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POP-UP WASTE OR DRAIN

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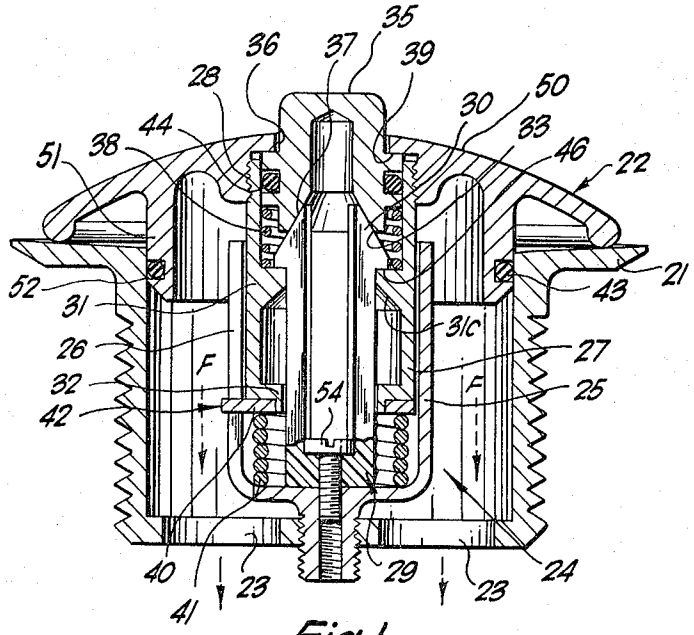


Fig. 1.

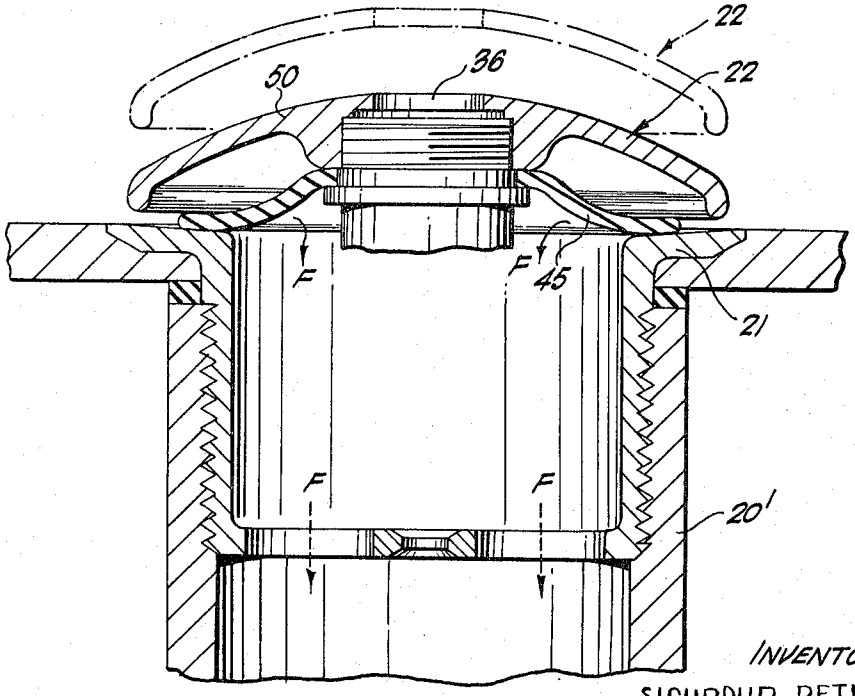


Fig. 2.

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POP-UP WASTE OR DRAIN

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ABSTRACT OF THE DISCLOSURE

A push-button waste-plug assembly for installation in a waste outlet. A stopper is mounted on an axially movable portion of a supporting structure having a further portion adapted to be fixedly mounted in a waste outlet. The stopper is adapted to be pushed closed and is held there by catch means in the supporting structure. A push-button release means mounted in the stopper releases the catch means when actuated, thereby allowing the stopper to move to a fully-open position.

This invention is directed to a stopper or waste plug for use in a waste outlet.

It is common in domestic sink-like waste outlets to provide flow obstructing plugs which are manually inserted in and removed from the waste outlet. Also known are more complex arrangements provided with mechanical operating linkages.

Simple plugs, while being generally effective suffer from the disadvantage that they sometimes fail to effect a complete seal of the outlet, as in the absence of some means to positively secure them they depend upon friction and gravity to retain them in position.

The more complex remotely actuated plugs sometimes incorporate positively acting securing means but are generally complex and difficult to install. In addition the linkage used to provide remote control is prone to wear, distortion and corrosion, and servicing of the device after installation usually requires the services of a plumber.

Certain of the advantages of a simple plug and of a remotely actuated plug have been obtained by means of the present invention which provides a waste plug assembly adapted for installation in a waste outlet and comprises a supporting structure having a first portion adapted to be fixedly mounted within the waste outlet and a second portion which is axially movable with respect to the first portion. The second portion is provided with a stopper which is axially movable, together with the second portion, between a fully-open position permitting flow through the outlet and a fully-closed position blocking flow through the outlet. The supporting structure includes means for securing the stopper in the fully-closed position and means urging the stopper towards the fully-open position. The assembly also includes release means operable to release said means for securing the stopper in the fully-closed position, thereby permitting movement of said stopper from said fully-closed position to said fully-open position in response to said means urging said stopper towards said fully-open position.

A preferred embodiment of the device comprises a spring-loaded stopper adapted to be moved manually into sealing position against the force of the spring, and having a push-button release, operation of which causes the stopper to pop-up into the open position, thereby permitting operation of the waste. This embodiment comprises a substantially cylindrical housing forming a flow-way adapted to be installed in a waste outlet and having a stopper for blocking flow through the housing, a spring adapted to move and maintain the stopper in a fully

opened position permitting flow through the housing, a catch to secure the stopper in a fully closed flow blocking position against the force of the spring, and means to release the catch whereby the spring can move the stopper to the fully opened position.

In the drawings which illustrate embodiments of the invention;

FIGURE 1 is an elevation in section of the device, and

FIGURE 2 is an elevation in section of a portion of the device incorporating an alternative main seal arrangement.

The pop-up waste plug assembly may be installed in a waste outlet such as that of a domestic sink with the upper flange of the housing **21** generally arranged flush with the bottom of the sink or other container to which the waste is attached, such as a bathtub or the like.

The pop-up waste plug assembly shown in FIGURE 1 is in the fully-closed position. The plug assembly is adapted to be mounted within a waste outlet by means of a suitable hollow housing **21**. A flow-way, designated by the arrows F, extends through the hollow housing **21**. The bottom of the housing **21** is provided with a spider **23** which carries thereon a plug supporting assembly **24** which includes an axially extending sleeve **25**.

Slidably mounted within sleeve **25** is sliding member **27** which carries the stopper **22** at its upper end. The stopper **22** consists of a top flange **50**, and skirt **51** having a recess **52** therein to receive a sealing O-ring **43**.

The sliding member **27** is secured to a washer **40** which is biased upwardly by the main spring **41** positioned between the washer **40** and the bottom of the outer sleeve **25**. The washer **40** is secured against rotation within the outer sleeve **25** by means of a driving lug **42** attached to the washer and sliding within the slot **26** of the outer sleeve **25**, this prevents rotation of the sliding member **27** relative to the sleeve **25**.

In the closed position of the assembly the stopper **22** blocks off the entrance to the flow-away F in the housing **21**, in which position the O-ring **43** sealingly engages the inner surfaces of housing **21**.

The stopper **22** is movable manually downwards to the fully closed position against the pressure of a spring **41** contained within the lower portion of sleeve **25**. The stopper **22** is maintained in the closed position by a catch member **29** made of resilient material such as nylon mounted within the outer sleeve **25** by means of cap screw **54**. The catch member **29** has a plurality of upstanding arms **30** in its base, which arms are biased outwardly to engage and hook over upper annular rib **31** which projects inwardly of the sliding member **27**. The upper portion of the hooks have outward facing cam surfaces **33**.

When the stopper **22** is released, it moves to the open position under the influence of the spring **41** on depression of a release button **35** which extends through an orifice **36** of stopper **22**. The release button **35** has an inwardly tapered annular surface **37** adapted to cooperate with the cam surfaces **33** of the hooks in the arms **30** in a manner which will be explained hereinafter. The release button **35** is biased upwardly by a spring **38** so that normally its external shoulder **39** abuts the sides of the orifice **36** of stopper **22**. In the open position the hooks on the arms **30** engage and hook over the lower annular rib **32** of the sliding member **27**.

FIGURE 2 shows the stopper **22** in the partially closed position, the upper or fully open position being shown in phantom. In this embodiment the sealing skirt **51** and O-ring **43** of the embodiment shown in FIGURE 1 are replaced by disc seal **45** which is made of resilient material such as rubber and forms a part of the stopper **22**. The operating mechanism, not shown, is the same as that illustrated in FIGURE 1.

In operation of both embodiments shown, manual depression of the stopper 22 moves the stopper into the fully closed position as shown in FIGURE 1.

Downward movement of the stopper 22 compresses the spring 41 and moves the lower annular rib 32 away from the underside 46 of the hooks of the arms 30. Further depression causes the camming surface 31C of the upper annular rib 31 to engage with the camming surface 33 of the arms 30, so compressing the arms 30 inwardly and permitting passage of the upper rib 31 over the hooks. The hooks of the arms 30, under their natural bias, then spring outwardly to engage and hook over the upper surface of the upper rib 31. In this position the main spring 41 is held in a compressed condition by catch member 29. Flow leakage between the inner surface of the housing 21 and the stopper 22 is precluded by O-ring 43 (FIGURE 1) or the rubber disc seal 45 (FIGURE 2) and leakage between the release button 35 and the inner surface of the sliding member 27 is prevented by the O-ring 44.

To raise the device and open the flow-way F, the catch 29 is released by depression of the release button 35, causing the tapered surface 37 to engage the cam surface 33 of the resilient arms 30, thereby causing the arms to move radially inwardly until their shoulders 46 disengage from the upper surface of the annular rib 31. This then releases the sliding member 27 from restraint by the arms 30 so that member 27 is free to move upwardly under the influence of the main spring 41, thereby causing the stopper to pop-up and sealingly disengage from the housing 21. The upper or fully opened stopper position is reached when the upper surface of the lower annular rib 32 of member 27 engaging the underside 46 of the hooks, the spring 38 having served to return the release button 35 to the raised position.

To facilitate assembly of the device prior to installation in a sink the washer 40 is secured to the bottom of the sliding member 27 so that engagement of the driving lug 42 of the washer 40 in the slot 26 of the outer sleeve 25 enables torque to be transmitted through the sliding member 27 to the outer sleeve 25. During assembly of the device the stopper 22 can be screwed to the sliding member 27. Further rotation of the stopper 22 then produces corresponding rotation of the stopper supporting means 24, enabling it to be threadedly engaged into the spider 23 of the housing 21 and thus complete the assembly.

It will be evident that the device can be arranged to operate in the opposite sense so as to provide push-button closure of the stopper. Such an arrangement then requires the provision of additional means for moving the stopper to the open position.

What we claim as our invention is:

1. A waste plug assembly adapted for installation in a waste outlet and comprising a supporting structure having a first portion adapted to be fixedly mounted within the waste outlet and a second portion which is axially movable with respect to said first portion, said second portion being provided with a stopper which is axially movable together with said second portion, between a fully-open position permitting flow through said outlet and a fully-closed position blocking flow through said outlet, said supporting structure including means for securing said stopper in said fully-closed position and means urging said stopper towards said fully-open position, said assembly also including release means operable to release said means for securing said stopper in the fully-closed position thereby permitting movement of said stopper from said fully closed position to said fully-open position in response to said means urging said stopper towards said fully-open position.

2. A waste plug assembly as claimed in claim 1 wherein said means for securing the stopper in the fully-closed position includes resiliently biased catch means adapted to be actuated when the stopper is moved to the fully-closed position.

3. A waste plug assembly as claimed in claim 2 wherein said catch means comprises a plurality of resilient arms having first ends secured to said first member and second, hook-like free ends adapted to engage with rib-means of said second member to secure said second member together with the stopper in said fully-closed position.

4. A waste plug assembly as claimed in claim 3 wherein said means for releasing said securing means comprises a push-button mounted in said stopper, said push-button having a camming surface engageable with camming surfaces on the free ends of said resilient arms for camming the resilient arms out of engagement with said rib-means when said push-button is pushed, said push-button being spring biased away from engagement of its camming surface with the camming surfaces on said resilient arms.

5. A waste plug assembly as claimed in claim 4 wherein said waste outlet is provided with a housing defining a flow-way and said supporting structure is secured within the housing.

6. A waste plug assembly as claimed in claim 5 wherein said housing is cylindrical and said stopper has a cylindrical portion slidable in said housing, said cylindrical portion having an O-ring seal engageable with said housing to block flow therethrough.

7. A waste plug assembly as claimed in claim 5 wherein said stopper includes a resilient disc-like seal adapted to close off said flow-way when the stopper is moved to the fully-closed position.

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