July 28, 1925. 1,547,253

L. McCARTHY

PRESS

Filed Nov. 2, 1922

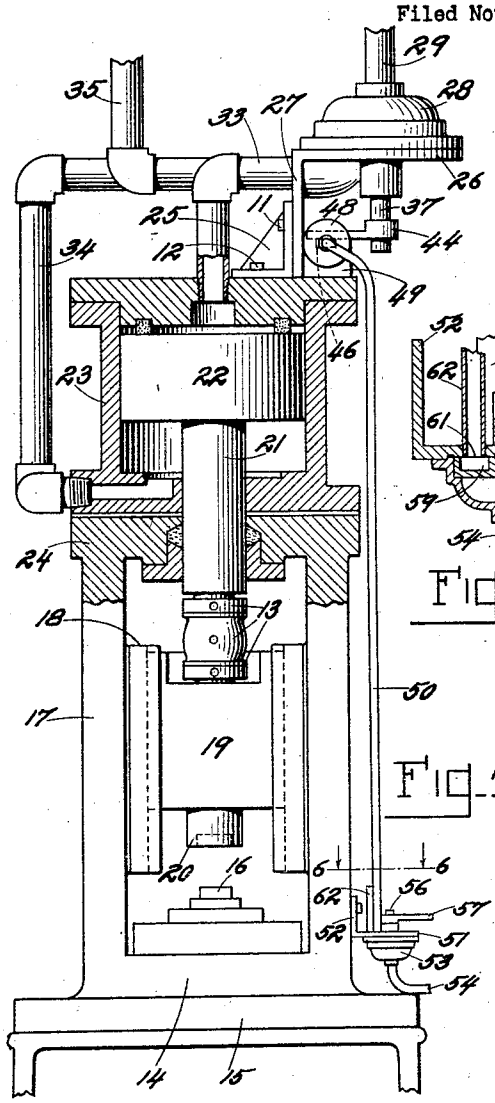


Fig. 1.

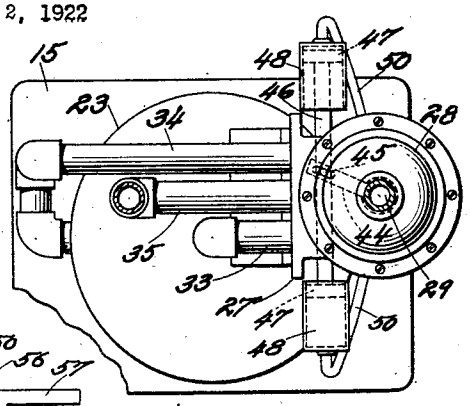


Fig. 2.

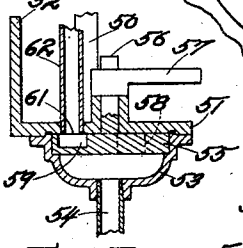


Fig. 7.

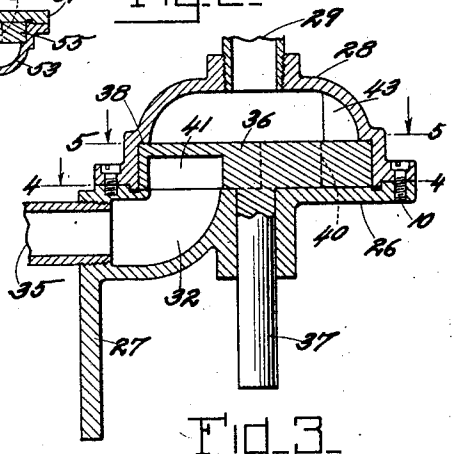


Fig. 3.

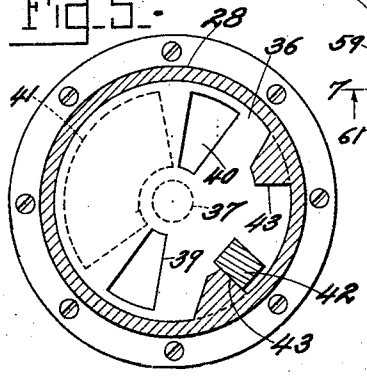


Fig. 5.

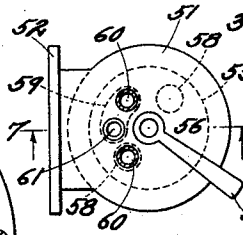


Fig. 6.

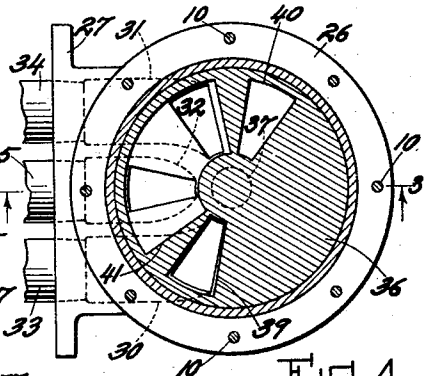


Fig. 4.

INVENTOR:
Louis McCarthy,
by Macleod, Calver, Copeland & Dike,
Attys.

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UNITED STATES PATENT OFFICE.

LOUIS McCARTHY, OF BOSTON, MASSACHUSETTS.

PRESS.

Application filed November 2, 1922. Serial No. 598,699.

To all whom it may concern:

Be it known that I, LOUIS MCCARTHY, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Presses, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to fluid pressure operated presses and especially, although not exclusively, to pneumatic die presses for forming insulating bushings, thimbles, and the like from mica. It has for its general objects to provide a die press which is especially well adapted to fulfill the particular requirements of the work last referred to, and also to provide a high-powered press which can nevertheless be accurately and quickly controlled with slight effort notwithstanding the relatively high pressure of the motive fluid.

The more particular objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of one form or embodiment thereof illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation of a die press constructed in accordance with the invention, the pneumatic cylinder for operating the ram being shown in vertical section.

Fig. 2 is a top plan view of the press shown in Fig. 1.

Fig. 3 is an enlarged vertical section, taken substantially on the line 3—3, Fig. 4, of the distributing valve and its casing.

Figs. 4 and 5 are horizontal sections taken substantially on the lines 4—4 and 5—5, Fig. 3, respectively.

Fig. 6 is a horizontal section, taken substantially on the line 6—6, Fig. 1, of the pilot valve.

Fig. 7 is a vertical section taken substantially on the line 7—7, Fig. 6.

The frame of the press is supported upon a base 15 and comprises a bottom member 14 which supports the fixed die 16, a top member 24, and uprights 17 connecting said top and bottom members, said uprights being provided with vertical guides 18 for the ram 19 which carries a movable die 20 adapted to cooperate with the fixed die 16. The ram 19 is carried, through suitable adjustable connections 13, by the lower end of a piston rod 21 connected with a piston 22 working in an upright cylinder 23 carried by the top member 24 of the frame.

Supported by a bracket 25 secured, as by cap screws 12, to the top of the cylinder 23, is a substantially circular valve seat 26 having a lateral projection formed with a vertical flange 27 which is secured, as by bolts 11, to the bracket 25. The valve seat 26 constitutes one part of a valve casing, the other part of which comprises a dome-like top or casing body 28 which is secured, as by cap screws 10, to said seat 26. The valve casing is supplied with compressed air through a suitable pipe or conduit 29 which communicates with the top of the casing dome 28 substantially axially thereof. The valve seat 26 is formed with three ports 30, 31, and 32, respectively. The ports 30 and 31 communicate, through suitable conduits 33 and 34, with the top and bottom respectively of the cylinder 23, while the port 32 communicates with an exhaust pipe 35. Cooperating with the valve seat 26 is a rotary disk valve 36 having an axially disposed stem 37 journalled in the valve seat 26, said valve being held upon said seat by the engagement of the margin thereof by an annular shoulder 38 on the casing body 28. The valve 36 is formed with two segmental ports 39 and 40 extending completely therethrough and with a segmental cavity 41 on its underside. The valve ports 39 and 40 are adapted to register with the valve seat ports 30 and 31, respectively, when said valve is oscillated or rotated in opposite directions through a small angle, the limits of which are determined by the engagement of a stop lug 42 on said valve with one or the other of two stop shoulders 43 on the interior of the valve casing body 28. The cavity 41 communicates with the exhaust port 32 and is adapted to connect said exhaust port with one or the other of the ports 30 and 31 depending upon the angular position of the valve. The arrangement is such that when one of the ports 30 or 31 is in communication with the corresponding valve port 39 or 40, the other will be placed in communication with the exhaust port 32 by the cavity 41.

Secured to the valve stem 37 is a radially extending arm 44 which is slotted to receive a pin 45 projecting from a piston rod 46 connecting two pistons 47 in alined, single-acting cylinders 48 carried by a bracket 49

on the top of the cylinder 23, said cylinders 48 and pistons 47 constituting a motor for operating the distributing valve 36. The cylinders 48 are alternatively supplied with air admitted and exhausted through pipes 50 communicating with the outer ends of said cylinders and controlled by a manually operated pilot valve conveniently located adjacent the base 15. Said pilot valve is similar in construction to the distributing valve above described and comprises a substantially circular valve seat 51 having a flange 52 secured to one of the uprights 17, and a cover or body portion 53 supplied with compressed air through a pipe 54 and enclosing a disk valve 55 having a stem 56 journalled in the valve seat 51 and provided with an operating handle 57. The valve disk 55 is formed with ports 58 and a cavity 59 adapted to register alternatively with ports 60 in the valve seat 51 with which the pipes 50 communicate. The valve cavity 59 is adapted to connect the ports 60 alternatively with an exhaust port 61 communicating with an exhaust pipe 62, while one or the other of the valve ports 58 is adapted to register with whichever of the ports 60 is not placed in communication with the cavity 59, according to the angular position of said valve.

In operation, the ram 19 being raised, as shown in Figure 1, the operator moves the pilot valve 55 into the position shown in Figure 6, thereby admitting pressure fluid, through the proper ports 58 and 60 and pipe 50, to the cylinder 48 shown at the bottom in Figure 2, at the same time exhausting the other cylinder 48 through its pipe 50 and port 60 which at this time is placed in communication with the exhaust port 61 by the valve cavity 59. The piston rod 46 thereupon moves upwardly as shown in Figure 2, turning the distributing valve 36 into the position shown in Figure 4. This places the port 39 in communication with the port 30, admitting air from the pipe 29 through the conduit 33 to the top of the cylinder 23, at the same time exhausting the bottom of the cylinder through the conduit 34, port 31, cavity 41, and exhaust port 32 to the exhaust pipe 35. The piston 22 thereupon moves downwardly, carrying with it the ram 19 with its attached die 20. To raise the ram, the pilot valve 55 is turned in a counterclockwise direction from the position shown in Figure 6, thereby admitting pressure fluid to the other cylinder of the motor 48, which turns the distributing valve 36 likewise in counterclockwise direction, thereby admitting air into the bottom of the cylinder 23 and exhausting the same from the top thereof, as will be clear without further explanation.

Having thus described my invention, I claim:—

1. In a press, in combination, a ram, a fluid pressure cylinder and piston for operating said ram, a valve for controlling the admission of pressure fluid to said cylinder and its exhaust therefrom, a motor for operating said valve, and a manually operated controlling device for said motor.

2. A pneumatic die press comprising, in combination, cooperating fixed and movable dies, a ram by which said movable die is carried, a cylinder and piston for operating said ram, a distributing valve for controlling the admission of compressed air to said cylinder and its exhaust therefrom, a pneumatic motor for operating said distributing valve, and a manually operated pilot valve for controlling the admission and exhaust of compressed air to and from said motor.

3. In a press, in combination, a ram, a fluid pressure piston and cylinder for operating said ram, an oscillating disk valve for controlling the admission of pressure fluid to said cylinder and its exhaust therefrom, said valve having an axially disposed stem, a radially extending arm on said stem, a pair of alined cylinders, pistons in said last named cylinders, a piston rod connecting said pistons and operatively connected with said arm, and a manually operated valve for controlling the admission and exhaust of pressure fluid to and from said last named cylinders respectively.

In testimony whereof I affix my signature.

LOUIS McCARTHY.