April 30, 1935. E. DAVIS 1,999,400

GARMENT OR IRONING PRESS

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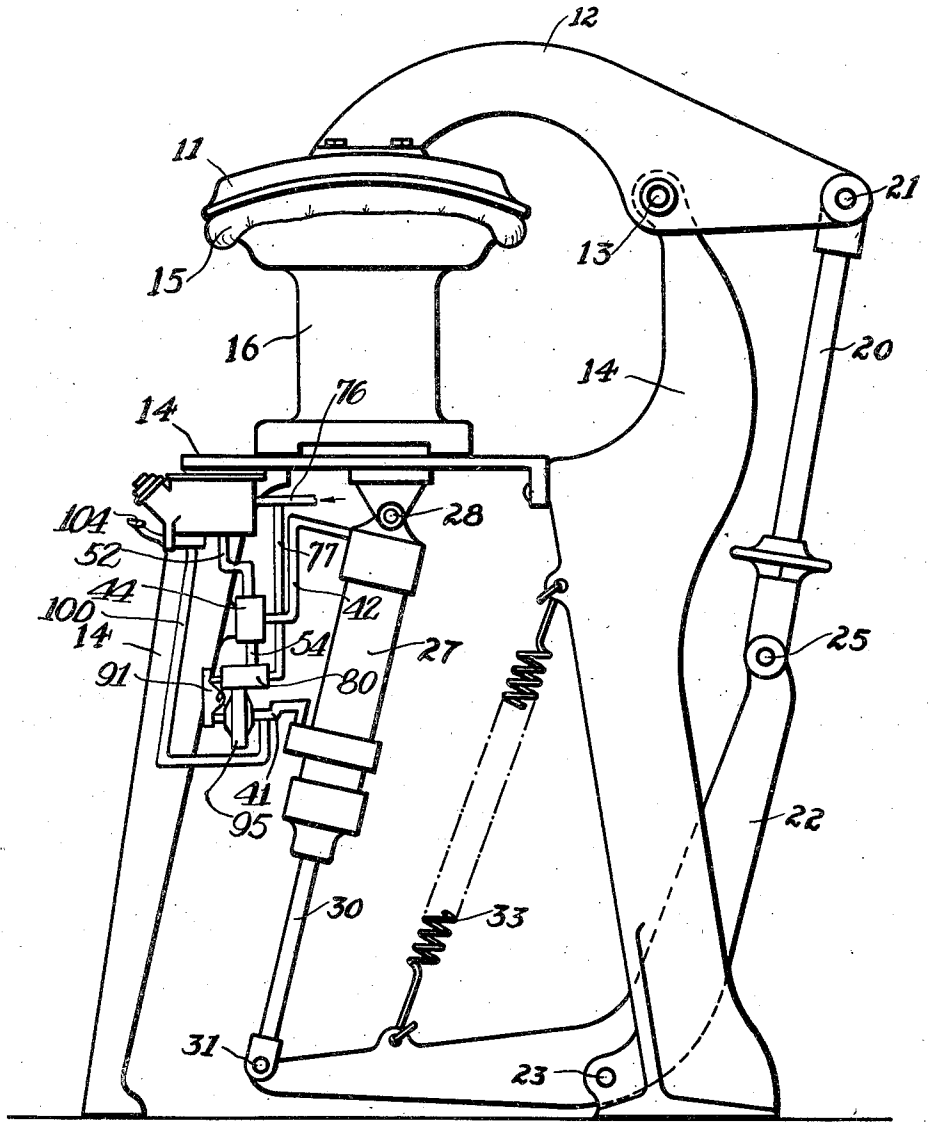


Fig-1-

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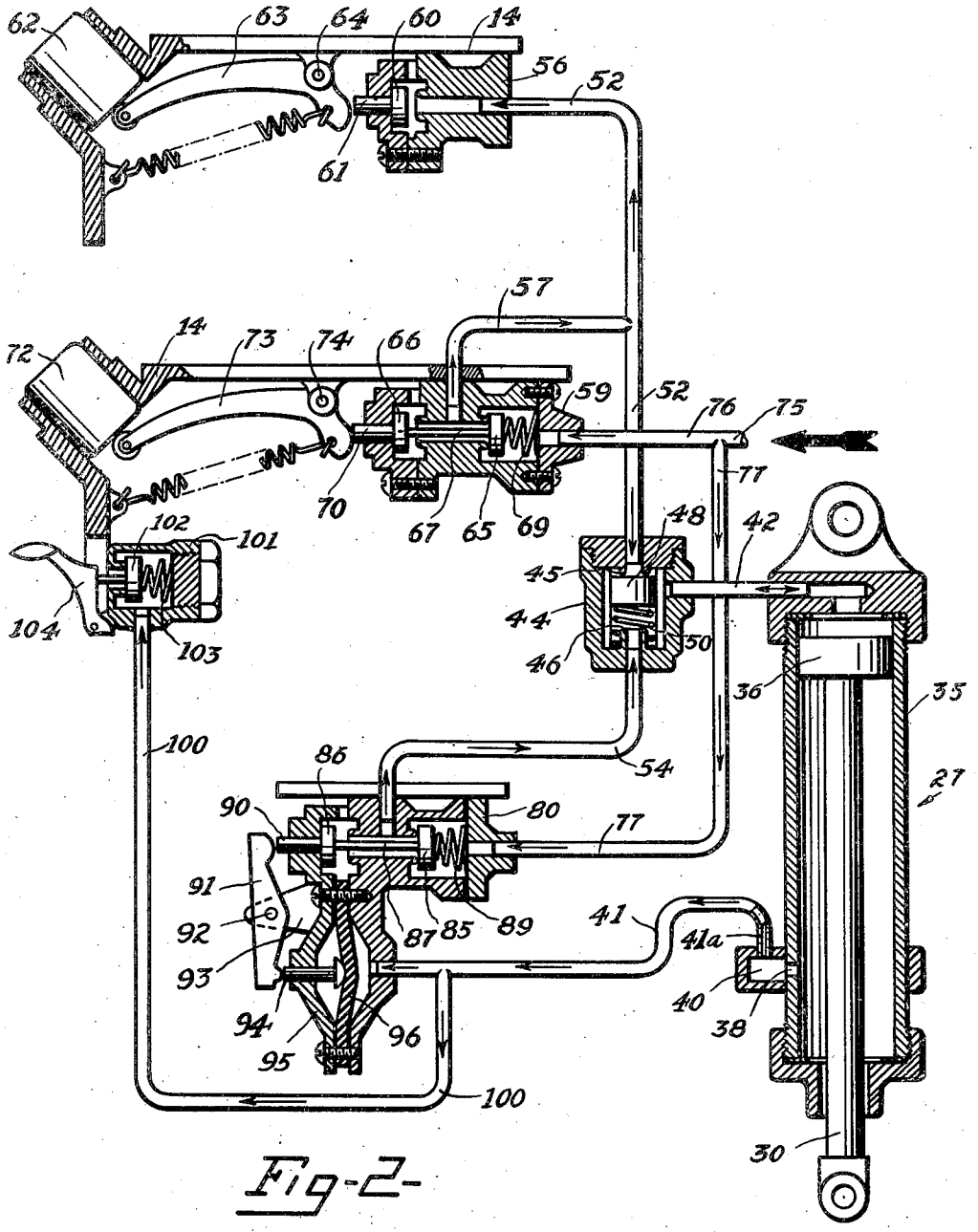


Fig-2-

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UNITED STATES PATENT OFFICE

1,999,400

GARMENT OR IRONING PRESS

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11 Claims. (Cl. 121—38)

This invention relates to jaw-type pressing machines such as garment and laundry presses and particularly to means of the two-hand control type for operating the motors of such presses.

It is common practice to provide pneumatic pressing machines with two-hand control devices which require the operator to hold a push button depressed with each hand until the pressing elements have come together. When the press is thus closed it is conventional practice to provide means for locking the valves, which are operated by the push buttons, in position so that the operator may release the push buttons and working fluid will continue to flow to the press motor to hold the press jaws closed.

The principal object of this invention is to provide novel means for locking a pressing machine closed without locking the two-hand control means. A further object of the invention is to provide means for automatically supplying working fluid to the motor when the press reaches closed position, and to operate such means independently of the valves which are operated by the two-hand control.

A further object of the invention is to provide a by-pass, for working fluid, around the two-hand control devices, and to provide means for automatically opening a valve in the by-pass to supply working fluid to the motor, after the pressing elements have come together, to hold the press closed.

Other objects and advantages of the invention will appear and will be pointed out as the description proceeds.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation of a pressing machine to which my invention is applied.

Figure 2 is a schematic showing, mostly in section, of the pressing machine motor and the control mechanism therefor.

The invention is designed primarily for use on pressing machines having an opening and closing movement and such a machine is shown in Figure 1 and includes a pressing head 11 secured to a yoke or press lever 12 which is pivotally mounted at 13 on a frame 14 of the pressing machine. A fixed pressing element or buck 15 is supported by a neck 16 which is mounted on the pressing machine frame 14. A link 20 is pivoted at 21 to the yoke. A bell crank 22 is pivoted at 23 to the pressing machine frame 14, and is pivotally connected at 25 to the link 20. A fluid motor 27 is oscillatedly mounted at 28 on the pressing machine frame 14. The fluid motor 27 includes a piston 30 which is pivotally connected at 31 to the forwardly extending arm of the bell crank 22. The link 20 and upstanding arm of the bell crank 22 form a toggle and operation of the motor 27 rocks the bell crank 22 in a counter-clockwise direction, in Figure 1, to straighten the toggle and bring the pressing elements 11 and 15 together to close the press. A spring 33 is secured at its upper end to the pressing machine frame 14, and at its lower end to the forwardly extending arm of the bell crank lever 22. The spring 33 rocks the bell crank lever 22 in a clockwise direction, in Figure 1, to break the toggle and open the press when working fluid is released from the fluid motor 27. The mechanism thus far described is of the conventional type and is merely one form of ironing press with which my invention may be used.

The fluid motor 27 includes a cylinder 35 having a piston 36 therein which is rigidly secured to the piston rod 30. The cylinder 35 is provided with a port 38 in the wall thereof at a point near the lower end of the cylinder. The port 38 establishes communication between the inside of the cylinder 35 and a chamber 40 which is connected to a pipe 41.

An orifice 41a of reduced cross section is provided in the pipe 41 for reasons which will be explained in connection with the operation of the control mechanism to open the press at the end of the pressure ironing operation.

Working fluid passes to and from the cylinder 35 through a pipe 42 which leads to a check valve casing 44. This valve is in effect a double check valve means 44 provided with an upper valve seat 45 and a lower valve seat 46, thus forming a two-way check valve. A check valve 48 is located within the check valve casing 44 and is normally held against the seat 45 by a spring 50 to close a by-pass pipe 52 leading from the top of the check valve casing 44. A by-pass pipe 54 leads from the bottom of the double or two-way check valve casing 44. When the check valve 48 is against the seat 45, working fluid can not flow from the check valve casing 44 into the by-pass pipe 52. When the check valve 48 is against the seat 46 working fluid can not flow from the check valve casing 44 into the by-pass pipe 54.

The pipe 52 is provided with an exhaust valve casing 56 at one end, and a branch pipe 57 con-

nects the pipe 52 with a combined intake and exhaust valve casing 59.

The valve casing 56 contains a normally open exhaust valve 60 having a valve stem 61 which extends through the end of the valve casing 56. A push button 62 is provided to operate the valve 60 in the valve casing 56. A bell crank 63, pivoted at 64 to the pressing machine frame 14, transmits motion of the push button 62 to the valve stem 61 to operate the valve 60.

The valve casing 59 contains a normally closed intake valve 65 and a normally open exhaust valve 66 which are connected together by a spacer rod 67 so that they operate as a unit. A spring 69 holds the valves in their normal open-press positions as shown in Figure 2. The valve 66 is provided with a valve stem 70 which projects through the end of the valve casing 59. A push button 72 is provided to operate the valves 65 and 66 in the valve casing 59. A bell crank 73, pivoted at 74 to the pressing machine frame 14, transmits motion of the push button 72 to the valve stem 70 to operate the valves 65 and 66 in the valve casing 59.

A fluid supply source conduit system such as a pipe or air pressure line 75 is connected by a pipe 76 with the valve casing 59. A branch pipe 77 leads from the fluid supply source or pipe 75 to a valve casing 80 comprising in effect a control valve means in the by-pass pressure supply line 77, 54.

The valve casing 80 contains a normally closed intake valve 85 and a normally open exhaust valve 86 which are connected together by a spacer rod 87 so that the valves operate as a unit and they remain in the position shown in Figure 2 until the press closes. A spring 89 holds the valves 85 and 86 in normal position. The valve 86 is provided with a valve stem 90 which projects through the end of the valve casing 80. A rocker arm 91 is pivotally mounted at 92 to a bracket 93 formed on the valve casing 80. The rocker arm 91 is operated by a plunger 94 which extends through the side of a diaphragm chamber 95 in which is mounted a diaphragm 96. When working fluid pressure is applied behind the diaphragm 96 the plunger 94 will be operated to move the rocker arm 91 against the valve stem 90 to operate the valves 85 and 86 in the valve casing 80. The pipe 54 connects the valve casing 80, at a point midway between the valves 85 and 86, with the check valve casing 44. Pressure is supplied to the diaphragm chamber 95 through the pipe 41.

To exhaust working fluid from the diaphragm chamber 95 a pipe 100 is connected with the pipe 41 and leads to a valve casing 101 which contains a normally closed exhaust valve 102. A spring 103 holds the valve 102 in normal position and a handle 104 may be operated to open the exhaust valve 102 to permit fluid to escape from the pipe 100 through the valve casing 101.

The operation of the control mechanism is as follows—

When the press is in open position, the control devices will occupy the positions shown in Figure 2 of the drawings and the piston 36 and piston rod 30 will be at the top of their stroke. Depression of the push button 62, without likewise operating the push button 72, will close the normally-open exhaust valve 60 but have no effect to start the operation of the motor since the supply of working fluid pressure is cut off by the normally closed intake valve 65. Depression of the push button 72, without operating the other push button 62, will open the intake valve 65 and close the exhaust valve 66. Working fluid will flow through the pipe 76 around the open intake valve 65, through the valve casing 59, and branch pipe 57, to the pipe 52, but no pressure will build up in the pipe 52 since the working fluid will escape through the valve casing 56 and open exhaust valve 60 as fast as it is supplied through the branch pipe 57. From the above description it will be apparent that it is impossible for the operator to close the press by operating only one of the push buttons 62 and 72. Should the operator remove his hand from either button 62 or 72 while the press is closing the motor is instantly deenergized, and the press-opening spring 33 arrests the closing movement of the ironing head 11 and pulls it back up out of the way to afford clear vision of the work and room to safely smooth or correct the lay of the garment or work about to be ironed on the buck 15.

If the push buttons 62 and 72 are both depressed at the same time working fluid from the supply line or pipe 75 will flow through the supply pipe 76, around the open intake valve 65, through the valve casing 59, and branch pipe 57 to the pipe 52. Since the exhaust valve 60 is closed working fluid can not escape to atmosphere from the pipe 52 through the valve casing 56. Pressure will now build up in the pipe 52 and the two-way check valve 48 will move downwardly and open against the tension of the spring 50. Working fluid will then flow from the pipe 52 into the double check valve casing 44, and through the pipe 42 to the cylinder 35 to operate the fluid motor 27 to close the press.

The check valve 48, spring 50 and valve casing 44 are so designed that the dynamic pressure of the working fluid flowing from the pipe 52 into the valve casing 44 against the check valve 48 will hold the check valve 48 against the lower seat 46 so that working fluid can not escape from the check valve casing 44 through the pipe 54 to atmosphere thru the by-pass control means 80 having the normally-open exhaust valve 86.

As the fluid motor 27 operates to close the press the piston 36 will move downwardly, in Figure 2, until it uncovers the port 38 in the wall of the cylinder 35. The port 38 is located in such a position in the cylinder wall that the pressing elements or jaws will be substantially together before the piston 36 uncovers the port 38. When the pressing elements are substantially together there is no longer any danger of the operator getting one hand between the pressing elements and hence, it is not necessary to require the operator to keep his hands on the push buttons 62 and 72 during the remaining operation of the press. When the piston 36 uncovers the port 38 and admits working fluid into the chamber 40 from which it flows through the pipe 41 to the diaphragm chamber 95, the valves in the valve casing 80 will be operated to supply working fluid to the motor and the operation of the valves, which are controlled by the operator, is no longer necessary.

When the diaphragm 96 is actuated by pressure from the cylinder 35 and the rocker arm 91 tilts to open the intake valve 85 and close the exhaust valve 86, working fluid will flow from the pipe 75, through the by-pass pipe 77, around the open intake valve 85, through the valve casing 80, the by-pass pipe 54, thru the check valve casing 44, and thence to the fluid-pressure motor 27. Hence the spaced two-hand controls 62 and 72 are cut out, shunted or by-passed by the pressure feed lines 75, 77 and 54 under the control of the

cylinder port 38 and pneumatic control means 87, 96 after the press has reached closed position, whereby the operator may then release the two buttons and yet the pressure remains applied to the cylinder to keep the press closed.

When the pressure is applied under the check valve 48, from the cylinder port 38, this pressure together with the spring 50 will overcome the dynamic pressure caused by working fluid entering from the pipe 52 and the check valve 48 will move into its normal position by expansion of the spring 50 and into contact with the seat 48. Working fluid from the pipe 54 now flows through the check valve casing 44, and pipe 42, to the cylinder 35 of the fluid motor 27 to operate the fluid motor to apply final heavy pressure to the pressing elements and hold the press in closed position. After the operation of the valves to close the exhaust 86 and open the intake 85 in the valve casing 80 the operator may release the push buttons 62 and 72 since the check valve 48 will prevent working fluid from escaping through the pipe 52 to either of the open exhaust valves 60 or 66.

When the operator wishes to open the press he will open the exhaust valve 102 by raising the handle 104. Pressure in the pipe 41 and diaphragm chamber 95 will immediately be reduced by the escape of working fluid through the pipe 100, valve casing 101, and around the open exhaust valve 102. Due to the reduced cross section of the orifice 41a in the pipe 41 working fluid will not enter from the chamber 40 into the pipe 41 as fast as it will exhaust through the pipe 100, valve casing 101, and around the open exhaust valve 102. When the pressure in the diaphragm chamber 95 is thus reduced the spring 89 will move the valves 85 and 86 into normal position with the intake valve 85 closed and the exhaust valve 86 open. The supply of working fluid from the pipe 77 is thus cut off by the closing of the intake valve 85, and working fluid will exhaust from the cylinder 35 through the pipe 42, check valve casing 44, pipe 54, valve casing 80, and open exhaust valve 86. The spring 33 (see Figure 1) will return the press operating mechanism to open-press position.

It is to be noted that the by-pass control valve means 44 serves to connect the initial pressure feed line 57, 52 with the final or by-pass feed line 54, 77. The spring 50 controls the action of the by-pass valve means 44 at or near the end of the power stroke of the pneumatic motor piston 36 by opening the pressure port 46 and thereby continuing the flow of motive fluid pressure to the cylinder 35 and completely cutting out the initial or preliminary pressure supply or feed line 52 so that it matters not that the operator releases the control manuals 62 and 72 after the press closes. The spring 50 does not open the normally-closed port 46 until near the end of the piston stroke and then the two valve means 56 and 59, which are merely pilot or initial operating valves, are completely shunted or cut out. The combination mechanical-pneumatic means 87, 96 exercises complete control over the by-pass valve means 44 and its actuating spring means 50 and permits the latter to function only after the piston 36 uncovers the port 38. These are important features of the invention.

A plurality of closed intake spring-loaded valves 65 and 48, as well as the open exhaust valve 60, insures a deenergized motor means 27, until the two pilot or preliminary manuals 62 and 72 are depressed, whereupon the spring closed valve 48 is opened by fluid pressure initially to energize the motor and thereafter the motor is continued energized by pressure received from another line, the by-pass 77, 54.

From the above description it will be apparent that I have devised a novel two-hand control for pressing machines by means of which the press is closed under final heavy pressure and held or locked in closed position by fluid pressure without the necessity of locking the operator-operated control valves. It will be further apparent that the operation of my improved locking or by-pass pressure feed line control means is entirely automatic. The invention is illustrated in its preferred embodiment but changes and modifications may be made without departing from the spirit of the invention as set forth in the appended claims.

What I claim is:

1. In a pressing machine in combination co-operative pressing elements, one of which is movable toward and from the other to close and open the press; operating mechanism for the movable pressing-element including a fluid motor having a piston, and a cylinder with a port opening in the wall thereof near the end of the stroke of the piston; operator-operated devices for supplying working fluid to the cylinder to operate the fluid motor to close the press; other devices for supplying working fluid to the cylinder to lock the press in closed position; operating means for said other devices including means operated by working fluid supplied thereto when the piston uncovers the port in the cylinder during closing movement of the press.

2. A garment or ironing press, comprising in combination, coacting press jaws, operating mechanism to open and close the press, including a fluid-pressure motor operatively connected with one of the press jaws, an initial fluid-pressure supply line connected with the motor, two-hand control-valve means included in the supply line to admit fluid pressure to the motor to actuate it and close the press, spring means included in the operating mechanism to arrest the closing movement of the press should an operator release either two-hand control-valve means during said closing movement, a by-pass pressure-supply line also connected with the motor and by-passing pressure around the two-hand control-valve means; and a two-way check-valve means connecting the by-pass pressure-supply line with the two-hand control-valve means, whereby said by-pass line is closed when the two-hand control-valve means is operated to start the motor, and conversely said by-pass line is opened to supply the motor with fluid pressure after the two-hand control-valve means are released to hold the press closed by fluid pressure.

3. A garment or ironing press, comprising in combination, coacting press jaws, operating mechanism to open and close the press, including a fluid-pressure motor operatively connected with one of the press jaws, an initial fluid-pressure supply line connected with the motor, two-hand control-valve means included in the supply line to admit fluid pressure to the motor to actuate it and close the press, spring means included in the operating mechanism to arrest the closing movement of the press should an operator release either two-hand control-valve means during said closing movement, a by-pass pressure-supply line also connected with the motor and by-passing pressure around the two-hand control-valve means; and by-pass control-valve means con-

necting the two aforesaid supply lines to the motor and adapted to normally close the initial fluid-pressure supply line when the press is open but operable to open when the two-hand control-valve means are actuated aforesaid and simultaneously closing said by-pass pressure-supply line, and means operative near the end of the press-closing motion to reverse the setting of the by-pass control-valve means to close the initial fluid-pressure supply line and open the by-pass pressure-supply line.

4. A garment or ironing press, comprising in combination, coacting press jaws, operating means to open and close the press, including a fluid-pressure motor operatively connected with one press jaw, an initial pressure-feed line including a two-hand control means connected with the motor, a by-pass pressure-feed line connected with the initial line and with the motor to by-pass pressure around the two-hand control means, a two-way check-valve means in the by-pass line and operative in one direction by pressure from the initial line to close the by-pass line, and means to operate said check-valve means in the other direction by pressure from the by-pass line to close the initial line and open the by-pass line near the end of the press-closing movement.

5. A garment or ironing press, comprising in combination, coacting press jaws, operating means to open and close the press, including a fluid-pressure motor operatively connected with one press jaw, an initial pressure-feed line including a two-hand control means connected with the motor, a by-pass pressure-feed line connected with the initial line and with the motor to by-pass pressure around the two-hand control means, a valve housing connecting the two lines and having two valve-port seats, a valve head movable between the two seats to close first one port and the other, and actuating means operated near the end of the press-closing movement to actuate the valve head to one of its seats to close the initial feed line and open the by-pass line.

6. A garment or ironing press, comprising in combination, coacting press jaws, operating means to open and close the press, including a fluid-pressure motor operatively connected with one press jaw, a double-check valve housing connected with the motor, spaced-valve seats forming two intake ports in the housing, a pressure-feed line connected with each port, a valve head movable between the seats, a spring to hold the valve on one seat when the press is open, manually-controlled valve means in one line, pressure-controlled valve means in the other line, and means to actuate the pressure-controlled valve means upon a predetermined extent of movement of the press.

7. A garment or ironing press comprising, in combination, coacting press jaws; operating mechanism operatively connected with one of the press jaws to open and close the press including, a fluid pressure motor; operator actuated valve means having a normally open exhaust and a normally closed intake adapted to be connected with a source of fluid pressure, an operating connection connecting the operator actuated valve means and the motor, a by-pass valve means having a normally open exhaust and a normally closed intake adapted to be connected with the source of fluid pressure, a by-pass connection connecting the by-pass valve means with the motor, actuating means operatively connected with the by-pass valve means to close the exhaust and open the intake upon a predetermined extent of movement of the operating mechanism, and means normally closing one of the connections and operated upon the same predetermined extent of movement of the operating mechanism to cut off the operating connection and open the by-pass connection.

8. A garment or ironing press comprising, in combination, coacting press jaws; operating mechanism operatively connected with one of the press jaws to open and close the press including, a fluid pressure motor; operator actuated valve means having a normally open exhaust and a normally closed intake adapted to be connected with a source of fluid pressure, an operating connection between the operator actuated valve means and the motor, a by-pass valve means having a normally open exhaust and a normally closed intake adapted to be connected with the source of fluid pressure, a by-pass connection connecting the by-pass valve means with the motor, actuating means operatively connected with the by-pass valve means to close the exhaust and open the intake upon a predetermined extent of movement of the operating mechanism, and means normally closing the operating connection and operated upon the actuation of the operator actuated valve means to open the operating connection and close the by-pass connection and operated upon actuation of the by-pass valve means to close the operating connection and open the by-pass connection.

9. A garment or ironing press comprising, in combination, coacting press jaws; operating mechanism operatively connected with one of the press jaws to open and close the press including, a fluid pressure motor; operator actuated valve means having a normally open exhaust and a normally closed intake adapted to be connected with a source of fluid pressure, an operating connection between the operator actuated valve means and the motor, a by-pass valve means having a normally open exhaust and a normally closed intake adapted to be connected with the source of fluid pressure, a by-pass connection connecting the by-pass valve means with the motor, actuating means operatively connected with the by-pass valve means to close the exhaust and open the intake upon a predetermined extent of movement of the operating mechanism, and check valve means resiliently closing the operating connection, means connected with fluid pressure upon actuation of the operator actuated valve means and operating the check valve means to open the operating connection and close the by-pass connection and being operated by fluid pressure from the by-pass valve means upon actuation thereof to cut off the operating connection and open the by-pass connection.

10. A garment or ironing press comprising, in combination, coacting press jaws; operating mechanism operatively connected with one of the press jaws to open and close the press including, a fluid pressure motor; operator actuated valve means having, a normally closed intake valve adapted to be connected with a source of fluid supply and a normally open exhaust valve; an operating connection between the operator actuated valve means and the motor, a by-pass valve means having a normally closed intake valve connected with a source of fluid supply, a by-pass connection connecting the by-pass valve means with the motor, means operated upon a predetermined extent of movement of the operating mechanism for opening the by-pass intake valve, valve means in the operating connection and op-

erated by fluid pressure in the by-pass connection to close the operating connection and render the normally open exhaust valve ineffective to exhaust fluid from the motor, and means to exhaust the fluid pressure from the motor to open the press.

11. A garment or ironing press comprising, in combination, coacting press jaws; operating mechanism operatively connected with one of the press jaws to open and close the press including, a fluid pressure motor; operator actuated valve means having, a normally closed intake valve adapted to be connected with a source of fluid supply; an operating connection between the operator actuated valve means and the motor; a by-pass valve means having a normally closed intake valve connected with a source of fluid supply, and a normally open exhaust valve; a by-pass connection connecting the by-pass valve means with the motor, means operated upon a predetermined extent of movement of the operating mechanism for opening the by-pass intake valve and closing the open exhaust valve, and valve means operated by fluid pressure in the operating connection to close the by-pass connection and thereby render the normally open exhaust therein ineffective, and means to exhaust the motor.

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