

Sept. 25, 1956

R. HAPPE

2,764,112

POWER OPERATED CONTROL UNITS FOR SEWING MACHINES

Filed April 26, 1954

4 Sheets-Sheet 1

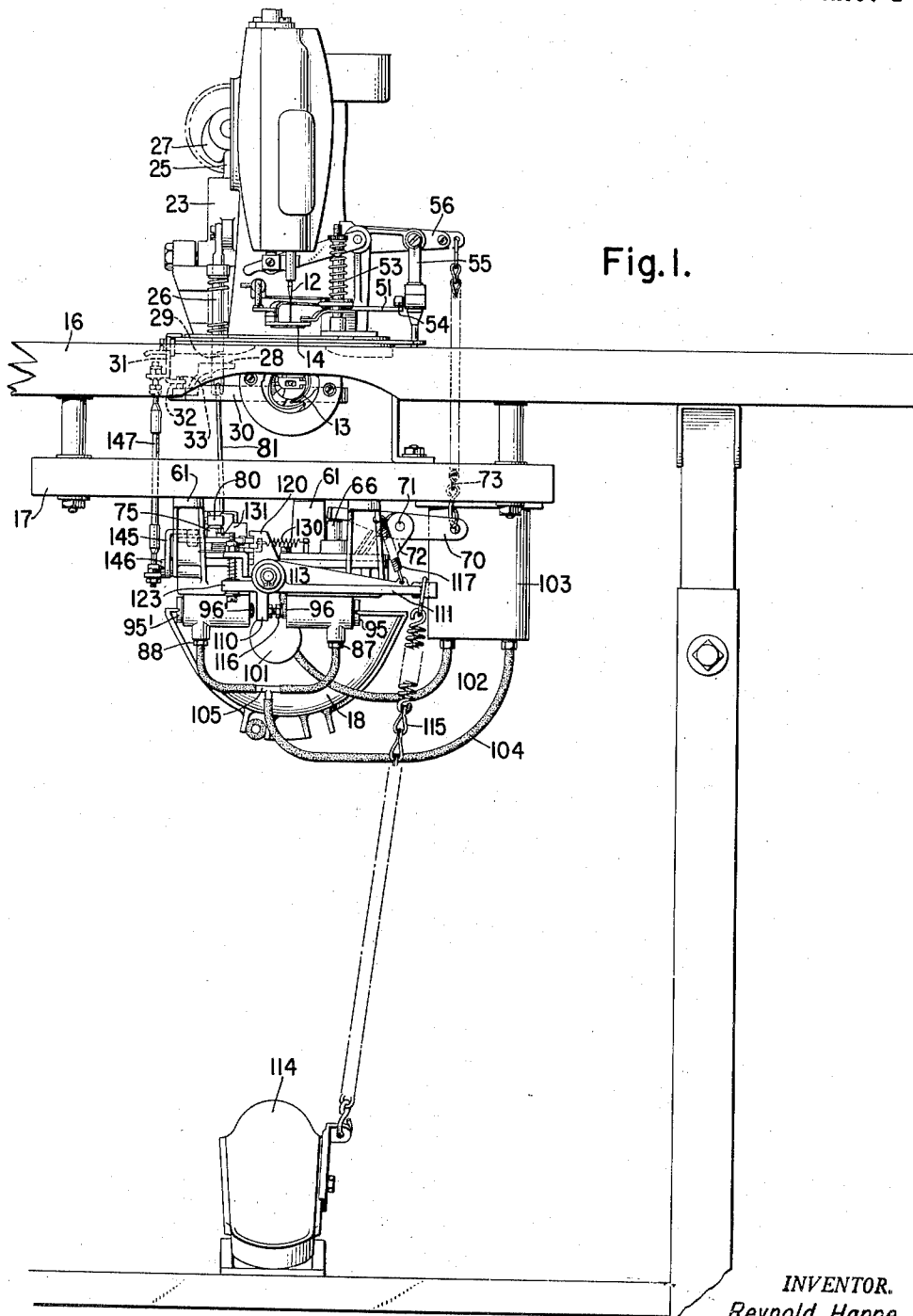


Fig. 1.

WITNESS
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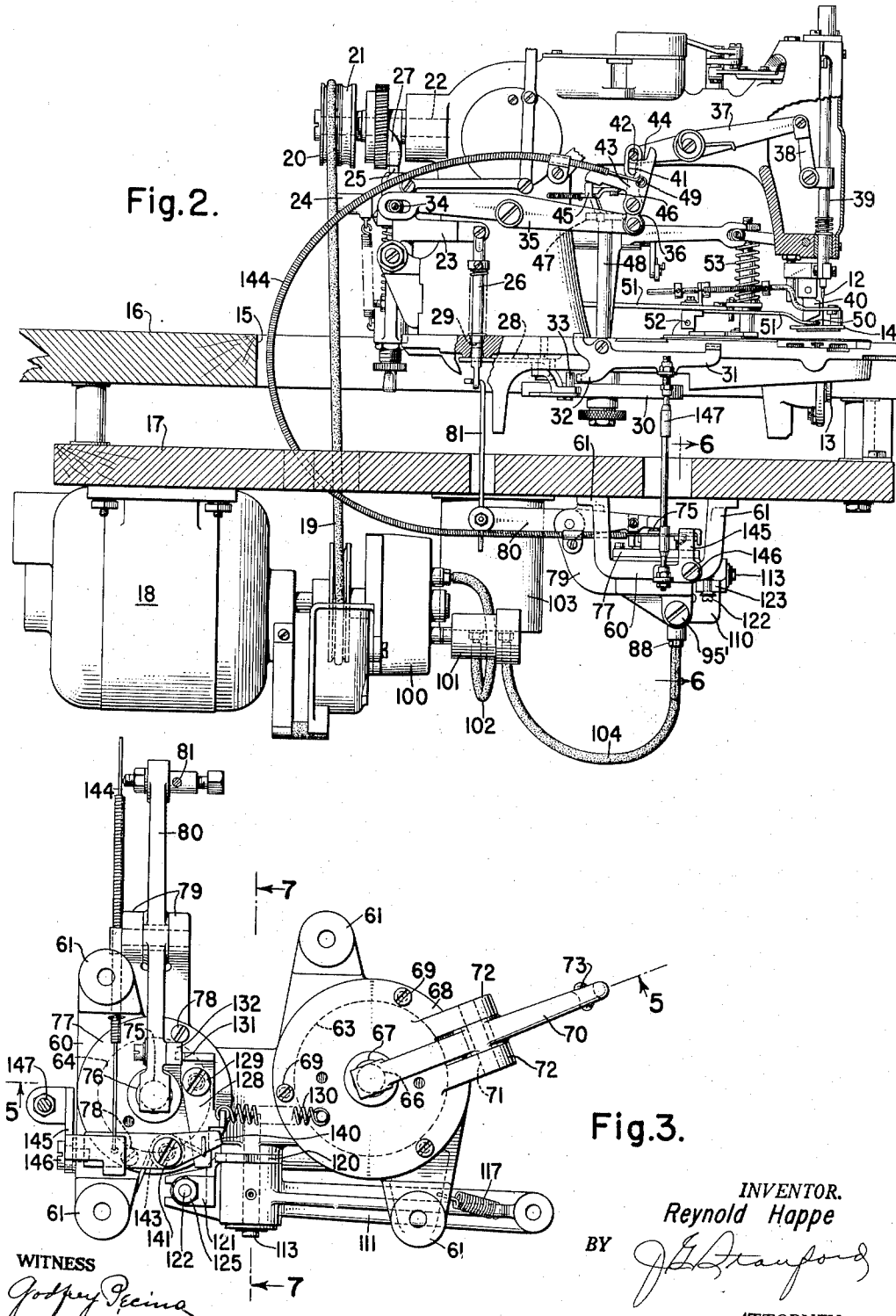
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4 Sheets-Sheet 3

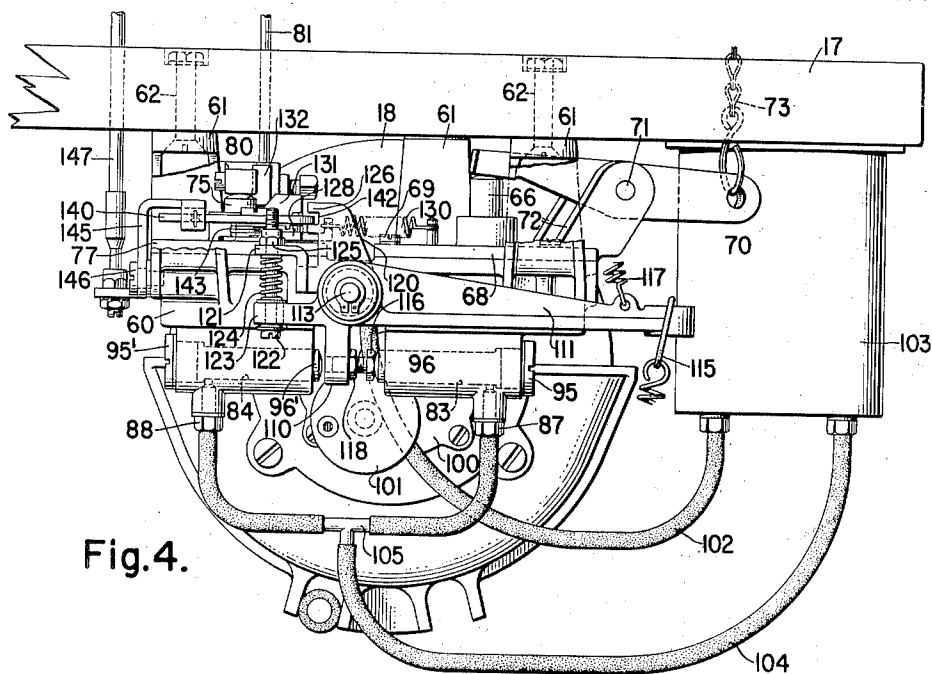


Fig. 4.

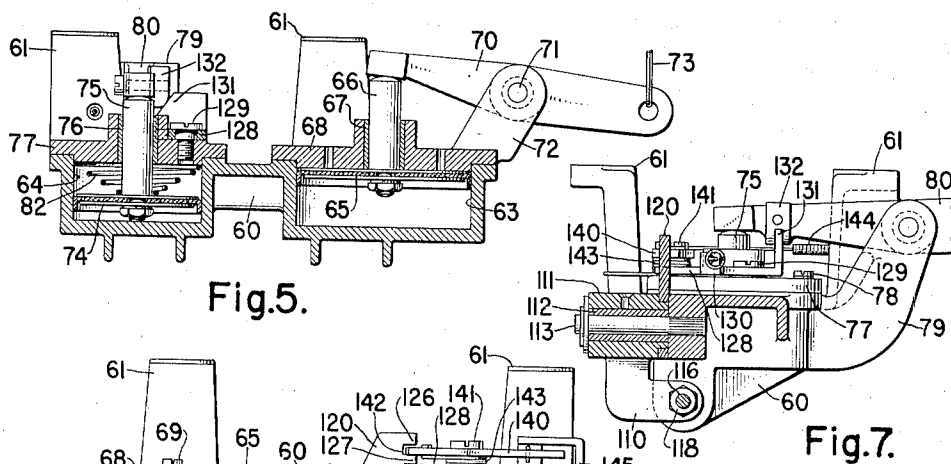


Fig. 5.

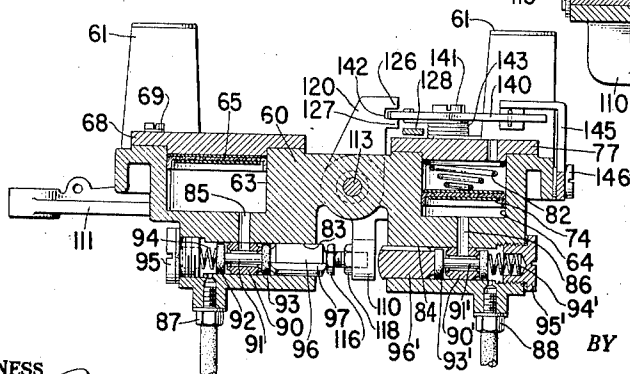


Fig. 6.

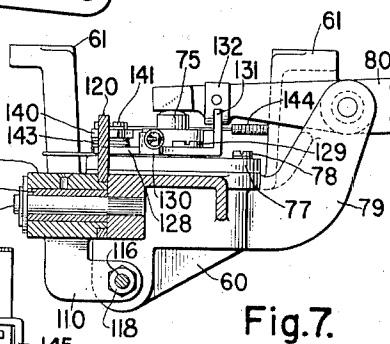


Fig. 7.

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4 Sheets-Sheet 4

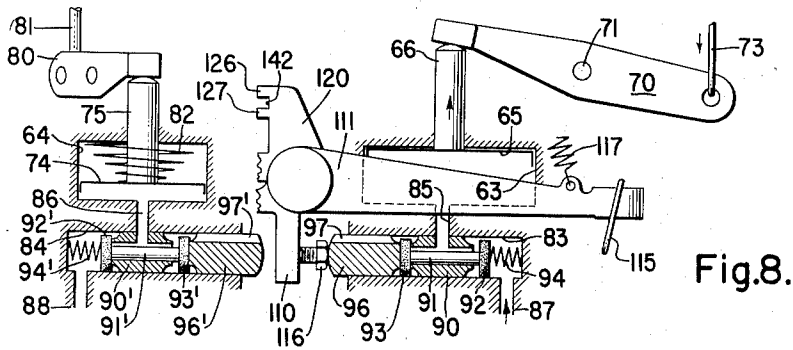


Fig. 8.

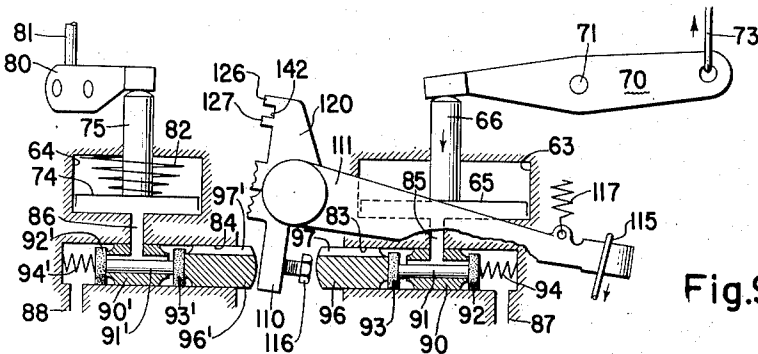
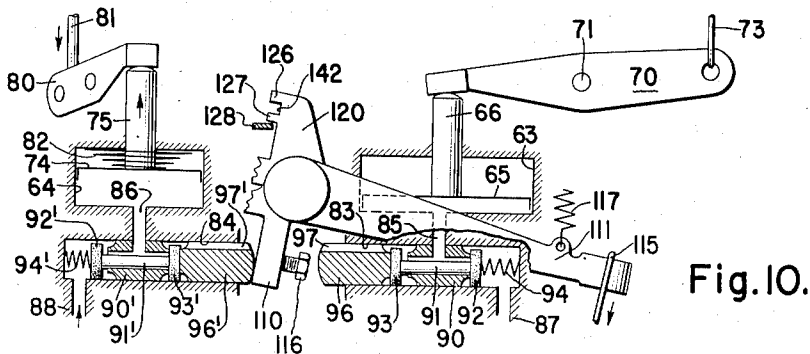


Fig. 9.



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2,764,112

POWER OPERATED CONTROL UNITS FOR SEWING MACHINES

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Application April 26, 1954, Serial No. 425,683

16 Claims. (Cl. 112—67)

This invention relates to sewing machines, and more particularly, to a power operated means for manipulating the controls of a sewing machine.

It is an object of this invention to provide means for minimizing operator fatigue and for increasing the production and the quality of work which may be produced by the sewing machine operator by the provision of a power operated mechanism for controlling the sewing machine operation.

It is also an object to provide a power operated unit which is adapted to supply the effort needed to control not only the operation of the stitch-forming instrumentalities but also to control the operation of various mechanisms and devices which are appurtenant to the stitch-forming instrumentalities.

A further object of this invention is the provision of a fluid pressure operated unit for supplying the effort necessary to manipulate the controls of a sewing machine. Moreover, it is an object to provide a pressure operated control unit of the above character which is highly efficient in its use of compressed fluid and which may be operated successfully from a compressor which is driven by the usual sewing machine driving motor.

Still another object of this invention is the provision of a power operated control unit in the nature of an attachment to a sewing machine; this control unit attachment being so constructed and arranged that it may be installed and removed conveniently and with no modification or adjustment being required of the sewing machine.

With the above and other objects and advantages in view as will hereinafter appear, this invention comprises the devices, combinations, and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

Fig. 1 is a front elevational view of a portion of a sewing machine together with the supporting table therefor, and having the power operated control unit of this invention applied thereto with the parts being illustrated in the positions occupied when the sewing machine is stopped and the work clamp is open;

Fig. 2 is an enlarged side elevational view of the sewing machine and power operated control unit including control connections to the knife actuating mechanism from the power control unit which were omitted in Fig. 1 to more clearly illustrate the remaining mechanism;

Fig. 3 represents a top plan view of the power control unit;

Fig. 4 is an enlarged front elevational view of the control unit of Fig. 1;

Fig. 5 represents a cross-sectional view of the power operated control unit taken substantially along line 5—5 of Fig. 3;

Fig. 6 represents a cross-sectional view of the power operated control unit taken substantially along line 6—6 of Fig. 2;

Fig. 7 represents a cross-sectional view of the power operated control unit taken substantially along line 7—7 of Fig. 3; and

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Figs. 8, 9, 10 and 11 represent diagrammatic front elevational views of the power control unit and illustrate the sequence of operation of the power control unit during a typical cycle of sewing machine operation.

Referring more particularly to Figs. 1 and 2 of the drawings, a preferred form of my invention is illustrated as it is applied to a group-stitch sewing machine.

The sewing machine, which is illustrated in the accompanying drawings, is constructed substantially in accordance with the disclosure of the U. S. patent of Wood No. 1,839,823, Jan. 5, 1932, to which reference may be had for a more complete disclosure of the sewing machine construction. The sewing machine is especially adapted to form stitches about the edges of a buttonhole and to that end it is provided with a laterally jogging and endwise reciprocating needle 12 which cooperates with a conventional shuttle 13 to form zigzag stitches. By means of a shiftable work clamp 14, the work is moved with respect to the needle so that the zigzag stitches are arranged in two spaced rows, one row along each side of the space which will ultimately be severed to provide the buttonhole aperture.

Generally, the power operated control unit of the selected embodiment shown in the accompanying drawings acts to perform two principal functions, first, it is operatively connected either to open the work clamp 14 so as to release the material in which the stitches have been formed, or to permit the work clamp to close as when a fresh piece of material is ready to be clamped in place beneath the needle. The second function of the control unit in the present embodiment is to shift the actuating mechanism of the sewing machine into operating or running position each time it is desired that a new cycle of stitch formation should begin. The present control unit, as will be described in detail below, also includes means whereby the sequence of actuation of the various mechanisms which are controlled by this unit may be predetermined, as for instance, to insure that the work clamp is closed before the stitching mechanism of the sewing machine is started, and to prevent the work clamp from opening prior to completion of the stitching. The control unit of the present invention is also provided with means for preventing actuation of certain mechanisms on the sewing machine as, for instance, for preventing opening of the work clamp at the end of the stitching cycle in the event that defective stitches should be made during the stitching cycle. If, for instance, the needle or the sewing thread should break, it is desirable for the work clamp to remain closed so that the alignment of the material being stitched will not be disturbed and the buttonhole may be restitched by the machine, thus obviating costly repair of the garment by hand operations.

Before a detailed description is made of the control unit, the salient features of the sewing machine will be discussed briefly, and particularly those sewing machine parts and mechanisms with which the present control unit operates.

The sewing machine is mounted in a cut-out 15 of the table-top 16 beneath which is secured an auxiliary platform 17 from one side of which depends an electric motor 18. By means of a belt 19, the motor 18 serves to rotate either a loose pulley 20 or a pulley 21 fast on a main shaft 22 of the sewing machine. The sewing machine is rendered group-stitch or cyclic in nature by virtue of a stop-motion mechanism comprising a frame 23 which is pivoted to the sewing machine and which carries both a belt-shifting arm 24 and a spring loaded stop-plunger 25. As will be evident from Fig. 2, movement of the frame 23 in a clockwise direction by depression of a pull-rod 26, will shift the stop-plunger 25 out of engagement with a stop-cam 27 carried on the main shaft 22, thus freeing the main shaft for rotation. Depression of pull-rod 26

will at the same time carry the belt-shifting arm 24 to the right, thus moving the belt onto the fast pulley 21 and establishing a power driving connection between the motor 18 and the main shaft 22. A latch lever 28 on the sewing machine engages a notch 29 in the pull-rod 26 and maintains the stop-motion mechanism in running position. The number of stitches which the machine will make each time the stop-motion mechanism is shifted into running position depends upon the speed ratio at which a pattern cam 30 is actuated. A trip lug (not shown) on the periphery of the pattern cam 30 serves after one revolution of the pattern cam to engage and shift the latch lever 28 out of the notch 29 in the pull-rod 26. When the pull-rod is released, the frame 23 moves in a counterclockwise direction as viewed in Fig. 2, thus carrying the belt-shifting arm 24 to the left, shifting the belt onto the loose pulley 20, and carrying the stop-plunger 25 into engagement with the stop-cam 27, thus stopping the sewing machine.

The sewing machine may also be stopped at any point during the cycle by means of a manually operable lever 31 which is pivoted to the side of the sewing machine and which is formed with an arm 32 adapted to engage an upstanding pin 33 carried by the latch lever 28. Movement of lever 31, therefore, manually trips the latch lever 28 out of the notch 29 in the pull-rod 26 and stops the sewing machine in the same manner as that described in the preceding paragraph.

The sewing machine illustrated in the drawings is of the type having a buttonhole cutting mechanism which is designed to cut after the stitches of the buttonhole tack have been completed. The buttonhole cutting mechanism has been omitted from Fig. 1 to illustrate better the stop-motion mechanism, however, the cutting mechanism is clearly shown in Fig. 2. The cutting mechanism is actuated by a roller 34 which is attached to the stop-plunger 25 of the stop-motion device. When the stop-motion device is shifted into operative or stop position, the action of the stop-cam 27 upon the stop-plunger 25 is first to force the plunger downwardly against the spring with which it is upwardly biased and then to provide a positive stop position for the plunger. The downward movement of the stop-plunger 25 and the roller 34 just prior to the end of each cycle of stitch formation is harnessed by means of a lever 35, a link 36, a lever 37, a link 38, and a cutter bar 39 to actuate a buttonhole cutting blade 40. The link 36 in the train of cutter actuating mechanism is slotted as at 41 slidably to accommodate a pin 42 carried by lever 37. Pivoted to link 36 is a latch lever 43 which is formed with a shoulder 44 adapted to engage under the pin 42. Thus, when the latch lever 43 is turned in a clockwise direction, as shown in Fig. 2, the pin 42 may play freely in the slot 41 and the cutter actuating mechanism will be rendered inoperative. As discussed in greater detail in the U. S. patent of Corral et al., No. 1,936,381, Nov. 21, 1933, to which reference may be had for a more complete explanation, means are incorporated in the sewing machine for shifting the latch lever 43 to the extreme clockwise and inoperative position illustrated in Fig. 2 during all but the last few stitches of each stitch group. The purpose of this mechanism, of course, is to prevent accidental actuation of the knife before the stitching has been completed. To this end, the latch lever 43 is engaged and held in inoperative position during substantially all of each cycle of machine operation by a trip lever 45 which is pivoted as at 46 to a frame extension, and which is disposed in contact with the periphery of a small cam 47 carried by a cam shaft 48 to which the pattern cam 30 is secured. The small cam 47 is formed with a projection (not shown) which acts to shift the trip lever 45 free of the latch lever 43 for a short interval just prior to the end of each cycle of machine operation. The latch lever 43 is also provided with a laterally projecting pin 49 in the nature of a handle by which the lever may be manually held in inoperative position. Thus the cam 47 and the trip lever 45 serve to pre-

vent the knife from being actuated until the end of the stitching cycle and by means of the pin 49, the knife may be prevented from cutting at the end of the cycle.

As best illustrated in Figs. 1 and 2, the work clamp 14 of the sewing machine includes an upper clamp jaw 50 which is carried by a lever 51 pivoted at 52 to the base of the clamp. The clamp jaw 50 is normally biased into cloth gripping position by a spring 53 which engages the lever 51. The lever 51 is also engaged by a roller 54 carried by a link 55 which depends from one arm of a conventional clamp opening lever 56 that is pivoted on the sewing machine.

The preceding description will identify the buttonhole sewing machine of the drawings as one which was originally designed to be controlled or operated by means of two foot treadles or knee shifts, i. e., one treadle being connected with the stop-motion pull-rod 26, and the other treadle to the clamp opening lever 56. The power control unit of the present invention is adapted to replace these treadles or knee shifts and to provide a source of power suitable for operating the stop-motion pull-rod 26 and the clamp opening lever 56 in proper sequence and in response to movement of a single operating member.

The power control unit of this invention comprises, in the preferred embodiment, a one piece body portion 60 preferably in the form of a casting provided with four upturned supporting arms 61 by which the unit may be suspended beneath the platform 17 as by fastening bolts 62. The body portion 60 is formed with two upwardly open cylindrical bores 63 and 64, which provide separate air cylinders or air motors for the operation of the work clamp opening lever 56 and the stop-motion mechanism pull-rod 26, respectively.

The bore 63 is adapted to accommodate a piston 65 secured to a piston rod 66 slidable in a bushing 67 carried by a cylinder head 68 which closes the bore 63 and which is secured to the body portion 60 by fastening screws 69. The piston rod 66 is arranged to engage beneath one extremity of a lever 70 which is fulcrumed on a pin 71 carried in spaced upstanding lugs 72—72 which project from the cylinder head 68. A chain 73 is used operatively to connect the lever 70 with the clamp opening lever 56 on the sewing machine.

The bore 64 is similarly fitted with a piston 74 which is carried by a piston rod 75 that is slidable in a bushing 76 carried by a cylinder head 77 which closes the bore 64 and is secured to the body portion 60 as by fastening screws 78. Pivoted in a bracket 79 extending from the body portion 60 of the control unit is a lever 80 which at one end overhangs the piston rod 75, and which at the other end is operatively connected by a connector rod 81 to the pull-rod 26 of the stop-motion mechanism. Means, in the form of a coil spring 82, is disposed within the air cylinder 64 between the cylinder head 77 and the piston 74 to bias the piston downwardly in the cylinder.

The body portion 60 of the power control unit is formed beneath each of the air cylinders 63, 64 with a valve accommodating bore 83, 84, respectively. The valve bore 83 and the air cylinder 63 are interconnected by a port 85, while a port 86 joins the air cylinder 64 with the valve bore 84. The body portion 60 is provided with hose clamps 87 and 88 which lead, respectively, to the valve bores 83 and 84. Since the valve mechanisms in each of the valve accommodating bores 83, 84 are identical, only that which is arranged in the bore 83 beneath the air cylinder 63 will be described. The counterparts appearing in the valve which is disposed in the bore 84 will be indicated on the drawing by prime numbers.

Fixed within the valve accommodating bore 83, as by a forced fit therein, is a sleeve 90 (Fig. 6) which is formed at each end with a valve seat and which is axially bored loosely to accommodate a stem 91 which is slightly longer than the sleeve 90. The stem 91 and the sleeve

90 are arranged between two neoprene washers 92 and 93, the washer 92 being biased toward the sleeve 90 by a coil spring 94 disposed between the washer 92 and a plug 95 which closes one end of the valve accommodating bore 83. The washer 93 is engaged by a cylindrical slide block 96 which extends out of the bore 83 and is grooved lengthwise as at 97 to provide a vent to the atmosphere. Since the stem 91 is longer than the sleeve 90, only one of the washers 92, 93 may be disposed against its respective valve seat on the sleeve 90 at any one time. The coil spring 94 normally biases washer 92 against its valve seat and thereby blocks the passage of air from the hose clamp 87 to the air cylinder 63, and opens the air cylinder 63 to the atmosphere by way of the vent grooves 97 in the slide block 96. When the slide block is forced into the bore 83, however, washer 93 is moved against its respective valve seat on the sleeve 90, thereby sealing off the air cylinder 63 from the atmosphere, and the washer 92 is shifted away from its valve seat through the stem 91, thereby opening a passageway between the hose clamp 87 and the air cylinder 63.

The operation of the power control unit requires a continuous supply of air under pressure. This may be obtained from a supply line, if such is convenient, but in the preferred embodiment, the air is supplied by a rotary pump best indicated at 100 in Fig. 2. This air pump is of the type adapted to be carried by and driven from the electric motor 18 by which the stitch-forming instrumentalities are actuated. This air pump is illustrated and described in greater detail in my pending U. S. patent application Serial No. 134,958, filed December 24, 1949, now Patent No. 2,721,692; and to which reference may be had for a more detailed description thereof. The present pump 100 differs from that disclosed in the above mentioned application primarily in that this pump is carried by a motor which does not have a friction clutch associated therewith, and as a result, the pump will be operated continuously with the motor 18.

At 101, a filter is indicated on the air pump intake. A flexible hose 102 is used to connect the pump discharge with a storage reservoir 103 which, in turn, is connected by means of a flexible hose 104, through a branched connection 105 to both hose clamps 87 and 88, one associated with the valve of each of the two air cylinders 63, 64 of the power control unit.

The slide blocks or plungers 96, 96' which regulate the flow of air under pressure from the pump 100 to the air cylinders 64 and 63, respectively, are controlled by a depending arm 110 of a control lever 111 which is fitted with a bushing 112 journaled on a pivot pin 113 projecting from the body portion 60 of the power control unit. As best shown in Figs. 1 and 4, the depending arm 110 is adapted to engage and to operate the plunger 96' whenever the lever 111 is moved in a clockwise direction, as under the influence of a foot treadle 114 by means of a chain 115. The depending arm 110 is provided with a bolt 116 of which the head is adapted to engage the plunger 96 when the lever 111 is moved in a counterclockwise direction, as when the lever is being returned under the influence of a return spring 117. By means of a lock nut 118, the bolt 116 may be adjusted on the arm 110 to regulate the clearance or lost motion between the arm 110 and the opposed slide-blocks 96 and 96'.

As best illustrated in Figs. 3 and 7, a locking arm 120 is journaled on the control lever 111 concentrically of the bushing 112 and the pivot pin 113. A lateral projection 121 of the locking arm 120 serves to secure the locking arm adjustably to the lever 111. This adjustable connection is provided by means of a bolt 122 which is arranged between the lateral projection 121 of the locking arm 120 and a lug 123 which extends from the control lever 111. A coil spring 124 which is disposed in compression between the lug 123 and the projection 121

serves to urge the projection 121 firmly against a nut 125 on the bolt 122. Adjustment of the nut along the bolt 122, therefore, provides for angular adjustment of the locking arm 120 with respect to the control lever 111.

The locking arm 120 is formed, as is shown in Figs. 4, 6 and 8 to 11, with vertically spaced and horizontally extending projections 126 and 127 by virtue of which the arm 120 provides for three separate interlocks any one of which may prevent the locking arm 120 and consequently the control lever 111 from returning to a normal at-rest position.

The first of the interlocks is provided by means of a lever 128 which is pivoted at 129 to the air cylinder head 77 and which is biased by means of a spring 130 toward the locking arm 120. The lever 128 is formed with an upturned follower-edge 131 which, as is shown in Figs. 3 and 7, underlies a cam lug 132 which extends from the stop-motion control lever 80. The lever 128 has an interlocking position, as shown in Figs. 10 and 11, beneath the lower projection 127 of the locking arm 120 so as to prevent the locking arm 120 and the control lever 111 from returning to normal position, however, the stop-motion control lever 80 regulates the position of lever 128 by virtue of the cam lug 132 and the cam follower edge 131 on lever 128. These parts are formed as shown in the drawings so that lever 128 is free to be urged by its spring 130 to interlocked position beneath the lower projection 127 only when the stop-motion control lever 80 is in the operative or running position, illustrated in Figs. 10 and 11, and the projecting cam lug 132 is raised above the follower-edge 131. By this construction, the clamp will be locked in closed position during operation of the sewing machine.

When the stop-motion mechanism of the sewing machine moves into stopped position, the push rods 26 and 81 serve to turn the lever 80 into the position illustrated in Figs. 8 and 9 in which the cam lug 132 carried by lever 80 will act upon the follower edge 131 to shift the lever 128 free of the locking arm 120 and thus to free the lever 111 so that it may operate the clamp-lifting valve.

A second interlock is provided by means of a lever 140 which is pivoted at 141 to the cylinder head 77 and which is adapted to work in a slot 142 defined between the projections 126 and 127 of the locking arm 120. A spring 143 arranged between the body portion 60 of the power control unit and the lever 140 serves to bias the lever 140 to a position out of the slot 142. The position of the lever 140, however, is controlled by the latch lever 43 of the knife actuating mechanism on the sewing machine through the agency of a Bowden wire cable 144. The cable 144 is adjusted such that the lever 140 will be turned to a position within the slot 142 of the locking arm 120 whenever the latch lever 43 is manually turned into inoperative position by means of the finger grip pin 49. With this arrangement, the work clamp will be locked in closed position whenever the knife actuating mechanism is held out of operative position when the machine stops.

The third interlock also involves the lever 140 but instead of the Bowden wire cable 144, a bell crank lever 145 which is pivoted to the power control unit body portion as at 146 is utilized to shift the lever 140 into the slot 142 of the locking arm 120. The bell crank lever 145 is operated by means of a rod 147 from the manual stop lever 31 on the sewing machine.

By these three interlocks, therefore, the work clamp is automatically locked in closed position whenever the sewing machine is operating, whenever the knife actuating mechanism is prevented from operating, and whenever the machine is stopped manually prior to the completion of the normal stitching cycle.

With the above described safety interlocks in mind, the operation of the power control unit of this invention will be clearly indicated by a comparison of Figs. 8, 9, 10 and 11.

In Fig. 8 the parts of the power control unit are illustrated in the positions occupied when the sewing machine is stopped and the work clamp is open. The control lever 111 and its depending arm 110 is turned under the influence of the return spring 117, and the bolt 116 engages the slide block 96 so that air pressure is admitted to the cylinder 63 to hold the clamp open. The depending arm 110 is out of engagement with the slide block 96' so that the coil spring 94' acts to shift the neoprene washer 92' against the valve seat on the sleeve 90' thus shutting off the air pressure from the stop-motion controlling cylinder 64. Since the machine is stopped, the connector rod 81 will force the stop-motion control lever 80 into the position shown.

Fig. 9 illustrates the position of the parts of the power control unit when the control lever 111 has been turned into its mid-position in which both slide blocks 96 and 96' are disengaged. In this position, both the valves will close the air supply from the cylinders 63 and 64 so that the work clamp will close under the influence of its spring 53 (see Figs. 1 and 2) but the stop-motion mechanism will remain in stopped position as in Fig. 8. It will be understood that the operator may, therefore, open and close the work clamp at will, as for instance, to correct an undesirable positioning of the work in the clamp, provided that the control lever 111 is not turned beyond the position shown in Fig. 9.

When the control lever is turned beyond the position of Fig. 9 to that shown in Fig. 10 the slide block 96' is engaged by the depending arm 110 of the lever 111 and air is admitted to cylinder 64 to actuate the stop-motion control lever 80 which initiates the cycle of sewing machine operation. As the stop motion control lever 80 is lifted by piston rod 75 and with it the cam lug 132, the lever 128 is free to move under the action of spring 130 to a position beneath the projection 127 of the locking arm 120.

Thus, after the control lever has been in the position illustrated in Fig. 10 to start the sewing machine, the operator may release the foot treadle 114 and the projection 127 of the lever 111 will be engaged by the latch lever 128 so as to prevent the complete return of the lever 111. The lever 111 is preferably latched in the position shown in Fig. 11 in which neither slide block 96 nor 96' is operatively engaged thereby. It will be understood that a fine adjustment may be obtained of the position of lever 111 while under the influence of the safety interlock of latch lever 128 by means of the nut 125 which acts to adjust the locking arm 120 angularly with respect to the control lever 111.

It will also be appreciated that at any time during the operation of the machine the safety interlock lever 140 may be shifted into operative position in the notch 142 of the locking arm 120 to prevent the clamp from being opened. The lever 140 may be brought into play either by manually shifting the buttonhole cutter latch lever 43 by means of the pin 49, or by manually depressing the stop lever 31 on the sewing machine.

The control lever 111, therefore, will not be released and permitted to return to the position of Fig. 8 in which the clamp will be raised, until the cycle of machine operation has been completed successfully, i. e., the stitching has been completed, nor until the manually operable safety interlocks, i. e., pin 49 or stop lever 31 are released.

This invention thus provides a unit by which practically effortless manipulation of a single lever serves to control a plurality of instrumentalities incident to the operation of a sewing machine. The power control unit of this invention also insures that a proper sequence of sewing machine operation will occur thereby minimizing defective production while increasing the output of the sewing machine.

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

1. In a sewing machine having stitch-forming instru-

mentalities, a work clamp, driving mechanism for said stitch-forming instrumentalities, a stop-motion mechanism of the type adapted to render said driving mechanism ineffective upon the formation of a predetermined number of stitch-forming cycles, and stop-motion control means effective to re-establish operative relation between said driving mechanism and said stitch-forming instrumentalities, a single operator influenced lever movable from an inoperative position to an operative position in engagement with said stop motion control means and effective in said position of engagement to render said stop motion control means operative, work clamp opening means comprising a fluid pressure operated motor operatively associated with said clamp, a fluid pressure source, a valve adapted to control the delivery of fluid under pressure from said fluid pressure source to said motor, and valve control means arranged for operative engagement with said single operator influenced lever when the lever is disposed between said inoperative position and said position of engagement with said stop motion control means.

2. In a sewing machine having stitch-forming instrumentalities, a work clamp, driving mechanism for said stitch-forming instrumentalities, a stop-motion mechanism of the type adapted to render said driving mechanism ineffective upon the formation of a predetermined number of stitch-forming cycles, and stop-motion control means effective to re-establish operative relation between said driving mechanism and said stitch-forming instrumentalities, said stop-motion control means including a manually operable stop-motion control member, work clamp opening means comprising a fluid pressure operated motor operatively connected to open said clamp, a fluid pressure source, valve means associated with said motor and adapted to control the delivery of fluid under pressure from said fluid pressure source to said motor, and valve regulating means carried by said manually operable stop-motion control member.

3. In a sewing machine having stitch-forming instrumentalities, a work clamp, driving mechanism for said stitch-forming instrumentalities, a stop-motion mechanism, a first stop-motion control means for rendering said stop-motion mechanism effective, and a second stop-motion control means effective to re-establish operative relation between said driving mechanism and said stitch-forming instrumentalities, work clamp opening means comprising a fluid pressure operated motor operatively connected to open said clamp, a fluid pressure source, a valve adapted to control the delivery of fluid under pressure from said fluid pressure source to said motor, means under control of said second stop-motion control means for closing said valve, and means under control of said first stop-motion control means for locking said valve in closed position until said stop-motion mechanism is rendered effective.

4. In a sewing machine having stitch-forming instrumentalities, a work clamp, driving mechanism for said stitch-forming instrumentalities, a stop-motion mechanism, a first stop-motion control means for rendering said stop-motion mechanism effective, and a second stop-motion control means including a manually shiftable stop-motion control member for re-establishing operative relation between said driving mechanism and said stitch-forming instrumentalities, work clamp opening means comprising a fluid pressure operated motor operatively connected to open said clamp, a fluid pressure source, a valve adapted to control the delivery of fluid under pressure from said fluid pressure source to said motor, valve, regulating means carried by said manually shiftable stop-motion control member and disposed to effect closing of said valve when said manually shiftable stop-motion control member is shifted to re-establish operative relation between said driving mechanism and said stitch-forming instrumentalities, latch mechanism effective to prevent said valve-regulating means from reopening said valve,

and means under control of said first stop-motion control means for releasing said latch mechanism upon operation of said first stop-motion control means.

5. A power control unit for a cyclically operated sewing machine having stitch-forming instrumentalities, a stop-motion mechanism for said instrumentalities, and a work clamp, said power control unit comprising a frame, stop-motion operating mechanism carried by said frame and operatively connected with said stop motion mechanism, a control member shiftably supported on said frame, said control member being arranged for operative engagement with said stop-motion operating mechanism, means under control of the sewing machine operator for shifting said control member, fluid pressure operated work clamp controlling means, a valve carried by said frame and adapted to regulate said clamp controlling means, and valve operating means carried by said control member.

6. An automatic clamp-lifting attachment for a cyclically operated group stitching machine having a stop-motion mechanism including a shiftable stop-motion control member, a work-holding clamp and a manual clamp-lifting mechanism, said attachment comprising a frame adapted to be secured to said stitching machine, a fluid motor of the expansible chamber type carried by said frame, means operably connecting said motor and said manual clamp-lifting mechanism, valve means carried by said frame and adapted to control the fluid pressure delivered to said motor, and valve regulating cam means carried by said shiftable stop-motion control member and disposed for engagement with said valve means.

7. In a cyclically operated group stitching machine having stitch-forming instrumentalities, a work clamp having opposed work-gripping jaws and a stop-motion mechanism, a manually shiftable stop-motion control member adapted to disengage said stop-motion mechanism to initiate a stitching cycle, means for moving one of said work-clamp jaws relative to the other said means comprising a fluid motor operatively connected with one of said jaws, a valve associated with said motor and adapted to control the admission of fluid under pressure thereto, a valve regulating means carried for movement with said stop-motion control member and adapted to disengage and close said valve as the stop-motion mechanism is disengaged, latch means adapted to maintain said valve regulating means out of operative engagement with said valve, and latch release means effective upon operation of said stop-motion mechanism.

8. A power control unit for a cyclically operated sewing machine having stitch-forming instrumentalities, a stop-motion mechanism for said instrumentalities, and a work clamp having opposed work-engaging jaws, said power control unit comprising a frame adapted to be secured adjacent to said sewing machine, a fluid pressure operated motor carried by said frame, operative connections between said motor and one of said work clamp jaws, a valve carried by said frame, said valve being operable to admit fluid under pressure to said motor, a valve control member shiftably secured to said frame, means under control of the sewing machine operator for manually shifting said valve control member in one direction with respect to said valve, means yieldingly biasing said valve control member in the opposite direction with respect to said valve, latch means maintaining said control member in said manually shifted position, latch release mechanism associated with said sewing machine and effective upon completion of a cycle of operation thereof.

9. In a group-stitch sewing machine having a work clamp, means biasing said work clamp into closed work gripping position, stitch-forming mechanism, stop-motion mechanism, and means controlled by the stitch-forming mechanism after a predetermined number of stitch-forming cycles have been made for rendering said stop-motion mechanism effective to lock said stitch-forming mechanism in stopped position, a power operated control

unit for said sewing machine comprising, a first motor effective to open said work clamp in opposition to said work clamp biasing means, a second motor effective to shift said stop-motion mechanism out of locking relation with said stitch-forming mechanism, means associated with each of said motors for controlling the operation thereof, a manually shiftable regulating member for said motor controlling means, and means under control of said stop-motion mechanism for rendering said manually shiftable regulating member ineffective to actuate the means for controlling the operation of said work clamp opening motor while the stitch-forming mechanism is being operated.

10. A power control unit for a sewing machine having associated therewith a stop-motion mechanism and a device adapted to be operated only when the sewing machine is at rest, said power control unit comprising, a pair of motors of which a first is adapted to operate said device and a second is adapted to shift said stop-motion mechanism into running position, a single shiftable control member for said pair of motors, said mechanism having a first position in which said first motor is rendered effective and a second position in which said second motor is rendered effective, means under manual control of the sewing machine operator for regulating the movement of said control member from said first to said second position, and means under control of said stop-motion mechanism for regulating the movement of said control member from said second to said first position.

11. A power control unit for a sewing machine having associated therewith a stop-motion mechanism and a device adapted to be operated only when the sewing machine is at rest, said power control unit comprising, a pair of motors of which a first is adapted to operate said device and a second is adapted to shift said stop-motion mechanism into running position, a shiftable control mechanism for said pair of motors, said mechanism including a member which is movable into a first position in which said first motor is rendered effective and a second position in which said second motor is rendered effective, and latch means under control of said stop-motion mechanism for preventing movement of said member into said first position during operation of said sewing machine.

12. A power control unit for a sewing machine having associated therewith a stop-motion mechanism and a device adapted to be operated only when the sewing machine is at rest, said power control unit comprising, a pair of fluid pressure operated motors of which a first is adapted to operate said device and a second is adapted to shift said stop-motion mechanism into running position, valve means associated with each of said motors for controlling the flow of fluid under pressure thereto, valve operating means under control of the sewing machine operator for operating a selected one of said pair of motors, and means effective when said stop-motion mechanism occupies a running position for preventing operation of the valve associated with said first motor.

13. A power control unit for a sewing machine having associated therewith a stop-motion mechanism and a device adapted to be operated only when the sewing machine is at rest, said power control unit comprising, a pair of fluid pressure operated motors of which a first is adapted to operate said device and a second is adapted to shift said stop-motion mechanism into running position, valve means associated with each of said motors for controlling the flow of fluid under pressure thereto, a manually operated lever pivoted on said unit for swinging movement into operative engagement with a selected one of said valve means, and latch means under control of said stop-motion mechanism for preventing movement of said lever into operative engagement with the valve associated with said first motor while the stop-motion mechanism occupies a running position.

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14. A power control unit for a sewing machine having a work clamp and a stop-motion device, said unit comprising a fluid pressure operated motor adapted to open said work clamp, valve means associated with said motor, a manual operating member being shiftable for manipulation of said valve means to open or reopen said work clamp, means under control of said operating member for disengaging said stop motion device to initiate operation of said sewing machine, and means associated with said stop-motion device for preventing movement of said operating member to manipulate said valve means during the operation of said sewing machine.

15. A power control unit for a sewing machine having a work clamp and a stop-motion device, said unit comprising a frame adapted to be supported in the nature of an attachment to said sewing machine, a work clamp opening motor carried by said frame, a motor controlling member supported on said frame for movement into an extreme position in which said motor is rendered operative to lift the work clamp, means biasing said motor controlling member into said extreme position, manually operable means for shifting said motor controlling member out of said extreme position, a first latch associated with said stop-motion device and effective to maintain said motor controlling member out of said extreme position while the sewing machine is operating, a second latch for maintaining the motor controlling member out of said extreme position, said second latch being manually operable for maintaining said motor controlling

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member out of said extreme position after the operation of the sewing machine has been stopped.

16. A power control unit for sewing machines comprising a frame, two fluid pressure operated motors carried by said frame, each of said motors comprising a cylinder associated with said frame, a piston slidable in said cylinder, a piston rod fixed to said piston, and an operating lever pivoted with respect to said frame and adapted at one extremity to bear against said piston rod, valve means associated with each of said motors for controlling the admission of fluid under pressure thereto, said valve means being of the normally closed type and each including a plunger member which serves when depressed to open said valve means, a manually operable valve actuating member movably mounted on said frame, said valve plunger members being arranged in opposed relation one with the other and disposed one on each side of said valve actuating member, and latch mechanism rendered effective by the movement into operative position of the operating lever of one of said motors for preventing said valve actuating member from moving into operative relation with the valve means of the other of said motors.

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