

Floor Trap Device

5 TECHNICAL FIELD

The present invention relates broadly to a floor trap device and to a method for prevention of fluid transmission.

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BACKGROUND

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In current piping arrangements, floor traps are typically used to allow fluids to flow to outlets e.g. sewage or waste pipes, while at the same time, the floor traps also serve to prevent gas, e.g. odorous gases, from being transmitted from the outlets. Such floor traps are typically U, S, P or J-shaped pipes integrally installed under a floor. A typical floor trap is shaped such that liquid can be retained at a location between an inlet of the floor trap and an outlet of the floor trap, and in a retainer portion of the pipe so that gas from the outlet is prevented by the retained liquid to be transmitted to the inlet.

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One problem that typically arises from current floor traps is that the retainer portion can over time accumulate sediment such as dirt etc. This typically results in pipe chokage that has to be cleared using e.g. a plunger. In many instances, the chokage may be serious such that a pressure pump has to be used to clear the retainer portion of sediment/deposit. Other techniques of clearing chokage can include usage of solvents or tablets formulated for pipe clearing. However, it has been recognised that these techniques are typically inadequate for many instances of solid sediment/deposit accumulation.

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Furthermore, the accumulated sediment may also pose health hazards if, for example, the floor trap is not used for a long period of time, such as during a long vacation, and bacteria is allowed to cultivate.

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In view of the above, there exists a need for a floor trap device and a method for prevention of fluid transmission that seek to address at least one of the above problems.

SUMMARY

5 In accordance with a first aspect of the present invention, there is provided a floor trap device comprising an inlet for receiving liquid into the floor trap device; an outlet for transmitting liquid from the floor trap device; a chamber comprising a base trough portion, the chamber for providing fluid communication from the inlet to the outlet; a dividing member extending into the chamber, the dividing member arranged to divide the base trough portion into at least two sub-chambers, said sub-chambers in fluid communication with each other; 10 and wherein the sub-chambers are capable of retaining liquid within the base trough portion.

The device may be capable of being removably installed in a floor trap opening.

15 The dividing member may be disposed internal the chamber.

The device may be substantially tubular in shape.

The dividing member may be removably attached to the device.

20 The base trough portion may further comprise a flange member for maintaining a liquid level, whereby in use, the dividing member can cooperate with liquid in a sub-chamber adjacent the outlet to prevent fluid flow from the outlet into the chamber.

25 The fluid may be a gas or a liquid.

In use, at least part of the dividing member may contact liquid retained in the base trough portion.

30 The device may further comprise one or more spine members coupled to one or more sidewalls of the device, wherein the spine members function to facilitate removal of the device from the floor trap opening.

35 The device may further comprise a cover for covering the inlet, the cover comprising a grating and a circumferential opening around the grating for allowing liquid into the device via the circumferential opening.

The device may be capable of being installed in a conventional floor trap pipe.

The outlet may be disposed on a bottom surface of the device in fluid communication with the floor trap pipe.

5 In accordance with a second aspect of the present invention, there is provided a method for prevention of fluid transmission, the method providing a floor trap device having a chamber comprising a base trough portion, the chamber for providing fluid communication from an inlet to an outlet of the floor trap device; providing a dividing member dividing the base trough portion into at least two sub-chambers, said sub-chambers in fluid
10 communication with each other; and retaining liquid within the base trough portion; wherein transmission of fluid is substantially prevented from the outlet to the inlet by the dividing member and the retained liquid.

15 The method may further comprise removably installing the device in a floor trap opening.

 The method may further comprise providing the dividing member internal the chamber.

20 The device may be substantially tubular in shape.

 The method may further comprise removably attaching the dividing member to the device.

25 The method may further comprise maintaining a liquid level in the base trough portion using a flange member, wherein the dividing member can cooperate with liquid in a sub-chamber adjacent the outlet to prevent fluid flow from the outlet into the chamber.

30 The fluid may be a gas or a liquid.

 The method may further comprise providing the dividing member such that at least part of the dividing member contacts liquid retained in the base trough portion.

35 The method may further comprise coupling one or more spine members to one or more sidewalls of the device, for facilitating removal of the device from the floor trap opening.

The method may further comprise providing a cover for covering the inlet, the cover comprising a grating and a circumferential opening around the grating for allowing liquid into the device via the circumferential opening.

5 The method may comprise installing the device in a conventional floor trap pipe.

The outlet may be disposed on a bottom surface of the device in fluid communication with the floor trap pipe.

10 In accordance with a third aspect of the present invention, there is provided a method for reversibly installing a floor trap device, the method comprising providing a floor trap opening; inserting the floor trap device into the floor trap opening, the floor trap device comprising an inlet for receiving liquid into the floor trap device; an outlet for transmitting liquid from the floor trap device; a chamber comprising a base trough portion, the chamber
15 for providing fluid communication from the inlet to the outlet; a dividing member extending into the chamber, the dividing member arranged to divide the base trough portion into at least two sub-chambers, said sub-chambers in fluid communication with each other; and wherein the sub-chambers are capable of retaining liquid within the base trough portion; and coupling the outlet of the device to an outlet pipe.

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The outlet pipe can transmit liquid from the device to a sewage pipe.

The outlet pipe may comprise a conventional floor trap pipe.

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BRIEF DESCRIPTION OF THE DRAWINGS

Example embodiments of the invention will be better understood and readily apparent to one of ordinary skill in the art from the following written description, by way
30 of example only, and in conjunction with the drawings, in which:

Figure 1 is a schematic cross-sectional diagram of a floor trap device installed in a floor trap opening in an example embodiment.

35 Figure 2 is a schematic cross-sectional diagram of the floor trap device in use in an example embodiment.

Figure 3(a) is a schematic top view diagram of a stand-alone floor trap device in an example embodiment.

Figure 3(b) is a schematic cross-sectional diagram of the floor trap device.

Figure 4(a) is a schematic top view diagram of a floor trap device in an example embodiment.

Figure 4(b) is a schematic cross-sectional diagram of the floor trap device.

Figure 5 is a schematic flowchart for illustrating a method for prevention of fluid transmission in an example embodiment.

Figure 6 is a schematic flowchart for illustrating a method for reversibly installing a floor trap device in an example embodiment.

Figure 7(a) is a schematic cross-sectional diagram of a floor trap device installed in a conventional floor trap pipe in an example embodiment.

Figure 7(b) is a schematic bottom view of the floor trap device in the example embodiment.

DETAILED DESCRIPTION

Example embodiments described herein can provide a floor trap device and a method for prevention of fluid transmission that can allow easier removal of sediment/deposit from a retainer portion of the floor trap device.

The terms "coupled" or "connected" as used in this description are intended to cover both directly connected or connected through one or more intermediate means, unless otherwise stated. The terms "in fluid communication" used in this description are intended to cover both directly in fluid communication or in fluid communication through one or more intermediate means/openings, unless otherwise stated.

Figure 1 is a schematic cross-sectional diagram of a floor trap device installed in a floor trap opening in an example embodiment. The floor trap device 102 is installed in a floor

trap opening 104 of a floor. In the example embodiment, an inlet 106 of the floor trap device 102 is shown covered by a cover 108. The floor trap device 102 may have a plurality of inlets such as a second inlet 110 in fluid communication with e.g. a basin pipe 112. The inlets 106, 110 are capable of receiving liquid into the floor trap device 102. The floor trap device 102 comprises an outlet 114 in fluid communication with e.g. a sewage pipe 116, for transmitting liquid from the floor trap device 102 to e.g. an external sewage system/tank.

In the example embodiment, the floor trap device 102 comprises a chamber 118 having a base trough 120. Liquid can flow from the inlets 106, 110 to the outlet 114 in fluid communication via the base trough 120. In the example embodiment, a dividing member 122 is provided. The dividing member 122 extends into the chamber 118 such that the base trough 120 can be divided into two or more sub-chambers, indicated at numerals 124, 126. The sub-chambers 124, 126 are in fluid communication with each other. The sub-chamber 126 is in fluid communication with the outlet 114. The sub-chambers 124, 126 are arranged to function to retain liquid within the base trough 120.

In the example embodiment, the base trough 120 comprises a flange member 128 for facilitating in retention of liquid. Therefore, the flange member 128 can maintain a maximum liquid level at the edge of the flange member 128.

Figure 2 is a schematic cross-sectional diagram of the floor trap device 102 in use in an example embodiment. The floor trap device 102 retains liquid 202 within the sub-chambers 124, 126 of the base trough 120. Any excess liquid above the edge of the flange member 128 is expelled to the outlet 114. In use, at least a part of the dividing member 122 is in contact with the liquid 202 retained in the base trough 120. A space region 204 is formed by the co-operation of the dividing member 122 and the liquid retained in the sub-chamber 126 adjacent the outlet 114.

In the example embodiment, the space region 204 functions as a trapping or stopping point for preventing fluid flow from the outlet 114 into the chamber 118 and/or to the inlet 106. The fluid can be a gas or a liquid. If the fluid is a gas, the gas is trapped in the space region 204 and is prevented from entering the part of the chamber 118 that is adjacent the sub-chamber 124 by the liquid retained in the sub-chamber 126 and the blockage provided by the dividing member 122. If the fluid is a liquid, the space region 204 functions to temporarily retain the fluid and excess fluid is discharged over the edge of the flange member 128 back into the outlet 114.

In one example embodiment, the dividing member 122 is provided to provide sub-chambers. One advantage is that even if a pressure pump or plunger is used at the opening 104 for removal of sediment/deposit, the dividing member 122 can function to better concentrate pressure into a sub-chamber e.g. sub-chamber 124 to expel sediment/deposit through another sub-chamber e.g. sub-chamber 126 into the outlet 114.

In one example embodiment, the dividing member 122 is provided internal chamber 118 such that the floor trap device 102 can be in a substantially tubular shape. One advantage of a tubular shape is that the floor trap device 102 can be installed or removed easily from the opening 104.

In one example embodiment, the floor trap device 102 can be removably installed. In such a scenario, the floor trap device 102 can be removed from the opening 104 at any time and any sediment/deposit can be easily removed from the base trough 120 of the floor trap device 102.

To further facilitate maintenance, in one example embodiment, the dividing member 122 can be removably attached to the floor trap device 102. This can be accomplished in a number of ways, for example, a slot arrangement can be provided on the floor trap device 102 and a mating slot arrangement can be provided on the dividing member 122 such that the dividing member 122 can be slotted and attached to the floor trap device 102.

Figure 3(a) is a schematic top view diagram of a stand-alone floor trap device 302 in an example embodiment. Figure 3(b) is a schematic cross-sectional diagram of the floor trap device 302. The floor trap device 302 is shown without a cover. Openings e.g. 304, 306 are provided in the body of the floor trap device 302 to co-operate or receive pipe sockets (not shown) that can be connected to e.g. sewage pipes or basin discharge pipes etc. A dividing member 308 is provided as shown. A sub-chamber 310 defined by the dividing member 310 is provided as shown. A floor portion such as a floor-tile area through which a floor trap opening is provided to install the floor trap device 302 is schematically indicated at numeral 312.

Figure 4(a) is a schematic top view diagram of a floor trap device 402 in an example embodiment. Figure 4(b) is a schematic cross-sectional diagram of the floor trap device 402. In the example embodiment, the floor trap device 402 is shown covered with a cover 414. The cover 414 may be in the form of a porous grating and providing a circumferential opening around the grating. The cover 414 can be fitted with bracing members 406, 408 that

function to facilitate positioning and fitting into a floor trap opening in a floor. The bracing members 406, 408 may be made of silicon, rubber material or the like.

In the example embodiment, one or more spine members e.g. 410, 412 are provided coupled to the sidewalls of the floor trap device 402. In the example embodiment, two spine members 410, 412 are shown in a cross arrangement and partially covered by the cover 414. The cover 414 can be removed such that a user can grip the spine members 410, 412 to remove the floor trap device 402 from the floor trap opening, e.g. for maintenance or cleaning purposes. A circumferential opening 416 is provided around the cover 414 to allow liquid to pass from above the floor opening into the chamber of the floor trap device 402. In the example embodiment, grooves (not shown) may be provided on the surfaces of the spine members 410, 412 contacting the cover 414 so as to maintain the cover 414 in position over the floor trap device 402 and to maintain the circumferential opening 416.

Figure 7(a) is a schematic cross-sectional diagram of a floor trap device 702 installed in a conventional floor trap pipe 704 in an example embodiment. The floor trap device 702 can be provided with spine members (not shown) substantially identical to those of Figure 4 such that the floor trap device 702 can be removed from the floor trap opening connected to the conventional floor trap pipe 704. Alternatively, the floor trap device 702 may be non-removably installed. Figure 7(b) is a schematic bottom view of the floor trap device 702 in the example embodiment.

In the example embodiment, an inlet 706 of the floor trap device 702 functions as the inlet to the conventional floor trap pipe 704. It will be appreciated that the floor trap device 702 may have a plurality of inlets such as a second inlet in fluid communication with e.g. a basin pipe (not shown). The inlet 706 is capable of receiving liquid into the floor trap device 702. The floor trap device 702 comprises an outlet 708 in fluid communication, or coupled, with the conventional floor trap pipe 704 for transmitting liquid from the floor trap device 702 to the outlet, i.e. the conventional floor trap pipe 704 and in turn to e.g. an external sewage system/tank.

In the example embodiment, the floor trap device 702 comprises a chamber 710 having a base trough 712. The base trough 712 is shown containing liquid in the example embodiment. Liquid can flow from the inlet 706 to the outlet 708 in fluid communication via the base trough 712. In the example embodiment, a dividing member 714 is provided. The dividing member 714 extends into the chamber 710 such that the base trough 712 can be divided into two or more sub-chambers, indicated at numerals 716, 718. The sub-chambers

716, 718 are in fluid communication with each other. The sub-chamber 718 is in fluid communication with the outlet 708. The sub-chambers 716, 718 are arranged to function to retain liquid within the base trough 712.

5 In the example embodiment, the base trough 712 comprises a flange member 720 for facilitating in retention of liquid. Therefore, the flange member 720 can maintain a maximum liquid level at the edge of the flange member 720.

10 In the example embodiment, a space region 722 is formed by the co-operation of the dividing member 714 and the liquid retained in the sub-chamber 718 adjacent the outlet 708. The space region 722 functions as a trapping or stopping point for preventing fluid flow from the outlet 708, i.e. from the convention floor trap pipe 704, into the chamber 710 and/or to the inlet 706. The fluid can be a gas or a liquid. If the fluid is a gas, the gas is trapped in the space region 722 and is prevented from entering the part of the chamber 710 that is
15 adjacent the sub-chamber 712 by the liquid retained in the sub-chamber 718 and the blockage provided by the dividing member 714. If the fluid is a liquid, the space region 722 functions to temporarily retain the fluid and excess fluid is discharged over the edge of the flange member 720 back into the outlet 708.

20 Therefore, in the example embodiment, the floor trap device 702 can be used for existing floor trap pipes and can thus alleviate a number of problems identified with existing floor trap pipes.

25 In one example embodiment, the dividing member 714 is provided to provide sub-chambers. One advantage is that even if a pressure pump or plunger is used at the opening 706 for removal of sediment/deposit, the dividing member 714 can function to better concentrate pressure into a sub-chamber e.g. sub-chamber 716 to expel sediment/deposit through another sub-chamber e.g. sub-chamber 718 into the outlet 708. It will also be appreciated that this mode of sediment/deposit removal is less preferred because the floor
30 trap device 702 can be removably installed in the conventional floor trap pipe 704.

35 In one example embodiment, the dividing member 714 is provided internal the chamber 710 such that the floor trap device 702 can be in a substantially tubular shape. One advantage of a tubular shape is that the floor trap device 702 can be installed or removed easily from the conventional floor trap pipe 704.

In one example embodiment, the floor trap device 702 can be removably installed. In such a scenario, the floor trap device 702 can be removed from the conventional floor trap pipe 704 at any time and any sediment/deposit can be easily removed from the base trough 712 of the floor trap device 702.

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To further facilitate maintenance, in one example embodiment, the dividing member 714 can be removably attached to the floor trap device 702. This can be accomplished in a number of ways, for example, a slot arrangement can be provided on the floor trap device 702 and a mating slot arrangement can be provided on the dividing member 714 such that

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the dividing member 714 can be slotted and attached to the floor trap device 702.

Figure 5 is a schematic flowchart 500 for illustrating a method for prevention of fluid transmission in an example embodiment. At step 502, a floor trap device having a chamber comprising a base trough portion is provided, the chamber for providing fluid communication from an inlet to an outlet of the floor trap device. At step 504, providing a dividing member to divide the base trough portion into at least two sub-chambers, said sub-chambers in fluid communication with each other. At step 506, liquid is retained within the base trough portion. At step 508, transmission of fluid is substantially prevented from the outlet to the inlet by the dividing member and the retained liquid.

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Figure 6 is a schematic flowchart 600 for illustrating a method for reversibly installing a floor trap device in an example embodiment. At step 602, a floor trap opening is provided. At step 604, a floor trap device is provided comprising an inlet for receiving liquid into the floor trap device; an outlet for transmitting liquid from the floor trap device; a chamber comprising a base trough portion, the chamber for providing fluid communication from the inlet to the outlet; a dividing member extending into the chamber, the dividing member arranged to divide the base trough portion into at least two sub-chambers, said sub-chambers in fluid communication with each other; and wherein the sub-chambers are capable of retaining liquid within the base trough portion. At step 606, the outlet of the device is coupled to an outlet pipe.

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In the described example embodiments, the floor trap device may be constructed with a body/chamber diameter of, for example, about 100mm such that it can be used industry-wide in the building and construction fields. Furthermore, the outlet and/or the inlet can be provided with dimensions suitable for allowing access by a human to facilitate removal of sediment/deposit from the base trough portion. In addition, the dividing member

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may be made of a flexible material such that the member can be flexed to allow access by a human to facilitate removal of sediment/deposit from the base trough portion.

In the above described example embodiments, a floor trap device and a method for prevention of fluid communication can be provided that can allow easier removal of sediment/deposit from a base trough portion of the floor trap device. This may be accomplished through concentrating pressure through a sub-chamber to more easily expel sediment/deposit. The floor trap device may also be removably installed such that the device can be removed from a floor trap opening for cleaning or maintenance purposes, to remove sediment/deposit.

Furthermore, the floor trap device can also reduce the likelihood of health hazards. For example, if a user decides to leave the floor trap device unused for a long period of time, the user can remove the floor trap device and leave an inert liquid such as oil in the base trough portion so that pests such as mosquitoes are less likely to breed, as compared to leaving water in the base trough portion. Bacteria can also be prevented from cultivating by removing the floor trap device and covering the base trough portion with, for example, a layer of dry sand.

It will be appreciated by a person skilled in the art that although the terms "divide", "dividing" and the like are used, the sub-chambers are not limited to being physically divided to be independent from each other. Rather, the sub-chambers can have fluid communication with each other and the division is appreciated to create a space region for the floor trap device to carry out its primary function.

It will be appreciated that the dividing member is not limited to the shape shown in the exemplary figures and can be in any shape or form suitable for implementing the described example embodiments.

It will be appreciated by a person skilled in the art that other variations and/or modifications may be made to the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects to be illustrative and not restrictive.

CLAIMS

1. A floor trap device comprising,
an inlet for receiving liquid into the floor trap device;
5 an outlet for transmitting liquid from the floor trap device;
a chamber comprising a base trough portion, the chamber for providing fluid communication from the inlet to the outlet;
a dividing member extending into the chamber, the dividing member arranged to divide the base trough portion into at least two sub-chambers, said sub-chambers in fluid
10 communication with each other; and
wherein the sub-chambers are capable of retaining liquid within the base trough portion.

2. The device as claimed in claim 1, wherein the device is capable of being
15 removably installed in a floor trap opening.

3. The device as claimed in claims 1 or 2, wherein the dividing member is disposed internal the chamber.

20 4. The device as claimed in any one of claims 1 to 3, wherein the device is substantially tubular in shape.

5. The device as claimed in any one of claims 1 to 4, wherein the dividing member is removably attached to the device.

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6. The device as claimed in any one of claims 1 to 5, wherein the base trough portion further comprises a flange member for maintaining a liquid level, whereby in use, the dividing member cooperates with liquid in a sub-chamber adjacent the outlet to prevent fluid flow from the outlet into the chamber.

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7. The device as claimed in claim 6, wherein the fluid is a gas or a liquid.

8. The device as claimed in any one of claims 1 to 7, wherein in use, at least part of the dividing member contacts liquid retained in the base trough portion.

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9. The device as claimed in claim 2, further comprising one or more spine members coupled to one or more sidewalls of the device, wherein the spine members function to facilitate removal of the device from the floor trap opening.

5 10. The device as claimed in any one of claims 1 to 9, further comprising a cover for covering the inlet, the cover comprising a grating and a circumferential opening around the grating for allowing liquid into the device via the circumferential opening.

10 11. The device as claimed in any one of claims 1 to 10, wherein the device is capable of being installed in a conventional floor trap pipe.

12. The device as claimed in claim 11, wherein the outlet is disposed on a bottom surface of the device in fluid communication with the floor trap pipe.

15 13. A method for prevention of fluid transmission, the method,
providing a floor trap device having a chamber comprising a base trough portion, the chamber for providing fluid communication from an inlet to an outlet of the floor trap device;
providing a dividing member dividing the base trough portion into at least two sub-chambers, said sub-chambers in fluid communication with each other; and
20 retaining liquid within the base trough portion;
wherein transmission of fluid is substantially prevented from the outlet to the inlet by the dividing member and the retained liquid.

25 14. The method as claimed in claim 13, further comprising removably installing the device in a floor trap opening.

15. The method as claimed in claims 13 or 14, further comprising providing the dividing member internal the chamber.

30 16. The method as claimed in any one of claims 13 to 15, wherein the device is substantially tubular in shape.

17. The method as claimed in any one of claims 13 to 16, further comprising removably attaching the dividing member to the device.

35 18. The method as claimed in any one of claims 13 to 17, further comprising maintaining a liquid level in the base trough portion using a flange member, wherein the

dividing member cooperates with liquid in a sub-chamber adjacent the outlet to prevent fluid flow from the outlet into the chamber.

19. The method as claimed in claim 18, wherein the fluid is a gas or a liquid.

20. The method as claimed in any one of claims 13 to 19, further comprising providing the dividing member such that at least part of the dividing member contacts liquid retained in the base trough portion.

21. The method as claimed in claim 14, further comprising coupling one or more spine members to one or more sidewalls of the device, for facilitating removal of the device from the floor trap opening.

22. The method as claimed in any one of claims 13 to 21, further comprising providing a cover for covering the inlet, the cover comprising a grating and a circumferential opening around the grating for allowing liquid into the device via the circumferential opening.

23. The method as claimed in any one of claims 13 to 22, further comprising installing the device in a conventional floor trap pipe.

24. The method as claimed in claim 23, wherein the outlet is disposed on a bottom surface of the device in fluid communication with the floor trap pipe.

25. A method for reversibly installing a floor trap device, the method comprising, providing a floor trap opening;
inserting the floor trap device into the floor trap opening, the floor trap device comprising

an inlet for receiving liquid into the floor trap device;

an outlet for transmitting liquid from the floor trap device;

a chamber comprising a base trough portion, the chamber for providing fluid communication from the inlet to the outlet;

a dividing member extending into the chamber, the dividing member arranged to divide the base trough portion into at least two sub-chambers, said sub-chambers in fluid communication with each other; and

wherein the sub-chambers are capable of retaining liquid within the base trough portion; and

coupling the outlet of the device to an outlet pipe.

26. The method as claimed in claim 25, wherein the outlet pipe transmits liquid from the device to a sewage pipe.

5 27. The method as claimed in claims 21 or 26, wherein the outlet pipe comprises a conventional floor trap pipe.