No. 806,231. PATENTED DEC. 5, 1905.

E. B. ALLEN.

BUTTONHOLE SEWING MACHINE.

APPLICATION FILED MAY 17, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

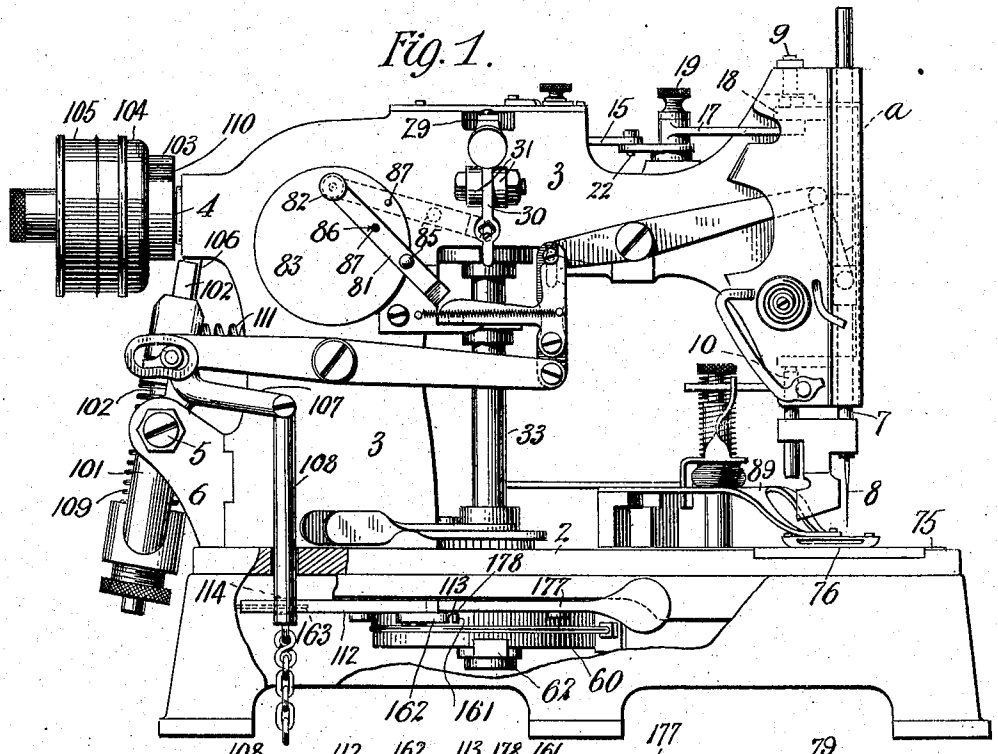


Fig. 2.

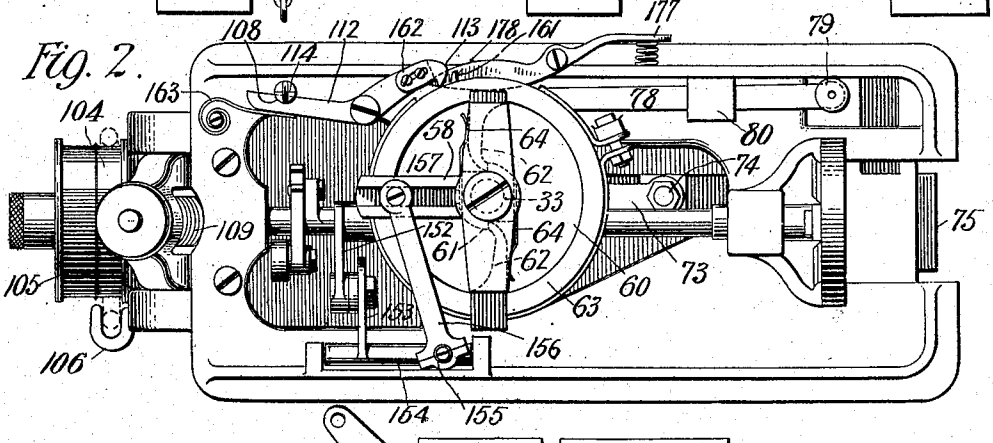
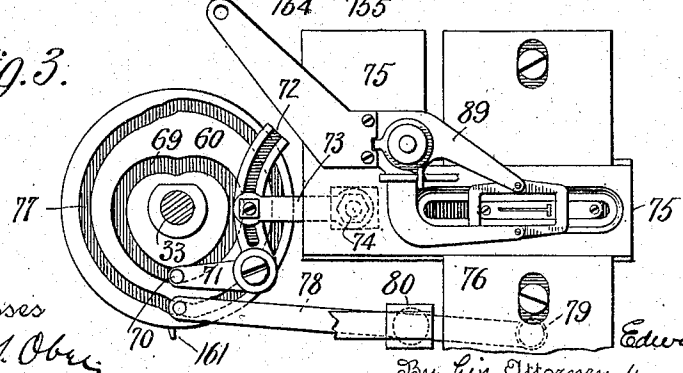


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

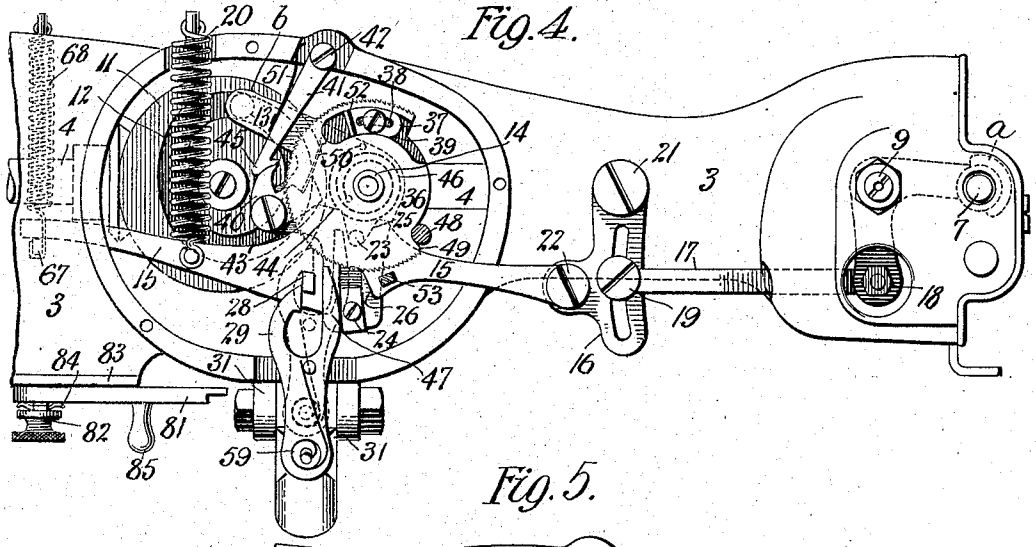


Fig. 5.

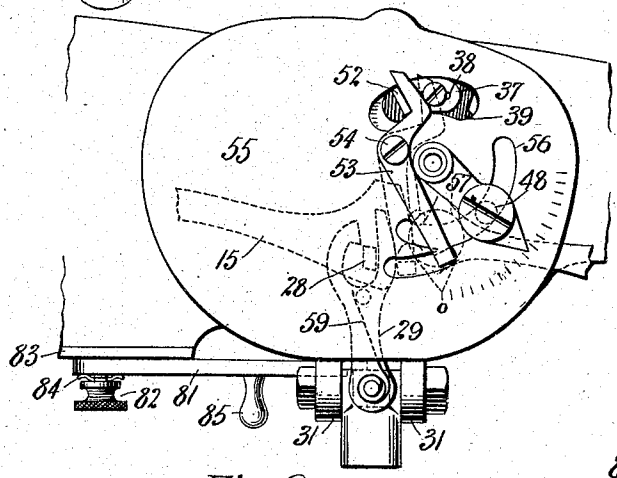


Fig. 7.

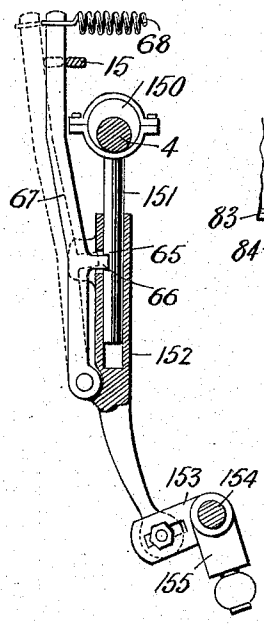


Fig. 8.

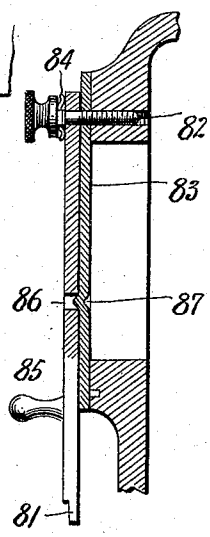
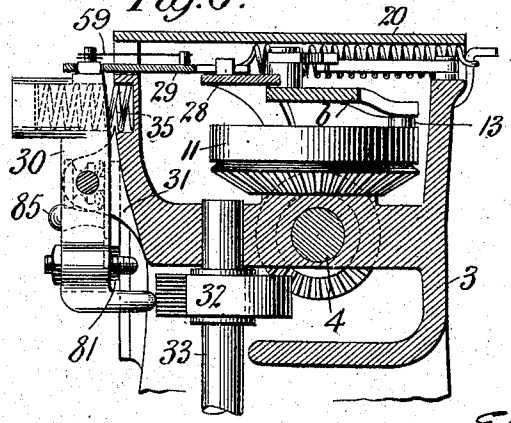


Fig. 6.



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UNITED STATES PATENT OFFICE.

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BUTTONHOLE-SEWING MACHINE.

No. 806,231. Specification of Letters Patent. Patented Dec. 5, 1905.

Application filed May 17, 1904. Serial No. 208,366.

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 an improvement in buttonhole stitching and barring machines; and it has for its primary object to provide means whereby the action of the barring devices may be wholly interrupted or may be controlled to produce any given number of stitches. It also has for its object to effect the interruption or the continuance of the feeding action at the ends of a buttonhole. It has for its further object the control of the stop-motion device for action independently of the several conditions of adjustment of the barring mechanism.

There are two generally-recognized classes of "straight" buttonholes — those having barred ends and those having unbarred ends. The barred buttonhole, as commercially known, is composed of two lines of side stitches covering the edges of the buttonhole-slit and series of intermediate reinforcing or barring stitches of substantially uniform length disposed crosswise at the end or ends of the slit intermediate the lines of side stitches. In the more common and approved form of barred buttonhole the individual barring-stitches are materially longer than the side stitches, so that their opposite ends may be anchored in the material upon opposite sides of and sufficiently far from the line of the buttonhole-slit to insure the effective strengthening of the material at the end of the slit where it is subjected to the greatest strain. The barring-stitches are usually crowded or bunched together by the arrest of the relative longitudinal feed of the stitch-forming mechanism and the work; although in some cases the normal longitudinal feeding movement is continued in the production of the barring-stitches, which are properly located in line with the end of the slit by the mere lateral shifting of the stitch-forming devices in relation to the work. As commercially known, the unbarred buttonhole comprises a series of overseaming stitches of uniform length extending uninterruptedly entirely around the buttonhole-slit without the bunching or crowding of stitches at the ends of the slit to form a bar or stay, being produced by the employment of uniformly-acting overseaming mechanism in conjunction with continuously-acting mechanism for producing a constant relative feed of the work and stitch-forming mechanism in a pattern corresponding with the shape of the stitched buttonhole without pause for producing a succession of reinforcing-stitches at the end of the buttonhole. Heretofore the mechanism employed for stitching these different types of buttonholes has been such as to require separate and independent machines for each class of such work, a single machine being unadapted for use interchangeably in producing both kinds of buttonholes. This has necessitated the duplication of machines for producing a given quantity of work in order to enable manufacturers of garments to handle satisfactorily the different classes of work required.

In devising the present improvement I believe myself to have been the first to provide a buttonhole-stitching machine capable of producing both classes of straight buttonholes, whereby a single machine may be readily adjusted to stitch an unbarred buttonhole or a buttonhole having barred ends comprising groups of stitches of any number up to a given maximum.

The invention consists in the devices herein shown and described for effecting such objects.

In the drawings annexed, Figure 1 is an elevation of a buttonhole stitching and barring machine embodying the present improvement with certain portions broken out to show the construction and arrangement of parts behind the same. Fig. 2 is a plan of the under side of the machine, and Fig. 3 a top view of the feed-cam and its connections with the work-clamp slides. Fig. 4 is a plan, upon a larger scale, of the forward portion of the overhanging arm with the cap-plate of the casing inclosing the timing mechanism of the barring devices removed. Fig. 5 is a partial plan view of the overhanging arm with the cap-plate of the barring-mechanism casing and the parts above the same in position. Fig. 6 is a transverse section through the arm of the machine on the axial line of the feed-shaft. Fig. 7 is a detail view of a portion of the feed-actuating mechanism, and Fig. 8 is a

detail sectional view of one of the devices for interrupting the normal automatic action of the barring and feeding mechanisms.

In Figs. 1 to 4, inclusive, the machine is shown adjusted for making barred buttonholes, the operative parts being represented in the positions assumed immediately at the close of the barring operation preparatory to the tripping of the stop-motion device and with the lever 81 (indicated in full lines) as set in its inoperative position, while, as represented in Figs. 5 and 6, it is set for making unbarred buttonholes.

My present improvement is shown applied to a buttonhole stitching and barring machine adapted to work straight buttonholes, as shown and described in my United States Patents No. 738,591, of September 8, 1903; No. 743,213, of November 3, 1903, and No. 757,171, of April 12, 1904.

In conjunction with the usual side-stitching mechanism comprising the stitch forming and feeding devices I have provided means for controlling the operation of said mechanism at the end of each side-stitching operation, which may consist of either barring mechanism of special character capable of being readily set to permit the continued operation of the side-stitching mechanism throughout the cycle of the machine or for interrupting such operation for the production of a given number of bar-stitches intermediate the side-stitching operations, or of the usual barring mechanism combined with means adjustable to prevent the normal operation of the latter in providing periodically for the production of bar-stitches. The machine is constructed with the work-plate 2, overhanging arm 3, driving-shaft 4, having the usual crank- and-pitman connections with the needle-bar 7, having the needle 8 and carried by the swinging frame or gate *a*, mounted on pivotal centers 9 10 and deriving its swinging movements from the cam-wheel 11, geared to the shaft 4 and having a cam-groove 12, entered by a pin or stud 13 on an arm of the lever or rocker *b*, having its fulcrum or center of motion at 14 and connected, through the link-bar 15, slotted swinging arm 16, and link 17, with an arm 18 of the needle-bar frame, the link 17 being adjustable to and from the screw-stud 21, upon which the arm 16 is pivoted by means of the screw 19, entering the slot in said arm. The bar 15 is pivotally connected at its forward end to the swinging arm 16 by the screw 22. The lever or rocker *b* is provided with two pins 23 and 24, the latter being adjustable, located at different distances from the fulcrum or center of motion 14 of said lever or rocker, and the bar 15 is provided with notches 25 and 26 for alternate engagement with said pins.

The bar 15 is normally held by a spring 20 in side-stitching position with the narrow part of the notch 25 embracing the pin 23, and the said bar is at the proper times automatically shifted to barring position, with the contracted portion of the notch 26 embracing the pin 24. To this end the bar 15 is provided with a pin 28, arranged to be engaged by a spring-pressed pawl 29, pivotally connected with the upper end of the bent lever 30, fulcrumed in brackets 31 on the arm 3, an inturned finger upon the lower portion of said lever being held by means of the stiff spring 35 in peripheral contact with the double snail-cam 32, mounted upon the vertical shaft 33, carrying the feed-wheel 60 and rotating therewith, the feed-wheel imparting to the work-clamp the usual longitudinal feeding and lateral shifting movements.

At the end of the first side-stitching operation the cam 32 has caused the pawl 29 to move inward to enable its hook or shoulder to engage the pin 28 on the bar 15, the passing of one of the shoulders of the cam 32 under the lower portion of the lever 30 permitting the latter under the impulse of the spring 35, which is stronger than the spring 20, to tilt upon its pivotal connection with the brackets 31 and through the pawl 29 and pin 28 to draw the bar 15 outward into engagement with the pin 24 and out of engagement with the pin 23, so as to increase the throw of the needle-bar frame to form the barring-stitches.

The number of stitches for each bar is governed by a ratchet-wheel 36, provided with a curved controlling-plate 37, let into a corresponding groove 39 in the top of said wheel, in respect of which it is adjustable by means of a set-screw entering a segmental slot 38 in the plate 37. The ratchet-wheel 36 is given intermittent forward rotary movements during the barring operations by a spring-pressed operating-pawl 40, mounted on the lever or rocker *b*, a detent-pawl 41, pivoted on a screw or stud 42, fixed to the bracket-arm 3, being provided to prevent the return motion of the ratchet-wheel. The operating-pawl 40 is provided with a tripping-arm 43, arranged to be engaged by a lug or projection 44 on the bar 15, and the detent-pawl 41 is provided beyond its operative tooth with a finger or projection 45, adapted to be engaged by the pawl 40 when the latter is thrown out of operative relation with the wheel 36 to render said wheel free to effect its return movement to initial position under the impulse of the spring 46. (Shown in dotted lines in Fig. 4.)

From the foregoing it will be observed that when the bar 15 is shifted into barring relation its shoulder or projection 44, being withdrawn from engagement with the tripping-arm 43, will permit the operating-pawl 40 and detent-pawl 41, under the action of their springs 50 and 51, respectively, to drop into operative relation with the ratchet-wheel 36, in which relation they remain until an upwardly-projecting lug 52 upon the controlling-plate 37 by engagement with one arm of a bent lever 53, pivoted at 54 upon the cap-

plate 55, causes the turning movement of such lever, so that its other arm engages the contact-finger 47 of the pawl member 29, which operates to release the pin 28 to permit the bar 15 to return to initial position under the action of the spring 20, the engagement of its shoulder or projection 44 with the tripping-arm 43 serving to throw out of action the operating-pawl 40 and detent-pawl 41, thereby permitting the ratchet-wheel 36, under the action of its spring 46, to return to initial position with the shoulder 49 of the peripheral notch therein in engagement with the adjustable stop-pin 48, projecting through a slot 56 in the cap-plate 55 from a pointer-arm 57, by which it is carried. The position of the stop-pin 48, as indicated by the scale in conjunction with the pointer 57, determines the initial position of the ratchet-wheel, which in turn determines the number of barring-stitches to be applied to the end of a buttonhole, as in my former patents before mentioned.

As in my said Patent No. 738,591, the cycle-feeding mechanism for spacing the overseaming side stitches of the buttonhole comprises a rod 151, having a strap embracing an eccentric 150 upon the main shaft 4 and entering a socket of the rod or bar 152, having an adjustable connection at the lower end with the slotted arm 153 of the rock-shaft 154, of which the depending arm 155 is connected by the pitman 156 adjustably by means of a set-screw 157 with the slotted swinging arm 58, pivoted upon the feed-shaft 33, beneath the feed-cam 60. Each projection 61 of the arm 58 is engaged by the inner end of a clutch-dog 62, of which the outer end is slotted to embrace the circular rib or flange 63 of the feed-cam 60, these clutch-dogs in conjunction with the vibrating projections 61 and springs 64 serving to impart intermittent or step-by-step rotary movements to the feed-wheel.

It is evident that in the machine as herein represented the number of shoulders or projections upon the cam 32 will determine the number of bars in the buttonholes produced, the provision of only one of such shoulders or projections causing only a single barring operation in the cycle of the machine in cases wherein the production of buttonholes is required having one plain and one barred end, such as are sometimes demanded by the trade.

The rod 151 has a notch 65, entered by the lug 66 of the lever 67, pivoted to the rod or part 152, such lug being normally held in its notch 65 by a spring 68, acting on said lever 67 to couple together the two sections 151 and 152 of the two-part connecting-rod thereby formed. When the bar 15 is shifted laterally from side-stitching position to barring position, its tail engages the upper end of the lever 67, and thereby withdraws its lug 66 from the notch 65, whereby the rod 151 is caused to move idly in the socket of the rod 152, and the feeding movement of the feed-cam 60 is thereby interrupted, and the restoration of the bar 15 to initial or side-stitching position similarly causes the lever 67, under the action of its spring 68, to return the lug 66 to its notch 65 in the rod 151, whereby the sections of the two-part feed-actuating rod are recoupled and the actuation of the feed mechanism is continued.

To communicate to the work-clamp the requisite longitudinal feeding movements, the feed-wheel 60 has in its upper face a cam-groove 69, entered by a pin or roller stud 70 on the arm 71 of a clamp-feeding lever pivoted to the work-plate 2 with the curved and slotted arm 72, having adjustably connected thereto one end of a pitman 73, with its other end attached to a pin or stud 74, depending from or connected with the work-clamp base-plate 75, which slides longitudinally in a transverse plate 76, mounted for lateral sliding movement on the work-plate 2. The lateral or shifting movements of the clamp are derived from a cam-groove 77 in the feed-wheel 60 through a shifting lever 78, having at its rear end a pin or roller stud entering said cam-groove and having at its forward end a connection with the transverse plate or slide 76 by means of a set-screw 79, entering a slot in said plate or slide. The shifting lever 78 swings on an adjustable fulcrum-block 80 of well-known form. The plate 75 carries a work-clamp 89, which may be of any suitable construction.

The stitch-forming mechanism, as shown herein, comprises the needle 8, already referred to, and complemental lock-stitch mechanism of the well-known "Singer" oscillating-shuttle type, the latter not being specifically illustrated herein, as it forms no part of the present invention.

As thus far described it will be observed that the machine comprises the stitch-forming mechanism, jog-producing mechanism, and cycle-feeding mechanism, adapted when all are allowed to remain in unchanged relation for the whole cycle of operation of the machine to produce a buttonhole having stitches of substantially uniform length and spacing throughout, combined with means for effecting the lengthening and subsequent shortening of the relative jogging movements of the needle and the work and the periodical arrest of the relative longitudinal feeding and lateral shifting movements at the opposite ends of the buttonhole. In speaking herein of interrupting or arresting the action of the feeding mechanism during the formation of the bar I do not wish to be understood as limiting myself to bringing the same to absolute rest, although I prefer to do so.

As shown in my Patent No. 743,213, of November 3, 1903, the stop-motion device of the present machine comprises a lever 101, pivotally mounted on center screws 5, tapped in ears 6 on the arm 3 of the machine, said lever

carrying a vertically-movable rod or plunger 102, coöperating with a cam 103, rotating with the pulley 104, fast on the driving-shaft 4 of the machine and adjacent to which fast pulley is a loose pulley 105. The lever 101 is provided with a belt-shifting arm 106 and with a second arm 107, to which is connected a treadle-operated rod 108. The rod 102 is pressed upward by a spring 109, encircling said rod, and the upper end of said rod is fitted to enter a peripheral notch 110, formed in the cam 103, which may be yieldingly connected with the fast pulley 104 through a buffer-spring in the manner fully described in United States Patent No. 541,276, so as to soften or cushion the impact of the stopping operation.

The stop-motion lever 101 is held in inoperative position against the stress of the spring 111 when the machine is running by a spring-pressed latch or lever 112, which enters a lateral notch 114, formed in the rod 108, and the feed-wheel 60 is provided with a tripping-lug 161, which is arranged to engage a toe-piece 113 on said latch or lever 112 when the machine is to be stopped. The toe-piece 113 is shown formed on a plate 162, adjustably secured to the latch or lever 112, so as to vary the timing of the tripping action of the stop-motion device to accommodate different lengths of buttonholes. The latch or lever 112 is yieldingly held in engagement with the rod 108 by a spring 163.

In starting the machine the lever 101 is thrown backward from its initial position to disengage the rod or plunger 102 from its notch in the cam 103 by drawing down the rod 108 connected with said lever until the latch or lever 112 snaps into its notch, thereby locking the lever 101 in inoperative position, with its belt-shifter 106 in position to guide the driving-belt upon the fixed pulley 104 for actuating the driving-shaft 4. The stop-motion remains in this position until the latch-lever 112 is tripped by engagement of the tripping-lug 161 with the toe-piece 113, when the tail of the lever 112 is withdrawn from its notch in the rod 108 and the lever 101 is permitted under the impulse of the spring 111 to return to the initial position and to arrest the motion of the driving-shaft in a manner well known. The tripping-lug 161 is so disposed upon the periphery of the feed-cam as to trip the stop-motion device for stopping the machine just after the feeding mechanism is thrown into action at the completion of the second barring operation.

If it be desired to stop the machine by reason of breakage of the thread or for any other cause during a buttonhole-stitching operation and before the stop-motion device would normally be automatically released by the stopping-lug 161 on the feed-wheel 60, the stop-motion device can be tripped manually by a hand-lever 177, the forward part 178 of which is arranged to impinge against the latch-lever 112, and thus withdraw the latter from holding engagement with the notched rod 108.

In the stitching of buttonholes for various classes of work upon material known as "white goods" it is sometimes desired to vary the character of the bar at the end or ends of the buttonhole for certain different conditions, and at other times it is equally desirable to perform the stitching without producing the usual bar intermediate the two lines of side stitches. Heretofore it has been found impracticable to perform these several kinds of work upon the same machine. By the present improvement, however, I have provided means whereby any number of bar-stitches up to a given maximum may be formed intermediate the series of side stitches, or the bar-stitches may be wholly omitted.

For the temporary use of the machine when the work requires the omission of bar-stitches, the slot 56 in the cover-plate 55 for the stop-stud 48 being extended sufficiently far backward toward the rear of the overhanging arm 3, the pointer-arm 57 may be set in the dotted-line or zero position, (indicated in Fig. 5,) in which position its enlarged portion carrying the stud 48 serves as a stop against which the bent lever 53 rests in opposition to the spring 46 of the ratchet-wheel 36, which lever in turn by the engagement of its downturned finger with the contact-finger 47 of the pawl-lever 29 in opposition to the action of the spring 59 maintains the pawl-lever 29 in inoperative relation to the stud 28 upon the bar 15, whereby the reciprocation of such pawl-lever, under the action of the snail-cam 32 and spring 35, fails to produce the periodical shifting of the bar 15 from side-stitching to barring position, and hence wholly interrupts the normal automatic operation of the barring and feed-interrupting devices. Thus while the spring-actuated bent lever 53 is wholly unaffected in its normal operation by the pointer-arm 57 in the adjustment of the latter for the normal operation of the barring mechanism in the production of barred buttonholes the shifting of the pointer-arm to zero position brings it into the path of normal movement of the lever 53, wherein it constitutes a stop for preventing the movement of such lever, with the result above described.

When it is desired to maintain entirely out of action the barring and feed-interrupting devices, the operation of the lever 30 may be suspended by introducing under its lower end the notched lower extremity of a lever 81, having at its opposite end an aperture entered by the enlarged shank portion of the shouldered fastening-screw 82, serving to hold the usual side cover 83 in position, a spring-washer 84 being interposed between the said lever and the head of the fastening-screw 82. The stop-lever is shown provided with a handle 85 and with a hole 86 intermediate its ends for coöp-

eration with projections 87, formed upon the cover 83, as indicated in Figs. 1 and 8, to retain such lever yieldingly in its operative and inoperative positions, respectively, in and out of engagement with the lever 30. By means of this stop-lever the wear upon the operative parts of the barring and feed-interrupting devices is wholly removed, and the machine may be operated for long periods in connection with work requiring production of a continuous overseam around the entire buttonhole and without successions of superposed stitches at the ends, the mechanism thus maintained out of normal action not being subjected to the wear which would otherwise be produced.

It is always desirable in practice to provide means for adjustment of the number of bar-stitches in conjunction with means for throwing the barring mechanism into and out of effective operation, and therefore the adjustable stop-pin 48, carried by the pointer-arm 57, is preferably employed in conjunction with the stop-lever 81, whereby the machine is not only fitted to produce bars comprising stitches of variable number, depending upon the class of work operated upon, but the operation of its entire train of barring mechanism under the actuation of the cam 32 may be suspended by the enforced inaction of the primary member 30 of said train in the production of unbarred buttonholes. It is therefore evident that the stop-lever 81 may be added to the barring mechanism of the present machine as embodied in my former patent, No. 757,171, before mentioned for producing the effect above described, or such former construction may be modified, as indicated in Fig. 5 of the accompanying drawings, to extend the limits of adjustment of the controlling device for the barring mechanism, when the stop-lever 81 may be dispensed with excepting in cases wherein the machine is designed to be used for long periods with the automatic barring mechanism inactive. It is evidently immaterial to what particular spring-actuated member of the barring or feed-interrupting mechanisms is applied the stop member, such as the lever 81 or the pointer-arm 57, as the desired result will be attained by throwing out of action any member of the train intermediate the timing-cam and the part or parts to be affected.

Having thus described the construction, arrangement, and mode of operation of the several parts of the machine as embodying the preferred form of the present improvement, it will be observed that the characteristic feature of that portion of the invention relating to the control of the barring and feeding mechanisms consists in the normally operative members for controlling the number of bar-stitches to be produced and comprising the shifting and timing devices for determining throughout the cycle of the machine the positions of the swinging and reciprocating link-bar 15 during the stitching of each bar of the buttonhole in conjunction with the means described for locking in inoperative position one of the normally operative members of such shifting and timing devices, so as to prevent the operation of the barring and feed-interrupting mechanisms, the same comprising in the present embodiment either the stop-lever 81, adapted to engage the shift-lever 30, or the enlarged head of the pointer-arm 57, adapted to serve as a stop for the tripping-lever 53 to prevent engagement of the pawl 29, with its pin 28 upon the link-bar 15, either of which means is adapted to be set for rendering operative or inoperative at will the said normally operative member of the mechanism. It will thus be seen that the particular construction and arrangement of parts herein shown and described are not essential to the present invention, nor is the particular type of stitching and barring machine in connection with which it is herein disclosed.

While a feature of special importance of the present improvement is the capacity of the machine for stitching either barred or unbarred buttonholes at will by a simple adjustment of one of its members, the inaction of any member or members of the barring mechanism in the stitching of unbarred buttonholes renders it also important that the stop-motion device be tripped by means other than any member normally actuated or controlled by such a part of the barring mechanism, as described in my prior United States Patent, No. 738,591, before mentioned, in which the action of the barring mechanism was essential to effect the tripping of the stop-motion for insuring the production of the several groups of stitches comprising a commercial stitched buttonhole.

The terms "unbarred" and "barless" as herein applied to buttonholes are not to be literally understood as descriptive of incomplete buttonholes having only two parallel lines of side stitches wholly unconnected at the ends, but those commercially so designated as comprising the usual parallel lines of side stitches connected at the ends by one or more cross-stitches which are not bunched or crowded together to form a stay and are produced during a continuous relative shifting movement of the work and stitch-forming mechanism, whereby no two of such intermediate stitches are formed in the line of the slit intermediate the side stitches. In other words, the unbarred or barless buttonhole is herein to be understood as a buttonhole of which each of the component overseam-stitches is spaced from the adjacent stitches by means of a constant relative movement of the stitch-forming mechanism and the work throughout the stitching operation, a relative lateral shifting movement intermediate the side-stitching operations being effected at the ends of the

buttonhole preparatory to the production of each crossing stitch.

As herein represented, the production of the stitches constituting the bar or stay is effected at an end of the buttonhole by arresting the longitudinal feed and lateral shifting movements of the work and simultaneously increasing the lateral throw of the needle to produce overseam-stitches of increased length, and the essential change of the relative movement between the stitch forming and feeding devices to produce the barring-stitches is that whereby the normal continuous shifting movement of the working position of the needle intermediate the production of the parallel lines of side stitches is interrupted to effect the production of a succession of crowded or superposed cross-stitches intermediate the lines of side stitches.

As will be readily understood, the unbarred buttonhole, as above described, is applied in practice only to garments, such as underwear, which are subjected to little or no strain in ordinary use and do not, therefore, require the reinforce or bar to give requisite strength, such as is necessary in various other classes of garments.

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

1. In a buttonhole stitching and barring machine, the combination with mechanism comprising stitch-forming and cycle-feeding devices operating normally to produce a buttonhole stitched along both sides and across the ends, of a barring device adapted to cause the said mechanism to produce additional staying-stitches across the ends of the buttonhole, controlling means adapted to be set at will to permit or prevent the effective action of said barring device, and a stop-motion device acting independently of said controlling means for effecting the starting and automatic stopping of the machine.

2. In a buttonhole stitching and barring machine, the combination with mechanism comprising stitch-forming and cycle-feeding devices operating normally to produce a buttonhole stitched along both sides and across the ends, of a barring device adapted to cause the said mechanism to produce additional staying-stitches across the ends of the buttonhole, controlling means adapted to be set at will to permit or prevent the effective action of said barring device, and a stop-motion device tripped into action by means of a direct connection with a member of the feeding device.

3. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism including a vertically-reciprocating and laterally-moving needle, and a continuously-vibrating member from which the lateral movements of said needle are derived through a suitable connection, of a shifting device for automatically changing the point of attachment of the needle connection with said vibrating member to vary the amplitude of the needle movements, controlling means adapted to be set to prevent the action of said shifting device, and a stop-motion device controlled independently of the shifting device.

4. In a buttonhole-sewing machine, the combination with stitch forming and feeding mechanisms, of a feed-interrupting device normally actuated automatically to periodically arrest the normal operation of the feeding mechanism for a series of consecutive stitches, a device constructed and arranged to be set for rendering said feed-interrupting device either operative or inoperative, and a stop-motion device controlled independently of the said feed-interrupting device.

5. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism and barring mechanism comprising a plurality of connected members including a spring-actuated member, all in normal operative relation, of a stop adapted to be set into and out of the path of movement of said spring-actuated member of the barring mechanism to prevent the effective operation of the same.

6. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism including a reciprocating needle-bar mounted in a swinging frame deriving its lateral movements from a link connection with a continuously-vibrating lever or rocker, of barring mechanism comprising a spring-actuated member for shifting said link connection of the needle-bar frame with said vibrating lever or rocker to vary the amplitude of the lateral movements of the needle-bar for the side and bar stitches, and a stop device adapted to be set in or out of the path of movement of said spring-actuated member of the barring mechanism to control the action or inaction of said barring mechanism upon said needle-bar frame.

7. In a buttonhole stitching and barring machine, the combination with stitching and feeding mechanisms, of a device including a spring-actuated member for periodically interrupting the action of the feeding mechanism, and a stop device adapted to be set in and out of the path of movement of said spring-actuated member of the feed-interrupting device to control its action or inaction.

8. In a buttonhole stitching and barring machine, the combination with stitch-forming, feeding and barring mechanisms, of means for causing alternate action and inaction of the feeding and barring mechanisms, the one being at rest while the other is in action, a stop-motion device, and means acting when the feeding mechanism is in operation for tripping the stop-motion device to stop the machine.

9. In a buttonhole stitching and barring

machine, the combination with stitch-forming, feeding and barring mechanisms, of means for causing the alternate action and inaction of the feeding and barring mechanisms, the one being at rest while the other is in action, a device for maintaining said means inoperative throughout the cycle of the machine, a stop-motion device, and means controlled from the feeding mechanism for tripping the stop-motion device to stop the machine.

10. In a buttonhole stitching and barring machine, the combination with the main shaft, stitch-forming mechanism actuated thereby, feeding mechanism comprising a cam deriving step-by-step movements from a connection with the main shaft, barring mechanism, means for controlling the initial actuation of said barring mechanism, including a connection with said cam, and means with which said barring mechanism is provided whereby the operative connection of the feed-cam with the main shaft is alternately interrupted and re-established, of a stop-motion device, and means carried by the feed-cam for tripping the same.

11. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism, of barring mechanism comprising an actuating member, a train of mechanism normally actuated thereby in the production of barring-stitches, and means acting in conjunction with a member of said train of mechanism to prevent the effective action of said barring mechanism, and a stop-motion device controlled independently of the barring mechanism.

12. In a buttonhole stitching and barring machine, the combination with stitch-forming mechanism, of barring mechanism comprising means adapted to be set to produce groups of bar-stitches varying in number within predetermined limits, and means auxiliary thereto for entirely interrupting the action of said barring mechanism, and a stop-motion device controlled independently of said barring mechanism.

13. In a buttonhole-stitching machine, the combination with overseaming stitch-forming mechanism and mechanism acting normally to produce for each stitch a relative movement between the stitch-forming mechanism and the work, said movements being longitudinal for spacing the side stitches and lateral for spacing the cross-stitches at an end of the buttonhole, of mechanism whereby the relative lateral movements of the stitch-forming mechanism and the work may be interrupted intermediate the lines of side stitches, and means whereby the interrupting mechanism may be rendered inoperative.

14. In a buttonhole-stitching machine, in combination with stitch-forming and jog-producing mechanisms and cycle-feeding mechanism normally operative throughout the entire cycle of operation of the machine, controlling mechanism whereby said cycle-feeding mechanism may be arrested at an end of the buttonhole, and means whereby the controlling mechanism may be rendered inoperative.

15. In a buttonhole-stitching machine, in combination with stitch-forming, jog-producing and cycle-feeding mechanisms whereby a buttonhole having stitches of uniform length may be stitched, means whereby the length of jog may be increased, means whereby the feeding mechanism may be arrested, and means whereby both the jog-lengthening and feed-arresting means may be rendered inoperative.

16. In a buttonhole-stitching machine, in combination with stitch-forming and jog-producing mechanisms and cycle-feeding mechanism normally operative throughout the cycle of operation of the machine, and stop-motion mechanism, whereby the stitching of a buttonhole may be produced and stopped, means whereby said cycle-feeding mechanism may be arrested, and means whereby the feed-arresting means may be rendered inoperative or may be permittted to operate.

17. In a buttonhole-stitching machine, the combination with overseaming stitch-forming mechanism, mechanism acting normally to produce for each stitch a relative movement between the stitch-forming mechanism and the work, said movements being longitudinal for spacing the side stitches and lateral for spacing the cross-stitches at an end of the buttonhole, and a stop-motion device for stopping the machine at the completion of a buttonhole, of mechanism whereby the relative lateral movements of the stitch-forming mechanism and the work may be interrupted intermediate the lines of side stitches, and means whereby the interrupting mechanism may be rendered inoperative.

18. In a buttonhole-stitching machine, the combination with overseaming stitch-forming mechanism, mechanism acting normally to produce for each stitch a relative movement between the stitch-forming mechanism and the work, said movements being longitudinal for spacing the side stitches and lateral for spacing the cross-stitches at an end of the buttonhole, and a stop-motion device for stopping the machine at the completion of a buttonhole, of mechanism whereby the relative lateral movements of the stitch-forming mechanism and the work may be interrupted intermediate the lines of side stitches, and means whereby the interrupting mechanism may be rendered inoperative without affecting the operation of said stop-motion mechanism.

19. In a buttonhole-stitching machine, in combination with stitch-forming and jog-producing mechanisms, cycle-feeding mechanism normally operative throughout the cycle of operation of the machine, and stop-motion

mechanism, whereby the stitching of a buttonhole may be produced and stopped; means whereby said cycle-feeding mechanism may be arrested, and means whereby the feed-arresting means may be rendered inoperative without affecting the operation of said stop-motion mechanism.

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.