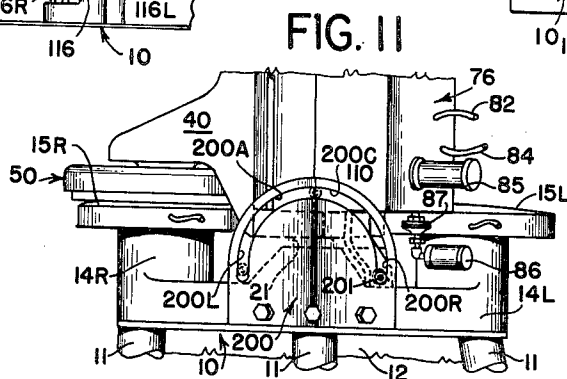
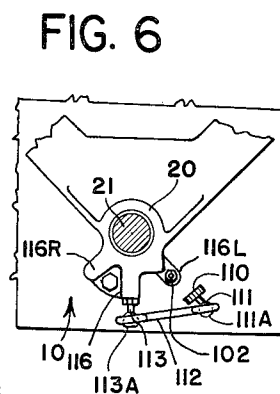
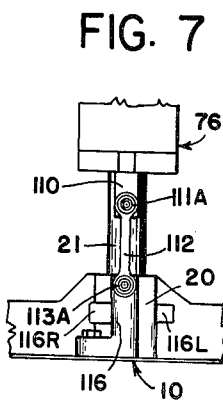
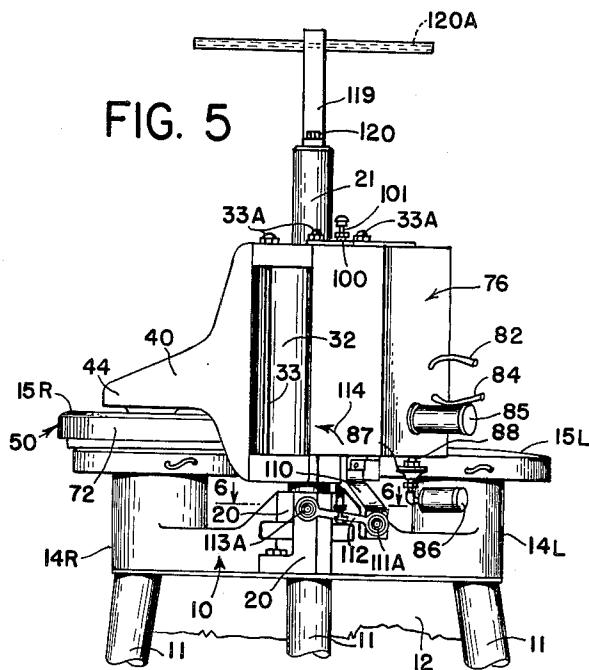


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May 22, 1962

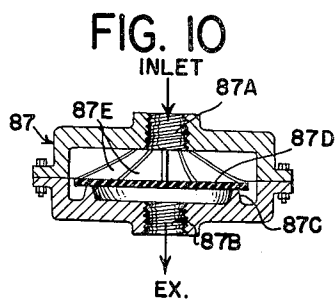
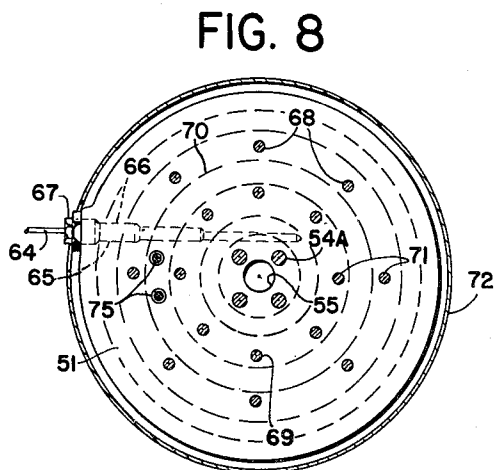
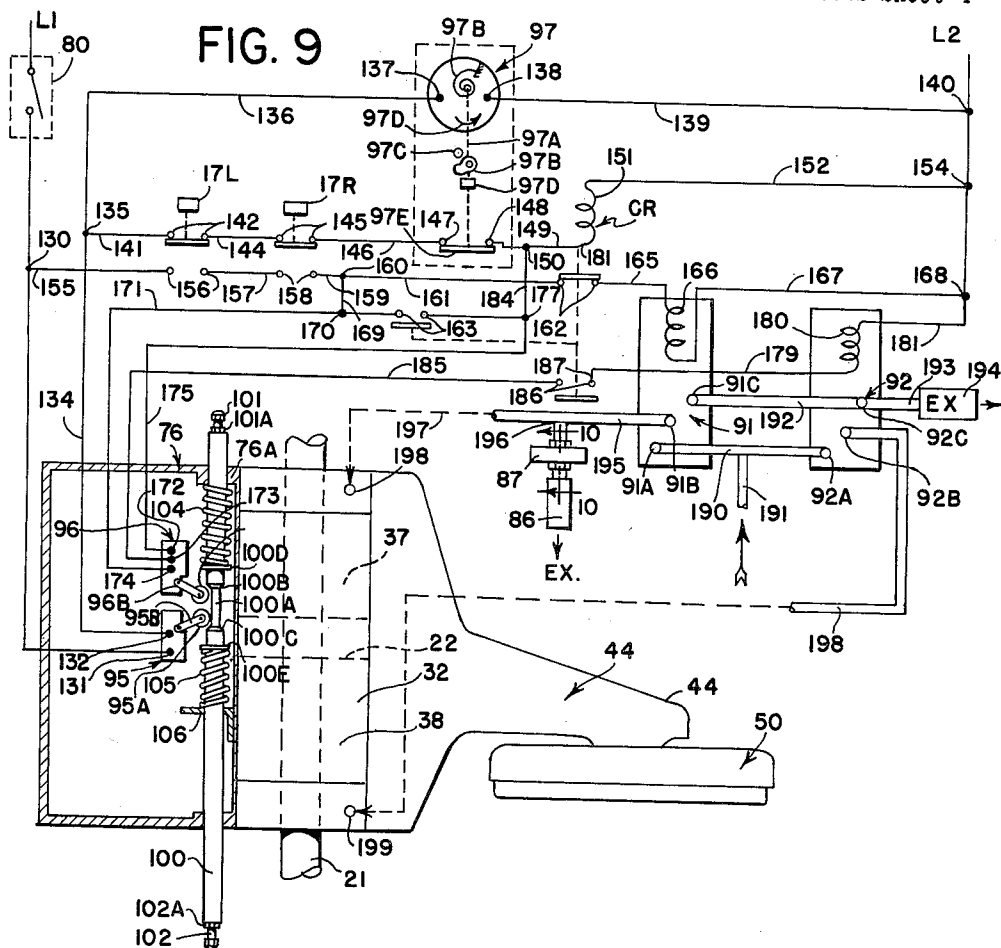
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3,035,510

HEAT SEAL MACHINE

Filed Sept. 29, 1959

4 Sheets-Sheet 4



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3,035,510

HEAT SEAL MACHINE

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10 Claims. (Cl. 100—93)

This invention relates to improvements in heat seal machines and more particularly to a machine of this character capable of being operated by unskilled help, safely, and yet at high speed. In many industrial applications, garments, bags, etc. become torn. Heretofore, the patching of such garments, bags, etc. has been accomplished by sewing a patch on the affected area. More recently there has become available suitable cloth for patching, the cloth being provided with an adhesive coating which in its normal condition is dry, but which is capable of being softened with heat. For applying a patch of this type to the garment, bag, etc., which is being patched, it is only necessary to cut off a patch of the requisite size, place it over the area which is affected, and apply heat and pressure thereto. This softens the adhesive so that the adhesive penetrates the cloth of the garment, bag, etc. which is being patched and makes the patch adhere tenaciously over the area being patched.

In order to achieve the best results in the use of a patching material of this type, it is essential that the patch be applied for a reasonably precise time, with pressure and with closely controlled temperature. In order that such patches may be applied economically, it is desirable to utilize relatively untrained help, and to apply the patches rapidly.

It is an object of the present invention to provide an improved heat seal machine by means of which adhesive type patches may be applied to torn surfaces of textile material with great rapidity, at low cost, and by the use of untrained and unskilled help. It is another object of the invention to provide an improved heat seal machine having ordinate operating positions so that while the heat sealing operation is being carried out in one position on one garment, the operator may make ready another garment at another position for patching. It is a further object of the invention to provide a heat sealing machine of utmost simplicity capable of being operated by unskilled help and yet with entire safety. It is another object of the invention to provide an improved heat sealing machine having a plurality of heating stations which are alternately engageable by heat sealing presser heads. It is a further object of the invention to provide an improved heat sealing machine having fully automatic controls and in which the machine is moved alternately and automatically from one station to another.

Other and further objects are those inherent in the invention herein illustrated, described and claimed and will be apparent as the description proceeds.

To the accomplishment of the foregoing and related end this invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative however of but a few of the various ways in which the principles of the invention may be employed.

The invention is illustrated with reference to the drawings wherein:

FIGURE 1 is a front elevational view of the apparatus of the invention;

FIGURE 2 is a side elevational view of the apparatus of the invention with the cover of the control box shown in the open position;

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FIGURE 3 is a plan view of the apparatus of the invention;

FIGURE 4 is a vertical sectional view taken along the line and in the direction of arrows 4—4 of FIGURE 3;

FIGURE 5 is a rear elevational view of the machine taken along the line and in the direction of arrows 5—5 of FIGURE 3;

FIGURE 6 is a fragmentary horizontal sectional view taken along the line and in the direction of arrows 6—6 of FIGURE 5;

FIGURE 7 is a fragmentary back elevational view of a portion of the apparatus in one position that it assumes during operation;

FIGURE 8 is a fragmentary horizontal sectional view of the top of the presser heads of the apparatus as taken along the line and in the direction of line 8—8 of FIGURE 4;

FIGURE 9 is a schematic diagram of the electrical and pneumatic circuits showing some of the mechanical portions of the apparatus schematically;

FIGURE 10 is a sectional view of the quick release valve taken along the line and in the direction of arrows 10—10 of FIGURE 9;

FIGURE 11 is a rear elevational view (corresponding to FIGURE 5) showing a modified form of mechanism.

Referring to the drawings, the machine comprises a frame generally designated 10 having extending downwardly therefrom a plurality of legs 11—11. In the form shown, there are three legs on the frame 10, thereby forming a tripod. Frame 10 is provided with bracing at 12 and with a plurality of vertically extending bosses at 14L and 14R which serve as mountings for the padded backs 15L and 15R. These are on the forward part of the frame and adjacent the operator station as shown in FIGURE 3. On the bosses there are forwardly extending housings 16L and 16R which serve as places of attachment for the lefthand control button 17L and the righthand control button 17R by means of which the operation of the machine is controlled. On each of the bosses there is also a vertical pivot aperture at 18L and 18R in which swinging arms 19L and 19R are placed, these being work supporting arms.

It will be noted from FIGURE 3 that the frame is of generally rectangular plan on the base portion. Along the centerline of the frame and towards the rear thereof there is a central boss 20 in which a vertical post 21 is mounted. This post is smoothly machined and polished and it serves as a piston rod, but in this case the piston rod is stationary and the piston 22, see FIGURE 4, is fastened at the middle of the post 21 by means of snap rings at positions 23 and 24. A groove 25 on the inner diameter of the piston is provided with an O-ring which serves as a seal to prevent the passage of air up along the post in the clearance between it and the piston 22. The piston is provided with two grooves 27 in its external diameter in which are fitted O-rings which serve as piston rings. Upon the top of the piston there is placed a spring 28 which rests against a large washer 29 at its upper end. The washer is held in place by screws.

The cylinder in which the piston operates is in this case movable vertically and it is composed of a lower cylinder head 30 and an upper cylinder head 31 which are machined to receive a tube 32. The two cylinder heads are bolted together by means of a plurality of studs 33 which are threaded into the lower cylinder head and project through the upper cylinder head and have nuts 33A on the top for clamping the assembly together. The lower cylinder head 30 is provided with a groove at 34 in which there is positioned an O-ring the latter being held in place by a large collar 35 that is held down by screws. The O-ring serves to seal the sliding fit of the cylinder head

30 on the post 21. Similarly, the upper cylinder head 31 is provided with a groove 35 in which there is also positioned an O-ring, the latter being held in place by the washer 29 which is pressed upwardly by the spring 28. Suitable ports, such as the port 198 in the upper cylinder head 31 of FIGURE 9, provide for introducing air into the space 37 above the piston and another similar port 199 provides for introduction of air under pressure into the space 38 below the piston. The spring 29 normally holds a part of the weight of the cylinder assembly and all mechanism attached to it. When pressure is introduced in the space 38 below the piston, the cylinder will be pushed downwardly against the action of spring 28. When pressure is released from the space 38 and is introduced into the space 37, the entire cylinder assembly and everything attached to it will be elevated.

Upon the front of the cylinder heads 30 and 31 there is attached a bracket generally designated 40 which is attached at its upper end by the cap screws 41 to the cylinder head 31 and attached at its lower portion to the lower cylinder head 30 by the cap screws 42. The bracket has a forwardly extending portion 44 on which the presser head generally designated 50 is mounted. The presser head is composed of a top casting 51 having a central depression 52 in its upper surface. A ball 54 is seated in this depression. Similarly the arm 44 likewise has a depression 55 in its undersurface and the ball 54 seats in this depression. Accordingly, the presser head 50 can rock on the ball. The presser head is held upward, by a plurality of studs 54A which extend through the lower apertures in the arm 44, the upper ends of these studs are surrounded by springs 54B which are held in place by nuts 56, three or more of these studs are provided in spaced relation around the position of the ball 54.

As a consequence the presser head 50 is held onto the arm 44 but the presser head is free to pivot a little around the ball 54 and thus settle evenly upon the buck 15L or the buck 15R. It will be noted from FIGURE 4 that the buck which happens to be 15R is held in place on the pedestal 14R by means of a stud 60.

The member 40 of which the arm 44 is a part has a cover 60 attached thereto and wherein the space thus enclosed there is provided a thermostatically controlled electric switch 61 having a control knob 62 thereon. This thermostatically controlled switch has a capillary tube 64 which extends down into and enters the casting 51 which constitutes the pressure head 50. This construction will be seen in FIGURE 8 where the casting is shown as having an aperture 65 therein in which a pressure bulb 66 is contained, being held in place by nuts 67. The capillary tube 64 thus has generated in it a pressure corresponding to the temperature of the casting 51 and this effects control of the thermostatic switch 61.

Referring to FIGURES 4 and 8, the casting 51 is provided with a plurality of holes drilled in concentric circles, the outer circle being a circle with holes 68 and the next smaller circle being a circle with holes 69. In these are placed studs 71 which serve as means for holding down arcuately shaped electrical heating pads 70—70. These heating pads are electrically operated, they are adequately insulated and are held down by the studs 71, see FIGURE 4. These studs also serve as means for anchoring a coverplate at 72 which covers the entire top of the heated presser head. This coverplate is apertured so that it does not interfere with the downward central protrusion on the arm 44.

The electrical heating elements are supplied by two conductors at 75 which extend up through suitable conduits or tubing to the control switch 61.

The arm 44, forming a part of the casting 40, and the presser head 50 carried thereon may be considered as the front of the cylinder arrangement. At the rear of the cylinder arrangement there is bolted on a housing generally designated 76 in which all of the controls are contained, this housing being provided with a door 77

which swings on a hinge 78. The door has a lock at 79 and when the door is closed it engages a switch 80. This switch is opened when the door is opened and shuts off all electrical circuits of the apparatus, thereby to prevent operation when the door is open. Referring to FIGURE 5, an outside electrical circuit is provided at 82, an incoming pressure line is provided at 84 and the back of the housing 76 is provided with mufflers 85 and 86, the latter extending downwardly from a quick exhaust valve 87 which is in turn connected by the pipe 88 to the pneumatic valves within the housing 76. While FIGURE 2 illustrated the mechanical position of the various elements in the housing, no attempt is made therein to show the various electrical and pneumatic circuits. These elements, however, include solenoid operated valves 91 and 92, the door switch 80, relay 94, down limit switch 95, up limit switch 96, timer 97, and various other smaller circuit components.

Through the housing 76 there extends a rod 100 which is drilled in each end to receive the studs 101 at the upper end and 102 at the lower end, each of these studs being arranged with a locking nut at 101A for the upper stud and 102A for the lower nut. The rod 100 is best shown in FIGURE 9. The rod 100 has a reduced diameter central portion 100A which joins the larger diameter portion at each end of the rod by means of the conical portions 100B and 100C. Closely adjacent each of these conical portions there are fixedly attached to the rod the collars 100D and 100E. Above the collar 100D there is positioned a spring 104, the upper end of which presses against the frame portion 76A of the box 76. Likewise, below the collar 100E there is another spring 105 the lower end of which presses against a perch 106 on the inside of the housing 76. The two springs 104 and 105 are balanced so that normally the rod 100 occupies a certain position within the housing, with the reduced diameter portion 100A at a certain level. Adjacent the rod there is positioned the lower limit normally open micro-switch 95 which has a roller 95A on an arm 95B for operating the micro-switch. When the rod 100 is elevated with reference to the box 76, in which the switch 95 is fixedly mounted, the conical portion 100C of the rod will grip against the roller 95A and consequently actuate the micro-switch 95, causing it to close. Similarly, there is also positioned in the box the upper limit micro-switch generally designated 96 which likewise has its roller 96A on its rod 96B. When the rod 100 moves downwardly with reference to the housing 76 and hence with reference to the switch 96, the conical portion 100B of the rod will bear against the roller 96A and cause it to be moved and thereby actuate the upper limit switch to cause it to close.

Also on the lower cylinder head casting 30 there is bolted a downwardly extending heavy lug 110, see FIGURE 2, having a rearwardly extending stud 111 thereon, which terminates in a ball head 111A. To this ball head there is attached the upper end of a ball-connected link 112, the lower end of which is connected to the ball head 113A of a stud 113 that is screwed into the rear part of the central end 20 of the framework.

Now, the entire cylinder arrangement 30—31—40—76 is free to move up and down on the post 21 and it is also perfectly free to rotate arcuately on the post. The length of the forwardly extending arm 40—41 is such that when the piston arm arrangement is swung to the position shown in FIGURE 3, the presser head 50 can be aligned directly over the buck 15R and when the piston-arm-presser head arrangement is swung clockwise, the presser head can be brought into alignment over the buck 15L. Stated another way, the radius from the center of post 21 to the center of the ball 54 which is the center of the presser head 50 aligns with the center of the bucks 15R and 15L and depending upon which way the cylinder-arm-presser head arrangement is swung, either the left buck 15L or the right buck 15R will be engaged.

The effect of the linkage composed of the stud 111, the

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link 112, and the stud 113, see FIGURE 2, is as follows: The link is perfectly free to swing and as the cylinder-arm-presser head is swung to a position of alignment over one buck, the links will also be brought down to the nearly horizontal position, shown for example in the rear view of FIGURE 5 where the link 112 is swung to the right and the presser head 50 is brought down upon the right buck 15R. As the link 112 approaches the position shown in FIGURE 5, it does not swing very much on the piston rod 21 since the link is then nearly horizontal. Accordingly, at this portion of the "stroke" the presser head 50 will be moving almost vertically and the pressure head comes down upon the work on the bucks 15L and 15R.

Then, due to the actuation of the pneumatic system, as will be explained, the entity composed of the cylinders is actuated upwardly (due to pneumatic pressure) the effect is that the link 112 is brought from the position shown in FIGURE 5, in the direction of the arrow 114, see FIGURE 5, until it finally reaches a completely vertical position as shown in FIGURE 7 and FIGURE 2. In this position the entity composed of the cylinder 30—31—32, the arm 40, and the presser head 50, is then in a position extending directly forwardly, see FIGURE 2 and note the dotted line position of FIGURE 3. However, the presser head does not stop in this position, but swings right on around toward the other buck, which in the illustration would be towards the buck 15L, having left the buck 15R. When this occurs, the presser head then swings down gradually to a position in alignment over the buck which is approaching and the link 112 is then extended slightly below the horizon in the opposite direction and the motion then continues on down until the presser head 50 engages the other buck.

Therefore, the motion of the entities 30—31—32, arm 40, and presser head 50 is in an upward and thence downward swinging motion and at the same time an arcuate motion from a position of alignment with one buck to a position of alignment with the other.

This motion is used to actuate the rod 100 and hence the control system, as will be described. On the base casting, and at the rear of the machine, there are two abutment areas 116, 116L, and 116R, these being positioned so that they will be engaged by the head of the stud 102 on the rod 100 when the presser head 50 is brought down to pressing position, either right or left. The stud 102 can be adjusted vertically with reference to the rod 100 and this permits a close adjustment of the vertical position of the presser head at which actuation of the rod 100 takes place. Thus as the presser head 50 comes down finally to a pressing position, the rod 100 will be elevated with reference to the box 76 and hence actuate the down limit switch.

The movement of the rod 100 in a downward direction relative to the box 76 is accomplished by a roller 118 which is mounted on the back end of a bracket 119 fastened by cap screw 120 on the top of the post 21. This bracket is so positioned that it extends directly backwardly and forwardly in respect to the machine, see FIGURES 1, 3, and 5, and the roller 118 is so situated that as the entity composed of the cylinder arrangement 30—31—32, the arm 40, and the presser head 50, with the control box 76 on the back side is swung upwardly and also turned around from one buck position to the other buck position, at the peak of its travel, the head of the stud 101 will just touch the roller 118 and hence the rod 100 will be pushed downwardly with reference to the buck 76 and therefore actuate the up limit switch 96, causing the up limit switch to close. This switch is normally open. Therefore, the up limit switch is actuated at the peak of the travel of the pressing assembly from one position to the other and this actuation occurs in the middle of the travel from one buck to the other. By comparison the down limit switch is actuated as the presser head comes in to pressing engagement with each of the bucks.

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The bracket 119 has an upwardly and forwardly extending portion 119A as seen in FIGURE 2, which is fitted with a cross pin 120A. Upon the cross pin at each side of the bracket, there is slipped a link of rubber tubing and a plurality of washers are provided for each side, these washers having holes in them which are just tight enough, to slip with some pressure onto the exterior surface of the rubber tubes. The reason for this is to provide a handy bracket for a plurality of spools for patching material without the necessity of complicated clamps for holding them on. It is only necessary to slip on a spool and then slip on a washer and that holds the spool in place. As many as three or four spools can be kept on each side, thus providing a variety of widths and colors of patching material.

Referring to FIGURE 9, power is supplied by way of lines L1 and L2, line L1 extends through the door switch 80 to junction 130 and thence to terminal 131 of lower limit switch 95. From the opposite terminal 132, line 134 extends to junction 135. From junction 135, line 136 extends to terminal 137 of the motor of the timer switch 97. From the opposite terminal 138, line 139 extends to junction 140 on line L2. From junction 135, a circuit extends via line 141 through the upper pair of terminals 142 of the lefthand push button control switch 17L and thence via line 144 through the upper pair of terminals 145 of the righthand push button switch 17R and thence via line 146 to terminal 147 on the timer switch. From the opposite terminal 148 of the timer switch 97 the circuit extends via line 149 through junction 150 to and through the coil 151 of relay CR, and thence via line 152 to junction 154 on line L2. From junction 130 on line L1, the circuit extends via line 155 through the lower terminals 156 of the lefthand push button control switch 17L and thence via line 157 through the lower terminals 158 of the righthand push button control switch 17R and thence via line 159 to junction 160 and thence via line 161 to one of the terminals 162 of normally closed contacts 162 of relay CR and thence from the other terminal via line 165 through the coil 166 of the solenoid operated valve 91 and thence via line 167 to junction 168 on line L2. From the junction 160 a circuit extends via line 169 to junction 170 and thence via line 171 to the terminal 172 of the upper normally open limit switch 96 and after passing through that switch, the circuit extends from terminal 174 and thence via line 175 to junction 176, and via line 177 through junction 178 and thence via line 179 through the coil 180 of the down solenoid controlled valve 92 and thence via line 181 to junction 182 on line L2. From junction 176 a circuit extends via line 184 to junction 150 on line L2. From junction 170 a circuit extends via line 185 to one terminal 186 of the normally opened contacts 186—186, of the relay CR and a circuit then extends from the companion contact via line 187 to junction 178 on line L2. The solenoid operated valves 91 and 92 are identical. Each valve has three ports, thus valve 91 has ports 91A, 91B, and 91C. Valve 92 has ports 92A, 92B, and 92C. The ports 91A and 92A are for introducing pressure into the valve and they are hence connected via the cross pipe 190 to the air pressure supply pipe 191. The ports 91C and 92C are the exhaust ports and they are connected via lines 192 and 193 to the exhaust muffler 194. The ports 91B and 92B are delivery ports and port 91B is connected via line 195 through junction 196 and line 197 to the inlet port 198 which goes into the upper portion 37 of the cylinder, this being the part of the cylinder above the piston 22. From the junction 196 on this line an air circuit extends through the quick exhaust valve 37. This valve is a standard article of manufacture having been made as shown in FIGURE 10. It contains a two-part casing having an inlet 87A and exhaust outlet 87B. Within the righthand portion of the housing there is an inner annular flange 87C against which a flexible rubber

diaphragm 87D is adapted to seat and to close off the flow from the top to the bottom side of the valve chamber. A plurality of ribs 87E inside the housing stabilize the position of the rubber diaphragm 87D. When pressure is introduced through the inlet 87A, the diaphragm 87D will be pressed tightly against the annular flange 87C and hence close off flow to the exhaust opening 87B. However, when the pressure is relieved from the upper portion of the housing (i.e. when it is relieved at the inlet 87A) the rubber diaphragm 87D is no longer tightly held against the annular rib 87C and then the air can quickly exhaust out through the exhaust housing 87B. Hence any reduction of pressure on the cylinder system to which this valve is applied, as for example, when a reduction of pressure occurs in line 197, the valve 87 will then operate and very quickly exhaust the remaining pressure from that portion of the system.

Referring again to FIGURE 9, from the port 92B a circuit extends via line 198 to the port 199 leading into the lower portion 38 of the cylinder, that being the portion below the piston 22. In describing the operation it will be assumed that the presser head 50 has just completed its pressing operation and that the pressure has been relieved from the space 38 beneath the piston 22, see FIGURE 4. When this occurs, the spring 28 presses up on the cylinder head 31 and pushes the cylinder up, consequently lifting the presser head 50 off the buck, with which it is engaged. For purposes of description it will be assumed that the presser head is just approaching the end of its pressing function against the right buck 15R and is about to be elevated by action of the spring to the slightly elevated position. The spring does not have sufficient force to do more than lift the presser head 50 a slight distance off the buck. The operator has meanwhile placed another garment or bag or whatever is being patched upon the buck 15L and has cut off the requisite piece of patching material and has applied it on the tear that is to be patched. The operator then presses the lefthand and righthand buttons 17L and 17R and holds them depressed. It is noted that the operator must hold the push buttons depressed until the press has moved up and swung over and then moved down into (or almost into) engagement with the next buck, after which time self-holding circuits take over and the squeezing cycle begins. If the operator lets up on a button before the squeezing cycle begins, the press immediately opens. This is a safety feature. When this operation of the push buttons occurs a circuit is established from line L₁ to the then closed door switch 86 to junction 130 and thence through the lefthand terminal 156 via line 157 to the righthand switch lower terminals 158 via line 159, junction 160, line 161, through the then closed (normally closed) contacts 162 of the relay CR (which is then de-energized), and then via line 165, operating coil 166 of the solenoid valve 91, and via line 167 to junction 168 on line L₂. This energizes the solenoid valve 91 and pressure is then introduced from line 191, pipe 190, inlet port 91A, through the valve and out of port 91B, thence via line 195 and line 197 to the inlet port 198 and into the upper portion of the cylinder above the piston 22. This causes the entire cylinder arrangement together with the arm 44 and the presser head 50 to be elevated. As this upward movement occurs the entire cylinder arm and presser head assembly is also moved arcuately due to the action of the line 112, as previously described, and hence the cylinder arm and presser head assembly is swung arcuately around the piston rod shaft 21 as the pivot 111 is elevated higher and higher to its peak position. At the peak (raised) position, the upper surface of the stud 101 on the rod 100 engages against the roller 118, see FIGURE 2, and this causes the rod 100 to be moved downwardly against the action of the spring 105, see FIGURE 9. When this occurs, the upper limit switch 96 is actuated. The upper limit switch has a common terminal 174; a switch which is "normally

closed," which closes a circuit from terminal 174 to terminal 173 when roller 96A is operated, and another "normally open" switch which closes a circuit to terminal 172 when roller 96A is actuated. Therefore, when switch 96 is actuated a circuit is established between terminals 172 and 174 of that switch. It will be remembered that the operator is still holding the push button switches 17L and 17R depressed, and consequently when the limit switch 96 is actuated a circuit is established from junction 160 (to the right push button switch 17R) through line 169 to junction 170 thence via line 171, terminal 172 to terminal 174 of switch 96, thence via line 175 to junction 177, line 184, to junction 150, thence through the coil 181 of relay CR and line 152 to junction 154 on line L₂. When this occurs, the relay CR is operated, closing its contacts 186 and opening its contacts 162 and its contacts 163. The opening of the contacts 162 interrupts the circuit previously described, through the coil 166 of the up solenoid valve 91 and the air energization of the cylinder 32 for up motion is interrupted and air is exhausted via port 91B to line 195 and quick exhaust valve 37. The machine now coasts momentarily through the fully up (dead center) position. The closure of the circuit through contacts 163—163 provides a circuit from junction 130, through still closed push button contacts 156 and 158, junction 160, line 169, junction 170, closed relay contacts 163, junction 177, line 184, junction 150, and then through relay coil 181 to line L₂. This maintains relay CR operated, subject to push buttons 17L and 17R.

The closure of contacts 186 of relay CR does not, for the moment accomplish anything because the normally closed circuit between terminals 174 and 173 (of switch 96) is then open due to actuation of switch 96 via rod 100. However, as the mechanism coasts past the fully up (dead center) position, the actuation of rod 100 (via roller 118 against end 101) ceases, and rod 100 "centers" due to the springs 104 and 105, thereby moving the cam shoulders 100B into a neutral position out of contact with roller 96A (of switch 96), and switch 96 accordingly re-establishes a circuit between its terminals 174 and 173 and breaks the circuit between 174 and 172. The latter does nothing because contacts 163 are closed, but closing the 174—173 circuit now completes the circuit to solenoid valve 92 as follows: From junction 130 on line L₁ via still closed pushbutton contacts 156 and 158 to junction 160, thence via line 169, junction 170, line 171 to terminal 174, through switch 96 to terminal 173, via line 185, through closed contacts 186 of relay CR and line 179 through solenoid coil 180 and line 181 to line L₂. Valve 92 actuates and air under pressure flows from inlet 92A to outlet 92B, via line 198 to port 199 at the lower end of cylinder 32 (under piston 92) and cylinder 32 and everything attached to it begins movement downward.

The push button controlled switches 17R and 17L are of the type known as a micro-switch and have a normally closed upper contact switch which are closed when the switches are not pushed and normally open lower contacts 156—158 which are normally closed when the switches are operated. These push button switches are identical and the duration of time from the instant at the upper contact 145, for example, opens and the lower contact 158 is closed and practically negligible. Advantage is taken of the circumstance in the present circuit. The operator holds the two push button control switches actuated until the presser head reaches a pressing position against either the right or the left buck. This pressing actuation is accomplished via the circuit which is maintained through the down solenoid valve 92, as previously described, which is through the lower contacts 156 and 158 of the left and right push button control switches respectively. It might be supposed that the solenoid valve 92 and relay CR would be de-energized when the push buttons are lifted but this is not the case. When the

presser head 50 reaches pressing position, end 102 on rod 100 engages either pad 116R or 116L, depending on which way the motion is headed, and the down limit switch 95 has been actuated and closed. Hence a circuit extends from junction 130 through the down limit switch 95 to junction 135. Switch 95 is normally open but is closed when cam 100C on rod 100 engages roller 95A. From this junction 135 a circuit extends via line 136 to the motor terminal 137 and through the motor to terminal 138, and thence via line 139 to junction 140 on line L2. The motor begins to operate and turn in shaft 97A in the direction of arrow 97D, which is provided with a coil spring arrangement, 97B, by which it is normally returned in a counterclockwise direction so as to bring the cam 97B against an adjustable stop 97C, the position of which can be adjusted for varying the timing interval. When the motor operates the cam 97B operates in a counterclockwise direction and after a certain predetermined time interval the cam will strike the cam follower 97D, causing it to push downwardly and actuate the switch 97E to break a circuit between the terminals 147 and 148. Therefore, so long as the timer switch has not operated to break this circuit between its terminals 147 and 148, a circuit will be provided through down limit switch 95 to terminal 135 as previously described and then through the then closed terminals 142 and 145 of the push button switches 17L and 17R respectively (which have now been assumed to have been released), and this circuit extends over to the terminal 150 and thence sustains power through the coil 151 of the relay CR. Even though there is a very slight time lapse between the time the lefthand push button switch 17L opens from contacts 156 and closes against contacts 142, the time is so short that it does not permit either the relay CR to drop out or the solenoid valve 92 to become de-energized. Therefore, as soon as the presser head 50 has come down to the pressing position and the rod 100 has been pushed upwardly to operate the lower limit switch 95, the operator may then simultaneously release the push buttons 17L and 17R and the valve 92 remains energized and the relay CR remains energized through the circuit as just described until the timer switch 97 brings the cam 97B around into a position to actuate the cam follower 97D thereupon moving the switch element 97E' out of engagement with the terminals 147 and 148. This breaks the circuit and relay CR becomes de-energized, consequently closing its terminals 186 and opening its terminals 162 and 163. When the terminals 186 are opened the down solenoid valve 192 becomes de-energized and the supply of air from the port 92A to the port 92B is disconnected and port 92B is connected to the exhaust port 92C, thereby permitting the space 38 below the piston 22 to be exhausted to air. When this occurs the spring 29 elevates the presser head a little bit to the position shown in FIGURE 5, as previously described.

It makes no difference which buck 15R or 15L has been engaged by the presser head 50 because the actuation is the same. The motion is always away from the buck up through the highest position and then down against the other bucks. The sequence of operation is as above described.

In FIGURE 11 (which is a rear view corresponding to FIGURE 5) there is illustrated a slightly modified form of the invention wherein the link 112 and ball joint pivots 111A and 113A are replaced by a cam and cam follower for controlling the swinging movement of the cylinder-presser arm assembly as it is moved up and down. Here the cam plate 200 is a fragment of a cylindrical surface, curved (in plan view) so as to be a uniform distance from the axis of the piston rod 21. The cam is attached to the frame 10. Cam plate 200 has a cam slot 200R—200C—200L which is shaped to receive and guide a cam follower roller 201, which replaces the ball pivot 111A. The cam slot provides vertical portions

200A and 200C which are so located that the presser head 50 will be permitted to come straight down on the buck 15R (when the cam follower 201 is in the portion 200R of the cam slot) and to come straight down on the buck 15L (when the cam follower 201 is in the portion 200L of the cam slot). These portions 200R and 200L of the cam slot are connected by a smooth curve 200C which serves to swing the cylinder-presser arm assembly around the piston rod as an axis, as the assembly moves up and down. Of course all parts at the rear of box 76 are sized and located so as not to hit against cam 200 as the assembly swings on piston rod 21.

As many widely apparent different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments herein.

What is claimed:

1. A pressing machine operating mechanism comprising a frame having a stationary upwardly extending piston rod thereon, a piston on said rod, a cylinder mounted on the piston rod for movement upwardly and downwardly with reference to the piston, a presser head mounted on the cylinder for movement therewith and extending radially therefrom, means connecting the cylinder and the frame for swinging the cylinder through a prescribed angular path of movement about the piston rod as the cylinder moves from a first down limit position then upwardly and thence downwardly to a second down limit position which is angularly disposed with reference to the first position down limit position and a buck mounted on the frame so as to be engaged by the presser head in one of the limit positions.

2. A pressing machine comprising a frame having a stationary upwardly extending piston rod thereon, a piston on said rod, a cylinder mounted on the piston rod for movement upwardly and downwardly with reference to the piston, means connecting the cylinder and the frame for swinging the cylinder through a prescribed angular path of movement about the piston rod as the cylinder moves from a first down limit position, then upwardly and thence downwardly to a second down limit position which is angularly disposed with reference to the first position down limit position, a presser head on the cylinder extending radially therefrom and first and second bucks mounted on the frame so as to be engaged by the presser head when the cylinder is in its first and second down limit positions.

3. A pressing machine comprising a frame having thereon an upwardly extending piston rod, a piston on the rod between the upper and lower ends thereof, a cylinder mounted on the rod so as to enclose the piston, said cylinder being mounted for movement axially so as to be free to rotate on the piston rod, air supply means connected to the cylinder for moving it upwardly and downwardly relative to the piston and rod, means connecting the cylinder and the frame for automatically moving the cylinder rotatively through a prescribed angular path as the cylinder is oscillated axially on the piston rod through a path of motion which is upwardly from a first down limit position to an up limit position and thence downwardly to a second down limit position, air supply and control means is connected to those portions of the cylinder which are above and below the piston for introducing air into the cylinder first to move it upwardly and then move it downwardly, a presser head mounted on the cylinder and at a fixed radial position relative to the axis of the cylinder and piston rod, and first and second bucks mounted on the frame each at a fixed radial position relative to the axis of the cylinder so that one buck is engaged by the presser head when the cylinder approaches its first down limit position and the other buck is engaged by the presser head when the cylinder approaches its second down limit position.

4. The pressing machine specified in claim 3 further characterized in that said means connecting the cylinder

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and the frame comprises a link having its ends pivotally connected to the cylinder and frame respectively.

5 The pressing machine specified in claim 3 further characterized in that said means connecting the cylinder and the frame comprises a cam and cam follower, one being connected to the cylinder and the other to the frame.

6. The pressing machine specified in claim 3 further characterized in that an electric heater is provided for the presser head and that a thermostatic control having a sensitive element in the presser head is provided for controlling the temperature of the presser head.

7. The pressing machine specified in claim 3 further characterized in that the control means includes means on the cylinder engageable with the frame for directing air under pressure first to elevate the cylinder and then to lower it.

8. Pressing apparatus comprising in combination a supporting base provided with a first and a second pressing buck, a piston rod on said base, said piston rod provided with a fixed piston thereon central of its ends, a cylinder surrounding said piston rod and movable axially and rotationally in respect to said rod, an upper and a lower cylinder head on said cylinder on opposite sides of said piston, said cylinder heads enclosing said piston and defining a first and a second chamber on opposite sides of said piston, a pressing head on said cylinder, resilient means in one of said chambers urging said cylinder and said pressing head to a position distal of said base, means between said cylinder and said base for defining the extent of said axial and radial movement, and actuating means operatively associated with said first and second chambers for causing said pressing head to alternately engage each of said pressing heads.

9. A pressing machine comprising a frame, a first pressing buck mounted on said frame, a second pressing

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buck mounted on said frame in horizontal spaced relation to said first buck, a presser head, means mounted on the frame and connected to the presser head for first moving the presser head from a first position at an elevation nearly the same as the pressing bucks to a second position at an elevation substantially higher than said first position and then to a third position at an elevation to be in pressing engagement with the pressing bucks, means interconnecting the first-mentioned means and the frame for automatically horizontally swinging the presser head from a position in pressing engagement with one buck into pressing engagement with the second buck as first mentioned means moves the presser head through the aforementioned elevated positions and control means for actuating the first-mentioned means to move the presser head through the aforementioned elevated positions.

10. A pressing machine comprising a frame, a first pressing buck on said frame, a second pressing buck on said frame horizontally spaced from the first buck, a presser head, means connected to the frame for automatically moving the presser head horizontally relative to the bucks to first space the presser head above the first buck and then above the second buck and also moving the presser head vertically relative to the bucks between an elevation spaced above the first buck to an elevation in pressing engagement with the second buck after said presser head has been moved horizontally relative to said bucks and means stationarily mounted on the frame and connected to the first mentioned means for actuating first mentioned means for movement in the aforementioned manner.

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