March 1, 1949. T. F. STACY 2,463,003

BASE FOR SELF-CONTAINED HYDRAULIC MOTORS

Filed May 14, 1945

Fig. 1.

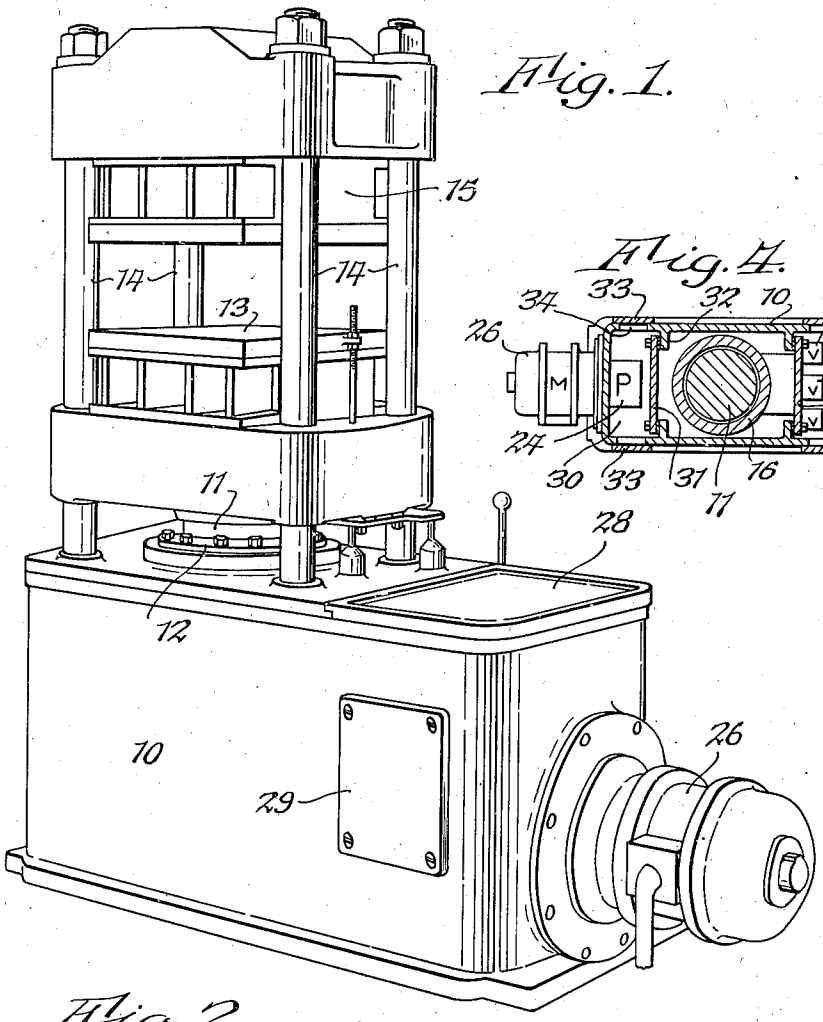



Fig. 4.




Fig. 2.

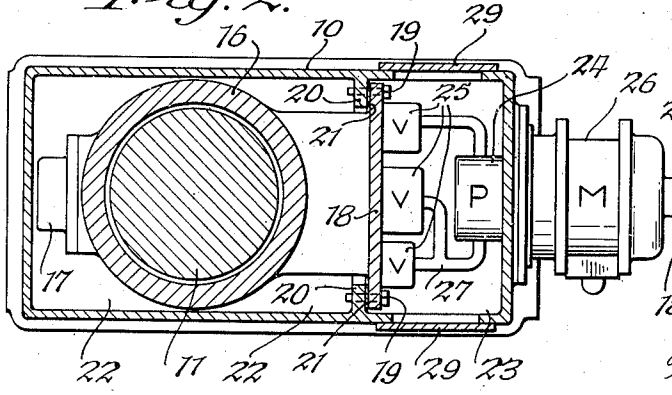
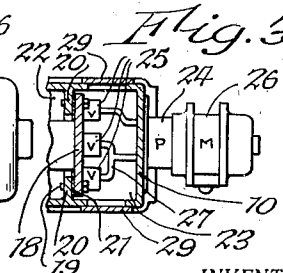



Fig. 3.




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## BASE FOR SELF-CONTAINED HYDRAULIC MOTORS

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4 Claims. (Cl. 60—52)

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This invention relates to hydraulic motors and more particularly to the type popularly known as the self-contained motors, where the hydraulic motor, pump, valves and hydraulic system are all assembled in a device that may be handled as a complete unit. Heretofore hydraulic motors of this type utilized as molding presses have had the cylinder with the advancing and retracting chambers, through pressure differentials in which the ram is operated, disposed with all of the valves, pump and piping in the reservoir that formed the base of the unit or press, so that any leakage in the system was directly into the reservoir where it did no harm. The major part of the adjustments and maintenance work required on these presses was in connection with the valves, and when servicing of the valves, piping or pump was required, it was necessary to empty the reservoir of the oil. A workman doing the servicing was not only handicapped by the film of oil that remained on the exterior of all the parts being serviced, but there was substantial danger that the workman would get dirt and other foreign matter into the oil or residue of the oil remaining in the reservoir, which, if taken up in the system and carried to different parts of the apparatus, might cause scoring of relatively moving, interfitting parts or other damage.

An object of this invention is to provide an improved, self-contained, hydraulic motor or press in which any or all of the control valves, pump and connections may be disposed exteriorly of the reservoir and normally concealed within the housing forming the base where leakage may be collected; with which all of such concealed parts will be readily available for servicing and inspection without the servicing mechanic being usually smeared with oil, and with a minimum danger of dirt or foreign matter getting into the operating fluid of the system; with which it will not be necessary to empty the reservoir of the operating oil when the servicing of such control valves, piping or connections and pump becomes necessary; with which leakage may be collected and filtered before being returned to the system, and which will be relatively simple, compact and inexpensive.

Other objects and advantages will be apparent from the following description of an embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a perspective of a self-contained molding press constructed in accordance with, and representing one embodiment of the invention;

Fig. 2 is a sectional plan of the same;

Fig. 3 is a similar sectional plan, of another embodiment of the invention, with the pump disposed outside of the housing; and

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Fig. 4 is a section plan of another embodiment of the invention.

In the embodiment of the invention illustrated in Figs. 1 and 2, the self-contained hydraulic motor is incorporated in a hydraulic molding press of the type disclosed in my prior Patent #2,358,353, granted Sept. 19, 1944. In that patent the pump and all of the valves are disposed in the hollow base which acts as the reservoir. In the present invention the press includes a hollow base or housing 10 which is liquid-tight on its side and bottom walls and which has, extending upwardly through its top wall, a hydraulic ram 11 surrounded by a packing gland 12 where it emerges from the base 10. The upper end of the ram 11 is connected to and operates a platen 13 which is guided, by vertical strain rods 14, toward and from a head 15.

Within the housing 10, and connected to the packing gland 12, is a hydraulic cylinder 16, Fig. 2, having a pilot operated prefill valve 17 which opens into the space surrounding the cylinder 16. Secured to one side of the cylinder 16 is a valve plate 18, which is removably coupled to the cylinder 16 and also removably coupled by screws 19 to an internal flange 20 provided on the side and bottom walls of the housing 10. A gasket 21 is disposed between the valve plate 18 and the flange 20 to make a liquid-tight connection between them. This valve plate 18, with the flange 20, thus provides a partition or wall across the interior space of the housing 10, and divides it into two non-communicating compartments 22 and 23, in one of which is disposed the cylinder 16 with its prefill valve, and in the other of which the control valves 25 are disposed, and if desired also the pump 24. The control valves 25 are preferably mounted on the valve plate 18, and the pump 24, either within or exteriorly of the housing.

An electric motor 26 is coupled to the outside of a wall of housing 10, and its armature shaft is coupled to and directly drives the pump. The pump is connected by suitable piping 27 to the valves and the advancing and retracting chambers of the cylinder 16 to form a hydraulic operating system of any suitable type, one of which is illustrated in Fig. 1 of my prior Patent #2,358,353, to which reference may be had for a detailed illustration and description of one type of hydraulic system that may be employed.

The housing 10 is provided at its top with a removable closure 28, see Fig. 1, through which access may be had to the compartment 23 through the top thereof, and is also provided with removable plates 29 on the opposite side walls, so that access may be had to the compartment 23 through these openings in the sides and top of the housing. The operating oil is all contained in the system and in the compartment 22. Any leakage through

the prefill valve will be directly into the reservoir, and any leakage from the control valves, the pump and from the connections between the pump, valves, cylinders and reservoir will be largely into the compartment 23 where it collects in the bottom thereof. When any substantial amount of leakage has collected in the bottom of this compartment 23, it may be removed through a suitable drain valve, not shown, filtered if necessary to remove foreign matter, and returned to the reservoir compartment 22. When servicing of the hydraulic system is required, access to the control valves, pipes and pump may be easily had through the openings in the top and side walls of the housing 10, and the workman will not have to handle parts covered with films of adhering oil as in previous instances. The danger of foreign matter being introduced into the oil by the workman is also reduced to a minimum, if not entirely eliminated.

In the embodiment of the invention illustrated in Fig. 3, the arrangement is generally similar to that shown in Fig. 2, and corresponding parts are given the same reference characters, the difference being that in the example shown in Fig. 3, the pump is disposed exteriorly of the housing 10, but mounted on the end wall with the motor, and connected by pipes extending through the end wall to the valves and cylinder chambers.

In the embodiment of the invention illustrated in Fig. 4, the housing or base 10 is extended horizontally in the opposite direction from the cylinder 16 so as to provide a second compartment 30. A partition plate 31 is disposed across the interior of the housing 10 and detachably coupled to an internal flange 32, which extends along the sides and bottom of the interior of the housing 10, with a gasket interposed between the plate 31 and the flange 32, so as to prevent leakage of oil from the reservoir chamber surrounding the cylinder 16 into the chamber 30. The housing 10 may have removable plates 33 secured across and closing windows 34 in one or more side walls of the housing 10, so as to provide ample access to the chamber 30, and the top wall of the housing may, if desired, also have a removable top plate, not shown, similar to the removable top 28 at the opposite end of the housing 10.

The pump 24 may be disposed in the chamber 30 and driven by the motor 26 mounted on the exterior of the end wall of the housing 10 adjacent the pump. Thus the pump will be disposed in a separate chamber to which access may be had for servicing through the removal of plates on the sides and top of that end of the housing. In the chamber 23 at the opposite end of the housing, the valves 25 may be disposed, as in the other embodiments of the invention. With this arrangement, more convenient access may be had to the valves in the chambers 23 without interference from the pump, and similarly more convenient access may be had to the pump in its separate compartment.

I have found that the adjustments and most of the maintenance work in these self-contained molding presses are required in connection with the valves, and, in all of the embodiments of the invention, the valves are isolated in a chamber separate from the reservoir, so that when servicing on the valves is required, it is unnecessary to remove and store the operating liquid, and the danger of getting dirt or foreign matter into the oil while working on or servicing the valves is largely eliminated. The time required to service such a press is thus greatly reduced. The pump



may be left in the reservoir, if desired, because servicing of the pump is relatively infrequent in comparison with the frequency of servicing required for the valves. By removing the pump from the reservoir, servicing of the pump, when required, is more easily made, and inasmuch as there is little leakage from the pump, the pump can, if desired, be removed entirely from the housing 10 and mounted on the top or any of the side walls of the housing 10.

It will be understood that various changes in the details, materials, and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention, as expressed in the appended claims.

I claim:

1. In a self-contained, hydraulic motor of the type having a reservoir, a pump, a cylinder having a prefill valve and advancing and retracting chambers disposed within said reservoir, a ram operated by pressure differentials in said chambers, a plurality of control valves, and connections between the valves, pump, reservoir and chambers and forming an operating hydraulic system by which the movements of said ram are controlled, that improvement which comprises an upright, separate plate within said reservoir, coupled to the side and bottom walls thereof and to a side of said cylinder, forming a liquidtight partition across the interior of said reservoir at one sde of said cylinder, and dividing the reservoir into two horizontally side by side, non-communicating compartments, with said cylinder and its prefill valve in one of said compartments and serving as the reservoir and into which said prefill valve opens, and said control valves in the other of said compartments where they will be free of external oil and exposed for easy servicing.

2. In a self-contained, hydraulic motor of the type having in its base a reservoir, a pump, a cylinder having a prefill valve and advancing and retracting chambers disposed in said reservoir, a ram operated by pressure differentials in said chambers, a plurality of control valves, and connections between the valves, pump, reservoir and chambers and forming an operating hydraulic system by which the movements of said ram are controlled, that improvement which comprises an upright, separate, added, partition wall across the interior of said reservoir at one side of said cylinder coupled and sealed to the side and bottom walls of said reservoir, and dividing said interior into two non-communicating, horizontally, side by side compartments, one of which contains said cylinder and its prefill valve and serves as said reservoir, and the other contains said control valves and said pump, whereby said control valves and pump will be outside of said compartment carrying operating oil and exposed for easier servicing without emptying of the reservoir compartment, and contamination of the oil by servicing operations will be reduced.

3. In a self-contained, hydraulic motor of the type having a base with a chamber serving as a reservoir, a pump, a cylinder having a prefill valve and advancing and retracting chambers disposed in said reservoir, a ram operated by pressure differentials in said chambers, a plurality of control valves, and connections between the valves, pump, reservoir and chambers and forming an operating hydraulic system by which the movements of said ram are controlled, that improvement which comprises an upright, separate

additional partition wall inserted in and extending across the interior of said reservoir at one side of said cylinder, coupled and sealed to the side and bottom walls of the reservoir and dividing said interior into two non-communicating, horizontally, side by side compartments, one of which contains said cylinder and serves as said reservoir, and the other contains said control valves, and said base having openings in its walls leading directly to said other compartment and removable closures for said openings, whereby said control valves will be outside of said compartment carrying operating oil and exposed for easier servicing without emptying of the reservoir compartment, and contamination of the oil by servicing operations will be reduced.

4. In a self-contained hydraulic motor of the type having in its base a reservoir housing, a cylinder with advancing and retracting chambers and a prefill valve disposed in said housing, a ram operated by pressure differentials in said chambers extending out of said housing, a pump, a valve plate secured to the side of said cylinder, a plurality of control valves mounted on said plate, and connections between the valves, pump, reservoir and chambers, and forming an operating hydraulic system by which the movements of said



ram are controlled, that improvement which comprises said valve plate engaging and sealed to the side and bottom walls of the housing and dividing the interior of said housing into two non-communicating compartments, with said cylinder and its prefill valve in one of said compartments, and said control valves in the other of said compartments, whereby said control valves will be unsubmerged in oil and exposed for easier servicing without emptying of the reservoir compartments surrounding the cylinder, and contamination of the oil by servicing operations will be reduced.

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