

Sept. 25, 1934.

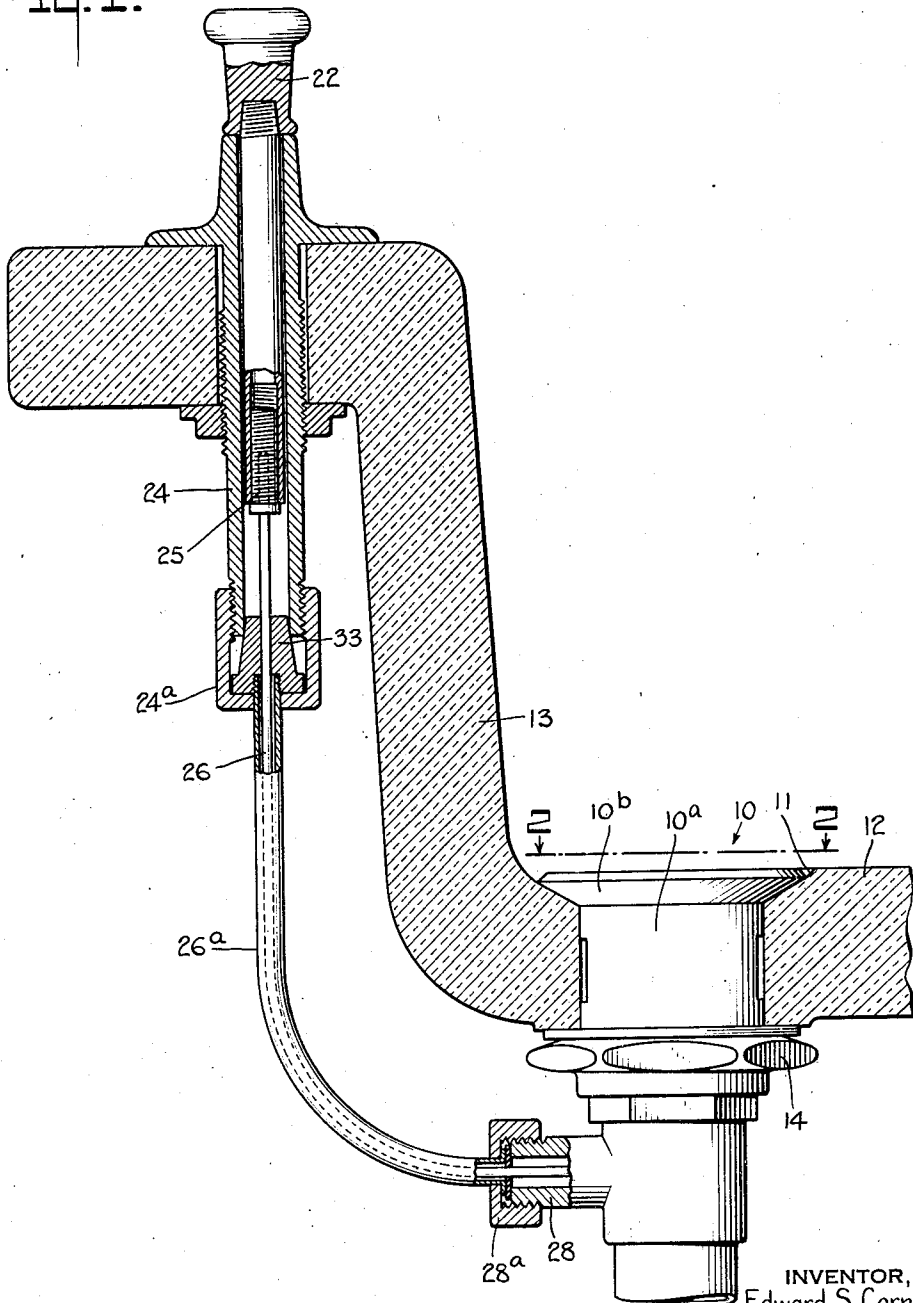
E. S. CORNELL, JR
STOP AND DISCHARGE VALVE

1,974,419

Filed Nov. 22, 1932

2 Sheets-Sheet 1

Fig. 1.



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Fig. 4.

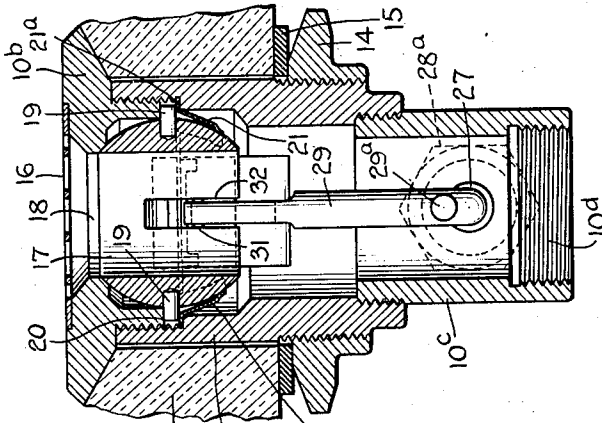


Fig. 3.

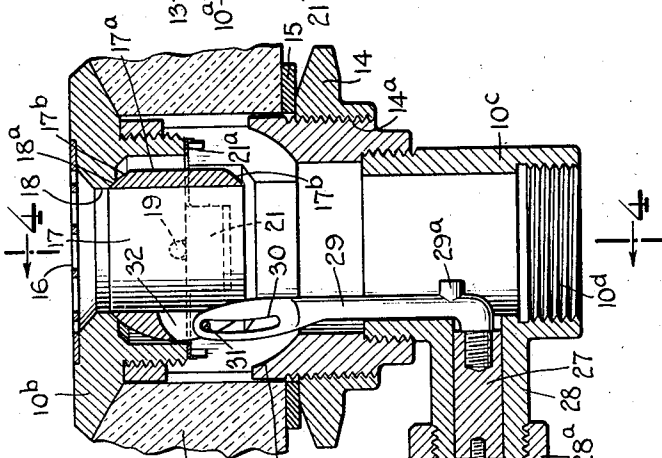
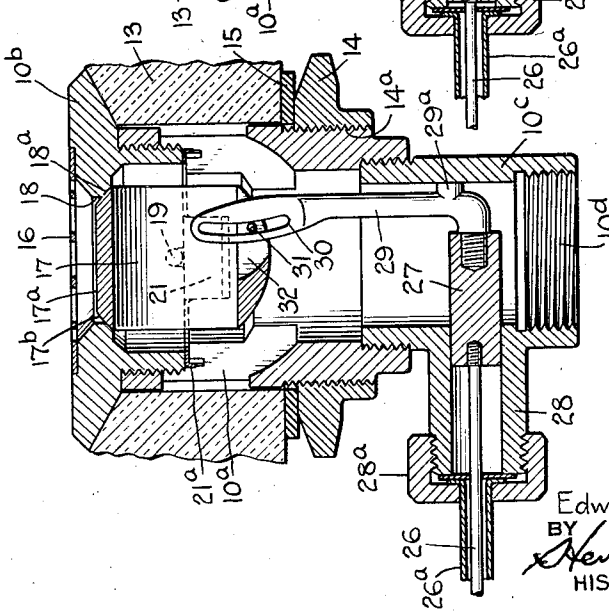


Fig. 2.



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STOP AND DISCHARGE VALVE

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Application November 22, 1932, Serial No. 643,835

16 Claims. (Cl. 4—194)

This invention relates to discharge valves.

Valves embodying the present invention are arranged for the control of the discharge of basins, bowls, tubs, and other containers for water and other fluids and the like.

More particularly, the valve per se embodies a suitable valve seat, a movable valve member, which is rotated or otherwise suitably displaced, the movable valve member at its closed position serving as a stop or plug, and when displaced providing for increased discharge as its rotation or displacement is continued until the valve is moved to its full open position whereat complete discharge ensues.

Preferably, the movable valve member is hollow and its body is of substantially spherical formation, an imperforate face of the body of the hollow member serving as the closure when the valve member is in its closed position.

My valve, and particularly the movable valve member, is advantageously operated by applied push and pull force, for which purpose a flexible connection between the manipulating member and the movable valve member may be employed.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawings, in which

Fig. 1 is a side elevation of a preferred form of my invention, the same being illustrated as mounted in a fixture such as a wash bowl, the fixture and portions of the operating parts of the valve being shown in central vertical section;

Fig. 2 is a detail substantially central elevation of the valve structure on section line 2—2 of Fig. 1, the movable valve member being shown in its stop position;

Fig. 3 is a sectional elevation similar to Fig. 2 but showing the movable valve member in fully open position;

Fig. 4 is a detail central sectional elevation on line 4—4 of Fig. 3.

Referring to the drawings, the valve housing 10 may be of any suitable configuration; as illustrated it is hollow and comprises a central substantially cylindrical body portion 10a, and an upper hollow frusto-conical portion 10b. Such upper portion conforms generally to the facial and other contour of the discharge opening in the fixture in which the valve is located, the frusto-conical configuration serving to locate and liquid-seal the housing, the edge 11 of the discharge opening 12 of the fixture 13 being beveled or otherwise contoured correspondingly. A ring nut 14 is provided, the threading of its inner face, see 14a, Figs. 2 to 4, meshing with the threading of the central housing portion 10a. Preferably a gasket, such as a washer 15 of rubber or other suitable material, is employed.

The upper portion 10b may be assembled upon

the central housing portion 10a by meshing threading, as illustrated or by any other suitable connection, preferably adjustable.

Preferably, and as illustrated, a strainer plate 16 is provided for the upper terminal opening 65 of the frusto-conical portion 10b.

The movable valve member 17 is generally of hollow construction and is mounted to be displaced relative to the opening in the valve housing from its shut-off position to its full open position, and vice versa. Preferably, the movable valve member is of hollow and general spherical contour, a facial area 17a of which may be substantially flat at its central portion, the therewith merging adjacent spherical face portions 17b 75 being arranged to effect sealing relation with the substantially correspondingly contoured edge 18a of the discharge opening 18.

As illustrated, the movable valve member is mounted for rotation about a horizontal axis, 80 as by means of the oppositely disposed studs 19 or other suitable lug or projection means, the outer ends of the studs 19 being rotatably received in suitable oppositely disposed bearing openings 20 in the housing.

Preferably, the movable valve member is resiliently urged to effect a substantially liquid-tight seal with the housing when in its closed position. For embodiments of the type illustrated, such object is attained by a member 21 90 having oppositely disposed depending, preferably spherically contoured skirt elements of suitable resilient material such as spring steel, preferably coated with nickel, chromium and by other corrosion-resisting treatment, the member 21 being provided with laterally extending ring 21a, and outer downward flange thereof. The ring 21a is received between and adjustably clamped between the edge of the lower cylindrical portion of the upper frusto-conical portion 10b and the indented face of the central housing body 10a. 100

Suitable means for operating the movable valve member may be employed. For use as a plug and discharge valve, as for plumbing fixtures, operating means of the push and pull type is desirable. 105 As illustrated, the operating means comprises a manipulating knob 22, removably connected to the rod 23, slidably housed and received with the housing tube 24, the rod 23 being removably and adjustably connected to coupler member 25 110 secured to or forming a part of one end of the flexible connection 26, the opposite end of which is connected to the rod 27, slidably received in nipple portion 28, which may be secured to or form a part of the discharge portion 10c 115 of the housing. As shown, the reciprocation of the rod 27 in its housing tubing 26a effects substantially horizontal displacement, which is suitably translated into rotary displacement of the movable valve member 18, as by the arm 29 120

having a slot 30 and a pin 31 received in the slot 30 and carried by the movable valve member 18. The body of the valve member is cut away as indicated at 32 to provide for the to-and-fro displacement of the arm 29. The arm 29 preferably has a stop lug portion 29a.

Suitable means are provided for frictionally or otherwise retaining the operating means in the respective positions of the movable valve member. As illustrated, such retaining means is shown in the form of the resilient member 21, also by such friction engagement of the wire connector 26 with its housing 26a, which as shown may be curved, and/or by other suitable provision.

The plug 33, see Fig. 1, of rubber or the like, serves as a bearing for the wire connector 26, and may also serve as a packing between the cap 24a and the housing 24. The upper end of the arm 29, see Figs. 2, 3 and 4, and the location of the cut-away portion 32 are preferably selected, to position the arm substantially without the path of flow of the discharge when the valve member assumes its full open position.

The discharge portion 10c is threaded as at 10d, or otherwise suitably connected to a waste pipe.

As illustrated, the operating means are adapted in design for the type of plumbing fixture with which it is associated and appropriately ornamented and designed.

From the above, it appears that my invention provides for a valve, the movable member of which is rotated or otherwise displaced in its movement from closed to open position in a direction transversely to the axis, i. e. the direction of length of the hollow cylindrical body portion, and suitable means for operating the movable member and for retaining the same in its closing and its intermediate positions relative to the valve seat of the housing.

Such retaining means may be in the form of resilient means engaging the body of the movable valve member to effect its retention not only in its closing position but in its fully open and the intermediate partially open positions.

Preferably the movable valve member is cylindrically hollow and of a diameter at least that of the diameter of the discharge opening, which feature coupled with provision of locating its immediate operating parts substantially without the path of the discharge flow, affords a full bore substantially free from all obstruction, when the valve member attains its full open position, thus affording maximum rate of discharge of the water or other fluid from the fixture.

When desired, a restricted rate of flow is effected by setting the valve member at an appropriate intermediate position.

My valve construction possesses the merit of ready and low cost manufacture of the individual parts and of the assembly of the same.

As appears from the foregoing general description, and as is embodied in the illustrated form of my invention, the movable valve member is of general spheroidal or other spherically contoured configuration, having an annular or equivalent valve face portion which co-operates with the valve seat, provided in its hollow housing, when in valve closing position.

It further appears that the movable valve member is provided with a cylindrical or other suitable perforation extending through the member, having openings at the outer contour of the member at substantially diametrically opposite locations, one opening of such perforation or

other form of passage communicating with the opening of the valve seat of the housing, when the movable valve member is rotated or otherwise moved toward and to its closing position, the extent of such communication determining the relative rate of discharge through the perforation.

My invention, as appears from the aforesaid, resides, inter alia, in providing an annular or equivalent valve face, formed either on a face of the movable valve member or equivalent, the plane, that is, the median plane, of which lies substantially normal to the plane of the inlet opening of the discharge perforation or passage through the movable valve member.

Whereas, I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim.

1. A valve of the character described, comprising a hollow housing provided with a valve seat, a movable substantially spherical valve member mounted in the housing for rotary movement transversely of the direction of length of the hollow interior of the hollow housing, the movable spherical valve member having an annular face portion cooperating with the valve seat when in closing position, the movable spherical valve member being provided with a perforation extending from the annular face portion, and means for operating the movable valve member and for retaining the same in its closing position relative to the valve seat.

2. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a movable substantially spherical valve member mounted in the housing for movement transversely of the direction of length of the hollow interior of the hollow housing, the movable spherical valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, the movable spherical valve member being provided with a substantially cylindrical perforation, and means for operating the movable valve member and for retaining the same in its closing, open and intermediate positions.

3. A valve of the character described, comprising a hollow housing provided with an annular valve seat, a spherically contoured valve member mounted in the housing for movement transversely of the direction of length of the hollow interior of the hollow housing, the spherically contoured valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, and push and pull means for operating the movable valve member.

4. A valve of the character described, comprising a hollow housing provided with an annular valve seat, a substantially cylindrically perforated spherically contoured valve member mounted in the housing for movement transversely of the direction of length of the hollow interior of the hollow housing, the movable valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, the annular valve face portion being disposed substantially normal to an end opening of the perforation of the movable valve member, and adjustable means for operating the movable valve member.

5. A valve of the character described, comprising a hollow housing provided with an annular valve seat, a spherical valve member mounted in

the housing for movement transversely of the direction of length of the hollow interior of the hollow housing, the movable spherical valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, push and pull means for operating the movable valve member and means for retaining the same in its closing, open and intermediate positions.

6. A valve of the character described, comprising a hollow housing provided with an annular valve seat, a spherical valve member mounted in the housing for movement transversely of the direction of length of the hollow interior of the hollow housing, the movable spherical valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, push and pull means for operating the movable valve member, and resilient means for retaining the same in its closing and open positions.

7. A valve of the character described, comprising a hollow housing provided with an annular valve seat, a spherically contoured substantially cylindrically perforated valve member mounted in the housing for movement transversely of the direction of length of the hollow interior of the hollow housing, the movable spherically contoured valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, adjustable push and pull means for operating the movable valve member, and resilient means for retaining the same in its closing and open positions.

8. A valve of the character described, comprising a hollow housing provided with an annular valve seat, a diametrically opposite open ended hollow spherically contoured valve member mounted in the housing for movement transversely of the direction of length of the hollow interior of the hollow housing, the movable valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, the annular valve face portion lying normal to the open ends of the hollow spherically contoured member, and push and pull means for operating the movable valve member, said push and pull operating means including a link pivotally connected to the movable valve member.

9. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a substantially spherical valve member rotatably mounted in said housing, the rotatable spherical valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, the rotatable spherical valve member being provided with a perforation, and means for rotating the valve member to and from its open and closed positions, the rotatable valve rotating means including an element having a pin and slot connection with the rotatable valve member.

10. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a perforated spherical valve member rotatably mounted in said housing, and the rotatable perforated spherical valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, and push and pull means for rotating the valve member to and from its closing and open positions, the rotatable valve member rotating means including an element having a pin and slot connection with the rotatable valve member.

11. A valve of the character described, comprising

ing a hollow substantially cylindrical housing provided with an annular valve seat, a spherically contoured valve member rotatably mounted in said housing, the rotatable valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, push and pull means for rotating the valve member, and means for retaining the same in its closing and open positions.

12. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a hollow spherically contoured valve member rotatably mounted in said housing, the rotatable spherically contoured valve member having an annular valve face portion and provided with a perforation arranged to communicate with the interior of the hollow housing when the rotatable valve member is in its open position, means for rotating the valve member, the rotating means including an element having a pin and slot connection with the rotatable valve member, and means for retaining the same in its closing position relative to the valve seat.

13. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a spherical valve member rotatably mounted in said housing, the spherical valve member having an annular valve face portion cooperating with the annular valve seat, the spherical valve member being provided with a perforation communicating with the interior of the hollow housing when the rotatable valve member is in open position, and push and pull means for rotating the valve member and for retaining the same in its closing position relative to the valve seat.

14. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a perforated spherical valve member rotatably mounted in said housing, the perforated spherical valve member having an annular valve face portion cooperating with the annular valve seat when in closing position, push and pull means for rotating the valve member, and resilient means for retaining the rotatable valve member in its closing and open positions.

15. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a spherically contoured valve member rotatably mounted in said housing, the spherically contoured valve member having annular valve face means cooperating with the annular valve seat when in closing position, and push and pull means for rotating the valve member, the push and pull means including an element having a pin and slot connection with the rotatable valve member in its closing position relative to the valve seat.

16. A valve of the character described, comprising a hollow substantially cylindrical housing provided with an annular valve seat, a perforated spherically contoured valve member rotatably mounted in said housing, the spherically contoured valve member having annular valve face means cooperating with the annular valve seat when in closing position, push and pull means for rotating the valve member, the push and pull means including an element having a pin and slot pivotal connection with the spherically contoured valve member, and resilient means for retaining the spherically contoured valve member in any of its rotated positions.

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