C. E. FISHER.

FLOAT OPERATED DRAIN VALVE.

APPLICATION FILED NOV. 20, 1913.

1,182,873. Patented May 9, 1916

Fig. 1.

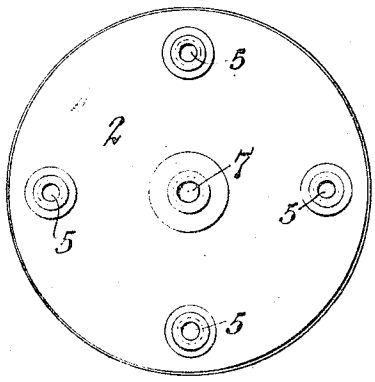


Fig. 3.

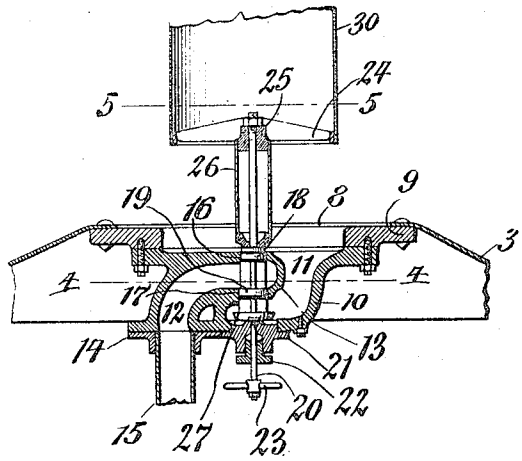


Fig. 2.

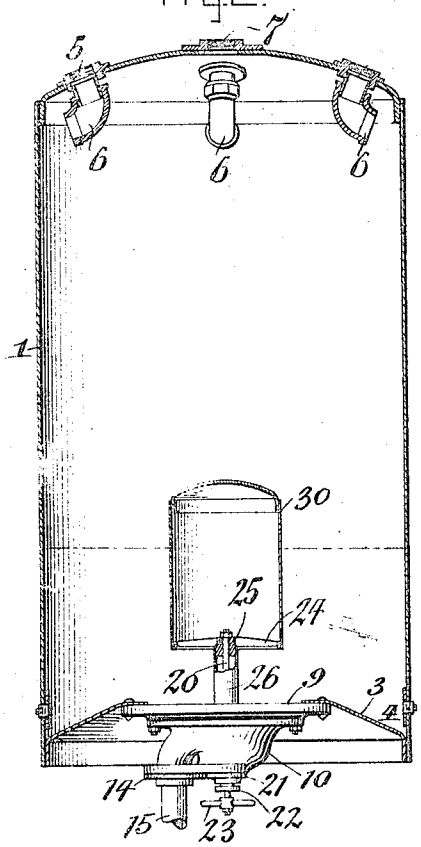


Fig. 4.

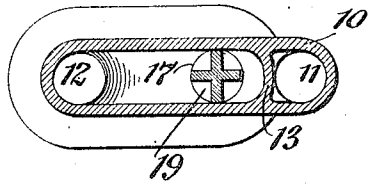
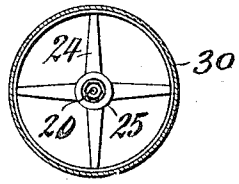


Fig. 5.



WITNESSES.

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FLOAT-OPERATED DRAIN-VALVE.

1,182,373. Specification of Letters Patent. Patented May 9, 1916.

Application filed November 20, 1913. Serial No. 802,044.

To all whom it may concern:

Be it known that I, CHARLES E. FISHER, a citizen of the United States, residing at Titusville, in the county of Crawford and State of Pennsylvania, have invented new and useful Improvements in Float-Operated Drain-Valves, of which the following is a specification.

This invention relates to a float-operated drain valve which is more particularly designed for use in a separator for separating oil from combustible gas but which may also be used for other purposes.

The object of this invention is to provide an improved valve of this character which is simple and durable in construction, efficient in operation and not liable to get out of order.

In the accompanying drawings: Figure 1 is a top plan view of a gas and oil separator having a float operated drain valve constructed in accordance with my invention. Fig. 2 is a vertical section of the same. Fig. 3 is a vertical section, on an enlarged scale, of the float valve mechanism embodying my improvements. Fig. 4 is a horizontal section, on an enlarged scale, taken in line 4—4, Fig. 3. Fig. 5 is a horizontal section taken in line 5—5, Fig. 3.

Similar characters of reference indicate corresponding parts throughout the several views.

In the drawings my improvements are shown in connection with a gas and oil separator which comprises a separating tank, chamber or receptacle into which the oil laden gas is delivered and the oil is separated from the gas and retained within the tank while the gas which has been freed from the oil is carried away from the tank to any suitable place for storage or consumption. The preferred form of tank which is shown in the drawings comprises an upright cylindrical side wall or body 1, an upwardly dished upper head or top 2 arranged at the upper end of the body and an upwardly dished lower head or bottom 3 secured to the lower end of the body and forming an annular channel or trough 4 between the marginal part of this bottom and the adjacent part of the body.

The mixed oil and gas may be delivered into the separating tank in any suitable manner but preferably through a plurality of openings 5 formed in the marginal part of this top equidistant around the center of the same. On its underside the top of the chamber is provided with elbow-shaped nozzles 6 each of which extends downwardly and laterally toward the side wall or body of the tank or chamber and thereby prevent the incoming oil laden air from striking directly against the float valve mechanism arranged centrally in the lower part of the separating tank. By projecting the incoming oil laden gas against the side wall of the separating tank the separation of the oil from the gas is also facilitated. After the gas has been liberated from the oil the same passes from the upper part of the tank out through a gas outlet opening 7 in the central part of the top and conducted by any suitable piping to a place of storage or consumption.

The liquid separated from the oil is drawn off from the tank through a liquid discharge opening 8 arranged centrally in the bottom of the tank. This liquid outlet is controlled by a float valve mechanism which contains my invention and which is constructed as follows: 9 represents an attaching flange or ring secured to the underside of the tank bottom around the central opening 8 in the latter. 10 represents the body of a balanced valve which is detachably secured by means of screws or otherwise to the flange of the bottom and which is provided with a liquid passage comprising an inlet section 11 opening into the lower end of the tank and an outlet section 12 which is separated from the inlet section by means of the partition 13. The outlet section of the valve conduit is connected with the flange 14 of a delivery pipe 15 which latter leads to any place where the oil is to be disposed of. The partition of the valve body is provided with two vertically alined ports 16, 17 which are arranged one above the other and which are adapted to be opened and closed by means of the upper and lower stoppers or plugs 18, 19 of a balanced valve. These two valve plugs are mounted on a stem 20 the lower part of which extends downwardly through a cover 21 closing an opening in the lower part of the inlet section of the valve conduit and also through the gland 22 of a stuffing box mounted on this cover. Below the stuffing box this valve stem is provided with a handle 23 which permits of operating the valve

by hand to prevent it from sticking and which also serves as an indicator for determining the position of the valve and the parts connected therewith. The valve stem also projects from the valve upwardly into the lower part of the separating tank where the same is connected with a float 30 which operates to raise and lower the valve by the action of the liquid therein. This float is preferably constructed of sheet metal in the form of a bell or inverted cup so that it faces with its open end downwardly. When this float rests on the liquid in the tank a body of air will be trapped within the same and render it buoyant so that it will rise and fall with the varying level of the liquid or oil in the tank. Various means may be employed for connecting this float with the stem of the valve, those shown in the drawings being suitable and preferred and comprising a skeleton or open work head 24 secured in the lower end of the bell-shaped float and provided centrally with a hub 25 which is connected with the upper end of the valve stem, and a distance piece 26, preferably of tubular form, surrounding the upper part of the valve stem and engaging at its upper end with the hub 25 while its lower end engages with the upper end of the valve.

The upward movement of the valve and the parts connected therewith may be limited in any suitable way, for instance, by means of a stop or shoulder 27 arranged on the balanced valve within the inlet section of its valve conduit and adapted to engage with the underside of the partition.

When the tank is empty or the level of this liquid in the same is below normal the float and the parts connected therewith are in their lowermost position in which the plugs or stoppers 18, 19 of the valve are arranged within their companion ports 16, 17 of the partition and thereby close the valve and cut off the escape of oil or liquid from the tank, as shown in Fig. 3. As the oil gradually accumulates in the lower part of the tank, the float resting upon the same is gradually lifted, thereby causing the plugs of the valve to be withdrawn from their respective ports and permitting the oil in the lower part of the tank to escape through the valve body until the normal level of the liquid in the tank has been again restored and the float has dropped to a position in which the valve plugs again close the valve ports.

By observing the position of the handle of the valve stem it is possible to determine the working of the valve and the float within the tank and if the valve for any reason should stick, the same can be easily cleared by taking hold of the handle and turning the same or raising and lowering it until the valve again works freely.

Inasmuch as the bell-shaped float is exposed to the same pressure on its inner as well as its outer side there is no liability of its leaking or getting out of order and it is therefore immaterial what the pressure may be to which the same is exposed inasmuch as the same cannot collapse. Owing to the fact that the bell-shaped float is self evacuating because the oil is free to flow out of the same there is no liability of the float becoming weighted to such an extent with liquid that its operation is either impaired or destroyed.

The float valve mechanism is all arranged on the high or elevated central part of the tank bottom so that any sediment falls away from the same into the channel formed by the depressed marginal parts of the bottom, thereby keeping such sediment away from the passages of the valve and reducing the liability of clogging the same to a minimum. The valve mechanism is alined with the liquid discharge opening and can be removed as a unit from the bottom of the tank so that all the parts thereof are readily accessible for inspection, cleaning or repairs. Furthermore, by arranging all the movable parts of the valve mechanism and the float within the valve body and tank they cannot be tampered with after being once adjusted.

All of the pipe connections of the valve mechanism are oil sealed so that leakage of gas or oil is immediately visible and permits of making repairs promptly for stopping further loss.

Inasmuch as this gas and fluid separator is not dependent for its action on any weights or flexible piping it is more sensitive and positive under all pressures to which the same is likely to be subjected while in use regardless of whether such pressure is high or low. Owing to the large area of the ports and passages of the balanced valve the same attains its maximum opening when the valve travels a comparatively short distance, thereby enabling the separator to handle a greater quantity of oil in a given time than has been possible in oil and gas separators as heretofore constructed.

By lengthening or shortening the distance piece, the position of the float with reference to the balanced valve may be changed to suit the varying requirements of different users, thereby enabling the level at which the fluid will be discharged to be either raised or lowered in accordance with the amount of liquid it is desired to store in the tank between the periods of time when the balanced valve is operated for discharging the excess oil from the tank.

My improved float valve mechanism is very simple and inexpensive in construction and reliable in operation and is not liable to get out of order.

I claim as my invention.

A tank having a liquid outlet in its bot-

tom, and an automatic valve mechanism for controlling said liquid outlet comprising a valve body having a passage communicating with said liquid outlet and provided with a port, a stem connected with said valve, a a bell-shaped float adapted to rest on the liquid in the tank, an open work head secured to the lower end of the float and connected with said stem, and a spacing sleeve surrounding said stem and bearing at its opposite ends against said head and valve, respectively.

Witness my hand this 13th day of November, 1913.

CHARLES E. FISHER.

Witnesses:
R. E. DICKINSON,
CHRISTEN JENSEN.