STOP MOTION MECHANISM FOR BUTTON SEWING MACHINES
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STOP MOTION MECHANISM FOR BUTTON SEWING MACHINES


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This invention relates to improvements in stop motion mechanism for button sewing machines, particularly of the character used for sewing flat buttons on work of various kinds, such as strips of cloth, articles of clothing, and the like. It relates more particularly to machines which are used for attaching either two-hole or four-hole buttons thereto by stitching through the eyes of the buttons and the cloth, especially such machines as are operated by power.

One object of the invention is to improve the construction of the stop motion of the machine, whereby the mechanism operates through a predetermined number of stitches, and then is stopped and held against further sewing operations until the stop motion is released by the operator. This includes a device which holds the machine against rebound operation whereby the power shaft is rotated through the sewing cycle and then stopped, after which the shaft is held against rebound or movement in the opposite direction. The stop motion is released by the operator either by hand or by foot power, as desired. The machine is provided with a hand release control member projecting upwardly through the top plate of the base, and separate means is provided for connection with a foot treadle to effect the release of the stop motion.

A preferred embodiment of the invention is shown in the accompanying drawings in which:

Fig. 1 is a side elevation of the button sewing machine;
Fig. 2 is a top plan view thereof;
Fig. 3 is a front end elevation of the machine;
Fig. 4 is a bottom plan view thereof in open position, with the machine bed partly in section;
Fig. 5 is a horizontal section therethrough generally on the line 5—5 of Fig. 8;
Fig. 6 is a similar view therethrough on the line 6—6 of Fig. 8;
Fig. 7 is a transverse vertical section substantially on the line 7—7 of Fig. 4;
Fig. 8 is a similar view on the line 8—8 of Fig. 4;
Fig. 9 is a longitudinal sectional view on the line 9—9 of Fig. 4;
Fig. 10 (sheet 3) is a horizontal section through the thread clamp on the line 10—10 of Fig. 3;
Fig. 11 is a detail section through the thread-hook mounting on the drive shaft; and
Fig. 12 is a detail perspective view of the drive shaft rebound lock device.

The machine is adapted for end operation with the operator facing the machine as viewed in Fig. 3, and with the machine supported on a table, work-bench, or other support, generally designated at 8. Accordingly, the machine is constructed with a machine bed designated generally by the numeral 1, adapted to be mounted on or secured to the support 8.

A hollow base 2 is connected with the bed 1, by pivotal connections 3 (Figs. 2 and 4) for swinging movement of the base 2, away from the bed 1 to gain access to the operating parts of the machine housed within the base. Normally the base 2 is held in a closed position on the machine bed 1 by a thumb screw 4, which extends through an orifice in one side of the base 2 and engages a recess in a lug 5 attached to the bed 1, which lug extends upwardly within the base 2, as shown in Fig. 5.

The base frame 2 encloses the principal operating parts of the machine and confines these from entanglement of the cloth therewith, as well as presenting a more attractive appearance to the machine. The base 2 has a forward extension 6 on the front end thereof over which the button clamp is disposed as hereinafter described, which extension is of appreciably less width than the base (Figs. 2 to 4), to facilitate the manipulation of the articles and access to the button clamp by the operator.

The base 2 also supports the usual upstanding standard 7 fixed on the base, with an arm 8 extending horizontally from the upper end of the standard 7, which arm carries the usual sewing head 9 at the free end thereof. These parts are hollow and communicate at their lower end with the base 2. These parts comprise the standard 7, arm 8, and sewing head 9 are preferably cast integral and either secured rigidly on the base 2 or cast integral therewith. The outer side of the sewing head 9 is initially open but is enclosed by a cover plate 10 which is detachably mounted thereon in the usual manner.

The sewing head 9 has the usual needle bar 11 mounted therein and guided at the top through a bushing 12 for reciprocating movement vertically through the head 9. The lower end of the needle bar 11 carries the usual sewing needle 13. The needle bar 11 is adapted to be reciprocated sufficiently far to project the needle 13 into the base extension 6 for cooperating action with sewing instrumentalities contained therein as hereinafter described.

For the purpose of reciprocating the needle bar 11 axially, this needle bar is connected with one end of a rocker arm 14 (Fig. 9) by means of a clamp 15 secured to the needle bar 11 and loosely
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3 pivoted to said end of the rocker arm by a short pivoted link. The rocker arm 14 extends lengthwise through the hollow arm 9, and is pivotally mounted at 16 intermediate the ends of said rocker arm for vertical rocking movement on the pivot 16 to accomplish the vertical reciprocating movement of the needle bar 11.

The opposite end of the rocker arm 14 extends into the space at the upper end of the standard 7 where it is pivotally connected with the upper end of a pitman 17. The pitman 17 extends vertically through the standard 7 downward into the base 2, and is adapted to be reciprocated vertically to cause swinging motion of the rocker arm 14 for reciprocating the needle bar 11 in the head 9.

The lower end of the pitman 17 is in the form of an eccentric strap 18 (Figs. 4 and 7) which surrounds an eccentric 19 fixed on a main drive shaft 20 that extends lengthwise through the base 2. The drive shaft 20 is journaled in bearings 21 and 22 at opposite ends of the base 2 and in a bearing 23 in a transverse partition 23' intermediate the ends of the base. The drive shaft is connected with the operating parts of the machine by the drives said parts.

At the forward end, the drive shaft 20 extends through the bearing block 22, at the lower end as viewed in Fig. 4, and has fixed thereon a holder 24 which is screwed over the driving shaft 20 (Fig. 11, sheet 3) and is secured thereto by set screws 25 which engage in recesses in the periphery of the corresponding portion of the drive shaft 20. The holder 24 carries the usual thread looper 26 fixed thereon by a stub shaft 26' inserted into the end of the holder 24 and secured thereto by a set screw 28', whereby the looper 26 will rotate with the drive shaft 20. The mounting of the looper 26 on the holder 24 permits rotation of the latter relative to the drive shaft 20 for adjustment of the looper 26, so as to time its operation relative to the other operating parts of the machine, particularly the movement of the needle 13 which coasts with the looper 26 to accomplish the stitching action in the manner well-known in the art.

The pinching with the looper 26 to form the chain stitch in the thread, is a thread deflector 27 (Fig. 4), which, in the form illustrated, is mounted for oscillatory movement, being in the shape of a thin finger fixed on a rock shaft 28 that is journaled in a bushing 29 extending through the bearing block 22. The opposite end of the rock shaft 28 has fixed thereto a cam follower 30 in position to bear upon a cam 31 fixed on the drive shaft 20 and held in operating position therewith by a spring 32. Any suitable threading deflecting means may be used for the purpose, which will cooperate with the looper 26 and the needle 13 to form the usual chain stitch ordinarily employed in attaching flat buttons to the work.

At the opposite end, the drive shaft 20 projects through the bushing 24 externally of the base 2, and has mounted on said projecting end of the shaft fixed and free pulleys 33 and 34, respectively, the former being fixed to the shaft 20 and adapted to receive a drive belt from a suitable source of power. On the extreme end of the shaft 20 is mounted a hand wheel 35 pinned to the shaft for manual turning thereof when desired.

Stop motion mechanism

The machine is provided with a shifter yoke, generally designated in Fig. 4, by the numeral 36, and formed by a pair of shifter arms which embrace opposite sides of the belt and shift the belt from one pulley to the other, either to drive the shaft 20 when the belt engages the pulley 33 or to run free of the shaft on the loose pulley 35. The shifter yoke 36 is connected with a brake shoe 37 which moves with the yoke and carries a lining 38 fixed to the brake shoe 37 to move the lining into frictional engagement with the pulley 35, so as to stop the rotation of the pulley and drive shaft 20 when the brake lining 38 is shifted into engagement therewith. The parts are so disposed that the lining will be shifted into engagement with the pulley 33 when the belt is shifted from this pulley onto the pulley 34 by axial displacement of the yoke 36.

The brake shoe 37 extends transversely of the base 2 and is guided at one end on a pin 39. The opposite end of the shoe 37 is formed integral with the support which carries the arms forming the shifter yoke 36. This support is mounted rigidly on a stop shaft 40.

The stop shaft 40 extends lengthwise into the base 2 and is guided in bearings 41 and 42 therefor, for axial movement under the influence of a helical spring 43, which is screwed over the stop shaft 40, and bears at one end against the partition 23 extending transversely in the base 2 and carrying the bearings 23 and 42. The opposite end of the spring 43 bears against a stop bumper 45 pinned to the stop shaft 40. The spring 43 normally tends to move the stop shaft 40 axially rearwardly (toward the top in Fig. 4), unless the shaft is anchored in its operating position as shown therein. When moved to its released position, the spring 43 is forced axially forward and carries with it the stop bumper 45 and also moves the shifter yoke 36 to cause the driving belt to engage the free pulley 35, which will also stop the operation of the machine by the engagement of the brake lining 38 with the pulley 35.

The stop bumper 45 also carries a coiled spring 46 mounted in the end thereof, but projecting slightly therefrom in position to engage a stop finger 47 fixed to the drive shaft 20. The stop finger 47 is in such position that its transverse vertical plane of operation will cause it to engage the stop bumper 45 when the latter is moved to its stop position at the completion of a sewing cycle, thus blocking the further rotation of the drive shaft 20 until the machine is re-set.

The stop shaft 40 is adapted to be shifted axially to its locked position by means of a hand lever 48 pivotally mounted at 49 (Figs. 7 and 9) in the base 2 so that the upper end of the lever 48 projects above the base in position for convenient reach by the operator for manipulation at the starting of a new sewing cycle. The lower end portion of the lever 48 is bifurcated and engages a pin 50 which projects laterally from the back face of the stop bumper 45 (see Figs. 4 and 7). Thus upon shifting the hand lever 48 in the direction of the arrow in Fig. 9, the stop shaft 40 would be moved to its reposed position, shown in Fig. 4, against the tension of the spring 43, and would be locked in said operating position for another sewing cycle. Previous machines had two foot pedals, one for raising the clamp and one for starting the machine and inexperienced operators often depressed the wrong pedal, and, instead of lifting the clamp, they started the machine and sometimes drove the needle into their finger. By having a conveniently located hand start lever 48, only one
pedal needs be used, the one for lifting the clamp, as the starting of the machine can be controlled manually at the top of the machine, thus eliminating any danger of prematurely starting the machine and running the needle through the operator's fingers when she is inserting a button into the clamp.

The machine is also capable of resetting by a treadle, if desired, for which purpose it is provided with a bell crank lever 51, pivotally mounted at 52 on the base 2. One end of the bell crank lever 51 is slotted and receives therein the pin 55, as shown in Figs. 7 and 9, while the opposite end of the bell crank lever 51 is connected with a chain 53, extending outwardly through a slot 54 in the bed plate 1, and through the table 8 or other support to a foot treadle (not shown). Upon downward movement of the foot treadle, the bell crank lever 51 would act to move the stop shaft 40 to the left in Fig. 9, to its re-set position for repeating the sewing cycle, when the main shaft 26 would be free for continued operation. Such a foot treadle may be used if desired, although the same operation may be accomplished by the manual actuation of the hand lever 56.

Provision is made for locking the stop shaft 40 in its retracted or set position. This stop shaft 40 is accordingly provided with a block 57, fixed thereon and extending downwardly from the stop shaft in position to be engaged by a stop latch 58, that has a shoulder 59 (see Fig. 9) to engage under the block 57 and hold the latter and the stop shaft 40 in retracted positions. The latch 58 has an extended end portion 60 that engages the lower face of the block 57 when the machine is in its blocked or inoperative position, so that the latch 58 will be ready to engage the block 57 again upon movement of the latter to the left in Fig. 9, beyond the shoulder 59. The latch is normally drawn upward by a coiled spring 61 connected therewith.

The latch 58 is pivotally supported at 62 on a bracket or casing 63 which is mounted in the base 2. Said latch 58 underlies a transverse arm 64 integral with the bracket 63 and extending transversely therefrom as will be evident from Figs. 4 and 6.

The latch 58 is adapted to be released by a trip member 55 (Figs. 6 and 8) pivotally mounted at 66 on the transverse arm 64 in a position with one end thereof overlying the latch 58. The opposite end of the trip member 65 carries a tripper finger 67, which is slotted and adjustable lengthwise relative to the trip member 65 by an adjusting screw 68 for providing properly timed operation of the machine.

The finger 67 has a down-turned end 69 in position to be engaged by a stud 70 mounted on the upper face of the upper cam 71. The stud 70 is provided with an inclined face as shown in Fig. 8, to ride under the down-turned end 69 of the tripper finger 67 to cause an upward swinging movement of said finger when engaged by the stud which will force the opposite end of the tripper 65 downwardly and cause the latch 58 to be disengaged from the block 57. This will release the stop mechanism and move it forward to its blocking position under the action of the spring 43.

The cams are shown at 71 and 72, as hereinafter described in more detail. These cams are mounted on a stub shaft 73 integral with a worm gear 74 in mesh with a worm 75 fixed to the main drive shaft 20. The stub shaft 73 is journaled on a pin fixed in the base 2 and extending downwardly therein, and is retained in place by means of a screw 76 (Fig. 4) extending through the journal pin and retaining the stub shaft thereon.

The upper cam 71 has a pair of arcuate slots 77 therein through which screws 78 extend into the stub shaft 73 for the adjustment of the cam 71 circumferentially, so as to obtain proper timing operation of the button clamp. The cams 71 and 72 are secured together in their adjusted positions by screws 79 (Fig. 8). A pin 80 extends outwardly from the stub shaft 73 and through orifices in the cams 71 and 72 to hold the cams in fixed relation.

**Rebound stop**

The shaft 20 is adapted to be locked also against rebound action upon stopping of the stitching operation. Accordingly, it is provided with a stop collar 81 fixed to the shaft (Figs. 6 and 12), and arranged with a shoulder 81' in position to engage the offset end of a rebound stop member 82, the opposite end of which is pivoted at 83 to the bracket or casing 63. The rebound stop member 82 is normally held pressed against the collar 81 by a spring 84, connected with said stop member and extending downwardly therefrom to a fixed point in the base 2.

A positioning strap 85 is fixed at one end to the block 57, being secured against vertical swinging movement relative to the block. At its opposite end the strap 85 is beveled and said beveled edge underlies the rebound stop member 85, as shown in Fig. 12. The strap member 85 is held in a fixed horizontal position by the block 57 and moves therewith upon shifting of the stop mechanism lengthwise. When the beveled portion of the strap 85 is in position to underlie the rebound stop member 82, the latter may be drawn downward against the collar 81 by the spring 84, but will be held raised out of engagement with the collar when the beveled portion of the strap member 85 is shifted lengthwise beyond the strap member 82, in the position shown in Fig. 12.

The collar 81 is adjusted circumferentially of the shaft 20 so that the end of the stop member 82 will pass over the shoulder 81' thereof almost simultaneously with the engagement of the stop member 47 with the bumper 45 upon movement of the stop mechanism to its blocking position. Thus the shaft 20 will be locked against rebound action when its continued rotation is blocked by the parts 45-47, and will be held firmly in its stopped position until the stop mechanism is released for continued operation.

**Button clamp**

The button clamp may be of any suitable or desired character, one form of which is shown merely for purpose of illustration. This clamp is mounted above the base 2 and extends lengthwise thereof over the base extension 6, substantially as shown in Figs. 1 and 3. The clamp comprises a base plate 66 fixed upon the upper face of the base 2 and adjustable lengthwise relative thereto.

Pivoting supported upon the base 66 at one end thereof is a hinge member 88 to which is fixed a top plate 88 that projects forwardly over the base 2 in spaced relation therefrom. The opposite end of the top plate 88 carries a jaw holding plate 89 fixed to the free end thereof, and from which depend downwardly and forwardly directed clamping jaws 90, pivotally connected with the jaw holding plate 89 for lateral swing-
adjustment relative to each other, by adjusting devices 91 which are constructed in the usual manner for spreading the clamping jaws apart or drawing them together to accommodate flat buttons of different sizes.

Also supported on the forward end of the base plate 85 and projecting forwardly over the base extension 6, under the button clamp 92, is a clamp underbody 92 upon which the clamping jaws 90 are adapted to be seated when the button clamp is in its lowered position. This underbody 92 has an enlarged opening in the forward end portion thereof beneath the needle 13 in position to register with a corresponding opening in an underlying plate 93 (Fig. 5) carried by the base extension 6.

Provision is made for vibrating the button clamp and the underbody 92, both longitudinally and transversely relative to the needle 13 and the base extension 6 between successive strokes thereof, when it is desired to sew two-hole buttons to the cloth; or longitudinally only, when it is desired to sew two-hole buttons thereon, so that the stitches will be caused to pass through the holes of the button and into the cloth in a predetermined number of needle strokes. The button is secured to the cloth by chainstitches.

For four-hole buttons, the button should be shifted so as to present one pair of holes and then the other pair of holes alternately in the path of the needle, so that the total number of stitches will be divided between the holes of each pair and between the respective pairs of holes during the stitching cycle.

Accordingly, the base plate 86 is mounted for sliding and swinging movements relative to the top surface of the base 2, but guided by a screw 94 and pin 95 extending through slots in the base plate 86 and secured to the base 2. The base plate 86 is also pivoted for turning movement about the axis of the screw 94 for swinging the jaws 96 transversely relative to the needle 13. These longitudinal and transverse movements of the button clamp are actuated by the cams 72 and 71, respectively.

As shown in Figs. 1, and 4 to 6, the base plate 86 has a pin 96 connected therewith and extending downwardly through a slot 97 (Fig. 5) in the base 2. The lower end of the pin 96 is fixed to a vibrating lever 99 intermediate the length thereof, which lever is pivoted at 90 to the under surface of the base 2. A spring 100 is connected with the lever 99 tending to move said lever in a forward direction when released. A spring 101 (Fig. 6) is connected with the cloth plate or underbody 92 tending to move the button clamp rearwardly when free to move.

The opposite end of the vibrating lever 99 is sloted at 102 (Fig. 5) and receives therein a headed pin 103, the enlarged end of which is guided by a T-slot 104 in a rocker member 105. The rocker member 105 is carried by a stub shaft 106 journaled in a bearing bracket 107 (Fig. 6) in a side of the base 2, and projects through said bearing bracket. The projecting end of the stub shaft 106 has an arm 108 fixed thereto, carrying a roller 109 on the free end thereof guided in the cam groove 116 of the bottom cam 72 (see Fig. 4). The cam groove 116 is provided with suitable rises and, so as to accomplish the longitudinal reciprocating motion of the button clamp according to the desired number of stitches for each button.

The transverse motion of the button clamp is actuated by the cam 71. The pin 95 projects through a transverse slot 111 (Fig. 5) in the upper surface of the base 2, and is connected with one end of a lever 112 which extends transversely of the base 2 to a point externally thereof, being provided with a hand knob 113 on the outer end of said lever, externally of the base. The lever 112 has a headed pin 114 secured thereto intermediate the length of the lever 112 and having the head thereof guided in a T-slot 115 formed in the upper surface of a rocker member 116. The T-slot 115 and rocker member 116 are longitudinally curved on an arc of a circle, the center of which is substantially at the axis of the pin 95 in the normal position of the button clamp. The button clamp is held in its transverse normal position by the spring 101 (Fig. 6) which tends to pull the button clamp toward the right as viewed in Fig. 3.

The rocker member 116 is fixed on a stub shaft 117 that is journaled in a bearing bracket 118 (Fig. 6) and projects from the lower side of said bearing bracket. An arm 119 is fixed to the lower projecting end of the stub shaft 117 carrying a roller 120 on the free end thereof, and guided in a cam groove 121 (Fig. 6) formed in the upper surface of the cam 71. This cam groove 121 is provided with suitable rises and, so as to accomplish the longitudinal reciprocating motion of the button clamp, preferably, is moved laterally when a suitable number of stitches have been passed through the first pair of holes in the button, so as to stitch through the second pair of holes in a four-hole button, and then is returned to its initial position just before the completion of the stitching operation.

During the rotation of the cam 71, the cam groove 121 will cause swinging movement of the arm 119 to oscillate the stub shaft 117. This stub shaft 117 will rock the member 116 back and forth. If the pin 114 is spaced from the axis of the stub shaft 117, as shown in Fig. 5, this rocking motion of the member 116 will reciprocate the lever 112 to move the button clamp laterally.

The hand knob 113 is provided to rotate the lever 112 in a lateral direction about the pivot pin 114, so as to dispose the axis of the pin 114 either spaced from, or substantially in alignment with, the axis of the stub shaft 117. When so positioned in alignment therewith, the rocking motion of the rocker member 116 will not transmit any longitudinal movement to the lever 112, and, therefore, the button clamp will not be shifted transversely during rotation of the cams 71 and 72. This is desirable when stitching two-hole buttons.

The lever 112 may be locked in its set position for two-hole or four-hole buttons by a thumb screw 122 threaded into the lever, which screw extends through a slot 123 in a cover plate 124 secured on the upper surface of the base 2, as viewed in Fig. 2. Upon tightening this thumb screw 122, the lever 112 will be secured in its set adjusted position with respect to the rocker member 116, and when shifted to the position shown in Fig. 2, will be disposed substantially as shown in Fig. 6, whereby transverse movement of the button clamp will accommodate the stitching of a second pair of holes in the button. On the other hand, when the hand knob 113 is moved from position the thumb screw 122 at the opposite end of the slot 123, no transverse movement will be imparted by the cam 71 to the button clamp during the stitching cycle.
Button clamp raising and lowering

The button clamp is adapted to be raised at the completion of the stitching operation to facilitate the removal of the stitched button from and the insertion of another button between the clamping jaws 90. Accordingly, the jaw holding plate 85 has secured thereto a hinge 124 (Fig. 1) to which is pivoted the lower end of a link 125. The upper end of the link 125 is pivotally connected with one arm of a lifter bellcrank lever 126. This bell-crane lever 126 is pivotally mounted at 127 in the arm 8 of the head, and has its other arm extending upwardly (Fig. 9) in the head 8 beside the rocker arm 14 in position for swinging movement free thereof.

The upper end of the bell-crank 126 is pivotally connected with a connecting strap 128 extending lengthwise in the head arm 8 and supported at one end thereof in said arm on the bell-crank lever for longitudinal reciprocating movement. The opposite end of the connecting strap 128 is pivotally connected with one arm of a bell-crank lever 129 pivotally mounted at 130 at the upper end of the head standard 7.

The other arm of the bell-crank lever 129 is connected with the upper end of a link 131 that extends downwardly through the standard 7 and through a slot in a guide plate 132 secured in the base 2 (Fig. 4). A coiled spring 133 is connected with the lower end portion of the link 131 normally tending to move the link upwardly and thereby lowering the button clamp to its lowered position on the base, as shown in Fig. 1.

The lower end of the link 131 is connected with one end of a chain 134 extending downwardly through the slot 54 in the machine bed 1, to a foot treadle 135 (Fig. 3). The foot treadle 135 is pivotally mounted on the base 2 and resting on the floor. Therefore, upon depressing movement of the foot treadle by the operator, the button clamp will be lifted from the base, such lifting motion being accomplished by the downward pull on the chain 134 and connecting link 131, which in turn pulls the strap 128 to the right in Fig. 9, and swings the bell-crank segment 126 in a clockwise direction, which thereby pulls upward on the link 125, raising the button clamp to its elevated position.

It is noted that this lifting movement of the button clamp occurs after the machine is stopped and held in its set position, and then upon release of the foot treadle 135 by the operator, the clamp will be lowered again to its operating position by the action of the spring 133, ready to stitch another button to the work. After this lowering movement of the button clamp, the stop motion may be released by the rearward movement of the lever 48 (Fig. 9) or the depressing of the foot treadle (if used) attached to the chain 35. Then the operation will be continued.

Thread take-up and supply

The forward end of the connecting strap 128 has mounted thereon a supporting plate 135 which is adjustable longitudinally relative to the connecting strap 128. The supporting plate 136 carries an upstanding stud 137 which extends through a slot 138 (Fig. 2) in the head arm 8.

A slack take-up lever 139 is pivotally mounted at 140 on the arm 3 and is held normally in the position shown in Fig. 2, by a spring 141 connected therewith. In this position, the take-up lever 139 bears against a stop pin 142. The stop pin 142, as well as the up-turned end 143 of the lever 138, are perforated for passage of the thread therethrough. The lever 138 also has a lateral finger 144 overlapping the slot 138 in the path of movement of the pin 137, so this finger will be engaged by the pin 137 to cause swinging movement of the take-up lever 138 when the connecting strap 128 is pulled backward by the operator to lift the button clamp. The purpose of this is to draw up a new supply of thread, which will be done quickly, so as to break the thread below the button clamp and to have this additional supply of thread ready for the next sewing cycle.

The usual thread tensioning device 145 is illustrated as indicated generally at 145, which tension devices may be of any well-known construction and need not be described in detail.

The thread is supplied from a spool mounted on a stand generally designated at 147 at the back end of the machine, as shown in Fig. 1 and 2. This stand includes a supporting plate 148 and integrally cast flaring sides 149 (Fig. 4) formed in one integral piece with said spool, so as to extend over the top and down opposite sides of the pulleys 33 and 34. Thus the thread holder also forms a guard for the pulleys and belt as well as to support the thread.

The thread holder 147 is supported by brackets 150 secured upon the base 2. An upstanding hook member 151 is carried by the stand 147 and has an eyefoot in the upper end thereof in position to overlie the spool mounted on the stand for guiding the thread therefrom.

The face plate 10 has the usual eyelets 152 and 153 (Fig. 3) in the upper and lower portions thereof, and an intermediate thread guide generally indicated in Fig. 2, at 154. A thread guide as shown also at 155 projecting through a slot in the face plate 10 and carried by the needle bar 11.

Thread clamp

Afted mounted on the face plate is a thread clamp, generally designated at 156, through which the thread extends from the eyefoot 152 before passing through the thread guide 154.

The thread clamp 156 is shown more in detail in Fig. 10, and includes a bushing 157 having an end face portion secured to a stop plate 158 by set screws 159 which pass through the stop plate 158 and through the flanged portions of the bushing 157 and are threaded into the face plate 10 for securing these parts rigidly to the face plate. The bushing 157 has a vertical slot 160 therethrough for receiving and guiding the thread through the clamp to a position behind the stop plate for clamping action thereagainst.

Giddably mounted in the bushing 157 is a clamping stud 161 having an end face normally spaced from the clamp stop plate 158 but in position to cooperate therewith for clamping the thread therebetween. The thread guide slot 160 is intermediate the opposite sides of the stud 161, so as to locate the thread in clamping the stud.

The stud is pressed normally backward away from clamping position by a coiled spring 162 sewed theretoeover and Interposed between the end of the bushing 157 and a collar 163 clamped on the bushing. A pin 164 is telescoped into the end of the clamping stud 161 and guided in the collar 163 for moving the clamping stud to a clamped position, acting as a plunger therefor. A small coiled spring 165 is Interposed between the inner end of the plunger 164 and the bottom of the recess in the clamping stud 161 to cushion the action of the plunger thereon. A hand button...
166 is attached to the opposite end of the clamping stud 161 for hand release action thereof if required. Provision is made for actuating the thread clamp 166 automatically in timed relation with the operation of the machine, so that the thread will be clamped immediately after the completion of the sewing cycle. I have provided, accordingly, a thread clamp push-rod 167 (Fig. 11) slidable mounted in a guide 168 in the head arm 6, and extending lengthwise of said arm. The push-rod 167 extends through the arm 6 on the opposite side of the roller axis 14 from the connecting strap 128. These parts are sufficiently separated in the arm so as not to interfere with the independent operation of each. The forward end of a push-rod 167 has an up-turned abutment portion 169 in position to engage the plunger 164 on the thread clamping stud 161, so as to push the forward end of the stud into clamping relation with the clamp stop plate 158 and hold the thread therebetween.

The back end of the push-rod 167 is pivotally connected with one arm of a bell-crank lever 170 pivotally mounted at 171 at the upper end of the head standard 7. The other arm of the bell-crank lever 170 is pivotally connected with the upper end of a connecting link 172 that extends downwardly through a slot in a guide plate 173 (Fig. 4), mounted at the under side of the base 2.

The lower end of the connecting link 172 carries a laterally projecting pin 174 disposed in position to override an end of a thread-lock finger 175. This thread-lock finger 175 is pivotally mounted intermediate its ends on a support 178 carried by the base partition 23. The opposite end of the finger 175 is beveled at its upper side and in position to be engaged by a stud 177 secured to a side of the stub shaft 73, as shown in Fig. 8.

Thus, upon the completion of a revolution of the gear 74, and with it the cams 71 and 72, the stud 177 will engage the beveled end of the lock finger 175 and depress said beveled end. This action will push upward on the opposite end of the lock finger, and thereby move upward the link 172, swinging the bell-crank lever 170 to impart forward pushing action to the push-rod 167. This will cause a pushing action to be imparted by the offset end 169 against the plunger 164, thereby pressing the stud 161 forwardly against the tension of the spring 165 to clamp the thread between the end of the stud 161 and the clamp stop plate 158 (Fig. 10). This will cause the thread to be clamped at the completion of the stitching operation, and upon lifting the button clamp the thread will be broken below the clamp.

The location of the thread lock on the face plate, instead of on top of the arm, as in previous machines, provides for a shorter length of thread to stretch when the lifting of the clamp breaks the thread under the button. This results in a quieted break in the thread, which is a decided improvement.

Operation

Before commencing the sewing operation, it will be necessary for the operator to make the needed adjustments according to whether a two-hole button or a four-hole button is to be sewed onto the material. This variation can be made readily upon loosening the adjusting screw 123 and then grasping the hub knob 113 and moving the lever 112 to the required position, as indicated in Fig. 2. Then the thumb screw 122 may be tightened and this position will be maintained during the operation until it is desired to reset the machine for a different type of button.

As shown in Figs. 3 and 5, the machine is set for the sewing of four-hole buttons, but upon shifting the thumb screw to the opposite end of the slot 123, the button clamp is disengaged from the pin 114 in axial alignment with the stub shaft 117. In that event, no lateral motion would be imparted to the button clamp during the sewing operation.

Before starting the sewing operation, the material is placed under the button clamp upon the cloth plate or under jaw 92 of the button clamp. This should be done when the button clamp is in its elevated position, which will afford ready access thereto for this purpose. The button is then inserted into the clamping jaws 59, and upon release of the foot treadle 135 by the operator, the spring 133 acting on the link 131 will cause the button clamp to be lowered to its operating position. This will cause a return of the thread kick-off lever 138 to the position shown in Fig. 9.

The operator then swings the hand lever 48, either manually or by a foot treadle, if the latter is used, and connected with the lever 51. The movement of this hand lever in the direction of the arrow in Fig. 5, forces the stop shaft 40 to the left in Fig. 9, against the tension of the spring 43. This action moves the bumper 45 out of the path of movement of the member 47 and frees the shaft 20 for rotation. The longitudinal movement of the stop shaft 40 also slides the block 57 forwardly, to the left in Fig. 9, until this block is caught, and engaged by the spring-pressed latch 58, where the stop shaft 40 is held in its set position by the latch 58 during the operation of the machine. This movement of the block 57 also slides forwardly the strap 65 to lift the stop member 82 away from the rebuilt collar 81.

The forward movement of the shaft 40 slides the bolt shifter 36 inwardly which not only shifts the belt from the pulley 34 to the pulley 33 (Fig. 4), but also releases the brake lining 38 from the face of the pulley 33 which frees this pulley and the shaft connected therewith by the belt. The drive shaft 20 is then operated by the pulley 33.

The rotation of the drive shaft 20 turns the eccentric 19 to impart reciprocating movement to the connecting rod 11 (Fig. 9) swinging the rocking member 14 on its pivot 16, which, in turn, reciprocates the needle bar 11 through a stroke sufficient to direct the needle downwardly into the base extension 8 for cooperating stitching action with the looper 25 that is rotated by the main shaft 20 on which it is mounted.

At the same time, the driven worm gear 74-75, and the stub shaft 73, carrying the cams 71 and 72. These cams cause swinging movement of the arms 108 and 119, the former of which imparts reciprocating movement in vibrating action through the lever 120 moving back and forth as indicated by the arrow in Fig. 5, to reciprocate the button clamp. If a two-hole button is being attached, no transverse motion will be imparted to the button clamp. However, if a four-hole button is being applied, as is indicated in the example shown, a predetermined number of stitches are placed alternately through one pair of holes in the button, after which the button clamp is shifted laterally to present the other pair of holes to the
needle. The stitching is continued then in this lateral position until just before the completion of the stitching cycle when the button is shifted back to the first pair of holes, the needle taking two strokes through one hole at the completion of the cycle to provide the knotting stroke in the usual manner.

The complete sewing cycle involves rotation of the cams through one revolution, whereupon the stud 70 is moved into tripping engagement with the tripping finger 67 (Fig. 8), which depresses the opposite end of the tripper 65, thus pressing downward on the latch 56 (Fig. 9). This releases the latch from its engagement with the block 57 and allows the spring 43 to move the shaft 40 rearwardly. This action simultaneously shifts the belt onto the idler pulley 34, applies a braking action to the pulley 33, by the lining 38, and moves the stop bumper 45 into the path of the stop finger 47, so that as the latter turns further, it will engage the spring 48, yieldably stopping the rotation of the shaft 20.

Simultaneously therewith the rebound strap member 85 will be moved rearwardly, allowing the rebound stop member 82 to be moved downward by the spring 84 onto the collar 81, in position to engage behind the shoulder 81' on this collar approximately simultaneously with the engagement by the stop finger 47 with the end of the stop bumper 45. This will cause the shaft 20 to be held against rebound action when its continued forward movement is restrained.

As the revolution of the cam stub shaft 73 is completed, the stud 177 will engage the beveled end of the lever 175, which will lift the opposite end of the lever and push upward on the link 172 and forwardly on the push rod 161 (Fig. 1) to actuate the clamping stud 161 and clamp the thread against movement.

Then upon depressing action of the treadle 135 by the operator, the button clamp will be lifted and the thread broken therebelow. This action will serve also to actuate the thread take-up 139, as described above. The work may then be removed or shifted to another position, ready for the sewing of another button.

The particular stitching mechanism need not be described more in detail because this is conventional and well-known. For like reason, the conventional features of the machine are not set forth more in detail.

1. In a sewing machine having a rotary drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a stop extending transversely from and fixed to the drive shaft for rotary movement thereby, a rigid stop bumper, a shaft mounting said stop bumper for longitudinal movement into and out of position for engagement with the arm, means guiding said shaft for sliding movement in a longitudinal straight-line direction only, yieldable means normally tending to move the stop bumper longitudinally into the engaging position thereof with the arm, means for holding said stop bumper out of engaging position thereof with the arm, and means actuated automatically upon completion of said plurality of said stitch-forming cycles for moving the stop bumper into position to position the bumper for engagement with the arm.

2. In a sewing machine having a rotary drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a stop extending transversely from and fixed to the drive shaft for rotary movement thereby, a rigid stop bumper, a shaft mounting said stop bumper for longitudinal movement into and out of position for engagement with the arm, means guiding said shaft for sliding movement in a longitudinal straight-line direction only, yieldable means normally tending to move the stop bumper longitudinally into the engaging position thereof with the arm, means for holding said stop bumper out of engaging position thereof with the arm, and means actuated automatically upon completion of said plurality of said stitch-forming cycles for moving the stop bumper into position to position the bumper for engagement with the arm.

3. In a sewing machine having a rotary drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a stop extending transversely from and fixed to the drive shaft for rotary movement thereby, a rigid stop bumper, a shaft mounting said stop bumper for longitudinal movement into and out of position for engagement with the arm, means guiding said shaft for sliding movement in a longitudinal straight-line direction only, yieldable means normally tending to move the stop bumper longitudinally into the engaging position thereof with the arm, means for holding said stop bumper out of engaging position thereof with the arm, and means actuated automatically upon completion of said plurality of said stitch-forming cycles for moving the stop bumper into position to position the bumper for engagement with the arm.

4. In a sewing machine having a rotary drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a stop extending transversely from and fixed to the drive shaft, a rigid stop bumper, a shaft supporting the stop bumper, means guiding said shaft for longitudinal straight-line sliding movement only for moving the stop bumper into position for engagement with the stop arm, yieldable means connected with the shaft tending to move the stop bumper into engaging position, latch means for holding the shaft in a retracted position with the stop bumper out of engaging position thereof with the stop arm, and means operated automatically upon completion of said stitch-forming cycles for releasing the latch means and causing movement of the stop bumper by the resilient means into engaging position.

5. In a sewing machine having a rotary drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a stop extending transversely from and fixed to the drive shaft for rotary movement thereby, a rigid stop bumper, a shaft supporting the stop bumper, means guiding said shaft for longitudinal movement into and out of position for engagement with the arm, means for holding said stop bumper out of engaging position thereof with the arm, and means actuated automatically upon completion of said plurality of said stitch-forming cycles for moving the stop bumper into position to position the bumper for engagement with the arm.

6. In a sewing machine having a rotary drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a stop arm extending transversely from and fixed to the drive shaft.
drive shaft for rotation in a transverse plane therewith, a rigid stop bumper, a shaft supporting the stop bumper for longitudinal movement into and out of the plane of rotation of the stop arm, resilient means connected with said bumper shaft tending to move the stop bumper into engaging position with the stop arm, a block fixed to the bumper shaft, a latch in position to engage the block to hold the bumper shaft in retracted position, feed cam means operatively connected with the drive shaft for actuation thereby, and means actuated by the feed cam means upon completion of said plurality of stitch-forming cycles for releasing the latch means and causing movement of the stop bumper to an engaging position.

7. In a sewing machine, the combination of an enclosed base, a drive shaft journaling in the base, stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, shaft stop means, a shaft connected with the stop means and movable into and out of an actuating position, means for holding the stop means out of stopping position, resilient means for urging the stop means into an operative position, means operated automatically upon completion of said plurality of stitch-forming cycles to release the holding means and cause movement of the stop means to an engaging position, and a lever connected with the stop means and extending upwardly through the enclosed base to a point externally thereof in position for manual actuation for moving said stop means out of stopping position.

8. In a sewing machine, the combination of an enclosed base, a drive shaft journaling in the base, stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a stop member fixed on the drive shaft for rotation therewith, a stop bumper, a shaft supporting the stop bumper for longitudinal movement into and out of an actuating position for engagement by the stop member, resilient means for urging the stop bumper into an operative position, latch means for holding the stop bumper out of engaging position, means actuated automatically upon completion of said plurality of stitch-forming cycles to release the latch means and permit movement of the stop bumper to an engaging position, and a lever connected with the stop bumper and extending upwardly through the enclosed base to a point externally thereof in position for manual actuation for moving said stop bumper out of engaging position.

9. In a sewing machine, the combination of a drive shaft, stitch-forming mechanism actuated by said drive shaft and adapted to be operated through a plurality of stitch-forming cycles, a driving member connected with the drive shaft for operating said shaft, movable means for blocking continued rotation of the drive shaft, resilient means for urging the blocking means into an inoperative position, latch means for holding the blocking means in the inoperative position, and means connected with said blocking means and actuated thereby for applying braking action to the driving member upon actuation of the blocking means to stop the rotation of the shaft.

10. In a sewing machine having a drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a driving pulley fixed to the drive shaft, blocking means for the drive shaft, a shaft supporting the blocking means for longitudinally moving said blocking means into and out of blocking position, resilient means for urging said blocking means to an inoperative position, latch means for holding the blocking means in the inoperative position, a belt shifter connected with said blocking shaft and movable thereby to shift the belt out of driving position, and means connected with said blocking shaft for applying braking action to the pulley upon movement of the blocking means to a blocking position.

11. In a sewing machine having a drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, blocking means for stopping said drive shaft and mounted for longitudinal and out of blocking position, a rebound collar fixed to the drive shaft and spaced apart from the blocking means, a rebound stop member in position to engage said collar, and longitudinally moving means for causing disengagement of the stop member with the collar upon movement of the blocking means from a blocking position during rotation of the drive shaft.

12. In a sewing machine having a drive shaft, a stitch-forming mechanism actuated by the drive shaft and adapted for operation through a plurality of stitch-forming cycles, a driving pulley fixed to the drive shaft, blocking means for the drive shaft, a shaft supporting the blocking means for longitudinally moving said blocking means into and out of blocking position, a rebound stop member in position to engage the shoulder of said stop collar, a positioning strap connected with the blocking means and operated thereby to normally hold the rebound stop member out of engagement with the stop collar and longitudinally movable with the blocking means to cause engagement of the stop member with the shoulder to hold the drive shaft against rebound movement upon blocking the continued forward movement of the drive shaft.

WILLIAM T. MAXANT.

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