

TITLE

An improved waste water trap valve



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BACKGROUND TO THE INVENTION

Water is generally drained from shower cabinets, baths, water tubs and the like by discharging the waste water through a trap formed either under the facility or in the floor of the facility. The function of the trap is to conduct the waste water from the facility into a discharge pipe commonly known as a soil-pipe, for eventual discharge into a sewerage system. The trap generally includes a grating or the like located at the entrance to the trap to minimise the entry of debris into the trap. To prevent odours, vermin and the like from passing through the sewerage system and through the trap into the facility, a U bend or the like is generally formed in the soil pipe below the trap. Waste water will remain in the U bend and that generally is sufficient to prevent odours and vermin passing back from the sewerage system through the U bend and into the facility. However the U bend can not always be located close to the trap and particularly in warmer climates, it is possible for vermin to breed in the part of the soil pipe below the trap and above the U bend and the vermin can then enter the facility through the grating. In addition, it is possible for obnoxious odours to be generated in that area and to permeate the facility.

PRIOR ART

Various constructions have been proposed to prevent the ingress into the facility above the trap of odours and vermin.

One known form of construction comprises a receptacle which is placed into the opening in the floor or in a gully trap or the like. The receptacle has a generally spherical shape which houses a ball of light buoyancy. A discharge outlet is formed at the nadir of the

spherical housing and is normally closed by the surface of the ball which will seat against the outlet. When waste water passes into the receptacle, the buoyancy of the ball will lift it off the outlet and allow the water to pass through the discharge outlet. Consequently when there is no flow of water into the receptacle, the ball will rest on the discharge outlet and thus prevent the passage of odours and vermin emanating from the soil pipe below the receptacle. A known difficulty with this type of trap valve is that debris can collect in the housing and this can either decrease the buoyancy of the ball or interfere with the movement of the ball, thereby inhibiting the ball from floating and lifting off the outlet, even when there is a considerable amount of water in the housing.

Another known trap comprises a housing having a discharge opening which is situated at the bottom of the housing and which is normally closed by a flap hinged to the housing. The flap pivots in an essentially horizontal manner and is normally held closed against the opening by a counterweight. When a sufficient amount of water collects in the housing, the weight of the water will pivot the flap downwardly to allow waste water to discharge through the opening. Consequently, it is possible for a small amount of water to remain in the trap and this can result in the breeding of vermin.

The above types of known traps exhibit two other major disadvantages. The housings of the known traps are designed to occupy almost all of the area of the interior of the waste pipe below the entrance to the pipe. Generally the junction of the waste pipe with the floor is arranged by fixing a plate to the floor with the plate having a hole which corresponds in size with the interior of the waste pipe. If the opening in the plate is misaligned with the waste pipe it is necessary to remove the plate and to realign the plate with the waste pipe before the known type of valve can be installed. In many circumstances it can be a very difficult to remove the plate and to realign it.

Another disadvantage with the known traps is that the main body of the trap is essentially circular with an outside dimension that is close to the interior dimension of the waste pipe to which the trap is to be applied. If a secondary pipe or pipes are joined to the waste pipe below the opening, it is possible for the secondary pipe or pipes to protrude into the waste pipe by an amount which can interfere with or even prevent the insertion of the known traps into the waste pipe. This requires the cutting away of the portion of the secondary waste pipe that protrudes into the waste pipe but this can be very difficult and time consuming to perform adequately.

OBJECT OF THE INVENTION

It is therefore an object of this invention to provide an improved waste water trap valve that will overcome or at least minimise the known disadvantages.

DISCLOSURE OF THE INVENTION

Accordingly the invention comprises a waste water trap valve having a surface plate in the form of an annular open mouthed ring which surmounts a casing having an interior chamber communicating directly with the mouth of the surface plate, the said chamber including a discharge aperture normally closed by a flap valve which will open when waste water enters the chamber to thereby discharge the waste water from the chamber of the casing and wherein the outside diameter of the casing is less than the interior diameter of a waste pipe into which the trap valve is to be engaged and further wherein the casing is offset from the axial centre of the open mouth of the annular ring.

Preferably the chamber includes a spillway extending from the open mouth of the surface plate and terminating at a discharge end within the chamber.

Preferably the discharge aperture of the chamber includes sealing faces against which the flap valve can seal, means being provided to maintain the flap valve in sealing contact with the said sealing faces.

Preferably the flap valve includes bleed means to act in conjunction with the aperture to bleed waste water from the interior of the casing.

Preferably the bleed means comprises grooves formed in at least a portion of the flap valve adapted to seal against the aperture.

Preferably the bleed means comprises grooves formed in at least a portion of the aperture against which the flap valve can contact.

Preferably the flap valve is hinged to the casing in a manner that the flap valve will tend to normally close against the aperture.

Preferably the flap valve is hinged to the casing by means of hinge pins.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred forms of the invention will now be described with the aid of the accompanying drawings herein:

Figure 1 is a perspective view of one preferred form of the waste water trap valve.

Figure 2 is a view similar to that of Figure 1 but with the component parts of the trap

valve shown as an exploded view.

Figure 3 is a sectional view of the trap valve when located in a drainpipe

Figure 4 is a view of the valve during operation when located in a drainpipe illustrating the discharge of waste water through the trap valve

Figure 5 is a view of a component part of the trap valve.

Figure 6 is a view of the valve of a similar construction to that depicted in Figure 1 but illustrating a modification to the interior of the valve.

Figures 7a, 7b and 7c illustrate the installation of the waste water trap valve.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As illustrated particularly in Figures 1 and 2, the trap valve can be formed of a moulding from a plastics material as will be apparent to those skilled in the art. The valve has a surface plate 1 in the shape of an annular ring having an open mouth which surmounts a casing 8 formed integrally with the surface plate. The casing forms a chamber 12 which communicates directly with the open mouth of the surface plate 1

The trap valve may be utilised with an existing adapter plate 2 to seal the end of the soil pipe 7 to the floor. The adapter plate has a skirt 6 shaped to enter the soil pipe 7 and can be sealed to the floor and to the soil pipe 7 by the usual form of grout 3 or other sealing substance as is known in the art. As illustrated particularly in Figures 3 and 4, the adapter plate has an annular shoulder on which the undersurface 1a of the plate 1 can engage. As can

be seen particularly from Figures 3 and 4, the bulk of the casing 8 is offset from the axial centre of the surface plate 1.

A spillway 9 is also formed integrally with the casing 8 to provide a downwardly sloping path from the mouth of the surface plate 1 to terminate at a discharge edge 10 below the plane of the surface plate 1. The chamber 12 is preferably substantially spherical in shape to assist the smooth flow of waste water as will be hereafter further described, but other shapes can be utilized as required. The chamber 12 includes a discharge aperture 11 which as indicated particularly in Figure 2 comprises three aligned sealing faces.

A flap valve 13 is pivotally connected by pins 14 to the body of the casing 8 as indicated. Although in a highly preferred form, pins 14 are utilised to provide the pivotal movement, other means of pivoting the flap valve 13 to the casing 8 as will be appropriate can be utilised. The flap valve 13 can be formed of the same or different material as the casing 8 and as indicated for instance in Figure 3, when the flap valve is in a closed condition it will seal against the sealing faces of the aperture 11. As can also be seen from the illustration in Figure 3, the flap valve is pivoted in a manner that the weight of the valve will tend to close the valve against the sealing faces of the aperture 11. In its closed position the flap valve is therefore able to form a seal against the sealing faces of the aperture 11.

While the drawings illustrate a particular method of pivoting the flap valve to the housing, it will be understood that other methods as will be apparent to those skilled in the art can also be utilized for this purpose. In addition to or instead of the preferred method of pivoting the flap valve, spring means can be utilised to ensure the valve remains in its closed position until it is activated. In a yet further modification, suitable weights can be formed integrally with or attached to the flap valve 13 to assist the sealing between the face of the

flap valve and the sealing faces of the aperture 11.

After the trap valve has been installed in the waste pipe 7, the usual form of grating 15 can be located in the opening to the interior of the chamber 12 to act as a filter for debris and other solid matter.

In operation when waste water 18, see particularly Figure 4, enters the trap valve through the grating 15, it will impinge on the sloping surface of the spillway 9 and will spill over the discharge edge 10 of the spillway into the interior of the chamber 12. When water enters the chamber 12, the flap valve 13 is pivoted to discharge the water 18 from the chamber. When the flow of water into the casing 8 stops and the volume of water within the chamber 12 diminishes, the flap valve will pivot back to its rest position illustrated in Figure 3 and again seal against the sealing faces of the aperture 11.

It is desirable that any waste water that may remain at the bottom of the chamber after the flow of water into the trap valve has stopped, be able to bleed past the sealing face of the aperture. To provide this facility, a portion of the sealing surface of the flap valve 13 can include grooves 16 or other indentations as illustrated in Figure 5. These grooves will form gaps in the seal and will allow any water that may remain in the bottom of the casing and which is not by itself of sufficient bulk to open the flap valve, to bleed between the sealing faces.

In the modification illustrated in Figure 6, the grooves are formed in the sealing surface of the aperture. These grooves in the aperture can be instead of or in addition to the grooves in the flap valve 13. As is indicated also in Figures 6a and 6b, the shape of the grooves in either the flap valve 13 or in the aperture 11 can be varied according to the particular circumstances. For instance the grooves can be rounded as in Figure 6a or

rectangular as in Figure 6b. It is therefore to be understood that the gaps can be formed either in the body of the housing or in the flap valve or in both as desired. The gaps formed by the grooves, while large enough to allow water that may tend to remain in the bottom of the interior of the base to drain away, are nevertheless sufficiently small to prevent the passage of vermin through the gaps.

A specific advantage results from the construction of the trap valve as illustrated in the drawings because the casing 8 does not occupy the full area of the waste pipe below the surface plate 1. This enables the trap valve to be simply applied to a waste pipe which includes a protruding auxiliary waste pipe such as that illustrated in Figure 7b or if the opening to the fitment 2 is misaligned as illustrated in Figure 7c. In such a circumstance, the trap valve body can be rotated until there is sufficient clearance to enable the valve to be inserted into the waste pipe without the necessity of either removing the grating over the trap opening and realigning the grating or of cutting away the auxiliary waste pipe protruding into the soil pipe.

Having disclosed the preferred form of the invention and the preferred method of constructing the valve it will be apparent to those skilled in the art that modifications and amendments can be made to the specific form of construction and yet still come within the general scope of the concept of the invention. All such amendments and modifications are intended to be included within the scope of this application

CLAIMS

- 1 A waste water trap valve having a surface plate (1) in the form of an annular open mouthed ring which surmounts a casing (8) having an interior chamber (12) communicating directly with the mouth of the surface plate (1), said chamber including a discharge aperture (11) normally closed by a flap valve (13) which will open when waste water enters the chamber (12) to thereby discharge the waste water from the chamber 12 of the casing (8) and wherein the outside diameter of the casing (8) is less than the interior diameter of a waste pipe (7) into which the trap valve is to be engaged and further wherein the casing (8) is offset from the axial centre of the open mouth of the surface plate (1).
2. The waste water trap valve of claim 1, wherein the chamber (12) includes a spillway (9) extending from the open mouth of the surface plate (1) and terminating at a discharge end (11) within the chamber (12).
- 3 The waste water trap valve of claim 1, wherein the discharge aperture (11) of the chamber (12) includes sealing faces against which the flap valve (13) can seal and wherein means are provided to maintain the flap valve (13) in sealing contact with the said sealing faces.
4. The waste water trap valve of claim 3, wherein the flap valve (13) includes bleed means to act in conjunction with the aperture (11) to bleed waste water from the interior of the casing.
5. The waste water trap valve of claim 4, wherein the bleed means comprises grooves (16) formed in at least a portion of the flap valve (13) adapted to seal against the aperture (11).

6. The waste water trap valve of claim 5, wherein the bleed means comprises grooves formed in at least a portion of the aperture (11) against which the flap valve (13) can contact.
7. The waste water trap valve of claim 1, wherein the flap valve (13) is hinged to the casing (8) in a manner that the flap valve (13) will tend to normally close against the aperture (11).
8. The waste water trap valve of claim 7, wherein the flap valve (13) is hinged to the casing (8) by means of hinge pins 14.