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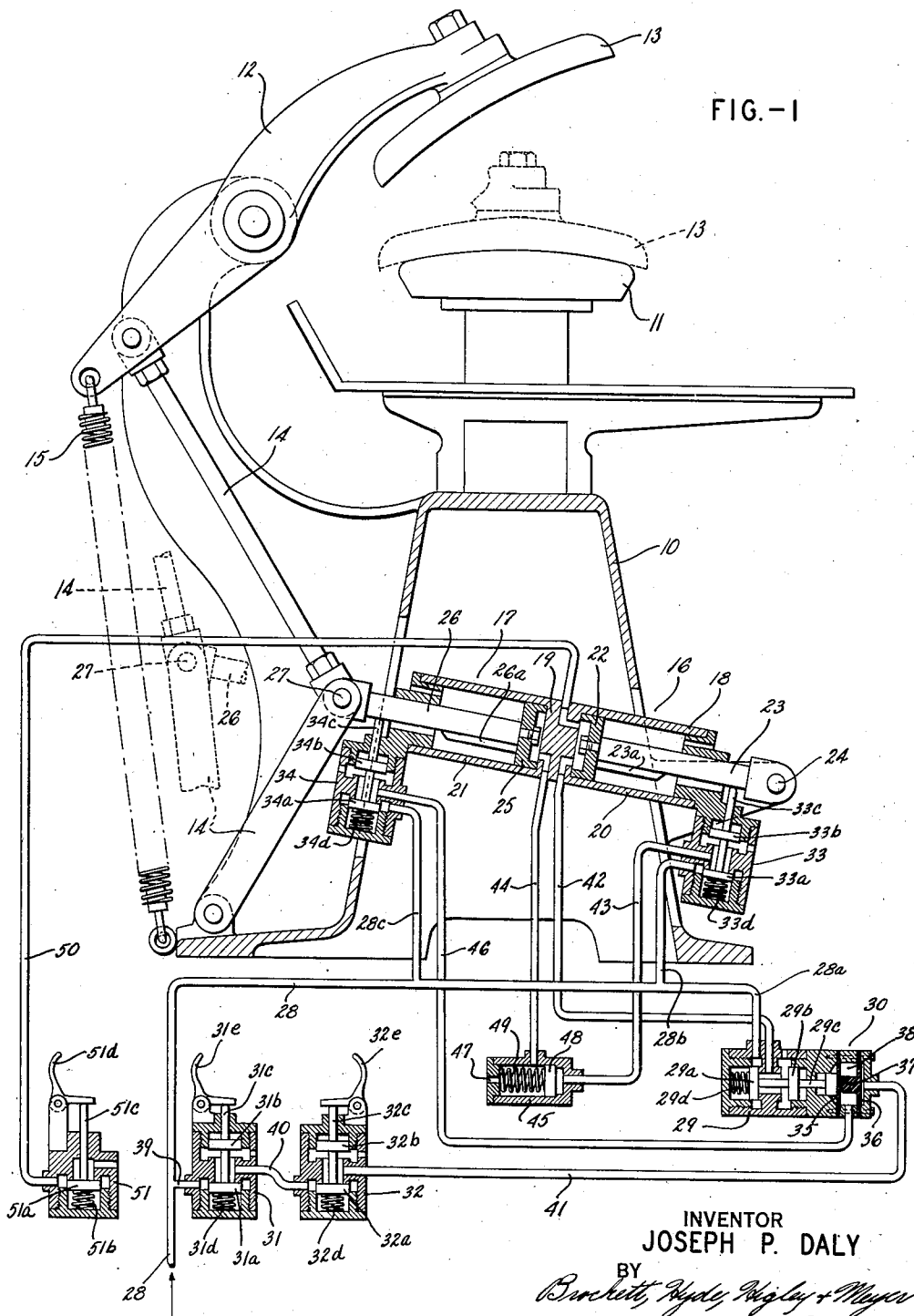
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2,086,259

PRESS OPERATING MECHANISM AND CONTROL

Filed March 4, 1935

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

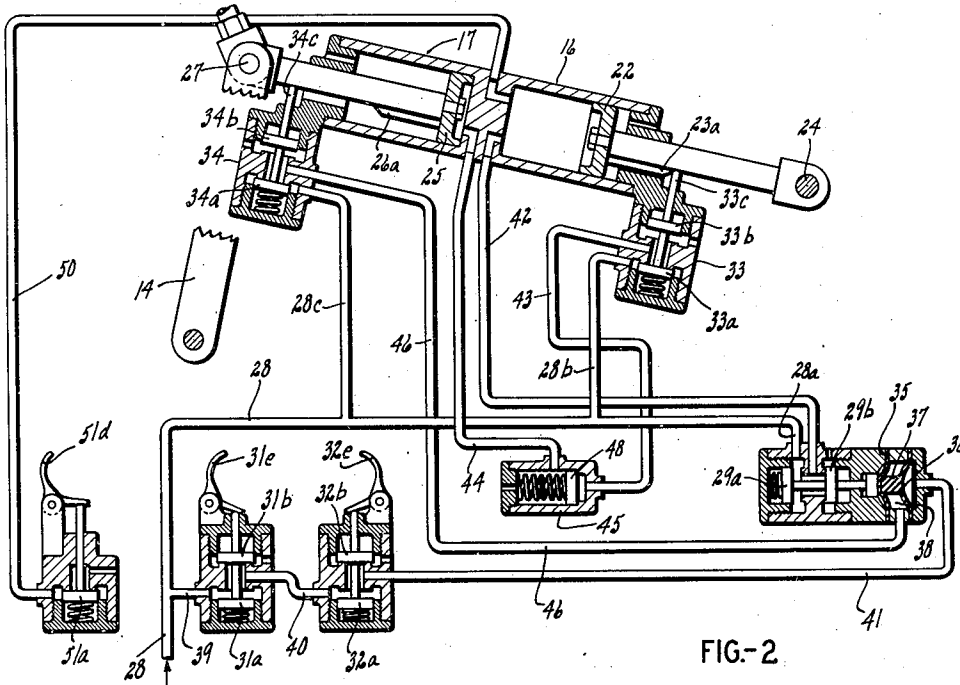


FIG-2

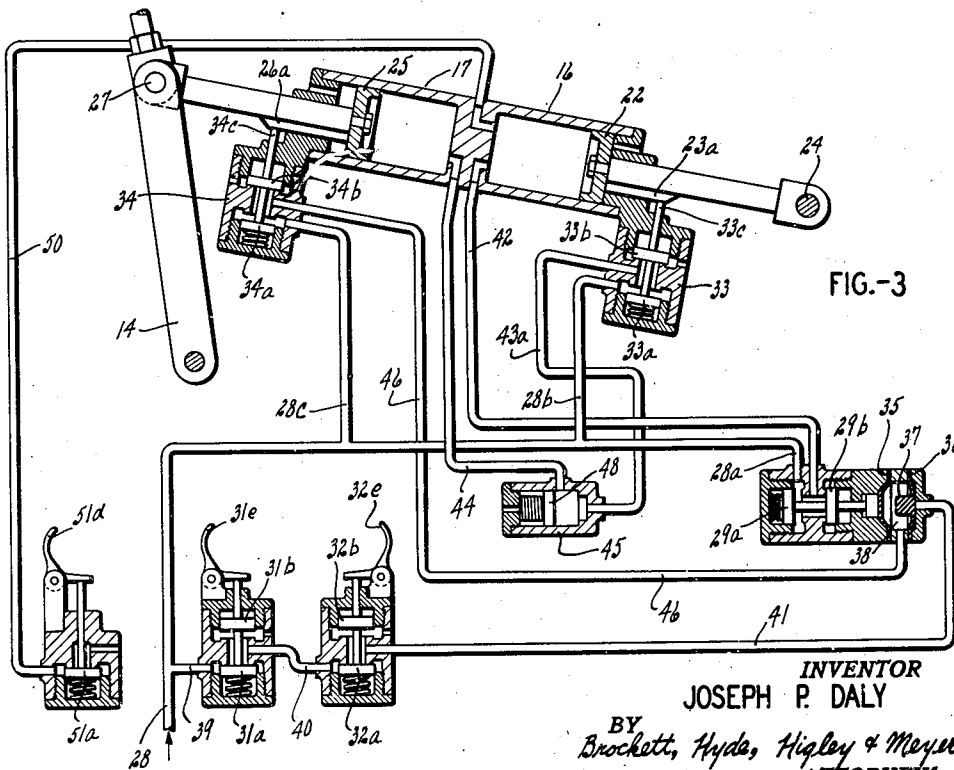


FIG-3

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PRESS OPERATING MECHANISM AND
CONTROL

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14 Claims. (Cl. 121—38)

This invention relates to improved operating and control mechanism for pressing machines.

An object of the present invention is to provide in a pressing machine having a pair of co-acting relatively movable pressing members two cylinder and piston motors and suitable motion transmitting mechanism connected therewith for relatively moving the members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press. In such a pressing machine I provide control mechanism including spaced safety manuals which require the use of two hands of an operator until the press is safely closed after which mechanism operated by the press closing motor serves to maintain the fluid supply for both motors.

My improved control mechanism is so arranged that the means for maintaining the fluid supply to hold the press closed cannot be actuated until the pressing members have moved to a nearly closed position.

Another feature of my improved control mechanism for a two motor press in which both motors must be actuated to completely close the press includes means for supplying motive fluid to a first of said motors, means actuated by the first motor for supplying fluid to the second motor, and means actuated by the second motor for supplying fluid to a maintaining means for the first motor supply.

Other objects and advantages include the arrangement of parts and suitable structure for carrying out the above named objects and the essential features will be summarized in the claims.

In the drawings, Fig. 1 shows an end elevation of a pressing machine embodying my invention with the control mechanism therefor shown diagrammatically; while Figs. 2 and 3 show the power and control mechanism of Fig. 1 in different operated positions.

My improved operating and control mechanism is applicable to many types of presses but I have chosen to illustrate the same as applied to a press of the type used in laundry and garment work. While I have shown one of the pressing members stationary and the other movable and the mounting of two motors both of which act upon the movable member to close the press, it will be understood that both members might be movable if desired and that one motor might move one of the members while the other motor moved the second member so that the use of both motors would be necessary to completely close the press.

Such arrangements of pressing machines are well known to this art and the application of my improved operating and control mechanism to such other types of machines would be within the scope of one skilled in this art. I do not desire to be limited in the application of the principles here disclosed except by the appended claims when construed in view of the prior art.

In the press illustrated, upon a frame 10 is mounted a stationary pressing bed 11. Upon a bracket of the frame is pivotally mounted a head lever 12 which carries a pressing head or chest 13 adapted to move into and out of coacting position with the pressing bed. To provide this movement a pair of toggles 14 is connected between the frame and the rear end of the head lever. These toggles are biased toward the broken position shown in full lines in the drawings by a spring 15. Power mechanism is provided for closing the press which moves the toggles to the broken line position of Fig. 1 which moves the pressing head into coacting position with the bed as indicated in broken lines. In this position the toggles are not quite straightened so that spring 15 is always effective to break the toggles upon the release of power application.

In the embodiment which I have chosen for the purpose of this description the two motors 16 and 17 are combined in a unitary structure although as pointed out above modifications of this arrangement are within the scope of my invention. In the form shown, 16 and 17 are two axially aligned fluid motors each having cylinder and piston elements, one element of each motor being connected with the frame and the movable pressing member respectively, and the other elements of said motors being rigidly connected together so that the working strokes of both motors are necessary to completely close the press. While I have shown a piston of one motor connected to the frame and a piston of the other motor connected to the toggle mechanism and the cylinders of both motors connected together, other arrangements of these cylinder and piston elements will readily occur to those skilled in this art which will produce the same results, as for instance the right-hand motor as viewed in the drawings might remain substantially as it is with the piston of the left-hand motor rigid therewith and the cylinder of the left-hand motor connected with the toggles, or the pistons of both motors might be connected together and the cylinder of one motor connected to the frame while the cylinder of the other motor was connected to the toggles.

As shown, a cylinder 18 is provided with a transversely extending partition wall 19 intermediate its ends which divides the cylinder 18 into the cylinder portions 20 and 21 corresponding to the motors 16 and 17 respectively. The cylinder portion 20 houses a piston 22 whose piston rod 23 is pivotally connected to a bracket of the frame at 24. Likewise the cylinder portion 21 is provided with a piston 25 whose piston rod 26 is pivotally connected at 27 with the toggle knuckle.

The supply of pressure fluid for actuating the motor means comprises a conduit 28 having branches 28a, 28b and 28c. The valves controlling the supply of fluid for operating motor 16 are housed in casing 29 and are operable by a double diaphragm device 30, the fluid supply for which is controlled by valves in casings 31 and 32. The fluid supply for motor 17 is controlled by valves in casing 33 while the valves for controlling the fluid supply for maintaining pressure in the diaphragm device 30 to maintain the press closed are housed in casing 34. The valve structure in casings 29, 31, 32, 33 and 34 are all similar and the parts thereof are provided with similar subscripts and one only will be described. For instance, in casing 31 there is a normally closed inlet valve 31a and a normally open outlet valve 31b, both of which are mounted on a common stem 31c and the valves are biased to their normal position by a spring 31d.

The diaphragm device 30 is preferably mounted integral with valve casing 29 and comprises spaced diaphragms 35 and 36 with a spacing member 37 between them so that pressure upon the right-hand face of diaphragm 36 will act through member 37 and diaphragm 35 to actuate valve stem 29c. It will also be obvious that pressure fluid supplied to the chamber 38 between the diaphragms will maintain diaphragm 35 in its left position so as to maintain the valve 29a open and valve 29b closed.

The supply of motive fluid to the right-hand face of diaphragm 36 is by way of conduit 39, valve casing 31, conduit 40, valve casing 32 and conduit 41. The supply of motive fluid from valve casing 29 to motor 16 is by way of conduit 42. The supply of motive fluid from valve casing 33 to motor 17 is by way of conduits 43 and 44 which may be directly connected together but preferably includes in series a shuttle valve casing 45 which will be later described. The fluid supply between valve casing 34 and the chamber 38 of the diaphragm device or fluid maintaining means 30 is by way of conduit 46.

The shuttle valve casing 45 has an outlet port 47 and a valve disk 48 which is biased by spring 49 to the position shown in the drawing where it prevents fluid flow from conduit 43 to conduit 44 and establishes an exhaust outlet from motor 17 through conduit 44 and port 47. However, upon flow of pressure fluid in conduit 43, valve disk 48 will be moved to the left in its casing against the bias of spring 49 so as to establish a flow from conduit 43 to conduit 44.

Means is provided for actuating the valves in casings 33 and 34 upon a predetermined movement of their associated motors 16 and 17 respectively. To this end the valve casings 33 and 34 are rigidly mounted at the ends of the cylinder 18 with the valve stems 33c and 34c in position to be contacted by cams 23a and 25a respectively on the piston rods 23 and 26 after a predetermined relative movement between the pistons 22

and 25 and the cylinder portions in which they are housed.

An exhaust conduit 50 is provided for motor 16 and communicates with valve casing 51 in which is housed a normally closed outlet valve 51a biased toward closed position by a spring 51b and having a stem 51c by which it is actuated. The control manuals are mounted in a position convenient for the operator and comprise manuals 31e and 32e for controlling the valves in casings 31 and 32 respectively and manual 51d for controlling the release valve in casing 51.

With the parts in the full line position of Fig. 1, the operator arranges the lay of the work upon the bed 11 and actuates manuals 31e and 32e. Fluid then flows through open valves 31a and 32a to the right-hand face of diaphragm 36 moving both diaphragms 35 and 36 toward the left to actuate the valves in casing 29. This establishes a flow of motive fluid to motor 16 to the left-hand face of piston 22. The piston being fixed at pivot 24, the entire cylinder 18 and piston 25 and its associated rod will move toward the left as viewed in the drawings to partially close the press. Upon sufficient relative movement between piston 22 and the cylinder portion 20, cam 23a will contact valve stem 33c which will close valve 33b and open valve 33a as shown in Fig. 2. This establishes a fluid supply through conduits 43 and 44, the action of valve disk 48 having been already described. This establishes a flow of motive fluid to the right-hand face of piston 25 and this piston then moves rearwardly or to the left as viewed in the drawings to completely close the press. When the pressing members are substantially in closed position cam 26a contacts valve stem 34c to close valve 34b and to open valve 34a as shown in Fig. 3. This establishes a fluid supply through conduit 46 to chamber 38 between diaphragms 35 and 36 which maintains diaphragm 35 in its position toward the left which maintains the valves in casing 29 in their actuated position and insures maintenance of the fluid supply to motor 16 and thus through the chain of valves and conduits already described to motor 17. The press thus remains closed under fluid pressure and the operator may release manuals 31e and 32e. The toggles and the pressing head are then in the broken line position of Fig. 1. To open the press the operator actuates manual 51d to open valve 51a and exhaust pressure from motor 16 through conduit 50. This manual is temporarily held while spring 15 breaks the toggles 14 and causes relative movement between cylinder portion 20 and piston 22 to move the cylinder toward the right with respect to the piston so that cam portion 23a rides off of the valve stem 33c which closes valve 33a and opens valve 33b thus establishing a fluid outlet for motor 17 whereupon relative movement takes place between piston 25 and cylinder portion 21 causing cam 26a to ride off of valve stem 34c which exhausts the maintaining fluid in diaphragm chamber 38. The parts thus return to their starting position.

What I claim is:

1. In a pressing machine, a pair of coaxing relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press, manually controlled means for supplying fluid to a first of said motors, means actuated by said first motor

upon a predetermined relative movement between its cylinder and piston for effectively supplying actuating fluid to the second motor, and means actuated by said second motor upon a predetermined relative movement between its cylinder and piston for maintaining said manually controlled means in fluid supply position.

2. In a pressing machine, a frame, a stationary pressing member thereon, a coacting pressing member movable toward and from said stationary member, two axially aligned fluid motors each having cylinder and piston elements, one element of each motor being connected with the frame and the movable pressing member respectively, the other elements of said motors being rigidly connected together, the working strokes of both motors being necessary to completely close the press, means including a manual for supplying fluid to a first of said motors, means actuated by said first motor upon a predetermined relative movement between its cylinder and piston for effectively supplying actuating fluid to the second motor, and means actuated by said second motor upon a predetermined relative movement between its cylinder and piston for establishing a fluid supply for said first motor independent of said manual.

3. In a pressing machine, a pair of coacting relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press, control means including spaced safety manuals requiring the use of two hands of an operator for supplying fluid to a first of said motors, means actuated by said first motor upon a predetermined relative movement between its cylinder and piston for effectively supplying actuating fluid to the second motor, and means actuated by said second motor upon a predetermined relative movement between its cylinder and piston for establishing a fluid supply for said first motor independently of said safety manuals.

4. In a pressing machine, a pair of coacting relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press, fluid actuated movable abutment means, two-hand controlled means for supplying fluid to said abutment means, means actuated by said abutment means for supplying fluid to a first of said motors, means actuated by said first motor upon a predetermined relative movement between its cylinder and piston for supplying fluid to the second motor, and means actuated by said second motor upon a predetermined relative movement between its cylinder and piston for supplying pressure fluid to said abutment means independently of said two-hand control.

5. In a pressing machine, a frame, a stationary pressing member thereon, a coacting pressing member movable toward and from said stationary member, two axially aligned fluid motors each having cylinder and piston elements, one element of each motor being connected with the frame and the movable pressing member respectively, the other elements of said motors being rigidly connected together, the working strokes of both motors being necessary to completely close the press, fluid actuated movable abutment means,

two-hand controlled means for supplying fluid to said abutment means, means actuated by said abutment means for supplying fluid to a first of said motors, means actuated by said first motor upon a predetermined relative movement between its cylinder and piston for supplying fluid to the second motor, and means actuated by said second motor upon a predetermined relative movement between its cylinder and piston for supplying pressure fluid to said abutment means independently of said two-hand control.

6. In a pressing machine, a pair of coacting relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press, means for supplying motive fluid to a first of said motors including a normally closed inlet valve and a normally open outlet valve and two spaced diaphragms operatively connected with said valves so that pressure on one of said diaphragms or pressure between them will open said inlet valve and close said outlet valve, manual means for supplying pressure fluid to said one diaphragm, means actuated by said first motor upon a predetermined relative movement between its cylinder and piston for supplying fluid to the second motor, and means actuated by said second motor upon a predetermined relative movement between its cylinder and piston for supplying pressure fluid between said diaphragms.

7. In a pressing machine, a frame, a stationary pressing member thereon, a coacting pressing member movable toward and from said stationary member, two axially aligned fluid motors each having cylinder and piston elements, one element of each motor being connected with the frame and the movable pressing member respectively, the other elements of said motors being rigidly connected together, the working strokes of both motors being necessary to completely close the press, means for supplying motive fluid to a first of said motors including a normally closed inlet valve and a normally open outlet valve and two spaced diaphragms operatively connected with said valves so that pressure on one of said diaphragms or pressure between them will open said inlet valve and close said outlet valve, manual means for supplying pressure fluid to said one diaphragm, means actuated by said first motor upon a predetermined relative movement between its cylinder and piston for supplying fluid to the second motor, and means actuated by said second motor upon a predetermined relative movement between its cylinder and piston for supplying pressure fluid between said diaphragms.

8. In a pressing machine, a pair of coacting relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press, means for supplying motive fluid to a first of said motors including a normally closed inlet valve and a normally open outlet valve and two spaced diaphragms operatively connected with said valves so that pressure on one of said diaphragms or pressure between them will open said inlet valve and close said outlet valve, control means including spaced safety manuals requiring the use of two hands of an operator for supplying pressure fluid to said one diaphragm, means

actuated by said first motor upon a predetermined relative movement between its cylinder and piston for supplying fluid to the second motor, and means actuated by said second motor
 5 upon a predetermined relative movement between its cylinder and piston for supplying pressure fluid between said diaphragms.

9. In a pressing machine, a pair of coacting relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press,
 10 manually controlled means for supplying motive fluid to one of said motors, fluid actuated means for holding said manually controlled means in fluid supply position, conduit means connecting a fluid supply with the other of said
 15 motors and including a normally closed valve, means for opening said valve upon predetermined movement of said one motor, conduit means connecting a fluid supply with said fluid actuated means and including a second normally
 20 closed valve, and means for opening said second valve upon predetermined movement of said other motor.

10. In a pressing machine, a frame, a stationary pressing member thereon, a coacting pressing member movable toward and from said stationary member, two axially aligned fluid motors each having cylinder and piston elements, one element of each motor being connected with
 25 the frame and the movable pressing member respectively, the other elements of said motors being rigidly connected together, the working strokes of both motors being necessary to completely close the press, manually controlled means for supplying motive fluid to one of said
 30 motors, fluid actuated means for holding said manually controlled means in fluid supply position, conduit means connecting a fluid supply with the other of said motors and including a normally closed valve, means for opening said
 35 valve upon predetermined movement of said one motor, conduit means connecting a fluid supply with said fluid actuated means and including a second normally closed valve, and means for opening said second valve upon predetermined
 40 movement of said other motor.

11. A pressing machine as in claim 9 and including in said first named conduit means a valve casing having an exhaust outlet, and a valve
 45 in said casing movable to connect said other motor either with said exhaust outlet or with said fluid supply established by opening of said first named valve.
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12. In a pressing machine, a pair of coacting relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press,
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three sets of valves, each set including a normally closed inlet valve and a normally open outlet valve and actuable to open the inlet and to close the outlet valve, the first set of valves controlling a fluid supply for a first of said motors, manually controlled means for actuating
 5 said first set of valves, fluid actuated means for maintaining said first set of valves in actuated position, the second set of valves controlling a fluid supply for the second of said motors, means
 10 controlled by predetermined movement of said first motor for actuating said second set of valves, the third set of valves controlling a fluid supply for said fluid actuated means, and means controlled by predetermined movement of said second
 15 motor for actuating said third set of valves.

13. In a pressing machine, a frame, a stationary pressing member thereon, a coacting pressing member movable toward and from said stationary member, mechanism for moving said
 20 movable member, a cylinder having a transverse partition wall intermediate its ends, two pistons having working strokes in said cylinder in opposite directions from said wall, one of said pistons having a rod connection with said frame, the
 25 other of said pistons having a rod connection with said mechanism, two valve casings rigidly mounted on said cylinder, one associated with each piston, each casing having a connected supply of pressure fluid and a normally closed valve
 30 controlling said supply, a cam on each piston rod, one cam for each of said valves, said cams being arranged to actuate said valves upon predetermined relative movement of said pistons and
 35 said cylinder, manually controlled means for supplying motive fluid to actuate one of said pistons, fluid actuated means for maintaining said last-named means in fluid supply position, a conduit connection from said casing associated with said one piston for conducting motive fluid
 40 to the other piston, and a conduit connection from the casing associated with said other piston for conducting pressure fluid to said fluid actuated means.

14. In a pressing machine, a pair of coacting
 45 relatively movable pressing members, two cylinder and piston motors and motion transmitting mechanism connected therewith for relatively moving said members to completely close the press, the stroke of either of said motors alone being insufficient to completely close the press, a manual control member and associated conduit
 50 connections for supplying fluid to a first of said motors, means actuated by said first motor upon a predetermined relative movement between its cylinder and piston for effectively supplying actuating fluid to the second motor, and means actuated by said second motor upon a predetermined
 55 relative movement between its cylinder and piston for establishing a fluid supply for said first motor independently of said manual control member.
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