

April 26, 1938.

E. DAVIS

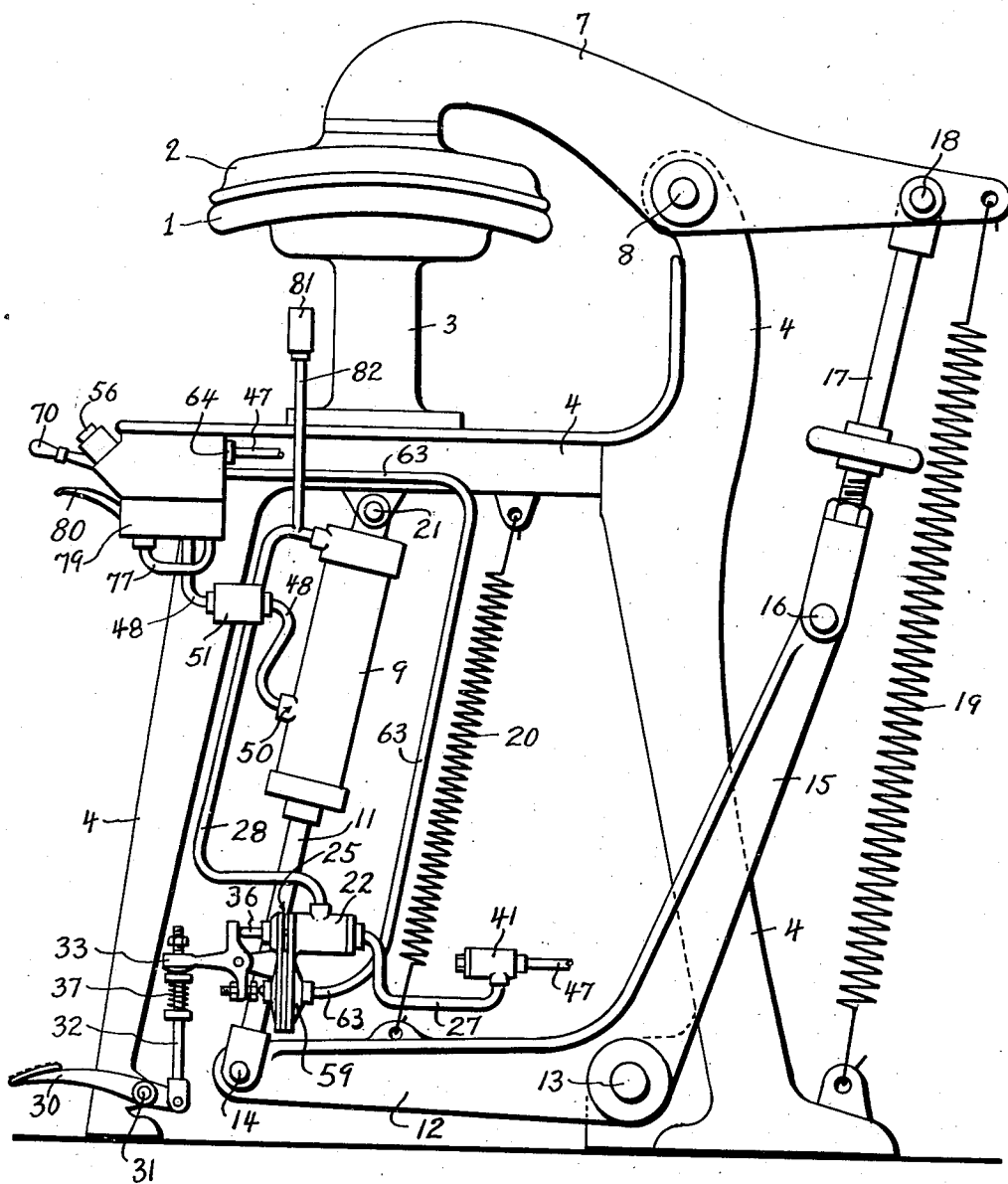
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MOTOR MEANS FOR FABRIC PRESSING MACHINES

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2 Sheets-Sheet 1

FIG. 1



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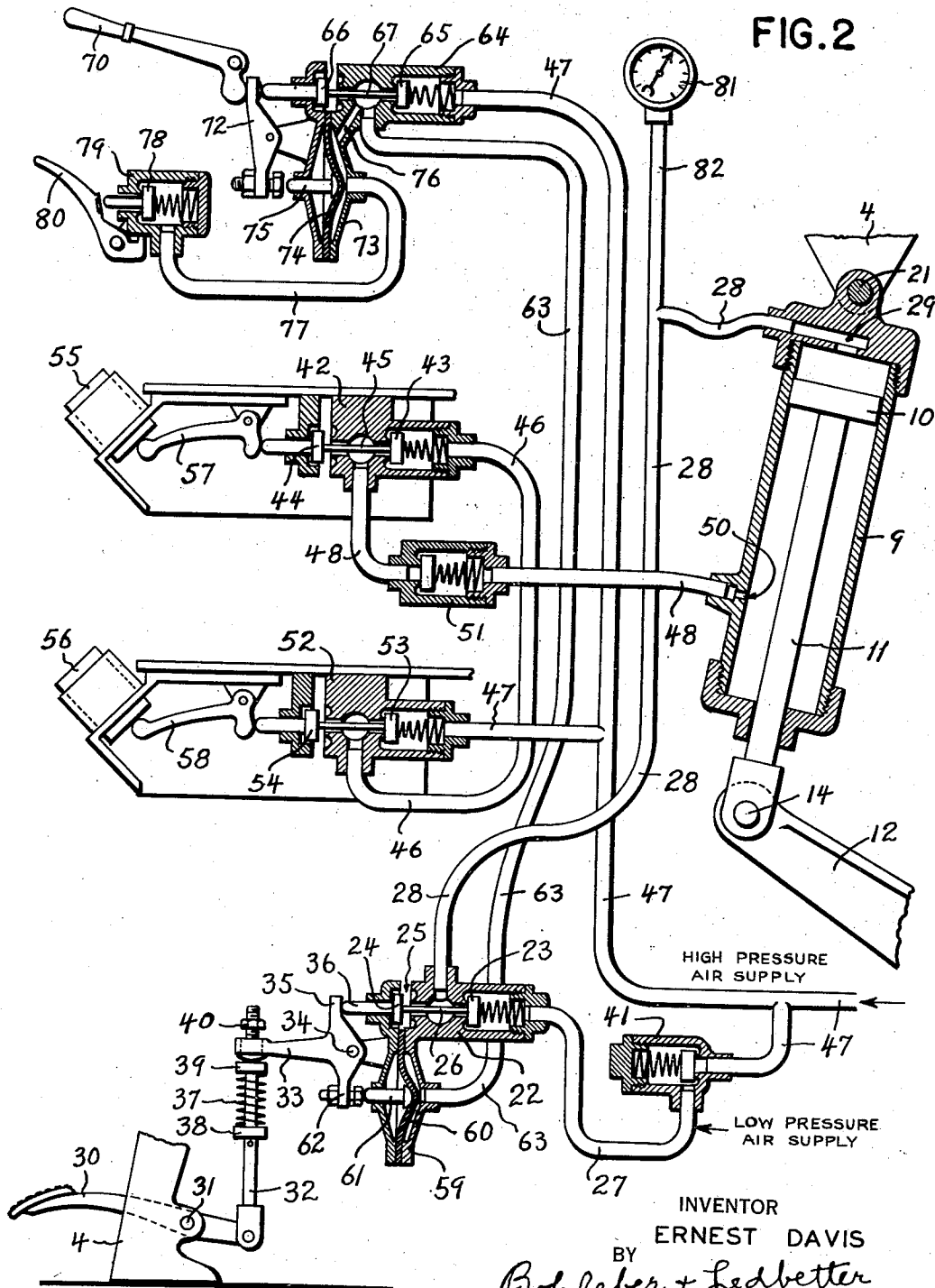
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2 Sheets-Sheet 2



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MOTOR MEANS FOR FABRIC PRESSING MACHINES

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The invention relates to pressing machines, such as garment and fabric or ironing presses, and particularly to fluid-pressure or pneumatic motor means and safety controls therefor, affording a full-automatic press having a power-operated two-step closing function.

An object of this invention is to provide a fluid or air-pressure motor means of simple form comprising few parts and having safety controls for fabric presses of novel construction, wherein the press first or initially closes to apply light pressure to the work between the press jaws, and thereafter secondly applies final-heavy pressure and locks closed for the necessary pressing period.

Another object is to produce a fabric or apparel press with a power-actuating mechanism having a simplified two-step motor means in which, after the second step heavy pressure is applied, varying degrees of graduated additional pressure in increments can be applied between the press jaws, if desired.

A further object is to produce a fabric-finishing press having a fluid-pressure motor means and safety controls therefor, in which the operator actively holds a two-hand three-member control at the time the press head goes under final-heavy locked pressure, so that a first-control means is held to its actuated position by the operator to initially close the press, and while still holding said first-control means, the operator actuates another or second-control means by which to put the press head under final-heavy pressure.

Other objects will be more apparent from the following description taken in connection with the accompanying drawings which illustrate one embodiment or example of how the principles and mode of operation of this invention may be carried into effect. Other forms of construction may be utilized without departing from the invention.

In the following description, reference is made to the accompanying drawings, for an example of one form of this invention, wherein like reference characters designate corresponding parts in all the views to which reference is now made to teach the principles of the invention.

Figure 1 is a side elevation of a pressing machine embodying the invention and shown in its second-pressure step which is finally-closed position under heavy pressure. The press illustrated is known as the scissors-action type wherein the upper ironing head is pivoted at the rear and swings up and down in an arc. The press is a full-automatic type, in that the ironing head is fully closed by motor means from its wide-open position to finally-closed heavy-pressure position.

Figure 2 is a sectional diagrammatic view of the motor means and its safety controls removed from the press frame, and spread apart for clarity of understanding, the position of all parts being that of open-press position.

The example of pressing machine shown comprises generally, cooperating pressing elements or jaws, which open and close in relation to each other, power actuating mechanism including a fluid-operated motor means for opening and closing the press, manual or operator-actuated means for initially controlling the flow of motive fluid to a motor means to safely close the press to its preliminary position, and additional manual means for thereafter controlling the flow of fluid pressure to a motor means to apply final-heavy jaw compression to the work.

In the example of construction selected to illustrate this invention, the pressing elements or press jaws comprise the usual padded buck 1 and an ironing head 2 movable toward and from the buck. The buck is mounted upon a bracket or goose neck 3 which is in turn mounted upon and supported by the frame 4 of the press. The press head 2 is usually carried on the front end of a yoke or lever 7 pivoted at 8 on the frame 4 at the rear of the press jaws.

The fluid-operated or pneumatic motor means shown in this example of the invention is of simplified type, and may take the form of a single cylinder 9 and a piston 10, since the principles herein taught provide means wherein a single piston is capable of two characteristically different functions in its power stroke for closing the press in two stages of movement. The motor control means of my invention impresses on a single motor piston a controlled two-step or two-stage power stroke, each of which delivers a different degree of power output, first a low-power long stroke safe to the operator in initially closing the press, and second a high-power short stroke capable of great ironing pressure.

The piston 10 has its connecting rod 11 operatively attached, through suitable motion-transmitting or operating connections, to the ironing head 2. This head-operating mechanism, in addition to the lever 7, may comprise a bell crank lever pivoted at 13 to the base of the frame 4. The bell crank has a forwardly extending arm 12 to which the piston rod 11 is pivotally connected at 14, and an upwardly extending arm 15 pivoted at 16 to the lower end of a link 17, the upper end of which is pivoted at 18 to the rear arm of the head-carrying lever 7. The arm 15 and the link 17 form a toggle to swing the ironing

head 2 up and down in an arc to coact with the usual padded buck 1.

The cylinder 9 is pivoted at its outer end on the press frame at 21 to afford free oscillating movement during the swinging action of the press head 2. Since the motor piston 10 is single acting to close the press only and not open it, counter-springs 19 and 20 are employed to reverse the motor and head-operating mechanism to open the press when the air pressure in the motor means is released or vented at the end of the ironing or press-finishing operation. Furthermore, these springs 19 and 20 also act to arrest the downward motion of the ironing head 2 and throw it back to safety wide-open position in the event the operator should carelessly fail to follow the proper sequence of motor control operation, which this invention provides as a protection against injury to the operator's hands or fingers at the instant the press head 2 goes under final-heavy pressure.

The press-starting control means for initially closing the press to preliminary position and safely applying light or low jaw pressure between the head and buck, through the first step of press operation, comprises a manually-operable control, shown in this instance as a pedal 30 with its valve means 22. This initial press closing control means 30, 22 will now be described, and it discloses how my invention provides a safely closing press, with a motor means capable of lightly swinging the head down, and thereafter applying final-heavy jaw compression on the work, both movements of which are governed by a two-hand three-member control means, assuring absolute protection to the operator.

The operator-actuated first control member 30 is for controlling a valve including a casing 22 having a normally-closed spring pressed inlet valve 23 therein controlling the intake of low-pressure air to the motor, and a normally-open exhaust valve 24 controlling an outlet or exhaust passage 25 venting to atmosphere, as shown. These valves 23 and 24 are connected by a stem 26 so that they act together as a unit.

The intake end of the valve casing 22 is connected with a low-pressure air supply line 27 for a motive fluid reduced to light or low pressure by any well known means. The valve casing 22 is also connected at a point between its two valve heads 23 and 24 to an air line 28 which conveys low-pressure air to a port 29 in the head or intake end of the cylinder 9 to actuate the piston 10 on its low-power first-stage movement, and this air line 28 also serves as the exhaust line to vent the cylinder 10 of all air pressure at the end of the ironing operation when the press is ready to be opened.

The pedal 30 is pivoted at 31 to the frame 4 of the press, and is connected by a push rod 32 to a lever 33 pivoted at 34 to the valve casing 22 and having a rocker arm 35 thrusting against a stem 36 of the unit exhaust and intake valve means 24, 23. The motion of the pedal 30 is yieldingly transmitted to the valve lever 33 through a coil spring 37 on the push rod 32 interposed between a fixed collar 38 and a slidable collar 39 on said rod. The spring 37 thrusts the free collar 39 upwardly against the lever 33 to move the valve unit 26 to the right, thus opening the intake 23 and closing the exhaust 24. The control rod 32 slides freely through an enlarged opening in the lever 33 and has a nut or fixed shoulder 40 at its upper end which pulls downwardly against the lever 33 when the pedal 30 is released and the

compressed spring 37 is free to react downwardly to return the pedal 30 to its up position.

The valves 23 and 24 are either held in their reversed or closed-press positions (opposite to that shown in Figure 2) by the toe-control 30 held down by the operator's foot, or by a pressure-operated means, say a diaphragm 60, under the control of another manual member 70, to be hereinafter described. In both events, i. e., by either of these two optional valve-holding means, the piston 10 is maintained on its outstroke under fluid pressure to keep the press initially closed under light or low pressure contact, or under heavy-final locked pressure at the will of the operator.

A main air supply line 47, say of normal or high-pressure, connects with one side of a well known form of pressure-checking or reducing valve 41, thereby affording a low-pressure output of air through the line 27 leading from the other side of the reducing valve 41 to the valve 22. The check valve 41 serves to reduce or cut down the degree or value of pressure in any well known manner flowing from the source or feed line 47 to the initial control or press-closing valve means 22, and hence to the cylinder 9, by which the latter develops a minimum or low-power output to initially close the press, but insufficient to produce ironing pressure.

A second manual control means comprises an operator-operated or preferably a manually operable normally-closed intake valve means 42 and its manual 55 connected in the high pressure feed line 46, 47, and also connected by a flexible tubing 48 to a port 50 in the cylinder 9 of the motor means. This second control means (it can be a one or two-hand control) governs a flow of high-pressure fluid to the cylinder 9, and thereby further energizes the motor means to a higher degree of power output to initiate the second and final stage of heavy locked jaw pressure.

This second control means comprises the valve casing 42 having therein a normally-closed spring-pressed intake valve 43, and a normally-open spring-pressed exhaust valve 44 therein, these valves being combined or connected to act as a unit by a stem 45. The intake end of the valve casing 42 is connected in series by the pipe 46 with the high-pressure feed line 47, through another and similar valve casing 52 also having a unit valve stem carrying an intake head 53 and exhaust head 54 with a manual 56 like its companion series valve 42. One of these valves 42 or 43 could be omitted. However, the second valve 52, in series with the other, is preferably and necessarily employed to obtain a two-hand control 55 and 56 so that the press head 2 cannot be locked closed under the final-heavy pressure second step unless both hands are held simultaneously on two control buttons or manuals at that time.

This second-step two-hand control means, formed by the series-arranged valves 42 and 52 in the feed line 47, 46, 48 safely controls the heavy locking pressure step of the motor means 9, whereby the press jaws 1 and 2 close under high power or final-heavy pressure. The high power is obtained, in the embodiment shown herein, by applying high pressure fluid to the single motor 9. This second control means includes manual means to operate the same, say the press buttons 55 and 56 with their connecting levers 57 and 58, and means operable upon a predetermined extent of movement of the motor means for rendering effective said two-hand con-

trol, and thereby governing the application of high pressure to the motor to finally close the press and lock it under final-heavy pressure, as now described.

5 The cylinder 9 has its port 50 located toward the end of the out stroke of the piston 10. This port is uncovered by the piston 10 when the latter has travelled a certain distance predetermined by the position of the port 50 in the cylinder wall, which port is appropriately located in relation to the initial down swing of the head 2. The port 50, therefore, is adapted to be uncovered by the piston 10 simultaneously with the head 2 reaching the buck 1 and making light contact therewith.

15 The port 50, in cooperating with the piston 10 and the first control means 30, 32, controls the second step of the press operation by application of high pressure to the motor means 9. The depression of the buttons 55 and 56 alone will not accomplish this high-power energization of the motor means until after the port 50 has been uncovered by the piston 10. However, after the press initially closes and the port 50 is opened, coupled with the holding down of the control 30 by the operator, this second-step control 55, 56 can then be manually actuated by the operator to deliver high-pressure air to the motor 9 to close and lock the press under final-heavy pressure.

30 A suitable check valve 51 is located in the pipe 48, between the motor and the second-step control 55, 56 to prevent the air pressure from the cylinder 9 from venting out through the pipe 48 and through exhaust ports in both valve casings 42 and 52 when low pressure fluid is initially applied to the motor means for the first-step closing function. This check valve 51 also prevents the high pressure from exhausting from the motor 9 when the manuals 55 and 56 are released at the end of the second-step closing function.

40 The spaced two-hand operated packless exhaust valves 44 and 54 do not function as exhaust valves per se. or as exhaust valves for the motor means 9 itself, because the check valve 51 is included in the high pressure line 48, leading to port 50. They are used, however, instead of packings to prevent leakage of air from the valve casings 42 and 52 when the intake valves 43 and 53 are held open by the two-hand control means 55 and 56. If soft or wrapped packings were used instead of these packless exhaust-closure heads 44 and 54, the check valve 51 would not be necessary. But since wrapped or soft packings become leaky, this type of unit packless valves is preferred.

There is provided a holding means for the first-step or press-starting control 30, 22. This is shown as a manual 70, with related means, for holding or locking the unit valves 23 and 24 in their operated or closed-press position in order to initially close and hold closed the press under light pressure. This necessarily requires that the exhaust port 25 be kept closed, which is accomplished either by the toe control 30 or the hand control 70, or both. There is also a press-opening or release manual 80 for releasing the valves 23 and 24 to effect the opening of the press at the end of the ironing operation. The optional control 70 and the press-opening control 80, with their related elements, will now be described.

A pressure or diaphragm chamber 59 is associated with the first control 30, 22. A flexible diaphragm 60 in said chamber acts on a stem 61 which in turn acts upon the third arm 62 of

the rocker arm 33 of the pedal control 30. The pressure side of this diaphragm chamber 59 is connected by a pipe 63 leading to a valve casing 64 of the control 70. The valve housing 64 has a normally-closed spring pressed intake valve 65 and a normally-open exhaust valve 66 connected together by a stem 67 to act as a unit. The intake end of the valve casing 64 is connected with the high pressure feed line 47.

The combined or unit valves 65 and 66 are operated by the manual or handle 70 pivoted on the valve housing 64 and thrusting against a rocker arm 72 which in turn acts upon the stem of the exhaust valve 66. The unit valves 65 and 66 are held in their operated positions by pressure-operated means such as a diaphragm chamber 73 associated with the valve casing 64, a diaphragm 74 therein acting upon a sliding stem 75, which in turn acts upon the rocker arm or lever 72. The pressure side of the diaphragm chamber 73 is connected by a passage 76 to the interior of the valve casing 64, so as to transmit pressure to the diaphragm chamber 73 and deflect the diaphragm 74 to the left, thus tilting the rocker arm 72 and locking closed the exhaust valve 66 and open the intake 65 by which to send a charge of air pressure to the diaphragm chamber 59 to actuate and hold the valve unit 26.

The diaphragm chamber 73 is also connected with an exhaust pipe 77 having a normally-closed spring-pressed exhaust valve 78 therein which is located in a valve casing 79. This release or exhaust valve 78 is operated by lifting a trigger-like manual 80 to free the diaphragm chamber 73 of air pressure so as to release the rocker arm 72 and permit it to assume the free position shown in Figure 2, thereby venting the pipe 63 leading from the other diaphragm chamber 59 of the toe control assembly 30, 22. When the pipe 63 vents, the exhaust 25 opens, and the cylinder 9 exhausts to atmosphere through pipe 28 and atmospheric port 25.

The valve casing 22 may be suitably supported in the lower part of the press frame 4 for convenient operation when the control 30 is made in the form of a toe control, as shown. The valve casings 42, 52 and 64 are mounted in suitable housings on the frame located near the table of the press in order that the manual controls 70, 55 and 56 are conveniently reached for hand operation.

A pressure gauge 81 is connected by a pipe 82 to the cylinder 9 or to the port 29 so that the operator can determine how much air pressure is being delivered, and hence determine whether or not additional jaw pressure is required for a particular piece of work being ironed and to determine when the jaw pressure reaches the required degree. Hence, in all operations, the pressure gauge 81 shows the operator the amount of pressure in the cylinder 9 which bears a relation to the amount of jaw compression being delivered to the work-piece being ironed, and permits him to determine how much extra pressure is required or how much extra pressure is being delivered.

In the use of the press, the operator first spreads the work to be ironed on the padded buck 1. The operator may then depress and hold the pedal 30, and the head 2 comes down easily under light pressure with no danger to the operator. If the operator determines that heavy pressure is not required, he can either hold down the pedal 30 with his toe, or depress the handle 70 to

permit air pressure to pass from the high-pressure feed line 47 through the valve casing 64, and hence through the pipe 63 to the diaphragm chamber 59 to lock the toe-control motor-starting unit valves 23 and 24 in their operated or closed-press position at the end of the initial or first-step closing movement of the press. Hence, the means 70, 64 is in effect a simple device for holding the toe control 30, 22 in its operated or closed-press position.

To put the press under locked final-heavy pressure, the push buttons 55 and 56 are now depressed, thus permitting high-pressure air to pass from the feed line 47 through the valve casings 52 and 42, the pipe 48, past the check valve 51 and into the cylinder 9. Hence, either one or both of the low-pressure controls 30 or 70 are first depressed, and thereafter the high-pressure control 55, 56 is actuated, and this final two-step control affords a safe, high-pressure, multi step ironing press.

To release the air pressure in the cylinder 9 and open the press jaws 1 and 2, the press-opening or release valve lever 80 is lifted by the operator's finger. This permits the air to exhaust from both diaphragm chambers 59 and 73, and thus permits the motor-starting or initial-step valves 23 and 24 to return to their normal open-press positions. The air pressure then exhausts from the cylinder 9 out through the combined intake and exhaust pipe 28, valve casing 22, exhaust passage 25 to atmosphere, and the head-returning springs 19 and 20 open the press.

In case the operator does not operate the supplemental motor-starting valve handle 70 to hold the first motor-starting valve 22 to its closed-press position, through deflection of both diaphragm chambers 59 and 73, but maintains the press closed by holding his toe on the pedal 30, the press can be opened up, either from light or heavy pressure, by merely releasing the pedal 30.

It will now be understood that I have provided an initial press-closing control (for example, the operator-actuated manual 30) which is held by the operator while the ironing head 2 is swinging down to preliminarily-closed position just short of its ironing pressure, and that this control is also held by the operator at the time he actuates the second control means, (either a single or double manual 55, 56) to put the press under final-heavy locked ironing pressure, and that at least one set of these controls preferably constitutes a two-hand control. In other words, my pneumatic motor and control combination, in an ironing press, comprises a two-hand third-manual control, that is to say a two-hand control composed of three manuals, all three of which are held by the operator at the moment of critical action when the press is going under heavy locked pressure. Thus, a factor of great safety is provided in the control of the movement of the steam-heated laundry press head 2 capable of grave danger to an operator.

The two-hand control 55, 56 may also be used for the further purpose of a graduated-pressure control to apply extra or graduated heavy pressure to the press jaws. The amount of high-pressure air delivered to the cylinder 9 is determined by the length of time the operator holds the push buttons 55 and 56 depressed. For example when the press is initially closed to preliminary position, the operator may depress the push buttons 55 and 56 momentarily so that working fluid under high pressure will flow to the

cylinder 9 for only an instant. It is obvious that these increments of additional working fluid will raise the pressure in the cylinder 9, thereby causing the pressing elements 1 and 2 to come together under increased graduated heavier pressure, if that is desired, up to the gage pressure afforded by the main feed line 47.

Various modifications may occur to those skilled in the art in the practice and use of this invention, and no limitation is intended by the phraseology of the description or disclosure of the foregoing example of this invention.

What is claimed is:

1. A pressing machine including, in combination, cooperating pressing elements, one of which is movable toward and from the other; actuating mechanism for the movable element including, a fluid operated motor having a movable member; the motor having a combined intake and exhaust port located adjacent the position occupied by the movable member when in starting position, a second port arranged in the motor to be uncovered by the movable member when it has traveled a predetermined distance from its starting position, a low pressure feed line for a motive fluid, a combined intake and exhaust valve in said low pressure line arranged with its intake normally closed and its exhaust normally open, a combined inlet and exhaust pipe connecting the valve casing and the first mentioned port, operator-operated means for actuating the combined valve to close its exhaust and open its intake, a high pressure feed line, a valve casing in said high pressure feed line having a normally closed intake valve therein, a conduit connecting the last mentioned valve casing and the second port, pressure operated means for holding the combined intake and exhaust valve in its operated position; and a manually operable valve including, a casing connected in one of the feed lines and operable at will to control the flow of motive fluid to the holding means.
2. A pressing machine including, in combination, cooperating pressing elements, one of which is movable toward and from the other; mechanism for actuating the movable element including, a cylinder, a single acting piston movable in the cylinder, and operating connections between the piston rod and the movable element; the cylinder having an intake port in one end thereof, a second port opening into the cylinder between the ends thereof in position to be uncovered by the piston when it approaches the end of its power stroke, a low pressure feed line, an operator-operated combined intake and exhaust valve comprising a casing connected in the low pressure feed line and normally arranged to close its intake and open its exhaust but manually operable to open the intake and close the exhaust, a combined intake and exhaust pipe connecting said valve casing with the first port, pressure operated holding means for retaining said combined intake and exhaust valve in its operated position, a high pressure feed line, manually operable valve means connected in the high pressure feed line for controlling the flow of motive fluid to said holding means, an additional manually operable normally closed intake valve having a casing connected in the high pressure feed line and having means tending to move the valve toward closed position, and a conduit connecting the last mentioned valve casing to the second port of the cylinder.

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