June 27, 1933. W. J. FIEGEL 1,915,656

HYDRAULIC UNIT

Filed July 20, 1931 2 Sheets-Sheet 2

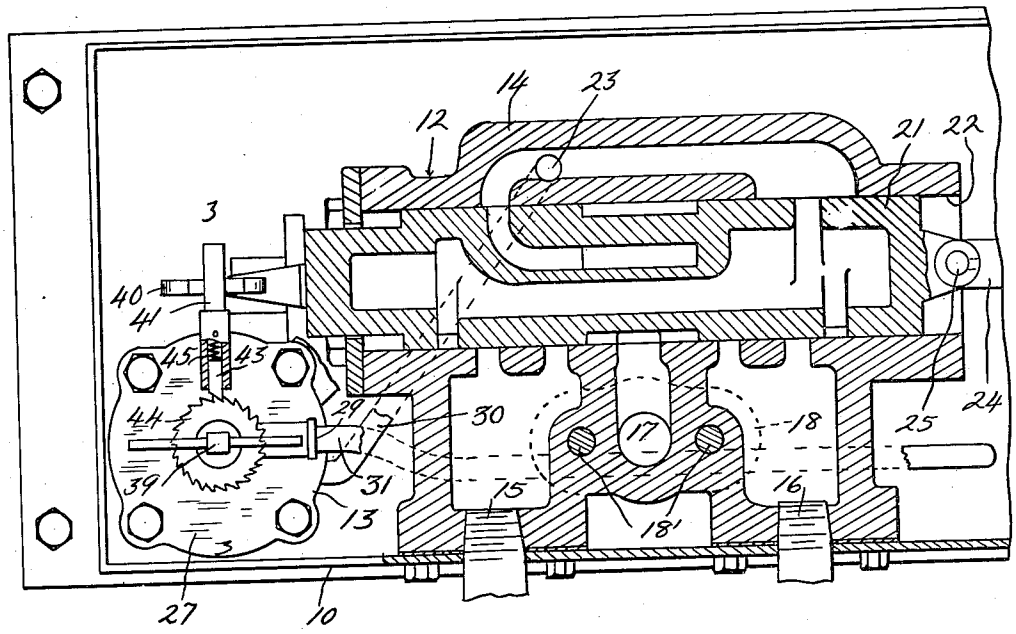


Fig. 2.

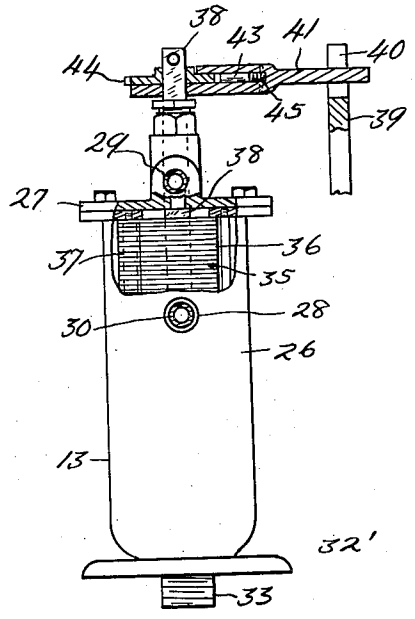


Fig. 3.

INVENTOR

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ATTORNEYS

Patented June 27, 1933

1,915,656

UNITED STATES PATENT OFFICE

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HYDRAULIC UNIT

Application filed July 20, 1931. Serial No. 552,080.

This invention relates generally to hydraulic systems and more particularly to a construction and arrangement of parts tending to render more efficient and improve generally systems of this character.

The invention contemplates minimizing leakage and obtaining a more compact unitary assembly by locating the control valve and filtering device for the system within the supply tank therefor in such a manner that fluid escaping from either the valve or filtering device will flow directly into the supply tank.

Another object of this invention is to locate a filtering device within the tank in such a manner as to permit draining the liquid from the filtering device without removing the same from the tank or interfering in any way with the liquid in the latter.

A still further advantageous feature of this invention is to operatively connect the filtering device to the control valve so that actuation of the latter automatically operates the filtering device to clean the same.

The foregoing as well as other objects will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a sectional side elevational view of the fuel tank assembly;

Figure 2 is a longitudinal sectional view through the control valve;

Figure 3 is a central sectional view through the filtering device.

Referring now to the drawings, it will be noted that there is illustrated in Figure 1 a reservoir or tank 10 adapted to contain a supply of lubricant or other suitable liquid and preferably supported upon a standard 11. Located within the supply tank 10 in such a manner as to be immersed in the fluid therein is a control valve 12 and a filtering device 13.

The control valve 12 is preferably of the reciprocable piston type and may be identical in construction to the valve described with some particularity in my copending application, Serial No. 538,386, filed May 18, 1931. As shown particularly in Figure 2, the valve 12 illustrated herein comprises a casing 14 having spaced openings 15 and 16 therein communicating with the points of distribution. For the purpose of illustration, it may be assumed that the openings 15 and 16 communicate with opposite ends of a hydraulically operated pump (not shown) for reciprocating the piston therein. The casing is further provided intermediate the openings 15 and 16 with a third opening 17 communicating with a suitable gear pump 18. The gear pump is preferably arranged exteriorly of and below the supply tank 10 as shown in Figure 1 and is secured to the valve casing to form a unitary construction by means of the bolts 18'. The pump is also rigidly secured to the bottom wall 19 of the tank in such a manner as to provide a fluid-tight connection and communicates with the interior of the tank by means of a passage 20.

The flow of fluid through the openings 15 and 16 is controlled by means of a piston type valve 21 reciprocably mounted within a bore 22 extending longitudinally through the casing. The piston 21 is so constructed that in the intermediate position thereof shown in Figure 2 the fluid discharged by the pump 18 is merely by-passed around the piston and prevented from flowing into either of the openings 15 or 16. On the other hand, when the piston 21 is in its extreme right-hand position as viewed in Figure 2, communication is established between the inlet opening 17 and the opening 16 in the casing so as to convey fluid under pressure into one side of the hydraulically actuated pump to move the piston therein in one direction. In this connection, it is to be noted that when the piston valve 21 is in the position above-mentioned, it also establishes communication between the opening 15 and the exhaust opening 23 in the casing, with the result that any fluid upon the compression side of the hydraulically actuated pump will be discharged through the valve 12 into the supply tank. Movement of the piston to its extreme left-hand position as viewed in Figure 2, establishes communication between the inlet opening 17 and the opening 15 permitting fluid

end of the pump and under pressure of the pump piston conducted back through the valve 12 out of the exhaust opening 23 therein. As previously stated, the exhaust opening 23 communicates with the filtering device by means of the conduit 30 so that the fluid returned by the hydraulic pump instead of exhausting directly into the casing is discharged into the filtering device 13 through the inlet opening 28 therein. As the fluid accumulates in the casing of the filtering device, it is compelled to flow out of the outlet opening 29 in the casing into the supply tank and since it is necessary for the lubricant to pass between the cleaning disks 36 prior to flowing out of the outlet opening 29, it will be apparent that all of the fluid exhausted from the valve will be filtered prior to reentering the supply tank. Thus, in view of the foregoing and in view of the fact that the filtering device is automatically cleaned upon reciprocation of the valve piston controlling the flow of fluid into the latter, it will be apparent that efficient operation of the filtering device to clean the fluid is insured.

For draining the liquid from the tank 10, I provide a suitable drain conduit 50 having one end communicating with the pump 18 through the bottom wall thereof and having the opposite end communicating with a suitable valve (not shown). The liquid level in the tank is visible at all times by means of a gage 51 comprising a transparent tube arranged exteriorly of the tank and having the opposite ends communicating therewith at points adjacent the top and bottom thereof through suitable valves 51′ as clearly shown in Figure 1 of the drawings.

If desired, a pressure gage diagrammatically illustrated at 52 may be arranged adjacent the gage 51 for indicating the pressure of the fluid discharged by the pump. As shown particularly in Figure 1, the gage 52 communicates with the pump by means of a conduit 53 having one end communicating with the gage and the opposite end communicating with the pump adjacent the discharge opening thereof.

What I claim as my invention is:

1. A hydraulic system having in combination, a fluid supply tank, a valve located within the tank and having movable means for controlling the distribution of fluid from the tank, filtering means for the fluid also located within said tank and having a filtering member and a cleaning member, one of said members being movable relative to the other for cleaning the filtering member, and an operative connection between the movable member and control means for actuating the former upon movement of the latter.

2. A hydraulic system having in combination, a fluid supply tank, a valve located within the tank and having a reciprocable valve piston for controlling the distribution of fluid from the tank, a filtering device for the fluid also located within said tank, said device comprising a filtering member and a cleaning member, one of said members being rotatable relative to the other for cleaning the filtering member, and means operatively connecting the rotatable member to the valve piston whereby reciprocation of the latter effects rotation of the former.

3. A hydraulic system having in combination, a valve having a casing communicating with a fluid supply and having exhaust and outlet openings therein, a valve member movable within said casing for controlling the flow of fluid through said openings, a filtering device having intake and outlet openings communicating respectively with the exhaust opening in said casing and source of fluid supply, said device having a filtering member and a cleaning member, one of said members mounted for rotation relative to the other for cleaning said device, and an operative connection between the movable valve member and rotatable member of the filtering device for effecting rotation of the latter upon movement of the former.

4. A hydraulic system having in combination, a valve having a casing communicating with a source of fluid supply and having a valve member movable within said casing for controlling the flow of fluid therethrough, a filtering device for the fluid having cleaning and filtering members mounted therein for movement relative to each other to clean said device, and an operative connection between said valve member and one of the members in said device for actuating the latter upon movement of the former.

5. A hydraulic system having in combination, a fluid supply tank, a valve assembly located within said tank and having a casing provided with intake and exhaust openings for fluid, a valve member reciprocably mounted in said casing for controlling the flow of fluid through the valve casing, a filtering device also located within said tank and having intake and outlet openings therein respectively communicating with the exhaust opening in said casing and fluid in said tank, said device further having filtering and cleaning members mounted for relative rotation to clean the device, and an operative connection between the valve member and one of the members in said device for rotating the latter member upon reciprocation of the valve member.

6. A hydraulic system having in combination, a fluid supply tank, a filtering device for the fluid located within said tank and having a casing for receiving the fluid provided with drainage means extending through one wall of the tank whereby the fluid in said casing may be drained there-

from without interfering with the fluid in said tank.

7. A hydraulic system having in combination, a fluid supply tank, a valve located within the tank and having movable means for controlling the distribution of fluid from the tank, filtering means for the fluid also located within said tank and having a filtering member and a cleaning member, one of said members being movable relative to the other for cleaning the filtering member, an operative connection between the movable member and control means of the valve for actuating the former upon movement of the latter and means accessible from a point exteriorly of the tank for draining the filtering device without interfering with the fluid in the tank.

8. A hydraulic system having in combination, a valve, a valve casing communicating with a source of fluid supply and having a movable valve member therein for controlling the flow of fluid therethrough, a filtering device for the fluid having means in association therewith for cleaning the same, and means operatively connecting the valve member to the means aforesaid of the filtering device for actuating said means to clean the device upon movement of the valve member.

9. A hydraulic system having in combination, a valve casing communicating with a source of fluid supply and having a valve member movable therein for controlling the flow of fluid therethrough, a filtering device for the fluid having means in association therewith for cleaning the same, and means operable in dependence upon the movement of said valve member for periodically actuating the means aforesaid of the filtering device to clean the latter.

10. A hydraulic system having in combination, a fluid supply tank, a valve casing located within the tank and having a valve member movable therein for controlling the flow of fluid therethrough, a filtering device also located within the tank and having a casing communicating with the valve casing for receiving fluid therefrom, means associated with the filtering device for cleaning the same, and means responsive to the movement of the valve member for periodically actuating the means aforesaid to clean the filtering device.

11. A hydraulic system having in combination, a fluid supply tank, a valve assembly located within said tank and having a casing provided with intake and exhaust openings, a valve member movable within said casing for controlling the flow of fluid through said openings, an auxiliary casing also located within the tank and having inlet and outlet openings communicating respectively with the exhaust opening in the valve casing and interior of the tank, and filtering means within the auxiliary casing between the inlet and outlet openings therein for cleaning the fluid prior to discharging the same into the tank.

In testimony whereof I affix my signature.

WILLIAM J. FIEGEL.

June 27, 1933. J. J. FINDLATER 1,915,657

METHOD OF MAKING A COMPOSITE DIE ELEMENT

Filed June 28, 1930

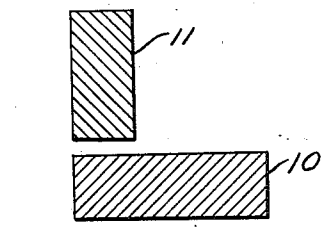


FIG. 1.

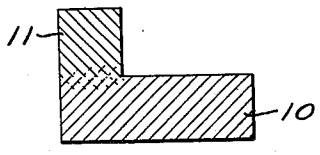


FIG. 2.

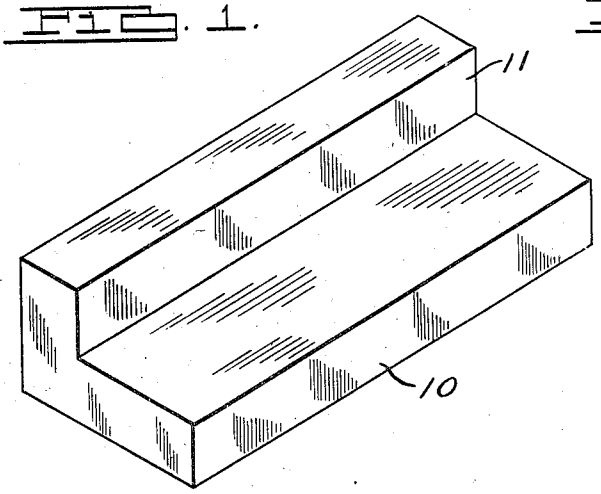


FIG. 3.

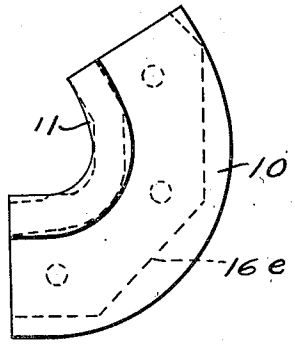


FIG. 5.

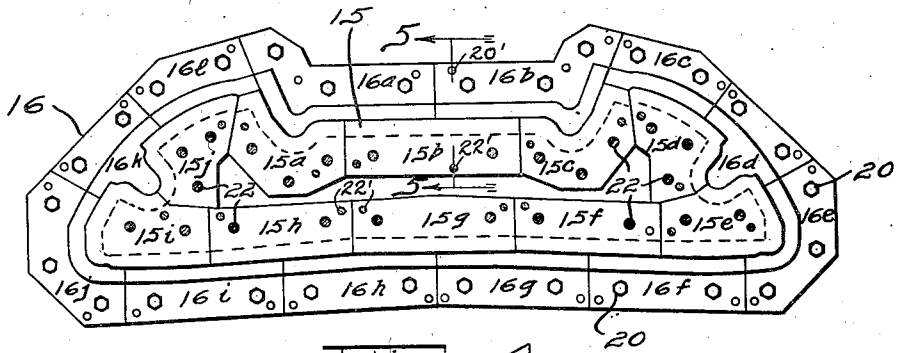


FIG. 4.

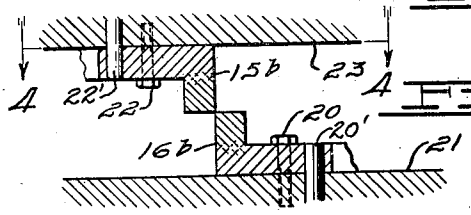


FIG. 5.

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