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(54) **Floor drain**

(57) A floor drain (2) with a drain bowl (4) with a preferably cylindric outer side (6) and a lower central drain connection (8) which is adapted for connecting to either a straight drain pipe or to an angular drain pipe (12). The drain bowl includes a grate (18) forming a detachable lid and a mounting flange (36) externally of the outer side (6) of the drain bowl (4). The mounting flange (36) is made integral with the drain bowl and is formed by a rim area (38) at the upper edge (40) of the drain bowl. At the outer delimiting edge (44) of the rim area, integrated anchor means (46) are formed, adapted to be bent outwards from the mounting flange plane, and the mounting flange (36) also includes an integrated mounting means (50) for earth rods. In a simple way is hereby achieved a floor drain with a drain bowl (4) with integrated associated mounting flange which may easily be permanently mounted in a floor and which at the same time can be adapted to the height of an existing as well as of a newly established building membrane.

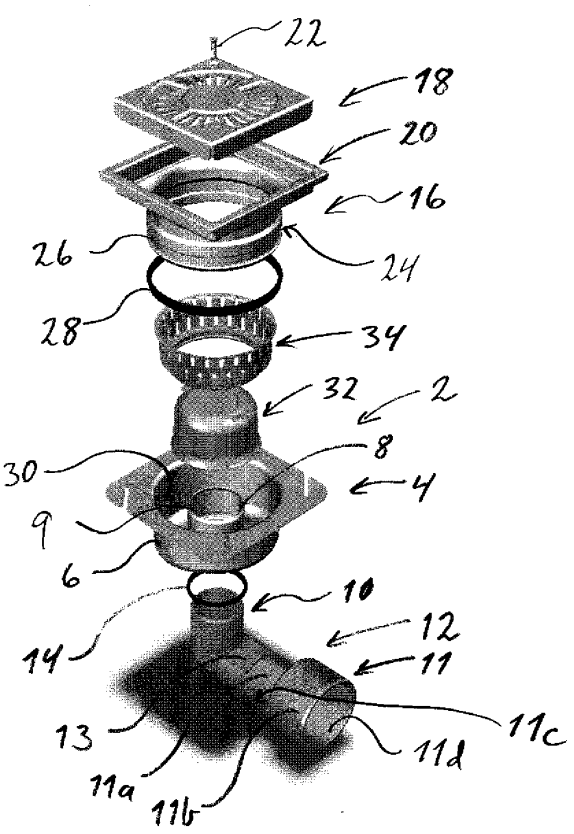

Fig. 1A

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Description

Scope of the Invention

[0001] The present invention concerns a floor drain with a drain bowl with an outer side and a lower central drain connection which is adapted for connecting to either a straight drain pipe or to an angular drain pipe, the drain bowl including a grate forming a detachable lid and a mounting flange externally on the outer side of the drain bowl.

Background of the Invention

[0002] It is prior art to provide the drain bowl of a floor drain with a mounting flange intended to act as a lubricated membrane which is lubricated or painted for guiding water into the drain bowl when connected to a building membrane with the purpose of establishing a waterproof connection between the floor drain in a wet room, e.g. a bathroom and a building membrane.

[0003] In connection with modernising or rebuilding of e.g. multi-storey buildings, it may be difficult to use current floor drains with mounting flanges, since it may be very tedious or impossible to achieve the required tight connection between the mounting flange of the floor drain and the building membrane.

[0004] In connection with cast floors it is known that floor drains are cast in place or fastened by using different types of anchor means connecting the drain bowl with surrounding building parts. This is difficult and usually requires utilisation of separate anchor means.

[0005] For some applications, it is moreover required to secure the floor drain by a ground anchor. This is typically effected in that earth connections are fastened by welding or by screwing screws into the drain bowl.

[0006] In buildings with storey partitions, it is furthermore difficult to build in floor drains with low height in wet rooms and/or kitchens, as it is to be provided that there is sufficient slope from the drain and out to a collector well and/or to the sewage system.

[0007] In order that the prior art drain unit may be adapted to different types of installation situations, the installation worker is required to carry different types of fittings, as e.g. connecting pieces, sockets, pipe sections and pipe bends with different dimensions.

[0008] For example, it is a disadvantage for the maker of the drain unit that other elements in addition to the drain unit itself, which are depending on the specific installation option, are to be used.

Object of the Invention

[0009] It is the purpose of the invention to indicate an improved floor drain of the kind mentioned in the introduction, including a mounting flange which may be mounted in an easy and rapid way into and connected to either an existing or a newly established building membrane, while at the same time providing possibility of secure anchoring of the floor drain. Moreover, it is desirable that the floor drain is made of few part elements and may be used with low installation height.

Description of the Invention

[0010] According to the present invention, this is achieved with a floor drain as specified in the preamble of claim 1 and which is peculiar in that the mounting flange is made integral with the drain bowl and is formed by a rim area at the upper edge of the drain bowl, and that integrated anchor means are formed at the outer delimiting edge of the rim area, arranged so as to be bent outwards from the plane of the mounting flange.

[0011] Hereby is achieved a floor drain with a drain bowl with integral mounting flange which may easily be anchored into and get a good connection with a cast floor, e.g. a cast storey partition. It is preferred that the anchor means are adapted for fixation by embedding into a cast floor, e.g. a wet room floor. Since the mounting flange is made with integrated anchor means, there may be established a fixation of the drain bowl in a cast floor, after which an overlying building membrane may be fastened subsequently to the top side of the mounting flange. A well-defined position of the drain bowl in the floor is secured by the embedment of the anchor means.

[0012] The floor drain according to the invention is suitably made of stainless steel sheeting. It is preferably made by forming without any welding of individual parts, or with a minimum of weldings.

[0013] The floor drain may be secured in the ground in a simple and safe way when, according to a particular embodiment, it is peculiar in that the mounting flange also includes an integral mounting means for earth rods which may be used for securing the drain bowl in the ground.

[0014] The floor drain according to the invention is preferably designed so that the mounting flange is formed mainly square, preferably with rounded corners, and that the drain bowl has preferably circular cross-section.

[0015] In principle, there is nothing to prevent the mounting flange and the drain bowl, respectively, from having any other desirable cross-sectional shape. The drain bowl and the mounting flange may thus have an edged outer side.

[0016] If there is a need for adaptation to the height of an existing or newly established building membrane, according to an embodiment of the invention the floor drain is peculiar in that an inner bowl has been provided within the drain bowl, where the inner bowl via a packing is mounted to the inner side of the drain bowl in a displaceable way in relation to the drain bowl. Furthermore, it is preferred that the packing is mounted in a recess in the inner bowl, and that it has a design so that, in addition to a mutual height displacement of the inner bowl and the drain bowl, mutual tilting is also enabled. Hereby, adaptation of the height and the angle of the grate of the floor

drain mounted in the inner bowl is enabled in relation to the floor.

[0017] In order to provide secure ground connection in a simple way, it is preferred that the inner bowl is provided with a bent upper edge area, and that this edge area also includes an integral mounting means for earth rod. Earthing of both drain bowl and inner bowl may hereby be provided.

[0018] According to a further embodiment, the floor drain according to the invention is peculiar in that the bottom of the drain bowl is made inclining at least over a sub-distance, that a stand-pipe forming the drain stub and downwards including a connection sleeve for the drain pipe is provided, and that the drain pipe is angular and has varying cross-section. Moreover, it is preferred that a bell part is provided with mounting means for securing the bell part at the upper edge of the stand-pipe.

[0019] In order to prevent air and return flow in the drain system, the drain unit is designed with a water trap whereby the drain water collected in the drain bowl passes down by the bell part and up between the stand-pipe and the bell part, after which the drain water may leave the drain system via stand-pipe and drain stub.

[0020] Thereby, an amount of water will always stand in the drain bowl, preventing smell from the drain stub, which is connected to the sewer network, from going back through the drain unit.

[0021] The grate forms a detachable lid on the drain bowl which e.g. by means of screws can be removed from the drain bowl or the inner bowl.

[0022] By cleaning, it is an advantage that a drain system is provided with a dismountable part, e.g. in that it is possible to remove the dismountable lid and thereby access the stand-pipe and parts of the drain stub. This provides that it is easy to clean the drain unit itself while at the same time it is possible to flush pipe/sewer system, or to use a cleaning wire from the drain side, in case of clogging in some part of the succeeding pipe/sewer system.

[0023] The grate is typically a circular or polygonal plate in which are provided a number of openings which may be arranged symmetrically or in certain patterns. The important thing is that there are enough openings, or that the openings are large enough to allow the amount of drain water appearing to be collected/led down into the drain bowl.

[0024] The grate may have a slight concave or convex shape, where the concave shape may contribute to prevent large elements in the drain water from penetrating down into the drain bowl, while the convex shape may contribute to leading the drain water down into the drain bowl.

[0025] In order to safeguard against leaking of drain water from the drain unit to the surroundings, e.g. in the storey partitioning, where a leaking drain unit may cause expensive damage on floor and ceiling, the connecting end of the drain pipe is inserted in the stand-pipe, which in the lower end includes a connection sleeve in which is disposed a sealing ring that ensure a tight connection between the stand-pipe and the drain stub.

[0026] In order to produce drain units with as few individual parts as possible, and simultaneously to achieve great flexibility so that the drain unit can be mounted in new as well as existing installations, the drain pipe is angle-bent and with varying cross-section.

[0027] The flexibility of the drain unit is achieved in that the drain pipe is angle-bent and with varying cross-section. Hereby, the installation worker may cut in the part of the drain pipe with varying cross-section so that the drain pipe has appropriate length and cross-sectional dimension that fit the succeeding connection in the pipe/sewer system.

[0028] In order to reduce the installation height of the floor drain according to the present invention, the bottom of the drain bowl is shaped inclining over a sub-distance. This entails that the bottom in the area on the angular drain pipe, which has a varying cross-section, can be adapted, whereby the total installation height of the drain system becomes less than if the drain unit had a flat bottom and a vertically downwards directed drain pipe with an angled bend thereon.

[0029] The stand-pipe in the drain bowl is typically disposed centrally so that it is possible to mount the drain pipe projecting at any angle relative to the drain bowl, while at the same time the drain water may flow uniformly around the bell part, irrespectively of the direction in which the drain water passes the grate.

[0030] In order to attain reduction of the installation height, there is provided a drain pipe which is designed with a connecting end for inserting in the connecting sleeve and close thereby a side narrowing, and that the varying cross-section is found opposite to the connecting end.

[0031] The side narrowing of the drain pipe which is close at the connecting end, entails that the bottom part of the drain bowl corresponds in shape with the side narrowing, whereby these two elements engage each other, whereby the bottom part can bear on the top side of the side narrowing, providing that the installation height is substantially reduced.

[0032] By using a side narrowing with a length approximately corresponding to the width of the bottom of the part of the bottom of the bottom bowl formed by stand-pipe and drain bowl, due to the side narrowing there will not be a reduction of the capacity of the drain unit since the side narrowing is only provided over this short length and is preferably disposed immediately at the connecting end/angle bend.

[0033] Following the side narrowing, opposite the connecting end, the drain stub will be shaped with varying cross-section. In order to attain further flexibility of the drain unit, the dimensions of the said connecting end and a section after the side narrowing are identical. This means that the installation worker can cut off the drain pipe in/or around the section after the side narrowing, and then choose which part of the drain pipe that is to be

mounted in the connection sleeve of the stand-pipe.

[0034] In order to ensure stable mounting of the drain unit, an inclining sub-distance extends between mutually parallel sub-surfaces of the bottom of the drain bowl. In a preferred embodiment of the invention, the inclining sub-distance will be the part of the bottom of the drain bowl that includes the area in which the stand-pipe is placed. This implies that the drain bowl has sub-surfaces in two parallel areas along each side edge of the bottom bowl. By a flat bottom part it may be used for abutting on the side narrowing of the drain stub. This means that when the bottom face is abutting on the side narrowing of the drain stub, the drain bowl will be supported in a stable way for a subsequent embedding by casting.

[0035] Furthermore, the flat bottom parts may be used for blocking-up, e.g. in situations where the mounting opening is too deep or uneven for stable mounting of the drain unit, e.g. by using a wedge a support of the drain bowl of the drain unit in the desired position may be provided.

Short Description of the Drawing

[0036] The invention will then be explained in more detail with reference to the accompanying drawing, where

- Fig. 1A shows an exploded perspective view of a floor according to the invention,
- Fig. 1B shows a perspective view of a floor drain according to the invention;
- Fig. 2A shows a perspective view of a drain bowl for the floor drain shown in Fig. 1, as seen from above;
- Fig. 2B shows a perspective view of a drain bowl for the floor drain shown in Fig. 1, as seen from below;
- Fig. 3 shows a perspective view of an inner bowl for the floor drain shown in Fig. 1;
- Fig. 4 shows a perspective view of a grate for the floor drain shown in Fig. 1;
- Fig. 5 shows a perspective view of a bell for the floor drain shown in Fig. 1; and
- Fig. 6 shows a perspective view of a strainer for the floor drain shown in Fig. 1.

Detailed description of the invention

[0037] The floor drain 2 shown in Figs. 1A and Fig. 1B includes a drain bowl 4 with a cylindric outer side 6. The drain bowl 4 includes a water trap with a lower central drain stub in the shape of a stand-pipe 8, in which a vertical connection end 10 of an angular drain pipe 12 may be mounted by means of a suitable packing 14. The stand-pipe 8 has an upper edge 9. The drain pipe is a connecting element used for connecting the floor drain with other drain pipes/installations.

[0038] At the top, the floor drain 2 is provided with an inner bowl 16 supporting a square drain grate 18 which is detachably fastened to a square top part 20 of the inner bowl 16 with a screw 22. The inner bowl 16 has a cylindric bottom part 24 with a recess 26 for accommodating a packing 28 which is in contact with the inner side 30 of the drain bowl 4 and enables adjusting in height, rotation and tilting of the inner bowl 16 in relation to the drain bowl 4.

[0039] In the interspace between the stand-pipe 8 and the bottom part 24 of the inner bowl 16 there is mounted a bell 32 and a strainer 34.

[0040] Figs. 1A and 1B moreover show how the connecting end 10 of the drain pipe 12 is connected with an angular drain end 11 with varying external cross-sections 11 a and 11 b and internal cross-sections 11c and 11d as well as a narrowing 13. On this drain pipe there may thus be fitted sewer pipes externally on or inside the varying parts 11 a - 11d of the drain end, as an installation worker may cut off the outermost part of the drain end 11.

[0041] In Fig. 1B appears that the bottom part of the drain bowl 4 is disposed down in the side narrowing 13 of the drain pipe 12.

[0042] On Fig. 1B is clearly seen how the narrowing 13 in drain pipe 12 corresponds in shape to a part of drain bowl 4 and stand-pipe 8, and thereby it is possible to rotate the drain pipe 12 through 360 degrees so that drain unit 1 can be adjusted laterally and in height.

[0043] Figs. 2A and 2B show the drain bowl 4 in greater detail. It comprises a mounting flange 36 which is made integral with the drain bowl 4 and is formed by a rim area 38 at the upper edge 40 of the drain bowl. The mounting flange 36 is formed externally at the outer side 6 of the drain bowl 4. In a rim area 42 at the outer delimiting edge 44 of the mounting flange 36, integrated anchor means 46 are formed, adapted to be bent out from the plane of the mounting flange. These anchor means are established as cut-outs 48 are provided, enabling bending out of the tabs formed thereby which constitute the anchor means 46. Furthermore, an integrated mounting means 50 for earth rod is formed at one of the anchor means.

[0044] The mounting flange 36 is mainly squarely formed with rounded corner sections in which the anchor means 46 are formed. The anchor means 46 are bent out, preferably downwards, for fixing by embedding into a cast floor, e.g. a bathroom floor. Subsequently, the building membrane is connected in the usual way to the top side of the mounting flange 36.

[0045] On Fig. 2B appears that the bottom 52 of the drain bowl 4 over a sub-distance 54 is formed inclining, and that this inclining sub-distance 54 extends between parallel sub-surfaces 56 and 58 of the bottom 52.

[0046] The bottom 52 of the drain bowl 4 is thus designed with varying level, entailing that when drain bowl 4 is rotated about a centre line of the connecting end 10 of the drain pipe 10, the drain bowl 4 may be adjusted in height.

[0047] The connecting end 10 and the drain end 11 a have the same diameter, and an installation worker may

thus cut off the drain end 11 of the drain pipe so that this part may be used as straight drain pipe. Alternatively, the fitter may cut the drain end 11b off the drain pipe 12 so that the parts used by the drain pipe are the connecting end 10 and the drain end 11 a. It is thus possible to connect the drain bowl 4 with different pipe diameters to the subsequent pipe and sewer system.

[0048] In Fig. 2 appears that the inner bowl 16 is provided with a bent upper edge area 60, in which an abutment surface 62 is formed for the grate 18, and that this edge area 60 also includes an integral mounting means 64 for earth rod.

[0049] Fig. 4 shows a grate 18 having an upper surface 66 and a bent edge 68 that rests on the abutment surface 62 of the inner bowl 16. In the upper surface 66, openings 67 with suitable size for allowing passage of drain water down into the drain bowl 4 are formed, as well as an opening 70 for the screw 22 with which the grate 18 is detachably fastened to the inner bowl 20. Alternatively, the grate may just rest on the inner bowl without screw connections.

[0050] Fig. 5 shows a detailed view of the bell 32. It is provided with three internal ribs 72, each having a first abutment surface 74 for bearing on the upper edge 9 of the stand-pipe 8, and a second abutment surface 76 for bearing against the outer side of the stand-pipe 8. Hereby is formed a water trap in the drain bowl 4. Alternatively, another number of ribs are possible.

[0051] At the exterior of the bell 32, six other ribs 78 are formed, each having an upwards facing abutment surface 80 on which a lower edge 82 of the strainer 34 shown in Fig. 6 is resting. The strainer 34 will preferably have such a dimension that its upper edge 84 may approximately cover the inner area of the bottom part 24 of the inner bowl 16. Hereby, all drain water will be led through the strainer 34.

[0052] The invention is not limited to the embodiments shown in the Figures and described above. Other embodiments with other shapes of the drain unit parts, including grate, bell, drain bowl, stand-pipe and drain pipe are possible within the scope of this invention and the subsequent claims.

Claims

1. A floor drain (2) with a drain bowl (4) with an outer side (6) and a lower central drain connection (8) which is adapted for connecting to either a straight drain pipe or to an angular drain pipe (12), the drain bowl including a grate (18) forming a detachable lid and a mounting flange (36) externally on the outer side (6) of the drain bowl (4), **characterised in that** the mounting flange (36) is made integral with the drain bowl and is formed by a rim area (38) at the upper edge (40) of the drain bowl (40), and that integrated anchor means (46) are formed at the outer delimiting edge (44) of the rim area, arranged so as to be bent outwards from the plane of the mounting flange.

2. Floor drain (2) according to claim 1, **characterised in that** the mounting flange (36) also includes an integrated mounting means (50) for earth rod.

3. Floor drain (2) according to claim 1 or 2, **characterised in that** the mounting flange (36) is designed mainly square, preferably with rounded corners, and that the drain bowl (4) preferably has circular cross-section.

4. Floor drain according to claim 1-3, **characterised in that** an inner bowl (16) has been provided within the drain bowl (4), the inner bowl via a packing (28) mounted to the inner side (30) of the drain bowl (4) in a displaceable way in relation to the drain bowl.

5. Floor drain according to claim 4, **characterised in that** the inner bowl (16) is provided with a bent upper edge area (60), and that this edge area also includes an integral mounting means (64) for earth rod.

6. Floor drain according to claim 1 -5, **characterised in that** the anchor means (46) of the mounting flange (46) are adapted for fixation by casting into a wet room floor.

7. Floor drain according to claim 1 -6, **characterised in that** the bottom (52) of the drain bowl (4) is made inclining at least over a sub-distance (54), that a stand-pipe (8) forming the drain stub and downwards including a connection sleeve (10) for the drain pipe (12) is provided, and that the drain pipe (12) is angular (10) and has varying cross-section (11a, 11b).

8. Floor drain according to claim 7, **characterised in that** a bell part (32) is provided with mounting means (72) for securing the bell part at the upper edge (9) of the stand-pipe (8).

9. Floor drain according to claim 4 -8, **characterised in that** the packing (28) is mounted in a recess (26) in the inner bowl (16), and that it has a design so that, in addition to a mutual height displacement of the inner bowl (16) and the drain bowl (4), mutual tilting is also enabled.

10. Floor drain according to claim 1 -9, **characterised in that** it is made of stainless steel sheet.

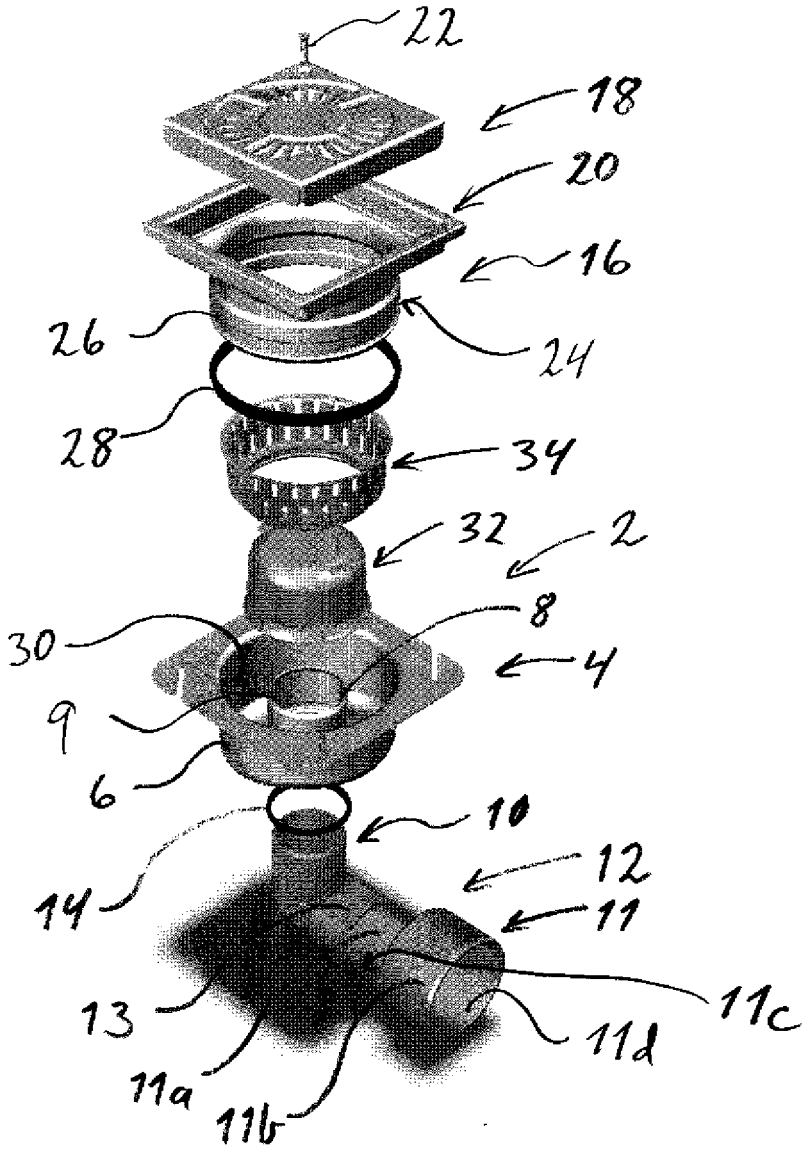

Fig. 1A

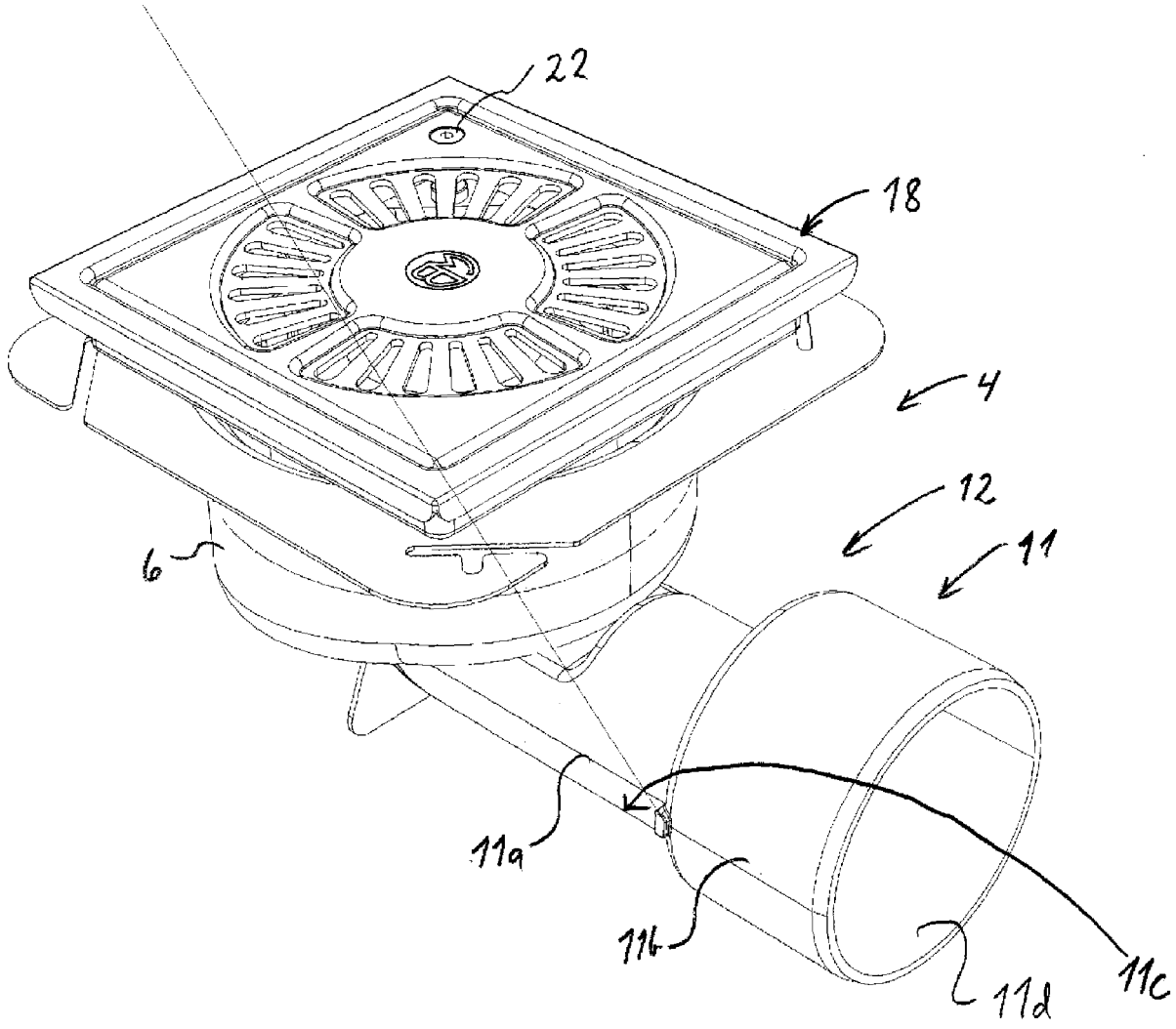

Fig. 1B

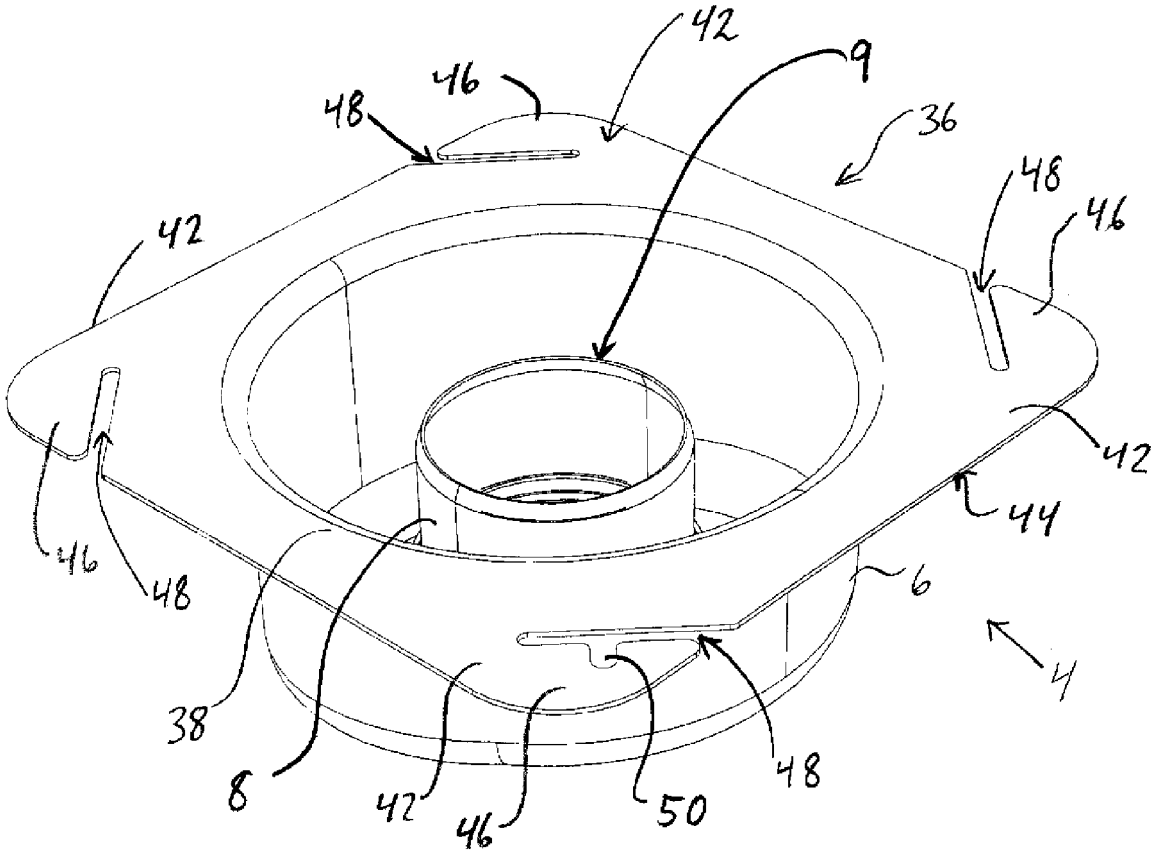

Fig. 2A

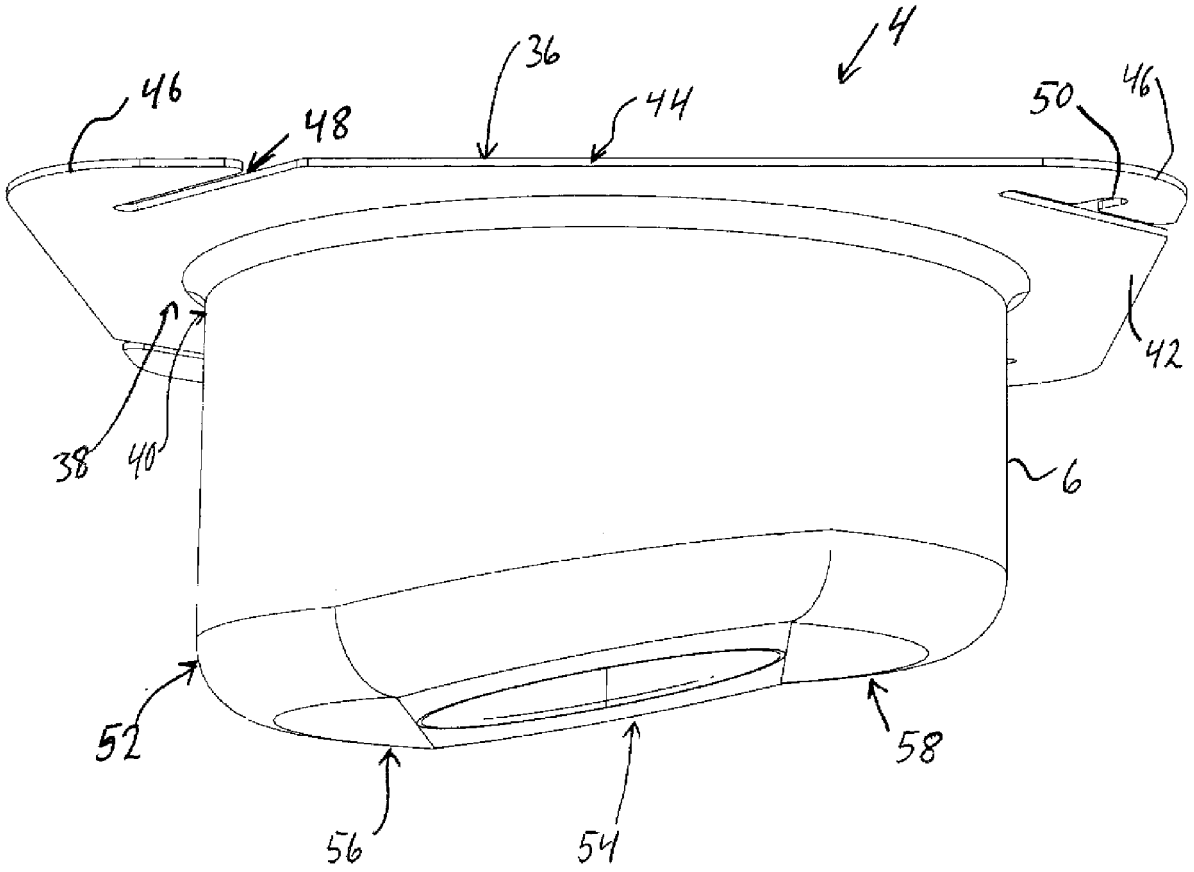

Fig. 2B

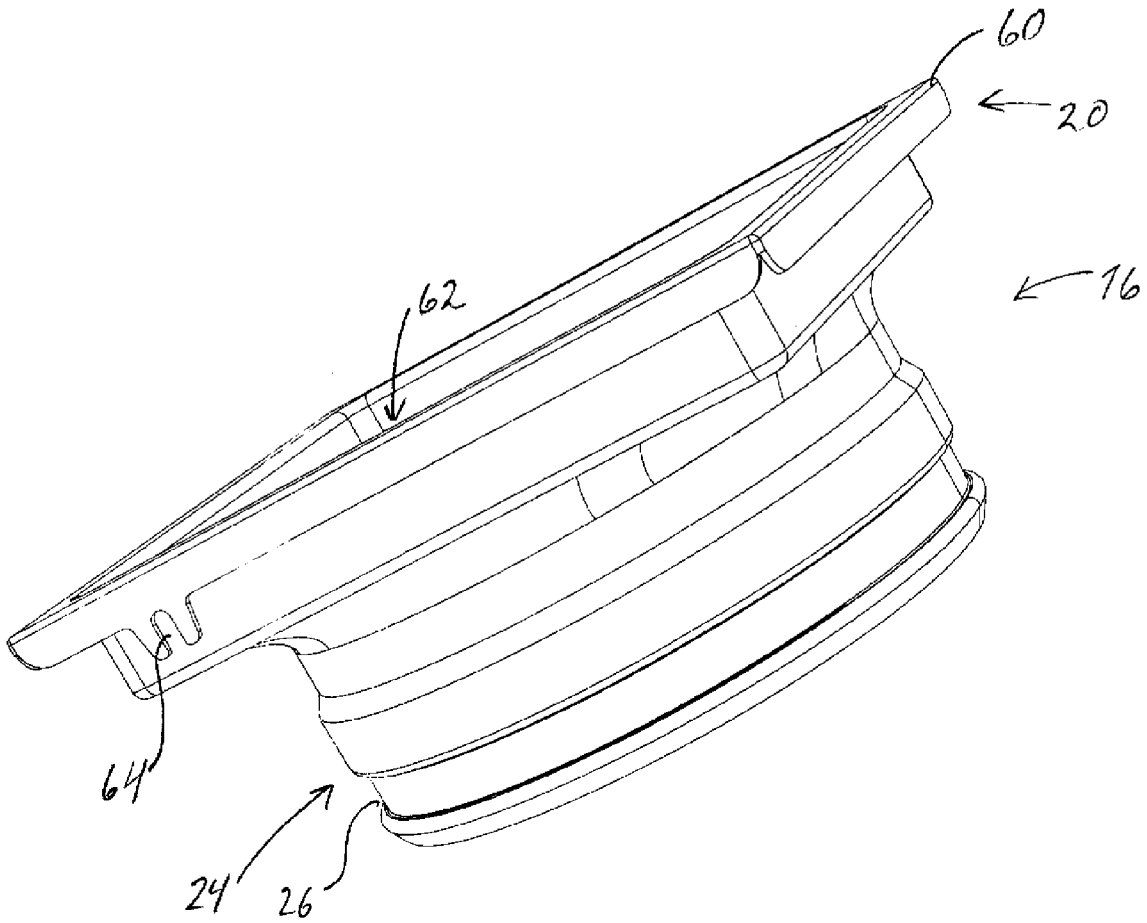

Fig. 3

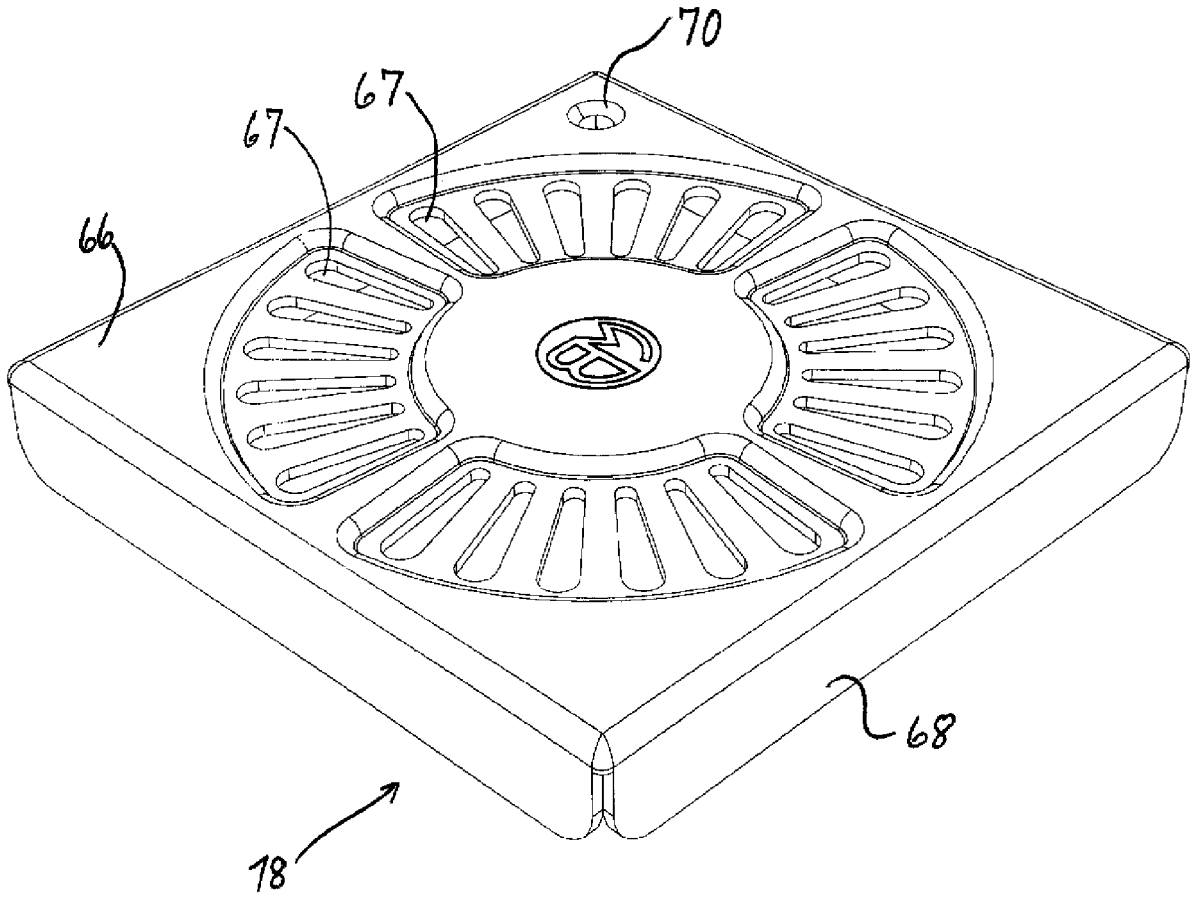

Fig. 4

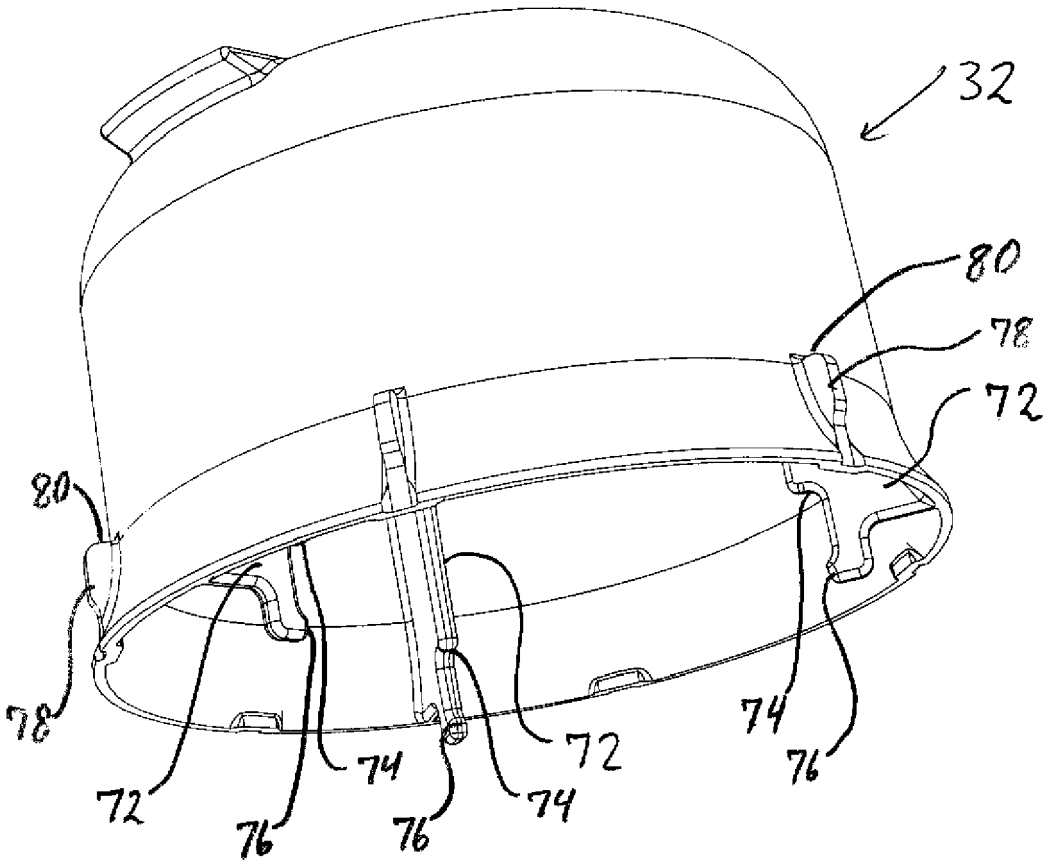

Fig. 5

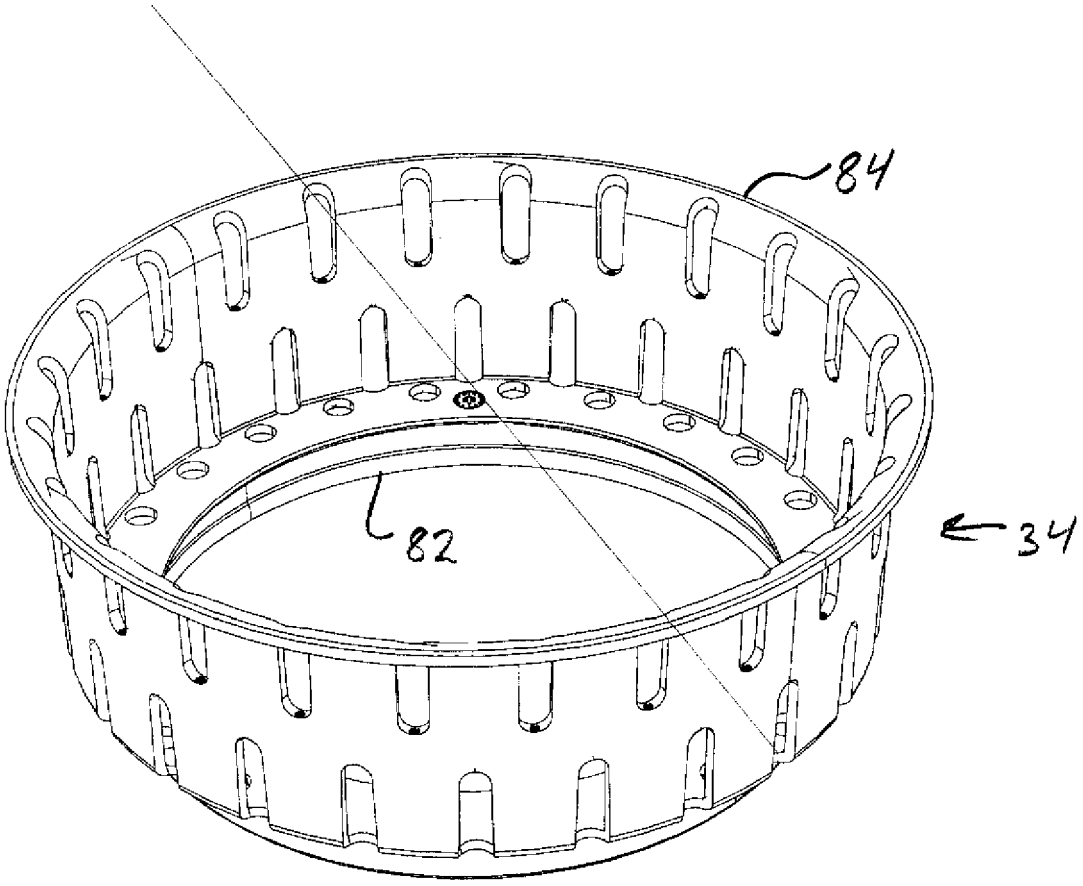

Fig. 6