

Sept. 3, 1935.

C. J. SIBBALD

2,013,449

BUTTON WINDING MACHINE

Filed June 30, 1934

5 Sheets-Sheet 1

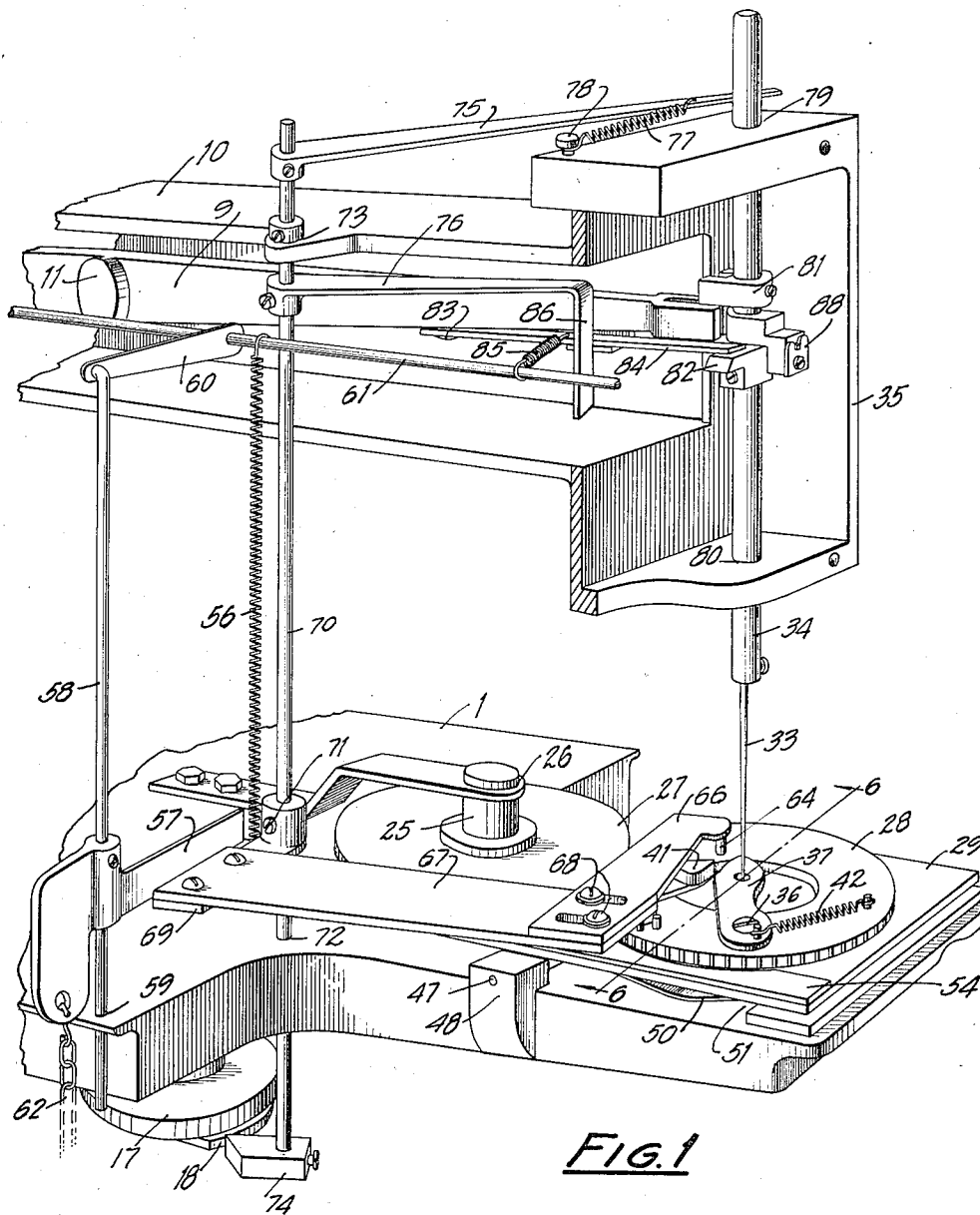


FIG. 1

INVENTOR
CHARLES J. SIBBALD
BY *Wm. H. Wood*
ATTORNEYS

Sept. 3, 1935.

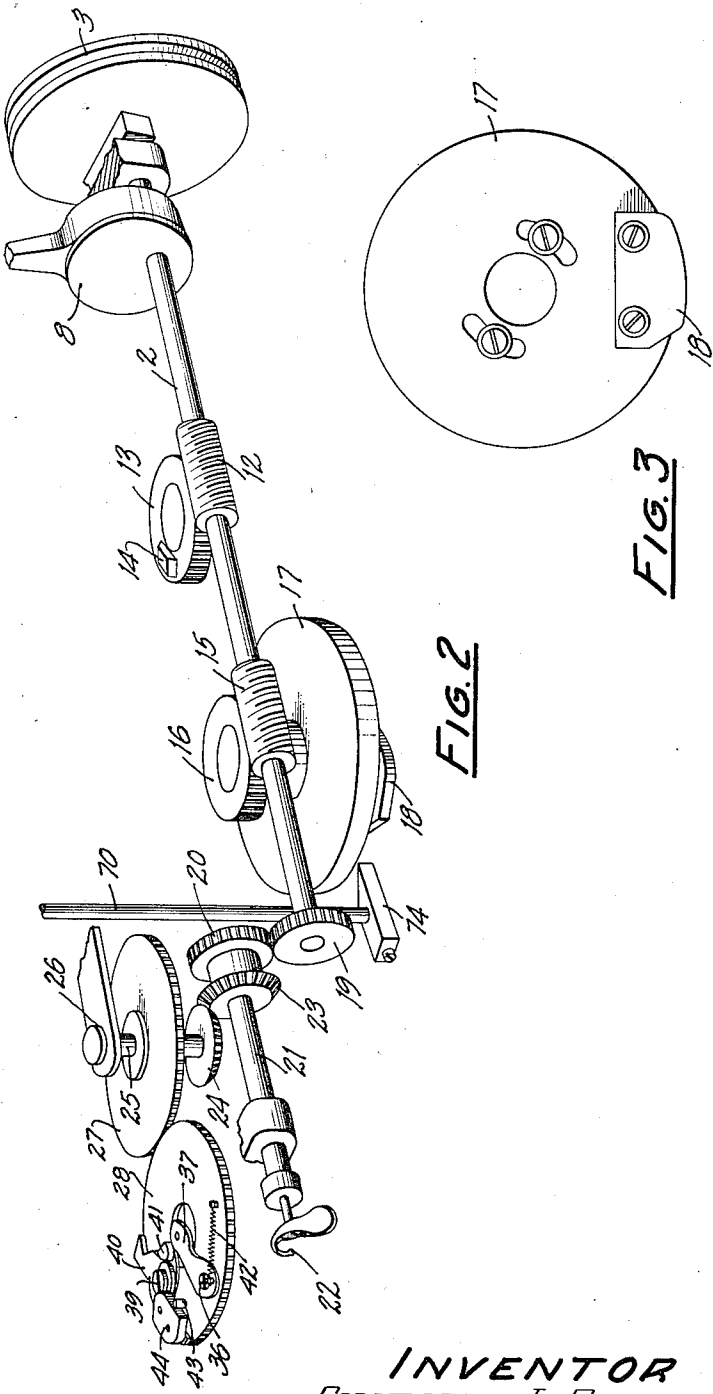
C. J. SIBBALD

2,013,449

BUTTON WINDING MACHINE

Filed June 30, 1934

5 Sheets-Sheet 2



INVENTOR
CHARLES J. SIBBALD
BY *Charles J. Sibbald*
ATTORNEYS

Sept. 3, 1935.

C. J. SIBBALD

2,013,449

BUTTON WINDING MACHINE

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5 Sheets-Sheet 3

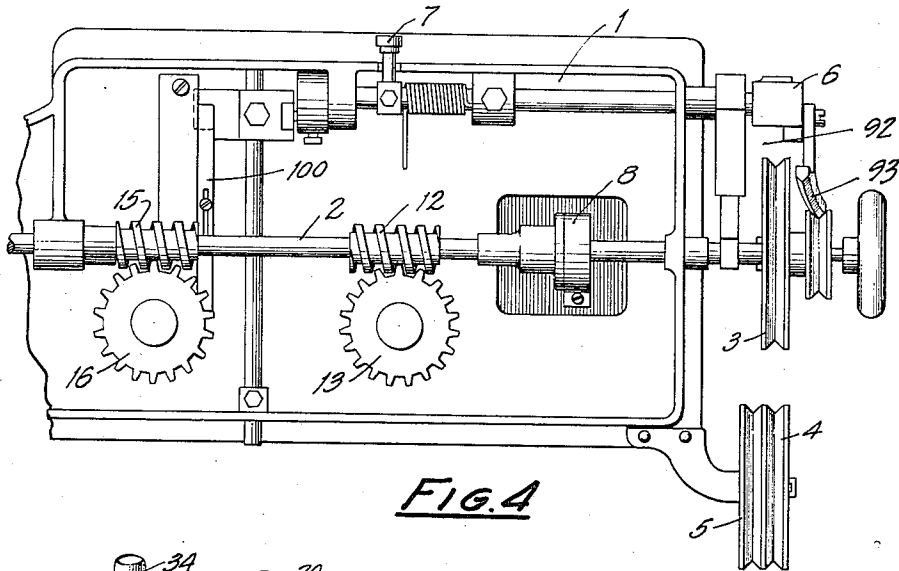


FIG. 4

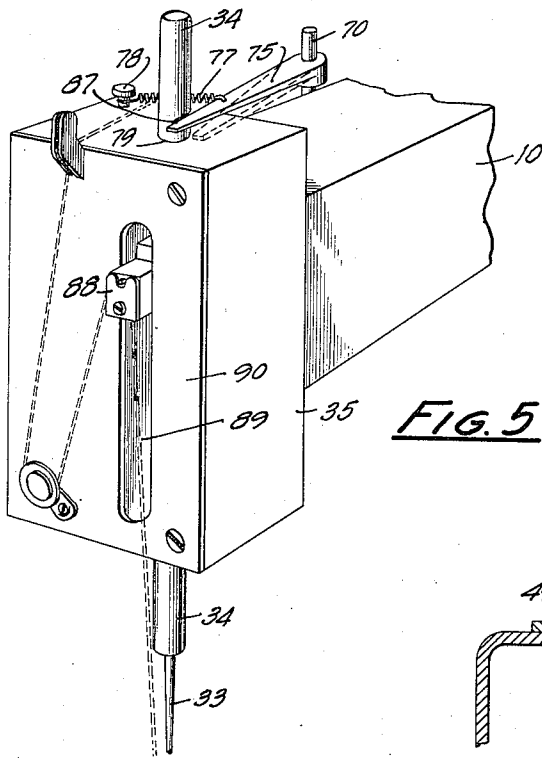


FIG. 5

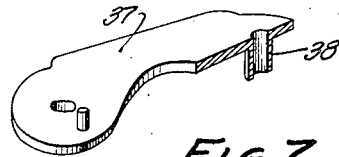


FIG. 7

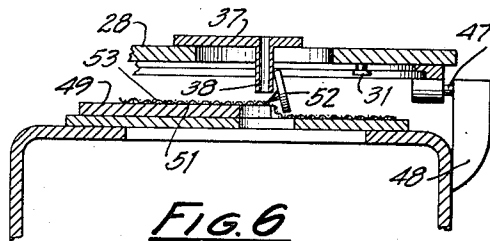


FIG. 6

INVENTOR
CHARLES J. SIBBALD
BY *Andrew Wood*
ATTORNEYS

Sept. 3, 1935.

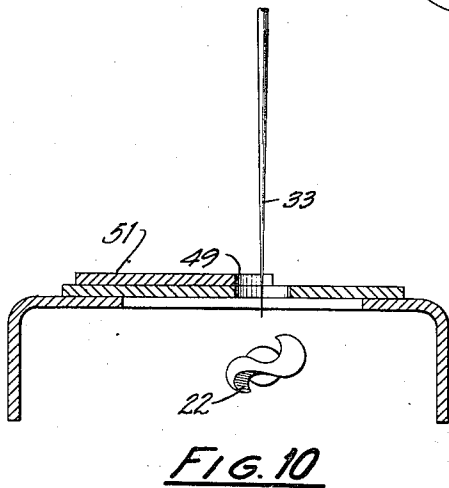
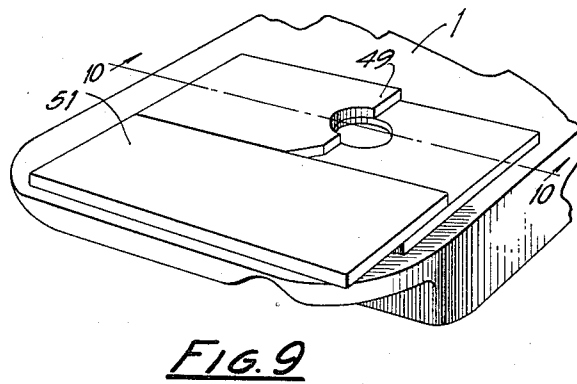
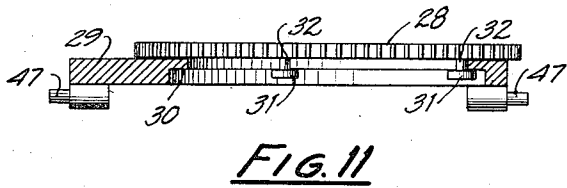
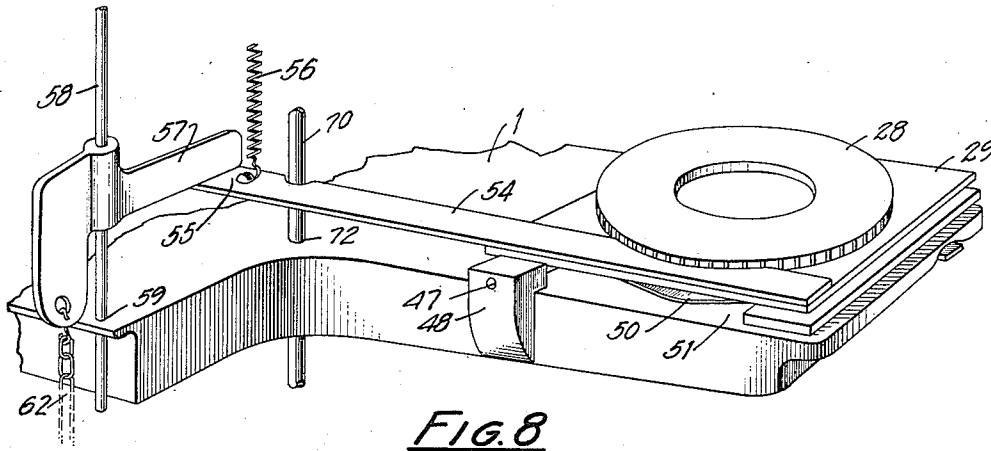
C. J. SIBBALD

2,013,449

BUTTON WINDING MACHINE

Filed June 30, 1934

5 Sheets-Sheet 4



INVENTOR
CHARLES J. SIBBALD
BY *Quincy Wood*
ATTORNEYS

Sept. 3, 1935.

C. J. SIBBALD

2,013,449

BUTTON WINDING MACHINE

Filed June 30, 1934

5 Sheets-Sheet 5

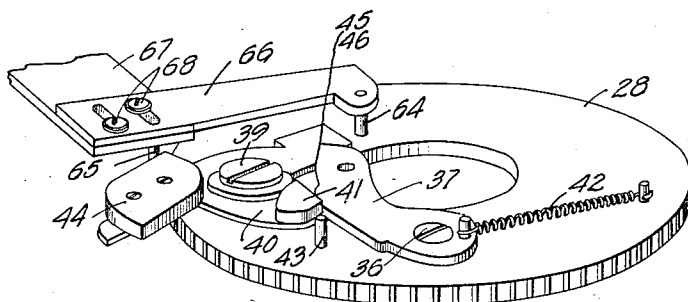


FIG. 12

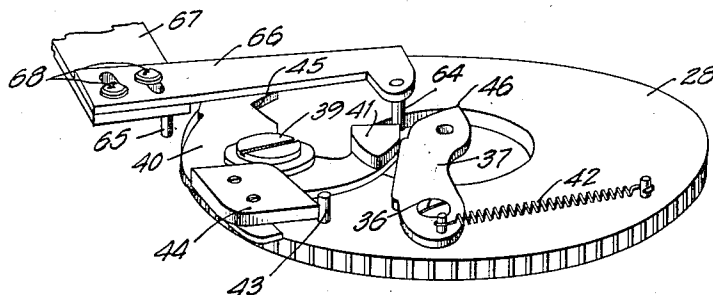


FIG. 13

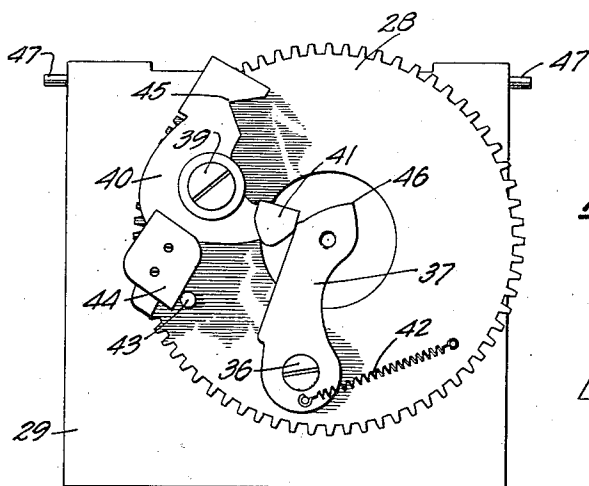


FIG. 14

INVENTOR
CHARLES J. SIBBALD
BY *Wm. H. Wood*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,013,449

BUTTON WINDING MACHINE

Charles J. Sibbald, Troy, N. Y.; John O. Sibbald
executor of said Charles J. Sibbald, deceased

Application June 30, 1934, Serial No. 733,194

24 Claims. (Cl. 112—110)

My invention relates to the art of sewing buttons on fabrics and more particularly to a machine for forming a neck, comprising thread windings, intermediate a fabric and a button secured thereto.

The present practice insofar as the sewing of buttons on garments and the like is concerned is first to secure the button to the fabric by means of a button sewing machine. Such machines are so designed that during the sewing operation the button is held somewhat above the fabric with the result that when the sewing operation is completed an appropriate space is left between the under side of the button and that portion of the fabric to which it is attached so that the fabric about the button hole may be received underneath the button. After the buttons are thus secured to the fabric, it is usual to form, by hand, a neck between the button and the fabric by winding and securing a thread about the threads which secure the button to the fabric. Sometimes the whole operation of sewing and winding is performed by hand.

The machine of the present invention does not sew the buttons to the fabric but is designed to form a neck intermediate a fabric and a button already secured thereto, as above described, by a continuous winding of thread, and includes means for first securing the winding thread to the fabric, means for forming the neck by a winding operation, and means for finally securing the end of the thread used in the winding operation.

It has heretofore been proposed to form a neck intermediate a fabric and a button secured thereto by looping the thread about the button securing means. The neck thus formed is not at all similar to the neck formed by the hand operation and is entirely unsatisfactory in that the loops are all formed at one side of the button securing means so that the neck is decidedly asymmetrical.

The principal object of my invention is to provide a machine for forming a neck between a fabric and a button secured thereto by winding a plurality of turns of thread continuously in one direction about the button securing means. Another object is to provide a means whereby the end of the thread which is wound about the button securing means to form the neck is initially secured to the work at a point underneath the button when in normal position. Another object is to provide a means whereby, after the neck is formed by the winding thread, the outer end of the winding thread is secured to the work

underneath the button in normal position. A still further object is to provide a device which will be entirely automatic in its operation. That is to say, when started, the device will initially fasten the thread end to the work, wind the thread about the button securing means to form a neck, fasten the thread after the winding operation, and stop, ready to repeat the cycle on the next button.

With these objects in view my invention includes the novel elements and the combinations and arrangements thereof described below and illustrated in the accompanying drawings in which—

Fig. 1 is a fragmentary perspective view, with certain parts removed, showing the general construction of my device;

Fig. 2 is a skeleton perspective view showing the arrangement of the driving mechanism of the device;

Fig. 3 is a bottom plan view of the cam and carrier disc therefor which controls the operation of the stitching mechanism;

Fig. 4 is a fragmentary bottom view of the rear portion of the machine showing the driving and stop mechanisms;

Fig. 5 is a fragmentary perspective view of the head of the machine;

Fig. 6 is a section in the plane 6—6 of Fig. 1;

Fig. 7 is a perspective view, partially in section, of the thread carrier;

Fig. 8 is a fragmentary perspective view showing the work holding portion of the bed plate of the machine, and the cloth plate;

Fig. 9 is a fragmentary perspective view of the work supporting portion of the bed plate showing a detail of the throat plate;

Fig. 10 is a section in the plane 10—10 of Fig. 9;

Fig. 11 is a section through the cloth and winding assembly plate to illustrate how the winding gear is secured to said plate;

Fig. 12 is a fragmentary perspective view of the winding mechanism with the parts in winding position;

Fig. 13 is a fragmentary perspective view similar to Fig. 12 showing the winding mechanism with the parts in stitch forming position; and

Fig. 14 is a plan view of the cloth plate and winding assembly showing the thread carrier in needle-passing position.

Referring to the drawings it may be said that my machine approximates in its general form and driving means an ordinary button sewing machine such as is well known in the art and

shown, for example, in Patent No. 961,507 granted to R. L. Lyons June 14, 1910. 1 represents generally the bed plate of the machine, the bottom view of which is shown in Fig. 4. Journaled in appropriate bearings in the bed plate is the main shaft 2 which is driven by means of pulley 3 by a belt (not shown) extending over pulley 4 which is integral with or secured to pulley 5 and is driven by a suitable motor. The machine is provided with the usual automatic stop mechanism indicated generally by the numeral 6 and the usual starting lever 7 associated therewith, all of which is identical with the mechanism now used on button sewing machines. The shaft 2 is provided with the usual eccentric 8 which drives the needle arm 9 (see Fig. 1) pivoted to the stationary arm 10 at 11. The shaft 2 is provided with the usual worm 12 driving the worm wheel 13 provided on its upper surface with a cam 14 which actuates a standard form of thread breaker (not shown) in a manner well understood in the art. The shaft 2 is provided with a second worm 15 which drives the worm wheel 16 secured to which is a disc 17 carrying cam 18.

Referring to Figs. 1 and 2, the end of shaft 2 remote from the driving pulley 3 is provided with a spur gear 19 which coacts with the usual spur gear 20 mounted on the shaft 21 which carries the looper 22. Also mounted upon the shaft 21 is a bevel gear 23 which drives bevel gear 24 on the vertical shaft 25 journaled in a bearing in the bed plate 1 and in a bearing 26 at the top. Secured to the shaft 25 is the main gear 27 which drives the winding mechanism of my device.

This winding mechanism comprises a centerless annular gear 28 in mesh with the driving gear 27. The gear 28 is rotatably mounted on the cloth plate 29 in the manner perhaps best shown in Fig. 11. The underneath side of the plate 29 is provided with an annular shoulder 30 which is engaged by the heads 31 of shoulder screws 32 secured to the under side of gear 28. Gear 28 is coaxial with the needle 33 carried by the needle bar 34 slidably mounted in the head 35 of the machine.

Pivotally mounted at 36 on the upper side of the gear 28 is the thread carrier 37, the details of which will be apparent from a consideration of Figs. 6 and 7. Near the free end of the thread carrier is a depending tube 38 of appropriate diameter to permit the passage of the needle 33 and which said tube is coaxial with the needle 33 and the gear 28 when the parts are in the relative positions shown in Figs. 1, 2, 6, 13 and 14. Pivotally mounted at 39 on the upper side of gear 28 is the thread carrier shifter and latch 40. When the shifter is in the position shown in Figs. 1, 2, 13 and 14 the cam 41 on one end of the shifter 40 is in contact with the side of the thread carrier and holds it in a position coaxial with the needle, the thread carrier being held against the cam 41 by means of a tension spring 42. A stop pin 43 secured to the gear 28 and coacting with a portion 44 of the shifter limits the counterclockwise movement of the shifter. When the parts are in the relative position shown in Fig. 12 the notch 45 in the shifter receives the end 46 of the thread carrier and forms a latch securing the thread carrier in a position offset from its needle-passing position, as shown in Fig. 12, against the tension on the thread during the winding operation.

The plate 29 with the above described winding assembly attached thereto is pivotally mounted on trunnions 47 journaled in bearings 48 secured

to the bed plate 1. These trunnions and bearings are so disposed relative to the pitch circles of the teeth on gears 27 and 28 that the free end of plate 29 may be tilted up slightly about the trunnions to permit the work to be inserted underneath the plate 29 and between the plate 29 and the throat plate 49. The bottom of the plate 29 is provided with two flat springs 50, a portion of one of which is shown in Figs. 1 and 8. These springs serve to hold the work in contact with that portion 51 of the bed forming the work holder. It will be noted by reference to Figs. 6, 9 and 10 that the throat plate is cut off or terminates slightly beyond the path of the needle so that the button 52 which is secured to the fabric 53 may be uplited over the edge of the throat plate as shown in Fig. 6 thus permitting the winding thread to be fastened underneath the button in its normal position. Secured to the plate 29 is an arm 54, best shown in Fig. 8, said plate and arm collectively constituting a lever pivoted on the trunnions 47. The free end 55 of the lever arm 54 is urged upwardly by means of the spring 56. Coacting with the free end of the arm 54 is a member 57 mounted on the vertical rod 58, one end of which passes slidably through the bed plate, at 59, and the upper end of which is secured to the rocker arm 60 on the shaft 61. Secured to the member 57 is a chain 62 connected with the treadle or pedal 63 secured to the floor beneath the machine.

It will be obvious from the foregoing that when the pedal 63 is depressed by the foot of the operator that the forward end of the plate 29 will be uplited and the work may be inserted therebeneath.

The thread carrier shifter and latch is actuated in timed relation to the operation of the needle, as will be hereinafter explained, by means of depending pins 64 and 65 secured to the underneath side of the member 66. The member 66 is adjustably secured to the member 67 by means of screws 68 which pass through slotted openings in the member 66. The member 67 is in turn secured to a crank 69 secured to the vertical shaft 70 by means of the set screw 71. The shaft 70 is journaled in the bed plate at 72 and in the arm of the machine at 73. Mounted on the lower end of the shaft is the cam follower 74 which coacts with cam 13 as shown in Fig. 1. The upper portion of the vertical shaft 70 carries an arm 75 and an arm 76, and the shaft 70 and all of its associated parts are normally urged to rotate in a clockwise direction, as viewed in Fig. 1 by means of the tension spring 77, one end of which is secured to the arm 75 and the other end of which is anchored, as at 78, to the head of the machine. The needle bar 34 is slidably mounted in bearings 79 and 80 in the head of the machine, and mounted upon the needle bar and within the head of the machine are lugs 81 and 82 by means of which the needle bar is reciprocated. The lug 81 cooperates directly with the extremity of the needle arm 9 and the needle bar is raised through the coaction of lug 81 and arm 9. Pivotally secured at 83 to the underneath side of the needle arm is an auxiliary arm or lever 84 which coacts with lug 82, in properly timed relation with the winding means, to depress the needle bar. The auxiliary arm 84 is normally urged outwardly and away from its position of coaction with lug 82, as shown in Fig. 1, by means of the tension spring 85 connecting it with the shaft 61 and it is moved into coacting relation with the lug 82 by means of the depending portion 86

of arm 76 when the vertical shaft 70 is turned in a counterclockwise direction by means of the cam 18 and the follower 74 secured to shaft 70. The operation of the needle bar is arrested at the proper time when it is in raised position by means of the coaction of the arm 75 therewith, as best shown in Fig. 5. The upper end of the needle bar is provided with a notch 87 adapted to receive the arm 75 in the manner shown in Fig. 5, and the coaction of this arm with the needle bar holds it in raised position. It will be apparent that when the arm 75 is engaged in the notch 87 that the auxiliary arm 84 which is pivotally mounted on the needle arm will be moved out of engagement with the lug 82 by tension spring 85, because arm 76 with its depending portion 86 which holds arm 84 engaged with lug 82 moves outwardly and away from arm 84 as the shaft 70 turns clockwise.

Intermediate the lugs 81 and 82 there is secured to the needle bar 34 the usual thread take-up 88. This take-up extends through the slot 89 in the face plate 90 (see Figs. 1 and 5) and its coaction with the sides of the slot serves to prevent rotation of the needle bar.

The operation of my device is as follows:

When the machine is stopped at the end of any cycle it is to be understood that the cam follower 74 is approximately in the center of the cam 18 and the other parts of the machine are about in the relative positions shown in Fig. 1 although the needle bar should be raised somewhat above the position there shown. The operator depresses the treadle 63 and slips the fabric 53 with the button 52 attached on the work support 51 with the button pulled up against the side of the tube 38 on the thread carrier 37 and tilted over the edge of the throat plate as shown in Fig. 6. The treadle is then released and the plate 29 tilts down upon the work, the springs 50 coming in contact with the fabric and holding the button in winding position. The starting lever 7 (see Fig. 4) is then depressed which operates the clutch mechanism, represented generally at 92, by means of cam 93 as is well understood in the button securing machine art. The shaft 2 and all of its associated and driven parts begin to turn and the needle passes downwardly through the tube 38 in the thread carrier and secures the end of the thread to the fabric underneath the button. At the finish of the thread fastening operation and when the needle bar 34 is in raised position the cam follower 74 passes out of engagement with cam 18 whereupon shaft 70 is rotated slightly in a clockwise direction by means of tension spring 77 secured to arm 75. Arm 75 is thus drawn into latching engagement with the needle bar, as shown in Fig. 5 and auxiliary needle arm 84 is drawn out of engagement with lug 82 by means of the tension spring 85. This movement is permitted because arm 76 turns in a clockwise direction with shaft 70 and auxiliary arm 84 follows it until it is out of engagement with lug 82. It is to be understood, of course, that the needle arm 9 continues to move upon its pivot 11 but this movement does not effect the needle bar 34 because arm 84 is disengaged with lug 82 and lug 81 is at the uppermost point of its travel.

As shaft 70 turns slightly in a clockwise direction due to the disengagement of follower 74 with cam 18, arm 67 turns with it and pin 64 on arm 66 is pulled into the position shown in Fig. 13 so that it engages cam 41 on shifter 40 when the gear 28 turns in a clockwise direction so that

they are brought in contact. The engagement of pin 64 with cam 41, and the turning of gear 28 move the shifter to the position shown in Fig. 12. Tension spring 42 causes the thread carrier to follow the shifter and the carrier also moves from the position shown in Fig. 13 to the position shown in Fig. 12 where it is held by the latch notch 45 in shifter 40. In other words, the thread carrier, and particularly the tube thereof, through which the thread already has been passed by the needle, is thus offset from its needle-passing position and the end of the thread is secured beneath the button. As gear 28 turns, the thread is wound continuously in the same direction about the thread which secures the button to the fabric thus forming a neck intermediate the button and the fabric to which it is attached. The number of turns may be varied by changing the gear ratios. When the disc 17 has made a complete turn so that cam 18 again engages follower 74 the shaft 70 is thereby rotated slightly in a counter-clockwise direction. This counter-rotation of shaft 70 moves the arm 67 in a counter-clockwise direction and moves pin 65 on the lower side of the arm 67 into position to engage the cam element 44 on the shifter 40. The coaction of pin 65 and cam 44 (see Fig. 12) as the gear 28 continues to rotate in a clockwise direction immediately moves the shifter 40 to the positions shown in Figs. 13 and 14, and the coaction of cam 41 with the side of the thread carrier moves the carrier back so that the tube 38 is placed in needle passing position. Simultaneous with this shifting of the thread carrier, arm 75 is moved out of latching engagement with the needle bar and the depending portion 86 of arm 76 moves the auxiliary needle arm 84 back into position over lug 82. The movement of the thread carrier back to needle passing position, of course, brings the tube 38 into engagement with the button which is again up-tilted as shown in Fig. 6. The stitching mechanism is then in operation and preferably two more fastening stitches are taken. At the finish of the second stitch and when the needle bar 34 is in raised position, the mechanism is stopped by means of the coaction of a cam (not shown) on worm wheel 16 which cooperates with slide 109 of the stop device, the construction and operation of which is well understood in the button-sewing machine art.

From the foregoing it will be apparent that the neck between the fabric and the button secured thereto is formed by a continuous winding of thread laid in one direction so that the resulting neck is comparable in all respects with a neck formed by hand. Furthermore, it will be apparent that by reason of the up-tilting or displacement of the button from its normal position during the time when the thread ends are being fastened that the knots or stitches used in fastening are concealed beneath the button.

While I have described my invention in its preferred embodiment, it is to be understood that the words which I have used are words of description and not of limitation. Hence, changes within the purview of the appended claims may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is:

1. In a device for forming a neck between a fabric and a button secured thereto, the combination with stitch forming mechanism including a needle and thread feeding means therefor, of means for winding the thread about the button

securing means intermediate stitches formed by said mechanism.

2. In a device for forming a neck between a fabric and a button secured thereto, the combination with stitch forming mechanism including a needle and thread feeding means therefor, of means for effecting a plurality of turns of the thread about the button securing means intermediate stitches formed by said mechanism.

3. In a device for forming a neck between a fabric and a button secured thereto, thread fastening mechanism including a needle and thread feeding means therefor, a thread carrier through which the needle passes during the thread fastening operation, and means for revolving the carrier about the button securing means to form said neck.

4. In a device for forming a neck between a fabric and a button secured thereto, the combination with stitching mechanism including a needle, of means for feeding thread to said needle, means for intermittently actuating said stitching mechanism, means for winding the thread about the button securing means, and means for actuating the winding means intermediate the operations of the stitching means.

5. In a device for forming a neck comprising thread windings intermediate a fabric and a button secured thereto, the combination with means for fastening the thread to the button-fabric assembly at a point near the button, of means for winding the thread about the button securing means, and means for putting the thread fastening means in operation after the winding to fasten the thread to the button-fabric assembly.

6. In a device for forming a neck comprising thread windings intermediate a fabric and a button secured thereto, the combination with stitching mechanism including a needle and means for feeding thread thereto, of a movable thread carrier, means for positioning the thread carrier so that the needle passes therethrough during the stitching operation, means for arresting the operation of the needle, means for offsetting the thread carrier from its stitching position, means for revolving the thread carrier about its stitching position to effect the winding operation, and means for actuating said positioning means and putting said needle in operation to effect a fastening of the thread.

7. In a device for forming a neck comprising thread windings intermediate a fabric and a button secured thereto, the combination with stitching mechanism including a needle and thread feeding means therefor, of thread winding mechanism including a thread guide adapted to displace said button from its normal position relative to the material during the operation of the stitching mechanism.

8. A device for forming a neck between a fabric and a button secured thereto comprising stitching mechanism including a needle, means for uptilting the button when the stitching mechanism is in operation whereby thread fastening stitches may be taken underneath the normal position of the button, means for winding the thread about the button securing means, and means for automatically stopping the operation of the stitching mechanism and putting the winding means in operation.

9. In a device for forming a neck between a fabric and a button secured thereto, the combination with stitch forming mechanism including a needle for securing a thread end to the

button fabric assembly, of a thread carrier through which the needle passes in the stitch forming operation, means for arresting the operation of the needle and simultaneously offsetting the thread carrier from needle-passing position, means for revolving the thread carrier about its needle-passing position to effect the formation of said neck, and means for simultaneously returning the thread carrier to needle-passing position and putting the needle in operation to effect a fastening of the thread.

10. The structure set forth in claim 9 including means for automatically stopping the device after the thread fastening.

11. In a device for forming a neck intermediate a fabric and a button secured thereto, the combination with a rotatable member adapted to be disposed substantially coaxial with the neck to be formed, of a thread carrier pivotally mounted on said member, stitching mechanism including a needle, means for arresting the operation of the stitching mechanism, means for moving the thread carrier to and retaining it in needle passing position during the operation of the stitching mechanism and means for moving it to and retaining it in thread winding position while the operation of the stitching mechanism is arrested.

12. In a device for forming a neck between a fabric and a button secured thereto, the combination with sewing mechanism including a needle arm and a needle bar actuated by said arm, of means for arresting the operation of the needle bar without stopping the movement of said needle arm, and means for winding the needle thread about the button securing means when the needle bar is arrested.

13. In a device for forming a neck between a fabric and a button secured thereto, the combination with stitching mechanism including a needle, of winding mechanism including a movable thread carrier cooperating with said needle when said stitching mechanism is in operation, and means for controlling the winding and stitching mechanisms whereby when said device is placed in operation said stitching mechanism will operate for a predetermined period, the winding mechanism will operate for a predetermined period after the stitching mechanism stops, and the stitching mechanism will again operate for a predetermined period after the winding mechanism stops.

14. In a device of the character described, the combination with a needle bar of a needle arm provided with means for raising said bar and means for depressing said bar, means for putting the depressing means into and out of cooperation with said bar, means for holding said bar in raised position, and means for actuating said holding means when the depressing means is out of cooperation with said bar.

15. In a device of the character described, the combination with a needle bar of a needle arm for raising said bar and means associated with said arm for depressing said bar, means for moving said arm associated means into cooperation with said bar, means for locking said bar in raised position, and means for releasing said locking means as the arm associated means moves into cooperation with said bar.

16. In a device for forming a neck intermediate a fabric and a button secured thereto, the combination with sewing mechanism including a needle bar, a needle arm for raising said bar and means associated therewith for depressing said bar, of means for moving said arm associ-

ated means into and out of cooperation with said bar, means for locking said bar in raised position, means for winding thread about the button securing means to form said neck, and means for actuating said locking means and putting said winding means in operation as the arm associated means moves out of cooperation with said bar.

17. In a device for forming a neck between a fabric and a button secured thereto, the combination with stitch forming mechanism including a needle and thread feeding means therefor, of means for winding the thread continuously in one direction about the button securing means intermediate stitches formed by said mechanism.

18. In a device for forming a neck between a fabric and a button secured thereto, the combination with stitch forming mechanism including a needle and thread feeding means therefor, of means for effecting a plurality of turns of the thread continuously in one direction about the button securing means intermediate stitches formed by said mechanism.

19. In a device for forming a neck comprising thread windings intermediate a fabric and a button secured thereto, the combination with means for fastening the thread to the button-fabric assembly at a point near the button, of means for winding the thread continuously in one direction about the button securing means, and means for putting the thread fastening means in operation after the winding to fasten the thread to the button-fabric assembly.

20. In a device for forming a neck between a fabric and a button secured thereto, means for supporting the work, thread guiding and securing means, and operating mechanism therefor adapted to wind the thread around the button securing means in a plurality of continuous

turns in the same direction and to secure the thread to the work.

21. In a machine for forming a neck between a fabric and a button secured thereto, means for supporting the work, means for winding a thread around the button securing means in a plurality of continuous turns in the same direction, means for securing said thread to the work, and means for operating said winding and securing means alternately.

22. In a device for forming a neck between a fabric and a button secured thereto, sewing mechanism including a needle and means for actuating the same, means for arresting the operation of the needle, and means for winding the needle thread about the button securing means when the operation of the needle is arrested.

23. In a device for forming a neck between a fabric and a button secured thereto, sewing mechanism including a needle and means for actuating the same adapted to be rendered operative or inoperative, means for winding a predetermined number of turns of the needle thread about the button securing means when the needle actuating means is inoperative, and means whereby said actuating means is rendered operative to cause said sewing mechanism to secure the needle thread to the work when the winding operation is completed.

24. In a device of the character described, a needle bar, a needle arm provided with means for raising said bar and means for depressing said bar, means for putting the depressing means into and out of cooperation with said bar, means for holding said bar in raised position, and means for rendering said holding means and depressing means alternatively operative.

CHARLES J. SIBBALD.