April 23, 1935. J. VOLLMAN 1,999,145

ARTICLE ATTACHING MACHINE

Filed May 5, 1933 4 Sheets-Sheet 1

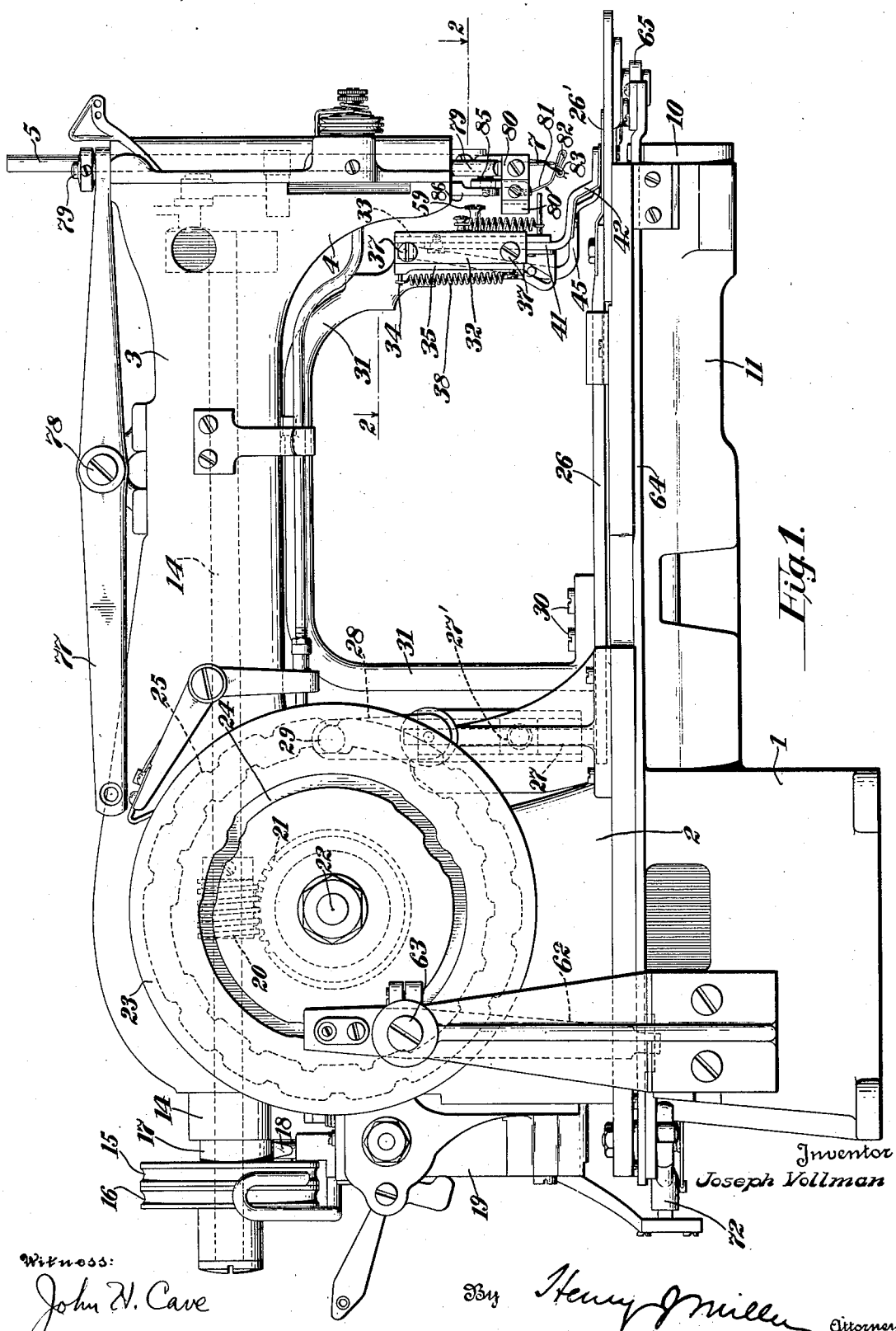


Fig. 1.

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April 23, 1935. J. VOLLMAN 1,999,145

ARTICLE ATTACHING MACHINE

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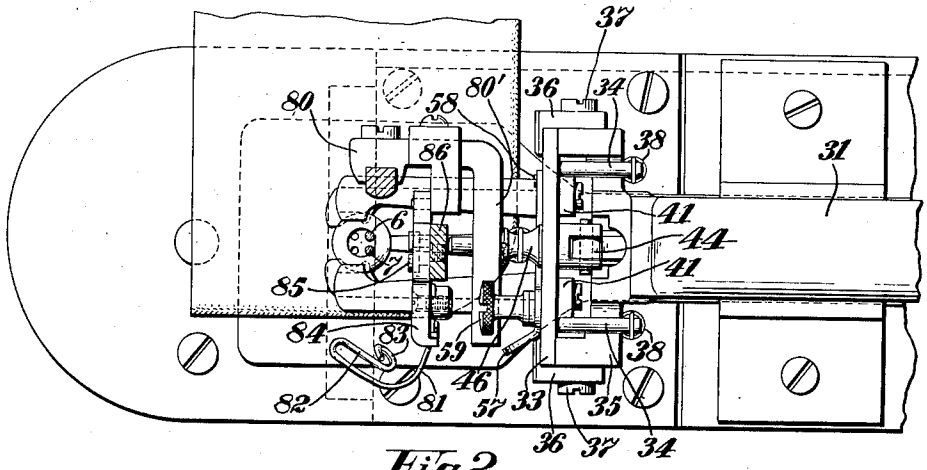


Fig. 2.

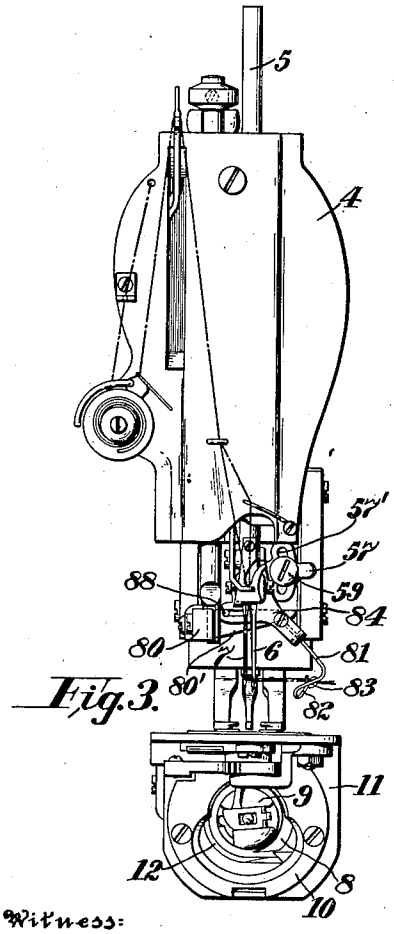


Fig. 3.

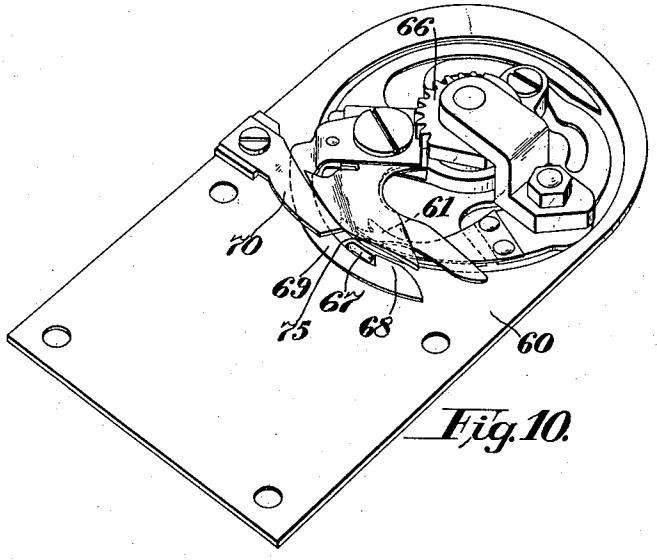


Fig. 10.

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April 23, 1935. J. VOLLMAN 1,999,145

ARTICLE ATTACHING MACHINE

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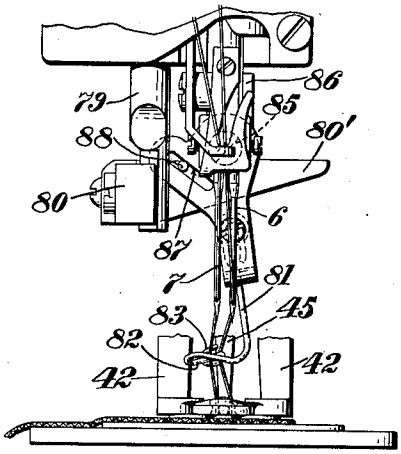


Fig.4.

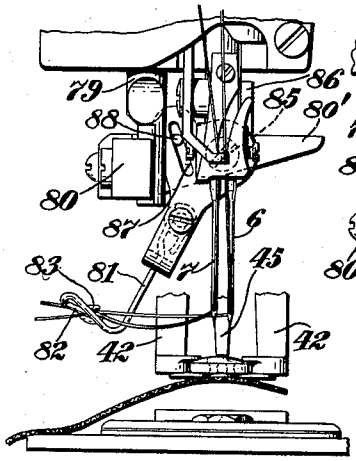


Fig.5.

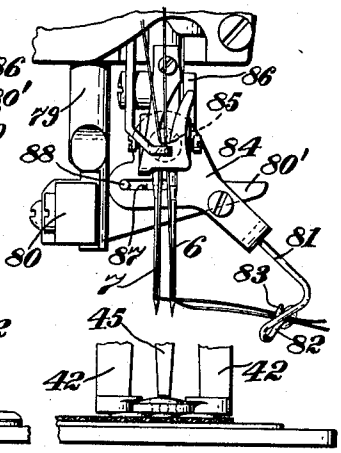


Fig.6.

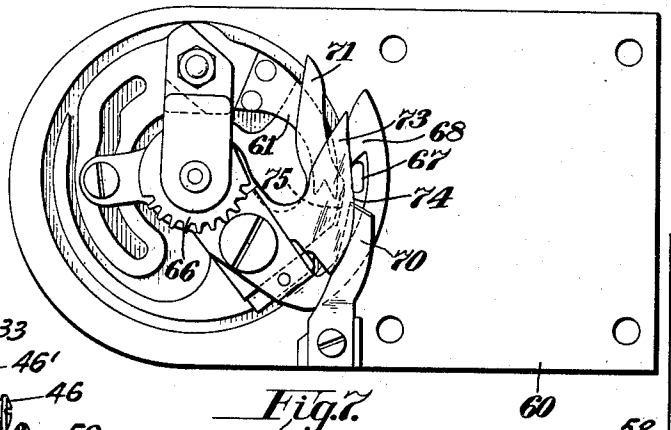


Fig.7.

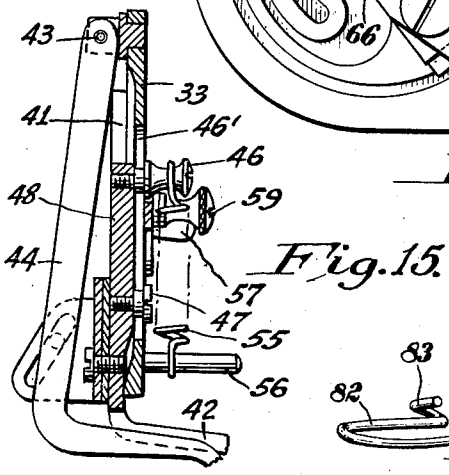
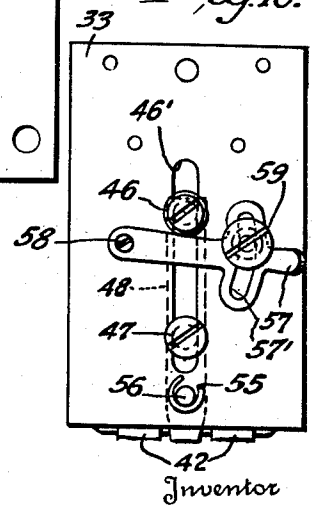


Fig.15.

Fig.14.

Fig.16.



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ARTICLE ATTACHING MACHINE

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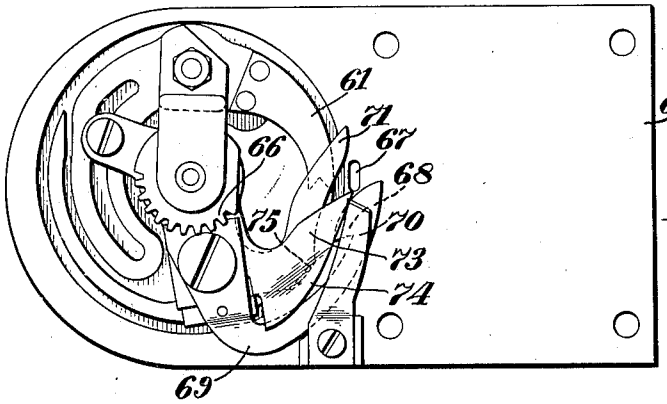


Fig. 8.

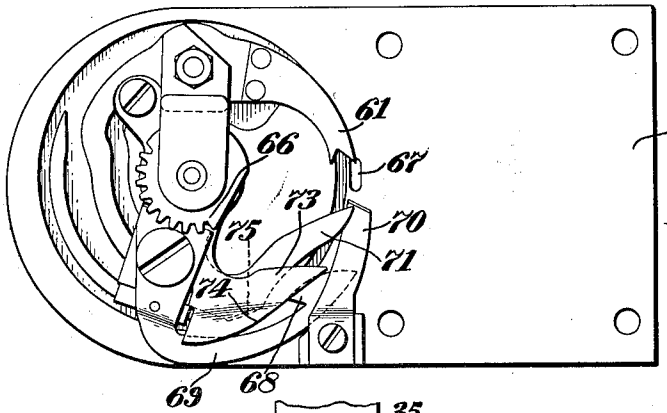


Fig. 9.

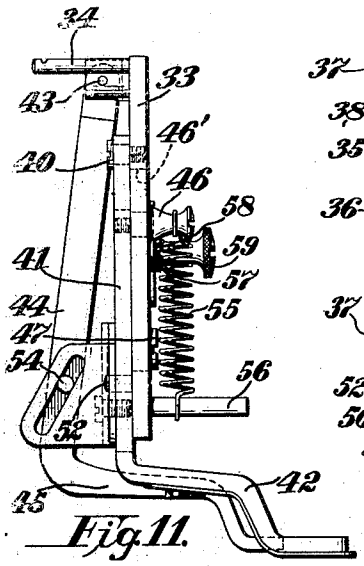


Fig. 11.

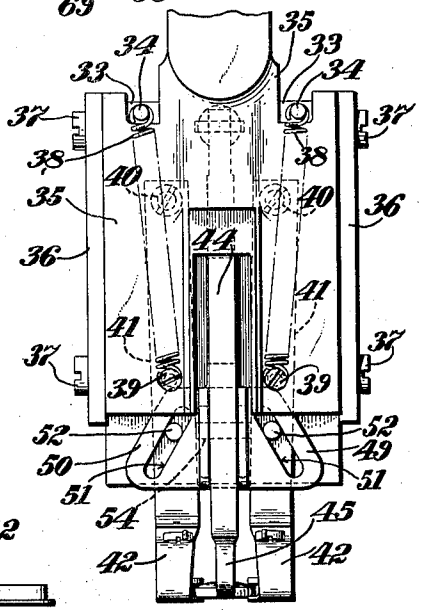


Fig. 12.

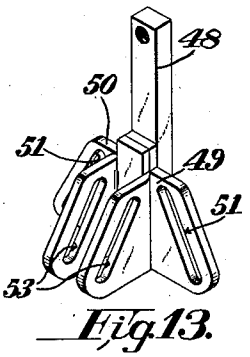


Fig. 13.

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Patented Apr. 23, 1935 1,999,145

UNITED STATES PATENT OFFICE

1,999,145

ARTICLE-ATTACHING MACHINE

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Application May 5, 1933, Serial No. 669,459

10 Claims. (Cl. 112—112)

This invention relates to sewing machines and more particularly to that type of machine used for attaching articles to material.

In carrying out the invention, I preferably make use of a sewing machine such as that disclosed in the United States patents to J. J. Sullivan, No. 777,564, dated Dec. 13, 1904, and to C. M. Horton, No. 807,676, dated Dec. 19, 1905. This invention is shown embodied in a sewing machine constructed substantially in accordance with the disclosure of said patents, wherein a shiftable work-holder is described having a lower or work-supporting plate and a pair of upper coacting button-gripping jaws adapted to locate a button at the upper side of the work with its eyes in position to receive the stitches formed by the sewing instrumentalities. In the present instance, however, the work-holder, stitch-forming mechanism, and thread-cutting and nipping mechanism, have been modified in certain important particulars and a thread-positioning element has been added. Other modifications, improvements, and additions will hereinafter appear as the description proceeds.

The features of the invention and the advantages attained thereby will be readily understood by those skilled in the art from the following detailed description of a preferred embodiment of the invention, taken in connection with the accompanying drawings, in which:

Figure 1 is a rear side elevation of a machine embodying the invention.

Figure 2 is a plan view, partly in section, taken substantially along the line 2—2 of Figure 1.

Figure 3 is an end elevation of the forward end of the machine.

Figures 4, 5 and 6 are enlarged elevations showing the various positions of the needle-thread positioning and holding member.

Figures 7, 8 and 9 are bottom plan views and Figure 10 is a perspective view, of the thread-nipping and severing elements showing the position of the parts at different points in the series of stitch-forming cycles.

Figures 11, 13, 15 and 16 are detail views of parts of the button-clamp.

Figure 12 is an enlarged rear elevation of the button-clamp.

Figure 14 is a perspective view of the needle-thread positioning element.

The machine is constructed with the usual base 1 from which rises the hollow standard 2 of the bracket-arm formed with the overhanging tubular portion 3 which terminates in the hollow head 4 wherein the reciprocating needle-bar 5 is journaled. Two needles 6 and 7 are carried by the reciprocating needle-bar 5 and cooperate with a single loop-taker 8 carrying a thread-case 9 and mounted to operate in a raceway closed by the gib 10 secured to the overhanging tubular arm 11. The loop-taker 8 derives its operative movements from a driver 12 connected in the usual manner with the main driving shaft 14. The main-shaft carries at its rearward end the tight and loose pulleys 15 and 16, respectively, to the former of which is secured the usual stopping cam 17 with which the upper end 18 of the stop-motion lever 19 cooperates in a well known manner to stop the machine. As shown in dotted lines in Figure 1, the main-shaft 14 is provided with a worm-gear 20 meshing with the worm-wheel 21 secured upon the transverse shaft 22 upon which is fixed the controller-cam wheel 23 formed on its rear face with the usual thread-cutter controlling cam-groove 24 and on its front face with the usual article-clamp jogging cam-groove 25.

The plate 26 of the work-holder is provided at its forward end with a work-supporting plate 26' and rigidly attached to its rear end is a pin or post 27 having an adjustable connection 27' with the lever 28 which is provided at its upper end with a roller-stud 29 entering the article-clamp jogging cam-groove 25 of the cam-wheel 23. Secured by screws 30 to the plate 26 of the work-holder so as to move therewith is an arched member 31 carrying at its free end an article-clamp indicated generally as 32.

As illustrated in Figures 1–3, 11–13, inclusive and 15 and 16, the article-clamp comprises a plate 33 slidably held in position on the head 35 of the arched member 31 by the L-shaped guide-members 36 which are fixed to the head 35 by the screws 37. The sliding plate 33 is constantly urged downwardly by tension-springs 38 which react between the pins 34 carried by the sliding plate 33 and the headed studs 39 fixed to the head 35. Pivotally secured to the plate 33 by the pivot-screws 40 are two button clamp-arms 41 formed with forwardly extending portions 42. Also pivotally secured to the plate 33 at 43 is a button-positioning member 44 having a forwardly extending portion 45 at its lower end. Slidably fixed by the screws 46 and 47 intermediate the button clamp-arms 41 is a sliding arm 48 having plates 49 and 50 fixed thereto, the plates being provided with cam-slots 51 which receive the studs 52 on the button clamp-arms 41 and cam-slots 53 which receive the stud 54 on the button-positioning arm 44. The arm 48 and plates 49 and 50 are constantly urged downwardly by a coiled spring 55 strained between the screw 46 and the stud 56 carried by the plate 33. It will be obvious that the spring 55 tends to force the arm 48 and plates 49 and 50 to their lowest position thereby yieldingly urging the clamp-arms 40 towards each other and the button-positioning arm 44 inwardly. In order to adjust the button-clamp for different sizes of buttons, I have provided a lever 57 (Figs. 2 and 16) which contacts the under side of the screw 46 to move it upwardly in the slot 46'.

The lever is formed with a slot 57' and is pivoted to the plate 33 by a pivot-screw 58. A thumb-screw 59 is provided for holding the lever 57 in its adjusted position.

The thread-cutting mechanism which is shown in detail in Figures 7, 8, 9 and 10 assumes three positions during the button-sewing cycle. At the beginning of the cycle the elements of the thread-cutting and nipping mechanism are in the position shown in Figures 7 and 10. In this position the end of the lower thread is held or nipped between the element 61 and the lower face of the throat-plate 60, the needles and upper threads being in the position shown in Figure 6. During the first stitch-forming cycle after the needles have descended and as the needles are nearing the end of their upstroke, the parts of the thread-cutting and nipping mechanism are moved to the position shown in Figure 8 by mechanism substantially the same as that disclosed in the said Horton and Sullivan patents. In the present instance this mechanism comprises an arm 62 pivoted at 63 and actuated by the thread-cutter controlling cam-groove 24 formed in the rear face of the controller-cam 23. The arm 62 engages a slide-bar 64 provided with the usual rack 65 which meshes with the sector gear 66 on the thread-cutting and nipping mechanism. During the movement of the parts from the position shown in Figure 7 to the position shown in Figure 8 the needle-threads, which have been passed through the needle-aperture 67 in the throat-plate and drawn out by the loop-taker, are seized by the hook 68 of the nipping element 69 and are drawn against the cutting-blade 70. The loose ends of the needle-threads are severed by the combined action of the element 69 and the blade 70 and the ends of the needle-threads are held nipped between the hooked end 68 of the element 69 and the lower face of the throat-plate 60.

At the end of the third stitch-forming cycle the parts of the thread-cutting and nipping mechanism are moved to the position shown in Figure 9. This movement releases the ends of needle-thread and permits them to be sewed under or enclosed by stitches formed by subsequent operations of the stitch-forming mechanism.

After a predetermined number of stitch-forming cycles have been completed the parts of the thread-cutting and nipping mechanism return to the position shown in Figure 7. In returning to this position the element 71 engages and draws aside and pulls out a length of bobbin-thread to insure the proper lead and the nipping element 61 engages and holds this thread nipped. Upon further movement of the parts, which occurs towards the end of the last stitch-forming cycle, the element 73 engages the needle-threads and draws out extra lengths of needle-thread. At this point in the button-sewing cycle the well known stop-motion mechanism, such as that disclosed in the said Horton and Sullivan patents is tripped in the usual and well known manner to stop the machine. The overthrow from the momentum of the moving parts causes the stop-motion mechanism through the lever 19, bell-crank lever 72, and slide-rod 64 to impart to the cutting elements 71 and 73 a quick movement to their extreme positions to cause the sharpened edge 74 on the cutting element 73 to sever the needle-threads and the depending knife-like edge 75 on the element 71 to sever the lower or bobbin-thread, the parts of the thread-cutting and nipping mechanism then return to the position shown in Figures 7 and 10, all of which is old and well known and fully described in the above mentioned patents.

To remove the work after the stitching operation, the free end of the pivoted lever 77 is depressed or drawn down by a treadle (not shown). The movement of the lever 77 about its pivot 78 lifts the usual spring-pressed presser-bar 79 upwardly, and the free end 80' of the L-shaped member 80, which is fixed to the presser-bar, engages the thumb-screw 59 fixed to the sliding plate 33 and forces the plate 33 carrying the button-clamp arm 41 upwardly against the action of the springs 38.

In order to position the needle-threads above the work and hold them at one side of the needles for the beginning of the article-attaching operation, I have provided a needle-thread positioning device or holder which is actuated when the presser-bar 79 is raised. The thread-holding device comprises an arm 81 formed with an inclined U-shaped lower portion 82, the free end of which terminates in a short spiral 83 which forms an open thread-receiving loop (Figure 14). The holder is carried by a swinging arm 84 pivoted at 85 to a member 86 fixed to the head of the machine. The arm 84 is provided with a slot 87 which receives a pin 88 fixed on the free end 80' of the L-shaped member 80. From the above it will be obvious that when the presser-bar 79 is raised the pin 88 will cause the arm 84 to swing about its pivot 85. The thread-holder is normally in the position shown in Figure 2 and when the presser-bar is raised the holder 81 moves forward to the position shown in Figure 4 at which point the inclined limb 82 of the holder engages the needle-threads and upon further upward movement of the presser-bar the holder moves to the position shown in Figure 5. During this movement the needle-threads slide down the inclined limb 82 into the thread-holding spiral 83 and when the presser-bar is lowered the holder 81 swings back to its original position, as shown in Figure 6, the needle-threads being retained in the spiral 83, whereby they are held out of the path of the needles, which prevents the needles from piercing the thread during the first stitch-forming cycle.

From the foregoing description considered in connection with the accompanying drawings, the construction, manner of operation and several advantages of my improved article-attaching machine will be clearly and fully understood. It is apparent that such a device has a wide variety of uses, and it will be understood that the form, construction and arrangement of the several elements employed may be varied. Therefore, the privilege is reserved of resorting to all such legitimate changes therein as may be fairly embodied within the spirit and scope of the appended claims.

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

1. In an article-attaching sewing machine adapted to perform a definite series of operations, in combination, a reciprocating needle-bar, a pair of thread-carrying needles secured to said needle-bar, a throat-plate, a single thread-carrying loop-taker operating below said throat-plate and co-operating with said needles in the formation of lock-stitches, a button-holder, means for vibrating said button-holder laterally of a plane containing said needles, a stop-motion device, and thread-cutting and nipping mechanism below said throat-plate, said thread-cutting and nipping mechanism including means for nipping and cutting the beginning ends of both needle-threads and means automatically operable at the comple-

tion of the series of operations for concomitantly severing both needle-threads.

2. In a button sewing machine adapted to perform a definite series of operations, in combination, a reciprocatory needle-bar, a pair of needles fixed to said needle-bar each needle carrying a sewing thread, a single thread-carrying loop-taker cooperating with said needles in the formation of stitches, means for holding a button and supporting the work in position to stitch the button to the work, means for vibrating said last named means and the needles relative to each other, a stop-motion device, and thread-holding and cutting means including a nipper for simultaneously engaging and holding the free ends of both needle-threads at the beginning of the series of operations and automatic means controlled by the machine for simultaneously severing both needle-threads at the end of the series of operations.

3. In an article sewing machine adapted to perform a definite series of stitch-forming cycles, in combination, stitch-forming mechanism having a plurality of thread-carrying needles spaced apart to simultaneously register with certain of the holes of an article to be attached, a throat-plate, a single thread-carrying loop-taker located below said throat-plate and cooperating with said needles to form lock-stitches, an article clamp, means for relatively moving the needles and article clamp to cause each needle to register with another hole in the article, and means located above said throat-plate for holding the beginning ends of the needle-threads out of the path of the needles at the beginning of the series of stitch-forming cycles.

4. In a sewing machine for sewing articles having sets of thread-receiving openings, sewing instrumentalities including a pair of needles each having a sewing thread, a loop-taker carrying a lower thread-mass coordinated with said needles, an article-holder, means for moving said needles and article-holder relative to each other so that the needles alternate between the sets of thread-receiving openings, means for simultaneously trimming the beginning ends of both needle-threads and means for thereafter holding the trimmed ends of the needle-threads for a predetermined number of stitch-forming cycles.

5. In an article-attaching machine adapted to perform a definite series of stitch-forming cycles, in combination, a stitch-forming mechanism having a pair of thread-carrying needles spaced apart to simultaneously register with certain holes of an article to be attached, a throat-plate, a single thread-carrying loop-taker located below said throat-plate and cooperating with said needles to form lock-stitches, an article-clamp, means for relatively moving the needles and article-clamp to cause each needle to register with another hole in the article, means for raising and lowering said article-clamp, means under control of said raising means for engaging and holding the needle-threads out of the path of the needles, thread-cutting and nipping mechanism located below said throat-plate, said thread-cutting and nipping mechanism including means for engaging and trimming the beginning end of the needle-threads, and means for holding the beginning ends of the needle-threads nipped for a predetermined number of stitch-forming cycles.

6. In an article-attaching machine adapted to perform a definite series of stitch-forming cycles, in combination, stitch-forming mechanism having a pair of thread-carrying needles spaced apart to simultaneously register with certain holes of an article to be attached, a throat-plate, a single thread-carrying loop-taker located below said throat-plate and cooperating with said needles to form lock-stitches, an article-clamp, means for relatively moving the needles and article-clamp to cause each needle to register with another hole in the article, means for raising and lowering said article-clamp, means under control of said raising means for engaging and holding the needle-threads out of the path of the needles prior to the first stitch-forming cycle, and thread-cutting and nipping mechanism located below said throat-plate, said thread-cutting and nipping mechanism including means for concomitantly seizing and trimming both needle-threads at the beginning of the cycle of operations, and means for concomitantly cutting both needle-threads at the completion of the cycle of operations.

7. An article-attaching machine adapted to perform a definite series of operations having in combination, a reciprocatory needle, a throat-plate, a loop-taker operating below said throat-plate and cooperating with the needle to form stitches, and a work-holder comprising an arched member, a plate slidably secured to said member for vertical movement, spring means for urging said plate downwardly, button-clamping arms pivotally secured to said plate, a button-positioning member pivotally mounted on said plate, and a cam element having a set of cam-slots for controlling the positions of said button-clamping arms and a second set of cam-slots for controlling the position of said button-positioning arm.

8. An article-attaching machine adapted to perform a definite series of operations having, in combination, a reciprocatory needle-bar, a pair of needles fixed to said needle-bar, each needle carrying a sewing thread, a presser-bar, and means operable when the presser-bar is raised and lowered for engaging and holding both needle-threads out of the path of the needles at the beginning of the series of stitch-forming operations.

9. An article-attaching machine adapted to perform a definite series of operations having, in combination, a reciprocatory needle-bar, a pair of needles fixed to said needle-bar, each needle carrying a sewing thread, an article-clamp, means for raising and lowering said article-clamp and means including a swinging arm terminating in a spiral for engaging and holding both needle-threads out of the path of the needles at the beginning of the series of stitch-forming operations, said last named means being under control of the means for raising and lowering the article-clamp.

10. An article-attaching machine adapted to perform a definite series of operations having, in combination, a reciprocatory needle-bar, a pair of needles fixed to said needle-bar, each needle carrying a sewing thread, a presser-bar, and means operable when the presser-bar is raised and lowered for engaging and holding both needle-threads out of the path of the needles at the beginning of the series of stitch-forming operations, said last named means comprising an arm pivoted to the head of the machine and an element having an inclined U-shaped lower portion, the free end of which terminates in a short spiral.

JOSEPH VOLLMAN.