March 29, 1927. 1,622,882

W. J. PETER

PRESSURE CONTROL FOR HYDRAULIC OIL STORING AND DELIVERING SYSTEMS

Filed Oct. 16, 1925

Fig. 1.

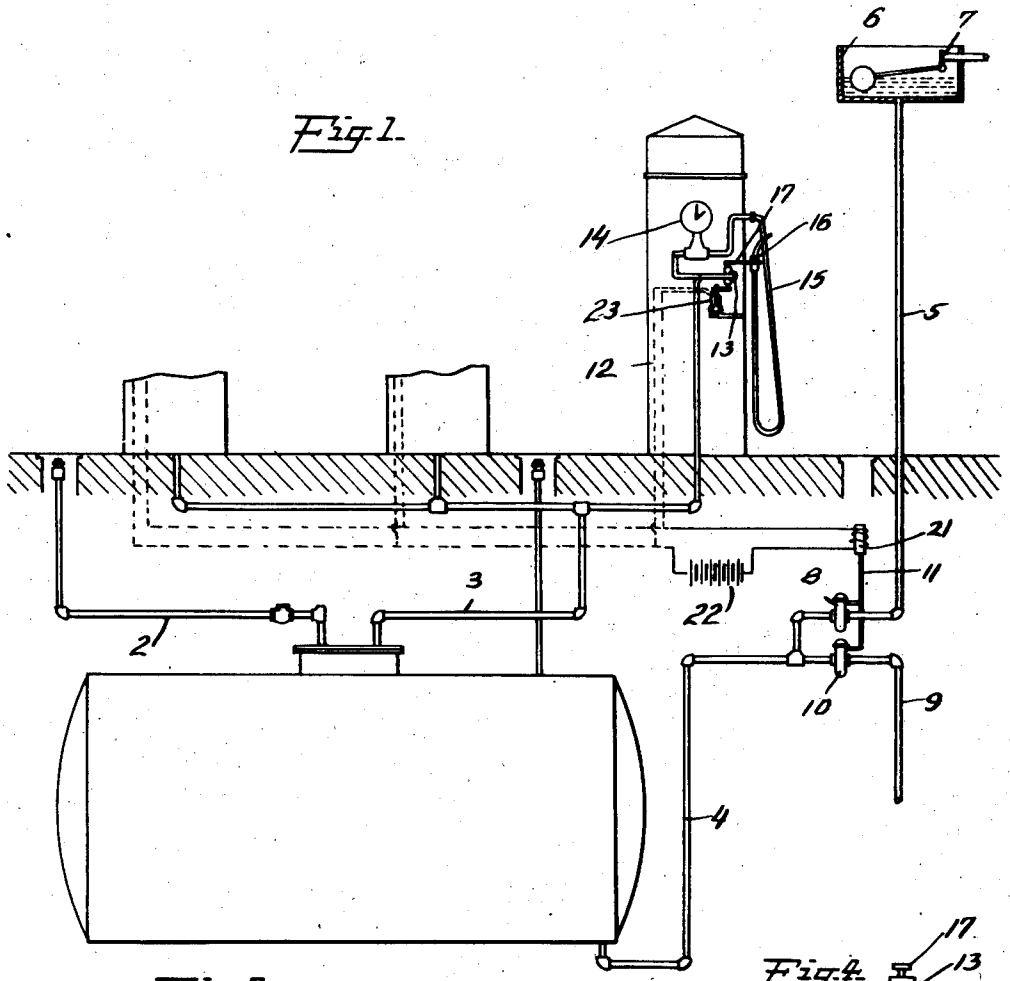


Fig. 2.

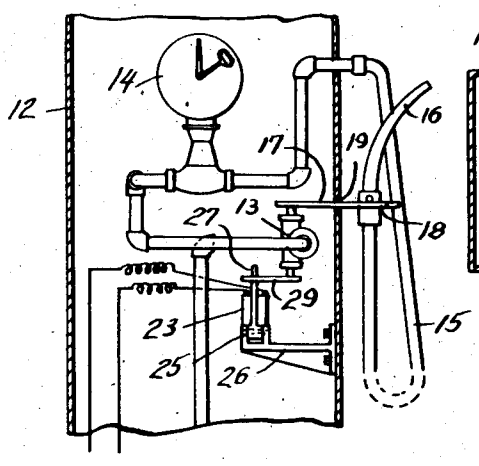


Fig. 3.

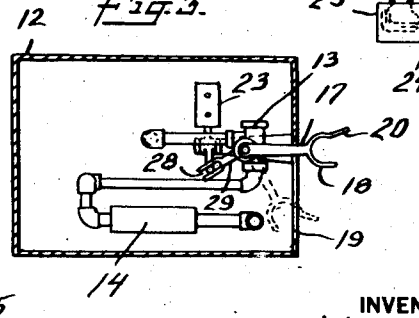
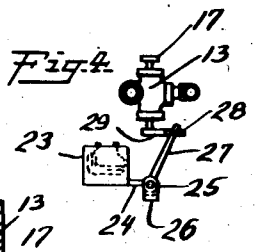


Fig. 4.



INVENTOR
William J. Peter
BY
Pennie, Davis, Marvin & Edmonds
his ATTORNEYS

Patented Mar. 29, 1927. 1,622,882

UNITED STATES PATENT OFFICE.

WILLIAM J. PETER, OF NEW YORK, N. Y.

PRESSURE CONTROL FOR HYDRAULIC OIL STORING AND DELIVERING SYSTEMS.

Application filed October 16, 1925. Serial No. 62,926.

This invention relates to hydraulic oil storage and delivery systems and particularly to means for automatically disconnecting the source of pressure when the system is not delivering oil.

In oil storage and delivery systems operated by hydraulic pressure the oil is stored within a tank and forced out through an oil delivery pipe entering the top of the tank, by means of water forced in at the bottom. Delivery of the oil can be controlled either by means of a valve placed in the water line or a valve placed in the oil delivery line. When the control is effected through the latter means the system is constantly under hydrostatic pressure whether oil is being delivered or not. In the event of a break in the oil delivery line, such as might occur during a fire, the entire hydrostatic head of the system would force oil out at the break. On the other hand to open and close the valve in the water line every time oil is to be dispensed is tedious and is objected to by operators of gasoline filling stations employing hydraulic delivery systems. The method of control favored by these gentlemen is by means of a valve placed in the nozzle of the delivery hose, and the only time they ordinarily operate the valve in the water line is in the morning when the station is opened and at night when it is closed. In addition to the nozzle control valve, the oil delivery line in gasoline filling stations is commonly provided with a key valve situated within the meter casing below the meter. It has been proposed so to connect this key valve with the valve in the water line that when the key valve is open the water control valve is likewise open, and when the key valve is closed the water control valve is closed. This system of control would work very well and would insure the cutting off of pressure between deliveries of oil if the operators could be relied upon to close the key valve after each filling operation. But the nozzle valve control being so much simpler, the operator sees no good reason why he should go out of his way to manipulate the key valve and consequently he doesn't.

In accordance with the present invention I have provided means which practically compel the operator to close the key valve at the end of each filling operation. I do this by combining the hose supporting hook and the key valve operating arm. When the valve is closed the arm projects beyond the casing and serves as a supporting hook for the hose. Before the system can be used, however, it is necessary for the operator to swing the arm inward. In this position it is impossible for him to hang the hose on it, and therefore he naturally swings it outward into valve closing position at the end of each filling operation in order to hang his hose up. The key valve, when open, closes a switch which, in turn, closes a circuit including a suitable source of electrical energy and a solenoid. The core of this solenoid is connected with the valve rod of the water control valve so that when the solenoid is energized the valve is opened and when the solenoid is de-energized the valve is closed due to the action of gravity or other counteracting force. Thus the key valve and the water control valve operate in concert.

In order that the invention may be more clearly understood I have illustrated a preferred embodiment of it in the accompanying drawings in which Figure 1 is a diagrammatic elevation of a gasoline filling station equipped with the pressure control of the present invention; Figure 2 is an elevation showing the upper end of the oil discharge pipe, the key valve and the switch which controls the water valve; Figure 3 is a plan view of the parts shown in Figure 2, and Figure 4 is a detail of the switch mounting.

Referring first to Figure 1, 1 represents the storage tank of the system, 2 the oil inlet pipe, 3 the oil delivery pipe, and 4 the water pressure pipe. The hydraulic pressure under which the system operates is supplied from a riser 5 terminating in a float box 6 which receives water from any suitable source as, for instance, the city water mains, the level of the water in the float box being maintained constant by means of a float actuated control valve 7. A valve 8, placed between the riser 5 and the water pipe 4, controls the flow of water through the pipe 4, and hence the pressure in the tank 1. The pipe 4 is also connected to a waste pipe 9 and that connection controlled by means of a valve 10. The valves 8 and 10 are preferably operated simultaneously by means of a common valve rod 11 in such a manner that when the valve 8 is opened, the valve 10 is closed and vice versa. When the system is being used to deliver oil the valve 8 is open

and the valve 10 is closed. When the tank 1 has been filled with water and it is necessary to re-fill it with oil the valve 8 is closed and the valve 10 opened. The pipe 2 is then connected with a suitable supply of oil, such as a tank wagon, and this oil having sufficient head to displace the water in the tank 1, forces this water out through pipe 4, the pipe 9, and to the sewer. The oil delivery pipe 3 may supply a plurality of outlets, as illustrated, but as the operation of all is identical, I shall describe only one. The pipe 3 passes upward into a meter casing 12 through a key velve 13 and a meter 14 and terminates in a hose 15 provided with a valve-controlled nozzle 16. The foregoing constitutes what is commonly known as the constant head hydraulic system and of itself forms no part of the present invention. I shall now describe the means whereby the key valve 13 is operated, and the means whereby this operation automatically controls the operation of the valve in the water line.

The key valve 13 is operated by means of a horizontally swinging arm 17 provided at its outer end with a hook 18 designed to support the hose 15 when the valve is closed and the hose is not in use. When the valve is closed the arm 17 and the hook 18 extend beyond the casing through a slot 19 therein, and occupy the full line position illustrated in Figure 3. To open the valve, the arm 17 is swung inward through the slot 19 and finally occupies the broken line position illustrated in Figure 1 with the hook 18 inside the casing. In order to swing the arm outward and close the valve, the hook 18 is provided with a finger 20 which extends beyond the casing when the arm is swung into valve opening position, and the operator, by grasping this finger, can swing the arm outward and close the valve. It will thus be noted that before the operator can hang up his hose after completing a filling operation he must swing the arm 17 outward to get at the hook, and in so doing he must perforce close the valve. By thus combining the valve operating arm with the host supporting hook and mounting this member so that it can perform its hose supporting function only when the valve is closed, I make sure that the operator closes the key valve as soon as he has finished with the hose. I wish, however, to do more than this and make sure that the water valve is automatically closed at the same time that the key valve in the oil delivery is closed.

Mounted above the valve 8 is a solenoid 21 the core of which is connected to the valve rod 11. This solenoid is in series with a suitable source of electrical energy 22 and a switch 23 mounted within the meter casing. When this switch is closed the solenoid is energized and the valve 8 is opened; when the switch is opened the solenoid is de-energized, and the valve 8 is closed by the action of the valve rod 11 dropping under its own weight. I shall now describe the operation of the switch 23. The switch which I have illustrated and preferably use is a non-sparking mercury switch designed to be open when in horizontal position and closed when inclined. A switch of this type is illustrated and described in greater detail in my co-pending application, Ser. No. 62,925, filed concurrently herewith, and will not be further described here. This switch 23 is supported upon and affixed to the horizontal arm 24 of a bellcrank lever pivoted at 25 upon a bracket 26 mounted upon a side wall of the meter casing. The upper end of the vertical arm 27 of this bellcrank lever lies between prongs 28 on the outer end of an arm 29 affixed to the lower end of the stem of the valve 13 and hence moving with the arm 17. When the arm 17 is in valve closing position the arm 29 holds the arm 27 vertical and the switch is therefore in horizontal position and open. When the arm 17 is swung into valve closing position, however, the switch 23 is swung upward about the axis 25 of the bellcrank lever and into inclined position, which closes it.

The system operates as follows: When oil is to be delivered, the operator removes the hose from the hook and swings the latter through the slot in the side wall of the meter casing into valve opening position. By this movement two things are accomplished; first, the key valve 13 is directly opened, and second, the switch 23 is closed, and this closes the solenoid circuit, energizes the solenoid, and opens the valve 8. Thus the system is under full hydrostatic pressure and oil will be delivered when the nozzle valve is opened. When a particular filling operation is completed, the operator closes the nozzle valve and through force of habit seeks for a hook on which to hang the hose. The only hook available for this purpose is the hook 18 which, at this time, is well within the meter casing and cannot be used until withdrawn. The operator must therefore seize the finger 20 and swing the hook 18 and arm 17 outward in order to have a place to hang his hose on. By this movement he closes the key valve 13 and by simultaneously opening the switch 23 breaks the solenoid circuit, de-energizes the solenoid and closes the water control valve.

I claim:

1. In an oil storage and delivery system, the combination of a tank, an oil delivery hose receiving oil from the tank, a source of pressure designed to be connected with and disconnected from the tank, a swinging arm for connecting the source of pressure with and disconnecting it from the tank, said arm acting when swung into such

position that the pressure is disconnected as a support for the hose, and means rendering said arm incapable of supporting the hose when the arm is swung into such position that the pressure is connected.

2. In a hydraulic oil storage and delivery system, the combination of a tank, a hose receiving oil from the tank, a pipe for conducting water under pressure to the tank, a valve in the water pipe, a swinging arm for controlling the water valve, acting when swung into valve-closing position as a support for the hose, means rendering said arm incapable of supporting the hose when the arm is swung into valve opening position.

3. In a hydraulic oil storage and delivery system, the combination of a tank, an oil delivery pipe, a valve in the oil delivery pipe, a hose connected to the oil delivery pipe, a manually operated arm for opening and closing the oil delivery valve, means on the arm for supporting the hose when the arm is moved into valve-closing position but incapable of supporting the hose when the arm is moved into valve-opening position, a pipe for conducting water under pressure to the tank, a valve in the water pipe, and means controlled by the swinging arm for closing the water valve when the oil valve is closed.

4. In a hydraulic oil storage and delivery system, the combination of a tank, an oil delivery pipe connected therewith, a valve in the pipe, a hose connected with the pipe, a manually operated arm for opening and closing the valve, a meter casing, means on the arm for supporting the hose when the arm is moved into valve-closing position, and a slot in the casing for receiving the arm when the arm is moved into valve opening position so that it is incapable of supporting the hose.

5. In a hydraulic oil storage and delivery system, the combination of a tank, an oil delivery pipe, a valve in the oil delivery pipe, a hose connected to the oil delivery pipe, a manually operated arm for opening and closing the oil delivery valve, means on the arm for supporting the hose when the arm is moved into valve-closing position but incapable of supporting the hose when the arm is moved into valve-opening position, a pipe for conducting water under pressure to the tank, a valve in the water pipe, and means for closing the water valve when the oil valve is closed.

6. In a hydraulic oil storage and delivery system, the combination of a tank, an oil delivery pipe, a valve in the oil delivery pipe, a hose connected to the oil delivery pipe, a manually operated arm for opening and closing the oil delivery valve, means on the arm for supporting the hose when the arm is moved into valve-closing position but incapable of supporting the hose when the arm is moved into valve-opening position, a pipe for conducting water under pressure to the tank, a valve in the water pipe, a solenoid acting when energized to open the water valve, a switch controlled by the oil valve operating arm, said switch being open when the oil valve is closed and closed when the oil valve is open, and a circuit including the solenoid, the switch, and a source of electrical energy.

7. In an oil storage and delivery system, the combination of a tank, an oil delivery hose receiving oil from the tank, a source of pressure designed to be connected with and disconnected from the tank, a swinging arm for connecting the source of pressure with and disconnecting it from the tank, and means on said arm capable of supporting the hose when the arm is swung into pressure disconnecting position, said means being incapable of supporting the hose when the arm is swung into pressure connecting position.

8. In a hydraulic oil storage and delivery system, the combination of a tank, an oil delivery pipe, a valve in the oil delivery pipe, a hose connected to the oil delivery pipe, a manually operated arm for opening and closing the oil delivery valve, means on the arm for supporting the hose when the arm is moved into valve-closing position but incapable of supporting the hose when the arm is moved into valve-opening position, a pipe for conducting water under pressure to the tank, a valve in the water pipe, and electrically actuated means controlled by the swinging arm for closing the water valve when the oil valve is closed.

In testimony whereof I affix my signature.

WILLIAM J. PETER.