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IMPROVED LIQUID VALVE

The present invention relates to a valve for a liquid drain.

5 In particular, although by no means exclusively, the present invention relates to a valve which prevents, by way of example, insects, animals and smells from emerging into domestic premises through drains.

10 There are many instances in households where drains are used to discharge liquid, usually water, from sinks or bathtubs or from floors of certain areas which get wet. For instance, there may be drains in the floors of bathrooms or kitchens. Usually trap reservoirs of water are provided in U-shaped parts of the drain close to the plug or drain holes. These reservoirs prevent foul air
15 escaping from the pipes through the plug or drain hole and into the house.

20 However, such reservoirs do not prevent certain pests or insects, for instance cockroaches, from crawling up the drains. These insects are able to pass through the reservoirs and enter the rooms or sinks, through the plug or drain holes. Such reservoirs can also provide breeding grounds for insects, such as mosquitos, if they are not used for any length of time and become stagnant. Such pests breed in the reservoirs or pass through them and can
25 be both a nuisance to inhabitants of the house and hazardous to health.

These problems are not just confined to houses but to other premises, for instance leisure, industrial and commercial

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premises or drains to almost any enclosed space.

It is an object of the invention to alleviate these problems, at least partially, and preferably to prevent pests, insects and smells from passing through drainpipes out through the drain and/or plug holes.

According to the present invention there is provided a valve for a liquid drain, which valve comprises:

- (a) a body adapted to fit into the drain and having a drain aperture; and
- 10 (b) a valve element that is a movable, in response to liquid flowing through the body, from a closed position in which the valve element seals the drain aperture to an open position thereby opening the drain aperture.

15 It is preferred that the valve element be movable from the closed position in response to liquid contacting a section of the valve element and thereby causing the valve element to deflect from the closed position to the open position.

It can readily be appreciated that with such an arrangement
20 the extent to which the valve element opens the drain aperture is a function of the weight of liquid flowing through the body.

It is preferred that the valve element be mounted to the body for swinging movement between the closed and open
25 positions.

It is preferred that in the absence of liquid flowing through the body the valve element be biased into the closed position.

It is preferred that the valve element comprises a quadrant-shaped wall and a wall that closes one radial face of the quadrant-shaped wall.

5 It is preferred although by no means essential that the bias be provided by the weight of the valve element.

According to the present invention there is also provided a liquid drain that includes the valve described in the preceding paragraphs.

10 The present invention is described further by way of example with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of a preferred embodiment of the valve in accordance with the present invention in a closed position;

15 Figure 2 is a perspective view of the valve shown in Figure 1 with a top cover removed to illustrate more clearly a valve element of the valve;

Figure 3 is a top plan view of the valve shown in Figure 1;

Figure 4 is a section along the line A-A in Figure 3; and

20 Figure 5 is a section along the line B-B in Figure 4 with the top cover removed.

The preferred embodiment of the valve shown in the figures comprises a hollow cylindrical body 5 which is adapted to fit snugly in a liquid drain (not shown) and has an inlet end 7 and an outlet end 9. The body 5 defines a passageway
25 for liquid to flow from the inlet end 7 to the outlet end 9.

The valve further comprises a cover 11 which closes half of the passageway, with the other half defining a drain aperture 13 of the valve.

5 The valve further comprises a valve element, generally identified by the numeral 15, which is movable between a closed position shown in the figures in which the valve element 15 closes the drain aperture 13 and an open position (not shown) in which liquid flows through the drain aperture 13.

10 In accordance with the present invention the valve element 15 is formed to be responsive to the flow of liquid through the body 5.

Specifically, the valve element 15 is formed to move from the closed position to the open position in response to the
15 impact/weight of liquid contacting a section of the valve element 15 and thereby causing the valve element 15 to deflect away from the closed position.

With particular regard to Figures 1, 2 and 4, the valve element 15 has a generally quadrant-shaped wall 19 and a
20 flap 21 that closes one radial face of the quadrant. The other radial face is defined by an edge 23 of the quadrant shaped wall 19 and forms an inlet for liquid when the valve element 15 is in the closed position shown in the figures.

The valve element 13 is mounted to the body 5 so that the
25 valve element 15 can swing from the closed position shown in the figures to an open position in which liquid may flow through the drain aperture 13. In this connection, the flap 21 is formed with diametrically opposed notches 25 which allow the valve element 15 to be positioned to
30 receive diametrically opposed pins 27 (Figures 4/5) extending inwardly from the body 5.

The arc described by the quadrant-shaped wall 19 is greater than 90° so that the flap 21 is inclined to the vertical, as shown in Figure 4. As a consequence, the weight of the flap 21 causes the valve member 15 to rotate so that the edge 23 of the quadrant-shaped wall 19 is biased towards the closed position.

It can readily be appreciated that, in use, when the valve is positioned in a drain and liquid flows into the valve through the inlet end 7, the liquid flows through the drain aperture 13 and contacts the quadrant-shaped wall 19 and begins to accumulate in the well defined by the quadrant-shaped wall 19/flap 21. When the weight of the liquid exceeds a threshold or the momentum of the liquid exceeds a threshold the valve element 15 swings in the direction of the arrow X in Figure 4 and thereby allows liquid to flow to and thereafter through the outlet end 9.

It can also readily be appreciated that, in use, when the flow of liquid into the drain subsides the valve element 15 swings back automatically, due to the weight of the flap 21, to the closed position shown in the figures.

The above-described valve is an effective and efficient means of automatically opening/closing a drain. The valve is suited particularly for use in situations where there are space limitations.

Many modifications may be made to the preferred embodiment of the valve described in relation to the drawings without departing from the spirit and scope of the present invention.

For example, whilst the preferred embodiment includes a valve element 15 that is biased into a closed position by the weight of the valve element, it can readily be

appreciated that the present invention is not so limited and extends to any means of biasing the valve element 15 into a closed position.

5 Furthermore, whilst the preferred embodiment includes a particular means of pivotally mounting the valve element 15 to the body 5, it can readily be appreciated that the present invention is not so limited and extends to any suitable means for this purpose.

10 Furthermore, whilst the preferred embodiment includes a valve element 15 that includes a quadrant-shaped wall 19 and a flap 21, it can readily be appreciated that the present invention is not so limited and extends to any suitable construction of valve element.



CLAIMS:

1. A valve for a liquid drain, which valve
comprises:
 - (a) a body adapted to fit into the drain and having a
5 drain aperture; and
 - (b) a valve element that is a movable, in response to
10 liquid flowing through the body, from a closed
 position in which the valve element seals the
 drain aperture to an open position thereby
 opening the drain aperture.
2. The valve defined in claim 1 wherein in the
absence of liquid flowing through the body the valve
element is biased into the closed position.
3. The valve defined in claim 1 or claim 2 wherein
15 the valve element is movable from the closed position in
 response to liquid contacting a section of the valve
 element and thereby causing the valve element to deflect
 from the closed position to the open position.
4. The valve defined in claim 3 wherein the valve
20 element is mounted to the body for swinging movement
 between the closed and open positions.
5. The valve defined in claim 3 or claim 4 wherein
the valve element comprises a quadrant-shaped wall and a
wall that closes one radial face of the quadrant-shaped
25 wall.
6. The valve defined in claim 5 wherein the section
of the valve element that in use is contacted by liquid
comprises the quadrant-shaped wall.



7. The valve defined in claim 6 wherein the weight of the valve element biases the valve element towards the closed position.

5 8. A drain incorporating the valve defined in any one of the preceding claims.

9. A valve for a liquid drain substantially as described herein with reference to the drawings.