J. D. LALOR.

AUTOMATIC DRAIN VALVE.

APPLICATION FILED MAY 21, 1914.

1,211,599. Patented Jan. 9, 1917.

FIG. I.

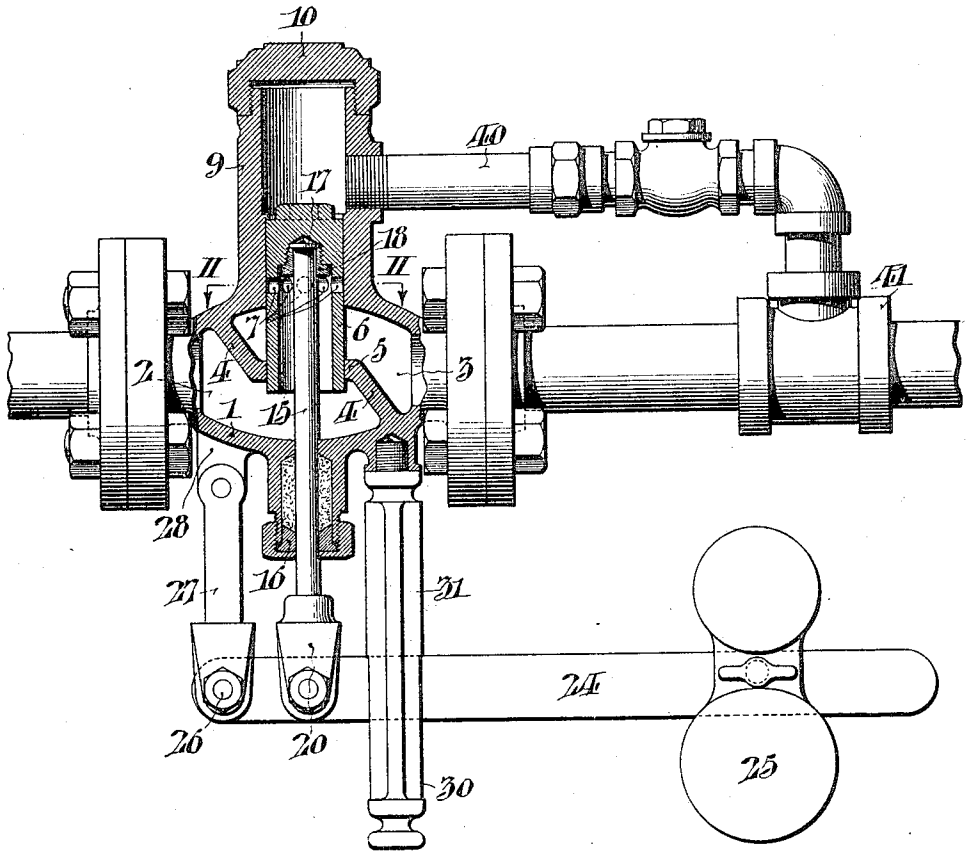
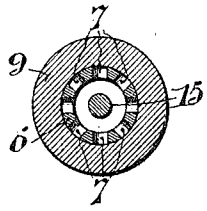


FIG. II.



Witnesses

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AUTOMATIC DRAIN-VALVE.

1,211,599. Specification of Letters Patent. Patented Jan. 9, 1917.

Application filed May 21, 1914. Serial No. 839,953.

To all whom it may concern:

Be it known that I, JAMES D. LALOR, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Drain-Valves, whereof the following is a specification, reference being had to the accompanying drawings.

The invention consists of a drain valve to be connected with a pipe system through which fluid flows normally under pressure, and which under such normal pressure is closed, but which automatically opens, draining the system whenever the pressure falls below a predetermined amount. Such a valve is useful as affording additional safety in connection with pipe systems used for feeding liquid fuel in light, heating or power plants or the like. As long as the fuel is being pumped through a pipe system under normal pressure, the valve performs no function, but when the pumping of the fuel ceases for any reason, as when it is shut down for the night, the entire pipe system is drained and so remains as long as the system is not in operation.

The valve which I have invented is exceedingly sensitive and accurate. Its operation is automatically dependent solely upon the reduction of pressure in the pipe.

In the accompanying drawings, Figure I, is a partial longitudinal section through a valve embodying my invention. Fig. II, is a horizontal section along the line II, II, of Fig. I.

The valve is set in the casing 1, provided with an inlet chamber 2, in free communication with a system of piping, and an outlet chamber 3, leading say to a storage tank. The chambers 2, and 3, are separated by a partition 4, furnished with a horizontal component 5, pierced by a circular orifice for the reception of the cylindrical valve 6, which plays vertically in this orifice. The valve is in the form of a cylinder open at the lower end and closed at the top, and is provided with a ring of lateral apertures 7, 7, together constituting the normal valve aperture. The upper end of the cylinder fits within a dome 9, the top of which is closed by a screw cap 10. The sides of the dome in combination with the valve orifice restrict the movement of the valve cylinder to a true axial reciprocation. The upward extent of the reciprocation of the valve cylinder is limited by a vertical stem 15, which enters the valve chamber on its lower side, this entrance being protected by a stuffing box 16. This stem passes up through the hollow cylindrical valve and terminates in a head 17, which is received within the upper end of the valve cylinder and there made fast by a screw cap 18. The lower end of this stem is formed into a yoke 20, to which is pivoted a lever 24, with a weight 25, adjustably set thereon. The lever 24, is pivoted at 26, with interposition of a link 27, to a lug 28, formed on the lower side of the valve casing. The play of the lever 24, is directed and limited by a slot 30, within which the lever is received, cut in a depending arm 31, set in the lower side of the valve casing.

The upper edge of the slot 30, with which the lever 24, is in contact as shown in Fig. I, of the drawings, limits the upward movement of the stem 15, and therefore the valve. In this upper position, the ring of apertures 7, is within the dome 9, the sides of which close said apertures so that no flow of liquid through the valve is possible. When the lever 24, passes to the lower end of the slot 30, under the stress of the weight 25, the cylindrical valve is depressed to a point which brings the ring of apertures 7, into free communication with the outlet chamber 3, of the valve and at the same time the lower end of the valve cylinder is in free communication with the inlet chamber 2.

The valve is normally held in the position shown in Fig. I, where it is in its uppermost position, where no passage of fluid through it is permitted, by reason of the pressure of the fluid upon the underside of the valve, which is normally able to lift the lever 24, and weight 25. The upper side of the valve is subject only to atmospheric pressure communicated through a by-pass 40, leading from the upper end of the dome 9, to the outlet pipe 41. This outlet pipe 41, leads preferably to a supply tank for the liquid fuel.

In operation the valve remains in the position of Fig. I, so long as the normal pressure is maintained. As soon however, as this pressure falls below a predetermined point, (which may be regulated by longitudinally adjusting the weight 25, upon the lever 24), the weight pulls the valve down to its lower position, permitting the liquid fuel to pass freely through the valve draining the entire pipe system into the supply tank. To again put the valve in operation

the pumps are started and the lever 24, held up until the working pressure is reëstablished.

Such valves are particularly useful in large manufacturing plants where fuel oil is employed. When the plant is shut down, it is important that the oil pipe system should be drained of the oil. By employing my invention this occurs automatically as soon as the pumps cease to pump oil under predetermined pressure to the furnace. Such a drain valve may also be used to relieve the system of oil in case of breakage, or other accident. In this case the drain valve may be set immediately in front of an automatic check valve of the sort described in United States Letters Patent granted to myself and Frederick L. Jahn, July 14, 1914, No. 1,103,058. When thus used if a break occurs in the pipe the check valve shuts off further supply of oil and the drain valve drains the system in advance of this point automatically by reason of the diminution of the pressure of the oil.

Having thus described my invention, I claim:

1. In an automatic drain valve, the combination of an inlet, an outlet, a horizontal partition located between the inlet and the outlet, an orifice in the partition, a dome located adjacent the orifice, a hollow valve cylinder closed at the top adapted to reciprocate in the orifice and dome, an aperture in the side of the valve cylinder adapted to be closed by the sides of the dome when the valve cylinder is raised, and opened when the cylinder is lowered, and means whereby the normal fluid pressure on the inlet side of the valve holds the valve cylinder in its raised and closed position, while a predetermined diminution of said pressure allows the cylinder to fall, opening the aperture and permitting the fluid to flow therethrough to the outlet pipe.

2. In an automatic drain valve, the combination of an inlet pipe, an outlet pipe, a horizontal partition located between the inlet pipe and the outlet pipe, an orifice in the partition, a dome located adjacent the orifice, a hollow valve cylinder closed at the top adapted to reciprocate in the orifice and dome, an aperture in the side of the valve cylinder adapted to be closed by the sides of the dome when the valve cylinder is raised, and opened when the cylinder is lowered, a by-pass leading from the dome to the outlet pipe, and means whereby the normal fluid pressure on the inlet side of the valve holds the valve cylinder in its raised and closed position, while a predetermined diminution of said pressure allows the cylinder to fall, opening the aperture and permitting the fluid to flow therethrough to the outlet pipe.

3. In an automatic drain valve, the combination of an inlet pipe, an outlet pipe, a horizontal partition located between the inlet pipe and the outlet pipe, an orifice in the partition, a dome located adjacent the orifice, a hollow valve cylinder closed at the top adapted to reciprocate in the orifice and dome, an aperture in the side of the valve cylinder adapted to be closed by the sides of the dome when the valve cylinder is raised, and opened when the cylinder is lowered, a by-pass leading from the dome to the outlet pipe, a stem made fast at its upper end to said valve cylinder and adapted to reciprocate therewith, having its lower end projecting without the valve casing, and a weight adjustably secured in relation to said valve stem, whereby the effective weight of the valve cylinder may be varied and thereby given such relation to the normal fluid pressure as to establish a predetermined pressure point at which the valve cylinder will fall and open the valve.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this eighteenth day of May, 1914.

JAMES D. LALOR.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."