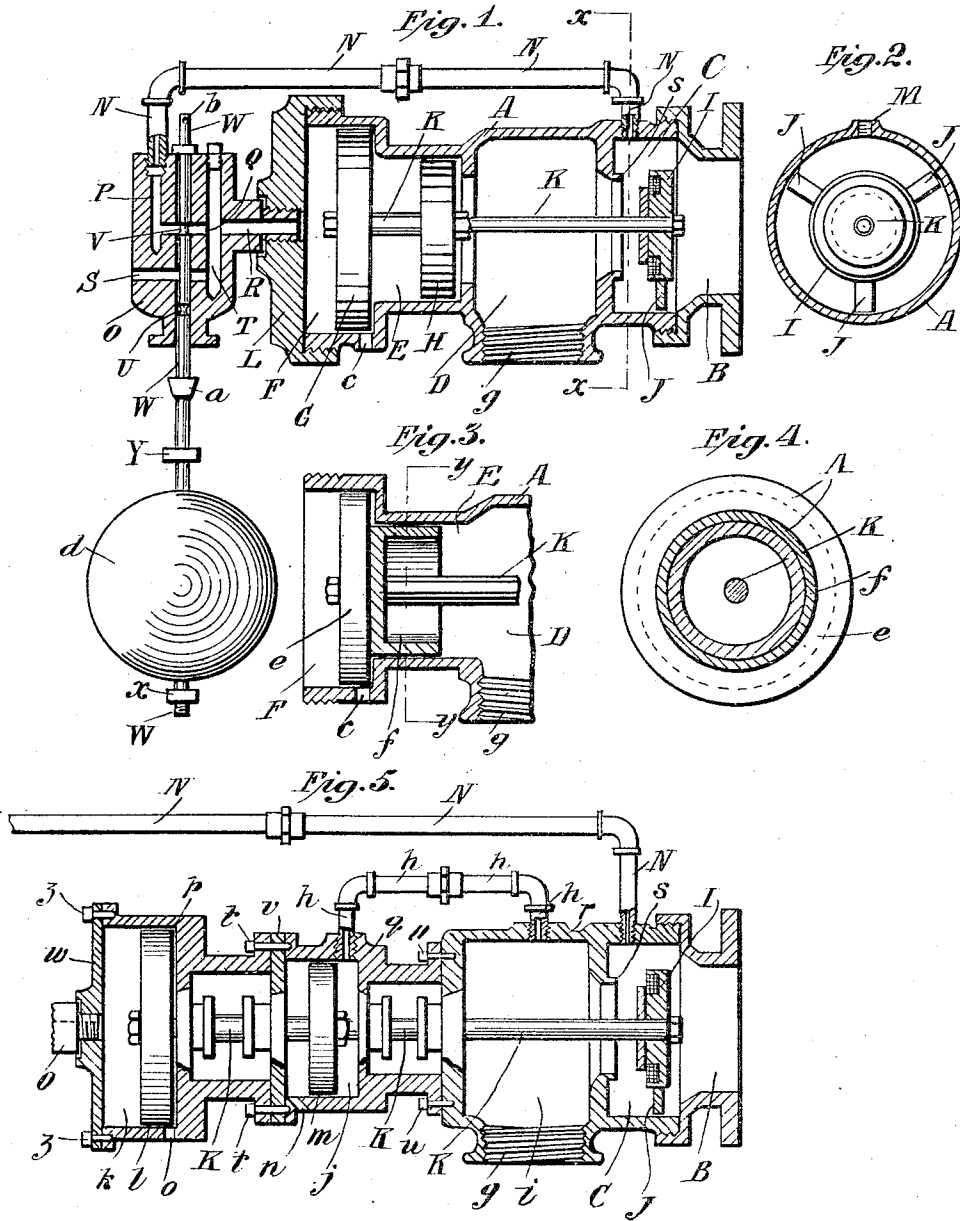


O. M. JONES,
VALVE.

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WITNESSES:

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OWEN MARSHALL JONES, OF NEW YORK, N. Y.

VALVE.

1,205,898.

Specification of Letters Patent.

Patented Nov. 21, 1916.

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To all whom it may concern:

Be it known that I, OWEN MARSHALL JONES, a citizen of the United States, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification accompanied by drawings.

The invention relates to improvements in valves but in particular to improvements in valves for controlling the level of liquids and the pressures of liquids and gases, although the invention may be used in any connection in which it is found applicable.

The objects of the invention are to improve upon and simplify the construction of such valves and to increase their ability and efficiency to control the levels of liquids and pressures of liquids, fluids, or gases in all classes of containers of liquids, fluids, or gases where it is desired to control the level of liquids or pressures within as small a variation of levels and pressures as may be possible.

Other objects of the invention are to eliminate stuffing boxes for the spindles or stems of the valves.

Further objects of the invention are to insure a positive and quick opening and closing of the valve, thereby reducing to a minimum the wear on the valve disk and seat; and to these ends the invention consists of apparatus and devices for carrying out the above objects embodied in a valve having the features and construction, combinations of elements, and arrangement of parts, substantially as hereinafter fully described and claimed in this specification, and shown in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of apparatus embodying the invention. Fig. 2 is a transverse section at line $x-x$ on Fig. 1. Fig. 3 is a longitudinal sectional elevation of a modification, partly broken away. Fig. 4 is a transverse section at line $y-y$ of Fig. 3. Fig. 5 is a longitudinal sectional elevation of another modification.

Referring to the drawings, in Fig. 1, I have shown a body, the parts therein and attached thereto, and this view shows the

valve open. A represents the body which may be of any suitable metal. I am not to be understood as limiting myself to this particular form of body, as other forms may be used in accordance with my invention. B is the inlet chamber and a pipe connection may be bolted to the flange of said inlet chamber. The inlet chamber B is attached to body A by screwing on with threads as shown, or may be attached to body A by bolted flanges, or other approved methods. Chamber C is the valve chamber in which valve I, guided by lugs J, which are integral parts of valve I, travels longitudinally. D is the discharge chamber with outlet g through which the liquids or gases are discharged by passing around valve I, through the apertures between lugs J and thence through the opening at seat S. E is a piston chamber in which piston H travels longitudinally. F is a piston chamber in which piston G travels longitudinally. L is a cap or bonnet secured to body A by means of threads as shown, or may be attached by bolted flanges, or other approved methods. O is a pilot valve casing attached to bonnet L. This pilot valve, in combination with the weight or pressure of the liquids or pressures of the gases in the container, operates the opening and closing of the main valve together with the pistons. I am not to be understood as limiting myself to this particular form of pilot valve, as other forms may be used in accordance with my invention. This form is shown for the illustration of the operation of the main valve. Opening c is a small hole drilled through the body into chamber F which allows to be exhausted to atmosphere any pressure which may accumulate between pistons G and H in chambers F and E. N is the by-pass connecting valve chamber C to pilot valve casing O. This may be of other approved construction, or a part of the by-pass may be embodied with the body or the by-pass connected from the inlet pipe to the valve.

The operation of the valve is as follows: The liquids or gases pass from valve chamber C through by-pass N to port P of the pilot valve casing, and around the cut-out section V of piston W in the pilot valve cas-

ing O, through ports Q and R as shown, and then into piston chamber F. As the area of piston G is greater than the combined areas of piston H and valve I, therefore the pressure on piston G forces the piston G away from cap L, which forces valve I away from seat S, thereby allowing passage through the seat and discharging the liquids or gases through outlet *g*, which is connected by piping or other approved means to the container. Piston W of pilot valve casing O is operated by a float *d* or other approved means which may be attached at *b*. When the liquid has risen to the desired mean level, or the liquid or gases are at the desired maximum pressure within the container, then the device for operating piston W of the pilot valve casing moves piston W, so that the reduced section U of the piston registers with port S and reduced section V moves out of line with port Q, thus cutting off the pressure from the by-pass N, which leaves ports R, T, and S open to atmosphere, thereby forming an exhaust from chamber F. Further operation then is: The weight of the liquid or the pressure of liquid or gas in the container creates a force on piston H which is larger in area than valve I, and forces piston H away from chamber D, which in turn forces piston G toward cap L and pulls valve I against seat S, thus closing the valve and preventing the further feed through the valve. When the level or pressure of the liquid or the pressure of the gas falls below the desired point, then reverse action takes place by piston W of the pilot valve casing being moved, which again causes reduced section V of piston W to register with ports P and Q, and then the pressure exerted on piston G opens the valve.

In Figs. 3 and 4, the pistons *e* and *f* are combined in one structure and operate the same way as described for pistons G and H in Fig. 1.

In Fig. 5, I have shown a modification of Fig. 1 as far as arrangement of pistons is concerned, by placing piston *m* in a separate chamber *j* and piston *l* in a separate chamber *k*, the two chambers being connected together by bolts *t* or other approved methods, and chamber *j* bolted to body *r*, and providing a by-pass *h* so that pressure may be brought to bear on piston *m* from chamber *i*. A pilot valve casing *o* (broken away) is to be attached to cover W of chamber *k* and contains a piston operating in the same manner as described in Fig. 1. The further operation of the valve would, to all intents and purposes, be similar to that described in Fig. 1.

It will thus be seen that the pressures of gases and liquids and the weights of liquids within the container are employed to per-

form part of the automatic operation of the valve controlling the feed to the container. The part of the automatic operation thus performed is by one of the pistons being actuated by the weight of the liquid or pressure of the liquid or gas from within the container, pulling the valve closed and holding it closed until reverse action or opening of the valve takes place by pressure through the by-pass and pilot valve chamber. It will further be seen that the pressures of gases or liquid or the weight of liquid which are flowing to feed the containers does not have to be employed to close the valve by pressure on the back of it forcing it to the seat. One of the main features of the invention is that the valve can be held closed without employing the pressure or weight of liquids or gases being fed into the valve, as there may be times when the agency creating the force for delivering the gases or liquids to the valve may not be operated and thus the pressure and weight on the back of the valve would not exist.

Obviously, some features of my invention may be used without others and my invention may be embodied in widely varying forms.

Therefore, without limiting myself to the construction shown and described, nor enumerating equivalents, I claim, and desire to secure by Letters Patent, the following:

1. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, and two pistons each of a diameter greater than the diameter of the valve operable within their respective chambers, substantially as described.

2. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, and two pistons each of a diameter greater than the diameter of the valve operable within their respective chambers, the several chambers and the valve and valve

seat being located in the order mentioned and in a direct line on a common axis, substantially as described.

3. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, and two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on a common axis, one of the pistons employed to move the valve from the valve seat and hold the valve from the valve seat and the other piston employed to move the valve to the valve seat and hold the valve against the valve seat.

4. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, and a spindle on which the said valve and the said two pistons are rigidly attached in their respective positions, substantially as described.

5. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, and a spindle on which the said valve and the said two pistons are rigidly attached in their respective positions, the several cham-

bers and the valve and valve seat being located in the order mentioned and in a direct line on the common axis.

6. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, and a spindle on which the said valve and the said two pistons are rigidly attached in their respective positions, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on the common axis, one of the pistons employed to move the valve from the valve seat and hold the valve away from the valve seat and the other piston employed to move the valve to the valve seat and hold the valve against the valve seat, substantially as described.

7. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, a spindle on which the said valve and the said two pistons are rigidly attached in their respective positions, and a by-pass with a pilot valve located therein connecting the two end chambers in the casing, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on a common axis, substantially as described.

8. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston

chambers which are contiguous and located beyond and in direct line with the discharge chamber, two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, a spindle on which the said valve and the said two pistons are rigidly attached in their respective positions, and a by-pass with a pilot valve located therein connecting the two end chambers in the casing, the pistons and the valve being actuated by pressure through the by-pass for the purpose of moving the valve from the valve seat and holding the valve away from the valve seat, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on a common axis, substantially as described.

9. In a valve, the combination of a casing or body with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers which are contiguous and located beyond and in direct line with the discharge chamber, two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, a spindle on which the said valve and the said two pistons are rigidly attached in their respective positions, and a by-pass with a pilot valve located therein connecting the two end chambers in the casing, the pistons and the valve being actuated by pressure through the by-pass for the purpose of moving the valve from the valve seat and holding the valve away from the valve seat, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on a common axis, one of the pistons employed to move the valve from the valve seat and hold the valve away from the valve seat and the other piston employed to move the valve to the valve seat and hold the valve against the valve seat.

10. In a valve, the combination of a casing or body consisting of several members with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers located beyond and in direct line with the discharge chamber, and two pistons each of a diameter greater than the diameter of the

valve operatable within their respective chambers, substantially as described.

11. In a valve, the combination of a casing or body consisting of several members with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers located beyond and in direct line with the discharge chamber, and two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on a common axis, substantially as described.

12. In a valve, the combination of a casing or body consisting of several members with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers located beyond and in direct line with the discharge chamber, and two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on a common axis, one of the pistons employed to move the valve from the valve seat and hold the valve from the valve seat and the other piston employed to move the valve to the valve seat and hold the valve against the valve seat.

13. In a valve, the combination of a casing or body consisting of several members with an inlet chamber, a valve chamber, a valve in the valve chamber opening toward the inlet chamber, a valve seat extending into the valve chamber with the surface of the face of the valve seat located transversely to the common axis of the casing and the chambers therein, a discharge chamber on the opposite side of the valve seat from the valve chamber, two piston chambers located beyond and in direct line with the discharge chamber, two pistons each of a diameter greater than the diameter of the valve operatable within their respective chambers, a spindle on which the said valve and the said two pistons are rigidly attached in their respective positions, a by-pass connecting the discharge chamber with the piston chamber nearest to the discharge chamber, and a by-

pass with a pilot valve located therein connecting the valve chamber with the piston chamber furthestmost from the valve chamber, the pistons and the valve being actuated
5 by pressure through the by-passes, the several chambers and the valve and valve seat being located in the order mentioned and in a direct line on a common axis, one of the
10 pistons employed to move the valve from the valve seat and hold the valve away from

the valve seat and the other piston employed to move the valve to the valve seat and hold the valve against the valve seat.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

OWEN MARSHALL JONES.

Witnesses:

GEORGE H. JEWELL,
JAMES S. HARTNETT.

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