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(54) **Odor trap**

(57) The present invention relates to an odor trap (1) for connection to a drain housing (100) adapted for being fixedly mounted to a building structure such as a floor (300), the odor trap (1) comprising:
an overflow cup (10) having a bottom (11), a sidewall (12) extending from said bottom (11) and an overflow rim (15) defined on said sidewall (12), the sidewall (12) having an inner surface (13) and an outer surface (14);
an immersion pipe (20) extending into the overflow cup (10) said immersion pipe (20) having a tubular wall (22) with an inner side (23) and an outer side (24), an upper rim (25) and a lower rim (26); and
connection means (30) for connecting to a receiving portion (110) of said drain housing (100) and being provided at the upper rim (25) of the immersion pipe (20); and
at least one wall (50) forming a connection between the overflow cup (10) and the immersion pipe (20), wherein a flow of liquid through the odor trap (1) is partitioned in at least two completely separated pathways (40', 40'') all the way from the upper rim (25) of the immersion pipe (20) to the overflow rim (15) of the overflow cup (10). The invention also relates to a combination of an odor trap (1) and a drain housing (100).

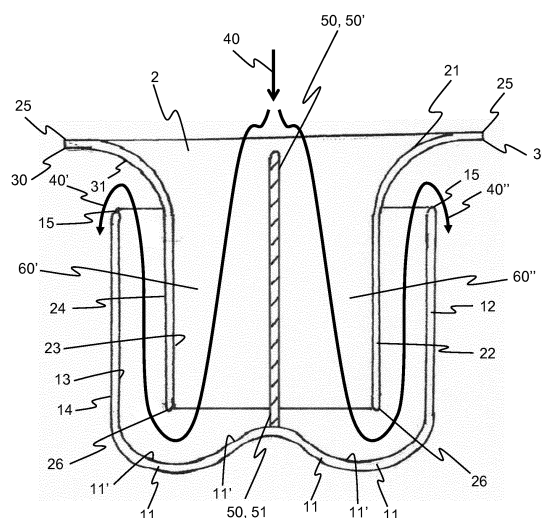


Fig. 2D

Description

[0001] The present invention concerns an odor trap for connection to a drain housing, the housing being adapted for being fixedly mounted to a building structure such as a floor. The invention also concerns a combination of an odor trap and a drain housing where the drain housing is adapted for being fixedly mounted to a building structure such as a floor.

Background of the invention

[0002] In its most basic form, odor traps are provided by a kink in a tubing forming a passage for a fluid from a fluid receptacle such as zinc or a floor to a sewage system, the kink containing a volume of liquid, typically water. The volume of water provides a barrier for bad smelling gasses to pass counterstream relative to a liquid flow from the fluid receptacle.

[0003] The liquid passing through such odor traps usually contains objects such as long hairs, etc., which may get stuck in or around the odor trap. If the flow is high and/or the passage through the odor trap and the drain housing is large enough, hairs etc. typically will be flushed away easily. But especially, for floor mounted odor traps this may be a problem. Floor mounted odor traps and drain housings are concealed in the floor of a room. Typically, there is very little room in the floor for the odor traps and drain housings. Therefore, the odor traps and drain housings needs to be compact. Also, it is a requirement that the liquid flow is as unrestricted as possible in order to avoid or minimize capacity restraints. Due to the space limitations the volume of the passageway through the odor trap is restricted, especially in floor mounted odor traps. At the same time it is a requirement that the odor trap and the drain housing must be able to separate so that both can be cleaned and access to connecting tubing can be accessed, e.g. for cleaning or repairs. And since the odor trap or any part thereof cannot be floating in the air (it needs to be physically connected to a drain housing) it is necessary to connect the parts of the odor trap to each other and to the drain housing via various forms of flanges. Therefore, floor mounted odor traps often of a type having an immersion pipe partially inserted in an overflow cup. The immersion pipe rests on a rim of the drain housing and is further connected via flanges to the overflow cup.

[0004] Such an odor trap is known from EP 1 026 330 A2.

[0005] It is a problem in such odor traps that the connecting flanges between the immersion pipe and the overflow cup will catch hair and the like objects. Over relatively short time the hairs and other elongate flexible objects will accumulate, and form a trap for lime and other small objects passing the odor trap, and the odor trap will clog.

[0006] In order to prevent such clogging, the prior art odor traps attempts to minimize the size and/or number

of flanges connecting the immersion pipe and the overflow cup. Examples of such odor traps are WO2012/024716A1 and EP 2 060 682 A2. However, the minimized flanges still catch hairs and the like, and therefore the clogging is only postponed a little.

[0007] A further problem of the prior art odor traps is that they have a complicated structure. In order to minimize the connection between the riser and the cup, the connecting flanges are often provided such that the odor traps are complicated to manufacture and/or needs to be formed in expensive materials.

Summary of the invention

[0008] On this background, it is an object of the present invention to provide an odor trap which limits or prevents clogging in particular the accumulation of hairs or other elongate flexible objects. It is a further object of the invention to provide an odor trap that allows the possibility of hygienic and easy cleaning by washing down without dismantling the odor trap. It is a further object to provide a compact odor trap, which provides a large flow area throughout a passageway through the odor trap. It is a further object of the invention to provide an odor trap that is simple and easy to manufacture.

[0009] This object is achieved by providing an odor trap for connection to a drain housing adapted for being fixedly mounted to a building structure such as a floor, the odor trap comprising:

- an overflow cup having a bottom, a sidewall extending from said bottom and an overflow rim defined on said sidewall, the sidewall having an inner surface and an outer surface;
- an immersion pipe extending into the overflow cup, said immersion pipe having a tubular wall with an inner side and an outer side, an upper rim and a lower rim, and an inlet formed opposite the lower rim;
- connection means for connecting to a receiving portion of said drain housing and being provided at the upper rim of the immersion pipe; and
- at least one wall forming a connection between the overflow cup and the immersion pipe,

where a flow of liquid through the odor trap is partitioned in at least two completely separated pathways all the way from the inlet of the immersion pipe to the overflow rim of the overflow cup.

[0010] Thereby, a clog free odor trap is provided, since hair and other long flexible objects are prevented from entangling after fluid pathways rejoin, or at least the propensity for clogging is considerably reduced.

[0011] Even though the propensity of clogging is considerably reduced, odor traps are still in need of regular cleaning, e.g. due to fat and/or lime deposits. The odor trap according to the invention allows such cleaning, to be easily done in a hygienic manner by simply washing down/rinsing with a water jet, e.g. from the tap, and with-

out disassembling the odor trap from the housing that it arranged in.

[0012] Preferably, each of said at least one walls has a lower wall portion extending below the lower rim of the immersion pipe and forms a water tight barrier against an inner surface of bottom of the overflow cup.

[0013] In an embodiment the wall further comprises an upper vane forming an extension of the wall and extending above the overflow rim of the overflow cup on the outer side of the tubular wall of said immersion pipe.

[0014] In a further embodiment the wall comprises an outer vane forming an extension of said wall and said upper vane said lower vane being formed on and extending from the outer surface of the sidewall of said overflow cup.

[0015] In an embodiment the odor trap is formed as an assembly of an overflow cup and an immersion pipe, wherein at least a portion of said wall is formed on immersion pipe, and the overflow cup and an immersion pipe (20) are joined by a snap lock.

[0016] In a further embodiment a hand grip is formed on an upper edge of the at least one wall. The hand grip has a cylindrical outer surface.

[0017] In a further embodiment, the immersion pipe has an upwardly facing surface, where the upwardly facing surface has a downward slope towards the upper rim of the immersion pipe, and where at least one opening is provided in the downward slope in the upwardly facing surface to allow liquid to enter an inner space of the immersion pipe.

[0018] In a further embodiment there is more than one wall (50).

[0019] In another aspect the objects of the invention are achieved by a combination of an odor trap and a drain housing, said drain housing being adapted for being fixedly mounted to a building structure such as a floor, the drain housing further having at least one outlet opening for connecting to a sewage pipe, and a receiving portion for releasable reception of an odor trap in the drain housing, where said odor trap comprises:

- an overflow cup having a bottom, a sidewall extending from said bottom and an overflow rim defined on said sidewall, the sidewall having an inner surface and an outer surface;
- an immersion pipe extending into the overflow cup said immersion pipe having a tubular wall with an inner side and an outer side, an upper rim and an lower rim, an inlet formed opposite said lower rim;
- connection means for connecting to a receiving portion of said drain housing and being provided at the upper rim of the immersion pipe; and
- at least one wall forming a connection between the overflow cup and the immersion pipe,

wherein a flow of liquid through the odor trap is partitioned in at least two completely separated pathways all the way

from the inlet of the immersion pipe to the overflow rim of the overflow cup.

[0020] In an embodiment the odor trap of the combination further comprises any of the features of any one of the embodiments mentioned in connection with the first aspect of the invention above.

[0021] Further objects, features, advantages and properties of the odor trap and the drain housing and odor trap combination according to the invention will become apparent from the detailed description.

[0022] The present text uses the term odor trap. Odor traps are also known as an odeur trap, an odor seal or a water seal.

Brief description of the drawings

[0023] In the following detailed portion of the present description, the invention will be explained in more detail with reference to the exemplary embodiments shown in the drawings, in which:

- Fig. 1, in a sectional view, shows a combination of a drain housing and an odor trap, where the drain housing is fixedly installed in a floor and to a sewage pipe (drainage pipe),
- Fig 2A, in a perspective view, shows an odor trap according to a first embodiment of the invention;
- Fig. 2B, in a top view, shows the odor trap of Fig 2A, seen from above;
- Fig. 2C, shows a section through the odor trap in Fig. 2B taken along section C-C;
- Fig. 2D, shows a section through the odor trap in Fig. 2B taken along section D-D, and further illustrates the flow through an odor trap according to the invention;
- Fig. 3, in a sectional view, shows another embodiment of an odor trap according to the invention, the section corresponding to the C-C section through the odor trap in Fig. 2B;
- Fig. 4, in a sectional view, shows yet another embodiment of an odor trap according to the invention, the section corresponding to the C-C section through the odor trap in Fig. 2B;
- Fig. 5, in a sectional view, shows yet another embodiment of an odor trap according to the invention, the section corresponding to the C-C section through the odor trap in Fig. 2B;
- Fig. 6, in a sectional view, shows yet another embodiment of an odor trap according to the invention, the section corresponding to the D-D section through

the odor trap in Fig. 2B;

- Fig. 7A, in a perspective view, shows yet another embodiment of an odor trap according to the invention and further discloses a method of assembling an odor trap according to the invention;
- Fig. 7B, in an exploded, sectional view, shows the odor trap of Fig. 7A;
- Fig. 8A, in a perspective view, shows yet another embodiment of an odor trap according to the invention and further discloses another method of assembling an odor trap according to the invention;
- Fig. 8B, in an exploded, sectional view, shows the odor trap of Fig. 8A;
- Fig. 9, in an exploded, sectional view, shows yet another embodiment of an odor trap according to the invention and further discloses yet another method of assembling an odor trap according to the invention;
- Fig. 10A, in a sectional view, illustrates yet another way of assembling an odor trap according to the invention;
- Fig. 10B, in a top view shows the odor trap of Fig. 10A.

Detailed description of the invention

[0024] In the following detailed description, the odor trap 1 and the combination 200 of an odor trap and a drain housing according to the invention, will be described by the preferred embodiments.

[0025] Fig. 1 shows the general principle of an odor trap 1 mounted in a drain housing 100. The drain housing 100 is fixedly mounted in a floor 300. Typically, such drain housings 100 are adapted to be mounted such that its upper surface 102 is flush with and upper surface 302 of the floor 300. The drain housing 100 is typically mounted in a cavity of the floor 300. The drain housing 100 is a cup shaped structure having at least one sidewall 103 and bottom 104. The drain housing 100 is provided with a number of fluid inlets and outlets. Typically it has a top inlet 105, which is configured to receive waste water from the floor 300. Further inlets and outlets will be described below.

[0026] The drain housing 100 with the odor trap 1 may serve as drainage in or connection to a bathroom shower or it may be used as floor mounted drain in a domestic or an industrial setting in a room where drainage of liquid from the floor is necessary. The top inlet 105 may typically be covered by a detachable grate/grid 270 having a plurality of openings 271 allowing fluid to pass into the top inlet 105 of the drain housing 100. The detachable grate

270 has a top surface 172 which is preferably flush with the above mentioned upper surface 102 of the drain housing 100.

[0027] One or more further inlets 106 may be provided through the at least one side wall 103 of the drain housing 100, the side inlets 106 being located above the odor trap 1. In Fig. 1 a single side inlet 106 is shown. The side inlets 106 may connect the drain housing 100 to other (not shown) waste fluid receptacles such as a wall mounted zinc (not shown), a washing machine (not shown), or the like, via suitable piping 260.

[0028] The drain housing 100 further comprises at least one outlet 101, connecting to a sewage pipe 250 leading to a main sewage system (not shown) or the like. The at least one outlet 101 is provided in/through the at least one sidewall 103, and below or downstream of the odor trap 1. In other embodiments (not shown) at least one additional or alternative outlet 101 may be provided in/through the bottom 104 of the drain housing 100. In principle, in further embodiments (not shown) the drain housing 100 may be without a bottom 104 as such, and where an outlet to a sewage pipe forms a downward extension of the drain housing 100, instead of or in addition to an outlet 101 being provided in/through the sidewall 103 of the drain housing 100.

[0029] The odor trap 1 is connected to the drain housing 100 via a receiving portion 110, e.g. in the shape of a rim provided on the inside 103' of the at least one side wall 103, and cooperating with connection means 30, e.g. in the shape of a rim 25, on an outer part of the odor trap 1.

[0030] The odor trap 1 comprises an overflow cup 10 and an immersion pipe 20.

[0031] The overflow cup 10 comprises a bottom 11, at least one sidewall 12 extending from the bottom 11 and an overflow rim 15 defined on an upwardly facing edge of the sidewall 12. The sidewall 12 has an inner surface 13 and an outer surface 14.

[0032] The immersion pipe 20 is a generally tubular structure, which is arranged to extend into the overflow cup 10. The immersion pipe 20 comprises at least one wall, preferably a tubular wall 22 with an inner side 23 and an outer side 24, and with an upper rim 25 and a lower rim 26.

[0033] By the drain housing 100, the overflow cup 10 and the immersion pipe 20 each having at least one sidewall, is meant that the respective sidewall maybe cylindrical (one sidewall) or have a polygonal cross sectional shape with two (arched) sidewalls, three (tube of triangular cross section), four or more sidewalls. The cross sectional shape of these parts may be the same or it may be different. However, the parts will be adapted in size to fit into each other the overflow cup 10 into the drain housing 100, and the immersion pipe 20 into the overflow cup 10.

[0034] Preferably, and as shown, the connection means 30 for connecting the odor trap 1 to the drain housing 100 are provided on/in connection with the upper rim

25 of the immersion pipe.

[0035] In Fig. 1, a section through the drain housing 100 and odor trap 1 has been chosen, where no connections between the overflow cup 10 and the immersion pipe 20 can be seen. However, it is clear that such a connection must be present since the overflow cup 10 cannot be floating freely between the drain housing 100 and the immersion pipe 20. In the prior art, at least one flange, vane or bridge is provided between the overflow cup 10 and the immersion pipe 20, sometimes via a tower arranged centrally in the overflow cup. The overflow cup 10 and the immersion pipe 20 must be removable from the drain housing 1 via the top inlet 105 of the drain housing 100 for cleaning purposes.

[0036] In Fig. 1, flow through a combination of a drain housing 100 and an odor trap 1 in general is further illustrated. This is illustrated via arrows. Arrow 401 shows the entrance of fluid from the floor 300 and into the drain housing 100 via the top inlet 105 of the drain housing 100. Arrow 402 shows the optional entrance of fluid from a secondary source of waste fluid via tubing/piping 260 and into the drain housing 100 via one side inlet 106 of the drain housing 100. The arrow 403 shows the fluid accumulated from the top and side inlets 105, 106 entering into the immersion pipe 20. The waste fluid impinges on the bottom 11 and flows up between the outer side 24 of the immersion pipe 20 and the inner surface 13 of the overflow cup 10, which is indicated by arrows 404. If the flow (volume) entering the odor trap 1 is large enough the waste fluid will rise to a level above the overflow rim 15 as indicated by arrows 405. Then the waste fluid may exit from the drain housing 100 through the outlet 101, as indicated by arrows 406.

[0037] Now referring to Fig. 2A-D, an odor trap 1 according to one embodiment of the invention will be described in greater detail.

[0038] The odor trap 1 comprises an overflow cup 10 and an immersion pipe 20. The overflow cup 10 and the immersion pipe 20 are connected via at least one wall 50. In Fig. 2A, the wall 50 can be seen to have one wall portion 50' inside the immersion pipe 20, and wall portions 52 between the immersion pipe 20 and the overflow cup 10. In Fig. 2B, the odor trap 1 is seen in a top view. In this view only an upper portion of the immersion pipe 20 and a connecting wall 50 can be seen (the overflow cup 10 is hidden under the immersion pipe 20 in this view). Also, only the wall portion 50' extending inside the immersion pipe 20 can be seen in this view. Other portions of the connecting wall 50 can be seen in Figs. 2C and 2D, which show the sections through the odor trap 1 as indicated in fig. 2B.

[0039] The overflow cup 10 comprises a bottom 11, at least one sidewall 12 extending from said bottom 11, and an overflow rim 15 defined on said sidewall 12. Thus, the overflow cup is cup-shaped. The overflow cup 10 is preferably cylindrical in shape, i.e. it has a (horizontal) circular cross section. In other, not shown embodiments the overflow cup 10 may have other (horizontal) circular cross

sections, e.g. square, rectangular, pentagonal, hexagonal, heptagonal, octagonal, etc. The at least one sidewall 12 has an inner surface 13 and an outer surface 14.

[0040] Preferably, and as exemplified in the sections shown in Figs. 1, 2D, 3-6, and 10A, the overflow rim 15 may, in embodiments, be rounded of. Thereby, any elongate objects such as hairs passing through the odor trap may more easily be prevented from sticking to the rim. This rounded of overflow rim 15 may also be applied to the overflow cup 10 of the other embodiments described below.

[0041] The immersion pipe 20 is generally tubular in shape. The immersion pipe 20 has at least one tubular wall 22 with an inner side 23 and an outer side 24, an upper rim 25 and a lower rim 26. The immersion pipe 20 is preferably cylindrical in shape, i.e. it has a (horizontal) circular cross section. In other, not shown embodiments the immersion pipe 20 may have other (horizontal) circular cross sections, e.g. square, rectangular, pentagonal, hexagonal, heptagonal, octagonal, etc.

[0042] Preferably, and as exemplified in the sections shown in Figs. 1, 2D, 3-6, and 10A, the lower rim 26 of the immersion pipe 20 may, in embodiments, be rounded of. Thereby, any elongate objects such as hairs passing through the odor trap may more easily be prevented from sticking to the rim. This rounded of lower rim 26 may also be applied to the immersion tube 20 of the other embodiments described below.

[0043] The immersion pipe 20 is coaxial with and extends partly into the overflow cup 10. An upper portion 21 of the immersion pipe 20 extends above the overflow cup 10, when the two are assembled. At least a part of the upper portion 21 of the immersion pipe 20 widens, i.e. extends outward or away from the central longitudinal axis of the immersion pipe 20.

[0044] The upper rim 25 is provided on the widened upper portion 21 of the immersion pipe 20.

[0045] The upper portion 21 defines an inlet 2 of the immersion pipe 20 for fluid/liquid entering into the odor trap 1.

[0046] The immersion pipe 20 further comprises connection means 30 for connecting to a receiving portion 110 of said drain housing 100. The connections means are preferably provided as shown, by a downwardly facing surface of said widened portion of the immersion pipe 20. In any event, the connection means 30 are preferably provided at or close to the upper rim 25 of the immersion pipe 20. The odor trap 1 is connected to the drain housing 100 via a receiving portion 110, e.g. in the shape of a rim provided on the inside 103' of the at least one side wall 103, adapted for cooperation with the connection means 30, e.g. in the shape of a rim, on an outer part of the odor trap 1, see Fig. 1 and the description relating thereto above.

[0047] A gasket (not shown) may be provided between the connection means 30 of the odor trap 1 and the receiving portion 11 of the drain housing 100 to prevent liquid from passing between the odor trap 1 and the drain

housing 100. Such a gasket may be a separate component or it may be part of the odor trap 1 or the drain housing 100.

[0048] In a further embodiment, not shown, the widened upper portion 21 of the immersion pipe 20 may be formed as a part assembled to the tubular immersion pipe 20. The widened upper portion 21 may then be formed in a resilient material, e.g. rubber, to provide a gasket.

[0049] In order to connect the overflow cup 10 and the immersion pipe 20, the odor trap 1 as mentioned above further comprises at least one wall 50. In all the figures there is provided only a single wall lying essentially within one plane. In other embodiments however, the odor trap 1 may comprise one or more further walls forming an angle with the first wall 50 (as seen from above), for example one extra wall formed perpendicularly to the one wall shown in the figures.

[0050] The wall 50 forms a connection between the overflow cup 10 and the immersion pipe 20, and the wall 50 also partitions a flow of liquid through the odor trap 1 into two completely separated pathways 40', 40" all the way from the upper rim 25 of the immersion pipe 20 to the overflow rim 15 of the overflow cup 10, as may be appreciated from Fig. 2D, where arrow 40 illustrates liquid flowing into the odor trap 1 from above. The flow of liquid 40 is divided into two flows of liquid, one illustrated by arrow 40' in the left side of the figure, and one illustrated by arrow 40" in the right side of the figure.

[0051] Thus, the wall 50 separates the odor trap 1 into two distinct chambers or channels 60' and 60", where fluid connection between the two chambers 60', 60" is prevented. Once fluid has entered one of the two distinct chambers or channels 60' and 60" it is thus prevented from passing into the other.

[0052] The wall 50 forms a water tight barrier between the two chambers or channels 60' and 60", and thus between the two pathways 40', 40" or flows.

[0053] This is provided, by the wall 50 having

- one central wall portion 50' extending across the at least one tubular wall 22, diagonally across the inner surface 23, and from the upper opening or fluid inlet 2 of the odor trap 1 to the lower rim 26 of the immersion pipe 20,
- one lower wall portion 51 extending below the lower rim 26 of the immersion pipe 20 between the lower rim 26 of the immersion pipe 20 and the bottom 11 of the overflow cup 10, and diagonally across the inner surface 13; and
- intermediate wall portions 52 extending between the outer surface 24 the immersion pipe 20 and the inner surface 13 of the overflow cup 10 from the lower rim 26 of the immersion pipe 20 to the overflow rim 15 at the top of the wall 12 of the overflow cup 10.

[0054] It is further provided by none of the mentioned wall portions 50' 51, 52 of the wall 50 having any perforations or holes or passages.

rations or holes or passages.

[0055] The lower wall portion 51 of the at least one wall 50 extends below the lower rim 26 of the immersion pipe 20 and forms a water tight barrier against an inner surface 11' of bottom 11 of the overflow cup 10.

[0056] The wall 50 comprising the mentioned wall portions 50' 51, 52 may be formed from a collection of wall parts or it may be formed from a singular piece. If the wall is formed from sub-components a water tight connection between such components is preferably provided.

[0057] Thus, in any embodiment, at least when the odor trap 1 is assembled the wall 50 is devoid of perforations or holes or passages, and forms a watertight barrier between the two pathways 40', 40" (chambers or channels 60' and 60").

[0058] By arranging the odor lock 1 in this way, hair and other long flexible objects does not become stuck in the odor trap. With the present invention it has been realized that the solution is not to minimize the connection between the overflow cup 10 and the immersion pipe 20. Instead a clog free odor trap may be obtained by "maximizing" the connection, making separate pathways through the odor trap, where liquid is prevented from passing from one pathway or flow-path to another. Thereby, obstacles are prevented. In the prior art the hair and other long flexible objects get stuck because a hair may have different portions (ends) entering two different pathways, and because the ends of a single hair may tangle downstream of an obstacle such as the prior art flanges, bridges and towers. Once a single hair or a group of hairs has tangled in this way, it is easy for other objects to get stuck, and clogging will eventually occur. It has been realized that if e.g. a hair just has a portion in each of two pathways it will relatively quickly be flushed out as long as the ends of the hair cannot entangle downstream of an obstacle (after a reunification of the flow).

[0059] As a further advantage of arranging the wall 50 as described above it has been found that the wall 50 prevents or minimizes liquid (water/wastewater) flowing through the odor trap 1 from becoming turbulent. In a prior art type odor trap turbulence sucks air into the prior art odor traps, thereby decreasing the capacity for flow through the odor traps. The wall 50 of the odor trap according to the present invention provides a more laminar flow and thereby increases the capacity of flow through the odor trap 1.

[0060] Fig. 3 is a section, similar to the section shown in Fig. 2C of another embodiment of the odor trap 1, than the one shown in Figs. 2A-D. In this further embodiment, which may be an addition to all the previously described embodiments, the at least one wall 50 may further comprise an upper vane 53 forming an extension of said wall 50 and extending above the overflow rim 15 of the overflow cup 10 on the outer side 24 of the tubular wall 22 of said immersion pipe 20.

[0061] Fig. 4 is a section, similar to the section shown in Fig. 2C and 3 of another embodiment of the odor trap

1, than the one shown in Figs. 2A-D, and in Fig. 3. In this further embodiment, which may be an addition to the embodiment shown in Fig. 3, the at least one wall 50 may further comprise upper vane 53 forming an extension of said wall 50, and extending above the overflow rim 15 of the overflow cup 10 on the outer side 24 of the tubular wall 22 of said immersion pipe 20, and to a downwardly facing surface 31 of the immersion pipe 20. Preferably, the upper vane 53 extends all the way to the upper rim 25 of the immersion pipe 20.

[0062] Fig. 5 is a section, similar to the section shown in Fig. 2C of another embodiment of the odor trap 1, than the one shown in Figs. 2A-D, and in Figs. 3 and 4. In this further embodiment, which may be an addition to the embodiment shown in Fig. 3 or the embodiment shown in Fig. 4, the at least one wall 50 may further comprise an outer vane 54 forming an extension of said wall 50 and said upper vane 53 said outer vane 54 being formed on and extending from the outer surface 14 of the sidewall 12 of said overflow cup 10.

[0063] In further embodiments, not shown, the outer vane 54 may further comprise portions extending all the way to the bottom 11 of the overflow cup 10.

[0064] In yet further embodiments, not shown the outer vane 54 may further comprise a portion extending from the lower surface 11" of the bottom 11 of the overflow cup 10, and in a downwards direction.

[0065] In all of the previously described embodiments, the at least one wall 50 has an upper edge 55 which is provided slightly below said upper rim 25 of the immersion pipe 20. The upper edge may be provide 0-1,5 cm, such as 0.2 -1 cm, such as 0,5-1cm below the upper rim 25. In another (not shown) embodiment however, the upper edge 55 is substantially flush with the upper rim 25. Thereby, the pathways 40', 40" can be made as long as possible. Further, the upper part of the wall 50 may be easily reached by a user, whereby it may be used as a handle to insert and to extract/pull out the odor trap 1 from a drain housing 100 (when grate 270 has been removed). These arrangements of the upper edge 55 may be used in combination with all of the previously described embodiments.

[0066] In other, not shown, embodiments the upper edge 55 of wall 50 may have a slight curve being lowest at the middle. This arrangement of the upper edge 55 may be used in combination with all of the previously described embodiments.

[0067] Fig. 6 shows a section, similar to the section shown in Fig. 2D, through another embodiment of the odor trap 1, than the one shown in Figs. 2A-D, and 3-5. In this further embodiment, the upper edge 55 of the at least one wall 50 is provided with an elongated, rounded, bulging rim 56. The elongated, rounded, bulging rim 56 may serve as a handle or grip, and has the further advantage of separating hair and other elongate flexible objects, to make it easier for a flow to flush them of the upper rim 55. This arrangement may be applied to all of the previously described embodiments.

[0068] Figs. 7A and B, shows an odor trap 1 according to a further embodiment of the invention. In this embodiment the odor trap 1 is pre-formed as two separate parts, one part comprising the overflow cup 10 and one part comprising the immersion pipe 20 with the wall 50, including the central wall portion 50', the lower wall portion 51, the intermediary wall portions 53, the upper vane 53, and outer vanes 54. The two parts 10', 20' are connectable by cooperating snap lock mechanisms 70, 71 on the two parts 10', 20'. In the shown embodiment, the snap lock is provided by the upper vane 54 being split in two flanges 54', 54", one or each of which is provided with an elongate opening or slot 71 adapted for cooperation with a stud or protrusion 72 formed on one or both sides of a vane 56 formed on the outer side 14 of the overflow cup 10/ overflow cup part 10'. Thereby, a snap lock connection may be formed. From Fig. 7A it will be appreciated that when the immersion pipe part 20' and the overflow cup part 10' have been connected the flanges 54', 54" and the vane 56 together forms a portion of the outer vane 54, as described above.

[0069] In some embodiments, the snap connection may be unreleasable. This may be obtained by the studs 72 and slots 71 interacting in such a way, that once the studs 72 have been inserted in the slots, they cannot be removed without breaking or deforming the parts.

[0070] However, in preferred embodiments, snap lock 70 is formed to be releasable. This may be obtained by a suitable flexibility of the studs 72, or of the material used for the vane 54 (and flanges 54', 54"). Thereby, when the odor trap 1 has been removed from the rain housing 100, the odor trap 1 may be disassembled for cleaning and removal of e.g. hard objects stuck in the odor trap 1, e.g. hair pins, coins etc.

[0071] In other not shown embodiments the vanes 56 and the flanges 54', 54" may be switched between the two parts, i.e. the immersion pipe part 20' and the overflow cup part 10'.

[0072] Optionally, and as shown in Fig. 7B, guide tracks 80 may be formed in the inner side 13 of the overflow cup 10/ overflow cup part 10'. These guide tracks 80 cooperates with outer edges 58 of the intermediate wall portions 52. Thereby a very stable connection between the two parts 10', 20' is obtained.

[0073] In other, not shown embodiments other types of snap lock connections between the two parts 10', 20" may be applied. Also a couple of alternative snap lock connections are shown in Figs.8A-B and Fig. 9. In Figs. 8A-B the outer vanes 54 do not have a portion split into two flanges 54', 54" as in the Fig. 7A-B embodiment. Instead the outer vanes 54 on the immersion pipe part 20' and the vane 56 on the overflow cup part 10' is disposed a little skewed in such that a slot 71 and a stud 72 of a snap mechanism will still mate, when the immersion pipe part 20' and the overflow cup part 10' are connected, i.e. when the outer vanes 54 on the immersion pipe part 20' and the vanes 56 on the overflow cup part 10' slides by each other. This embodiment of the snap

lock mechanism requires that the overflow cup part 10' and the immersion pipe part 20' are guided in a specific rotational orientation relative to each other, e.g. by guide tracks 80 formed in the inner side 13 of the overflow cup 10/ overflow cup part 10'. These guide tracks 80 cooperates with outer edges 58 of the intermediate wall portions 52.

[0074] In Fig. 9 an embodiment is shown, where a snap lock 70 is provided by two studs 73 provided on the outer edges 58 of the intermediary wall portion 52, the studs 73 cooperating with slots 74 formed in or through (as shown) the wall 12 of the overflow cup part 10'.

[0075] In other not shown embodiments, the intermediate wall portions 52 may be formed on the inner surface 13 of an overflow cup part 10' and optionally mating with guides 80 formed in the outer surface 24 of the wall 22 of the immersion pipe part 20'.

[0076] In other not shown embodiments, the lower wall portion 51 or parts thereof may be formed on the inner surface 13 of the wall and on the inner surface 11' of the bottom of an overflow cup part 10'.

[0077] In other not shown embodiments, the lower wall portion 51 or parts thereof may be formed on the inner surface 13 of the wall and on the inner surface 11' of the bottom of an overflow cup part 10' and the central wall portion 50' or parts thereof may be formed as an extension thereof. In this case the central wall portion 50' or the parts thereof may cooperate with guide tracks on the inner surface 23 of the immersion pipe part 20' (not shown).

[0078] Now returning to Fig. 8A-B, the embodiment shown in this figure, further shows an upwardly facing surface 27 formed on an immersion pipe part 20'. The upwardly facing surface 27 has a downward slope towards the upper rim 25 of the immersion pipe 20. Thus, when mounted in a drain housing 1, the upper rim 25, in this embodiment, does not constitute the very top of the odor trap. Rather, an upper inner rim 25' constitutes the top (or highest) region of the odor trap. The upwardly facing surface 27 thus has downward slope from the upper inner rim 25' to the upper rim 25, i.e. the slope of the upwardly facing surface 27 is outward relative to the inlet 2. Also, the upwardly facing surface 27 slopes downward towards the inlet 2 at two openings 28 provided in the downward slope in the upwardly facing surface 27 to allow liquid to enter an inner space 29 of the immersion pipe 20. These two openings 28 are in the embodiment shown provided at the connection of a handle 56 with the inner sides 23 of the immersion pipe 10. This will direct a flow of liquid to flush over the handle 56. It will be appreciated that this arrangement will also be possible where the upper rim 55 of the wall 50 is not provided with a handle 56 as such. It will also be appreciated that the sloped upwardly facing surface 27 arrangement will also be an option in embodiments where there the odor trap 1 is not formed as an assembly of two parts 10', 20 connected by snap locks 70 as shown. In further embodiments, not shown, there may only be provided one opening

28. In yet further embodiments (not shown), openings may be provided in other locations and manners in order to direct liquid collected by the sloping upwardly facing surface 27 to enter the inner space 29 of the odor trap. In yet further embodiments (not shown), there may be more than two openings 28.

[0079] In further embodiments, not shown, it will be appreciated that the upwardly facing surface 27 with openings 28 may be provided as a separate part attachable to the immersion pipe part 20'. This part may be manufactured in the same material as the immersion pipe 20 or in a different material.

[0080] In all of the above described embodiments the odor trap has been shown with a dent 11''' (see e.g. Fig. 2) in the bottom 11 of the overflow cup 10. Such dents 11''' are conventional within the art. It helps to distribute the flow. It is clear that any of the above embodiments would also be able to operate if the bottom 11 of the overflow cups 10 were shaped differently, e.g. with flat bottoms 11.

[0081] In all of the above described embodiments the odor trap 1 may be formed in a plastic material, e.g. molded PVC or the like. Any of the odor trap 1 embodiments may further be formed in metal, such as stainless steel.

In the embodiments where the odor traps are shown as assemblies (Fig. 7A-B, 8A-B, and 9) the steel parts 10', 20' may be plumbed or welded together after the snap lock assembly. It is also clear that embodiments could be conceived, where the parts 10', 20' did not comprise snap lock mechanisms and where the parts 10', 20' are plumbed or welded together after the assembly.

[0082] In yet other embodiments, the different component may be formed in different materials.

[0083] Fig. 10A-B shows an alternative way of assembling an odor trap 1 according to the invention. The odor trap 1 is basically as described with respect to any of the above mentioned embodiments except that the odor trap 1 is formed from a wall part 50'', and where each of the overflow cup 10 and the immersion pipe is formed as half parts (shells 10'', 20'') along a vertical plane. This would be advantageous when the odor trap 1 is formed in steel. This method of manufacturing is interesting because the shells are identical. Thus only three different types of parts need to be manufactured, namely one wall 50'', and one half overflow cup 10 shell 10'' and one half immersion pipe 20 shell 20''. The wall 50'' and the shells 10'', 20'' may be plumbed or welded together. However, in other embodiments, the parts may be formed with mating connection means, such as various types of snap locks.

[0084] The teaching of this invention has numerous advantages. Different embodiments or implementations may yield one or more of the following advantages. It should be noted that this is not an exhaustive list and there may be other advantages which are not described herein.

[0085] Moreover, due to its flexibility and limited space requirement the odor trap according to the invention may be utilized in already existing drain housings, which do

not already have an odor trap according to the invention.

[0086] Although the teaching of this application has been described in detail for purpose of illustration, it is understood that such detail is solely for that purpose, and variations can be made therein by those skilled in the art without departing from the scope of the teaching of this application.

[0087] The term "comprising" as used in the claims does not exclude other elements or steps. The term "a" or "an" as used in the claims does not exclude a plurality. The single processor or other unit may fulfill the functions of several means recited in the claims.

Claims

1. An odor trap (1) for connection to a drain housing (100) adapted for being fixedly mounted to a building structure such as a floor (300), the odor trap (1) comprising:

- an overflow cup (10) having a bottom (11), a sidewall (12) extending from said bottom (11) and an overflow rim (15) defined on said sidewall (12), the sidewall (12) having an inner surface (13) and an outer surface (14);

- an immersion pipe (20) extending into the overflow cup (10) said immersion pipe (20) having a tubular wall (22) with an inner side (23) and an outer side (24), an upper rim (25) and a lower rim (26), an inlet (2) formed opposite the lower rim (26);

- connection means (30) for connecting to a receiving portion (110) of said drain housing (100) and being provided at the upper rim (25) of the immersion pipe (20); and

- at least one wall (50) forming a connection between the overflow cup (10) and the immersion pipe (20),

characterized in that a flow of liquid through the odor trap (1) is partitioned in at least two completely separated pathways (40', 40'') all the way from the inlet (2) of the immersion pipe (20) to the overflow rim (15) of the overflow cup (10).

2. An odor trap (1) according to claim 1, wherein each of said at least one walls (50) has a lower wall portion (51) extending below the lower rim (26) of the immersion pipe (20) and forms a water tight barrier against an inner surface (11') of bottom (11) of the overflow cup (10).

3. An odor trap (1) according to claim 1 and 2, further comprising an upper vane (53) forming an extension of said wall (50) and extending above the overflow rim (15) of the overflow cup (10) on the outer side

(24) of the tubular wall (22) of said immersion pipe (20).

4. An odor trap (1) according to claim 3, further comprising an outer vane (54) forming an extension of said wall (50) and said upper vane (53) said lower vane (54) being formed on and extending from the outer surface (14) of the sidewall (12) of said overflow cup (10).

5. An odor trap (1) according to any one of claims 1-4, wherein the odor trap (1) is formed as an assembly of an overflow cup (10) and an immersion pipe (20), wherein at least a portion of said wall (50) is formed on immersion pipe and the overflow cup (10) and an immersion pipe (20) are joined by a snap lock (70).

6. An odor trap (1) according to any one of claims 1-5, wherein the at least one wall (50) has an upper edge (55) and wherein said upper edge (55) is substantially flush with said upper rim (25) of the immersion pipe (20).

7. An odor trap (1) according to claim 6, wherein hand grip (56) is formed on said upper edge (55) of the at least one wall (50), and wherein said hand grip (56) has a cylindrical outer surface.

8. An odor trap (1) according to any one of claims 1-7, wherein the immersion pipe (20) has an upwardly facing surface (27), and wherein the upwardly facing surface (27) has a downward slope towards the upper rim (25) of the immersion pipe (20), and wherein at least one opening (28) is provided in the downward slope in the upwardly facing surface (27) to allow liquid to enter an inner space 29 of the immersion pipe (20).

9. An odor trap (1) according to any one of claims 1-8, wherein there is more than one wall (50).

10. A combination (200) of an odor trap (1) and a drain housing (100), said drain housing (100) being adapted for being fixedly mounted to a building structure such as a floor (300), the drain housing (100) further having at least one outlet opening (101) for connecting to a sewage pipe (250), and a receiving portion (110) for releasable reception of an odor trap (1) in the drain housing (100), wherein said odor trap (1) comprises

- an overflow cup (10) having a bottom (11), a sidewall (12) extending from said bottom (11) and an overflow rim (15) defined on said sidewall (12), the sidewall (12) having an inner surface (13) and an outer surface (14);

- an immersion pipe (20) extending into the overflow cup (10) said immersion pipe (20) having a

tubular wall (22) with an inner side (23) and an outer side (24), an upper rim (25) and an lower rim (26), an inlet (2) formed opposite said lower rim (26); and

- connection means (30) for connecting to a receiving portion (110) of said drain housing (100) and being provided at the upper rim (25) of the immersion pipe (20); and 5
- at least one wall (50) forming a connection between the overflow cup (10) and the immersion pipe (20), 10

characterized in that a flow of liquid through the odor trap (1) is partitioned in at least two completely separated pathways (40', 40'') all the way from the inlet (2) of the immersion pipe (20) to the overflow rim (15) of the overflow cup (10). 15

11. A combination according to claim 10, wherein the odor trap (1) further comprises the features of any one of claims 2-8. 20

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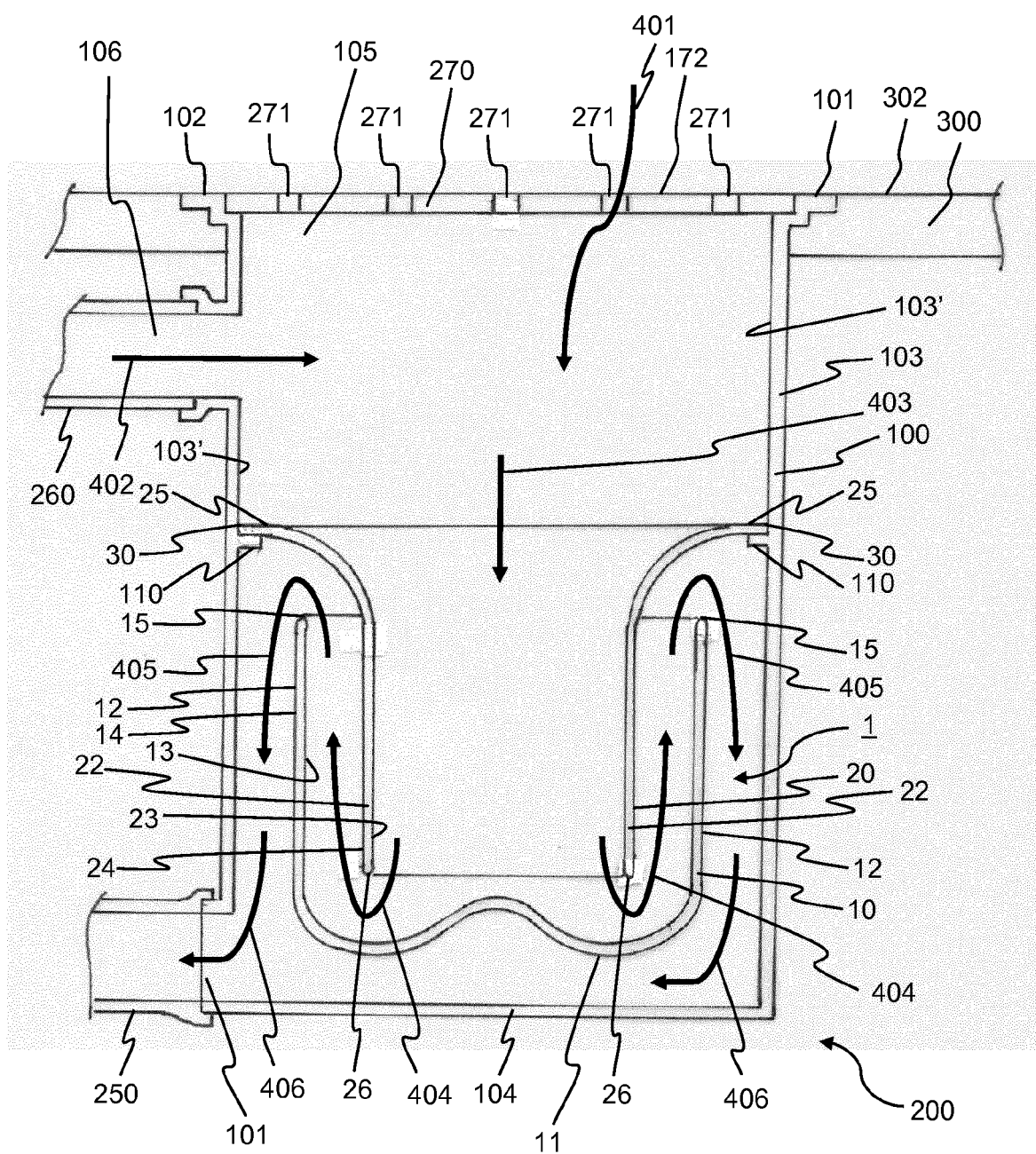


Fig. 1

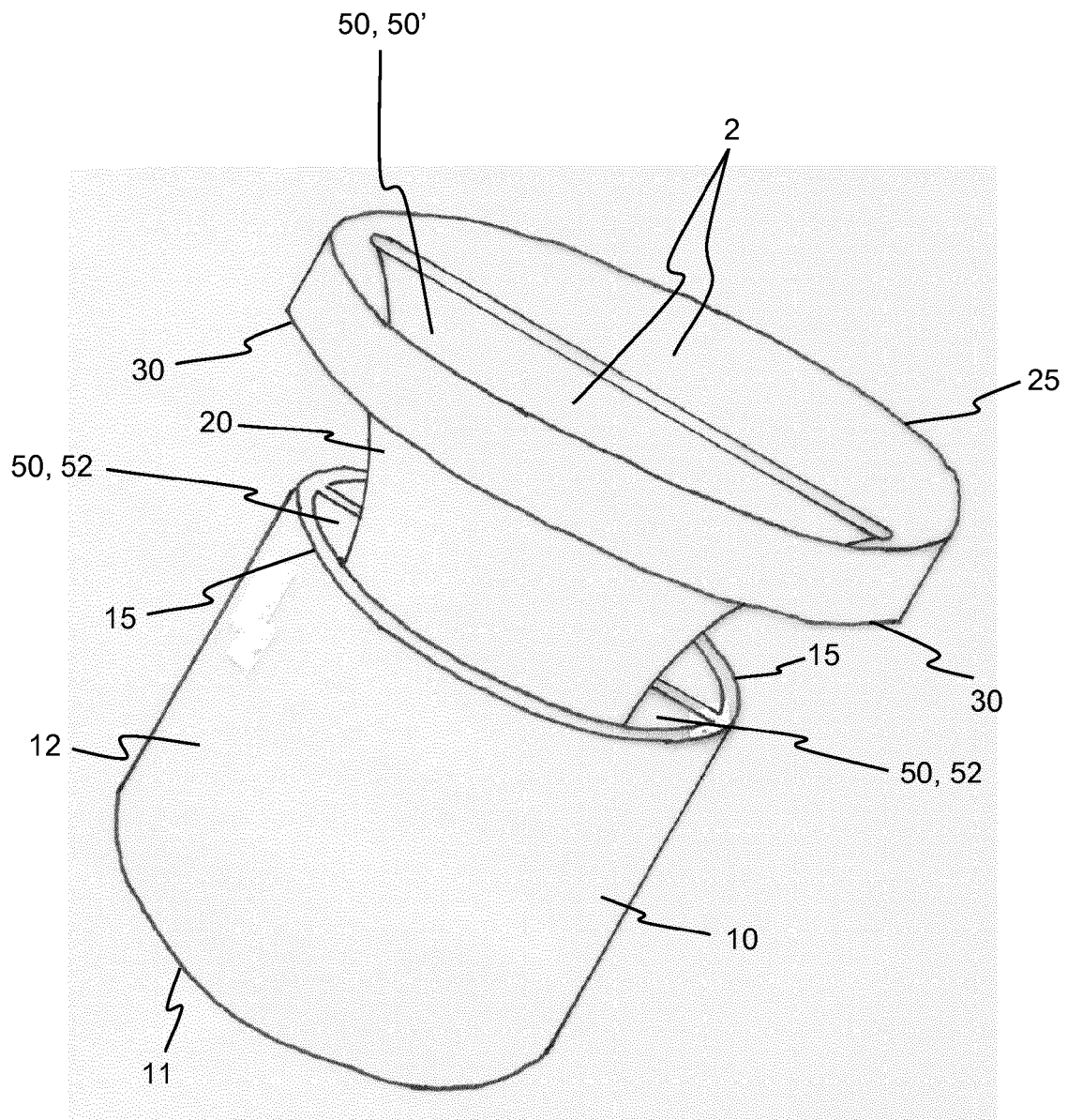


Fig. 2A

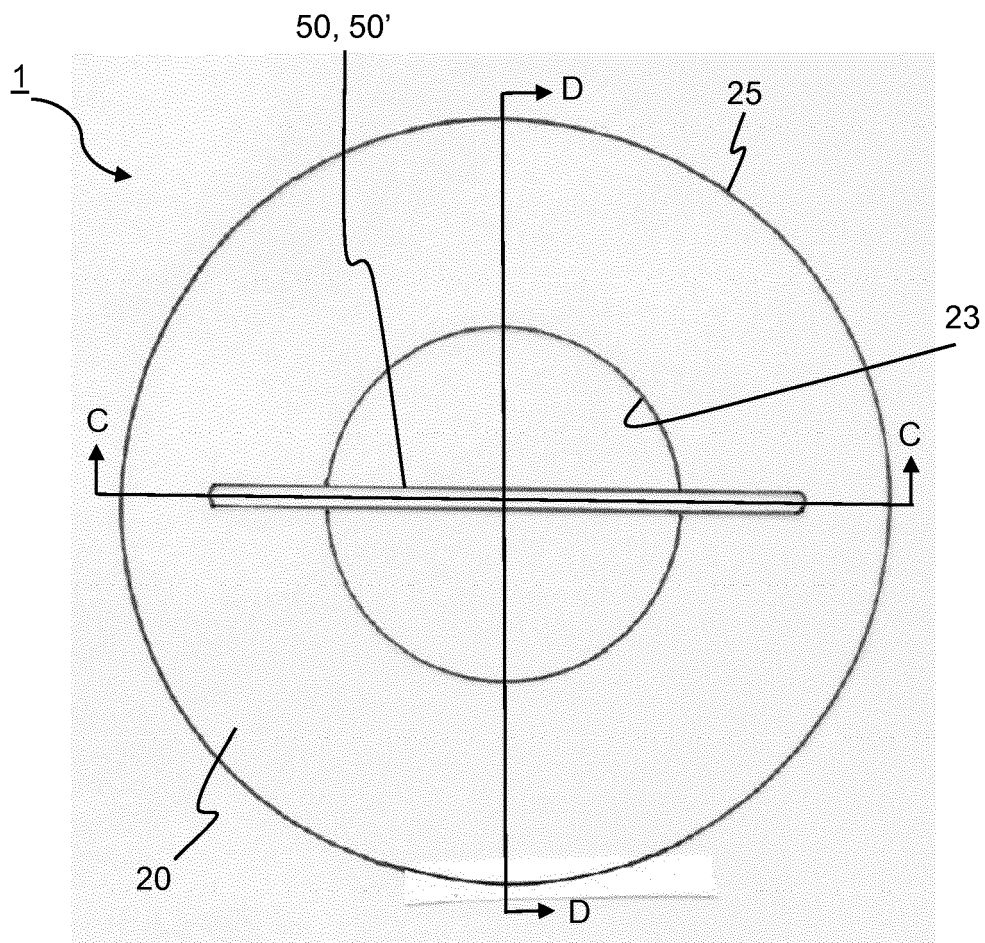


Fig. 2B

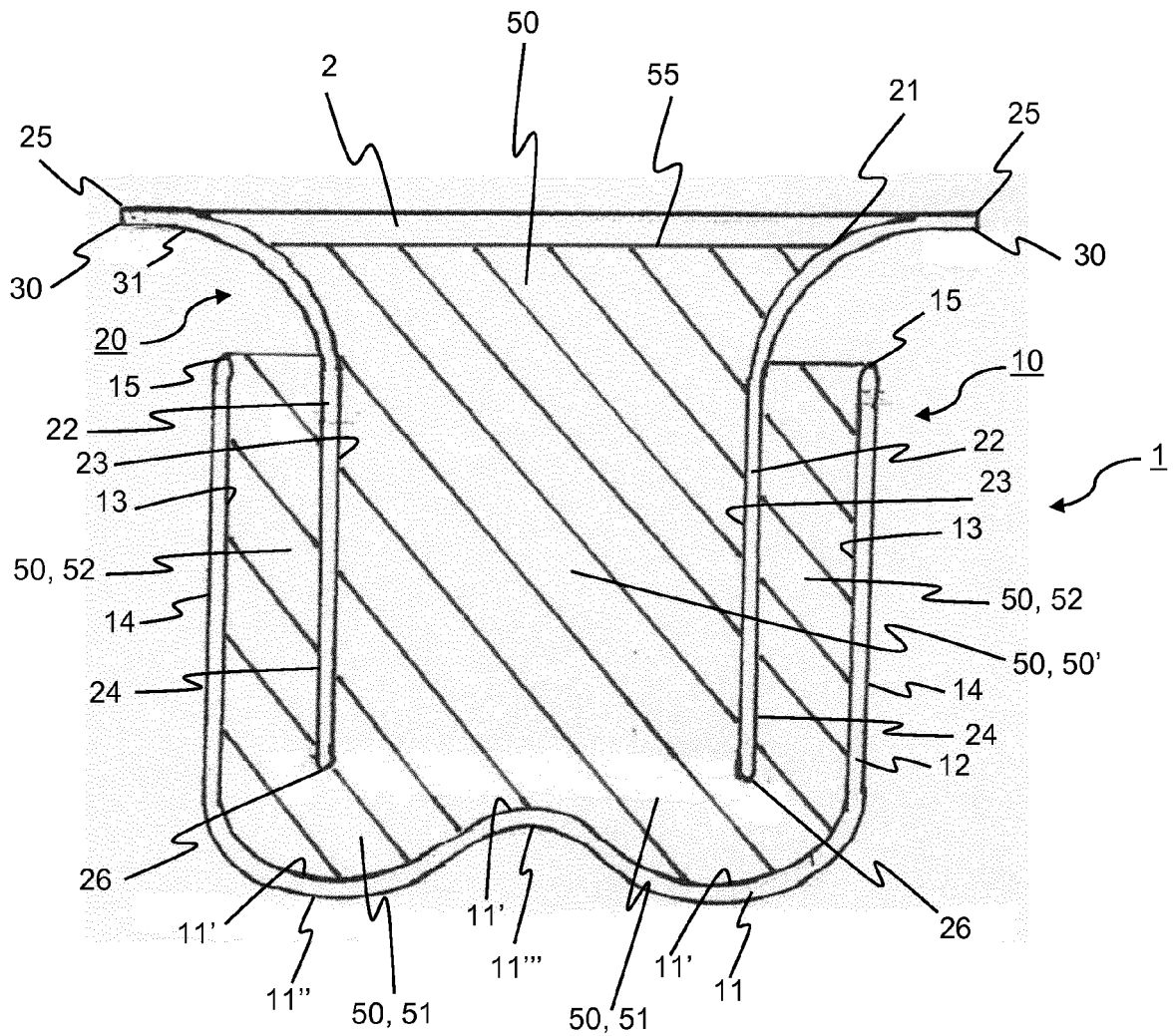


Fig. 2C

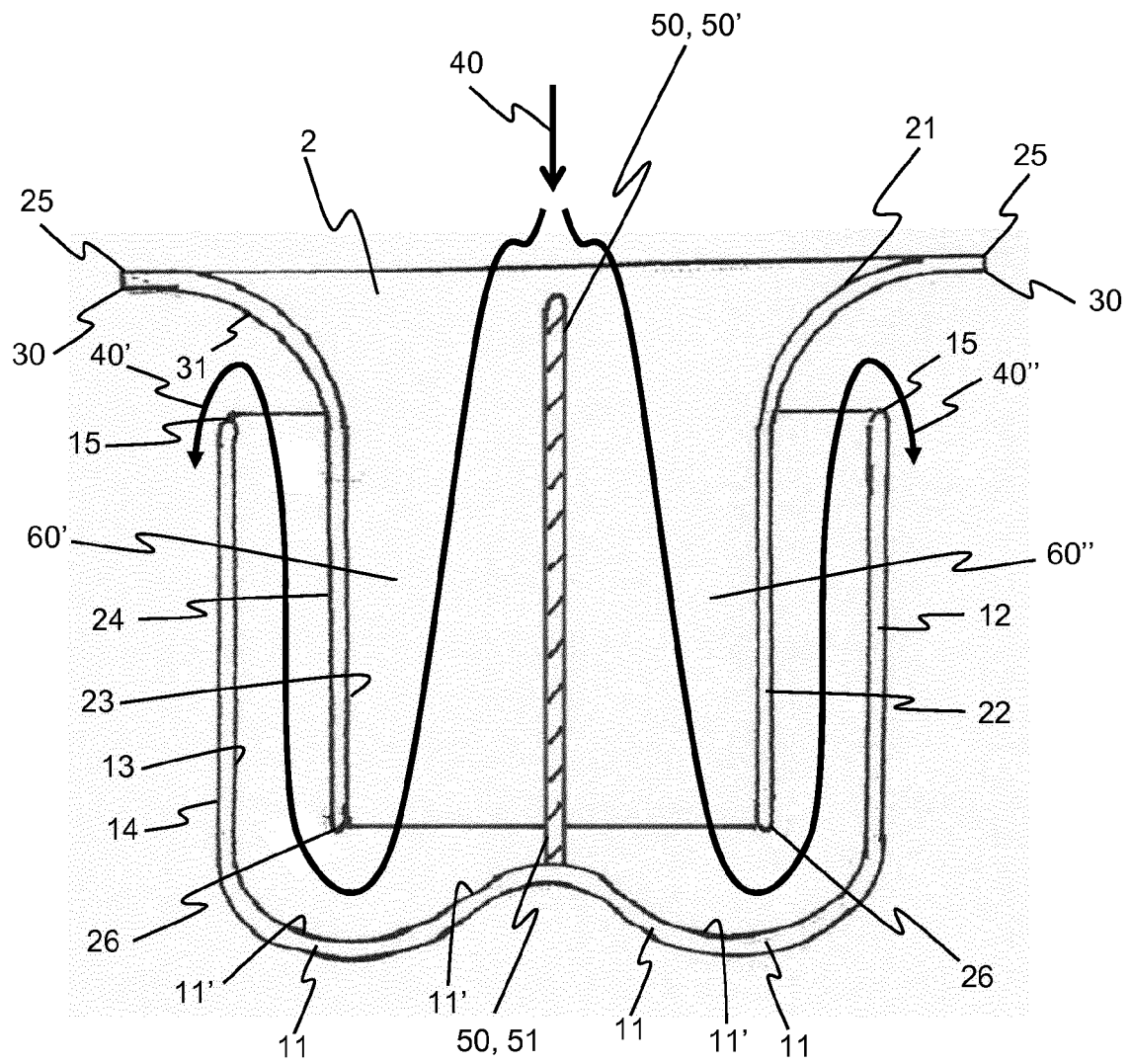


Fig. 2D

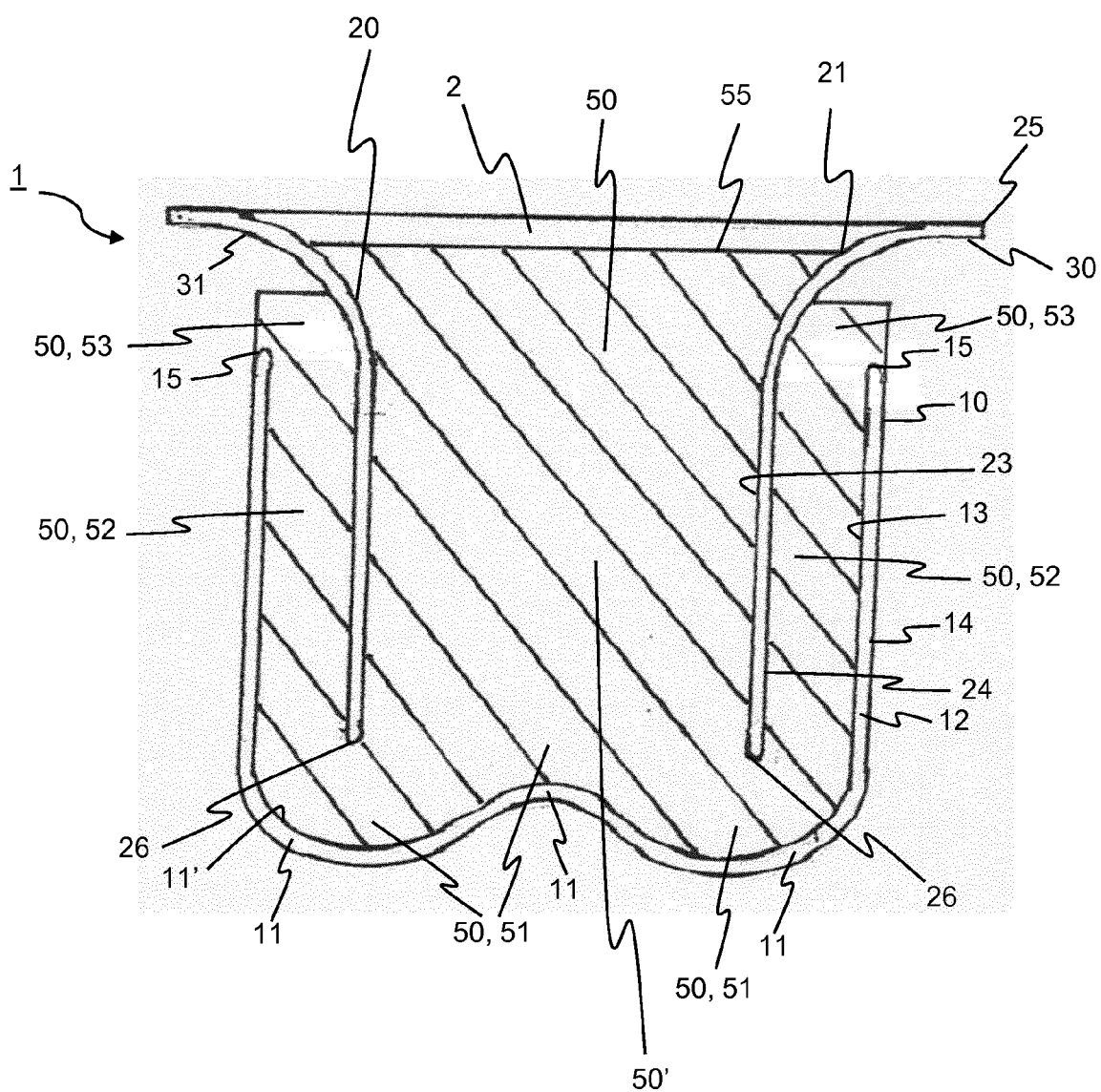


Fig. 3

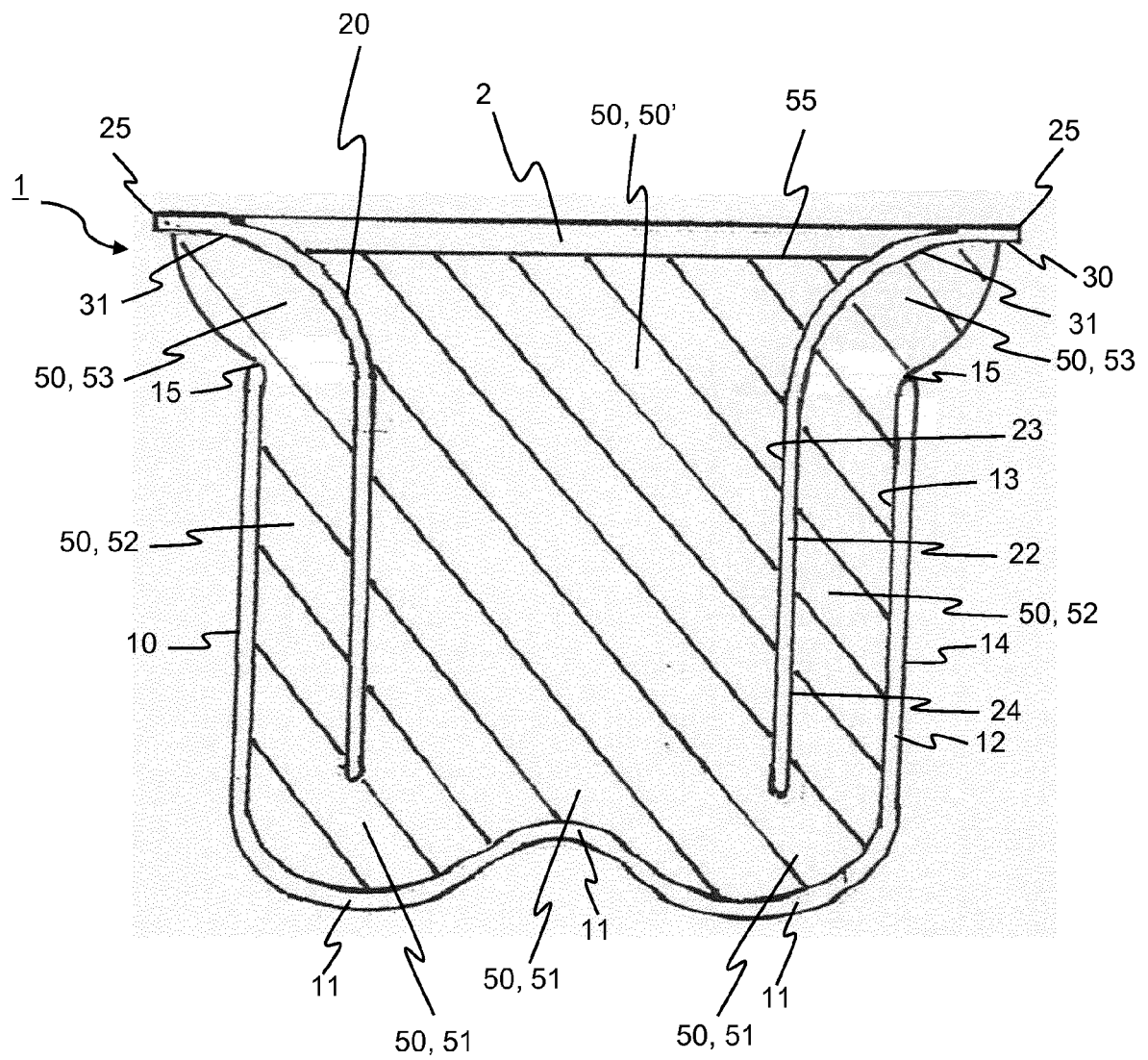


Fig. 4

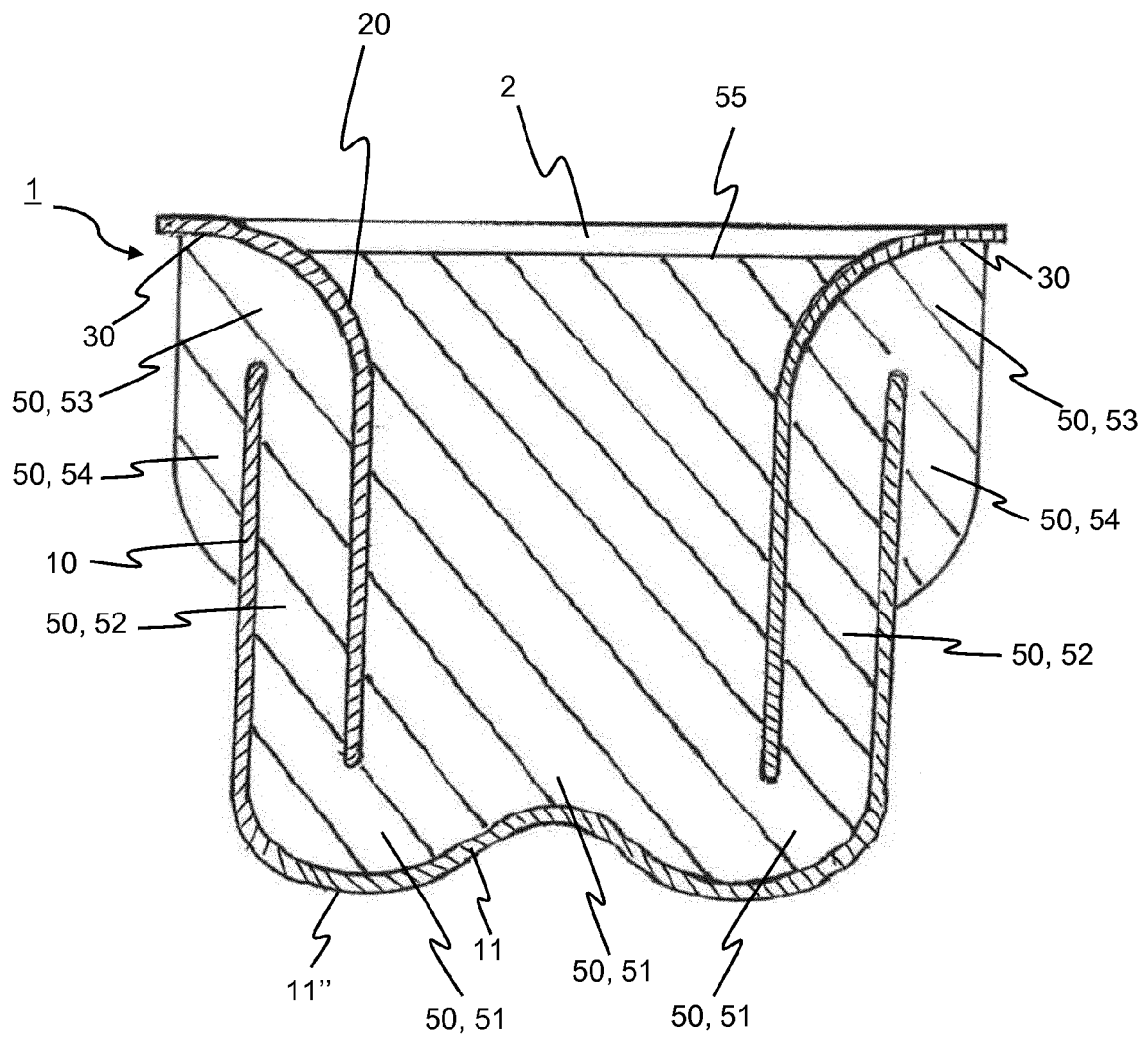


Fig. 5

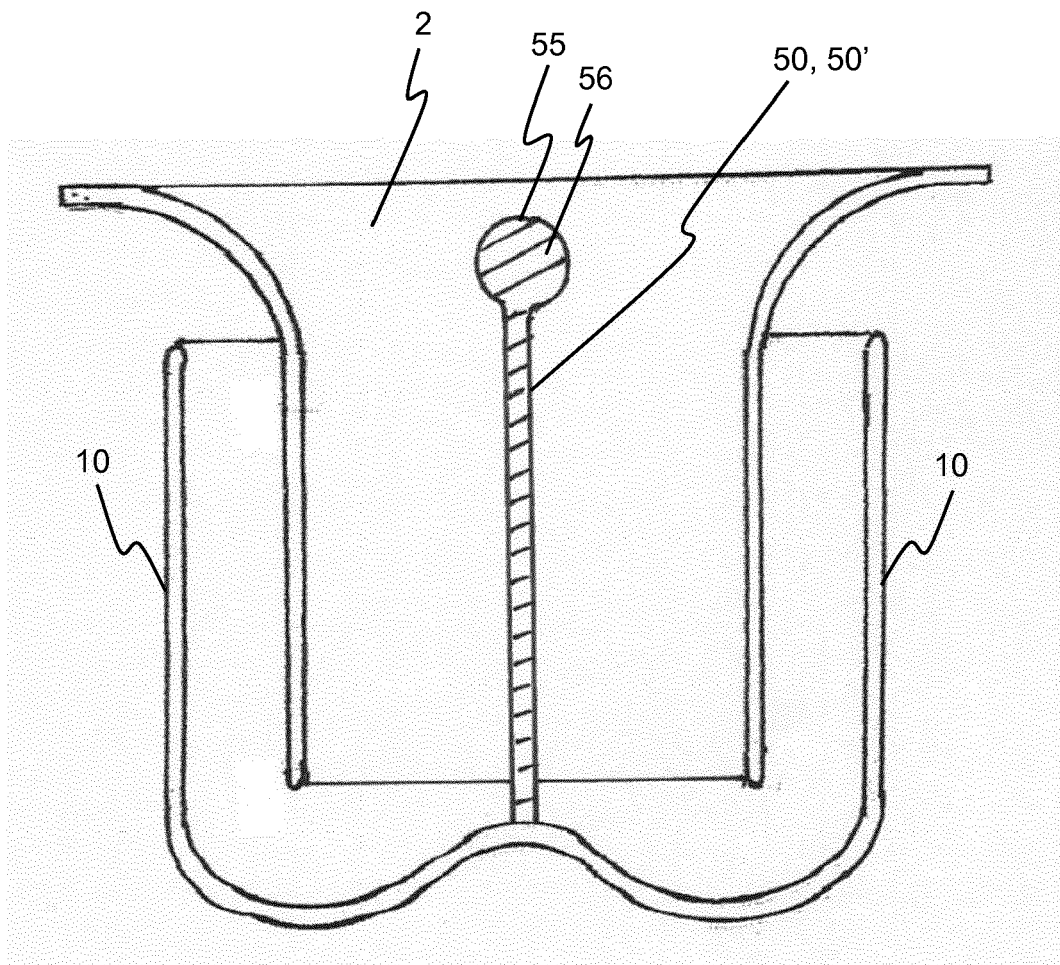


Fig. 6

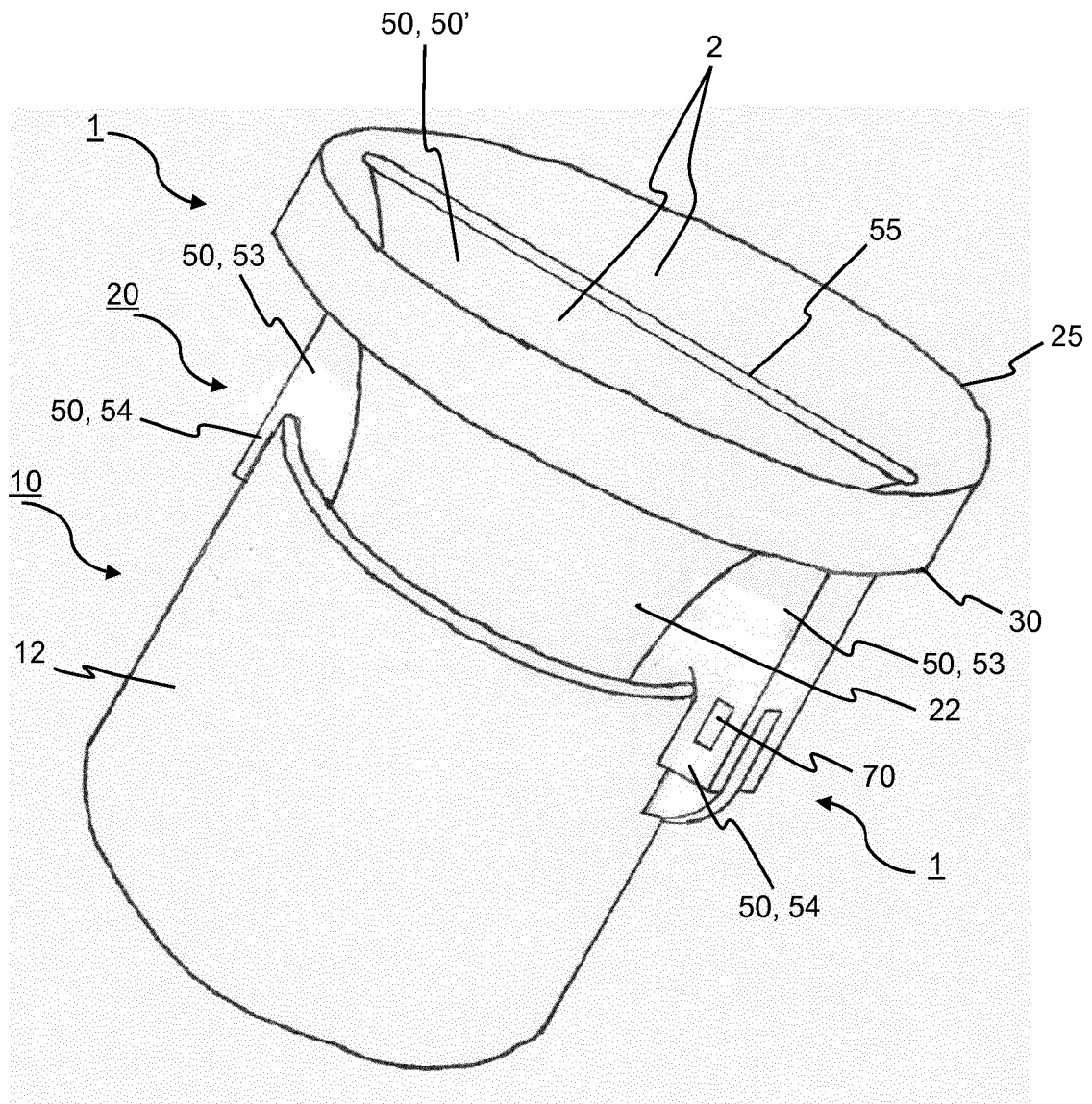


Fig. 7A

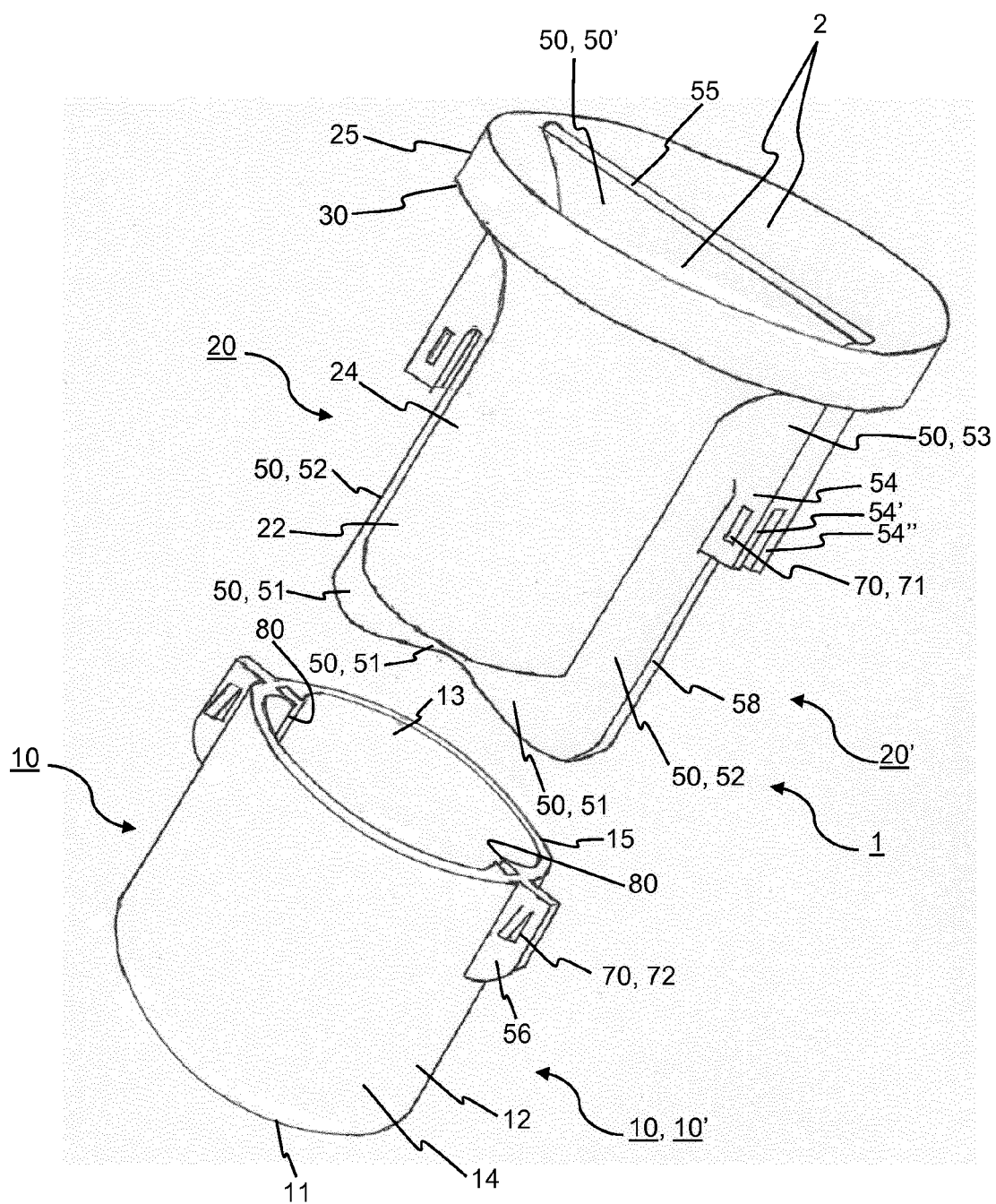


Fig. 7B

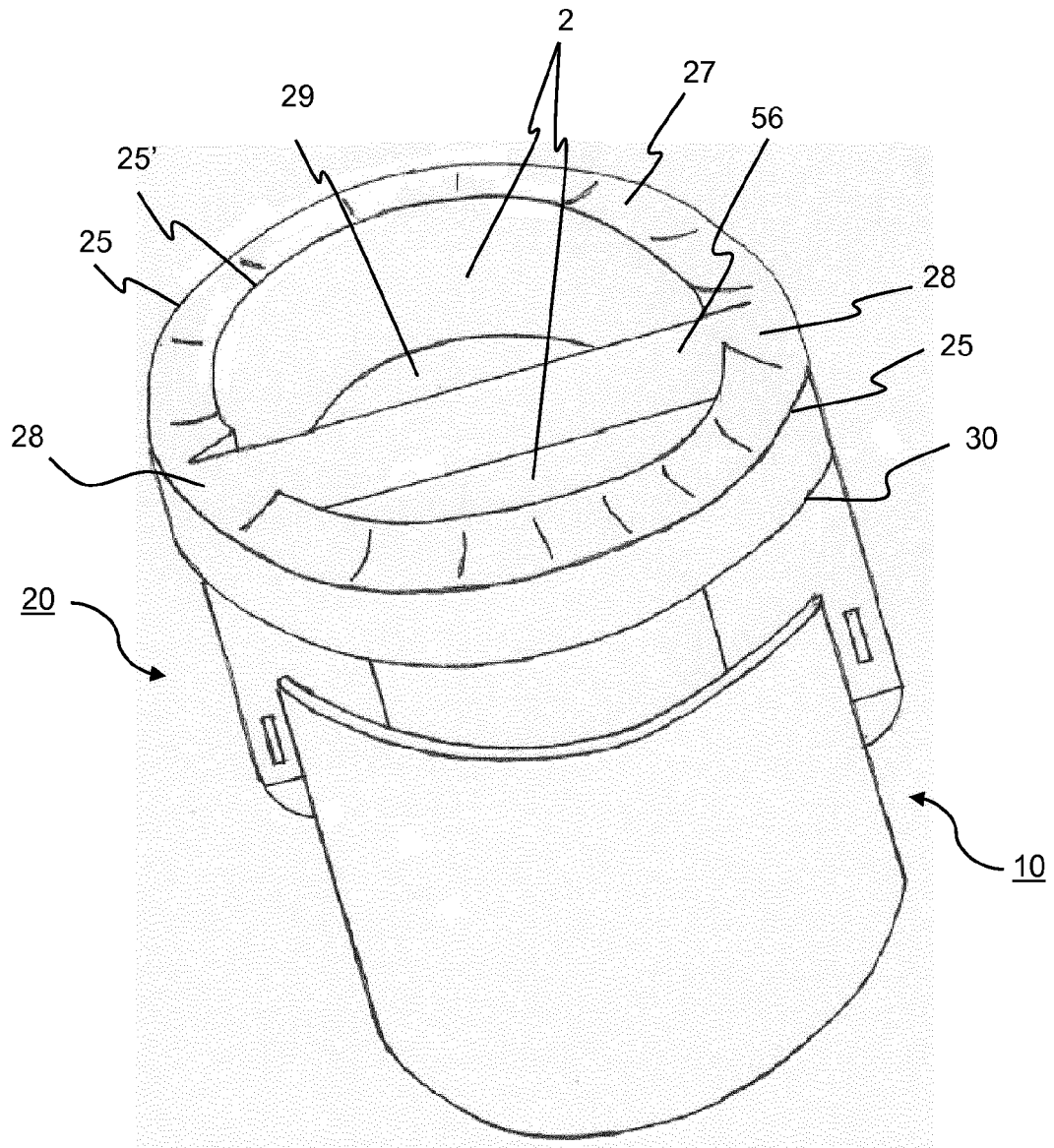


Fig. 8A

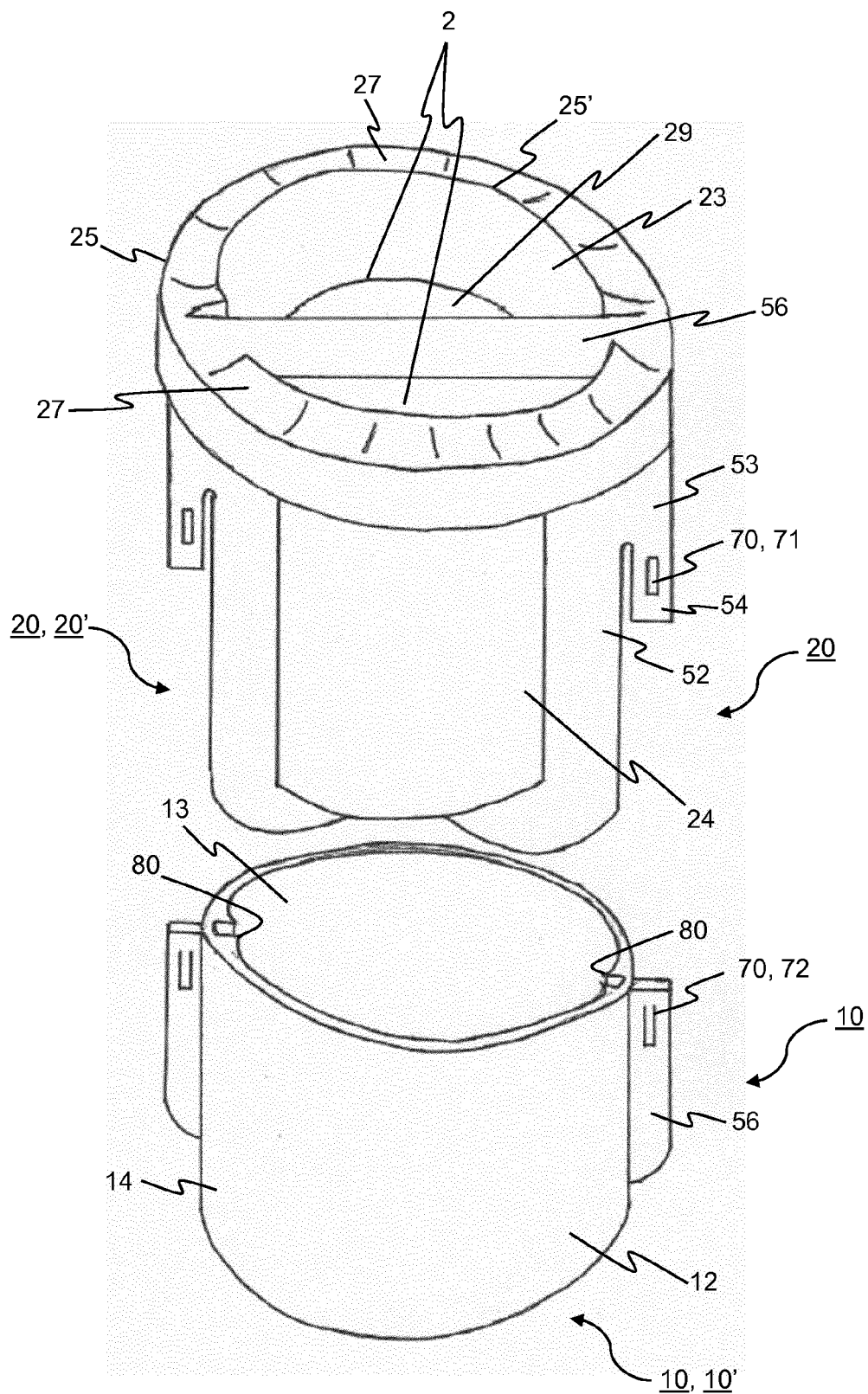


Fig. 8B

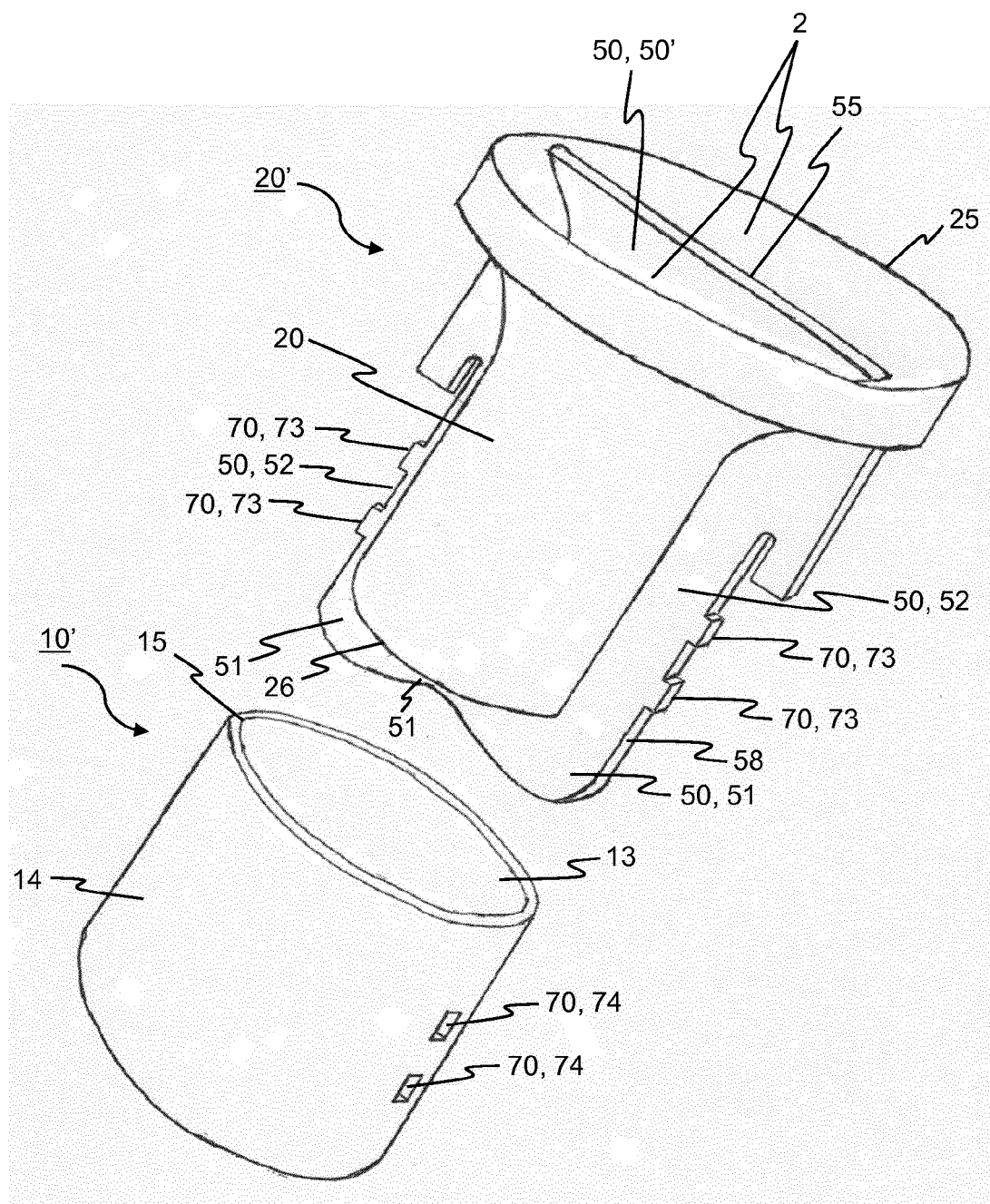


Fig. 9

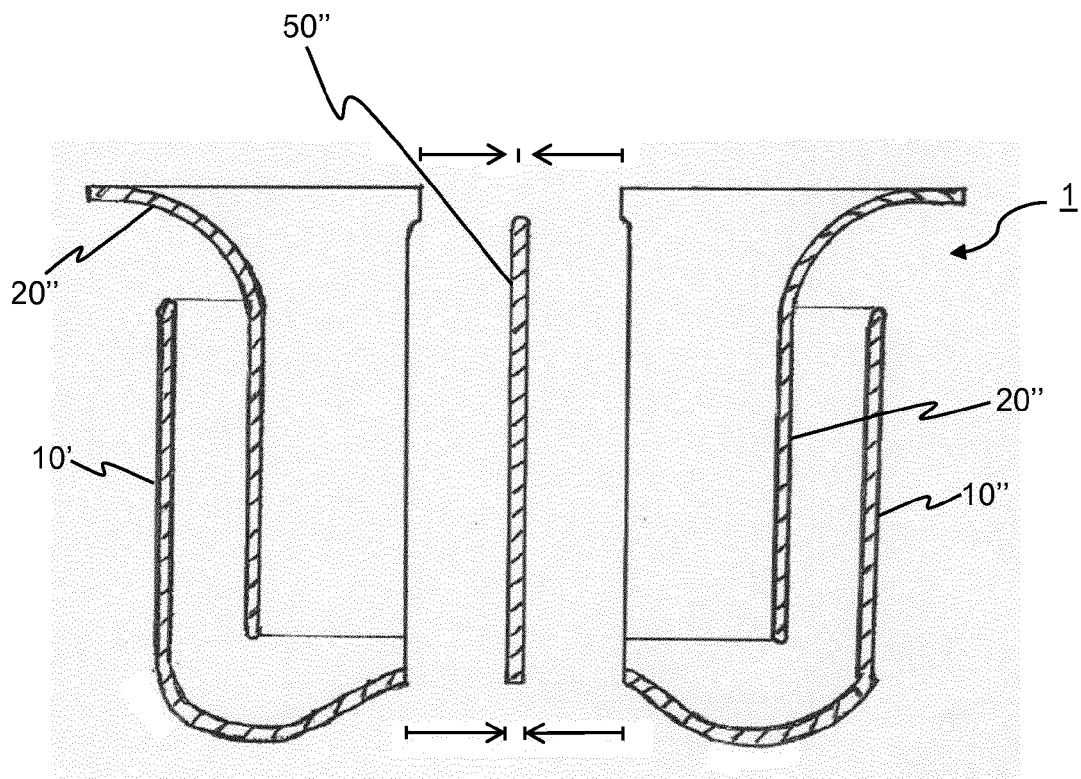


Fig. 10A

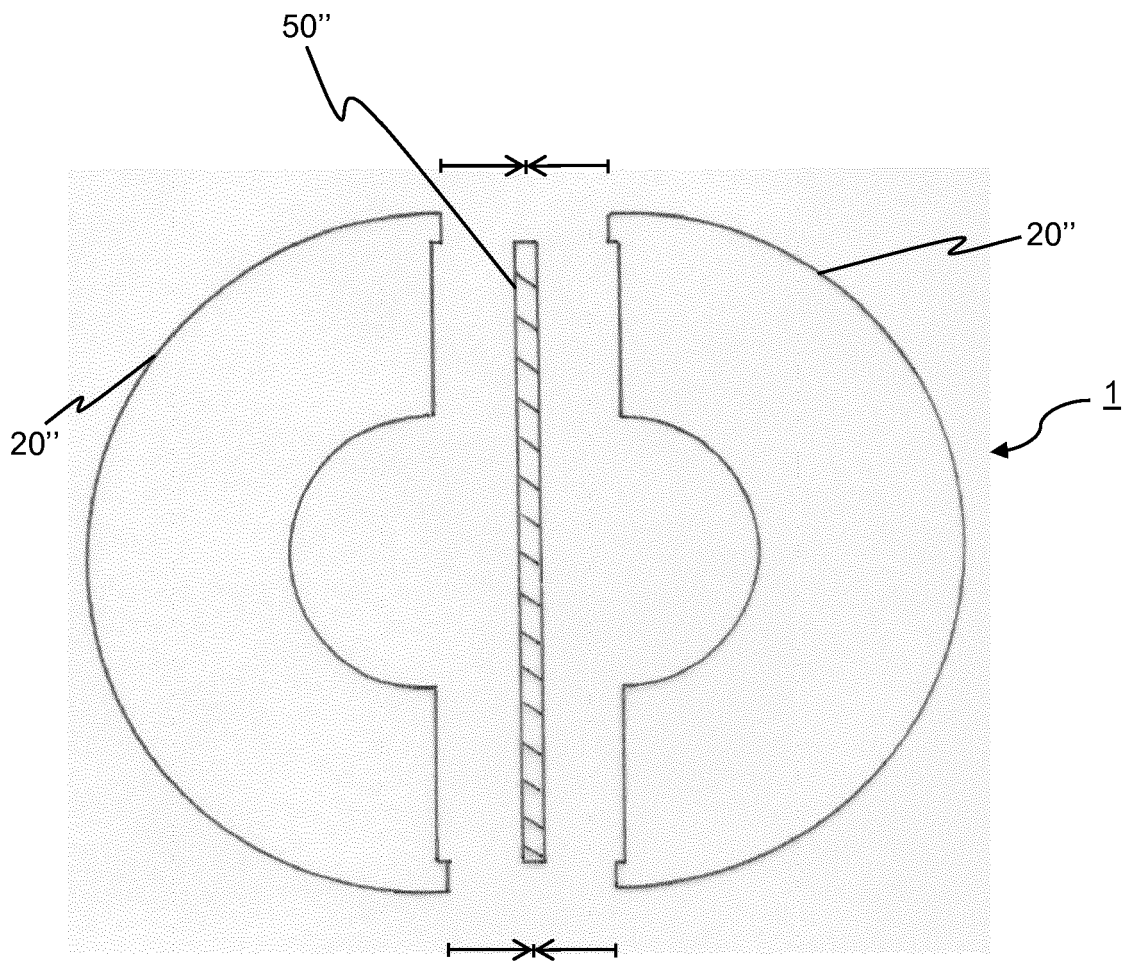


Fig. 10B



EUROPEAN SEARCH REPORT

 Application Number
 EP 14 17 3302

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 216 558 A (OLSSON JAN PLASTTEKNIK [DK]) 11 October 1989 (1989-10-11) * the whole document *	1,3,9-11	INV. E03F5/04 E03C1/29
A,D	EP 1 026 330 A2 (SJOEBO BRUK AB [SE]) 9 August 2000 (2000-08-09) * the whole document *	1,9-11	
A	DE 196 52 972 A1 (GROHE KG HANS [DE] HANS GROHE AG [DE]) 25 June 1998 (1998-06-25) * the whole document *	1,9-11	
A	EP 0 903 444 A1 (ILLY BOB W [CH]) 24 March 1999 (1999-03-24) * figure 2 *	1,2,10, 11	
			TECHNICAL FIELDS SEARCHED (IPC)
			E03F E03C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 December 2014	Examiner Leher, Valentina
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 17 3302

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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01-12-2014

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB 2216558	A	11-10-1989	DE	3908732 A1	05-10-1989
			DE	8903327 U1	21-09-1989
			DK	166488 A	26-09-1989
			FI	891400 A	26-09-1989
			GB	2216558 A	11-10-1989
			NO	891173 A	26-09-1989
			SE	469179 B	24-05-1993

EP 1026330	A2	09-08-2000	AT	413496 T	15-11-2008
			DK	1026330 T3	02-03-2009
			EP	1026330 A2	09-08-2000
			SE	512012 C2	17-01-2000

DE 19652972	A1	25-06-1998	NONE		

EP 0903444	A1	24-03-1999	AT	253669 T	15-11-2003
			AU	8796598 A	12-04-1999
			DE	59710964 D1	11-12-2003
			EP	0903444 A1	24-03-1999
			WO	9915736 A1	01-04-1999

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1026330 A2 [0004]
- WO 2012024716 A1 [0006]
- EP 2060682 A2 [0006]