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(54) **ODOUR TRAP**

(57) An odour trap member (100) comprising:
- a base portion having an upstream portion (112) and a downstream portion (114), where the base portion comprises an opening (defined by edge 130) between the upstream portion and the downstream portion allowing fluid communication through the opening,
- a cup member (120) made having a wall of a flexible elastomeric material, the cup member having a peripheral edge and a central portion (140), wherein the wall

extends from the central portion and towards the peripheral edge,

wherein the cup member is operable to attain at least a first position in which a part of the cup member abuts the base portion to prevent fluid communication through the opening and a second position in which the part of the cup member is spaced apart from the base portion to open up for fluid communication through opening.

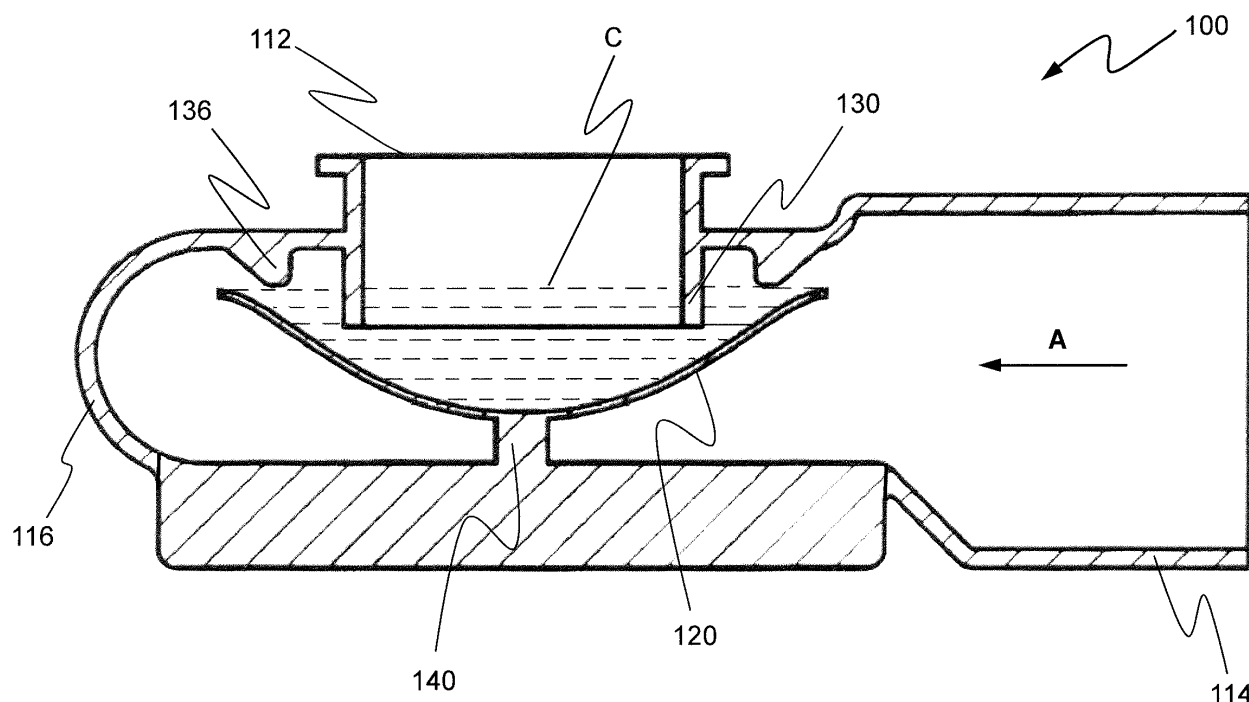


FIG. 4

Description

TECHNICAL FIELD

[0001] The present disclosure relates generally to drainage systems, and more particularly to odour trap units for use with sanitary products for locking odour of a foresaid drainage systems.

BACKGROUND

[0002] Sanitary products, such as washbasins, bathtubs, toilets and showers, use some kind of odour trap to prevent bad odour coming from a drainage system, such as drains or sewers. The odour traps are configured to prevent odour and yet are operable to allow water to flow down into the drainage system.

[0003] Generally, there are various kinds of odour traps, such as a bottle trap, a P-trap and traps having membranes, that are used with sanitary products. However, such odour traps exhibit limitations in operation that make them less efficient. For example, the bottle traps and the P-traps are generally relatively larger in size (particularly in terms of their heights) which make them inconvenient for use in limited spaces, for example in a floor under a sanitary product. Moreover, the traps having membranes may be relatively smaller in size but may suffer problems of not being able to provide required water flow therethrough. Furthermore, such traps (typically, the bottle traps) generally suffer a problem of inefficient self cleaning function, namely for removing dirt, hair and fat that are easily caught in the traps when in operation.

[0004] In order to address aforementioned problems, some odour traps are configured to have relatively smaller size with moving parts, such as a spring assembly, a sealing member and similar. Such odour traps can be used in limited spaces and may also provide required water flow therethrough, and also provide an efficient self cleaning function. However, such odour traps may require periodic maintenance due to functional (moving) parts associated therewith. For example, the spring assembly may become clogged with dirt and hair for which periodic maintenance may be required, and if maintenance is delayed or not performed, service life of such traps may shorten considerably. Furthermore, the moving parts of such traps add complexity to the manufacturing processes for producing the traps.

[0005] Therefore, in view of foregoing problems of known traps, there exists a need to provide improved types of odour traps.

SUMMARY

[0006] In accordance with the present invention there is provided an odour trap member comprising: a base portion having an upstream portion and a downstream portion, where the base portion comprises an opening between the upstream portion and the downstream portion

allowing fluid communication through the opening, a cup member made having a wall of a flexible elastomeric material, the cup member having a peripheral edge and a central portion, where the wall extends from the central portion and towards the peripheral edge, wherein the cup member is operable to attain at least a first position in which a part of the cup member abuts the base portion to prevent fluid communication through the opening and a second position in which the part of the cup member is spaced apart from the base portion to open up for fluid communication through opening.

[0007] This means that the cup member is adapted to be provided in a drain, or part of any type of drainage system in a wash basin, floor drain, where the upstream side of the base portion is mounted to face the surroundings of the drainage while the downstream side of the base portion may be configured to face the a drainage pipe that leads to e.g. a sewer. The odour trap member may be provided to close off any fluid communication between the upstream side and the downstream side, and thereby prevent any backflow of gasses to enter the surroundings of the drainage, when the cup member is in its first position. Upon usage of the drain and thereby the odour trap member, the liquid that is introduced into the drain comes into contact with the flexible member, and when the force of the liquid in contact with the cup member (e.g. the weight of the liquid) exceeds a predetermined amount, the flexible member is configured to flex, causing the cup member to separate from the base portion into its second position, and allow the liquids to pass the flexible member and enter the drainage pipe, a housing, or the sewer. When the flow of liquid into the drain is subsided, and the force of the liquids is less than the predetermined force (predetermined opening force) the cup member returns to its original first position to close off any fluid communication from the upstream side to the downstream side of the base member. The return of the cup member into its first position may be seen as the inner memory of the flexible material, where the flexible material returns to its original configuration/shape, when the force applied is below a certain amount.

[0008] The cup member may be formed in such a manner that even though there is a pressure applied to the cup member from the downstream side, i.e. from the drainage pipe or the sewer side, in form of a backflow of air or gasses, the increased pressure will force the part of the cup member which is in contact with the base member to close even more tightly. The cup member may be adapted to open if the pressure of the backflow exceeds a certain amount, where damage may be applied to the drainage system or drainage assembly, so that the pressure is released into the surroundings.

[0009] The cup member may further be configured to hold a predetermined amount of liquid. The cup member may be of a size where the cup central portion and the sides of the cup can be adapted to hold a predetermine amount of liquid, when the odour trap member is in its use position. Thus, if the liquid content inside the cup

member exceeds the predetermined amount, the flexible walls may be configured to begin their flex, and thereby releasing the seal between the base member and the cup member, and this flexure of the side walls will lower the height of the side walls, and thereby reduce the volume of the cup member, so that the excess liquid will exit the cup member over the sides of the side wall (e.g. the peripheral edge) furthermore, the side walls of the cup member may be configured to flex in certain positions, allowing the side of the cup to bend out of its original shape, and thereby allow the liquids to pass from the inner volume of the cup shape.

[0010] In one embodiment a peripheral edge of the cup member may abut the base portion. This means that the peripheral edge of the cup member is in contact with the downstream side of the base member, where the edge is in close contact with the base member to close the fluid communication from the downstream side. The peripheral edge may be soft or flexible, so that the tension in the flexible material or memory of the flexible material causes the peripheral edge into contact with the base member. As the peripheral edge may be relatively soft, the force pressing it into the base member causes a tight fit between the peripheral edge and the base member, as the soft edge adapts to the surface of the base member, and creates a seal.

[0011] In one embodiment the distance from base member from the central portion of the cup member may be larger than the distance from the peripheral edge to the base portion. This means that the cup member may be in the form of a cup, having peripheral edges and a central portion, where the peripheral edges are connected to each other via the central portion, and the volume defined in between the peripheral edges and the central portion (or the bottom of the cup shape) may be seen as the holding volume of the cup. The cup may be curved, where the peripheral edges are at one height, while the bottom (central portion) is at a lower height, seen from the side, where the peripheral edges curve upwards to enclose the volume of the cup. This may also be described as a bowl shape, or any shape that may be utilized to hold a volume of liquids, where the sides and the bottom of the shape holds the volume of liquids in their position.

[0012] In one embodiment the cup member may be configured to flex in order to transform from the first position to the second position and vice versa. The cup member may be adapted to bend in predetermined locations to move the cup member from its first position to its second position, where the locations of the flexing may be positioned between the central area of the cup member and the peripheral edge of the cup. The cup member may flex symmetrically around its central axis, or it may be adapted to tilt to the side, it may flex asymmetrically where one or more parts of the wall tilts to the side. The flexure causes the cup member to separate from the base member, and open up fluid communication allowing liquids to pass the cup member, and when the liquid flow

has been ceased, the cup member will flex back to its original position.

[0013] In one embodiment the cup member may be symmetrical around its central axis. This means that the cup member may be circular, and where the wall extends in the same way in a radial direction identically. Thus, the flexure may also be allowed in symmetry along the walls, so that same areas of the wall (at the same distance from the centre) are configured in such a manner that any one area may flex, or the area may flex identically, when the cup member goes into its second position, or back to its first position.

[0014] In one embodiment a portion of the cup member may be fixedly arranged relative to the opening. This means that the cup member may be fastened to the base plate, or fastened to a fixing member, so that the fixation of the portion of the cup member relative to the base member and/or the opening remains unchanged when the odour trap member is in use. The area of the cup member which is fixedly arranged therefore does not change when the cup member is transformed from the first position and or the second position, but at least some parts of the cup member are spaced from the base member. Thus, the fixation point may be used as the point which the flexure of the walls is focussed against, so that the fixure point maintains the relative position of the cup member, while other parts of the cup member may move and flex. The fixation point may also be the point which provides the counterforce to the flexing part, so that when the flexible element flexes back to its original position, the fixation point allows it also to return to its original spatial position.

[0015] In one embodiment a central portion of the cup member may be fixedly arranged relative to the opening. This means that the fixture point may be in the central point of the cup member, allowing the parts of the cup member that are radial to the fixture point to move spatially relative to the base plate, while the central portion remains in its position relative to the base plate or the opening.

[0016] In one embodiment the downstream side of the base portion may comprise a protrusion and/or a depression configured to abut the peripheral edge of the cup member, or the part of the cup member which is in contact with the base member. The protrusion and/or depression may be a contact point to come into contact with the cup member, allowing the cup member to return to a predefined position, by guiding the cup member into its correct position, and thereby reducing the risk that the cup member does not return fully into its first position from its second position. Thus, if the cup member comes into contact with the base member in an incorrect position, the guide member or the contact point may be slanted or at an angle, so that the cup member slides along the guide member into its correct position.

[0017] In one embodiment the opening may comprise an opening extension member that extends the into a volume defined by the peripheral edge and the central

portion of the cup member. The opening extension may be utilized to move the access of the opening closer to the bottom of the cup member, ensuring that the bottom of the opening is inside the volume of the cup member. The proximal opening of the extension member is located inside the volume of the cup member, so that the periphery of the flexible walls extends above the proximal opening of the extension member. This allows the cup member and the extension member to create a water trap, so that any water that remains inside the volume of the cup member, ensures that air cannot pass from the downstream side of the odour trap member to the upstream side, if the air pressure is sufficiently low. Thus, if the cup member does not seal fully between the base member and the cup, the water trap may function as a secondary element to prevent fluid communication from the downstream side to the upstream side of the base member.

[0018] In one embodiment the cup member may be further operable to attain at least an intermediate position between the first position and the second position. The extension member may be arranged at a position, where when the cup member is in its second position, the side walls extend below the height of the proximal part of the extension member, allowing water to pass the cup member. The intermediate position may be seen as a position where the cup member does not seal between the cup member and the base member, but where the peripheral edge, or the side walls, of the cup member is above the height of the proximal end of the extension member.

[0019] In one embodiment the wall may have has a uniform wall thickness from the central portion towards the peripheral edge. This means that the cup member may flex in any part of the wall, where there is no predefined areas that are intended to flex, relative to any other area.

[0020] In one embodiment the wall may have differing wall thicknesses from the central portion towards the peripheral edge. This means that some parts of the wall may have a lower bending moment than other parts of the wall, so that this part is the first part to flex, when a force is applied to the cup member, e.g. in the form of liquids.

[0021] In one embodiment the wall thickness at the central portion may be thinner than the wall thickness of the peripheral portion, so that wall of the central portion is configured to flex before the wall of the peripheral portion, and optionally where a peripheral part of the cup member is configured to maintain its shape when the central part flexes.

[0022] In one embodiment a central part of the cup member may be configured to flex upon application of external force on an upstream side of the cup member.

[0023] In one embodiment the cup member is configured to have a peripheral part of the cup member to have a higher stiffness than the central portion of the cup member, and optionally where the peripheral part of the cup member may comprise a reinforcement member to increase the stiffness. Thus, the reinforcement may be ap-

plied to the walls of the cup member, ensuring that the part of the wall which is provided with reinforcement has a lower risk of flexing during use. This ensures that the wall can bend in predefined areas, while other areas are unaffected by flexure.

[0024] Embodiments of the present disclosure substantially eliminate, or at least partially address, the aforementioned problems described in the background, and provide an efficient odour trap unit or member. Specifically, the odour trap unit or odour trap member is relatively small in size (particularly in terms of height) which makes invention convenient for being used in limited spaces. Additional aspects, advantages, features and objects of the present disclosure would be made apparent from the drawings and the detailed description of the illustrative embodiments construed in conjunction with the appended claims that follow.

[0025] It will be appreciated that features of the present disclosure are susceptible to being combined in various combinations without departing from the scope of the present disclosure as defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] The summary above, as well as the following detailed description of illustrative embodiments, is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the present disclosure, exemplary constructions of the disclosure are shown in the drawings. However, the present disclosure is not limited to specific methods and instrumentalities disclosed herein. Moreover, those in the art will understand that the drawings are not to scale. Wherever possible, like elements have been indicated by identical numbers.

[0027] Embodiments of the present disclosure will now be described, by way of example only, with reference to the following diagrams wherein:

FIG. 1 is a perspective view of an odour trap unit, in accordance with an embodiment of the present disclosure;

FIGS. 2, 3 and 4 are cross-sectional views of the odour trap unit of the FIG. 1 along an axis X-X' depicting different operating states thereof, in accordance with an embodiment of the present disclosure;

FIG. 5 is a sectional view of a cup member of an odour trap unit, in accordance with an embodiment of the present disclosure; and

FIG. 6 is a sectional view of a cup member of an odour trap unit, in accordance with another embodiment of the present disclosure,

Fig. 7 is a side view of a odour trap member in accordance with the invention,

Fig. 8A and 8B is a sectional view of an odour trap member,

Fig. 9 is an exploded view of one example of an odour trap unit, and

Fig. 10A and 10B is a bottom view and a side view of a cup member.

[0028] In the accompanying drawings, an underlined number is employed to represent an item over which the underlined number is positioned or an item to which the underlined number is adjacent. A non-underlined number relates to an item identified by a line linking the non-underlined number to the item. When a number is non-underlined and accompanied by an associated arrow, the non-underlined number is used to identify a general item at which the arrow is pointing.

DETAILED DESCRIPTION

[0029] The following detailed description illustrates embodiments of the present disclosure and ways in which they can be implemented. Although some modes of carrying out the present disclosure have been disclosed, those skilled in the art would recognize that other embodiments for carrying out or practicing the present disclosure are also possible.

[0030] It should be noted that the terms "first", "second", and the like, herein do not denote any order, quantity, or importance, but rather are used to distinguish one element from another. Further, the terms "a" and "an" herein do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item.

[0031] FIG. 1 is a perspective view of an odour trap unit 100, in accordance with an embodiment of the present disclosure. The odour trap unit 100 includes a hollow body 110. The hollow body 110 includes an inlet member 112, an outlet member 114 and an intermediate portion 116 between the inlet member 112 and the outlet member 114. In an example embodiment, the outlet member 114 is perpendicular to the inlet member 112. Alternatively, the outlet member 114 may be suitably angled to the inlet member 112 such that while using the odour trap unit 100, a flow of water can enter through the inlet member 112 and leave through the outlet member 114. Moreover, the inlet member 112 and the outlet member 114 are manufactured to have a shape including, but not limiting to, a hollow cylindrical shape, a hollow polygonal shape, and a hollow oval shape. The intermediate portion 116 is manufactured to have a shape including, but not limiting to, a hollow oblate spheroid shape and a hollow spherical shape. As shown, in one embodiment, the outlet member 114 is longer in comparison to the inlet member 112; alternatively, the outlet member 114 may be manufactured to have either an equal or a smaller length compared to the inlet member 112.

[0032] Referring next to FIG. 2, there is provided an illustrated is a cross-sectional view of the odour trap unit 100 of FIG. 1 along an axis X-X' in accordance with an embodiment of the present disclosure. As shown, the odour trap unit 100 also includes a cup member 120 located in the intermediate portion 116. Moreover, the cup member 120 is located in the intermediate portion 116 in such a manner that an interior edge 130 of the inlet member 112 extends into, or towards, the cup member 120. Specifically, the cup member 120 is positioned adjacent to the inlet member 112 such that the interior edge 130, opposite to an exterior edge 132, extends into the cup member 120. The inlet member 112 also includes a lip 134 provided on the exterior edge 132.

[0033] As shown in FIG. 2, the cup member 120 abuts, or rests against, the intermediate portion 116 to close the inlet member 112. Specifically, the cup member 120 rests against a rest-tab 136, configured on the intermediate portion 116 and closes the inlet member 112. The rest-tab 136 is an integral part extending from the intermediate portion 116. Furthermore, as shown, end portions, such as an upper end portion, of the cup member 120 and the rest-tab 136 lie in a mutually similar plane, when the cup member 120 rests on the rest-tab 136.

[0034] The cup member 120 is further operable to rest on, or be coupled to, a support-tab 140, which may be an integral part either extending from the intermediate portion 116 or the cup member 120. As shown, the intermediate portion 116 includes a base portion 118 having an increased thickness. The base portion 118 can be removable from the intermediate portion 116, for example to allow easy cleaning of the odour trap unit 100. For example, the base portion 118 may be coupled to the intermediate portion 116 using threads or a snap-fit arrangement (not shown). Furthermore, as shown, end portions, such as the upper end portion and lower end portion, of the cup member 120 and the interior edge 130, respectively, lie in mutually different planes, when the cup member 120 rests on the rest-tab 136. Therefore, it will be appreciated that the tab 140 may include a height that allows the end portions of the cup member 120 and the interior edge 130 to lie in mutually different planes; such an arrangement allows the interior edge 130 of the inlet member 112 to extend into the cup member 120. In one embodiment, the tab 140 is omitted from the odour trap unit 100, and the cup member 120 rests on, or is coupled to, the intermediate portion 116. In such an example, the cup member 120 may be of a height, or size, that allows the end portions of the cup member 120 and the interior edge 130 to lie in mutually different planes.

[0035] In one embodiment, the cup member 120 may be configured to have a bowl-shape. Furthermore, the cup member 120 is configured to have a uniform wall thickness. Moreover, the cup member 120 is manufactured from a flexible elastomeric material comprising one of: ethylene propylene diene monomer rubber, silicone or thermoplastic elastomer.

[0036] In one embodiment, the hollow body 110 is

manufactured from a hard material, which includes a plastics material, a metal or a metal alloy. For example, the plastics material includes one of: polypropylene, polyethylene, acrylonitrile butadiene styrene. Moreover, for example, the metal alloy includes stainless steel. Alternatively, the hollow body 110 may be manufactured from other suitable hard material such as Aluminium or a material which may be a combination of a metal, a metal alloy, a plastics material and a rubber material.

[0037] In one embodiment, the odour trap unit 100 of the present disclosure is manufactured as separate components using a suitable manufacturing process, such as an injection moulding process. Thereafter, the separate components may be assembled together using processes such as gluing, fusing, fastening and so forth.

[0038] In use, the odour trap unit 100 of the present disclosure may be installed in a floor (not shown) in conjunction with a sanitary appliance (not shown). Specifically, a cavity may be made in the floor to accommodate the odour trap unit 100 therein. For example, the odour trap unit 100 may be installed in the floor under a sanitary product, such as a washbasin, a bathtub, a toilet and the like. Furthermore, the inlet member 112 of the odour trap unit 100 may be connected to a pipe (or conduit, not shown) extending from such sanitary products, and the outlet member 114 of the odour trap unit 100 may be connected to a pipe (or conduit, not shown) extending towards a drain or a sewer (not shown).

[0039] In operation, the odour trap unit 100 of the present disclosure is configured to prevent, or trap, odour that may come from a drainage system. Specifically, the cup member 120 of the odour trap unit 100 is operable to attain a first position, a second position and an intermediate position for preventing such odour, as shown in FIGS. 2, 3 and 4, respectively. The FIGS. 2, 3 and 4 are cross-sectional views of the odour trap unit 100 depicting different operating states thereof, in accordance with an embodiment of the present disclosure.

[0040] Referring again to FIG. 2, there is provided an illustration of a cross-sectional view of the odour trap unit 100 in which the cup member 120 is in the first position. As shown, in the first position, the cup member 120 rests against the rest-tab 136 and closes the inlet member 112. It will be appreciated that the flexible nature of the cup member 120 allows the cup member 120 to flex towards and rest against the rest-tab 136. Therefore, in the first position, the odour trap unit 100 is operable to trap odour (that may come from the drainage system along a direction 'A'), because the cup member 120 closes (or seals) the inlet member 112.

[0041] Referring now to FIG. 3, there is provided an illustration of a cross-sectional view of the odour trap unit 100 in which the cup member 120 is in the second position. Specifically, in the second position, the cup member 120 is spaced apart from the rest-tab 136 and thus opens the inlet member 112. As shown, a flow of water (particularly, force exerted by water on the cup member 120 in a direction 'B') allows the cup member 120 to space apart

(or flex away) from the rest-tab 136. Furthermore, in the second position, the cup member 120 completely flexes away from the rest-tab 136 due to the continuous flow of water. Therefore, the flow of water through the inlet member 112 and the outlet member 114 traps the odour (that may come from the drainage system along a direction 'A'). Moreover, in the second position, the cup member 120 flexes in both outward and downward directions.

[0042] It may be evident that the force required to move, or flex away, the cup member 120 may be associated with the inherent material property of the cup member 120, namely associated with flexibility or elasticity of the cup member 120. In an example, the aforesaid force may be associated with the amount of water at least required to fill completely the cup member 120, which forces the cup member 120 to disengage, or flex away, from the rest-tab 136, which is explained in greater detail in conjunction with FIG. 4.

[0043] Referring next to FIG. 4, there is provided an illustration of a cross sectional view of the odour trap unit 100 in which the cup member 120 is in the intermediate position. Specifically, the cup member 120 is operable to attain at least one intermediate position (such as shown in FIG. 4) between the first position and the second position (shown in FIGS. 2 and 3, respectively). Furthermore, in the intermediate position, the cup member 120 is spaced apart from the rest-tab 136 and opens the inlet member 112.

[0044] As shown, there is no flow of water through the inlet member 112, into the cup member 120. However, the cup member 120 contains water (as shown) and a water surface 'C' lies above the interior edge 130. It may be evident that the force exerted by the water contained in the cup member 120 and the flexible nature of the cup member 120, allow the cup member 120 to flex away from the interior edge 130. Moreover, in the intermediate position, the odour trap unit 100 is operable to trap odour (that may come from the drainage system along a direction 'A'), because the water surface 'C' lies above the interior edge 130.

[0045] In an embodiment, the intermediate position of the cup member 120 (as shown in FIG. 4) may be a default functional state of the odour trap unit 100, namely when the trap is used frequently and water stays in the cup member 120 between the times when water flows through the trap. Furthermore, the cup member 120 may attain the first position from the intermediate position, when the force exerted by the water on the cup member 120 ceases, namely when the water contained in the cup member 120 gets evaporated. Moreover, the cup member 120 may attain the second position when used water (from the sanitary products) is allowed to pass through the odour trap unit 100 to the drainage system.

[0046] Referring next to FIG. 5, there is provided an illustration of a cross sectional view of a cup member 500 of an odour trap unit (such as the odour trap unit 100), in accordance with an embodiment of the present disclosure. As shown, the cup member 500 includes a non-

uniform wall thickness. Specifically, the cup member 500 includes a relatively thinner central portion 502 and a relatively thicker peripheral portion 504, extending from the relatively thinner central portion 502. Furthermore, the cup member 500 includes a bowl-shape. Specifically, the relatively thinner central portion 502 includes a uniform curve shape, such that the relatively thinner central portion 502 and the relatively thicker peripheral portion 504 together constitute a shallow hemispherical bowl shape. The cup member 500 also includes a support-tab 510 extending from (or integral to) the thin central portion 502. In use, the cup member 500 is configured to flex in both outward and downward directions, shown with arrows 'D'. Specifically, the structural configuration of the cup member 500 allows the cup member 500 to flex both in the outward and downward directions such that an upper edge 520 of the cup member 500 may lie above or below a lower edge 522 of the cup member 500, depending on the flow of water, namely as a result of a force exerted by the water on the cup member 500.

[0047] Referring now to FIG. 6, there is provided an illustration of a cross sectional view of a cup member 600 of an odour trap unit (such as the odour trap unit 100), in accordance with an embodiment of the present disclosure. As shown, the cup member 600 includes a non-uniform wall thickness. Specifically, the cup member 600 includes a relatively thinner central portion 602 and a relatively thicker peripheral portion 604, extending from the thin central portion 602. In the present embodiment, the relatively thinner central portion 602 is a non-uniform curve shape having a peak 610 and valleys 612. The cup member 600 also includes a support-tab 620 extending from, or integral to, the relatively thinner central portion 602. In use, the cup member 600 is operable to flex in a downward direction, shown with arrows 'E'. Specifically, the structural configuration of the cup member 600 allows the cup member 600 to flex in the downward direction such that an upper edge 630 of the cup member 600 may lie above the valleys 612.

[0048] In another embodiment, a cup member (such as the cup members 500 and 600) of an odour trap unit (such as the odour trap unit 100) may include a relatively thicker central portion and a relatively thinner peripheral portion (not shown) instead of a relatively thinner central portion (such as the relatively thinner central portions 502, 602) and a relatively thicker peripheral portion (such as the relatively thicker peripheral portion 504, 604). In such an example, the relatively thinner peripheral portion of the cup member may be configured to flex at least in outward and downward directions depending on a flow of water.

[0049] Fig. 7 shows a side view of an odour trap member 700, where the odour trap member comprises a base member 701 as well as a cup member 702. The cup member 702 comprises a flexible material, which abuts a downstream side surface 703 of the odour trap member 701, in order to close off an opening 705, which is through going from the upstream side surface 706, through the

base member 701, and to the downstream side surface 703. The odour trap member 700 in accordance with the invention is capable of being positioned inside e.g. an existing floor drain, where a sealing member 704 may be utilized to seal the peripheral edge 707 of the odour trap member, relative to a drainage pipe (not shown).

[0050] Fig. 8A shows schematically a similar odour trap member 700 as shown in Fig. 7, in its first position (closed) where the base member 701 comprises an upstream surface 706 and a downstream surface 703, having a through going opening 705 allowing fluid communication from the upstream surface to the downstream surface. The base plate comprises a fixation member 708, which is coupled to the inner surface 709 of the opening 705 in a crossbeam fashion, extending in a direction that may be seen as tangential to the planar surface of Fig. 8a. The fixation member 708 comprises a central vertical member 710, that extends from the base-plate and downwards into a holding member 711. The holding member 711, is attached to the cup member 702, in a central position, so that the side walls 712 of the cup member 702 extend from the holding member 711 and radially and upwards towards the downstream side 703 of the base member 701. The side walls 712 terminate in a peripheral edge 713 that abuts the downstream side 703 of the base member in its closed position, creating a seal between the cup member 701 and the peripheral edge 713. The downstream side 703 comprises a protrusion 714, which extends in an annular fashion along the base member 701, which has an outer surface 715, that is adapted to guide or steer the edge 713 in a correct position on the base member, in a direction that is radially outwards from the protrusion 714 on the base member. It may be envisioned that the protrusion could also be on the opposite side of the edge 713, so that the edge 713 is guided to a position in a direction radially inwards from the protrusion on the base member. Alternatively, the protrusion may be replaced with a groove, which guides the edge into its correct position inside the groove.

[0051] Fig. 8B shows the same odour trap member 700 in its open position, where the edge 713 of the cup member 702 has moved in a direction away from the base member (downwards direction or in the direction of gravity) due to a force that has been applied on the inner surface 716 of the cup member. The force may e.g. be a liquid that has been introduced through the opening 705, and which comes into contact with the cup member 702, where the weight of the liquid causes the flexible cup member to deform and bend away from the base member 700 creating a space 717 between the base member 701 and the cup member 702, allowing liquids to flow from the odour trap member 700 and into its surroundings.

[0052] Fig. 9 shows an odour trap unit 900, similar to that one shown in Fig. 1 and 2, where the same numerals are used for same elements as in Fig. 1. In this example the odour trap unit is provided with a removeable insert 901, which has the cup member 120, which is fixedly

coupled to a support tab (not shown) which is coupled to the removeable insert. The removeable insert may be coupled to an underside opening 902 of the hollow body 110, which allows the cup member 120 to be positioned below the inlet 112 inside the volume of the hollow body 110, and fixed in its position there, using a first fastening means 903 on the insert 901 and a mating fastening means 94 on the hollow body 110. When the insert is fixed or locked in its position, the fastening means 903 and 904 seal off the interior volume of the hollow body 110, ensuring that fluid communication is only allowed via the inlet 112 through the hollow body 110 and out through the outlet 113. This embodiment allows the inner volume of the odour trap to be cleaned, as well as the inspection of the cup member.

[0053] Fig. 10A shows a bottom view of a cup member 1000 and Fig. 10B shows a sectional view of the same cup member 1000 in accordance with the invention. The cup member is circular and comprises a flexible material 1001, that is located in a central area 1002 of the cup member 1000, and where the cup member further comprises an opening 1003, allowing attachment into an odour stop member, as shown in e.g. Fig 2 and Fig. 8A and 8B. The cup member is symmetrical in a radial direction from the central opening 1003 so that a sectional view across any diameter crossing the centre point would be identical. The cup member 1000 comprises a stiffening member 1004, that is adapted to provide an increased stiffness (reduced flexibility) in an area that is on outer side (in a radial direction) with the flexible material 1001. The stiffening member 1004, has an inner boundary 1005 that abuts the outer boundary 1006 of the flexible material 1001 (flexible central part), and is permanently fixed thereto. The stiffening member 1004 has an outer boundary 1007, that abuts a peripheral edge 1008 of the cup member, which may comprise a flexible and/or soft material.

[0054] It can be envisioned that the stiffening member may be added to a continuous flexible material that extends from the central opening and to the peripheral edge, where the stiffening member is bonded or fixed to the inner surface or the outer surface of the flexible member. Thus the stiffening member may be an annular member that is added to an uninterrupted flexible element.

[0055] Modifications to embodiments of the invention described in the foregoing are possible without departing from the scope of the invention as defined by the accompanying claims. Expressions such as "including", "comprising", "incorporating", "consisting of", "have", "is" used to describe and claim the present invention are intended to be construed in a non-exclusive manner, namely allowing for items, components or elements not explicitly described also to be present. Reference to the singular is also to be construed to relate to the plural. Numerals included within parentheses in the accompanying claims are intended to assist understanding of the claims and should not be construed in any way to limit subject matter claimed by these claims.

ITEMS

[0056]

- 5 1. An odour trap unit comprising:
 - a hollow body having
 - an inlet member,
 - an outlet member, and
 - an intermediate portion between the inlet member and the outlet member; and
 - 10 - a cup member, made of a flexible elastomeric material, located in the intermediate portion for allowing an interior edge of the inlet member to extend into the cup member;

20 wherein the cup member is operable to attain at least a first position in which the cup member abuts the intermediate portion to close the inlet member and a second position in which the cup member is spaced apart from the intermediate portion to open the inlet member.

- 25 2. The odour trap unit of item 1, wherein the cup member is further operable to attain at least an intermediate position between the first position and the second position.

- 30 3. The odour trap unit of item 2, wherein the odour trap is operable to trap odour in the first position when the cup member closes the inlet member, the second position when water flows through the inlet member and the outlet member, and
- 35 the intermediate position when the cup member contains water and a water surface lies above the interior edge of the inlet member.

- 40 4. The odour trap unit of item 1, wherein the cup member comprises a bowl-shape.

- 45 5. The odour trap unit of item 4, wherein the cup member is operable to flex at least in one of outward and downward directions or in a downward direction.

6. The odour trap unit of item 1, wherein the cup member comprises a uniform wall thickness.

- 50 7. The odour trap unit of item 1, wherein the cup member comprises a non-uniform wall thickness.

- 55 8. The odour trap unit of item 7, wherein the cup member comprises a central portion and a peripheral portion, wherein the central portion is relatively thinner compared to the peripheral portion.

9. The odour trap unit of item 8, wherein the central

portion includes a uniform curve shape.

10. The odour trap unit of item 8, wherein the central portion is a non-uniform curve shape having a peak and valleys.

11. The odour trap unit of item 1, wherein the flexible elastomeric material comprises one of: ethylene propylene diene monomer rubber, silicone or thermoplastic elastomer.

12. The odour trap unit of item 1, wherein the hollow body is made of a hard material comprising one of plastic, metal or metal alloy.

13. The odour trap unit of item 12, wherein the hard material comprises one of polypropylene, polyethylene, acrylonitrile butadiene styrene or stainless steel.

14. The odour trap unit of item 1, further comprising a support-tab for supporting the cup member on the intermediate portion.

15. The odour trap unit of item 1, wherein the intermediate portion comprises a removable base portion.

[0057] In one aspect, an embodiment of the present disclosure provides an odour trap unit comprising: a hollow body having an inlet member, an outlet member, and an intermediate portion between the inlet member and the outlet member; and a cup member, made of a flexible elastomeric material, located in the intermediate portion allowing an interior edge of the inlet member to extend into the cup member; wherein the cup member is operable to attain at least a first position in which the cup member abuts the intermediate portion to close the inlet member and a second position in which the cup member is spaced apart from the intermediate portion to open the inlet member.

[0058] In one embodiment, the cup member is further operable to attain at least an intermediate position between the first position and the second position.

[0059] According to an embodiment, the odour trap unit is operable to trap odour in the first position when the cup member closes the inlet member, the second position when water flows through the inlet member and the outlet member, and the intermediate position when the cup member contains water and a water surface lies above the interior edge of the inlet member.

[0060] Optionally, the cup member comprises a bowl-shape.

[0061] Optionally, the cup member is operable to flex at least in one of outward and downward directions or in a downward direction.

[0062] Optionally, the cup member comprises a uniform wall thickness.

[0063] Optionally, the cup member comprises a non-uniform wall thickness.

[0064] Optionally, the cup member comprises a central portion and a peripheral portion, wherein the central portion is relatively thinner than the peripheral portion; in other words, the peripheral portion is relatively thicker than the central portion.

[0065] More optionally, the central portion includes a uniform curve shape.

[0066] More optionally, the central portion is a non-uniform curve shape having a peak and valleys.

[0067] Optionally, the cup member is made of a flexible elastomeric material comprising one of ethylene propylene diene monomer rubber, silicone or thermoplastic elastomer.

[0068] Optionally, the hollow body is made of a hard material comprising one of a plastics material, a metal or a metal alloy.

[0069] More optionally, the hard material comprises one of polypropylene, polyethylene, acrylonitrile butadiene styrene or stainless steel.

[0070] Optionally, the odour trap unit further comprises a support-tab for supporting the cup member on the intermediate portion.

[0071] Optionally, the intermediate portion comprises a removable base portion.

[0072] The disclosure of the odour trap unit or odour trap member of the present disclosure also provides required water flow there through, because the odour trap unit or odour trap member is structural designed to include fewer sharp edges in a direction of flow of water there through. This further enhances a self-cleaning function of the odour trap unit or odour trap member. Furthermore, the odour trap unit or odour trap member of the present disclosure does not require periodic maintenance, and this may increase an overall service life of the odour trap unit or odour trap member. Moreover, the odour trap unit or odour trap member may be designed not to include movable parts (that move with respect to each other), therefore the odour trap unit can be easily manufactured and in a cost effective manner.

Claims

1. An odour trap member comprising:

- a base portion having an upstream portion and a downstream portion, where the base portion comprises an opening between the upstream portion and the downstream portion allowing fluid communication through the opening,
- a cup member made having a wall of a flexible elastomeric material, the cup member having a peripheral edge and a central portion, where the wall extends from the central portion and towards the peripheral edge,

wherein the cup member is operable to attain at least a first position in which a part of the cup member abuts the base portion to prevent fluid communication through the opening and a second position in which the part of the cup member is spaced apart from the base portion to open up for fluid communication through opening and wherein the cup member is configured to hold a predetermined amount of liquid.

2. The odour trap member in accordance with claim 1, wherein a peripheral edge of the cup member abuts the base portion.
3. The odour trap member in accordance with any of the preceding claims, wherein the distance from base member from the central portion of the cup member is larger than the distance from the peripheral edge to the base portion.
4. The odour trap member in accordance with any of the preceding claims, wherein the cup member is configured to flex in order to transform from the first position to the second position and vice versa.
5. The odour trap member in accordance with any of the preceding claims, wherein the cup member is symmetrical around its central axis.
6. The odour trap unit in accordance with any one of the preceding claims, wherein a portion of the cup member is fixedly arranged relative to the opening, or optionally wherein a central portion of the cup member is fixedly arranged relative to the opening.
7. The odour trap member in accordance with any of the preceding claims, wherein the downstream side of the base portion comprises a protrusion and/or a depression configured to abut the peripheral edge of the cup member.
8. The odour trap member in accordance with any of the preceding claims, wherein the opening comprises an opening extension member that extends the into a volume defined by the peripheral edge and the central portion of the cup member. [description ... disclose that it extends the fluid communication into the volume of the cup. cup]
9. The odour trap member in accordance with any of the preceding claims, wherein the wall has a uniform wall thickness from the central portion towards the peripheral edge.
10. The odour trap member in accordance with any of the preceding claims, wherein the wall has differing wall thicknesses from the central portion towards the peripheral edge.

11. The odour trap member in accordance with claim 10, wherein the wall thickness at the central portion is thinner than the wall thickness of the peripheral portion, so that wall of the central portion is configured to flex before the wall of the peripheral portion.
12. The odour trap member in accordance with any of the preceding claims, wherein a central part of the cup member is configured to flex upon application of external force on an upstream side of the cup member, and optionally where a peripheral part of the cup member is configured to maintain its shape when the central part flexes.
13. The odour trap member in accordance with any of the preceding claims, wherein the cup member is configured to have a peripheral part of the cup member to have a higher stiffness than the central portion of the cup member, and optionally where the peripheral part of the cup member may comprise a reinforcement member to increase the stiffness of the peripheral part.
14. The odour trap member in accordance with any of the preceding claims, wherein the base member constructed of a stiff material comprising one of plastic, metal or metal alloy.
15. The odour trap member in accordance with claim 14, wherein the stiff material comprises one of polypropylene, polyethylene, acrylonitrile butadiene styrene or stainless steel.

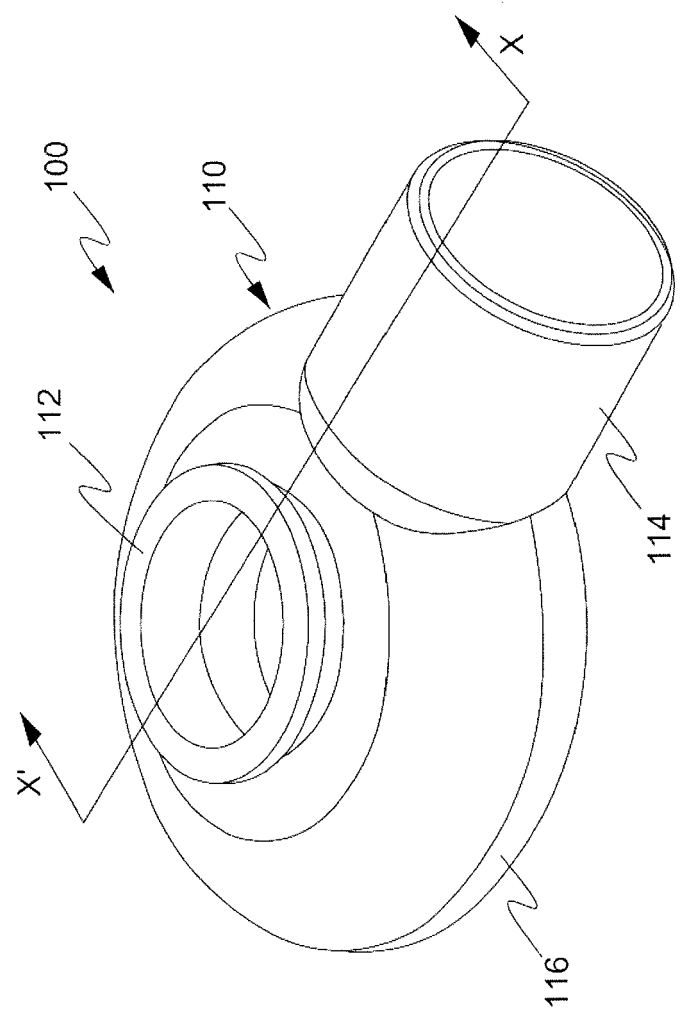


FIG. 1

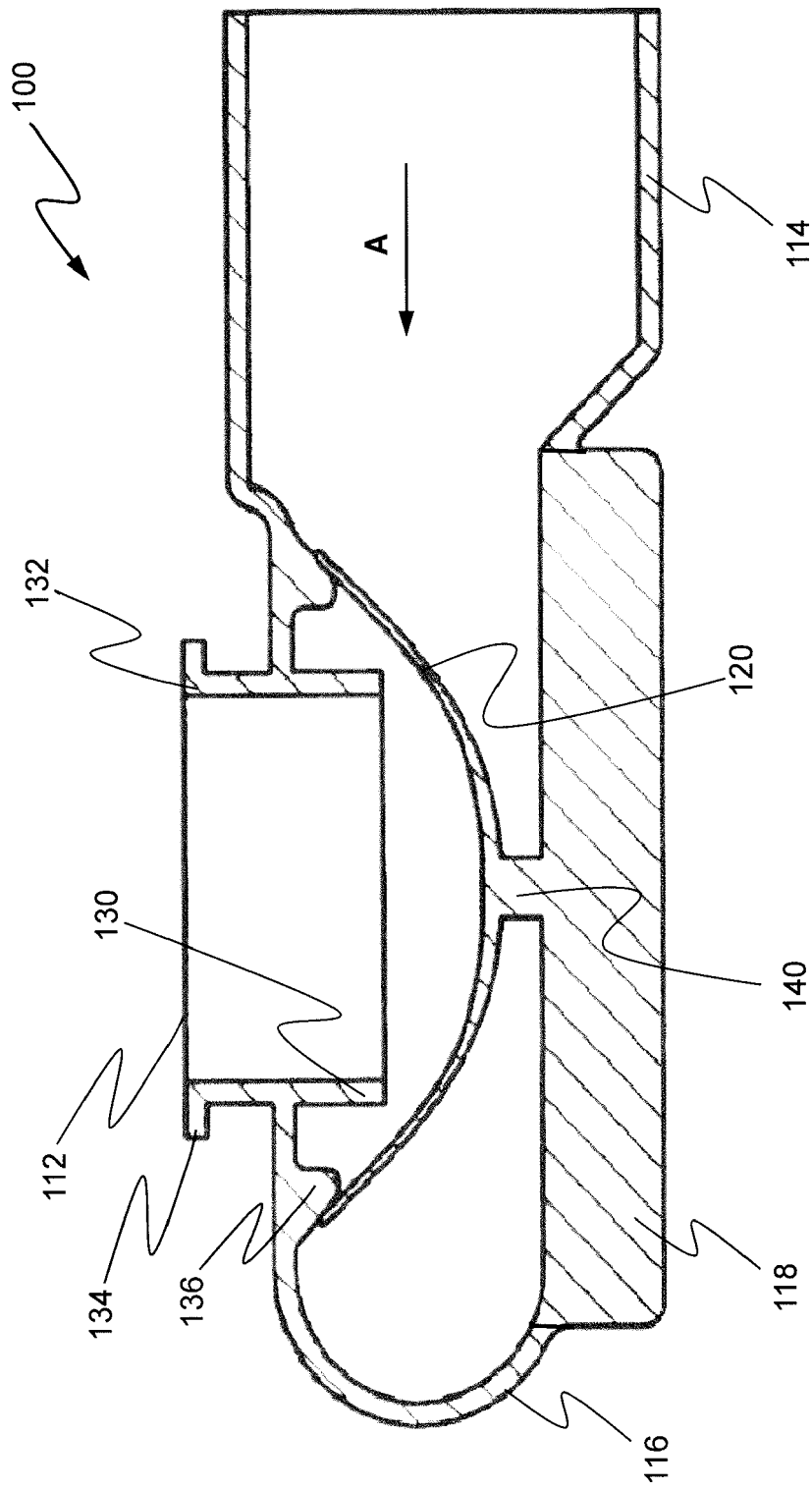


FIG. 2

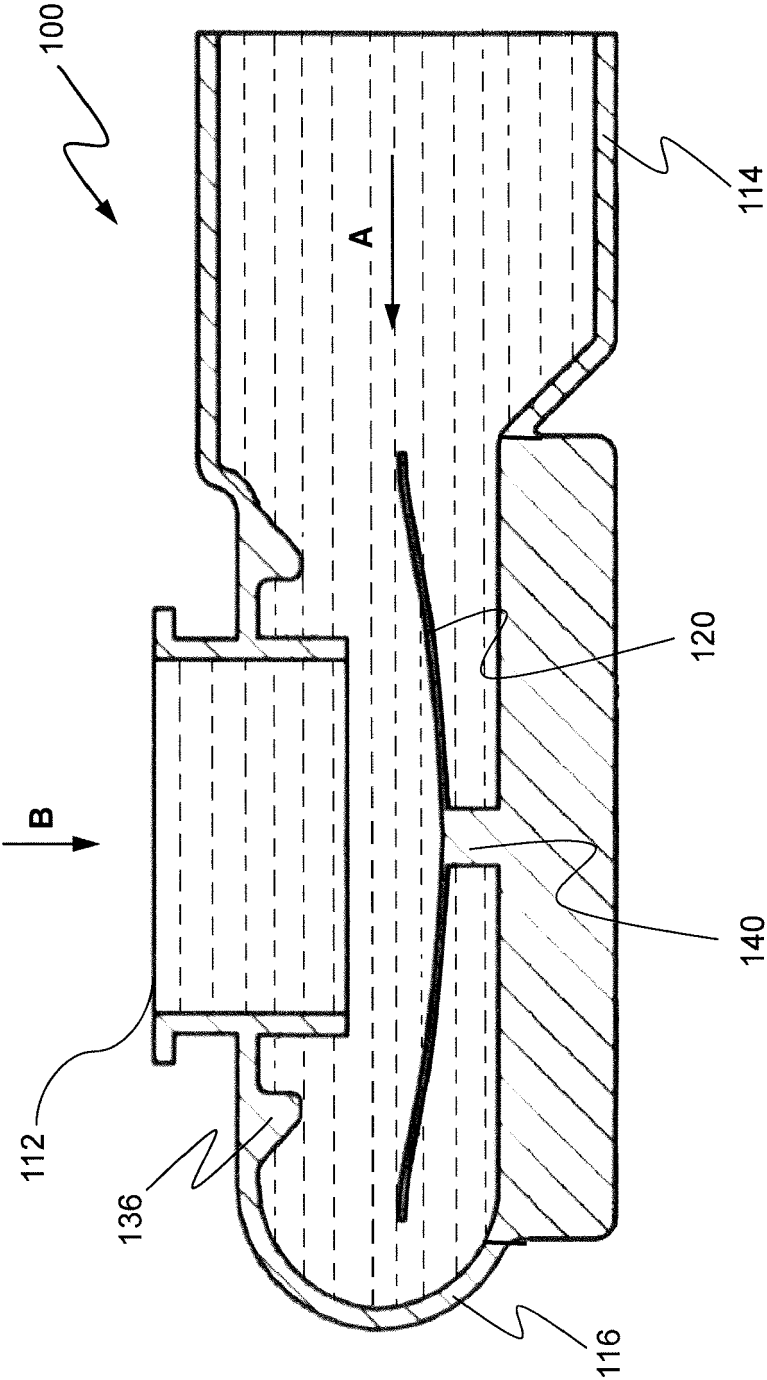


FIG. 3

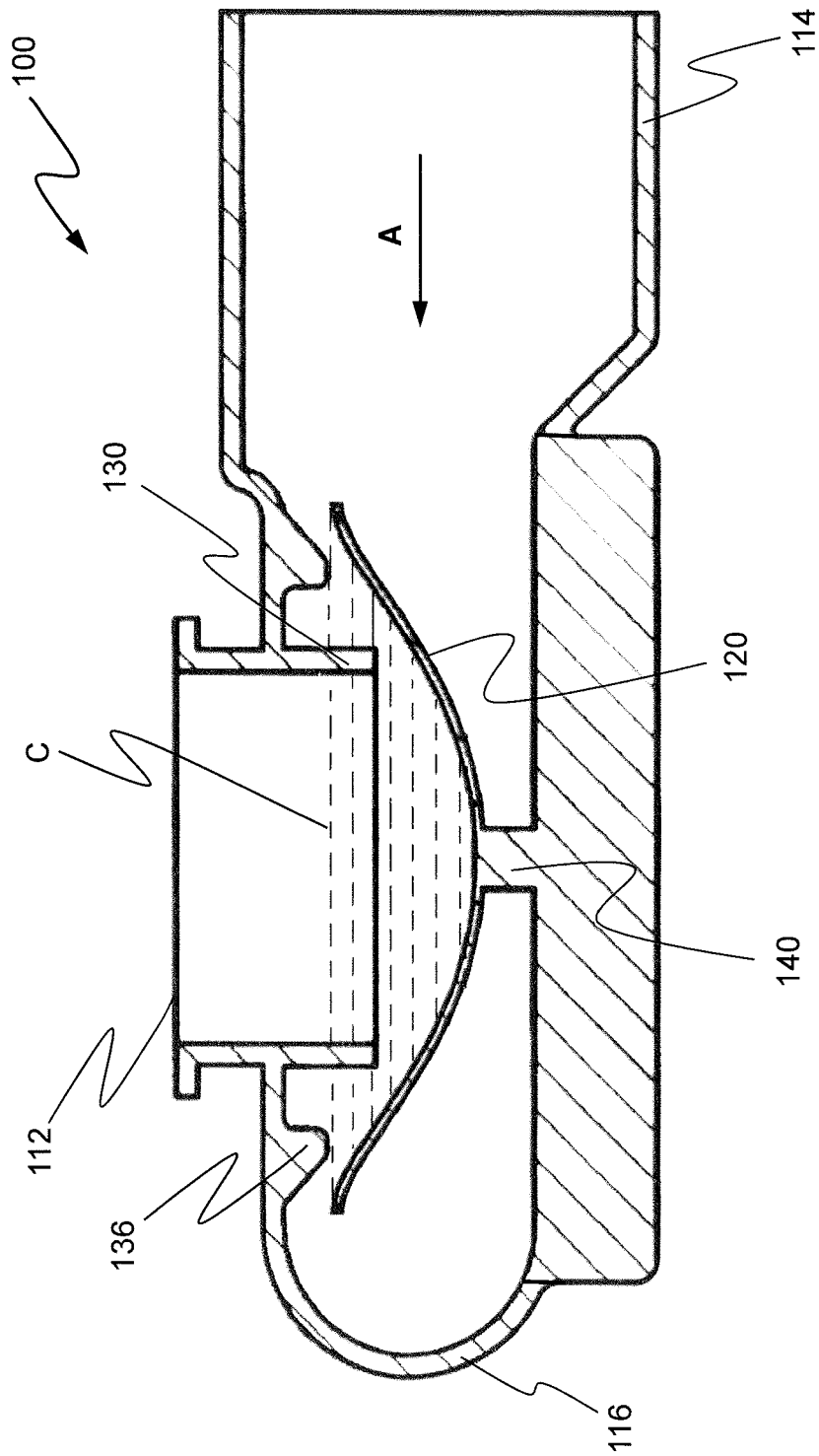


FIG. 4

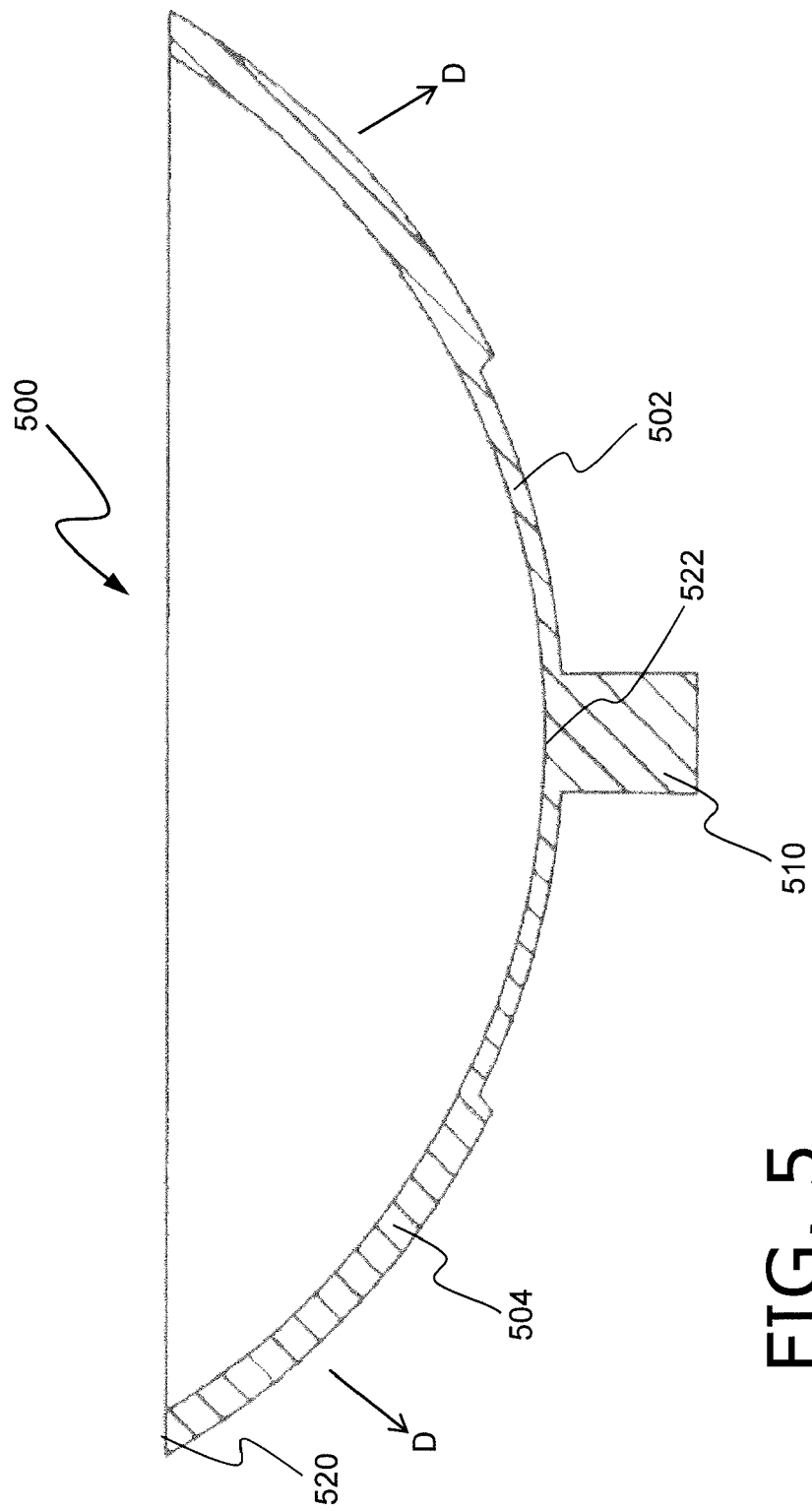


FIG. 5

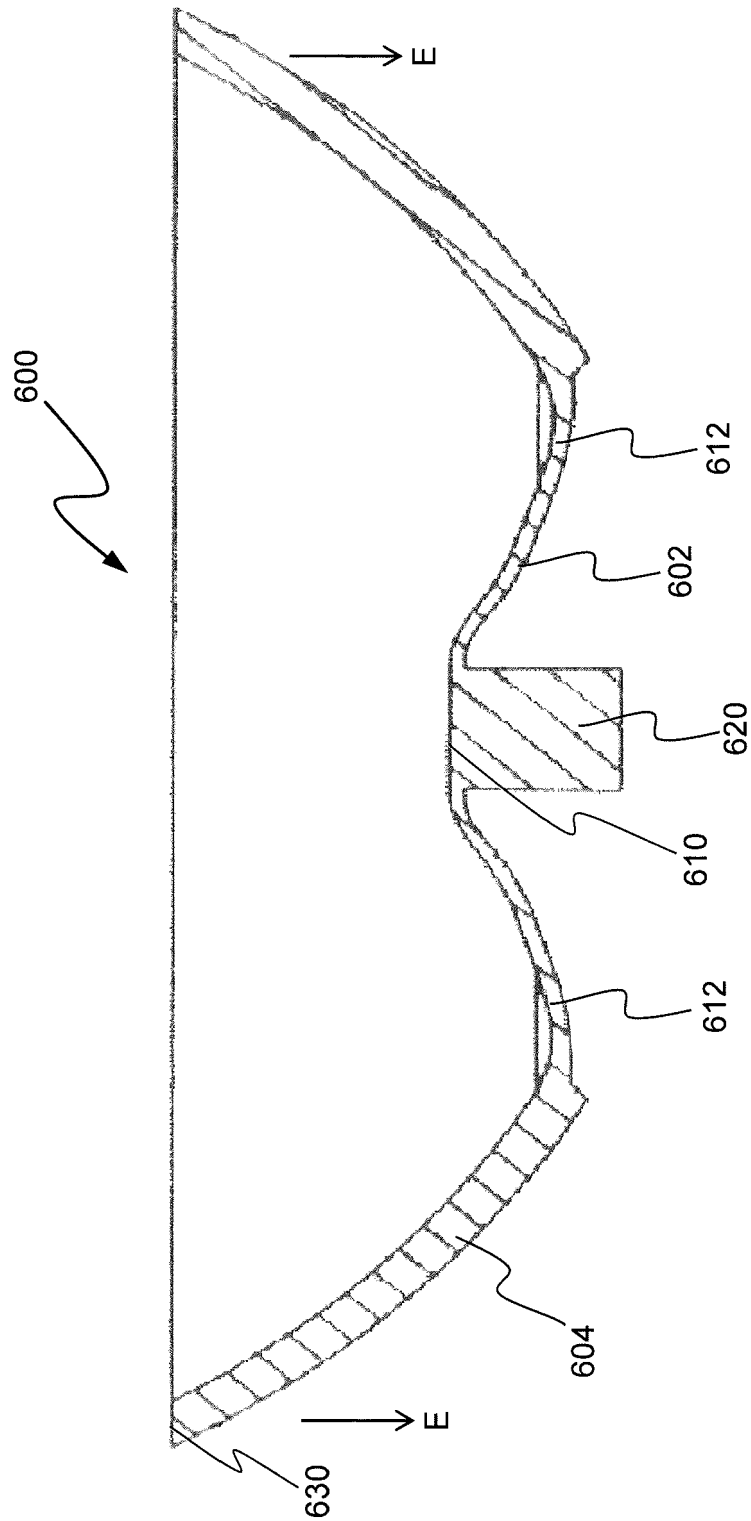


FIG. 6

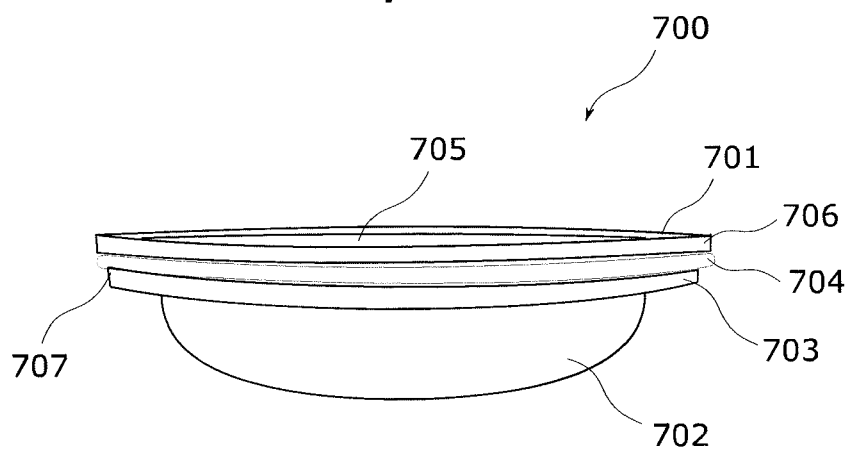


Fig. 7

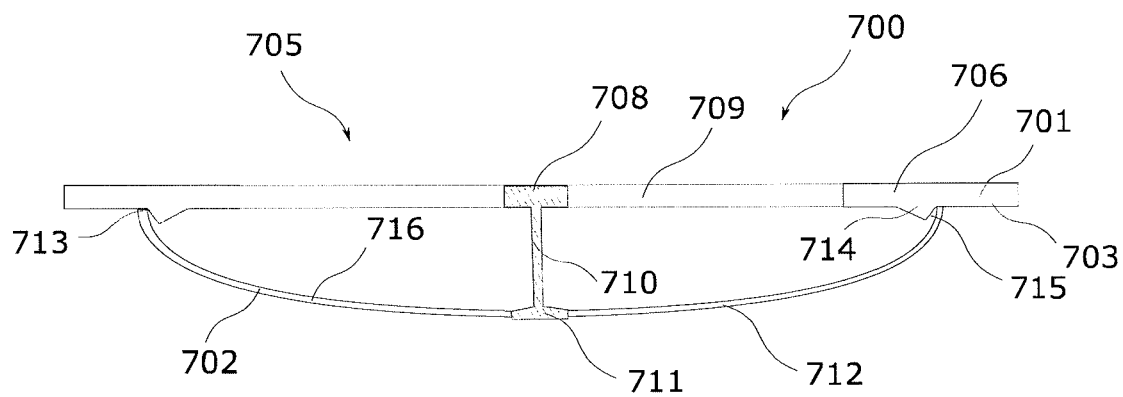


Fig. 8A

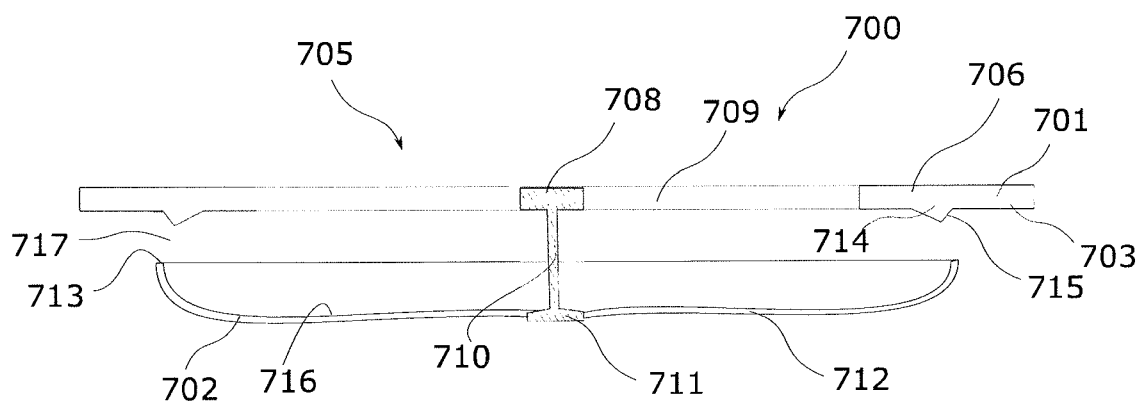


Fig. 8B

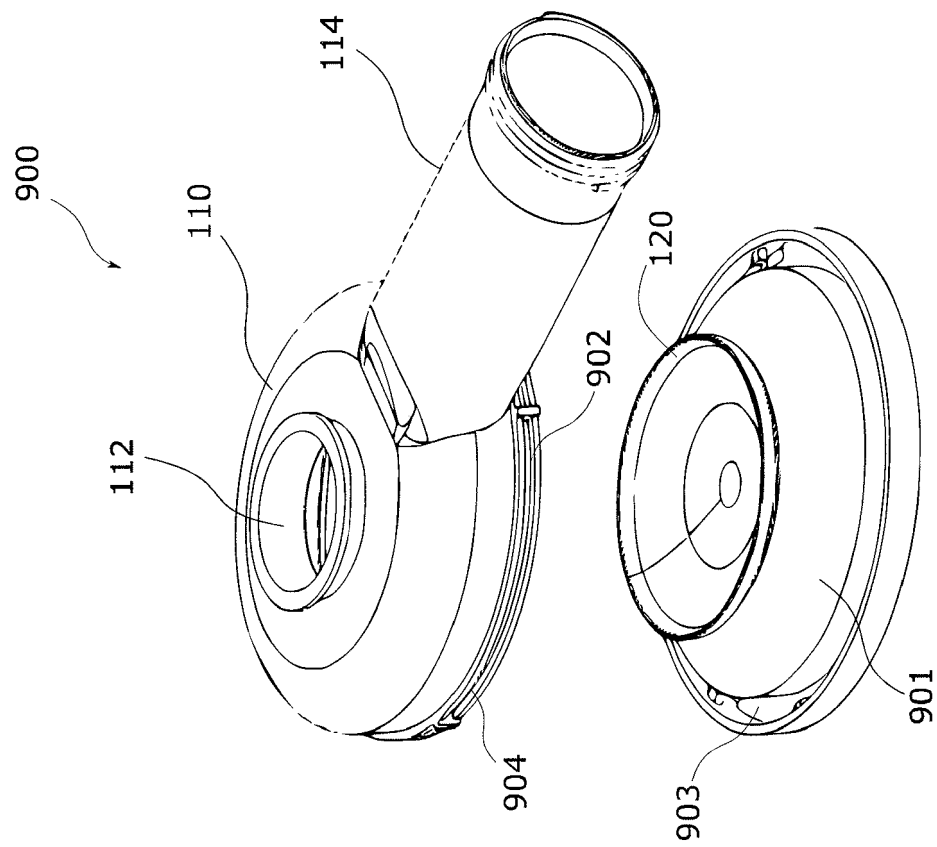


Fig. 9

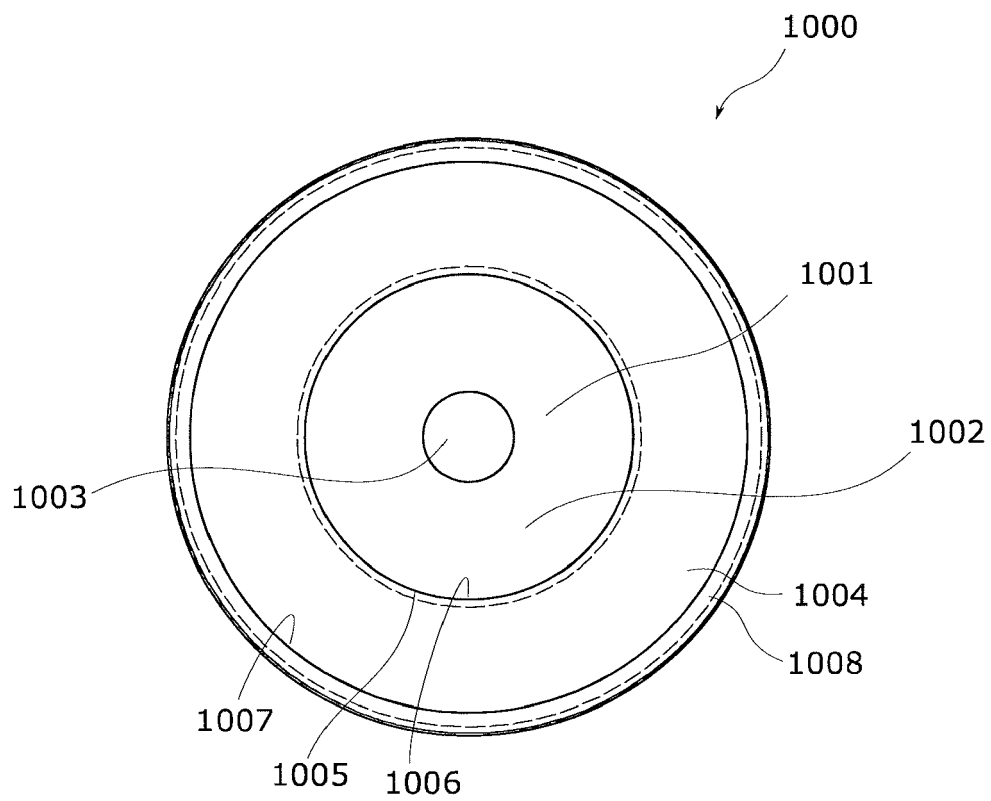


Fig. 10A

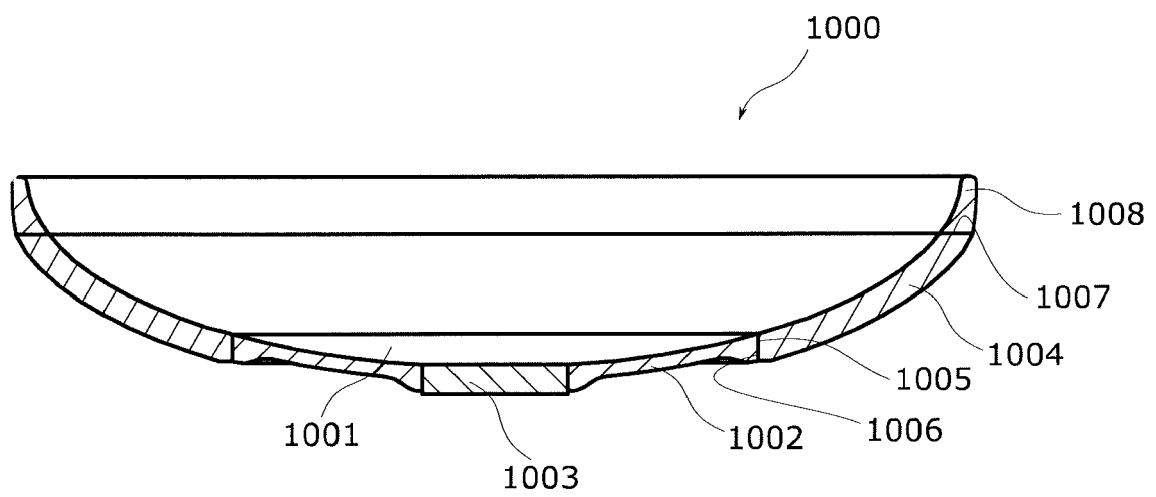


Fig. 10B



EUROPEAN SEARCH REPORT

Application Number
EP 17 17 4910

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 29 September 2017	Examiner Geisenhofer, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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