

Nov. 16, 1943.

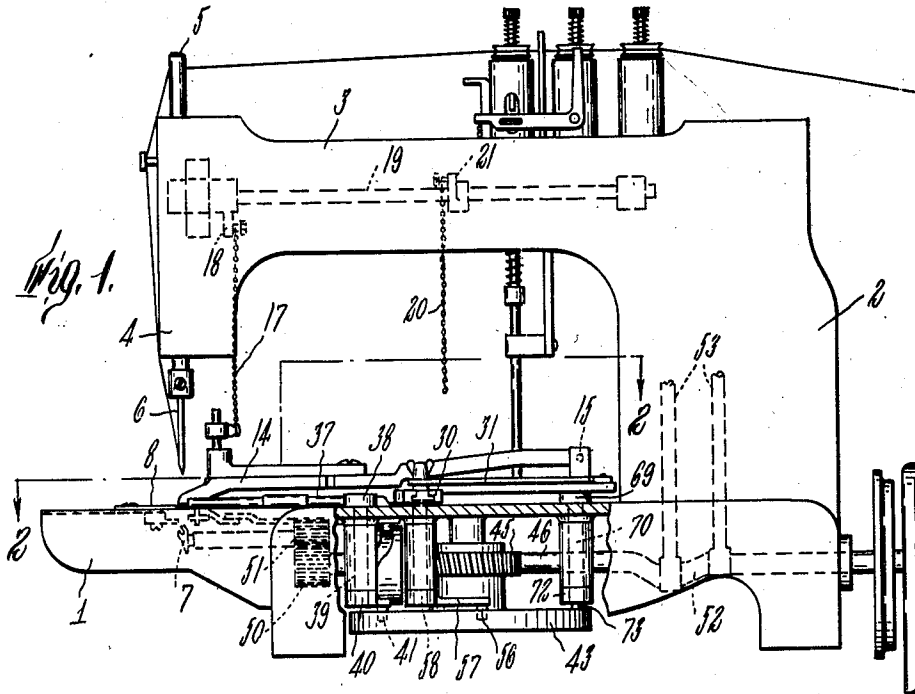
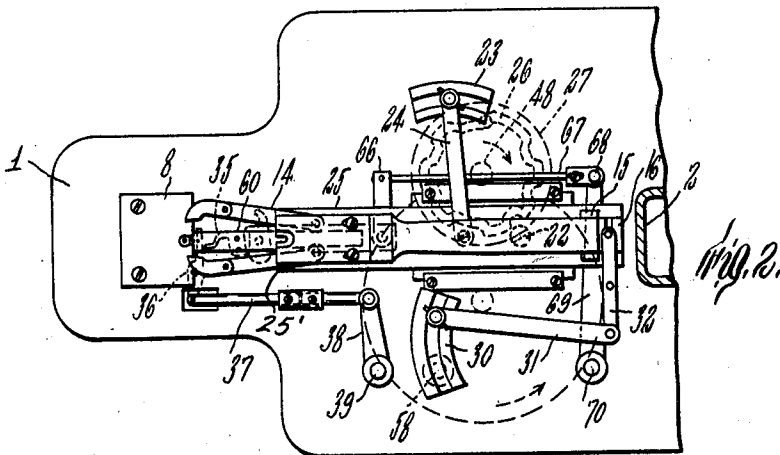
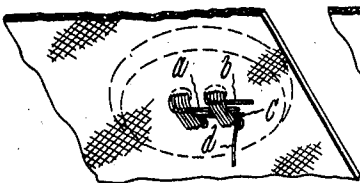
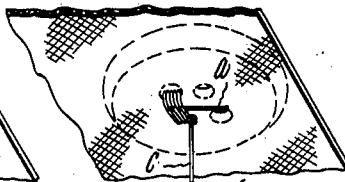
R. L. LYONS

2,334,569

BUTTON OR THE LIKE SEWING MACHINE

Filed June 28, 1940

2 Sheets-Sheet 1



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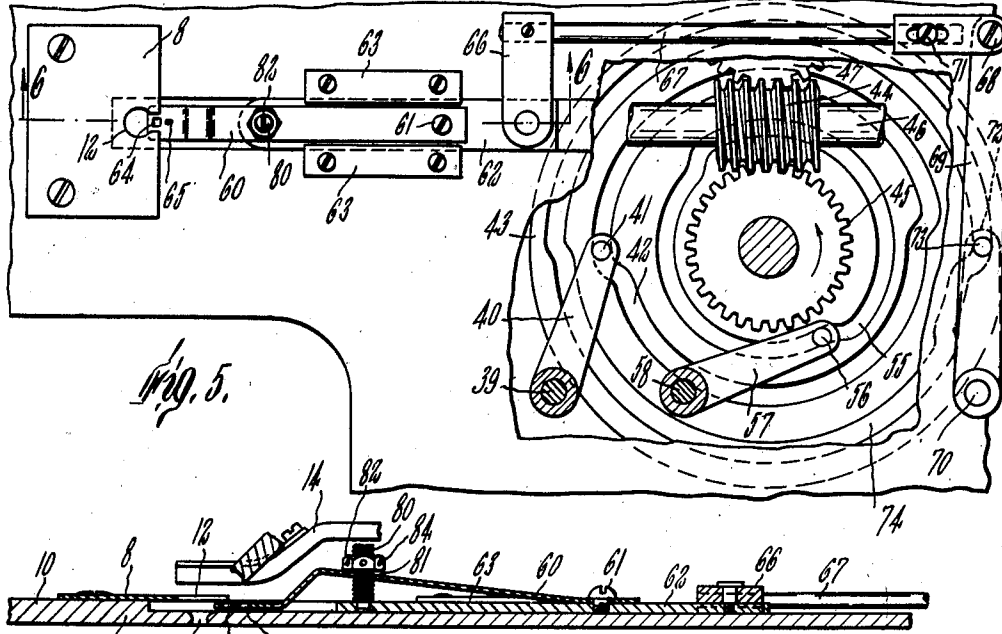
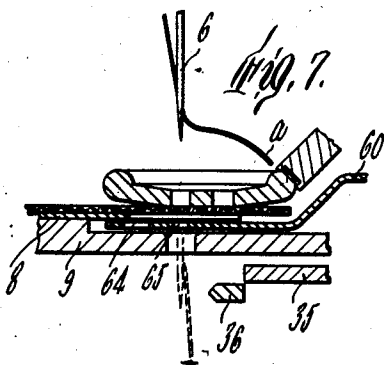
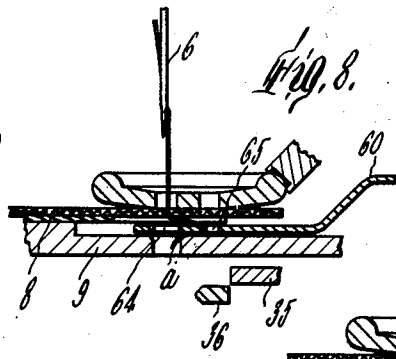
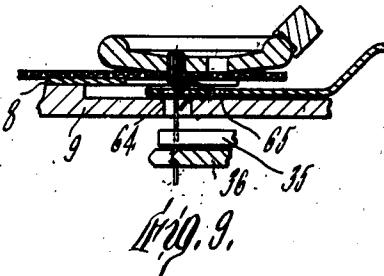
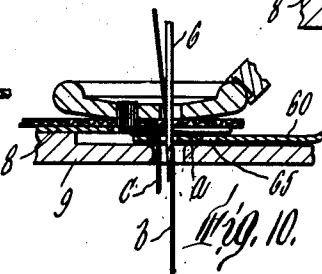
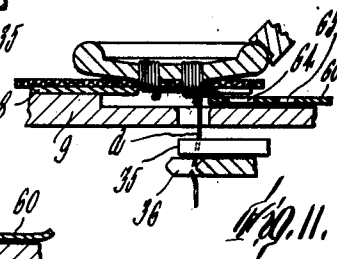
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2,334,569

BUTTON OR THE LIKE SEWING MACHINE

Filed June 28, 1940

2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,334,569

## BUTTON OR THE LIKE SEWING MACHINE

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Application June 28, 1940, Serial No. 342,841

9 Claims. (Cl. 112—112)

This invention relates to machines for sewing on buttons and analogous articles, and is more particularly concerned with machines of this type wherein the button or other article is secured by a plurality of independent sets of chain stitches which are successively placed by a single needle. In button sewing machines of the chain stitch type trouble has often been experienced from failure of the starting end of the thread to be securely held, this often resulting in the presence of one or more loose thread loops or a thread end appearing on the front face of the button, or a long thread end on the back face of the work, for one or both sets of stitches.

The present invention has for one object to hold the starting thread end for each set of stitches so that no loose loop or thread end will show on the front face of the work and no long thread end will be left on the back face.

A further object is to provide a securement, particularly of the starting thread end such that it is not liable to be worked loose during service.

Still another object is to so position and hold the thread end that a neat and trim appearance is presented on the back face of the work.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which

Figure 1 is a somewhat diagrammatic side elevation of a button sewing machine, with parts broken away, and embodying the invention.

Figure 2 is a detail section on line 2—2 of Figure 1.

Figures 3 and 4 are somewhat diagrammatic perspective views showing to a much larger scale the back face of the work after the first set of stitches have been placed and at the end of the sewing operation, respectively.

Figure 5 is a fragmentary plan of a portion of the machine, part of the bed being broken away, to a larger scale than Figures 1 and 2.

Figure 6 is a detail section on line 6—6 of Figure 5.

Figures 7 to 11, inclusive, are somewhat diagrammatic vertical sections through the button, work, and certain of the machine parts showing successive stages of the complete sewing operation.

Referring first to Figures 1, 2, and 5, a sewing machine is shown of the general type illustrated in my Reissue Patent No. 21,016 granted February 28, 1939, for Button sewing machine which illustrates a button sewing machine wherein by the use of a single needle a four-hole button is secured to work by two independent sets of stitches

placed in sequence during a single continuous machine operation. The machine comprises a bed 1 having an upstanding post 2 at the upper end of which is a sewing arm 3 terminating in a sewing head 4. At 5 is shown a needle bar to the lower end of which is secured a needle 6 which is arranged to reciprocate and cooperate with a rotary looper 7 and the other necessary instrumentalities to form stitches.

The work is supported on a stationary cloth plate 8 (see especially Figures 5 and 6) carried by a throat plate 9 and the throat plate has a raised portion 10 at its forward end so that the cloth plate is supported in spaced relation to the throat 11 of the throat plate. The cloth plate is also shown as provided with a slotted rear end 12 above this throat for the passage of the needle. At 14 is a clamp for receiving a four-hole button, though any holder for an article to be attached to the work by two sets of stitches might be substituted. This button clamp or article holder is shown as pivoted as at 15 in the well known manner so that its forward end may be elevated from the work and this pivot is carried by a slide 16 (see Figure 2) movable from front to back of the machine. The article holder or button clamp may be lifted from the work by any suitable means as is well known, a chain 17 being shown for this purpose. This chain is secured at its lower end to a portion of the button clamp and at its upper end to a crank arm 18 carried by a rock shaft 19 which may be rocked by the depression of a treadle or other suitable means (not shown) connected as by a chain 20 to a second crank arm 21 also secured to the rock shaft 19. As shown in my reissue patent to which reference has been made, the slide 16 may be rocked about a pivot 22 of a button clamp support 25 upon which the slide 16 is slidably mounted to impart lateral motion to the button clamp between successive strokes of the needle thus to bring alternately the two holes of a pair in the button held by the clamp into the needle path. This lateral motion is produced by the rocking of an arcuate lever 23 connected through a link 24 to the button clamp support 25, this lever 23 being rocked by a cam follower engaging in a cam groove 26 of a cam 27, all in the manner shown in my reissue patent as applied for lateral oscillation of the cloth plate and button clamp. In the present construction, however, the forward end of the slide 25 terminates at 25' well back of the button held by the button clamp so that its forward portion does not act as the cloth plate.

After the stitching has been made in the first

set of holes in the button, the slide 16 is moved forwardly to present the other set of holes in the button into the needle path with or without a final tying stitch for the first set, this being done through the rocking of an arcuate lever 30 connected through a link 31 and a lever 32 with the slide 16. Any suitable means may be provided for causing severance of the needle thread between the placing of the two sets of stitches, but as shown herein, the means employed is that shown and claimed in my application for patent filed October 5, 1937, Serial No. 167,368 for Button sewing machine, now Patent No. 2,294,471 granted September 1, 1942. For the purpose of the present application it may be stated that this comprises a thread finger 35 which is employed as a part of the stitch-forming mechanism to present the needle thread into proper relation to the looper 7 and an auxiliary thread finger 36 which is positioned to cause the thread finger 35 to move across it so as to sever the thread at the proper time between the stitch-forming operations. The auxiliary thread finger is operated through a rod 37 connected thereto and to a rock arm 38 carried by a rock shaft 39. This rock shaft 39 also carries a cam follower arm 40 provided with a follower 41 (see Figure 5) riding in a cam groove 42 of a cam 43. This cam 43 is rotated through a worm and worm gear 44 and 45, respectively, from the main drive shaft 46 and a second worm wheel 47 meshing with the worm 44 and mounted on the shaft 48 of the cam 27 also rotates the cam 27. The looper 7 is geared to the main shaft 46 as through the gears 50 and 51. The needle-reciprocating means is driven from the main drive shaft 46 as through the double crank mechanism at 52 through the driving rods 53 in the well known manner. A cam groove 55 in the cam 43 and in which rides a follower 56 secured to an arm 57 carried by the rock shaft 58 rocks the link 30 to produce the forward and back motion of the button clamp. This mechanism thus described provides for the automatic stitching of one set of stitches through the forward set of holes in the button and, if desired, with a double stroke through the same hole at the last stitch to produce a knotting stroke, and then the presentation of the rearward holes of the button into the needle path, the needle thread being severed for the placing of the second set of stitches independent from the first set through the second set of holes in the button, after which, as shown in my Re-issue Patent No. 21,016 the machine may be stopped automatically after one or more knotting stitches, whereupon by lifting the button clamp the thread is parted at the end of the stitching operation. The thread may, however, be severed automatically by the thread finger mechanism, if desired, at the end of the stitching operation.

In accordance with the present invention means are provided for clamping the starting thread end at each of the set of stitches and this mechanism is also effective to so position this starting thread end that it is engaged and sewed to the work by the stitches subsequently placed. This clamping mechanism comprises a thread-engaging element 60 in the form of a resilient strip which is secured at its rear end as by a screw 61 to a slide 62 mounted for forward and backward motion between guides 63 secured to the top face of the machine base. The forward end of the element 60 is provided with a pair of spaced needle openings 64 and 65 and it lies in the space between the cloth plate 8 and the throat plate 9. At the rear end of the slide 62 it carries a lateral extension

66 to which is secured a rod 67 having a pivotal connection at 68 with an arm 69 secured to a rock shaft 70. The effective length of the rod 67 is adjusted through a pin and slot connection at 71. The rock shaft 70 is provided with an arm 72 carrying a cam follower 73 riding in a cam groove 74 in the cam 43.

At the start of the sewing operation the element 60 is in the position shown in Figure 7, with its hole 65 in the path of the needle 6. The button clamp is then in retracted position so that the forward set of holes in the button may receive the stitching. The cam groove 74 for controlling the element 60 is so contoured that on the first stroke of the needle passing through one of the forward holes of the button to bring the starting thread end a down below the button, this thread end is carried through the hole 65 of the member 60, but as soon as the needle has retracted so that it no longer engages in the work, the element 60 is pulled rearwardly into the position shown in Figure 8, causing the thread end a to be clamped against the top face of the throat plate and the hole 64 of the clamp 60 to be positioned in the needle path. The sewing of the first set of stitches continues with the parts in this position, the starting thread end being held clamped so that it cannot be pulled through to the top face of the button and so that no loose loops of thread can be formed in the work, and it is in such position that this thread end is engaged by subsequent stitches of the first set and is sewed to the lower face of the work. After the completion of the first set of stitches as shown in Figure 9, the starting thread end having been sewed to the work by the stitches of this set, the thread is severed and the button clamp is moved forward into the position shown in Figure 10 so as to present the rear set of holes in the button alternately into the needle path. After the starting thread end b of the second set of stitches has been placed beneath the work by the first pass of the needle for the second set of stitches and the needle has retracted from the work, the element 60 is moved rearwardly further so that it is entirely out of the needle path, into the position of Figure 11. This causes the starting thread end a and any end c left for the first set of stitches after the severance of the thread to be drawn rearwardly with the starting thread end b of the second set of stitches so that all three of these thread ends are in position to be sewed to the work by the second set of stitches passed through the rear holes of the button as shown in Figures 4 and 11. Because the final end of the thread from the first set of stitches is stitched to the work by the stitches of the second set, the usual knotting stitch at the end of the first set may be omitted, if desired. The thread is severed again after the last knotting stitch of the second set of stitches, either by the lifting of the button clamp or by the operation of thread severing mechanism, as may be desired, this last thread end being illustrated at d. Figure 4 illustrates the neat appearance of the back face of the work at the completion of the stitching operation, with the starting thread end a engaged and sewed to the work by both the first and second set of stitches, the severed end of the thread of the first set of stitches, if sufficiently long, also being sewed to the work by the second set of stitches, and the starting thread end of the second set of stitches also being sewed to the work by the second set of stitches. Thus a very firm securement of the thread ends is pro-

duced and no thread ends or loose loops of thread appear on the front face of the work or button and the thread ends, except the final thread end, are either wholly concealed by the stitching or at most present very short portions which do not impair the appearance of the work.

It is important that the pressure with which the member 60 engages one of the plates 8 or 9, preferably the throat plate 9, be adjusted in order that it may not clamp the thread so tightly as to cause breakage, but that it may engage it sufficiently tightly to prevent the formation of loose loops of threads. Adjustment of this pressure may be produced by means shown best in Figure 6. A threaded post 80 is shown as secured in upstanding position to the slide 62, this passing through a hole 81 through the element 60. Threaded on this post is a nut 82 which may bear against the top of the member 60. Adjustment of this nut serves to determine the spring pressure exerted by the forward end of the member 60 against the throat plate. For the purpose of holding this nut in adjusted position, the post 80 is shown as split, the split parts springing apart sufficiently to frictionally grip the nut, and in order to adjust the nut it may be provided with holes 84 within which a needle may be placed to act as a lever to turn the nut. This prevents the necessity of the operator having to have a wrench for producing such adjustment, there always being needles convenient for the operator's use for this purpose.

From the foregoing description of an embodiment of this invention, it should be evident to those skilled in the art that various changes and modifications might be made without departing from the spirit or scope of this invention as defined by the appended claims.

I claim:

1. In a sewing machine, a throat plate, a cloth plate spaced above said throat plate, an article clamp for holding an article having provisions for receiving a pair of sets of stitches by which said article may be secured to work on said cloth plate, sewing instrumentalities including a needle reciprocable through openings in said throat and cloth plate, said mechanism also including means for severing the sewing thread, and means for relatively moving said instrumentalities, clamp, and cloth plate to sew the article to the work with one set of chain stitches, sever the thread and then sew the article to the work by another set of chain stitches, an element located in the space between said cloth and throat plates, and means for actuating said element to clamp the starting thread end for each set of stitches.

2. In a sewing machine, a throat plate, a cloth plate spaced above said throat plate, an article clamp for holding an article having provisions for receiving a pair of sets of stitches by which said article may be secured to work on said cloth plate, sewing instrumentalities including a needle reciprocable through openings in said throat and cloth plate, said mechanism also including means for severing the sewing thread, and means for relatively moving said instrumentalities, clamp, and cloth plate to sew the article to the work with one set of chain stitches, sever the thread and then sew the article to the work by another set of chain stitches, an element located in the space between said cloth and throat plates, and means for actuating said element to draw the starting thread end into position to be engaged and held by subsequently formed stitches of the corresponding set.

3. In a sewing machine, a throat plate, a cloth plate spaced above said throat plate, an article clamp for holding an article having provisions for receiving a pair of sets of stitches by which said article may be secured to work on said cloth plate, sewing instrumentalities including a needle reciprocable through openings in said throat and cloth plate, said machine also including means for severing the sewing thread, and means for relatively moving said instrumentalities, clamp, and cloth plate to sew the article to the work with one set of chain stitches, sever the thread and then sew the article to the work by another set of chain stitches, an element located in the space between said cloth and throat plates, and having a pair of spaced needle-receiving holes, and means acting after the needle has passed the starting thread end through one of said holes to move said element laterally of the line of stitches of said first set into position to cause said end to be engaged and held thereby and to bring said other hole into the needle path and to move said element again after the needle has passed the starting end of the thread for the second set of stitches through said other hole to cause said last mentioned starting end to be engaged and held by stitches of the second set.

4. In a button sewing machine, a throat plate, a cloth plate spaced above said throat plate, sewing instrumentalities including a needle, thread severing mechanism, a four-hole button clamp, means for producing sewing needle strokes and for vibrating said clamp laterally to place stitches through a pair of holes in the button and after knotting the thread to sever the thread, means for moving said button clamp to present the second set of holes in the button into the needle path and place a second set of stitches independent of the first mentioned stitches, an element having a pair of needle holes positioned between said cloth and throat plates, and means controlling said element for presenting one of said holes into the needle path at the start of sewing and to present the other hole into the needle path after the needle has retracted from the work at the start of the formation of a set of stitches and for moving the second hole out of the needle path after the needle has retracted from the work on the first stroke for the formation of the second set of stitches.

5. In a sewing machine having a cloth plate, an article holder for supporting an article to be sewed to work on said cloth plate, sewing instrumentalities including a needle and mechanism cooperating with said needle to form stitches, and to cause parting of the thread at a desired time, and means for relatively manipulating said holder and instrumentalities during a continuous machine operation to cause stitches to be made sequentially in a plurality of spaced independent sets securing an article carried by said holder to work on said cloth plate, an element engaging both starting and finishing thread ends of the first set of stitches, and means for moving said element after the first needle stroke of each set of stitch-forming operations to engage the starting thread end for that set and to hold said thread end during subsequent stitch-forming operations and to move the starting and finishing thread ends of the first set of stitches into position to be engaged and secured by the stitches of the second set.

6. A sewing machine having work holding means, an article holder for supporting an article in position to be sewed to the work by a plurality

of sets of stitches, stitch forming mechanism, and means for relatively manipulating said holder, holding means and mechanism for securing an article held by said holder to work carried by said holding means by one set of stitches, severing the thread, moving said holder and mechanism relatively and securing said article to the work by a second set of stitches, said machine including means engaging the severed end of the first set of stitches, and means to cause said engaging means to place said severed end into position to be secured to the work by stitches of the second set.

7. In a sewing machine having work holding means, an article holder for supporting an article in position to be sewed to work by a plurality of sets of stitches, stitch-forming mechanism, means for relatively manipulating said holder, holding means and mechanism for securing an article held by said holder to work carried by said holding means by one set of stitches and thereafter by another set of stitches, means for cutting the thread after the first set of stitches has been placed, thread gripping means located between said cutting means and the work, and means for actuating said gripping means before the placing of the second set of stitches to position the cut end from the first set of stitches to be secured to the work by the stitches of the second set.

8. A sewing machine having work holding means, an article holder for supporting an article in position to be sewed to the work by a plurality

of sets of stitches, stitch forming mechanism, and means for relatively manipulating said holder, holding means and mechanism all in a single continuous machine operation for securing an article held by said holder to work carried by said holding means by one set of stitches, severing the thread, moving said holder and mechanism relatively and securing said article to the work by a second set of stitches, said machine including means engaging the severed end of the first set of stitches, and means to cause said engaging means to place said severed end into position to be secured to the work by stitches of the second set.

9. In a sewing machine having work holding means, an article holder for supporting an article in position to be sewed to work by a plurality of sets of stitches, stitch-forming mechanism, means for relatively manipulating said holder, holding means and mechanism for securing an article held by said holder to work carried by said holding means by one set of stitches and thereafter by another set of stitches in the same continuous machine operation, means for cutting the thread after the first set of stitches has been placed, thread gripping means located between said cutting means and the work, and means for actuating said gripping means before the placing of the second set of stitches to position the cut end from the first set of stitches to be secured to the work by the stitches of the second set.

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