

Dec. 6, 1938.

W. P. BEATTIE
PRESS CONTROL MECHANISM

2,139,064

Filed Jan. 21, 1935

3 Sheets-Sheet 1

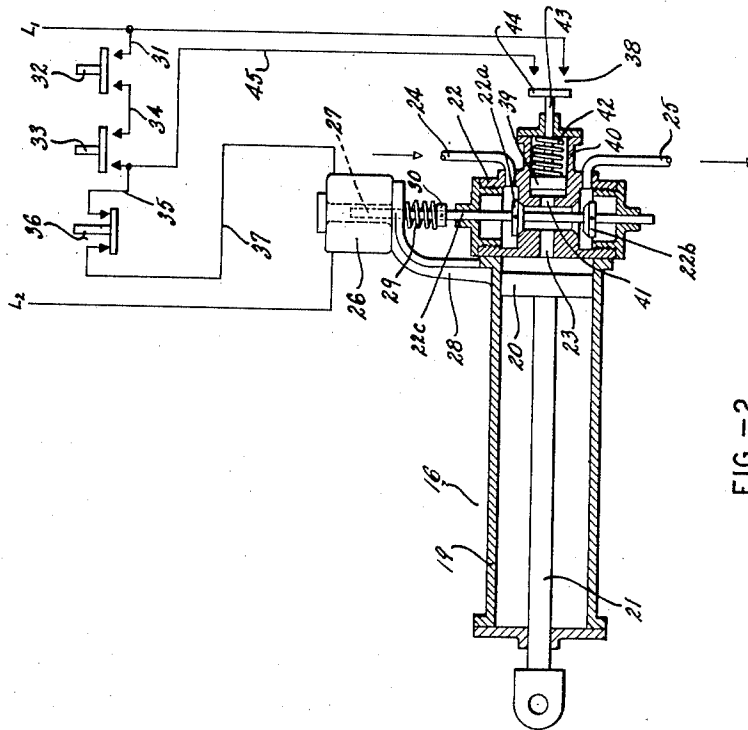


FIG. -2

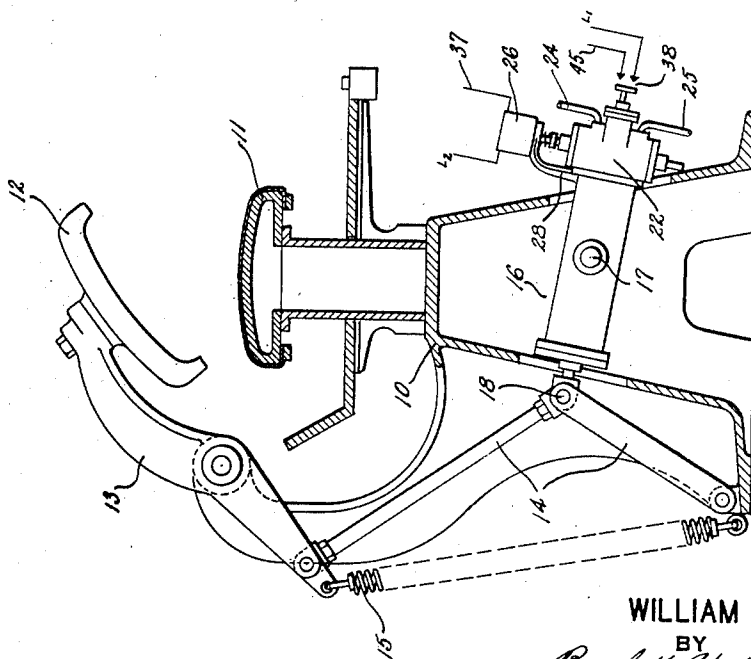


FIG. -1

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3 Sheets-Sheet 2

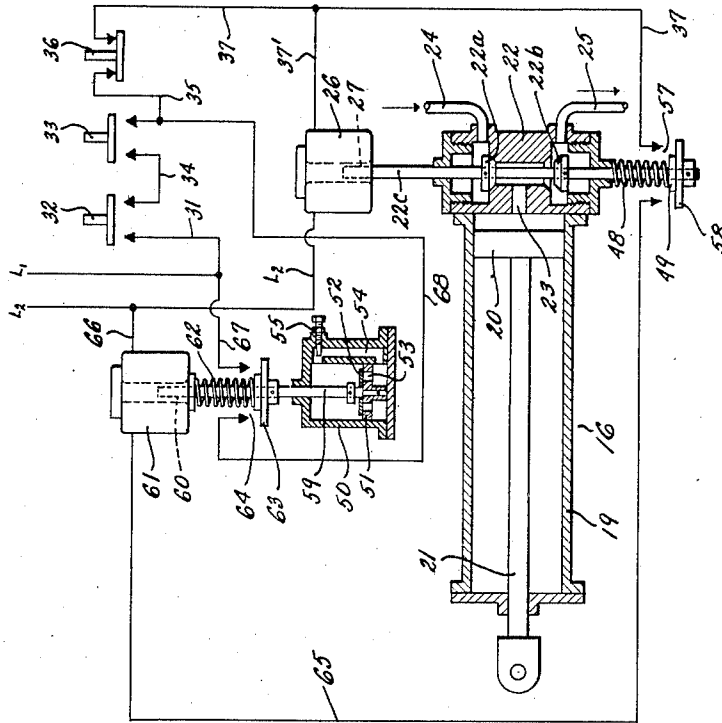


FIG. -4

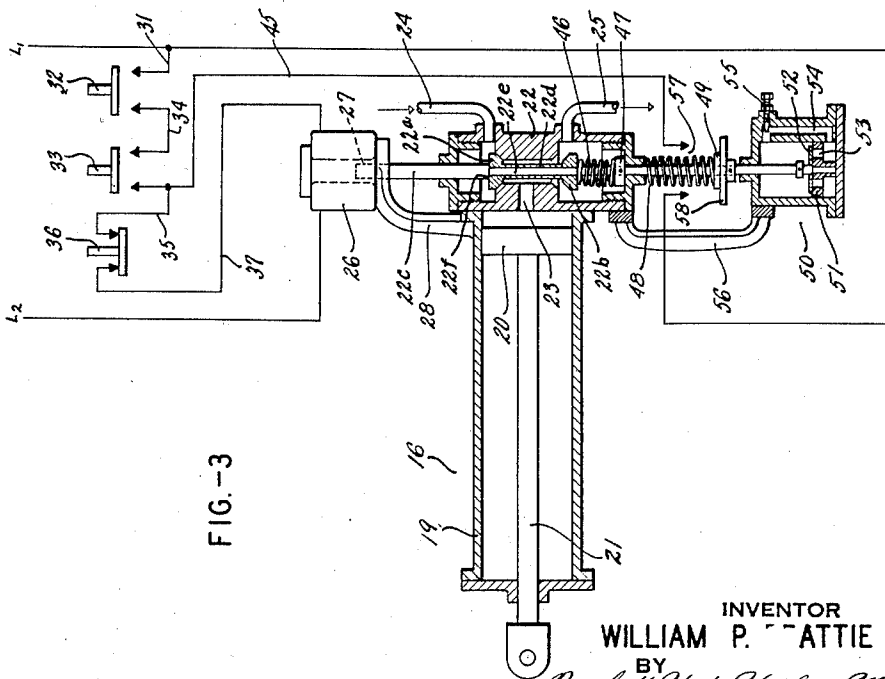


FIG. -3

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PRESS CONTROL MECHANISM

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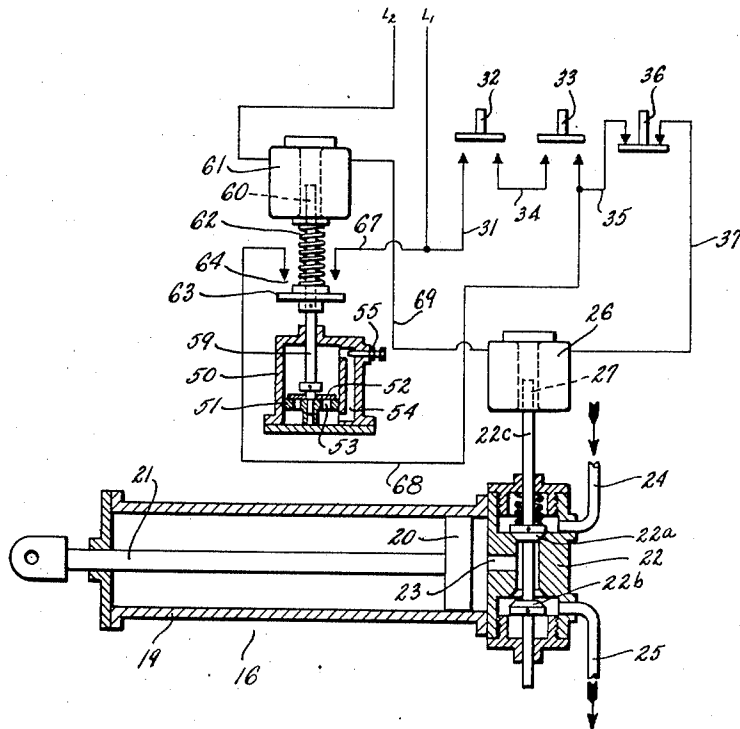


FIG.-5

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PRESS CONTROL MECHANISM

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Application January 21, 1935, Serial No. 2,698

16 Claims. (Cl. 121—38)

This invention relates to improved operating and control mechanism for laundry or garment presses.

An object of the present invention is to provide a fluid actuated motor for operating a press of the type described with suitable valves for controlling the supply and exhaust of fluid to the motor and electrically operated power means for moving the fluid control valves.

My improved control mechanism also provides in a press having a fluid motor, a suitable motion transmitting mechanism for moving one of the pressing members to close the press, suitable control valves for the fluid motor movable to press closing position by the operator and maintained in said position by electric power means. In such a press I have provided means for actuating the electrical power means by a change in the press closing mechanism which occurs upon the movable pressing member encountering resistance.

My invention also contemplates the provision, in a pressing machine closed by a fluid motor, of suitable valves with power means for moving the valves to press closing position and for maintaining them there. For the power means I provide two circuits, one a preliminary closing circuit under the control of the operator and the other a maintaining circuit which is established independently of the operator after the lapse of a short period of time.

My invention also contemplates the provision of an assembled unit including a power motor with all control devices necessary except operating manuals. Such a unit may be applied to a foot power press very easily with a few control manuals arranged convenient for the operator and with suitable power supply lines connected to the mechanism.

Other novel features of my invention include suitable structure for carrying out the above described purposes and objects, suitable control circuits and manuals and other features, all as will more clearly appear in the accompanying drawings and description and the same will be summarized in the claims.

In the drawings, Fig. 1 is an end elevation of a pressing machine partly in section showing one form of my improved operating and control mechanism applied thereto; Fig. 2 is a detail sectional view of the power mechanism of Fig. 1 and showing the control circuits in diagrammatic form; Fig. 3 is a view similar to Fig. 2 showing a modified form of control mechanism; Fig. 4 is another similar view showing a still

further modification; while Fig. 5 is a modified form of the device of Fig. 4.

My invention is applicable to any pressing machine in which a fluid motor moves the pressing members into final engagement and holds them there for the duration of a pressing operation. For the purpose of illustration I have illustrated a very simple form of press having a frame 10 on which is mounted a bed 11 which is adapted to coact with a suitable head or chest member 12 carried by head lever 13 into and out of engagement by suitable operating mechanism. A very simple form of mechanism comprises toggles 14 normally biased to broken position by spring 15 and movable to straightened position for a pressing operation by a fluid motor 16 which may be suitably mounted on trunnions 17 on the frame and connected at 18 to the toggle knuckle.

My invention relates more particularly to the arrangement of this fluid motor and its control mechanism. In Fig. 2 I have shown the motor 16 as comprising a cylinder 19 in which moves a piston 20 which has a suitable piston rod 21 for connection to the toggles. For controlling flow and exhaust of motive fluid to and from motor 16 I provide a valve casing 22 which houses a normally closed inlet valve 22a and a normally open outlet valve 22b which are provided by a common actuator, in this case the stem 22c which is connected with suitable power means for moving the valves to actuated position to operate the motor in press closing direction. In the valve casing is a passageway 23 providing communication with the cylinder 19 and connectible by suitable ports 24 with a supply of motive fluid and 25 with atmosphere for the exhaust of fluid, these operations depending upon the position of the valves as will be apparent from the drawings.

Certain features of my invention are realized regardless of the manner in which the valves 22a and 22b are first operated to their press closing position. However, I prefer to so move the valves by some power means and in the instant case I have used electrical power means and more specifically a solenoid 26. The armature 27 of the solenoid is operatively connected with the valve actuator or stem 22c and in the present instance is illustrated as being unitary therewith. The solenoid may conveniently be connected rigidly with the cylinder 19 by a bracket 28. The valves are biased to their normal position by a spring 29 which engages between bracket 28 and a collar 30 on the valve stem 22c.

Two control circuits are provided for energizing solenoid 26. The first or press closing control circuit includes a supply line L1, line 31, two spaced normally open switches 32 and 33 connected in series by line 34, line 35, normally closed release switch 36, and line 37, the opposite side of the solenoid being connected with a second supply line L2.

The other circuit for energizing solenoid 26 is a maintaining circuit and in the form shown in Fig. 2 this circuit includes a normally open switch 38 which is adapted to be closed a short period after the valves have been moved to their operated position to close the press. The closing of this switch 38 is arranged to take place upon the building up of a predetermined pressure in cylinder 19, which will take place when the head 12 encounters an obstruction such as the bed 11. To this end I have provided a movable abutment 39 in a cylinder 40 which communicates by port 41 with the motive fluid in cylinder 19 so that the pressure in the cylinder is exerted against one face of the abutment. A spring 42 biases the abutment in switch opening direction as shown in Fig. 2. The abutment is connected by rod 43 with a conductor 44 which is adapted to close the open contacts so as to close switch 38 and establish a circuit as follows: From L1 through conductor 44, line 45, line 35, normally closed switch 36, line 37, solenoid 26 to L2.

The operation of this form of device is as follows: With the parts in the position of Fig. 1 the operator arranges the lay of the work on the bed and depresses the buttons controlling switches 32 and 33. This establishes the press closing circuit above described and energizes solenoid 26 which moves valves 22a and 22b to their operated position with the inlet valve 22a open and the outlet valve 22b closed. Fluid then flows through conduit 24, valve 22a and passageway 23 to cylinder 19 against the working face of piston 20 and the press closes. If at any time before the pressing head engages the bed the operator releases either of the manuals 32 or 33, the solenoid will be deenergized and spring 29 will return the valves to their normal position, whereupon spring 15 will open the press. If however, the operator maintains both manuals 32 and 33 depressed fluid pressure will build up in cylinder 19 and against the left hand face of abutment 39 until it preponderates over spring 42 whereupon the abutment will move to the right and close switch 38, thus completing the maintaining circuit previously described, whereupon the operator may release manuals 32 and 33 and the press will remain closed. To open the press the operator depresses the manual controlling switch 36 which will open the switch and deenergize solenoid 26 thus permitting spring 29 to return the valves to their normal position and the press to open under the influence of spring 15.

In the modification shown in Fig. 3 a more positive time delay is provided between the movement of the fluid control valves to their press closing position and the establishment of the electric maintaining circuit. In this form the maintaining circuit does not depend for its establishment upon any specific change taking place in the press operating mechanism, such as the building up of fluid pressure in cylinder 19 as previously described. In the form of Fig. 3, the power means which moves the fluid motor control valves to their operated position eventually establishes a maintaining circuit but the establishment of

this maintaining circuit is delayed by means of a timing device which will now be more fully described. Parts similar to those in Fig. 2 have received similar designating characters and the form of my device illustrated provides a lost motion connection which permits the valve stem or actuator 22c a movement beyond that which is necessary to place the valves in press closing position. This lost motion connection is provided by mounting valves 22a and 22b on a common sleeve 22d which is movable longitudinally on a reduced portion 22e of the stem 22c. This sleeve is yieldably held against a shoulder 22f by a spring 46 surrounding the stem portion 22e and held between the sleeve 22d and a collar 47 pinned to the valve stem. In this form of the device, the valves are biased toward their normal position by a spring 48 which engages between the valve casing 22 and a collar 49 on the valve stem. At the lower end of the stem 22c is connected a timing device which in the form shown comprises a dash pot 50 in which reciprocates a piston 51 which is rigidly mounted on the stem 22c. This piston is arranged to impede the progress of the valve stem upwardly but to permit it to move freely downward. To this end the piston is provided with suitable flapper valves 52 which close ports 53 in the piston on the upward stroke but permit a flow through these ports on the downward stroke. The opposite ends of the dash pot cylinder communicate by a bypass 54 in which is located an adjustable needle valve 55 so that the upward stroke of the dash pot may be timed. In this form of the device the solenoid 26 may be supported by a bracket similar to bracket 28 in Fig. 2 and the dash pot 50 may be rigidly supported from the motor structure by a bracket 56 so that all working parts are combined in one unit.

The closing circuit for solenoid 26 in the form shown in Fig. 3 is in all respects similar to that described in connection with Fig. 2. The maintaining circuit for solenoid 26 is similar to that described in Fig. 2 except that the open switch in this circuit is now located at 57 and is closed by a conductor 58 which is carried by the valve stem and which completes the circuit through the normally open contacts after the lost motion has been taken up to compress spring 46 and after the dash pot has provided its delaying effect.

The operation of the device of Fig. 3 is similar to that shown in Fig. 2 except that during the operation of the closing circuit solenoid 26 exerts a continuous pull upon its armature 27 and the connected valve stem 22c after the valves 22a and 22b have moved to press closing position. During this additional motion of the valve stem the lost motion between collar 47 and sleeve 22d is taken up, spring 43 is compressed, the piston 57 moves up slowly in the dash pot and finally conductor 58 completes the closing of switch 57 thus establishing a maintaining circuit through L1, conductor 58, line 45, line 35, normally closed switch 36, line 37, solenoid 26 and line L2. To open this press, release manual 36 is depressed as previously described.

In the modification of Fig. 4 the timing device of Fig. 3 has been placed in a separate unit in which the stem 59 which is secured to the dash pot piston 51 is operated by the armature 60 of a solenoid 61. A spring 62 normally maintains the dash pot at its lowest position and upon completion of the stroke of stem 59 a conductor 63 carried thereby closes a normally open switch 64 to complete the electrical maintaining circuit for

solenoids 26 and 61. It will be noted in this figure that the electric circuit for solenoids 26 and 61 are in parallel and their circuit is completed through the normally open switch 57 which is closed by the conductor 58 practically simultaneously with the movement of valves 22a and 22b to press closing position. It will be understood that a substantially similar result would be attained if solenoids 26 and 61 were connected in series, as in Fig. 5.

The operation of the device of Fig. 4 is similar to Fig. 3. The operator arranges the lay of the work and depresses manuals 32 and 33. This completes a closing circuit L1, line 31, switch 32, line 34, switch 33, line 35, switch 36, lines 37 and 37', solenoid 26, L2. As soon as solenoid 26 has actuated valves 22a and 22b to their press closing position, normally open switch 57 is closed establishing the following circuit: L1, line 31, switch 32, line 34, switch 33, line 35, switch 36, line 37, conductor 58, line 65, solenoid 61, line 66, L2. Upon the holding of this circuit by means of manuals 32 and 33 for a sufficient length of time, solenoid 61 causes its armature 60 and stem 59 to complete a stroke as delayed by the dash pot 50 whereupon conductor 63 closes normally open switch 64 and establishes the following circuits: L1, line 67, conductor 63, line 68, line 35, switch 36, line 37, and two parallel circuits from this point on, namely, line 37', solenoid 26, L2, and line 37, conductor 58, line 65, solenoid 61, line 66 and L2. Both solenoids thus remain energized and the press remains closed until switch 36 is opened which deenergizes both solenoids and all parts return to the position of Fig. 4.

The operation of the device of Fig. 5 is like that of Fig. 4. The operator arranges the lay of the work and depresses manuals 32 and 33. This completes a closing circuit L1, line 31, switch 32, line 34, switch 33, line 35, switch 36, line 37, solenoid 26, line 69, solenoid 61, L2. When solenoid 26 is energized its armature 22c is raised, thus closing outlet valve 22b and opening inlet valve 22a which admits pressure fluid to motor 16 and causes a power stroke of piston 20 for closing the press. Upon the holding of the above circuit by means of manuals 32 and 33 for a sufficient length of time, solenoid 61 causes its armature 60 and stem 59 to complete a stroke as delayed by dash pot 50, adjustable at 55, whereupon conductor 63 closes normally open switch 64 and establishes the following circuit: L1, line 67, conductor 63, line 68, line 35, switch 36, line 37, solenoid 26, line 69, solenoid 61, L2. Both solenoids thus remain energized and the operator may release manuals 32 and 33, while the press remains closed until switch 36 is opened, which deenergizes both solenoids and all parts return to the position of Fig. 5.

The parts shown diagrammatically in Fig. 4 or 5 may be mounted on a unitary structure as taught by Figs. 2 and 3 if desired.

I have thus provided press control mechanism which requires the use of two hands of an operator while the pressing members are moving from their wide open position to a safely closed position and the circuits are so arranged that the operator must maintain the pressure of her hands upon the safety manuals until a further effect caused by the press moving parts has taken place. In Figs. 1 and 2 the closing circuit must be maintained until the pressing members have obstructed the movement of piston 20 so as to build up sufficient pressure in cylinder 18 to ac-

tuate the abutment 39 and establish the maintaining circuit, while in the remaining figures the actuator which closes the maintaining circuit has a lost motion, the taking up of which is delayed by a timing device which may be set by its adjusting needle valve to a point which gives the pressing members ample time to become safely closed before the maintaining circuit is completed.

I have also provided a unit including a fluid motor, its operating valves and a power actuator for those valves which may be suitably attached to a foot power press and control lines run to the forward edge of the press table thus transforming the foot power press to a full power operated press.

What I claim is:

1. In a pressing machine, a pair of coacting relatively movable pressing members, press closing means including a fluid actuated motor and motion transmitting mechanism for moving one of said members into ironing engagement with the other member, conduit means for the supply and exhaust of motive fluid to and from said motor and including a normally closed inlet valve and a normally open outlet valve, operator controlled means for moving said valves to operated position with said inlet valve open and said outlet valve closed, said last named means having a connection permitting additional movement beyond said valve operating movement, means for holding said valves in said operated position, a timing device for controlling said additional movement, and means for actuating said holding means upon completion of said additional movement.

2. In a pressing machine, a pair of coacting relatively movable pressing members, press closing means including a fluid actuated motor and motion transmitting mechanism for moving one of said members into ironing engagement with the other member, conduit means for the supply and exhaust of motive fluid to and from said motor and including a normally closed inlet valve and a normally open outlet valve, an actuator movable to press-closing position for moving said valves to operated position with said inlet valve open and said outlet valve closed, means for so moving said actuator including two spaced safety manuals, said actuator having a connection permitting additional movement after said valves are moved to operated position, a dash-pot for delaying said additional movement, and means operated by the taking up of said lost-motion for holding said actuator in press-closing position.

3. In a pressing machine, a pair of coacting relatively movable pressing members, press closing means including a fluid actuated motor and motion transmitting mechanism for moving one of said members into ironing engagement with the other member, conduit means for the supply and exhaust of motive fluid to and from said motor and including a normally closed inlet valve and a normally open outlet valve, operator controlled means for moving said valves to operated position with said inlet valve open and said outlet valve closed, said last-named means having a connection permitting additional movement beyond said valve operating movement, solenoid operated means for holding said valves in said operated position, a timing device for controlling said additional movement, and means for energizing said solenoid upon completion of said additional movement.

4. In a pressing machine, cooperating pressing members and operating mechanism therefor including a cylinder and piston motor for closing said pressing machine, conduit means for supply and exhaust of motive fluid to and from said motor and having a normally closed inlet valve and a normally open outlet valve, an actuator for said valves movable to press-closing position to open said inlet valve and to close said outlet valve, said actuator having a connection permitting movement past said press-closing position, a solenoid having an armature operatively connected with said actuator for moving the latter, two electric circuits for energizing said solenoid, an operator-operated control member in one circuit, a normally open switch in the other circuit, a timing device for controlling movement of said actuator past said press-closing position, and the parts being so arranged that said switch is closed when said actuator completes its said movement.

5. The combination of claim 4, in which said timing device is a dash-pot operatively connected with said actuator to delay movement of the same into press-closing position.

6. In a pressing machine, cooperating pressing members and operating mechanism therefor including a cylinder and piston motor for closing said pressing machine, conduit means for supply and exhaust of motive fluid to and from said motor and having a normally closed inlet valve and a normally open outlet valve, a first solenoid having an armature operatively connected with said valves for opening said inlet valve and for closing said outlet valve when said solenoid is energized, a second solenoid having an armature, a dash-pot connected with said armature for delaying the movement of the latter when said second solenoid is energized, two electric circuits for energizing said solenoids substantially simultaneously, one of said circuits having an operator-operated control member therefor, the other of said circuits comprising a normally open switch, and means actuated by the armature of said second solenoid for closing said switch.

7. In a pressing machine, cooperating pressing members and operating mechanism therefor including a cylinder and piston motor for closing said pressing machine, conduit means for supply and exhaust of motive fluid to and from said motor and having a normally closed inlet valve and a normally open outlet valve, a solenoid having an armature operatively connected with said valves for opening said inlet valve and for closing said outlet valve when said solenoid is energized, a contact closing device operable to close a pair of normally open electrical contacts, means independent of said motor and operable a predetermined period after said solenoid is energized for actuating said device, two electric circuits for energizing said solenoid, a pair of spaced normally open operator-operated switches connected in series in one of said circuits, and the other of said circuits including said normally open electrical contacts.

8. The combination of claim 7 and including a normally closed electrical switch in the said other of said circuits movable by the operator to open position to deenergize said solenoid and to permit said valves to return to normal position for opening the press.

9. A press actuating unitary assembly comprising a cylinder and piston motor, a valve casing housing movable inlet and outlet valves, a

suitable passageway in said casing communicating with said cylinder and ports adapted to connect said passageway to a source of fluid supply or to the atmosphere depending upon the position of said valves, a solenoid having an armature operatively connected with said valves for moving them when said solenoid is energized, said armature connection permitting additional movement of said armature beyond said valve operating movement, a dashpot for delaying said additional movement, and a contact closing member movable by said additional movement.

10. In a pressing machine, a pair of coacting relatively movable pressure members, press closing means including a fluid actuated motor, a supply of motive fluid therefor, valve means for controlling said fluid supply and movable to supply and exhaust positions, means biasing said valve means to exhaust position, electrical means adapted when energized to move said valve means to supply position and to hold it there against the action of said biasing means, a press closing circuit including a manually operated switch for energizing said electrical means, a second circuit by-passing said switch, a normally open switch in said second circuit, an electrical device connected in series in said closing circuit and having an operative connection with said last named switch for closing it, and a timing device for delaying the operation of said electrical device.

11. In a pressing machine, a pair of coacting relatively movable pressing members and operating means therefor including a fluid actuated motor, conduit means for the supply and exhaust of motive fluid to and from said motor and including a normally closed inlet valve and a normally open outlet valve, a power device for moving said valves to and for holding said valves in operated position with said inlet valve open and said outlet valve closed, two power supply circuits for said device, one of said circuits including an operator-operated member, the other of said circuits including a control member normally in power cut-off position, and time-delayed means independent of said motor for moving said control member to power supply position in timed relation with the supply of power to said one circuit.

12. A pressing machine as in claim 11, and in which said other circuit includes a control member normally in power supply position and movable to power cut-off position to deenergize said device.

13. In a pressing machine, a pair of coacting relatively movable pressing members, power means for causing relative approach and pressing action between said members, control means for said power means operable in two phases, a first phase to cause movement of said members into press-closed position and a second phase to hold said members in closed position, two spaced safety control members adapted upon coincidental operation to cause first phase operation of said control means, a control member for causing second phase operation of said control means, a time-delay device for causing actuation of said second phase control member, and an operative connection between at least one of said safety control members and said device for causing starting operation of said device by actuation of said safety control members.

14. In a pressing machine a pair of coacting relatively movable pressing members and operating means therefor including a motor for closing

ing said press, a power supply for said motor, a control member for said supply, power means adapted when energized for moving said control member to power supply position and for holding it there, two power supply systems, each system adapted to energize said power means, a manually operable control member in one of said systems normally in power cut-off position, a dash-pot operatively connected with said power means for delaying movement thereof, and a control member in the other of said systems normally in power cut-off position and arranged for movement to power supply position by said power means upon substantial completion of the movement thereof.

15. In a pressing machine a pair of coacting relatively movable pressing members and operating means therefor including a motor for closing said press, a power supply for said motor, a control member for said supply, power means adapted when energized for moving said control member to power supply position and for holding it there, said power means being adapted to perform an extra movement other than that necessary to operate said control member, said power means being arranged to start said extra movement substantially simultaneously with movement of said control member to power supply position, two power supply systems, each system adapted to energize said power means, a manu-

ally operable control member in one of said systems normally in power cut-off position, a dash-pot operatively connected with said power means for delaying said extra movement thereof, and a control member in the other of said systems normally in power cut-off position and arranged for movement by said power means to power supply position upon substantial completion of the said extra movement of said power means.

16. In a pressing machine, a pair of coacting relatively movable pressing members, press closing means including a fluid actuated motor and motion transmitting mechanism for moving one of said members into ironing engagement with the other member, conduit means for the supply and exhaust of motive fluid to and from said motor and including a normally closed inlet valve and a normally open outlet valve, operator controlled electric power means for moving said valves to operated position with said inlet valve open and said outlet valve closed and for holding them there, said electric power means having an energizing circuit with a normally open control member therein, said control member being arranged for closure by completion of a power movement of said electric power means, and a timing device for delaying the completion of said power movement.

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CERTIFICATE OF CORRECTION.

Patent No. 2,139,064.

December 6, 1938.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, lines 54 and 55, claim 2, strike out the words "the taking up of said lost-motion" and insert instead said additional movement; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of January, A. D. 1939.

Henry Van Arsdale

(Seal)

Acting Commissioner of Patents.