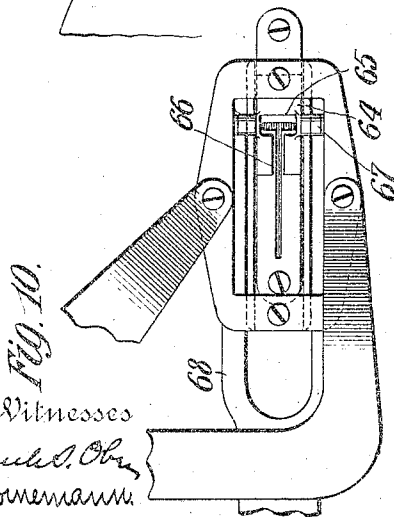
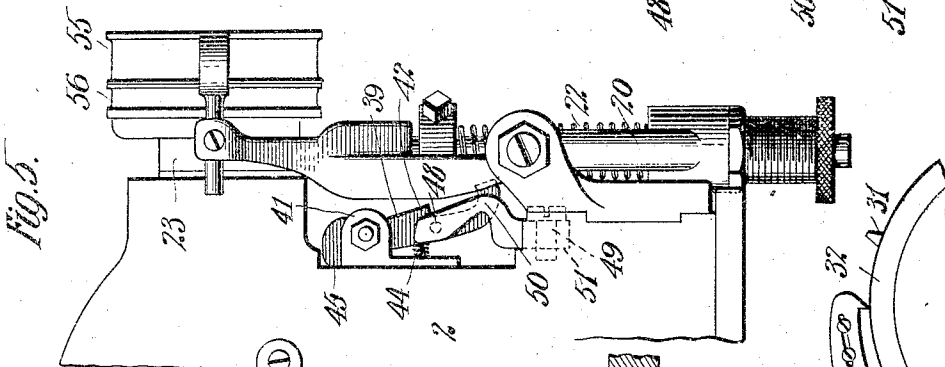
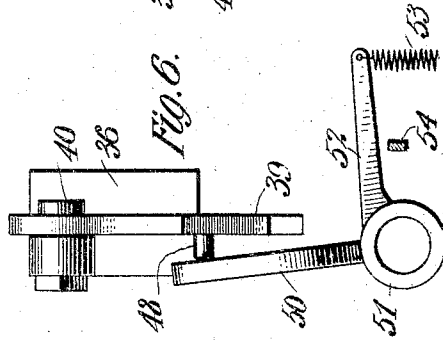
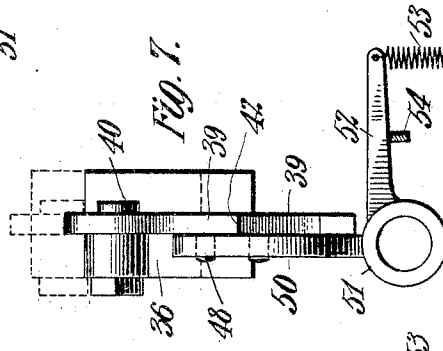
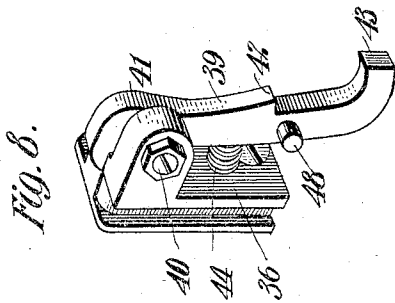
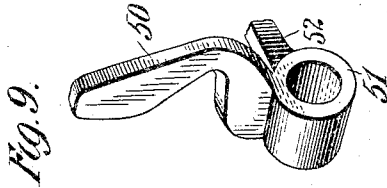
E. B. ALLEN.

BUTTONHOLE CUTTING AND STITCHING MACHINE.

APPLICATION FILED APR. 21, 1904.

NO MODEL.

3 SHEETS—SHEET 3.



Witnesses
Hans A. Ober
H. R. Hermann

Inventor
Edward B. Allen
By his Attorney
Amory & Miller.

UNITED STATES PATENT OFFICE.

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

BUTTONHOLE CUTTING AND STITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 767,539, dated August 16, 1904.

Application filed April 21, 1904. Serial No. 204,159. (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 Cutting and Stitching Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in that class of buttonhole cutting and stitching machines forming the subject of the United States Patent No. 738,591, granted to me September 8, 1903, and more particularly to a modification of the specific cutting mechanism of such machine forming the subject of the United States Patent No. 743,213, granted to me November 3, 1903.

The invention has for its primary object to adapt machines of this class for cutting the buttonhole-slit prior to the stitching operation, whereby the cut edge of the material is wholly covered by the overseam stitched along its edges instead of presenting the somewhat rough or ragged edge which has been produced heretofore in certain classes of work by cutting the buttonhole-slit subsequent to the stitching operation.

The present improvement consists partly in a buttonhole-stitching machine provided with a suitable stop-motion device and cutting mechanism comprising a continuously-operating actuator, a cutting-knife, and connections between said actuator and said knife including an intermittently-acting coupling operatively connected with a member of the stop-motion device for effecting the cutting action.

The invention further includes a presser-plate of special form auxiliary to the usual work-clamp and closely embracing the knife and needle paths for maintaining the cut material in contact with the throat-plate to prevent its displacement by friction with the needle when the latter rises or by the pull of the needle-thread in the setting of the stitches.

The present invention will be understood

by reference to the drawings annexed, in which—

Figure 1 is an elevation of a buttonhole cutting and stitching machine provided with my present improvements. Figs. 2, 3, and 4 are such sectional elevations of the rear end of the machine, showing the cutter-actuating devices in different positions; and Fig. 5 is an elevation from the opposite side to that represented in the position shown in Fig. 2. Figs. 6 and 7 are rear elevations, upon an enlarged scale, of the cutter-actuator and throw-out lever in different operative relations. Fig. 8 is a perspective view, upon a similar scale, of the cutter-actuator; and Fig. 9, a similar view of the throw-out lever detached. Fig. 10 is a plan, and Fig. 11 a transverse section, also upon an enlarged scale, of the forward portion of the work-clamp. Fig. 12 is a detail view showing the means for automatically actuating the stop-motion mechanism.

The machine in which I have embodied the present improvements is constructed with the usual bed-plate 1 with bracket-arm 2, in the forward end of which is mounted the needle-bar 3, whose needle 4 operates in conjunction with the shuttle 5 and the knife-bar 6, carrying the knife 7 and provided with a lug 8, connected by the link 9 with the forward end of a rock-lever 10, whose rear end is connected, by means of a stud 11, with the link 12, which is pivotally connected in turn with the forward end of the tilting lever 13, having at its rear end the angular slot 14, entered by a roller-stud 15, carried by an arm 16, projecting from the collar 17, secured by the clamp-screw 18 adjustably upon the vertically-movable plunger-rod 19, which is carried by the vibrating stop-lever 20, pivoted to the bracket-arm upon the center screws 21. The plunger 19, in conjunction with its spring 22, cooperates with the stop-motion cam 23 to successively retard and wholly arrest the motion of the main shaft 24, as usual, being set in inoperative relation to such cam by a lateral movement of the lever 20, whose lateral arm 25 is depressed by a treadle connection with the rod

26 in opposition to the spring 27 and locked in such position by means of the locking-lever 28, of which one end is normally maintained in the notch 29 of said rod by means of the spring 30, and the other end lies in the path of the tripping-lug 31 upon the feed-cam 32, which acts to periodically tilt the lever 28 to release the rod 26 and permit the stop-motion lever 20 to assume its operative position for engagement of the plunger 19 with the cam 23. The depression of the plunger 19 in the position indicated in Figs. 1, 2, and 5 evidently has no effect upon the cutter-actuating lever 13, the roller-stud 15 moving idly in the vertical portion of the angular slot in such lever.

The rear end portion of the main shaft 24 is shown provided with a crank 33, connected, by means of the pitman 34 and pin 35, with a block 36, fitted to a guideway 37, formed in the rear wall of the bracket-arm for the purpose, such block, constituting the cutter-actuator, receiving continuously a vertical reciprocatory motion throughout the cycle of the machine.

A coupling device is provided for temporarily connecting the spring-pressed plunger 19 with the continuously-reciprocating actuator 36, one member of which consists of a coupling-tooth 38, formed upon the collar 17, and the other member consists of a latch-lever 39, pivoted at 40 to a lug 41 upon the actuator 36 and formed on its adjacent side with a shoulder 42 for engagement with said coupling-tooth. The rear edge of the latch-lever 39 is notched or cut away below said shoulder and terminates in a rearwardly-projecting finger 43. A spring 44, interposed between the actuator 36 and lever 39, operates to press the latter normally backward toward the plunger 19, the forward projection 45 serving, in conjunction with the upper edge of the actuator, as a stop to limit the movement of the latch-lever.

When the treadle is operated to depress the rod 26 for shifting the vibrating lever 20 to disengage the plunger 19 from its cam 23 and simultaneously shift the belt for starting the machine, the lateral throw of the plunger 19 brings the coupling-tooth 38 into the normal path of movement of the shoulder 42, the coupling of which members causes the depression of the plunger, and hence the engagement of the roller-stud 15 with the lateral portion of the angular slot 14 in the operating-lever 13 in opposition to the spring 46 to depress the cutter, the pivoted latch 47 being at such time in operative relation with the pin 11. As the actuator rises after its initial descent the latch-lever 39 is thrown backward to disengage the members 38 and 39 by the means now to be described.

Upon the bracket-arm 2 below the latch-lever 39 is mounted, by means of a fixed screw-stud 49, a throw-out lever 50, of which

the outer operative end portion is adapted to engage a lateral stud 48 upon one side of the latch-lever 39 and is formed with a flat face adjacent to the said latch-lever and with an inner inclined cam-shaped edge. The hub 51 of this lever is provided with a lateral arm 52, which is normally drawn down by means of a spring 53 for pressing the throw-out lever 50 toward the latch-lever 39, but which lateral arm 52 is adapted for engagement with a finger 54, projecting from the adjacent side of the vibrating stop-lever 20, whereby the throw of the lever 20 into operative position for stopping the machine causes its finger 54 to engage the under side of the arm 52, and thereby shift the throw-out lever 50 wholly out of engagement with the latch-lever 39 and lateral stud 48, carried thereby.

When the machine is at rest, the various parts of the stop-motion and cutter-actuating mechanisms are in the positions illustrated in Figs. 1, 2, and 5 and in dotted lines also in Fig. 7, the roller-stud 15 being at the angle of the slot 14, the plunger 19 in its vertical position, the latch-lever 39 extended in its extreme rearward position, and the throw-out lever tilted out of contact with the latch-lever 39 and its lateral stud 48 under the action of the finger 54 of the stop-lever 20. The drawing down of the starting-rod 26 and consequent rocking of the lever 20 with its spring-pressed plunger 19 releases the stop-cam 23 and shifts the belt from the loose pulley 55 to the fast pulley 56 to start the main shaft and simultaneously throws the roller-stud 15 into the horizontal portion of the slot 14 of the cutter-lever 13, the coupling-tooth 38 into the vertical path of movement of the shoulder 42 of the latch-lever 39, and disengages the finger 54 from the arm 52 to permit the side face of the lever 50 to rest against the end of the lateral stud 48 upon the latch-lever 39, whereby the first depression of the actuator 36, with the parts carried thereby, causes the depression of the plunger 19 and consequent actuation of the train of levers of the cutter mechanism to depress the cutter 7. As the latch-lever 39 reaches its lowest position its lateral stud 48 rides over the margin of the recessed cam edge of the throw-out lever 50, as indicated in Fig. 3, thereby permitting the latter under the action of its spring 53 to fall into contact with the side face of the latch-lever 39, as indicated in Fig. 7, in the succeeding upward movement of which the engagement of the stud 48 with the cam edge of the throw-out lever causes the latch-lever to be shifted inwardly, as shown in Fig. 4, to withdraw the shoulder 42 from the tooth 38, which permits the plunger 19 under the action of its spring 22 to perform the remainder of its return to initial position in the vibrating lever 20 independently of the actuator 36 unless the cutter or any part of its train of actuating mechanism should stick and effectively resist the ac-

tion of the spring 22, in which case the finger 43 of the latch-lever 39, which projects therefrom sufficiently beyond the shoulder 42, engages the lower side of the tooth 38 and positively raises the plunger 19 to return the cutter to normal inoperative position. During the subsequent continued reciprocation of the actuator 36 throughout the remainder of the cycle of the machine the pin 48 continues under the action of the spring 44 to engage the cam edge of the throw-out lever 44, which causes a corresponding vibratory movement of the lever 39, whereby the shoulder 42 operates in a curved path which is not entered by the tooth 38, and hence all reciprocations of the latch-lever 39 after the first are idle and have no effect upon the cutter mechanism.

As before stated, the operation of the stop-motion device to arrest the motion of the machine at the end of a buttonhole-stitching operation, involving the vibration of the stop-lever 20 with its finger 54, returns to initial position the several parts of the coupling and uncoupling devices intermediate the actuator and cutter mechanism in readiness for a succeeding buttonhole cutting and stitching operation.

In order to adapt the present machine for operation upon light or thin material—such as collars, cuffs, shirts, and other articles of wearing-apparel of a similar nature for which the present machine is particularly designed—it is important that means be provided for supporting the goods close to the needle and knife paths to prevent the rising of the adjacent portion of the material with such members in the performance of their usual functions. In Figs. 1, 10, and 11 I have shown such means comprising primary and auxiliary work-holders. Upon the usual work-clamp slide 75, deriving its longitudinal feeding and lateral shifting movements from suitable connections with the feed-cam 32, such as those shown in my prior patents before mentioned, is mounted the upper member of the primary work-clamp, comprising the clamping plate or lever 57, connected therewith by the intermediate blocks 58 and 59 and pivotal pin 60, carrying at its forked forward end the clamping-foot 61, having the usual rectangular opening for operation of the cutting-knife and the needle, the clamping-plate 57 being pressed normally downward upon its seat on the work-clamp slide 75 or the goods interposed between such parts by means of the spring 63. Fitted loosely between the opposite edges of the clamping-foot 61 is a flat auxiliary presser-plate 64, formed with a transverse slot or opening 65, closely embracing the path of movement of the laterally-vibrating needle 4, and a longitudinal slot 66, extending rearwardly from the same and closely embracing the path of movement of the knife 7. This auxiliary foot 64 is pivotally connected at 67 with the forked extremities of a flat presser-bar 68,

loosely and slidably pivoted at its opposite end upon a lateral horizontal pin 69, carried by a rigid supporting-stud 70, attached to the bracket-arm 2, and is normally pressed lightly downward by means of a flat spring 71, whose forward end engages the top of a pin 72 upon the upper side of the presser-bar 68. The auxiliary presser 64 is prevented from movement endwise with the primary clamp by reason of its rigid connection with the stationary pin 69, but is given a corresponding lateral shifting movement upon such pin by means of a rigid arm connected at one end to the block 58 and having at the other end a shoe 73, slidably embracing the bar 68.

It will thus be seen that the auxiliary work-holder or presser 64 cooperates with the needle and the knife in stripping the fabric from each in their rising movements and in holding the same flat during the stitching operation to insure the uniform laying and setting of the stitches throughout the length of the buttonhole.

From the foregoing description it will be understood that the present improvement is susceptible of wide variation in the constructive features of its component parts without departing from the spirit of the present invention. Thus it is unnecessary that the stop-motion plunger be a member common to both the cutting mechanism and stop-motion devices, such feature being used to perform the double function only to insure simplicity of construction. It is obviously immaterial which member of the coupling device be the retractable part and which is carried by the actuator.

Although the present invention is herein disclosed as comprising a cutter actuated only once for each actuation of the stop-motion device, and hence for each buttonhole-stitching operation, it is evident that certain of its characteristic constructive features are applicable to cutter mechanism involving the so-called "trimming-cutter," with means for actuating it successively during a single buttonhole-stitching operation.

I have not claimed herein the specific form and construction of the auxiliary cloth-presser or work-holder operating in conjunction with the primary work-holder for the reason that the same forms the subject of a separate application filed simultaneously herewith, Serial No. 204,160.

Having thus set forth the invention, what I claim herein is—

1. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device for controlling the operation of the same; of cutting mechanism, a reciprocating actuator therefor operating independently of the stop-motion device, and means controlled by said stop-motion device for coupling said cutting mechanism with its actuator.

2. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device for controlling the operation of the same, of cutting mechanism, a reciprocating actuator therefor continuously operative during the action of said stitch-forming mechanism, and means controlled by said stop-motion device for coupling said cutting mechanism with its actuator.
3. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device including a vibrating stop-lever, of cutting mechanism, an actuator therefor operating independently of the stop-motion device, and means carried by said stop-lever for coupling said cutting mechanism with its actuator.
4. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device including a vibrating stop-lever, of cutting mechanism, a reciprocating actuator therefor continuously operative during the action of said stitch-forming mechanism, and means carried by said stop-lever for coupling said cutting mechanism with its actuator.
5. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device including a vibrating stop-lever, of cutting mechanism, an actuator therefor operating independently of the stop-motion device, means carried by said stop-lever and operative while the latter is inactive in arresting the motion of the machine for coupling said cutting mechanism with its actuator, and automatically-acting means for uncoupling said cutting mechanism from its actuator.
6. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device comprising a vibrating stop-lever carrying a spring-pressed plunger and a rotary cam coöperating with the latter in arresting the motion of the machine, of cutting mechanism, a connection between said plunger and cutting mechanism, and means acting independently of said cam for operating said plunger to actuate the cutting mechanism.
7. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device comprising a vibrating stop-lever carrying a spring-pressed plunger and a rotary cam coöperating with the latter in arresting the motion of the machine, of cutting mechanism, a connection between said plunger and cutting mechanism, a cutter-actuator, a coupling device for connecting said actuator with the stop-motion plunger, and means for disconnecting said actuator and plunger.
8. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism and a stop-motion device, of cutter mechanism, an actuator therefor operating independently of the stop-motion device, means controlled by the stop-motion device for coupling the cutting mechanism with its actuator, and means independent of said stop-motion device for uncoupling said cutting mechanism and actuator.
9. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism, an actuator therefor, and an intermediate normally inoperative coupling device, of a stop-motion device including an operative member the throw of which in one direction produces the arrest of the motion of the machine, and the throw of the same in the opposite direction operates the coupling device to connect said cutting mechanism with its actuator.
10. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism, an actuator therefor, and an intermediate normally inoperative coupling device, of a stop-motion device including a vibrating lever and means whereby the throw of said lever in one direction produces the arrest of the motion of the machine and the throw of said lever in the opposite direction operates the coupling device to connect said cutting mechanism with its actuator.
11. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and an actuator therefor, of a stop-motion device carrying means whereby said cutting mechanism is coupled with its actuator, and means for preventing successive actuations of said mechanism in the cycle of the machine.
12. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism, an actuator therefor, and an intermediate coupling device, of a stop-motion device including an operative member the throw of which in one direction produces the arrest of the motion of the machine, and the throw of the same in the opposite direction operates the coupling device to connect said cutting mechanism with its actuator, and means acting independently of said stop-motion device for uncoupling said cutting mechanism and actuator.
13. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and an actuator therefor, of a stop-motion device comprising a cam and a coöperating member common to said cutting mechanism, and means for controlling the position of said common member to cause its alternate action in conjunction with the stop-motion cam and the cutter-actuator.
14. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and an actuator therefor, of a vibrating lever carrying a

reciprocating member of the cutting mechanism, a device for coupling together the actuator and said reciprocating member of the cutting mechanism and comprising two relatively yielding coupling parts of which one is carried by said actuator and the other by said reciprocating member, and means for shifting said vibrating lever toward and from said actuator to bring one of said coupling parts respectively into and out of the normal path of movement of the other of said coupling parts.

15. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and an actuator therefor, of a vibrating lever carrying a reciprocating member of the cutting mechanism, a coupling-tooth carried by said reciprocating member, a spring-pressed latch-lever mounted upon said actuator and adapted to engage said coupling-tooth, and means for shifting said vibrating lever toward and from said actuator to bring said coupling-tooth respectively into and out of the normal path of movement of said latch-lever.

16. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and a reciprocating actuator thereof, of a vibrating lever carrying a reciprocating member of the cutting mechanism, a coupling-tooth carried by said reciprocating member, a spring-pressed latch-lever mounted upon said actuator and provided with a shoulder and a projecting finger adapted respectively to engage said coupling-tooth in the movement of said actuator in different directions, and means for shifting said vibrating lever toward and from said actuator to bring said coupling-tooth respectively into and out of the normal path of movement of the latch-lever.

17. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and a reciprocating actuator therefor, of a vibrating lever carrying a reciprocating member of the cutting mechanism, a coupling-tooth carried by said reciprocating member, a spring-pressed latch-lever mounted upon said actuator and provided with a shoulder and a finger projecting beyond the same and adapted respectively to engage said coupling-tooth in the movement of said actuator in different directions, a device for tilting said latch-lever sufficiently to disengage its shoulder from said coupling-tooth while permitting its finger to remain in the path of movement of such coupling-tooth, and means for shifting said vibrating lever toward and from said actuator to bring said coupling-tooth respectively into and out of the normal path of movement of the latch-lever.

18. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and a continu-

ously-reciprocating actuator therefor, of a coupling device intermediate said actuator and cutting mechanism comprising a pivoted latch-lever and a cooperating member, means for causing the component members of said coupling device to assume operative relation, and a device for tilting said latch-lever out of coupling relation after the initial movement of said actuator subsequent to the coupling operation.

19. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and a continuously-reciprocating actuator therefor, of a coupling device intermediate said actuator and cutting mechanism comprising a pivoted latch-lever provided with a lateral stud and a cooperating member, means for causing the component members of said coupling device to assume operative relation, a throw-out lever having a cam edge adapted to engage said lateral stud upon the latch-lever, and means for tilting said throw-out lever out of and into the path of movement of said stud.

20. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism and a continuously-reciprocating actuator therefor, of a pivoted spring-pressed latch-lever carried by said actuator and provided with a lateral stud, a coupling-tooth carried by a reciprocating member of said cutting mechanism and adapted to engage said latch-lever, means for throwing said coupling-tooth into engagement with said latch-lever, a laterally-vibrated spring-pressed throw-out lever adapted to rest normally against the side of said latch-lever and having a cam edge adapted to engage the lateral stud upon the latter, and means for shifting said throw-out lever out of the path of movement of said lateral stud.

21. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, cutting mechanism comprising a vibrating lever carrying a reciprocating plunger and a continuously-reciprocating actuator for said cutting mechanism, of a pivoted spring-pressed latch-lever carried by said actuator and provided with a lateral stud, a coupling-tooth carried by said reciprocating plunger and adapted to engage said latch-lever when said vibrating lever is thrown forward, means for vibrating the plunger-carrying lever to bring the said coupling-tooth and latch-lever into operative relation, a laterally-vibrated spring-pressed throw-out lever adapted to rest normally against the side of said latch-lever and having a cam edge adapted to engage the lateral stud upon the latter and a lateral finger, and a projection upon said plunger-carrying lever whereby its movement backward from said actuator causes the withdrawal of said throw-out lever from the path of movement of the lateral stud upon the latch-lever.

22. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism comprising a reciprocating needle and a cooperating loop-taker, a primary longitudinally-movable work-clamp including an upper member with an elongated opening embracing the path of the needle in the stitch-forming operation, and cutting mechanism comprising a reciprocating knife operating through said elongated opening in the primary work-clamp, of means for actuating the cutting and stitch-forming mechanisms to successively cut and stitch a buttonhole, an auxiliary work-clamp member provided with a needle-opening and a knife-slot closely embracing respectively the needle-path and the knife-path, and means for maintaining said auxiliary work-clamp member longitudinally immovable within the needle-opening of the primary work-clamp member and means for normally pressing same upon the work.

23. In a buttonhole cutting and stitching machine, the combination with stitch-forming mechanism, of cutting mechanism, a spring whereby said cutting mechanism is normally forced into and maintained in inoperative position, a positively-operating actuator for said cutting mechanism and a device for temporarily connecting said cutting mechanism with its actuator including means for positively insuring the return of the cutting mechanism to initial inoperative position after a cutting action while permitting the normal return movement of the cutting mechanism under the action of the said spring.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD B. ALLEN.

Witnesses:

ALFRED C. DARLING,
HENRY J. MILLER.