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PRESSING MACHINE

Filed June 27, 1927

3 Sheets-Sheet 1

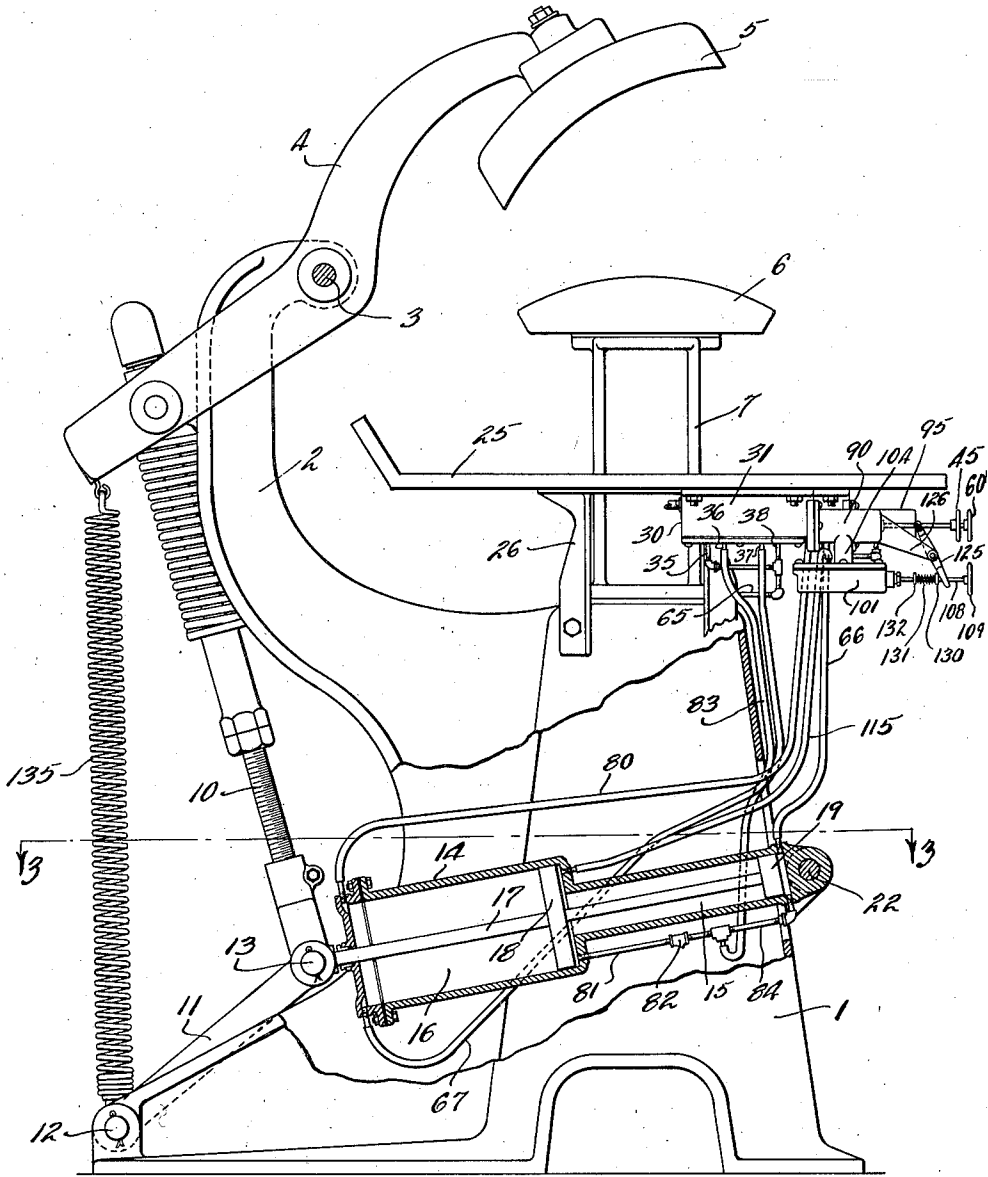


Fig. - 1

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3 Sheets-Sheet 2

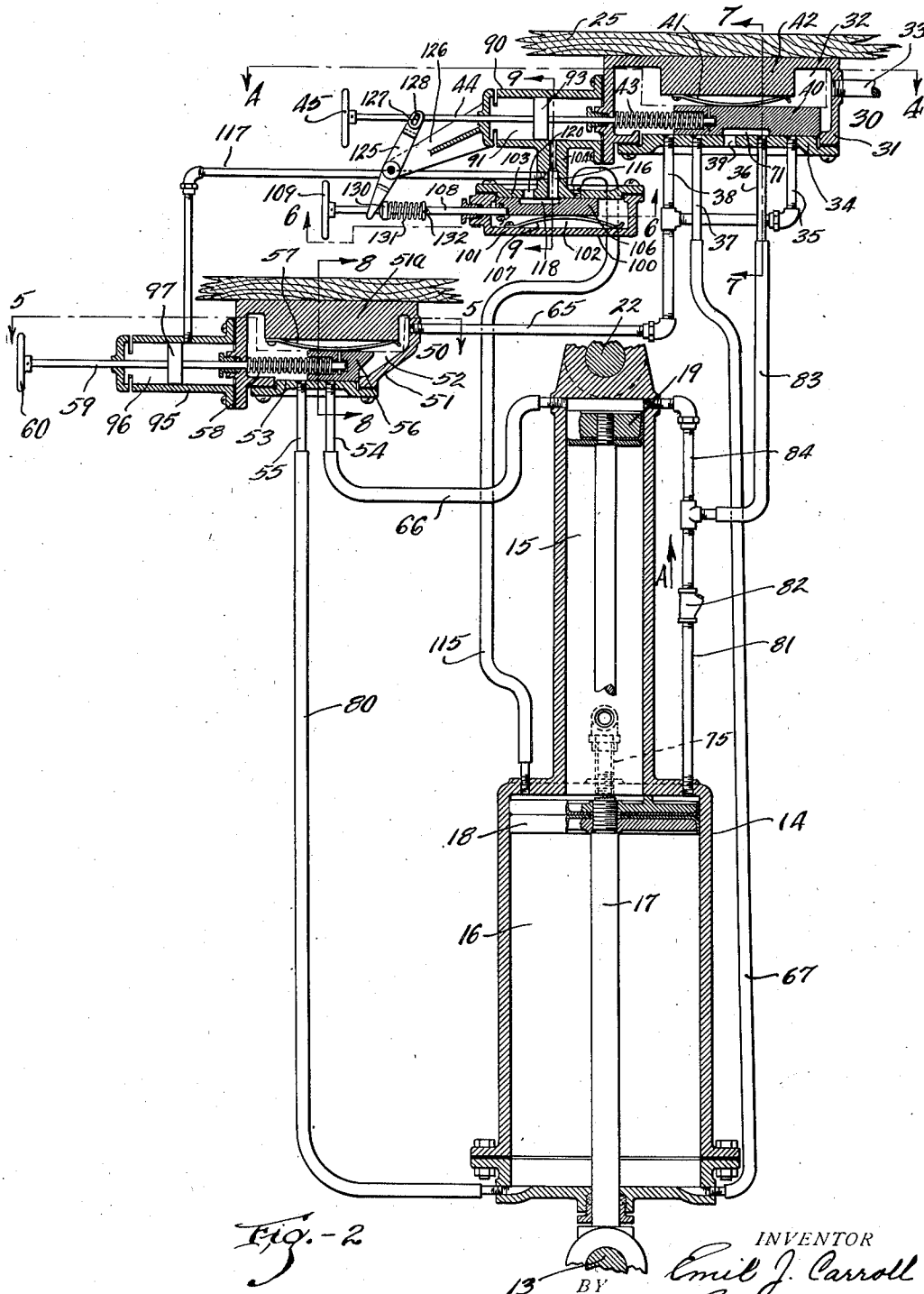


Fig. - 2

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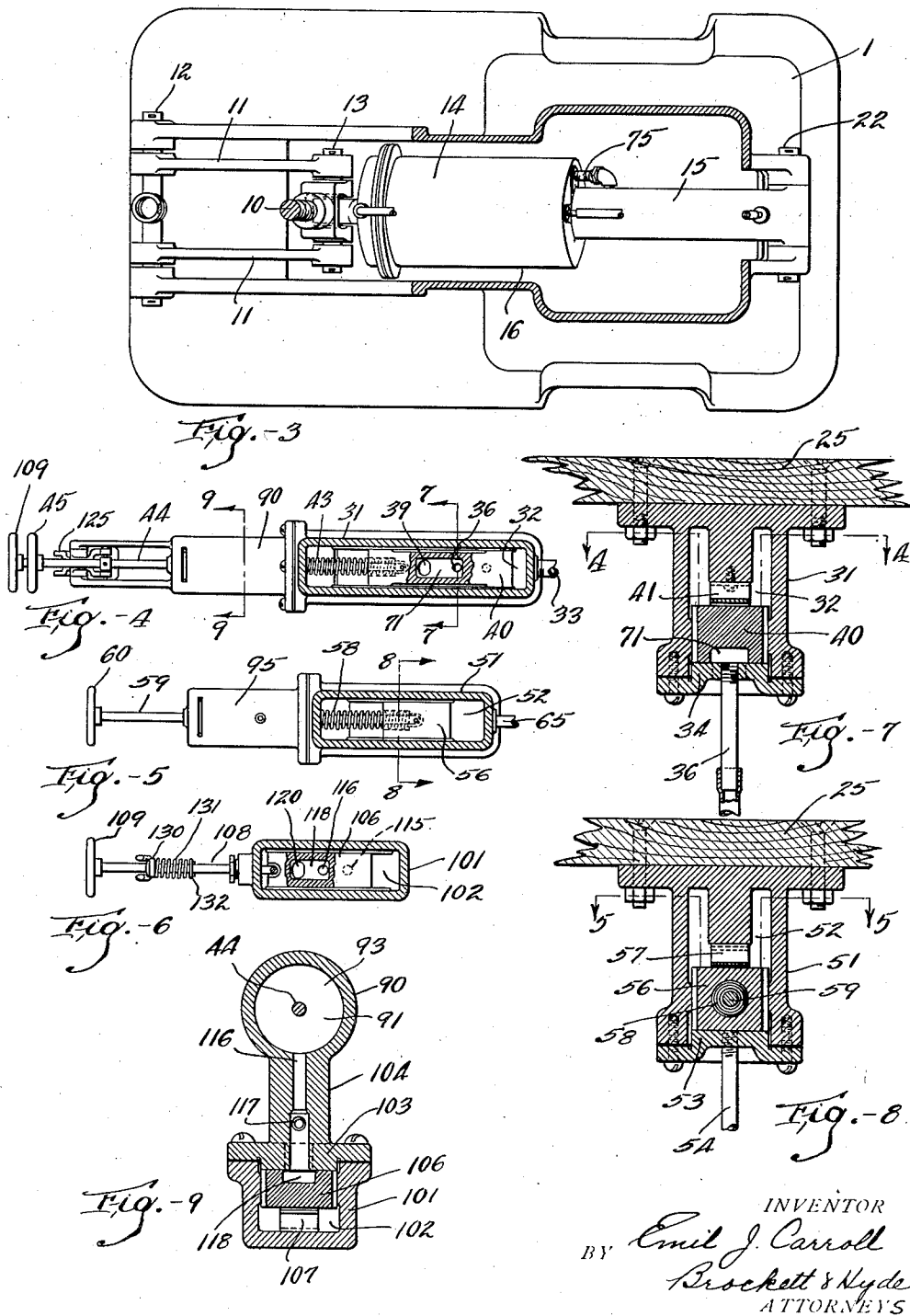
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UNITED STATES PATENT OFFICE

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PRESSING MACHINE

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This invention relates to improvements in machines for pressing fabric material, such as wearing apparel.

The object of the present invention is to provide an improved fabric pressing machine which is operated to close the press and to produce final pressure by piston and cylinder mechanism which includes a one-piece cylinder structure having two piston chambers in which move two pistons mounted upon a single piston rod, one of said chambers and one of said pistons being of different cross dimension than that of the other chamber and piston, the smaller chamber and piston being used to close the press and the larger chamber and piston being used to produce final pressure; in which press fluid is supplied from one piston chamber to the other piston chamber for the production of final pressure, such supply means being effective only after the fluid in said former chamber has closed the press; in which press two valve structures are provided for controlling the supply of fluid from the supply means to one of said piston chambers, each of said valve structures requiring for its opening operation the use of one of the operator's hands, so that there is no liability of a hand being caught between the pressing members during the closing operation; in which press fluid operated means is provided for each of said valve structures for automatically maintaining the same in open position for the production of final pressure, so that it is not necessary for the operator to manually hold said valve structures open after the press has been closed; in which press a single control means is provided for both of said maintaining means, said control means being automatically operated by one of said valve structures; and which press is simple and easy to operate and safe and efficient in use.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawings, which represent one suitable embodiment of the invention, Fig. 1 is a side elevation of a pressing machine embodying my invention, the piston and cylinder mechanism for closing the press and for

producing final pressure being shown in longitudinal section; Fig. 2 is a somewhat diagrammatical view showing the piston and cylinder mechanism for closing the press and for producing final pressure, the two valve structures for controlling the supply of fluid to said piston and cylinder mechanism, the means for automatically maintaining said valve structures in open position, and the control means for said maintaining means, all of these parts being shown in section; Fig. 3 is a cross-sectional view on the line 3—3, Fig. 1; Fig. 4 is a detail sectional view on the line 4—4, Figs. 2 and 7; Fig. 5 is a detail sectional view on the line 5—5, Figs. 2 and 8; Fig. 6 is a detail sectional view on the line 6—6, Fig. 2; Fig. 7 is a detail sectional view on the line 7—7, Figs. 2 and 4; Fig. 8 is a detail sectional view on the line 8—8, Figs. 2 and 5; and Fig. 9 is a detail sectional view on the line 9—9, Fig. 2.

The machine illustrated in the drawings includes a suitable frame 1 provided at its rear with an upwardly extending arm 2 upon which is pivotally mounted at 3 an intermediate portion of a lever 4. Suitably mounted upon the forward end of said lever is the head or upper pressing member 5 which is adapted to be moved into and out of pressing engagement with a bed or lower pressing member 6. Said lower pressing member is stationary and is carried by a pedestal 7 suitably mounted upon the front portion of the machine frame.

Operatively associated with the rear end portion of lever 4 is the upper end portion of a toggle member 10 having its lower end pivotally connected at 13 to the upper end of a toggle member 11 having its lower end pivotally mounted at 12 in the machine frame. When the press is open, as indicated in Fig. 1, the toggle formed by members 10 and 11 is broken, and in order to close the press and apply final pressure to the work, power operated mechanism is provided which is effective upon the toggle knuckle 13.

Said power operated mechanism is of the piston and cylinder type and in the present embodiment of the invention, a single cylinder

der structure 14 is provided. Said structure is preferably of integral construction, and has two piston chambers of different cross dimension, a front chamber 15 and an enlarged rear chamber 16. Extending through said chambers is a piston rod 17 provided with a piston 18 for movement in chamber 16 and a piston 19 for movement in chamber 15. The forward end of said cylinder structure is pivotally mounted at 22 to the front of the machine frame and the rear end of the piston rod 17 is pivotally mounted to the toggle knuckle 13, all as clearly shown in Fig. 1.

The flow of fluid to the cylinder structure 14 is controlled by two valve structures which are so associated or interconnected that both valve structures must be open to permit fluid to operate the piston and cylinder mechanism, to close the press and to produce final pressure. If either remains closed, the opening of the other cannot effect or bring about movement of the piston rod 17.

Each of said two valve structures is arranged below and is carried by a horizontally disposed work table 25 surrounding the pedestal 7 and suitably mounted upon brackets 26 secured to the machine frame.

One of said valve structures is represented as a whole by the reference character 30 and includes a casing 31 provided with a fluid receiving chamber 32 communicating at one side with a fluid supply pipe 33 and closed at its bottom by a valve seat 34. Said valve seat is provided with five ports or openings, in four of which are threaded or otherwise suitably secured two delivery pipes 35 and 38 and two exhaust or return pipes 36 and 37. If steam is the fluid used, a pipe should preferably be provided for the fifth port 39, which is an exhaust port, but such a pipe is not necessary if air is used, and is not shown in the drawings. Arranged within chamber 32 is a slidable valve member 40 held at all times in engagement with the valve seat 34 by a leaf spring 41 secured to the thickened top portion 42 of casing 31. Said valve member is normally held in the rear portion of said chamber by a compression spring 43 surrounding a valve operating rod 44 pinned or otherwise suitably secured to said valve member, said spring having its rear end portion abutting said valve member and its forward end portion abutting the front wall of casing 31. Said valve operating rod extends forwardly through an opening in the front wall of casing 31 and is provided at its forward end with an operating knob 45.

The second valve structure, which is quite similar in construction to the first, is represented as a whole by the reference character 50 and includes a casing 51 provided with a fluid receiving chamber 52 closed at its bot-

tom by a valve seat 53. Said valve seat is provided with two ports or openings, in which are threaded or otherwise suitably secured two delivery pipes 54 and 55. Arranged with said chamber 52 is a slidable valve member 56 held at all times in engagement with the valve seat 53 by a leaf spring 57 secured to the thickened top portion 51^a of casing 51 and normally held in the rear portion of said chamber by a compression spring 58. Said spring surrounds a valve operating rod 59 pinned or otherwise suitably secured to said valve member, the rear end of said spring abutting said member and the forward end of said spring abutting the front wall of casing 51. Said valve operating rod extends forwardly through an opening in the front wall of said casing and is provided at its forward end with an operating knob 60.

The delivery pipe 35 of valve structure 30 is connected to the delivery pipe 38 of said structure, and the latter pipe is connected to a pipe 65 which leads to the chamber 52 of valve structure 50. Therefore, if either pipe 35 or 38 is open, fluid will flow from chamber 32 of valve structure 30 to chamber 52 of valve structure 50. The delivery pipe 54 of valve structure 50 is connected to a flexible tube or hose 66 which leads to the rear end portion of the smaller piston chamber 15, thereby supplying fluid to said chamber in front of the piston 19 therein. Fluid thus supplied to said chamber is sufficient to move the piston rod 17 rearwardly, thereby straightening the toggle formed by members 10 and 11 and effecting downward movement of the upper pressing member into engagement with the lower pressing member, or, in other words, effecting closing of the press. While the fluid supplied to the smaller piston chamber 15 is sufficient to close the press, it is not sufficient to produce much pressure, so that if any one's hands were between the pressing members, such as the hands of a fellow operator, they would not be subjected to sufficient pressure to injure them.

During such rearward movement of the piston rod 17, fluid in the enlarged piston chamber 16 at the rear of piston 18 therein is exhausted or forced from said chamber through a flexible tube or hose 67 having its rear end communicating with the rear end portion of said chamber and its forward end connected to and communicating with the exhaust or return pipe 37 of valve structure 30. The valve member 40 of said structure is provided at its bottom with a longitudinal groove or channel 71 which is adapted to provide communication between exhaust pipe 37 and the exhaust port 39 when said valve member is in forward or open position, as it must be to close the press.

To produce heavy final pressure upon the work after the press is closed, fluid is supplied to the enlarged piston chamber 16, and the

fluid supply pipe for said chamber is so arranged that fluid cannot be supplied thereto until the pressing members have been brought into engagement by the fluid supplied to the smaller piston chamber 15.

In the specific embodiment of the invention here illustrated, fluid is supplied to the enlarged piston chamber 16 from the smaller piston chamber 15 through a pipe 75 having its delivery or outlet end communicating with the forward end portion of piston chamber 16 and its inlet or receiving end communicating with piston chamber 15 near the rear end thereof. It is therefore impossible for the enlarged piston chamber 16 to receive fluid to operate its piston 18 until the piston 19 of chamber 15 has been moved rearwardly beyond the inlet end of pipe 75, and piston 19 does not pass beyond this point until after the pressing members have been brought into engagement. It will thus be seen that it is impossible to produce heavy final pressure until after the pressing members have been brought into engagement, for if an obstruction prevents closing of the press, final pressure cannot be produced. There is therefore no liability of any one's hands being caught and crushed between the pressing members, nor is it necessary to provide the usual more or less complicated guard mechanism.

As before mentioned, it is necessary to open both valve structures 30, 50 to close the press, which means that both of the valve operating rods 44 and 59 must be pulled outwardly or forwardly, and said rods are so arranged or positioned that they cannot be operated by a single hand of the operator. Both hands of the operator must therefore be used to close the press, so that there is no liability of one of her hands being caught between the pressing members. If valve structure 30 were opened and valve structure 50 were permitted to remain closed, fluid would flow from chamber 32 of valve structure 30 to chamber 52 of valve structure 50, but delivery pipe 54 of said latter structure would not be opened so that fluid could not flow from chamber 52 to piston chamber 15. If, on the other hand, valve structure 50 were opened and valve structure 30 were permitted to remain closed, fluid would flow from valve chamber 32 to valve chamber 52 and from said latter chamber to piston chamber 15. However, the fluid supplied to said piston chamber would not operate the piston 19 but would flow back to valve chamber 32 through pipe 84 and the flexible hose 83 hereinafter referred to. The press is therefore not only safe but absolutely fool-proof.

In order to separate the pressing members, or in other words, to open the press, fluid is supplied to the rear end portion of the enlarged piston chamber 16 through a flexible tube or hose 80 connected to the delivery pipe 55 of valve structure 50. The fluid supplied

to chamber 16 through said pipe is sufficient to move the piston rod 17 forwardly, thereby breaking the toggle formed by members 10 and 11 and effecting separation of the pressing members. During such forward movement of the piston rod, the fluid in chamber 16 in front of piston 18 therein is exhausted or escapes from said chamber through a pipe 81 communicating with the forward end of said chamber and provided with a check valve 82 permitting flow of fluid therethrough only in a forward direction, that is, in the direction of the arrow A. The fluid in piston chamber 15 in front of the piston 19 therein is exhausted or escapes from said chamber through the pipe 84 before referred to having its front end communicating with the forward end portion of chamber 15. The rear end of pipe 84 and the forward end of pipe 81 communicates with the flexible tube or hose 83 connected to the exhaust or return pipe 36 of valve structure 30, as clearly indicated in Fig. 2. The fluid returned to pipe 36 is exhausted or discharged at the port 39 through the valve passage 71 which, when the valve is closed, is in position to provide communication between pipe 36 and the exhaust port 39, as shown in Fig. 1.

Preferably, means is provided for automatically maintaining the valve structures 30 and 50 open to permit fluid to be supplied to the piston chamber 16 for the production of heavy final pressure, and thereby rendering it unnecessary for the operator to manually hold the valve operating rods 44, 59 in their forward positions after the press has been closed. In the specific embodiment here illustrated, said maintaining means comprises two interconnected piston and cylinder devices, one of which is associated with each valve structure.

Connected to the front wall of casing 31 of valve structure 30 is a forwardly extending cylinder 90 surrounding the valve operating rod 44 and provided with a chamber 91, in which moves a piston 93 mounted upon said operating rod. Connected to the front wall of casing 51 of valve structure 50 is a forwardly extending cylinder 95 surrounding the valve operating rod 59 and provided with a chamber 96, in which moves a piston 97 mounted upon said operating rod 59.

The supply of fluid to both of said maintaining devices for operating the same is automatically controlled by a single valve structure represented as a whole by the reference character 100. Said valve structure is somewhat similar in construction to valve structures 30 and 50 and is arranged below and carried by the maintaining device for valve structure 30.

Said valve structure 100 includes a casing 101 provided with a valve chamber 102 which is closed at its top by a valve seat 103. Said valve seat is connected by a neck por-

tion 104 with the maintaining cylinder 90 for valve structure 30, and in the present embodiment of the invention, said valve seat, said neck portion and said cylinder are of integral construction. Arranged within said valve chamber 102 is a slidable valve member 106 which is held at all times in engagement with valve seat 103 by a leaf spring 107 secured to the bottom wall of casing 101. Suitably secured to said valve member is an operating rod 108 which extends forwardly through an opening in the front wall of casing 101 and is provided at its forward end with an operating knob 109.

The fluid for operating the two maintaining devices is supplied to the control valve structure 100 from the forward end portion of the enlarged piston chamber 16, a flexible tube 115 being connected to cylinder structure 14 and to valve seat 103 of valve structure 100 for this purpose.

The fluid thus delivered to valve structure 100 is supplied to both maintaining devices, being supplied to piston chamber 91 of cylinder 90 through a passage 116 in the neck portion 104, and being supplied to piston chamber 96 of cylinder 95 through a pipe line 117 communicating with said chamber and with said neck passage 116. A groove or channel 118 in the top of valve member 106 provides communication between the flexible supply tube 115 and the neck passage 116 when said valve member is in its rear position in valve chamber 102. When said valve member is moved forwardly in said chamber, as it is to effect opening of the press, as will hereinafter appear, said valve groove or channel 118 affords communication between said neck passage 116 and an exhaust port or outlet opening 120 in valve seat 103, thereby providing an outlet or exhaust for the fluid in both the maintaining piston chambers 91 and 96.

The valve member 106 of valve structure 100 is automatically moved to its rear position in chamber 102, to permit fluid to be supplied to the two maintaining piston chambers by opening movement of the valve member 40 of valve structure 30. Such rearward movement of valve member 106 is effected by a lever 125, pivoted intermediate its ends upon the forward end portion of a bracket 126 projecting forwardly and downwardly from the front wall of the maintaining cylinder 90. The upper bifurcated end of said lever is provided with elongated slots 127 receiving a pin 128 carried by the operating rod 44 for valve member 40 of valve structure 30. The lower bifurcated end of said lever embraces the operating rod 108 for the valve member 106 of valve structure 100 and engages a collar 130 loosely mounted upon said rod. Said collar forms the forward abutment for a compression spring 131 surrounding rod 108 and abutting at its rear end a collar 132 fast upon

said rod. Therefore, when the valve operating rod 44 of valve structure 30 is pulled forwardly by the operator in effecting closing of the press, the lever 125 is automatically swung in a counter-clockwise direction. The spring 131 surrounding valve rod 108 is thereupon compressed and said rod with its valve 106 is moved rearwardly. The valve groove or channel 118 is therefore so positioned that communication is established between the flexible supply tube 115 and the neck passage 116 which leads to both maintaining piston chambers 91 and 96. Fluid is therefore supplied to said chambers and holds both pistons therein in their forward positions, with the result that both valve structures 30 and 50 are automatically maintained in open condition. The operator, therefore, is relieved of the necessity of manually holding forwardly the valve operating rods 44 and 59 after the press is closed for the production of final power pressure.

When it is desired to open the press, the operator grasps knob 109 and pulls forwardly the valve operating rod 108 of valve structure 100. By thus moving forwardly valve member 106 of said structure, the valve groove or channel 118 is so positioned as to establish communication between the neck passage 116 and the exhaust outlet 120. The fluid in both maintaining piston chambers is therefore permitted to escape, and both valve members 40 and 56 are moved rearwardly or to closed position by their respective compression springs 43 and 58. The pulling forwardly of valve rod 108 does not in itself disturb lever 125, due to the compression of spring 131 surrounding said rod and the sliding movement of the collar 130 loose thereon. The machine is, of course, provided with the usual spring 135 which normally tends and helps to separate the pressing members or open the press, the power opening operation being effected in the manner previously set forth.

It will thus be seen that I have provided a power operated pressing machine which absolutely protects the operator from injury; first, by requiring the use of both her hands to open the press and second, by preventing the production of final pressure if the movable pressing member, moving under slight power, encounters an obstruction which prevents it from properly contacting with the lower pressing member or the work thereon. Moreover, it is unnecessary for the operator to manually maintain the two control valves 30 and 50 open after the press is closed, as said valves are automatically maintained in open position for the production of the final power pressure.

What I claim is:

In a pressing machine having relatively movable pressing members and mechanism adapted for actuation to close the press and effect final pressure, press-closing expansible-

chamber means and final pressure expansible-chamber means associated with said mechanism, control means for said expansible chamber means and including a pair of valve means arranged in series relation in the fluid supply line to said press-closing expansible-chamber means and having a corresponding pair of operating handles widely spaced upon said machine and means yieldably urging said valve means to closed position, means for communicating said final pressure expansible-chamber means with said press-closing expansible-chamber means when the press is closed, means for maintaining said valve means in open position responsive to pressure within said final pressure expansible-chamber means, and separate valve means for exhausting said final pressure expansible-chamber means.

In testimony whereof I hereby affix my signature.

EMIL J. CARROLL.

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