D., D. R. & R. C. GRUNDY.

PORTED PLUG VALVE FOR MEASURED LIQUID SUPPLY.

APPLICATION FILED MAY 6, 1901.

992,190. Patented May 16, 1911.

FIG. 6.

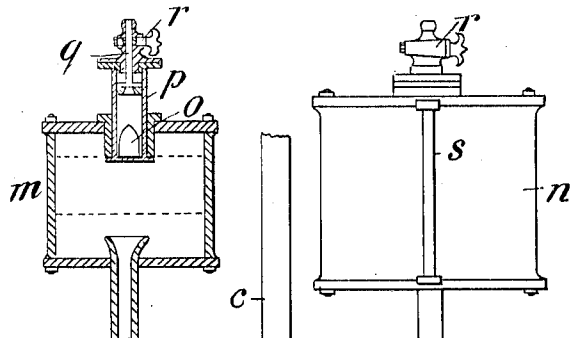


FIG. 5

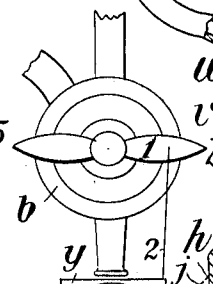


FIG. 4.

FIG. 7.

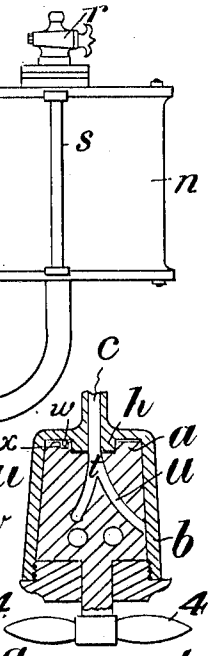


FIG. 1.

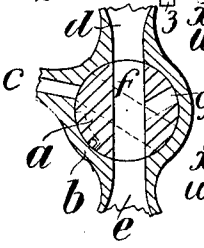
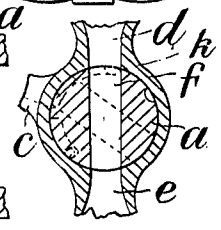


FIG. 2.

FIG. 3.



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UNITED STATES PATENT OFFICE.

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PORTED PLUG-VALVE FOR MEASURED-LIQUID SUPPLY.

992,190. Specification of Letters Patent. Patented May 16, 1911.

Application filed May 6, 1901. Serial No. 58,872.

To all whom it may concern:

Be it known that we, DAVID GRUNDY, engineer, DAVID REGINALD GRUNDY, teacher, and ROBERT CRIGHTON GRUNDY, warehouseman, subjects of the King of Great Britain, and residents of 76 Sister's avenue, Clapham Common, in the county of Surrey, England, have invented certain new and useful Improvements in Ported Plug-Valves for Measured-Liquid Supply; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in ported plug valves to be used more especially for supplying measured quantities of liquids to water closets and the like.

The improved valve is simple and requires but a small amount of movement to effect its purpose.

Referring to the drawings Figure 1 is a vertical section of a ported plug and its casing. Fig. 2 is a central horizontal section of the same. Fig. 3 is a view similar to Fig. 1 of a modified form of valve. Fig. 4 is a section of the same taken at an angle to the horizontal but showing a still further modification. Fig. 5 is an exterior view of the improved valve as operated by a water closet seat. Fig. 6 is a vertical section of such a valve as applied to two containers, one container being shown in section and one in elevation. Fig. 7 is a central horizontal section of such a valve.

The ported plug *a* which may be of the usual taper or cone type as shown, turns in a casing *b* which is correspondingly shaped interiorly. In the simpler form shown in Fig. 1 *c* is the main supply pipe, *d* is the duct leading to a container or measuring vessel and *e* is a duct leading to the discharge orifice. It is required that the container be charged from the pipe *c* by way of the pipe *d* and then discharged by way of the pipes *d* and *e*. For this purpose the plug is formed with a large straight through port *f* which will not obstruct or hinder the discharge but will allow of a thorough and efficient flush, if the valve be used for sanitary purposes. Running at an angle to the passage *f* is a smaller passage *g*, this passage owing to its size and position does not allow of too violent or noisy a supply. The comparative sizes of these ports or passages *f g* are well seen in Fig. 2. The plug in all the instances illustrated is centered by a boss *h* on the casing entering a recess *j* in the plug. When the plug is in the position Fig. 1, discharge can take place from *d* to *e* but when the plug is turned through a right angle, more or less, the discharge orifice *e* is covered and supply from *c* to *d* takes place by way of the passages *f* and *g*.

In Fig. 3 the plug is shown as having a wide straight through discharge passage and the small admission passage has the form of a curved groove *k* in the external surface of the plug which groove is shown in dotted lines as connecting the supply with the container. With this construction no swirling whatever takes place in the valve during discharge. In Fig. 4 also there is no communication of the admission passage with the discharge. The supply passage has the form of an angularly running hole *l* and the supply main, may, if desired, be connected centrally at the rear of the casing, as shown in dotted lines, instead of at the side.

As shown in Fig. 6 the single valve controls the supply to and discharge of two containers *m* and *n* which may be of the same or different sizes. They may each be fitted with a float valve *o* of known type, preferably adjustable by being carried in a sliding or screw casing *p* in order to adjust the amount of water admitted by closing the air escape passage *q* at a predetermined instant. Each passage *q* is controlled by a cock *r* so that any admission whatever to the tank can be prevented when desired, provided the pressure of the water supplied does not exceed three pounds, which would be a usual pressure for the water when it comes from a reservoir at or only just above the level of the apparatus. A gage glass *s*

may be fitted to each container. The supply pipe *c* is connected centrally at the rear of the valve and the plug is formed with a Y groove or hole *t* see Fig. 7 connecting with the two ports *u u* in the exterior surface of the plug *a*. As seen in Fig. 6 the container on the left hand side is connected with the supply *c* while the container on the right hand is connected by one of the two straight through passages *v* with the discharge orifice *e* and when the plug is turned to supply the right hand container the left hand one will be open to discharge, thus one container can always be full or be filling while the other is discharging.

All of the plugs shown on the drawings are fitted with a groove *w* into which projects a stud *x* on the casing, the stud meeting the ends of the groove limits the movement of the plug and insures registering of the ports with the various orifices. The valve is especially intended to be operated by a water closet seat *y* Fig. 5 pivoted at *z* an arm such as 1 on the plug *a* being connected with the rear of the seat by means of a rod 2 so that when a person seats himself the front of the seat is moved down and the rear moves up lifting the rod with it and turning the plug, so that the container is filled and when the weight of the person is removed from the seat the container is discharged by the counterweight 3 at the back of the seat tilting the seat thereby pulling down the rod and turning the plug back again. A handle 4 Fig. 7 may be employed for operating the plug shown in Figs. 6 and 7.

What we claim as our invention and desire to secure by Letters Patent is:

1. The combination with a vented liquid measure container, of a valve casing having a plurality of similarly dimensioned ports and a port of smaller dimensions than the first named ports, a supply connection to the last named port, a duct connecting one of the first named ports with the container, a discharge duct connected directly with another of the first named ports, a partially rotatable plug in the casing having a substantially straight passage formed about perpendicularly to the direction of the axis of the plug, the cross sectional area of which passage coincides with the area of the opening of one of the first named ports, said substantially straight passage being so positioned as to be adapted to register simultaneously with two of the first named ports, the ducts and passage together constituting a waterway of about uniform cross sectional dimensions from the container to the discharge orifice, said plug also having a passage adapted to connect the supply with said container when the substantially straight passage is not in register, and means for partially rotating the plug.

2. The combination with a vented liquid measure container, of a valve casing having a plurality of similarly dimensioned ports and a port of smaller dimensions than the first named ports, a supply connection to the last named port, a duct connecting one of the first named ports with the container, a discharge duct connected directly with another of the first named ports, a partially rotatable plug in the casing having a substantially straight passage formed about perpendicularly to the direction of the axis of the plug, the cross sectional area of which passage coincides with the area of the opening of one of the first named ports, said substantially straight passage being so positioned as to be adapted to register simultaneously with two of the first named ports and the ducts and passage together constituting a waterway of about uniform cross sectional dimensions from said container to the discharge orifice, said plug also having a curved passage, of smaller cross-sectional area than the substantially straight passage, adapted to connect said supply with the container when said substantially straight passage is not in register, and means for partially rotating said plug.

3. The combination with a vented liquid measure container having an air admission and exit port, a valve seat around said port and a float valve adapted to close on to said seat, of a valve casing having a plurality of similarly dimensioned ports and a port of smaller dimensions than the first named ports, a supply connection to the last named port, a duct connecting one of the first named ports with the container, a discharge duct connected directly with another of the first named ports, a partially rotatable plug in the casing having a substantially straight passage formed about perpendicularly to the direction of the axis of the plug, the cross sectional area of which passage coincides with the area of the opening of one of the first named ports, said substantially straight passage being so positioned as to be adapted to register simultaneously with two of the first named ports, said ducts and passage together constituting a waterway of about uniform cross sectional dimensions from said container to the discharge orifice, said plug also having a passage adapted to connect the supply with the container when the substantially straight passage is not in register, and means for partially rotating said plug.

4. The combination with two liquid measure containers, a port in each container for the admission and exit of air, a valve seat in connection with each port, and a float valve for each port to close the valve seats, of a ported valve casing, a supply connection to the casing, a connection from the casing to each of the containers, a discharge connection to the casing, a plug adapted to par-

tially rotate in the casing, two straight passages in the plug for alternately connecting one or other of the containers to the casing and to the discharge, a Y-shaped passage of small bore for alternately connecting the supply with one or other of the containers, and means for imparting a partial rotation to said plug substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

DAVID GRUNDY.
DAVID REGINALD GRUNDY.
ROBERT CRIGHTON GRUNDY.

Witnesses:
JAMES W. BROWN,
LIONEL A. SEARCH.