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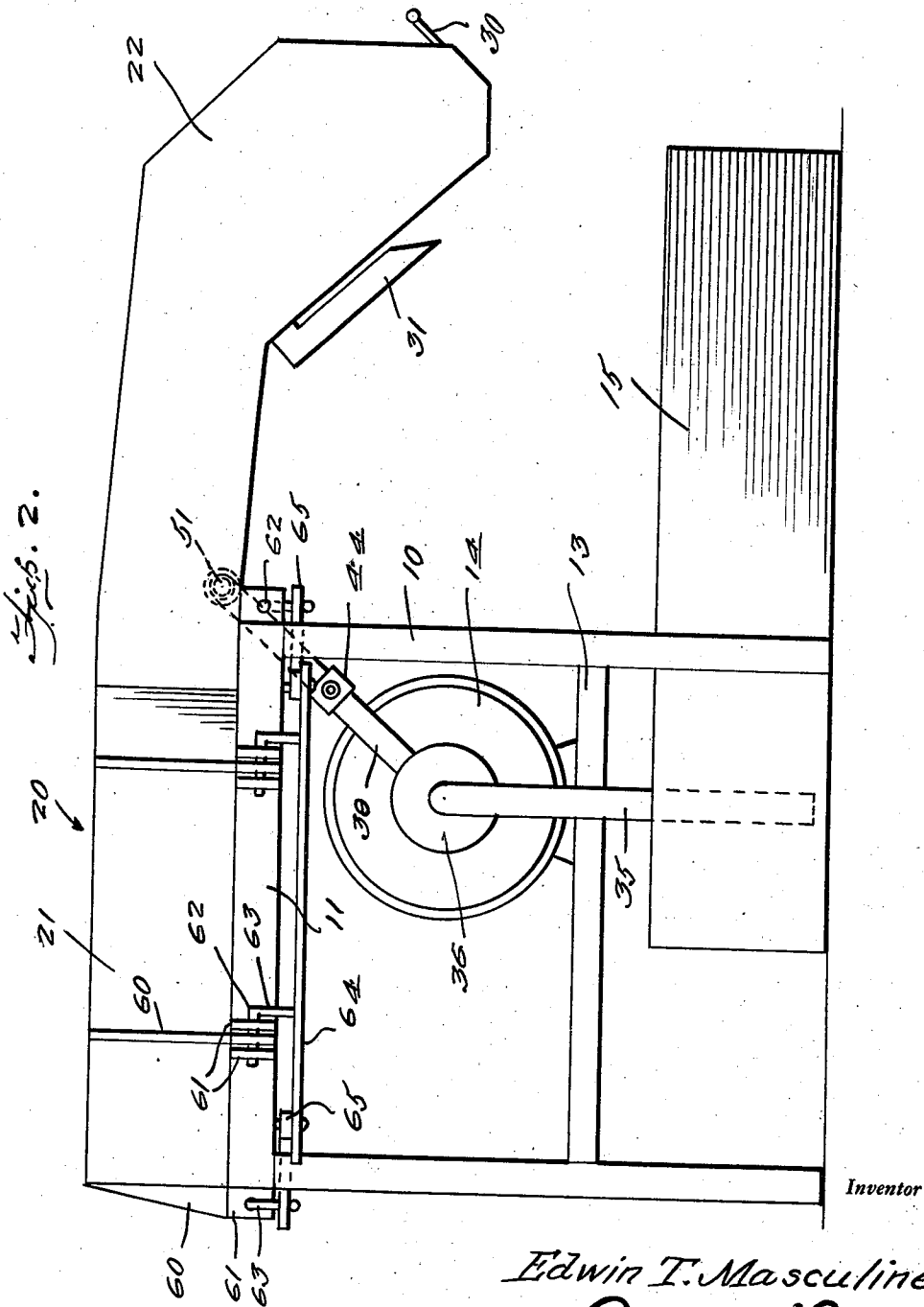
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2,383,810

HYDRAULIC PRESS

Filed Oct. 18, 1944

3 Sheets-Sheet 2



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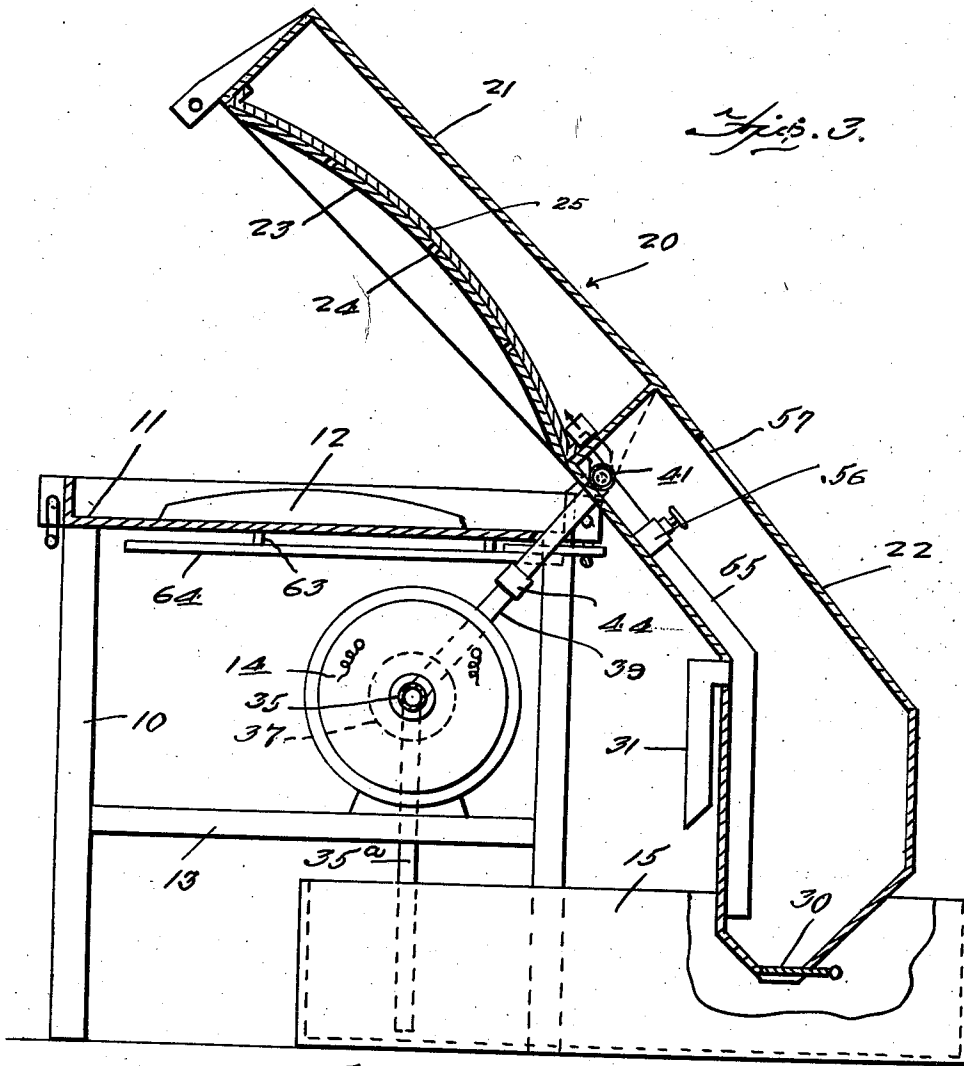


Fig. 3.

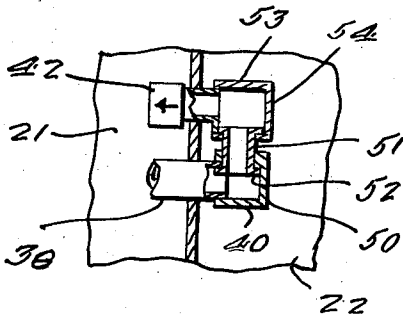


Fig. 4.

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UNITED STATES PATENT OFFICE

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HYDRAULIC PRESS

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7 Claims. (Cl. 18-16)

This invention relates to a hydraulic press, and more particularly to such a press adapted to the forming of articles adapted to be molded under pressure.

A primary object of this invention is the provision of an improved hydraulic press having means associated therewith whereby hydraulic pressure may be introduced into a pressure head thereof to form an article.

An additional object is the provision of such a press having improved locking means associated therewith for holding the pressure head in association with the base.

An additional important object is the provision of improved means for controlling the hydraulic pressure in such a pressure head.

Still another important object is the provision of such a press which will be sturdy and durable in construction, reliable and efficient in operation, and relatively simple and inexpensive to manufacture, assemble and operate.

Other objects reside in the combinations of elements, arrangements of parts, and features of construction, all as will be more fully pointed out and disclosed in the accompanying drawings, wherein there is shown a preferred embodiment of this inventive concept.

In the drawings:

Figure 1 is a top plan view of one form of device embodying features of this invention, certain concealed parts thereof being indicated by dotted lines.

Figure 2 is a side elevational view of the structure shown in Figure 1.

Figure 3 is a sectional view taken substantially along the center line of Figure 1, showing the parts in different positions of adjustment, and

Figure 4 is a fragmentary sectional view showing the constructional detail.

Like reference numerals refer to like parts throughout the several views of the drawings.

Having reference now to the drawings, there is shown at 10 a standard, or support, carrying at its upper extremity a base 11 comprised of a trough-like member within which is adapted to be positioned a former 12. Standard 10 has a transverse supporting plate 13 thereacross adapted to support an electric driving motor 14, and other mechanism to be described more fully hereinafter. A reservoir 15 for hydraulic fluid, such as water, oil or the like, is positioned adjacent the base of standard 10.

Pivotally secured to the base 11, as by pivot pin 16 engaging in lugs 17 carried by base 11, is a pressure head generally indicated at 20 com-

prised of a head portion 21, and a counterbalancing tank 22. Head portion 21 is comprised of a rectangular receptacle provided, at its lower face, adjacent base 11, with a diaphragm 23 secured in fluid-tight relation about the edges of the receptacle 21, and preferably comprised of two or more layers of rubber 24 and 25, or the like, the layers having different characteristics, as, for example, layer 25 being an inner layer of relatively tough, heavy rubber adapted to form articles provided with corners and the like without damage to the diaphragm, and the outer layer being formed of softer material adapted readily to mold the material being formed.

The tank 22 is provided at its lower extremity with a slide valve 30, and is also provided with an overflow pipe 31, adapted to return any overflowing liquid therein to the reservoir 15.

From reservoir 15 inlets, one of which is shown at 35, leads to pumps 36 and 37, the inlet to pump 37 being indicated at 35a in Figure 1. The pumps 36 and 37 are adapted to be supported by transverse plate 13 and driven by motor 14. Pump 36 is a high volume, low pressure pump, and pump 37 is a low volume, high pressure pump, the purpose and the utility of which will be more fully pointed out hereinafter.

From pumps 36 and 37 pipes 38 and 39, respectively, lead to pressure joints 40 and 41, from which joints inlets 42 and 43, respectively, lead to the interior of pressure head 21. Valves 44 and 45 are provided in lines 38 and 39, respectively, which valves may be either manually or automatically controlled in any desired manner.

As best shown in Figure 4, the member 40 comprises a cap 50 secured at the end of pipe 38, from which a transverse sleeve 51, provided with a flange 52, between which flange and the wall of cap 50 a pressure packing may be provided, extends to a second cap 53, within which a flange 54 is also secured, the cap 53 being positioned on the extremity of outlet pipe 42, thus effecting a relatively fluid-tight, high pressure joint between the pipes 38 and 42, the arrangement being such that the parts may pivot as the member 20 pivots with respect to the base member 11.

From the interior of pressure head 21 an outlet line 55 extends to a point adjacent the bottom of counterbalancing tank 22. Line 55 is provided with a valve 56, which may be either manually operable or of a type designed to open when a predetermined pressure is achieved within pressure head 21, the valve being accessible through an aperture 57 in the wall of ballast reservoir 22.

Means are provided for locking the pressure

head 21 in related assembly with the base 11, such means taking the form of spaced lugs 60 positioned at spaced points about the periphery of head 21 and provided with apertures adapted to be aligned with corresponding apertures in lugs 61 carried by the base 11, when the device is in closed position, through which apertures pins 62 are passed. Means are provided for locking and unlocking all of the lugs simultaneously, by simultaneous insertion and removal of pins 62. Such means take the form of angularly disposed extensions 63 secured to the pins 62 and having their opposite extremities secured to bars, or rods, 64. Bell crank members 65 are pivotally secured, as by pivots 66, at three corners of the base 11 to the extending legs of which the ends of adjacent rods 64 are secured, as by slot and pin connections 67. The arrangement is such that pivotal movement of any one of bell crank levers 65 will move the extremities of the rods 64 associated therewith, to move the associated pins 62. Such movement of the rods is transmitted to the bell crank members secured to their opposite ends, to correspondingly move the other of rods 64 associated with the last-mentioned bell crank member, whereby simultaneous insertion and removal of the pins 62 in their associated apertures is effected by one movement of one of the bell crank members 65, or alternatively, one of the rods 64.

Now, from the foregoing the operation of the device should be readily understandable. The former 12 is first placed in position in base 11, and the material to be molded placed thereover. The water is then drained from tank 22 by opening valve 30, whereupon the natural weight of pressure head 21 will cause the same to fall by gravity into position over former 12, whereupon the pins 62 are moved to engage the apertures in lugs 60 and 61 to lock the pressure head securely in position.

The motor 14 is then started, which draws hydraulic fluid through the inlets 35 and 35a, the low pressure, high volume pump 36 serving quickly to fill the pressure head 21 to force the diaphragm 23 downwardly over the former 12. After the low pressure capacity of the pump 36 is exhausted, the high pressure pump 37 takes over, forcing more and more hydraulic fluid into the head 21, and successively increasing the pressure therein to firmly mold and form the desired article. It is to be noted that a one-way valve may be positioned in the inlet line 38 or the low pressure pump 36 to preclude forcing of hydraulic fluid back therethrough during the operation of high pressure pump 37.

The operation of the pump 37 continues until the pressure has reached the desired point, whereupon the valve 56 may be opened, either manually or automatically, upon the achievement of the predetermined pressure, whereupon the fluid is permitted to escape from the pressure head 21 into the tank 22. After the article has been formed, the pins 62 are released in a manner previously described, whereupon the weight of the water in tank 22 serves to move the device to the open position, shown in Figure 3 by gravity. The formed article may then be removed from the former 12, and the operation successively repeated as desired.

Now, from the foregoing it will be seen that there is herein provided a hydraulic press which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. In a hydraulic press, in combination, a base, a pressure head pivoted thereto, a diaphragm in said pressure head, a counterbalancing tank mounted with said head on said base, a reservoir, means for forcing hydraulic fluid from said reservoir into said head to move said diaphragm, said means including a high volume, low pressure pump, and a low volume, high pressure pump, and means to drain hydraulic fluid from said head to said tank.

2. In a hydraulic press, in combination, a base, a pressure head pivoted thereto, a diaphragm in said pressure head, a counterbalancing tank mounted with said head on said base, a reservoir, means for forcing hydraulic fluid from said reservoir into said head to move said diaphragm, means to drain the fluid from said head to said tank, and means to return said fluid from said tank to said reservoir.

3. In a hydraulic press, in combination, a base, a pressure head pivoted thereto, a diaphragm in said pressure head, a counterbalancing tank mounted with said head on said base, a reservoir, means for forcing hydraulic fluid from said reservoir into said head to move said diaphragm, said means including a high volume, low pressure pump, and a low volume, high pressure pump, means to drain hydraulic fluid from said head to said tank, and means to return said fluid from said tank to said reservoir, said last-mentioned means including a valve positioned in the base of said ballast tank.

4. In a hydraulic press, in combination, a base, a pressure head pivoted thereto, a diaphragm in said pressure head, a counterbalancing tank mounted with said head on said base, a reservoir, means for forcing hydraulic fluid from said reservoir into said head to move said diaphragm, means to drain the fluid from said head to said tank, and lock means to secure said head to said base.

5. In a hydraulic press, in combination, a base, a pressure head pivoted thereto, a diaphragm in said pressure head, a counterbalancing tank mounted with said head on said base, a reservoir, means for forcing hydraulic fluid from said reservoir into said head to move said diaphragm, means to drain the fluid from said head to said tank, and lock means to secure said head to said base, said lock means including a plurality of apertured lugs on said base and said head, and pins adapted to be passed through said apertures.

6. In a hydraulic press, in combination, a base, a pressure head pivoted thereto, a diaphragm in said pressure head, a counterbalancing tank mounted with said head on said base, a reservoir, means for forcing hydraulic fluid from said reservoir into said head to move said diaphragm, means to drain the fluid from said head to said tank, lock means to secure said head to said base, said lock means including a plurality of apertured lugs on said base and said head, pins adapted to be passed through said apertures, and means for simultaneously engaging and disengaging all of said pins with said apertures.

7. In a hydraulic press, in combination, a base, a pressure head pivoted thereto, a diaphragm in said pressure head, a counterbalancing tank

mounted with said head on said base, a reservoir, means for forcing hydraulic fluid from said reservoir into said head to move said diaphragm, means to drain the fluid from said head to said tank, lock means to secure said head to said base, 5 said lock means including a plurality of apertured lugs on said base and said head, pins adapt-

ed to be passed through said apertures, and means for simultaneously engaging and disengaging all of said pins with said apertures, said means including a plurality of rods carrying said pins, and bell crank levers associated with said rods for simultaneously moving all of said rods.

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