

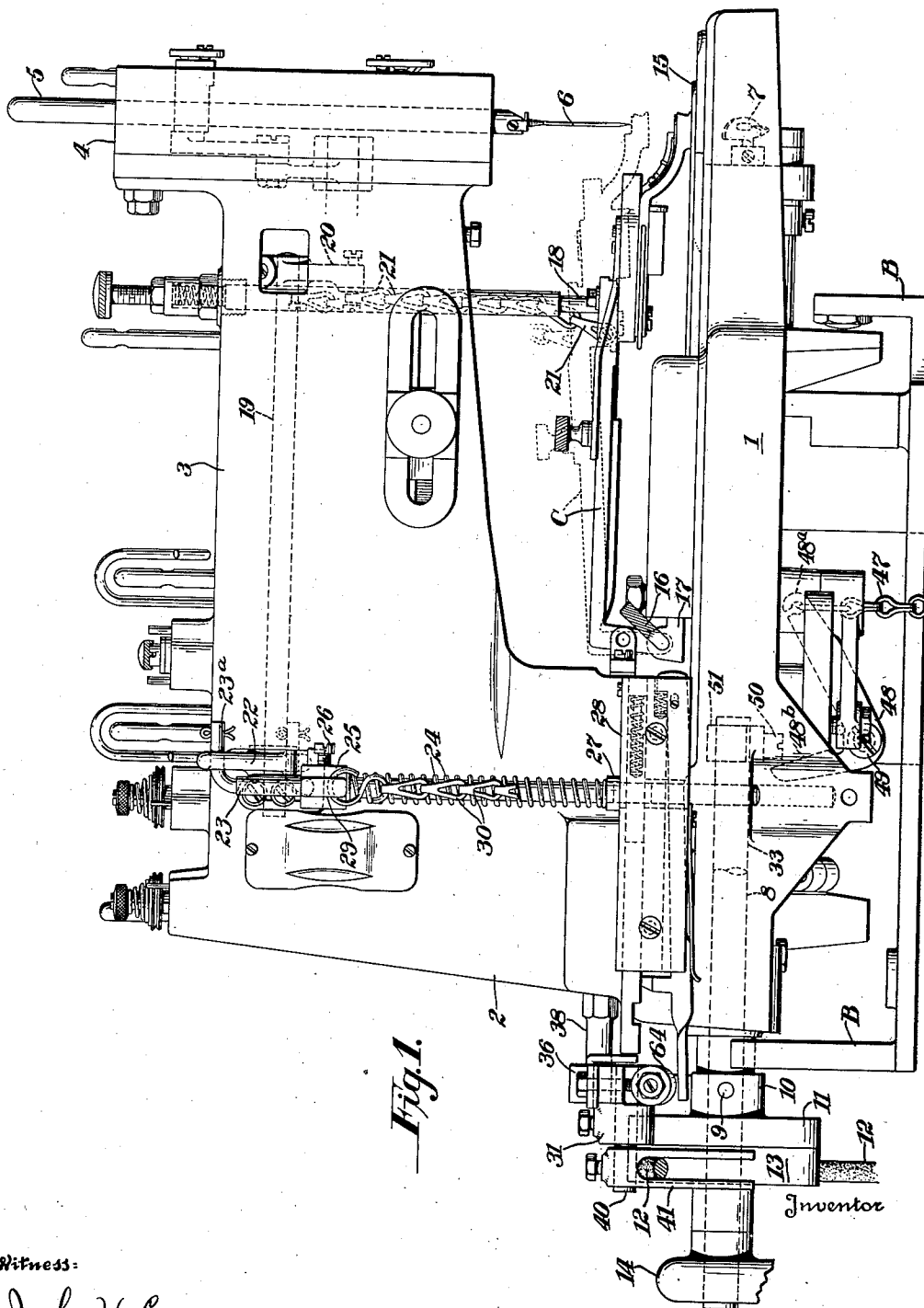
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M. McCANN

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STOP MOTION AND REBOUND CONTROL MECHANISMS FOR SEWING MACHINES

Original Filed Sept. 15, 1937 2 Sheets-Sheet 1



Witness:

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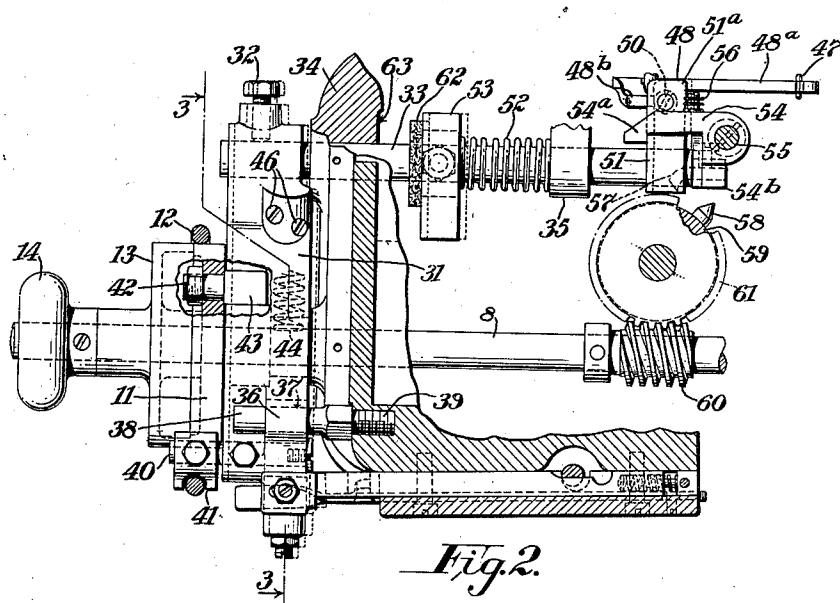


Fig. 2.

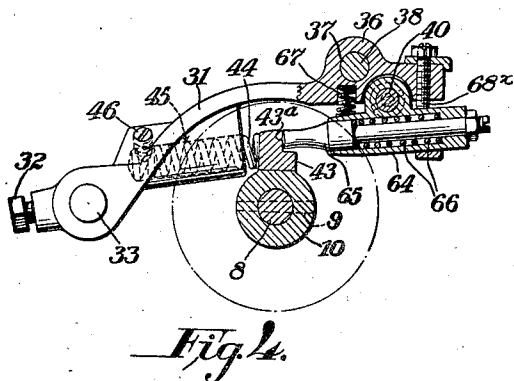


Fig. 4.

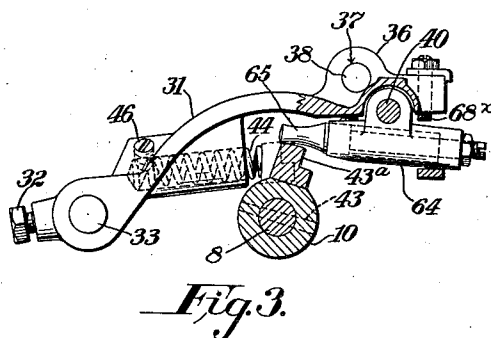


Fig. 3.

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STOP MOTION AND REBOUND CONTROL
MECHANISMS FOR SEWING MACHINESMichael McCann, Ozone Park, N. Y., assignor to
The Singer Manufacturing Company, Elizabeth,
N. J., a corporation of New JerseyOriginal application September 15, 1937, Serial
No. 163,927. Divided and this application February 9, 1939, Serial No. 255,415

6 Claims. (Cl. 192—149)

This application is a division of my prior application Serial No. 163,927 filed Sep. 15, 1937.

The present invention relates to sewing machines and more particularly to that type of sewing machine designed to operate in a predetermined cycle and having a stop-motion device adapted to bring the machine to rest at the completion of said cycle, in a predetermined position, and also having a clamp mechanism adapted to hold the work in position to be operated upon by the stitch-forming mechanism.

One of the objects of the invention is to provide an improved stop-motion mechanism which will bring the machine to rest in a predetermined position with a minimum of noise and vibration.

Another object of the invention is to provide an improved rebound control means for preventing material reverse rotation or rebound of the main shaft of the machine when its forward rotation is suddenly arrested.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements or parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings:

Fig. 1 is a side elevation of a button sewing machine embodying the present invention, the machine being shown in its position of rest.

Fig. 2 is a horizontal sectional view through the machine standard, showing the improved stop-motion mechanism in plan view and in position to effect running of the machine.

Fig. 3 is a vertical sectional view taken substantially on the line 3—3 of Fig. 2, with the parts approaching their stop position and with the rebound control device shown in elevation.

Fig. 4 is a view similar to Fig. 3 but with the parts in stop position and with the rebound control device shown in section.

Referring more specifically to the drawings the invention is disclosed as embodied in a "Singer Class 175" button sewing machine comprising a bed 1, standard 2, bracket-arm 3 and a bracket-arm head 4. Mounted in the head 4, for vertical reciprocation and lateral vibration, is a needle-bar 5 carrying at its lower end, an eye-pointed needle 6. Cooperating with the needle in the formation of stitches is a looper 7, shown in dotted lines in Fig. 1. Inasmuch as the means for actuating the needle and looper form no part

of this invention, detailed illustration and description thereof is deemed unnecessary. Suffice it to say that they both are actuated by mechanism driven from a rotary shaft 8 journaled in the bed 1. The shaft 8 has secured to it by a pin 9, the hub 10 of a driving pulley 11 adapted to be rotated by a belt 12. A loose pulley 13 is rotatably journaled on the shaft 8 intermediate the pulley 11 and a hand-wheel 14 secured upon the end of the shaft. The belt 12 runs idly upon the loose pulley when the machine is at rest.

The machine is also provided with a button-clamp, designated generally as C, and an underlying work-supporting plate 15, both of which are common to this type of button sewing machine. A pivot-pin 16 connects the clamp with conventional clamp actuating mechanism 17. The clamp is normally held depressed to its full-line position in Fig. 1 by a spring-pressed plunger 18 but it may, at certain times, be lifted to its dotted line position to permit removal of the work. Journaled within the arm 3 is a clamp-lifting rock-shaft 19, having at its forward end an arm 20 connected by a chain 21 with the button-clamp C. Adjacent its rear end the shaft 19 has secured to it a second arm 22 engaged by the off-set end 23^a of a vertical slide-rod 23 which is normally pressed upwardly by a coil spring 24 surrounding the rod 23 and interposed between a collar 25, secured to the rod by set screw 26, and a collar 27 which loosely surrounds the rod 23 and which is held against downward movement by a fixed member 28, later to be described. The collar 25 is formed with a laterally projecting arm 29 to which is connected a treadle-actuated chain 30. From the foregoing it will be apparent that, unless otherwise prevented, downward movement of the chain 30, under the influence of a conventional treadle mechanism, will rock the shaft 19 and effect lifting of the button-clamp. Operation of the machine is controlled by a stop-motion mechanism which comprises a sliding frame 31 secured at one end, by set screw 32, to a rod 33 slidably mounted in fixed bearings 34 and 35 provided by the machine bed (see Fig. 2). Adjacent its other end the frame 31 is formed with an ear 36 having a bore 37 slidably fitted upon a guide-pin 38 threaded into the standard 2 as shown at 39 in Fig. 2. Adjacent the ear 36, the frame 31 carries a pin 40, to one end of which is secured a belt-shifting fork 41. Secured to driving pulley 11, as by nut 42, (see Fig. 2) is a stop-lug 43 adapted, at a certain time, to engage the projecting end of a buffer-spring 44 fitted within a

socket 45 formed in the sliding frame 31 and held therein by the inner pointed ends of screws 46.

Means are provided for shifting the sliding frame 31 from the stop position shown in Fig. 1, in which the driving belt 12 is running idly on the loose pulley 13, to the position shown in Fig. 2 in which the driving belt is shown as engaging the tight pulley 11 to drive the machine. This means comprises a conventional treadle (not shown) connected by a chain 47 with one arm 48^a of a bell-crank lever 48. The lever 48 is fulcrumed upon a screw 49 carried by a machine-supporting base designated generally as B. The other arm 48^b, of the lever 48, is adapted to engage a stud 50 carried by an extension 51^a of a collar 51 secured upon the slide-rod 33. Thus it will be seen that downward movement of the chain 47, under the influence of the treadle, will cause the lever 48 to be rocked clockwise, as seen in Fig. 1, to shift the sliding stop-motion frame 31 and the parts carried thereby to the right. This movement is effected in opposition to the urge of a coil spring 52 surrounding the rod 33 and interposed between the fixed bearing 35 and a collar 53 secured to the rod. The rod 33 and the stop-motion frame 31 are adapted to be retained in the position shown in full lines in Fig. 2, with the spring 52 under tension, by a latch 54 pivotally mounted upon a stud screw 55 threaded into the machine bed. This latch is normally urged to turn counter-clockwise, as seen in Fig. 2 by a coil spring 56, and is provided with a tooth 54^a adapted to engage behind the collar 51. The latch 54 is formed with an arm 54^b which carries a finger 57 adapted, at a certain time during the operation of the machine, to be engaged by a cam-pin 58 carried by a rotary element 59 of the machine which is driven by a worm 60 and worm-wheel 61 from the main shaft 8. Engagement of the cam-pin 58 with the finger 57 turns the latch clockwise, as seen in Fig. 2 and causes the tooth 54^a to release the collar 51. This permits the rod 33, and the frame 31 carried thereby, to be shifted to the left under the influence of the spring 52 to shift the driving belt from the tight pulley to the loose pulley and to effect stopping of the machine as later will be described. Movement of the rod 33 to the left by the spring 52 is cushioned by a washer 62 surrounding the rod 33 adjacent the collar 53, the washer being adapted to engage a fixed wall 63 provided by the bed 1.

It will be understood that when the parts are in the positions shown in full lines in Fig. 2 the buffer-spring 44 is located at one side of the path of rotation of the stop-lug 43. However, when the latch 54 is tripped by the cam-pin 58 the rod 33 and the parts carried thereby, including the frame 31 and the spring 44, are moved to the left and the spring is placed in the path of the stop-lug. This tripping is effected at approximately the time the needle-bar starts downwardly to make the final stitch of a predetermined number of stitches. After this tripping the main shaft 8 makes approximately one complete rotation before the machine is finally brought to rest.

As shown most clearly in Figs. 3 and 4 the stop-motion frame also carries a rebound control device adapted to prevent material reverse rotation of the main shaft when the stop-lug 43 engages the buffer-spring at the completion of the cycle. This device preferably comprises a tubular member 64 pivotally mounted upon the

pin 40, which also carries the belt shifter 41. Within the member 64 is slidably mounted a spring-pressed plunger 65 normally forced to the left by a coil spring 66. The tubular member 64 is normally maintained in the tilted position 5 shown in Fig. 4 by the pressure of a coil spring 67 having one end fitted within a cavity in the frame 31 and the other end bearing upon the member 64. A stop-screw 68^x limits the movement of the member 64 under the influence of 10 the spring 67.

When the latch 54 is released and the stop-motion frame 31 is shifted outwardly by the spring 52, both the buffer-spring and the plunger 65 are placed within the path of rotation of the 15 stop-lug 43. As the stop-lug approaches its final position in the last rotation of the main shaft it engages the underside of the plunger 65 and tips the inner end of the plunger and its supporting member upwardly, as shown in Fig. 3, in 20 opposition to the spring 67. As soon as the wall 43^a of the lug 43 clears the end of the plunger 65 the spring 67 forces the member 64 and the plunger 65 downwardly to the position shown in Fig. 4. In this position the plunger 65 and the 25 spring 66 act as a recoil device to prevent material reverse rotation of the main shaft and stop-lug under the influence of the buffer-spring 44.

From the foregoing it will be perceived that 30 this invention has provided an improved stop-motion mechanism comprising the slidable frame 31 which is supported and guided at spaced points upon the slide-rod 33 and the pin 30 which are located at opposite sides of the drive- 35 shaft 8. This construction and arrangement prevents tilting and cramping of the frame 31 and consequently makes it more easily shiftable by the usual stop-motion control treadle. Likewise it eliminates vibration of the slide-frame 40 and therefore renders the machine less noisy in operation.

Furthermore it will be apparent that this invention has provided an improved stop and rebound control mechanism which will bring the 45 machine to rest in a predetermined position with a minimum of noise and vibration.

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

1. In combination with a machine having a 50 fixed frame and a rotary shaft journaled therein, means for arresting the rotation of said shaft in a predetermined angular position comprising a stop-member carried by said shaft, a frame movable parallel to the axis of said shaft, means, in 55 dependent of said shaft, located at opposite sides thereof to support and guide said frame, means to move said frame, and a buffer element carried by said frame and movable therewith into the path of rotation of said stop-member. 60

2. In combination with a machine having a fixed frame and a rotary shaft journaled therein, means for arresting the rotation of said shaft comprising a slide-rod mounted in said fixed frame, a stop-motion frame secured upon said 65 rod at one side of said shaft, guide means for said stop-motion frame, independent of said shaft, located at the opposite side thereof and arranged parallel with said slide-rod, a stop-member rotatable with said shaft, a buffer element carried 70 by said stop-motion frame, means to shift said slide-rod and stop-motion frame to position said buffer element in the path of rotation of said stop-member thereby to arrest the forward rotation of said shaft, and rebound control means 75

carried by said stop-motion frame adapted to cooperate with said stop-member to control the reverse rotation of said shaft under the influence of said buffer element.

5 3. A stop device for a rotary shaft combining a frame movable parallel to said shaft, means, independent of said shaft, located at opposite sides thereof to support and guide said frame, means to move said frame, a stop-member rotatable 10 with said shaft, a buffer element carried by said frame and movable therewith into the path of rotation of said stop-member, and a rebound control device pivotally mounted on said frame and having a portion also adapted to be moved with- 15 in the path of rotation of said stop-member, said member acting to tip said device about its pivot to move it out of the path of rotation of said member, and means operative after the passage of said member to return the device into the path 20 of rotation of said member to control the rebound of said shaft and member under the influence of said buffer.

4. A stop device for a rotary shaft comprising an abutment carried by the shaft, a frame, a 25 buffer element carried by said frame at one side of the axis of the shaft and adapted to arrest the forward rotation of said abutment, a rebound control device comprising a member pivotally mounted on said frame at the other side of the 30 axis of the shaft, a stop yieldingly and slidably mounted in said pivoted member and adapted to be located in the path of rotation of said abutment, said abutment being adapted in its forward rotation to contact with said stop and move it 35 out of the path of rotation of said abutment, and means operative after the passage of said abut-

ment to return said stop into the path of rotation of said abutment to control the rebound of said abutment under the influence of said buffer.

5. A stop device for a rotary shaft combining a frame movable parallel to said shaft, means to move said frame, a stop-lug rotatable with said shaft, a buffer element carried by said frame and movable therewith into the path of said stop-lug, and a rebound control device carried by said frame, said device comprising a tubular member 10 pivotally mounted on said frame, a spring-pressed plunger slidably mounted in said tubular member and adapted to be placed in the path of rotation of said stop-lug whereby said lug tips said device about its pivot just prior to the en- 15 gagement of said lug with said buffer element, and means operative after said lug has passed said plunger to return the plunger into the path of rotation of said lug to prevent material rebound of said shaft and lug under the influence 20 of said buffer.

6. In combination with a rotary shaft and means to arrest the forward rotation thereof, means for controlling rebound of said shaft comprising a member rotatable with the shaft, a tu- 25 bular element pivotally mounted on an axis parallel with said shaft, a spring-plunger carried by said tubular element having a portion normally arranged within the path of rotation of said member and adapted to be shifted out of its nor- 30 mal position by contact with said rotatable member, and spring means to replace said plunger within the path of rotation of said member to prevent material reverse rotation thereof.

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