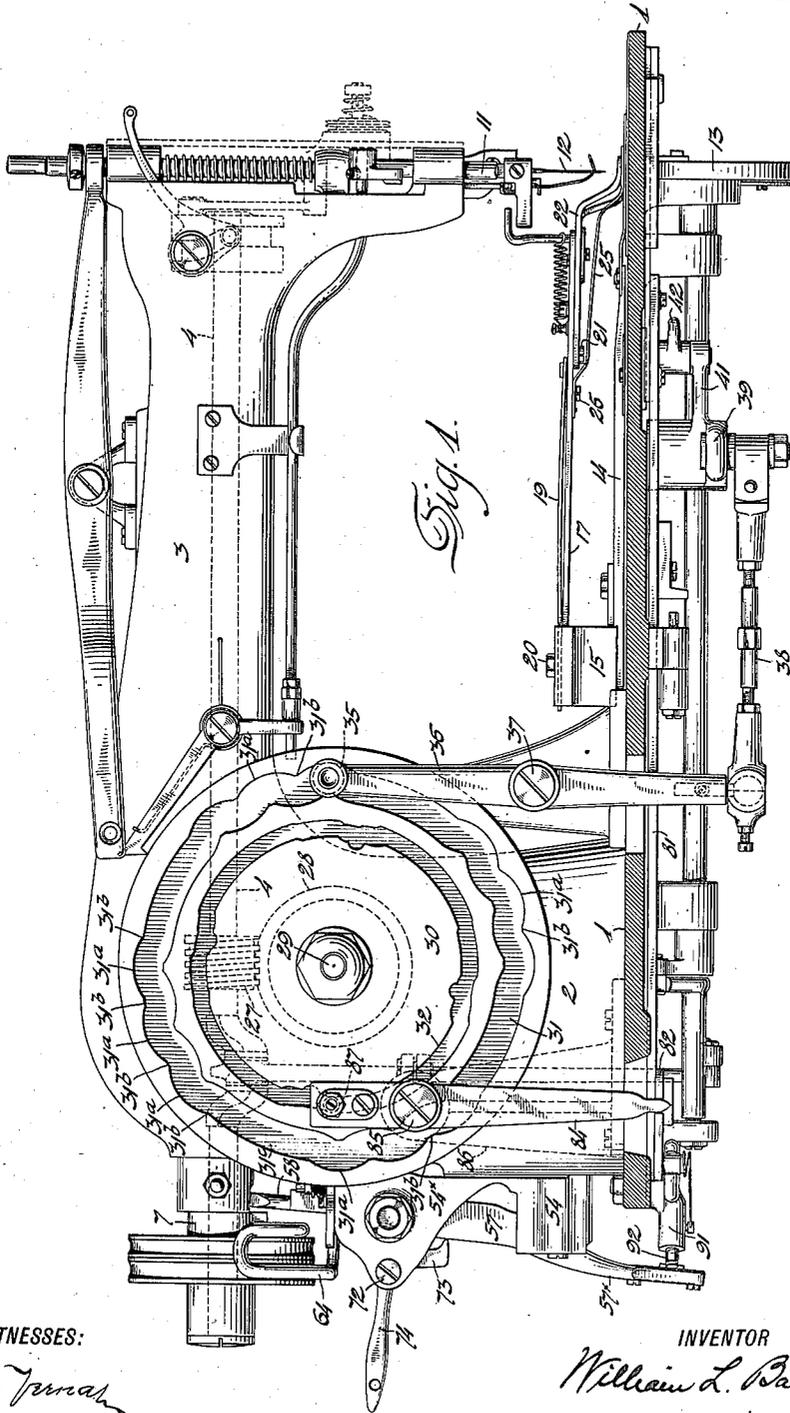


W. L. BARRON.
BUTTON SEWING MACHINE.
APPLICATION FILED OCT. 6, 1911.

1,093,241.

Patented Apr. 14, 1914.

3 SHEETS—SHEET 1.



WITNESSES:
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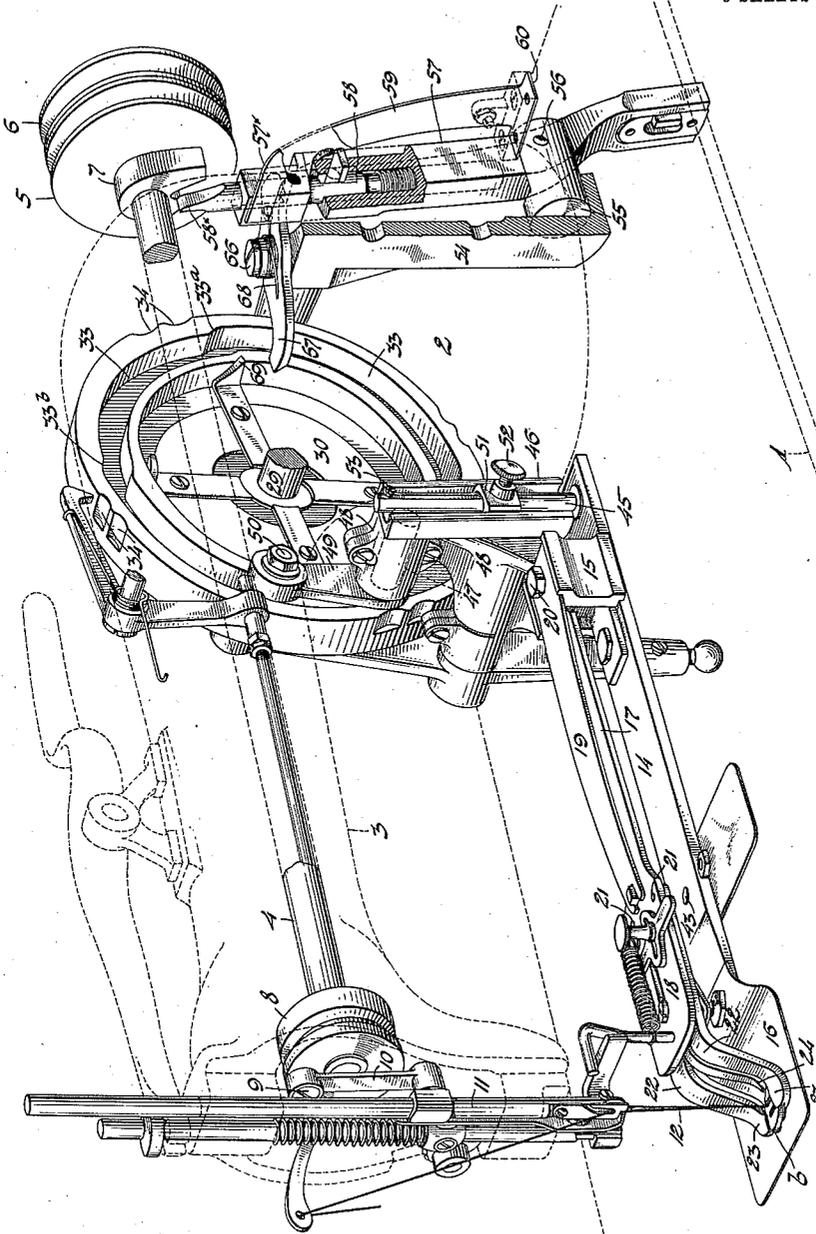


Fig. 2.

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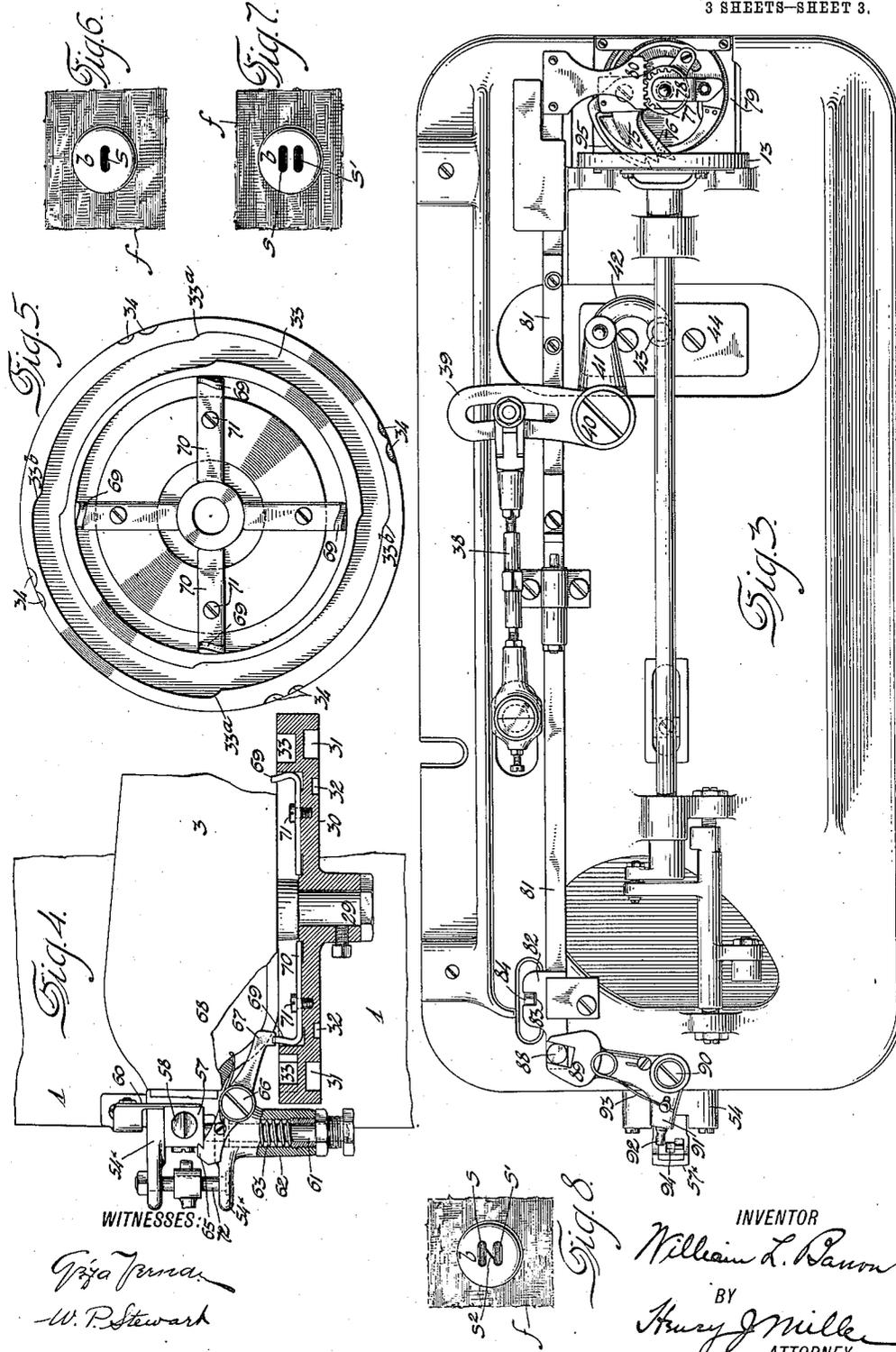


Fig. 4.
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Fig. 8.
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UNITED STATES PATENT OFFICE.

WILLIAM L. BARRON, OF NEW YORK, N. Y., ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

BUTTON-SEWING MACHINE.

1,093,241.

Specification of Letters Patent. Patented Apr. 14, 1914.

Application filed October 5, 1911. Serial No. 652,936.

To all whom it may concern:

Be it known that I, WILLIAM L. BARRON, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Button-Sewing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has for its primary object to provide a machine for automatically attaching flat buttons to garments by means of spaced and unconnected groups of stitches, and also to provide such a machine with means for attachment interchangeably of two- or four-hole buttons with the same number of stitches passing through each pair of holes.

In its preferred form, the machine is constructed with stitch-forming mechanism comprising a rectilinearly reciprocating needle operating in conjunction with a button-holder to which is imparted lateral jogging movements for production of a succession of fastening overseam-stitches passing through the eyes of one pair of a four-hole button and periodical lateral movements at the completion of each group of fastening stitches to position the button for reception of a second group of fastening stitches passing through the eyes of the second pair of holes in the button. The machine is provided with a stop-motion device and tripping means therefor arranged to operate the stop-motion device to arrest the stitch-forming mechanism at the completion of each group of fastening stitches so as to permit the cutting of the needle-thread, manually or otherwise, to prevent the laying of a connecting thread upon the face of the button between the groups of fastening stitches passing through its two pairs of eyes. The machine is preferably provided with thread-cutting mechanism actuated by the stop-motion device whereby the upper thread is automatically cut beneath the work, and the jogging of the button-holder is arrested during the production of the last few stitches of each group to produce tying stitches for preventing the unraveling of the fastening stitches. The button-holder jogging means is so constructed and arranged that the button is normally shifted across central or neutral po-

sition relatively to the needle path, but it is provided with adjusting means for interrupting its side-shift movements and simultaneously positioning the button-holder in intermediate or central position so as to hold a two-hole button suitably to receive a single group of fastening stitches of the same number as those applied to each pair of holes of a four-hole button.

In the accompanying drawings the present improvement is shown embodied in a flat button sewing machine constructed substantially in accordance with the United States patent to Charles M. Horton No. 807,676, dated December 19, 1905.

Figure 1 is a rear side elevation of a machine embodying the present improvements, Fig. 2 a front side perspective view of the same with the frame represented partly in dotted lines, with certain parts removed and others represented partially in section, and Fig. 3 is a bottom plan view of the same. Fig. 4 is a plan of the rearward portion of the machine with the controlling cam in section, and Fig. 5 an elevation of the forward face of the controlling cam. Figs. 6 and 7 represent pieces of material having attached thereto by means of the present improvement a two-hole and a four-hole button, and Fig. 8 a similar view representing a four-hole button attached by mechanism of the patent above mentioned without the present improvement.

The frame of the machine is composed of the usual bed-plate 1, hollow standard 2 and tubular overhanging arm 3 in which is journaled the main-shaft 4 having upon its rearward end the fast and loose pulleys 5 and 6, the former having secured thereto the stopping cam 7. The main-shaft 4 has secured upon its forward end the take-up cam-cylinder 8 carrying the crank-pin 9 connected by means of the pitman 10 with the rectilinearly reciprocating needle-bar 11 carrying the eye-pointed needle 12 which in practice coacts with a shuttle mounted in the shuttle race 13 depending from the under side of the bed-plate.

Sustained upon the bed-plate 1 is the laterally jogging slide-bar 14 carrying upon its rearward end the block 15 and having secured to its forward end the work-supporting plate 16 constituting the lower member

of the work-clamp. Journalled in the block 15 for slight vertical movement is the upper work-clamp arm 17 having an enlargement 18 at its forward end constituting the button-holder sustaining plate, and pressed normally downward by means of the arched pressure spring 19 secured upon said block by means of the clamp-bolt 20.

Pivotaly mounted beneath the plate 18 by means of the fulcrum-studs 21 are the swinging spring-pressed button-holding levers 22 each provided at the downwardly offset forward end with the button-clamp jaw 23 both grooved in their adjacent edges to receive the edges of the button *b* introduced between said jaws with its inner edge in engagement with the intermediate stop-finger 24, the horizontal portions of the upper face of the button being pressed in contact with the overhanging lips of the jaws by means of the spring holding-plate 25 secured to the under side of the arm 17 by the screw 26.

As represented in dotted lines in Fig. 1, the main-shaft 4 is provided with a worm 27 meshing with the worm-wheel 28 secured upon the transverse shaft 29 upon which is fixed the controller cam-wheel 30. This cam-wheel is formed in its rearward face with the clamp-jogging cam-groove 31 and thread-cutter cam-groove 32 and in its forward face with the clamp side-shift groove 33, while its cylindrical periphery is formed with the thread-clamp notches or cavities 34. The jogging cam-groove 31 is entered by a roller-stud 35 carried by the upper arm of a rock-lever 36 mounted upon the fixed fulcrum-screw 37 and having its lower arm connected by means of the extensible pitman 38 with the rearwardly extended slotted arm 39 of a bellcrank mounted beneath the bed-plate upon a fulcrum-stud 40 and having a forwardly extending arm 41 connected by means of the bent link 42 with the pin 43 mounted in the slide-plate 44 and connected with the forward portion of the slide-bar 14. The cam-groove 31 is composed of four similar sections each comprising a succession of outwardly extending indentations 31^a alternating with inwardly projected parts 31^b the final one of which latter has continuous therewith a concentric portion 31^c. As represented in the drawings, in each section of the cam-groove the stud 35 traverses first the jogging portions 31^a and 31^b to produce through the operative connections six lateral jogs of the work-clamp for production of a plurality of fastening stitches after which its traverse of the concentric cam-groove portion 31^c causes an interruption of the jogging movements to permit the descent of the needle three times through the same hole of the button for production of the tying stitches.

The laterally jogging slide-bar 14 has at its rear end the rigid pin or post 45 entering

the hollow or slotted lower arm 46 of a rock-shaft 47 mounted in the rigid bracket 48 and provided with the upwardly extending arm 49 carrying a pin or roller-stud 50 entering the side-shift cam-groove 33 of the cam-wheel 30. Vertically adjustable on the pin or post 45 between the flanges of the hollow arm 46 is the contact block 51 adjustably secured in position by the set-screw 52. The parts are so constructed and arranged that when the contact block 51 is shifted into upper position against the stop-screw 53 and in alinement with the rock-shaft 47, the slide-bar 14 is drawn into intermediate position in which the center of a button held by the button-holding jaws is in the plane of the lateral jogging movements relatively to the needle, so that a two-hole button is suitably positioned to receive a single group of fastening stitches corresponding with one of the sections of the controlling cam, or a quarter-rotation of the same, while the adjustment of the spacing block 51 in a lower position, as represented in Fig. 2, causes the button to be shifted laterally across such intermediate or neutral position at the completion of each series of tying stitches succeeding a group of fastening stitches. To this end, the cam-groove 33 is formed with four alternating outer and inner concentric portions with intermediate inclined portions 33^a and 33^b one of which is disposed substantially opposite the end of each concentric portion 31^c of the jogging cam-groove, so as to act in producing a side-shift of the work-clamp immediately succeeding the rise of the needle after its descent for the final tying stitch.

The standard 2 has secured to its rearward end a bracket 54 formed in its lower end with a socket in which is journalled the plug 55 having a forked outer end in which is pivoted by means of the transverse pin 56 the lower end portion of the vibratory stop-lever 57 carrying the spring-pressed plunger-rod 58 whose wedge-shaped upper end 58^x is adapted for engagement with the stopping cam 7 into operative relation with which it is normally pressed by means of the flat spring 59 having its foot 60 secured upon the bed-plate and its laterally offset upper end 59^x resting upon the face of the lever 57. The lever 57 is confined yieldingly against one of the spaced flanges 54^x of the bracket 54 by means of the transverse plunger-rod 61 mounted in the socketed bearing boss 62 in which is confined the buffer-spring 63. The stop-lever 57 carries the usual belt-shipper 64.

The outer or rearward face of the stop-lever 57 is formed with a groove which is entered by the hooked outer end 65 of a latch-lever mounted upon the fulcrum-screw 66 and having a forwardly extending arm 67 with a lateral nose normally pressed, by

means of the spring 68 in the path of circular movement of the lug 69 of each of four tripping plates 70 secured by means of fastening screws 71 upon the recessed inner face of the cam-wheel 30. As shown in Figs. 2 and 5, the points of the tripping lugs 69 are disposed substantially opposite the alternating operative shoulders 33^a and 33^b of the side-shift cam-grooves, and they are in practice so arranged that the latch-lever 65 67 is tripped to release the stop-lever 57 as the needle completes its descent for the final tying stitch succeeding each group of fastening stitches. For tilting the stopping lever 57 to disengage its plunger 58 from the stopping cam 7, a starting lever is mounted upon the transverse fulcrum-pin 72 between the flanges 54^x of the bracket 54, such lever comprising the depending arm 73 normally resting against the rearward edge of the lever 57 and the rearwardly extending arm 74 adapted to be drawn downwardly by a treadle connection or other means in shifting the stop-lever into forward inoperative position.

The present machine is preferably provided with a thread-cutting mechanism comprising the upper-thread and lower-thread cutting blades 75 and 76 rigidly connected with the sector gear 77 journaled in the bracket 78 which is attached to the shuttle race cover-plate 79. Meshing with the sector-gear 77 is the rack 80 carried by a slide-bar 81 suitably supported beneath the bed-plate and having near its rear end a block 82 having a notch 83 entered by the reduced lower end of the lever 84 which is pivotally mounted by means of the stud-screw 85 on the bracket 86 (represented in dotted lines in Fig. 1) and provided at its upper end with a pin or roller-stud 87 entering the cam-groove 32 of the cam-wheel 30. The block 82 carries at its rear end a pin or roller-stud 88 engaged by the forked arm 89 of a bellcrank-lever mounted on the fulcrum-stud 90 and having a rearwardly extending arm 91 provided with an endwise yielding pin 92 normally pressed outwardly by means of the spring 93. The stop-lever 57 has an extension 57^x below its fulcrum-point formed with an aperture 94 which is adapted to be entered by the yielding pin 92 when the stop-lever is in stopping position wherein its plunger-rod 58 is in operative relation with the stopping cam 7. The thread-cutter cam-groove is so formed that, in the drawing up of the needle-thread loop for the stitch next the last tying stitch, the sector-gear 77 receives the first stage of its operative movement which advances the point of the lower-thread cutting blade 76 beyond the needle-hole of the shuttle-race cover-plate so as to draw aside the shuttle-thread and insure the proper lead of the same without interference with the subsequently acting hooked

needle-thread retaining blade 95. About as the needle completes its final descent, one of the tripping points 69 engages the latch-lever 65 67 to trip the stop-motion, after which the momentum of the moving parts causes a continued partial rotation of the main-shaft during which the sector-gear 77 receives the second stage of its actuation to enter the point of the cutter-blade 75 within the final needle-thread loop, the later throw of the stop-lever 57 in opposition to the buffer-spring 63 producing through the bellcrank-lever 89 91 a final jog of the slide-bar 81 to produce the final thread-cutting action of the cutter-blades 75 76, all as more fully described in the United States Patent No. 807,676, before mentioned and the patent to George S. Gatchell No. 798,130, dated Aug. 29, 1905. After the stop-motion is actuated to produce the succeeding group of button-fastening and tying stitches the sector-gear 77 receives a slight retrograde movement after the first descent of the needle to retract the hooked retaining blade 95 into clamping engagement with the needle-thread to hold the end of the same in the production of a few fastening stitches, after which the cutter-blades and retaining blade are wholly retracted into inoperative position preparatory to a succeeding operative thread cutting movement.

It will be observed that, by employment of the present improvement, the machine is adapted to produce two spaced and unconnected groups of button-fastening or tacking stitches *s* and *s'* each terminating in a plurality of tying stitches substantially as represented in the United States patent to John J. Sullivan No. 777,564, dated December 13, 1904, with the severed ends of the threads retained wholly beneath the fabric and with the upper face of the button entirely free from projecting thread ends, as represented in Fig. 7; or, when the side-shift mechanism is suitably adjusted, to produce the groups of stitches *s* successively in the same central position for stitching two-hole buttons, as represented in Fig. 6. The production of the machine is therefore quite different from that of prior machines for fastening four-hole buttons, as represented in Fig. 8, wherein the tying stitches, when added to the fastening stitches, occur only after the second group *s'* of the latter which are connected by a cross-thread *s*² which marred the appearance of the button especially when of that type provided with parallel counter-sunk grooves intermediate the thread-holes of each pair to receive the stitches.

As in the operation of the mechanisms before referred to, the needle-thread loops are passed through the work in the initial and final thrusts of the needle for each group of stitches and are acted upon by the thread-

cutting and retaining elements without the locking of such loops by the shuttle-thread, and the controller-cam is so designed and actuated as to produce the requisite number of fastening stitches, the first two of the three final descents of the needle serving to produce the requisite tying stitches to form a knot in the upper and lower threads to securely hold the previously formed stitches against raveling.

It is obvious that the present machine is adapted to produce spaced groups of fastening or tacking stitches connected by an intermediate thread in case alternate tripping points are omitted from the controller-cam or the automatic actuation of the thread-cutter taking place after the production of each group of stitches should be omitted after each alternate group of stitches, so as to produce a button fastening having the appearance of that represented in Fig. 8, but with tying stitches at the ends of each of the separated groups of fastening stitches.

While the present improvement is shown embodied in a button sewing machine of the jogging-clamp type and with automatic upper and lower-thread cutting devices disposed beneath the work-support, it is evidently adapted to button sewing machines of other types and is susceptible of material modification of the construction and arrangement of its parts within the scope of the present invention.

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

1. In a button sewing machine, the combination with stitch-forming mechanism including a reciprocating needle, a button-holder, and means for producing between the needle and the button-holder in each stitching cycle series or successions of relative lateral jogging movements and intermediate said series or successions of jogging movements relative side-shift movements transverse thereto, of means for cutting the needle-thread beneath the work at the completion of each series of jogging movements preceding a side-shift movement.

2. In a button sewing machine, the combination with stitch-forming mechanism including a reciprocating needle, a button-holder, and means for producing between the needle and the button-holder during each complete stitching cycle series or successions of relative lateral jogging movements and intermediate said series or successions of jogging movements relative side-shift movements transverse thereto, of a needle-thread cutting device, and means whereby said cutting device may be actuated to cut the needle-thread a plurality of times in each stitching cycle.

3. In a button sewing machine, the combination with stitch-forming mechanism in-

cluding a reciprocating needle, a work-holder, and means for producing between the needle and the work-holder during each complete stitching cycle series or successions of relative lateral jogging movements and intermediate said series or successions of jogging movements relative side-shift movements transverse thereto, a stop-motion device for arresting the action of the stitch-forming mechanism, and automatically acting means for repeatedly tripping said stop-motion device into action during each stitching cycle, of a thread-cutting device for severing the thread, and means connected with a moving part of the machine for actuating said cutting device after each actuation of the stop-motion device.

4. In a button sewing machine, the combination with stitch-forming mechanism including a reciprocating needle, a button-holder, means for producing relative lateral jogging movements between the needle and the button-holder, and means for producing relative side-shifting movements between the needle and the button-holder, whereby button-fastening stitches may be produced in spaced and connected groups, of means for arresting the action of the stitch-forming mechanism intermediate said groups of fastening stitches, and means for adjusting the side-shifting means to render the same either effective or ineffective.

5. In a button sewing machine, the combination with stitch-forming mechanism including a reciprocating needle, a button-holder, means for producing relative lateral jogging movements between the needle and the button-holder to form a plurality of fastening stitches and for then interrupting the said jogging movements while the needle continues to reciprocate for production of a series of tying stitches, and means for producing relative side-shifting movements between the needle and the button-holder after completion of each series of tying stitches, of means for arresting the action of the stitch-forming mechanism at the completion of each series of tying stitches, and means for adjusting the side-shifting means to render the same either effective or ineffective.

6. In a button sewing machine, the combination with stitch-forming mechanism, a button-holder, means for producing relative lateral jogging movements between the stitch-forming mechanism and the button-holder, and means acting automatically at the completion of each group or succession of stitches of predetermined number for producing relative shifting movements between the stitch-forming mechanism and the work, of a stop-motion device for arresting the action of the stitch-forming mechanism, automatically acting means for tripping said

stop-motion device at the completion of each group or succession of stitches, a thread-cutting device, and means operatively connected with the stop-motion device for actuating said thread-cutting device to cut the needle-thread.

In testimony whereof, I have signed my

name to this specification, in the presence of two subscribing witnesses.

WILLIAM L. BARRON.

Witnesses:

D. P. BIRNIE,
H. J. MILLER.