

June 17, 1930.

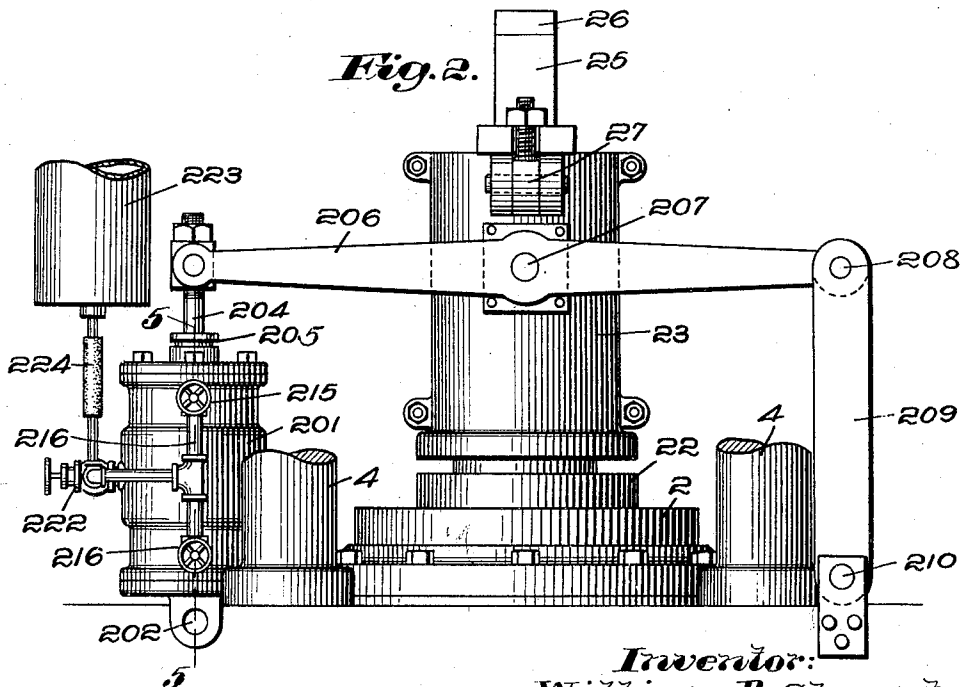
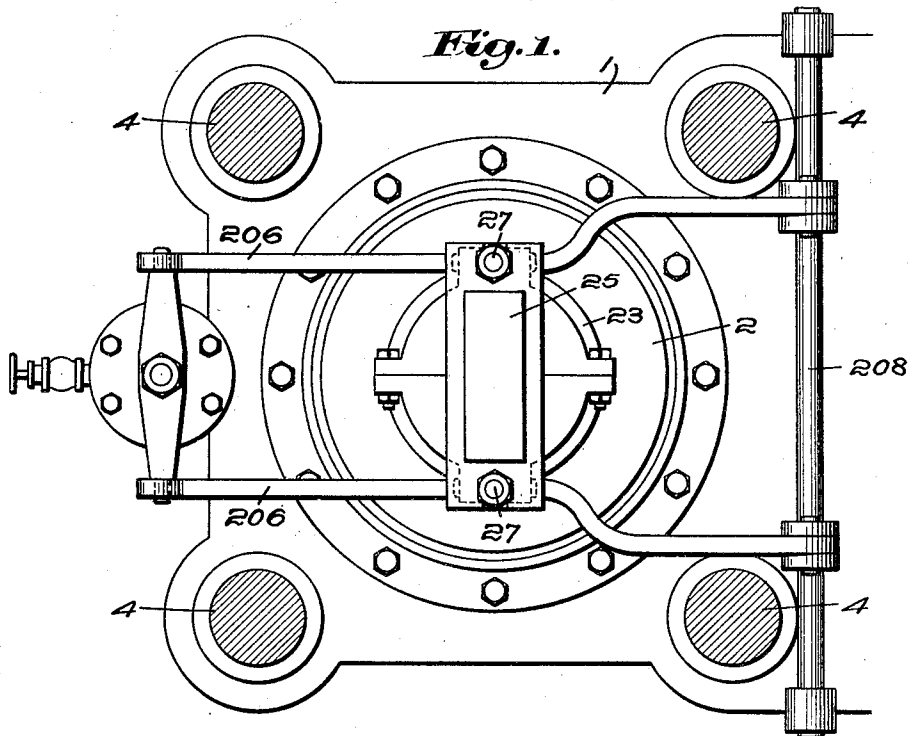
W. B. STUART

1,765,314

CONTROL FOR PRESSES

Filed March 19, 1924

2 Sheets-Sheet 1



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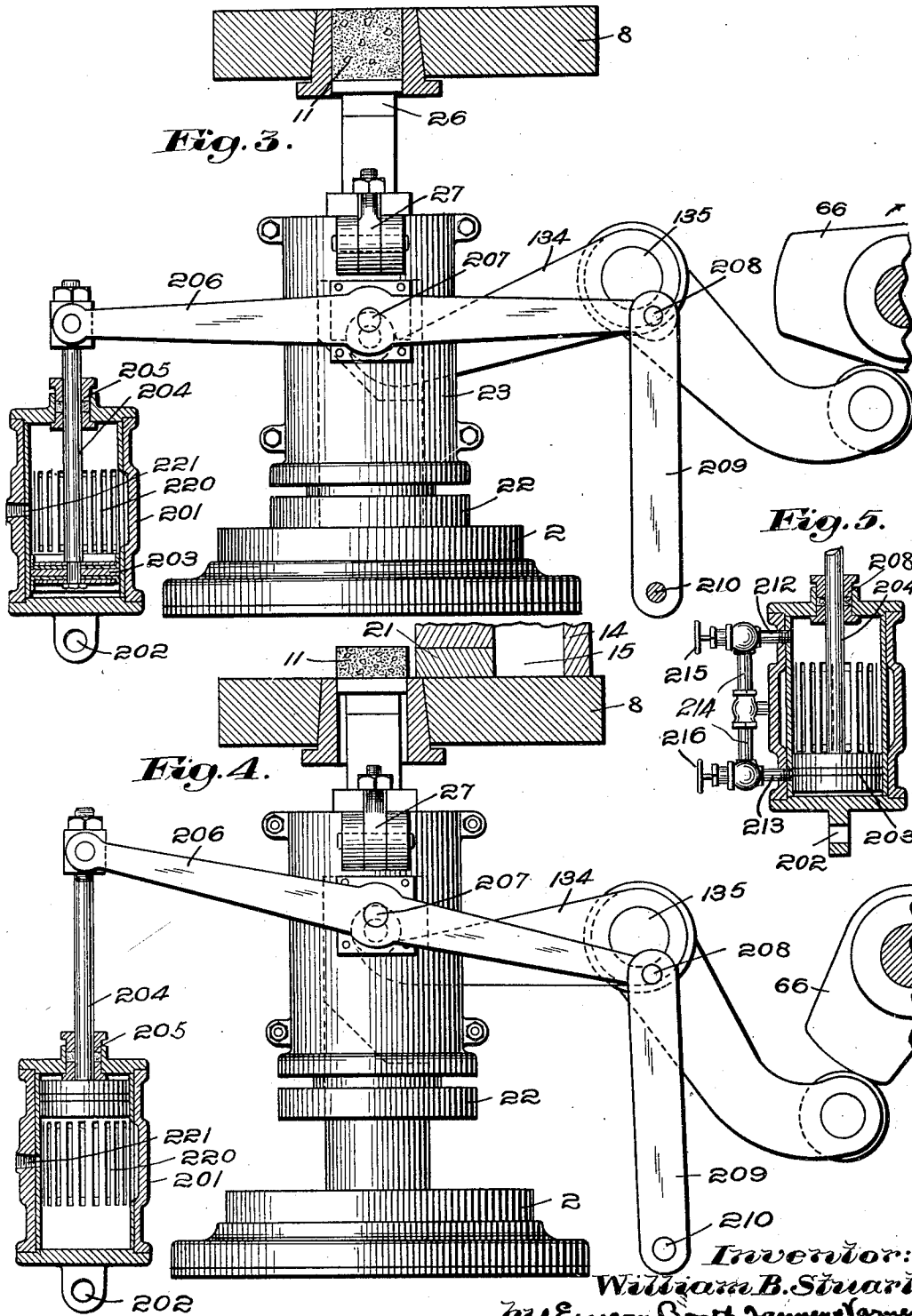
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CONTROL FOR PRESSES

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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CONTROL FOR PRESSES

Application filed March 19, 1924. Serial No. 700,312.

This invention pertains to improvements in presses.

It is among the objects of the invention to improve the control of mold plungers in high speed molding presses.

In the drawings, which show a preferred form of one embodiment of my invention:—
Figure 1 is a plan view of a portion of a press;

Fig. 2 is a side elevation of the parts shown in Fig. 1;

Fig. 3 is a view similar to Fig. 2, but showing additional portions of the press mechanism, being partly in vertical longitudinal section;

Fig. 4 is a view like Fig. 3, but showing the relation of the parts during a different portion of their cycle of operation; and

Fig. 5 is a section on the line 5—5 of Fig. 2.
Referring to the drawings and to the preferred form of my invention selected for illustrative purposes, I have shown my improved control mechanism associated with a press which may be that shown in United States Letters Patent No. 1,003,561, issued September 19, 1911, to International Pavement Company, assignee of George E. Whitney, and for purposes of clarity I have, so far as applicable, adopted the numerals of the drawings of said patent to the drawings of the present application.

The press shown in said patent can operate at very high speed considering the high pressures applied to the molded blocks produced thereby and the weight of the moving parts thereof, but at the higher speeds certain parts, because of their weight and speed of movement, become speed-limiting factors. It is to these parts that I have applied my improved control.

In the press illustrated, liquid in a hydraulic cylinder 1 actuates a ram 2 constituting a preferred form of compressing instrumentality carrying an ejecting head guide 22 which guides the ejecting head 23 to which is attached the mold plunger and plunger cap 26.

The cycle of operation of this plunger cap includes movement by the compressing instrumentality typified by the ram 2 from

filling position (Fig. 3) to an intermediate position where the material is compressed under the desired pressure against the pressure block 21 (which is above the mold in pressing position), a slight downward movement to relieve the pressure on the plunger cap during the uncovering of the mold, followed by ejecting movement of the plunger cap and associated parts to the position shown in Fig. 4, this position being maintained until the block is swept from above the mold by the forward movement of the sliding head 14, which carries the pressure block 21 and the filling neck 15. The ejecting movement before described is actuated by the cam 66 operating through the bell crank lever 134 fulcrumed at 135 and adapted to move the ejecting head 23 without corresponding movement of the ejecting head guide 22 or of the ram 2.

After the block has been swept from the top of the mold plunger, the latter is permitted to drop by gravity under the control of the cam 66, this being the mold filling movement.

The ejecting head 23, plunger and plunger cap 26 are of considerable weight, and the proportion of the cycle of operation allowed for ejecting and filling movement by the cam 66 is necessarily rather small. Therefore the plunger cap and associated parts may be moved so quickly during ejecting movement that the top of the plunger cap may, by the momentum of the parts, be projected beyond the upper surface of the mold and be struck by the sliding head during its movement from ejecting into mold filling positions. Even aside from this possible accident, the strain and jar on the press incidental to rapid movement of the ejecting head is likely to result in damage, though to a less degree on the downward mold filling movement than on the upward ejecting or mold emptying movement.

To minimize the difficulties described, I have provided deceleration means operatively connected to the mold plunger 26 by attachment to the ejecting head 23, which, in the embodiment of my invention illustrated, shares each movement of the mold plunger, being rigidly connected thereto.

The deceleration means preferably includes, as illustrated, dash pot means and appropriate connections, the dash pot means preferably including, as illustrated, a cylinder 201, which is mounted to rock about a fulcrum 202, and which contains a piston 203 connected to a piston rod 204 passing through a suitable stuffing box 205. The connections may include a lever 206 connected at one end to the piston rod 204, connected at its center to the ejecting head 23, as by studs 207, and having its opposite end connected to an oscillatory fulcrum 208 provided at the upper end of an oscillatory link 209 connected at 210 to the hydraulic cylinder 1 or other stationary portion of the press.

Movement of the lever illustrated is entirely actuated by the ejecting head 23, and as the lever 206 is of the third class, the travel of the piston 203 in the cylinder 201 is very considerably greater than the travel of the ejecting head 23 and associated parts. The preferred lever or link connection permits travel in a straight line of the connection 207 between the lever 206 and the ejecting head 23, the fulcrum 208 being oscillatory about the axis 210 of the link 209, and the cylinder 201 being mounted for oscillation about the axis 202, which may be connected to the hydraulic cylinder 1 or other stationary part of the press. The cylinder 201 is filled with appropriate fluid, preferably a liquid having lubricating qualities, and connection between the opposite ends of the cylinder is effected through by-pass means typified by the ports 212, 213 connected by a conduit 214 in which are preferably interposed valve means 215, 216 controlling the effective area of the ports 212 and 213 respectively. Supplemental by-pass means effective during the mid-portion of the stroke of the piston 203 is provided in the preferred form of my invention illustrated, such supplemental by-pass means taking the form of a plurality of elongated depressions 220 on the inner wall of the cylinder 201, extending longitudinally thereof and adapted at and near mid-stroke of the piston 203 to permit relatively free flow of liquid thereby. This supplemental by-pass means becomes ineffective as the plunger 26 and ejecting head approach the end of the ejecting stroke and also, in the preferred embodiment of my invention illustrated, as the end of the mold filling stroke is approached.

During a portion of the stroke the port 221 adjacent the longitudinal centre of the cylinder 201 permits relatively rapid escape of the liquid in front of the piston 203, such liquid either flowing to the opposite side of the piston 203, or, if the valve 222 is open, portions thereof may flow to the reservoir 223 containing a replenishing supply of the liquid and preferably held stationary, being connected to the oscillatory cylinder by a flexible conduit typified by the hose 224.

The valves 215 and 216 may be regulated to suit the speed of operation of the press and the valve 222 may be entirely closed or opened to the desired extent, this depending on the supply of liquid in the cylinder and also on the speed of operation of the press.

Assuming the parts to be in the position shown in Fig. 3 with the mold filled, the compressing instrumentalities typified by the ram 2 will force the ejecting head 23 and the mold plunger 26 upwardly until the material in the mold is compressed to the desired extent against the pressure block 21. During this movement, the piston 203 will have advanced in the cylinder 201 without substantial opposition from the liquid in advance thereof which is free to pass out through the ports 212 and 221. The pressure on the molded block is then relieved, the pressure block 21 moved to the position shown in Fig. 4, permitting elevation of the plunger cap 26 and associated ejecting head by the ejecting cam 66 to the position illustrated where the molded block is entirely out of the mold and in position to be swept forward (to the left as viewed in Fig. 4) until the mold-filling neck is above the mold. At this time the cam 66 permits the mold plunger and associated parts to drop, filling the mold with uncompressed material from the neck 15. Toward the end of this downward movement, the deceleration means functions to cushion the drop of the parts, relieving the impact on the feed controlling mechanism, where such is used as illustrated in the Whitney Patent No. 1,003,561, or on the ram or compressing means, where the liquid content of the hydraulic cylinder is varied to control the amount of drop of the parts.

Referring now to the detail of the cylinder 201, this is preferably as illustrated constructed with an inner slotted sleeve providing the ports 220 and with a recess in the cylinder wall exterior to said sleeve and opposite said slots 220. This recess preferably does not extend entirely around the cylinder, the cylinder wall preferably fitting relatively closely to the slotted sleeve at that portion where the central port 221 is provided.

While I have described and illustrated the preferred form of my invention in detail, it will be understood that I have done so for purposes of clarification and not for purposes of limitation, and that major changes involving omission, substitution, reversal and alteration of parts may be made without departing from the scope of my invention, which is best defined in the following claims.

Claims:

1. A dash pot for controlling the movement of the mold plunger of a press comprising, in combination, a cylinder, a piston therein, said cylinder provided with by-pass conduit means of relatively large effective cross-sectional area for the portion of said cylin-

der intermediate its length, conduit means
of relatively small effective cross-sectional
area connecting opposite end portions of said
cylinder, and a liquid reservoir for the cush-
5 ioning fluid of said dash pot connected to
said first mentioned conduit means.

2. A dash pot for controlling the move-
ment of the mold plunger of a press com-
prising, in combination, a cylinder, a piston
10 therein, said cylinder provided with by-pass
conduit means of relatively large effective
cross-sectional area for the portion of said
cylinder intermediate its length, conduit
means of relatively small effective cross-
15 sectional area connecting the opposite end
portions of said cylinder, a liquid reservoir
for the cushioning fluid of said dash pot, and
conduit means connecting said two first men-
20 tioned conduit means with each other and
with said reservoir.

In testimony whereof, I have signed my
name to this specification.

WILLIAM B. STUART.

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