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POP-UP WASTE VALVE

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FIG. 1

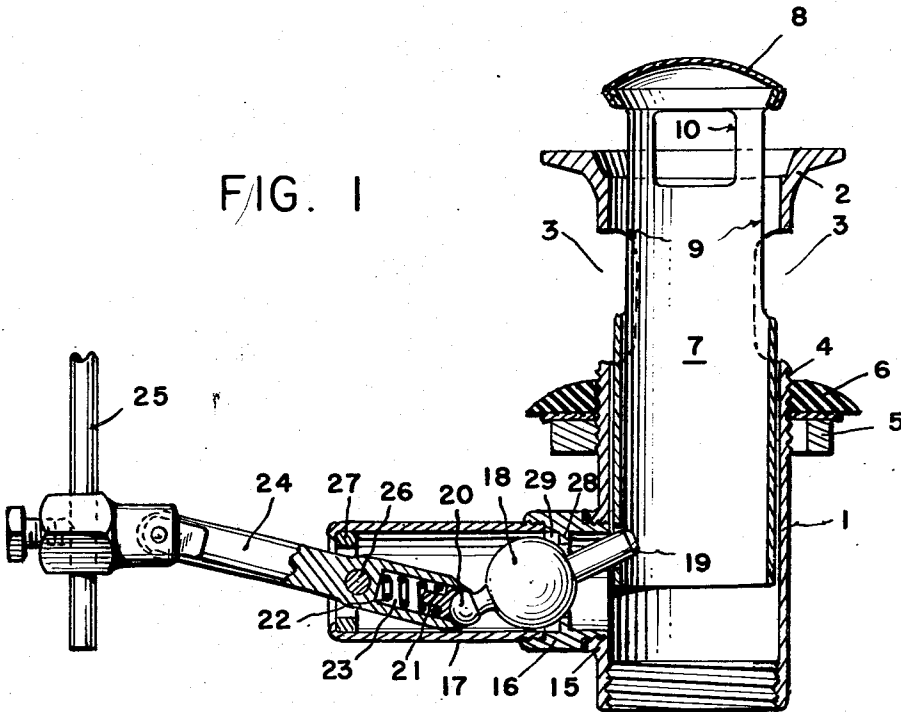


FIG. 2

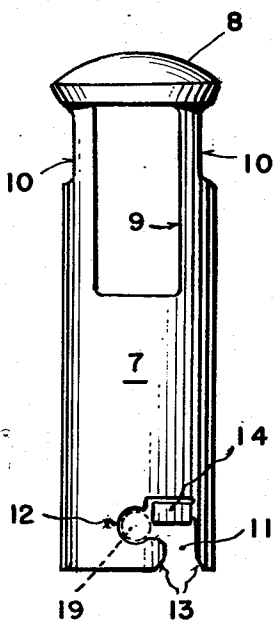


FIG. 3

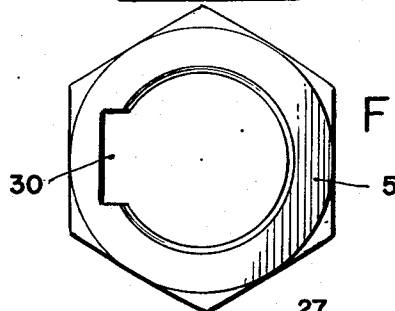


FIG. 4

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POP-UP WASTE VALVE

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4 Claims. (Cl. 4—203)

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This invention relates to certain improvements in waste valves and particularly to the type known in the trade as pop-up waste valves.

The object of the invention is the production of a simple, efficient and long lasting operating means for this type of valve and one that can be easily assembled, and in many instances used in connection with present pop-up valve structures with only minor changes.

Another object is to provide a valve actuating device that will be positive and quick acting and one that will automatically hold the valve in either its closed or open position.

A further object of the invention is to provide a valve actuating mechanism of the snap-action type completely enclosed and assembled as a unit before mounting the same in operative relation to the valve structure.

Another important object is the provision of, what might be termed, an interlocking connection between the valve member and its operating means under normal working conditions, but at the same time permitting the assembling and disassembling of these parts while the valve member is positioned in its supporting casing and in operative relationship with the valve seat.

With these and other objects in view, the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, and it will, of course, be understood that changes in the form, proportions and minor details may be made, within the scope of the appended claims, without departing from the principles of the present invention.

Generally stated, the present invention comprises the conventional type of pop-up waste valve including a tubular valve member and surrounding casing, said parts being provided with cooperating basin or bowl overflow and discharge ports, said parts being mounted in the usual manner by a clamping nut in the discharge opening of the basin or similar fixture.

Also, a side opening, as usual, is provided in the lower part of the valve casing adapted to receive a supporting housing for the valve actuating mechanism, a part of which extends through the opening to engage the valve member, while the opposite end of said valve actuating mechanism extends through the outer end of said housing in a position to be engaged by the manually operating rod for controlling the valve.

All of the above structure is broadly old but the present invention involves certain novel details of

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construction with respect to the valve actuating mechanism per se and its interlocking operative connection with the valve member, all to be fully described in the accompanying specification and illustrated in the drawing, in which:

Figure 1 is a vertical sectional view of the conventional pop-up valve having the improvements of the present invention applied thereto.

Figure 2 is a detail view of the valve member provided with the novel means for detachably interlocking the actuating mechanism thereto.

Figure 3 is a detail view of the lock nut for securing the valve casing and valve to the basin fixture, and

Figure 4 is a detail perspective view of the rotatable bearing member for pivotally mounting the main operating lever within the housing enclosing the improved valve actuating mechanism.

Referring to the drawings in detail, the open-ended casing 1 is of tubular construction and the upper end thereof is in the form of a valve seat and annular flange 2, adapted to be supported in the waste opening of the bowl or similar fixture. The lower end of the casing is screw-threaded for connection with a waste pipe in the ordinary manner.

Below the flange 2 the casing 1 is provided with slots or openings 3 to permit overflow water to enter the interior of the valve casing. Below the openings 3, the valve casing is exteriorly threaded as at 4 for engagement by a clamping or retaining nut 5, the usual packing or gasket 6 being interposed between the retaining nut 5 and the bottom of the basin (not shown).

Closely supported within the casing 1, is a tubular valve member or stem 7 provided at its upper end with a valve head 8 for cooperation with the valve seat 2 for closing the open upper end of said casing. The stem is provided with slots or openings 9 and 10 in its upper portion for communication with the side openings 3 in the valve casing 1 so as to admit overflow and discharge water from the basin into the interior of the valve stem 7, the latter being open at its lower end to permit the escape of the waste and overflow water into the waste pipe (not shown).

It will be noted that the water discharge slots 9 and 10 in the valve stem 7 are of different lengths or size, and they have been so made for a special purpose. Heretofore in valve members of this type, both sets of openings were made long and of the same length which necessarily weakened the valve stem and the valve head was only supported by relatively long thin columns

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or valve stem sections. Applicants have found that these valve stems can be greatly strengthened by making one pair of oppositely disposed openings short, as at 10, and the other oppositely disposed openings long as at 9, without in any way limiting the efficiency of the valve.

Referring to Figure 2, the lower end of the tubular valve stem 7 is constructed with a cut-out portion in the form of a bayonet or angular slot 11, the upper horizontal leg thereof terminating in a circular opening 12 and the lower end of the vertical leg being widened as at 13 for the purpose to be hereinafter more fully described. The upper horizontal edge of the slot 11 is cut back to form what might be termed a leaf spring member 14. The free end of the spring 14 is so constructed and positioned that it will close to a slight degree the entrance to the circular opening 12 but at the same time, by reason of its resiliency, permitting full access to said opening in a manner to be hereinafter more fully described.

Referring to Figure 1, the lower end of the casing 1 is provided with an outwardly extending boss 15 interiorly threaded to receive a nipple 16, which nipple in turn is interiorly threaded to receive a cylindrical or tubular housing 17, adapted to receive and enclose applicants' novel snap-action valve actuating mechanism.

This valve actuating mechanism is a spring pressed toggle device comprising two main members, one engaging the valve stem and the other secured to the manual control for the waste valve. One of said members is in the form of a ball or sphere 18 forming the main fulcrum of the mechanism. Extending from the ball fulcrum in a position to engage the valve stem 7 is a cylindrical pin or the like 19 and extending in the opposite direction from said ball is a semispherical-headed pin member 20. This headed pin member 20 is adapted to engage a socket member 21 outwardly urged by a coil spring 22, said socket member 21 and associated spring 22 being contained within a cylindrical bore 23 formed in the inner end of a lever arm 24 which is in turn pivotally connected to a manually controlled rod or the like 25. The lever arm 24 intermediate its ends is provided with oppositely disposed pivot pins or journals 26 adapted to be positioned and urged against a rotatable ring-like bearing member 27 provided with oppositely disposed bearing recesses 28 retained within the outer end of the housing 17. This bearing member 27 is shown in more detail in Figure 3 where it will be noted that the same is provided with a central elongated opening whereby the lever arm 24 with its pivot pins 26 can be inserted into the outer end of the housing through the bearing member and then turned to position the pivot pins in the bearing recesses 28. After so assembling, the lever 24 and bearing member 27 may be rotated in the housing 17 if necessary to facilitate further adjustments.

The nipple 16, adjacent the inner end of the cylindrical housing 17, is provided with an internal flange 23 supporting a water-tight packing or gasket 29 against which the spherical fulcrum member 18 is urged when the various parts are assembled in operative position.

Another novel feature of applicants' invention resides in the particular interlock between the tubular valve member 7 and the cylindrical pin 19 carried by the spherical fulcrum 18, whereby said pin may be introduced up through the lower end of the bayonet slot and forced over with light

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pressure into the circular opening 12 (Fig. 2), past the spring member 14 which afterwards snaps back to assume its original position partially blocking the entrance to said circular opening. This provides a simple, yet effective, means for retaining the pin 19 within the opening during working conditions, but permitting said pin 19 to be forced, with slight pressure, out of said opening 12 when necessary to disengage the parts, the spring member 14 being sufficiently resilient to permit this operation.

It will be apparent from the foregoing description, in conjunction with the accompanying drawings, that the toggle lever arm 24 and its cooperating spherical fulcrum member 18 may be assembled within the housing 17, either before or after said housing and nipple are secured to the valve casing 1. Furthermore, the snap-action toggle device may be substituted for other types of existing similar devices where the casing 1 is provided with an internally-threaded boss similar to the boss 15 herein shown.

The valve casing is assembled with a lavatory wash bowl or the like prior to the securing of the nipple 16 to the casing, by the specially designed nut 5 with the interposed gasket 3 to clamp the bottom of the bowl or basin between the flange 2 and said nut.

In order to permit the nut 5 to pass over the boss 15, the threaded opening of the nut is provided with a cutout portion 30 extending entirely through the nut from face to face. This cutout portion or notch 30 is of such size as to pass freely over the boss 15 when the nut is slipped over the lower unthreaded portion of the casing 1 to engage the exteriorly-threaded portion 4 of said casing to clamp and secure the casing within the bowl discharge opening in an obvious manner. The external diameter of the lower unthreaded portion of the valve casing 1 is slightly less than the diameter of the opening or bore of the nut 5, so as to enable the quick and convenient assembling of the nut and valve casing.

What we claim is:

1. In a waste valve mechanism, a tubular casing including inlet and outlet openings, a tubular valve member mounted in said casing for controlling said openings, a lateral opening adjacent the lower end of said casing, a tubular housing connected to said lateral opening, a toggle member having a spherical fulcrum portion and oppositely disposed extending arms mounted in said housing, one of said arms being relatively long and operatively connected to said tubular valve member and the other arm being provided with a spherical head portion, a toggle lever arm pivotally mounted in the outer end of said tubular housing, a cylindrical bore provided in the inner end of said toggle lever, a spring pressed seat mounted in said bore adapted to receive the said spherical head portion of said spherical toggle member to provide a resilient ball and socket connection with said spherical toggle member, and means for operating said toggle lever to provide a snap-action means for operating said valve member.

2. In a waste valve mechanism, a tubular casing including inlet and outlet openings, a tubular valve member mounted in said casing for controlling said openings, a lateral opening adjacent the lower end of said casing, a tubular housing connected to said lateral opening, a toggle member having a spherical fulcrum portion and oppositely disposed extending arms mounted in said housing, one of said arms being relatively long

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and the other arm being provided with a spherical head portion, a bayonet slot formed in the lower edge of said tubular valve member, the long arm of the first mentioned toggle member adapted to be inserted in said slot, a leaf spring member projecting towards the closed end of said slot formed integral with the lower end of said tubular valve member in a position to partially close said slot intermediate the ends thereof to normally retain said long arm in said slot, a toggle lever arm pivotally mounted in the outer end of said tubular housing, a cylinder bore provided in the inner end of said toggle lever arm, a spring pressed seat mounted in said bore adapted to receive the said spherical head portion of the short arm of said first mentioned toggle member, and means for operating said toggle lever to provide a snap-action means for operating said valve member.

3. In a waste valve mechanism, a tubular casing including inlet and outlet openings, a tubular valve member mounted in said casing for controlling said openings, a lateral opening adjacent the lower end of said casing, a tubular housing connected to said lateral opening, a toggle member having a spherical fulcrum portion and oppositely disposed extending arms mounted in said housing, one of said arms being operatively connected to said tubular valve member, an annular rotatable pivot bearing member positioned in the outer end of said tubular housing, a toggle lever arm, provided intermediate its ends, with pivot pins adapted to be supported in said annular bearing member and having a ball and socket connection with the other arm of said first mentioned toggle member, and means for operating said toggle lever to provide a snap-action means for operating said valve member.

4. In a waste valve mechanism, a tubular casing including inlet and outlet openings, a tubular valve member mounted in said casing for controlling said openings, a lateral opening adjacent the lower end of said casing, a tubular housing connected to said lateral opening, a toggle mem-

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ber having a spherical fulcrum portion and oppositely disposed extending arms mounted in said housing, one of said arms being relatively long and the other arm being provided with a spherical head, a bayonet slot formed in the lower edge of said tubular valve member, the long arm of the above mentioned toggle member adapted to be inserted in said slot, a leaf spring member projecting towards the closed end of said slot formed integral with the lower end of said tubular valve member in a position to partially close said slot intermediate the ends thereof to normally retain said arm in said slot, an annular rotatable bearing member positioned in the outer end of said tubular housing, a toggle lever arm, provided intermediate its ends, with pivot pins adapted to be supported in said annular bearing member, a cylindrical bore provided in the inner end of said toggle lever, a spring pressed seat mounted in said bore adapted to receive the spherical headed arm of said spherical toggle member to provide a resilient ball and socket connection with said spherical toggle member, and means for operating said toggle lever to provide a snap-action means for operating said valve member.

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