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(54) **COMBINATION OF DRAIN OUTLET AND OUTLET PIPE**

(57) The invention relates to a combination of a drain (2, 3, 4) and an outlet pipe (6), wherein the drain comprises a collecting tray with a bottom (2), a wall (3) standing upright along the periphery of the bottom (2), and a tubular outflow (4) arranged in the bottom, wherein the outlet pipe (6) comprises a groove (8) arranged in the wall and a sealing ring (10) arranged in the groove (8), and wherein the tubular outflow (4) extends into the outlet pipe (6), and
a bounding element extending in radial direction between the tubular outflow and the outlet pipe for the purpose of bounding the axial displacement of the tubular outflow relative to the outlet pipe.

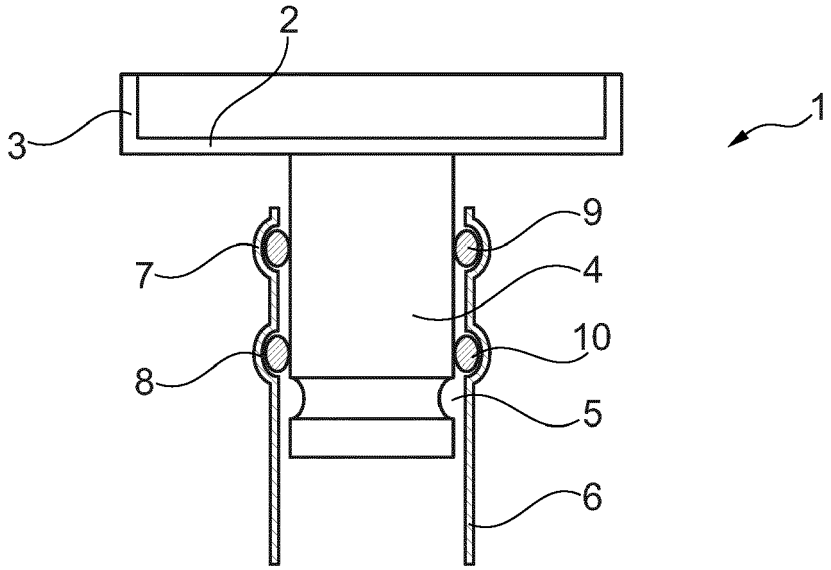

Fig. 1A

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Description

[0001] The invention relates to a combination of a drain and an outlet pipe, wherein the drain comprises a collecting tray with a bottom, a wall standing upright along the periphery of the bottom, and a tubular outflow arranged in the bottom, wherein the tubular outflow extends into the outlet pipe.

[0002] When a sanitary space is installed it is usual for an outlet pipe to be placed in the floor first, wherein the opening of the outlet pipe lies clear. At a later stage of installation the outflow of a drain is pressed into the opening of the outlet pipe, which drain seals with the outflow watertightly against the outlet pipe because of the sealing ring. A siphon can further be arranged in the outlet pipe. The opening of the outlet pipe can here at the same time serve as the inflow opening of the siphon.

[0003] When the outlet pipe and drain are placed in a concrete floor, the outlet pipe, and often a part of the drain, will be surrounded by concrete, whereby the outlet pipe and drain cannot move relative to each other.

[0004] If the outlet pipe and drain are however arranged in a wooden floor, or when foam filler plates are used in the floor, a displacement of the outflow relative to the outlet pipe can take place due to expansion and contraction, and the outer end of the outflow can here move beyond the sealing ring and, in the worst case, the outflow can become wholly separated from the outlet pipe, which can result in leakage.

[0005] It is known for this purpose to attach the drain to the outlet pipe before finishing the floor further. This attachment can for instance take place by a screw being screwed through the centre of the outflow into part of the outlet pipe. The drawback hereof is that hair and dirt can catch on this screw, this limiting the throughflow.

[0006] Another option is to attach the drain and the outlet pipe to each other externally, although normally this already has to be done before the floor is arranged at all. Especially when a foam filler plate is also used, drain, foam plate and outlet pipe will be attached to each other before the floor can be made. This considerably limits the freedom of movement for the installers during installation of the floor.

[0007] It is also known for a foam plate to be arranged over the drain after the drain has been arranged, which are then coupled by means of a screw connection. The extent to which the screw connection has to be tightened for a reliable and watertight connection may be unclear due to dirt and dust. Tension in the outlet pipe or a deformation of the plate may also result due to the thickness of the adhesive layer between the foam plate and the floor, and the subsequent tightening of the drain against the plate.

[0008] In addition, due to the drain being attached to the outlet pipe, the drain can no longer rotate relative to the outlet pipe, this usually still being possible when the outflow is placed in the outlet pipe without being attached. Because the drain can no longer rotate, it is possible that, during finishing of the floor, the drain is arranged in the floor under tension or that there is tension between the drain and the outlet pipe, whereby cracks can form in the outlet pipe, the drain or the surrounding floor in the longer term.

[0009] It is therefore an object of the invention to reduce or even obviate the above stated drawbacks.

[0010] This object is achieved according to the invention with a combination according to the preamble, which is characterized by a bounding element extending in radial direction between the tubular outflow and the outlet pipe for the purpose of bounding the axial displacement of the tubular outflow relative to the outlet pipe.

[0011] Providing a bounding of the displacement of the outflow relative to the outlet pipe enables the outflow to partially move and, in the case of a cylindrical outlet pipe, rotate relative to the outlet pipe, similarly to a prior art combination wherein the outflow is not attached to the outlet pipe.

[0012] The bounding according to the invention however ensures that the axial displacement of the outflow relative to the outlet pipe is bounded, this preventing the outflow from being able to move to a position outside of the sealing action of the seal and leakage resulting, while a free axial displacement is possible in order to prevent tensions resulting from for instance expansion or differences in adhesive thickness.

[0013] In a preferred embodiment of the combination according to the invention the bounding element comprises at least one resilient finger which runs parallel to the inner wall of the outlet pipe and has a radially outward directed edge arranged on the free outer end of the finger, wherein the tubular outflow has a radially inward directed edge arranged on the inner wall, this edge engaging on the edge of the finger during axial displacement of the tubular outflow relative to the outlet pipe.

[0014] Because the at least one finger has an outward directed edge which engages on an edge which is arranged directed inward in the outflow, it is easily possible to check during installation of the combination whether the outlet pipe is correctly coupled to the drain. The combination can moreover be easily uncoupled by bending aside the finger.

[0015] In another preferred embodiment of the combination the bounding element is a protrusion protruding from the peripheral wall of the outflow and the protrusion is arranged in axial direction of the outflow and, as seen from the collecting tray, beyond the sealing ring.

[0016] When the outflow moves axially in the outlet pipe, the protrusion will run up against the sealing ring and thus provide for a bounding. Because the protrusion is arranged beyond the sealing ring, the sealing ring will continue to provide for a correct sealing of the outflow against the outlet pipe.

[0017] In another embodiment of the combination according to the invention the protrusion is bent out of the peripheral wall. The outflow of a drain is often manufactured from metal. A suitable incision in the wall of the

outflow then makes it possible, after the outflow has been placed into the outlet pipe, to bend out the protrusion so that it provides for a bounding.

[0018] In yet another embodiment of the combination according to the invention at least one opening is arranged in the peripheral wall and a pin protruding to a position outside the periphery of the outflow is arranged in the at least one opening.

[0019] In this embodiment a pin can be inserted through an opening in the wall of the outflow after the outflow of the drain has been inserted into the outlet pipe, so that the pin protrudes on the outer side of the wall and there runs up against the sealing ring during displacement of the outflow relative to the outlet pipe for the purpose of bounding the displacement.

[0020] A further preferred embodiment of the combination according to the invention further comprises a radially resilient ring with an interruption extending in axial direction, wherein the protrusion is arranged on the periphery of the radially resilient ring and wherein an opening through which the protrusion extends is arranged in the peripheral wall of the outflow.

[0021] The radially resilient ring can be easily compressed so that the ring can be placed into the outflow. The radially resilient ring can then expand once again, so that the protrusion can extend through the opening in the outflow.

[0022] The protrusion is held securely in place by the use of a resilient ring.

[0023] A recess into which the protrusion extends is preferably provided in the inner wall of the outlet pipe. The possible displacement of the outflow relative to the outlet pipe can hereby be bounded further, and the sealing ring will not be unnecessarily loaded during bounding of the displacement.

[0024] In a preferred embodiment of the combination according to the invention the bounding element comprises a groove arranged in the outlet pipe, a sealing ring, such as an O-ring, arranged in the groove, and, parallel to the groove, a peripheral groove arranged in the outflow, wherein, in bounding state, the sealing ring lies both in the groove and in the peripheral groove in the outflow.

[0025] When the outflow is moved into the outlet pipe the sealing ring will be compressed and provide for a seal. When the outflow however moves axially, the sealing ring will, in the position in which the bounding takes place, expand in the groove and prevent the outflow from being able to move further in axial direction.

[0026] The sealing ring here further provides for a sound damping in that contact noise between the outflow and the outlet pipe is damped. Any difference in alignment between the outflow and the outlet pipe can further be easily compensated.

[0027] The sealing ring preferably comprises a radially inward directed sealing lip, wherein, in bounding position, the sealing lip extends into the groove.

[0028] In a further embodiment the groove comprises a large number of parallel grooves. The sealing lip can extend into any of these parallel grooves in order to bound the displacement between the outflow and the outlet pipe. Arranging a number of parallel grooves provides a guarantee that, if the lip nevertheless moves beyond a first groove, the lip falls into subsequent groove and thus still bounds the displacement.

[0029] In yet another embodiment of the combination according to the invention the bounding element comprises a protrusion directed radially inward in the outlet pipe and a tubular coupling piece with a radial external flange at one axial end and with an opening arranged in the wall at the other axial end, wherein the tubular coupling piece is placed in the outflow and the protrusion extends into the opening of the coupling piece.

[0030] Providing a separate coupling piece enables an existing drain with an outflow to be used without modifications. The separate coupling piece is inserted through the outflow of the drain and couples with the opening onto the protrusion in the outlet pipe. The outflow is enclosed and fixed to the outlet pipe by the flange on the coupling piece.

[0031] The other axial end of the coupling piece preferably comprises slots extending at least axially. The wall parts of the other axial end can hereby spring inward, and the coupling to the protrusion thus becomes easier.

[0032] The outlet pipe is preferably at least partially formed by the inflow opening of a siphon. The outlet pipe often begins in the floor as a siphon, so that the siphon can still be reached relatively easily in the case of a possible blockage.

[0033] Yet another embodiment of the combination according to the invention further comprises a foam plate with a cavity arranged in a surface, wherein the outlet pipe extends through the foam plate into the cavity and wherein the drain is arranged at least above the cavity.

[0034] Because the outflow of the drain is in the invention not provided with the bounding until after being inserted into the outlet pipe, a floor with drain and possible foam plate can be installed in a usual manner without the drain, outlet pipe and foam plate having to be handled as one whole.

[0035] In yet another embodiment of the invention the outlet pipe comprises a second groove arranged in the wall and a sealing ring arranged in the second groove, and the outer wall of the outflow lies sealingly against the sealing ring.

Figures 1A and 1B show a cross-sectional view of a first embodiment of the invention in two different positions.

Figure 2 shows a cross-sectional view of a second embodiment of the invention.

Figure 3 shows a cross-sectional view of a third embodiment of the invention.

Figure 4 shows a cross-sectional view of a fourth embodiment of the invention.

Figure 5 shows a cross-sectional view of a fifth embodiment of the invention.

Figure 6 shows a cross-sectional view of a sixth embodiment of the invention.

Figure 7 shows a cross-sectional view of a seventh embodiment of the invention.

Figure 8 shows a cross-sectional view of an eighth embodiment of the invention.

Figure 9 shows a cross-sectional view of a ninth embodiment of the invention.

[0036] Figure 1A shows a first embodiment of a combination 1 according to the invention. Combination 1 has a drain with a bottom 2 and an upright wall 3. Provided on the bottom is an outflow 4 having a peripheral groove 5 close to the end.

[0037] Outflow 4 is inserted into an outlet pipe 6 which is provided on the inner wall with two peripheral grooves 7, 8. Placed in the upper groove 7 is a sealing ring 9 which is an O-ring with a sealing lip, which sealing ring 9 seals against the wall of outflow 4. An O-ring is placed in the lower groove 8.

[0038] When outflow 4 moves axially out of outlet pipe 6 (see figure 1B), lower groove 8 with the O-ring 10 therein will at a given moment come to lie at the same level as groove 5 in outflow 4. At that moment O-ring 10 will expand and fall into both grooves 5, 8, and further displacement of outflow 4 in outlet pipe 6 will be bounded thereby.

[0039] Figure 2 shows a second embodiment 20. This embodiment 20 has a drain with a bottom 21, an upright wall 22 and an outflow 23. Outflow 23 is inserted into an outlet pipe 24, which is provided on the inner side with a groove 25 in which is placed a sealing ring 26 which seals against the wall of outflow 23.

[0040] A lip 27 is bent out of the wall close to the free end of outflow 23. When outflow 23 now moves axially out of outlet pipe 24, outward-bent lip 27 will run up against sealing ring 26 and thereby bound the axial displacement.

[0041] Figure 3 shows a cross-sectional view of a third embodiment 30 according to the invention. Embodiment 30 has a drain with a bottom 31, an upright wall 32 and an outflow 33.

[0042] Outflow 33 is inserted into an opening 34 of a siphon 35. Siphon 35 is connected by means of the drain opening to a further outlet pipe 36.

[0043] Arranged in the depending wall 37 which runs downward from opening 34 is a groove 39 with a sealing ring 38.

[0044] A pin 40, which bounds a possible axial displacement of outflow 33 in opening 34 of siphon 35, is further placed through the wall of outflow 33 close to the free end.

[0045] Figure 4 shows a cross-sectional view of a fourth embodiment 50 of the invention. This embodiment 50 has a drain 51 with an outflow 52 and a two-part outlet pipe 53, 54 with integrated siphon (only partially shown). Drain 51 and the first part 53 of the outlet pipe are arranged in a foam plate 55.

[0046] Outflow 52 is sealed via a first sealing ring 56 against first part 53 of the outlet pipe. Second part 54 is sealed via a second sealing ring 57. The two-part configuration enables the lower, second part 54 to move along outflow 52 relative to the upper, first part 53, whereby a height difference, for instance caused by a difference in adhesive thickness between foam plate 55 and subfloor, can be compensated.

[0047] Outflow 52 is provided with a helical groove 58 whereby outflow 52 can be screwed into the lower, second part 54. If this screw connection were to unexpectedly come loose, whereby second part 54 would move downward relative to outflow 52, the lip of sealing ring 57 would eventually fall into helical groove 58, whereby the further displacement is blocked.

[0048] Figure 5 shows a cross-sectional view of a fifth embodiment 60 of the invention. Embodiment 60 has an elongate drain 61 with an outflow 62. Drain 61 is arranged in a foam plate 63. Arranged against the underside of the foam plate is an outlet pipe 64 with a siphon 65.

[0049] Outflow 62 of drain 61 extends into siphon 65 and is herein sealed by an O-ring 66. Provided in siphon 65 is a recess 67 into which a protrusion 68 extends. This protrusion 68 is arranged on a radially resilient ring 69 which is placed against the inner side of outflow 62. Protrusion 68 protrudes here through an opening in outflow 62 and into recess 67, whereby a displacement of siphon 65 relative to outflow 62 is prevented.

[0050] Figure 6 shows a cross-sectional view of a sixth embodiment 70 of the invention. In this embodiment 70 an elongate drain 71 with an outflow 72 is placed in a foam plate 73 as well.

[0051] An outlet pipe 74 with siphon 75 is placed on the underside. Outflow 72 extends here into siphon 75 and is sealed by an O-ring 76.

[0052] A tubular coupling piece 77 is placed in outflow 72. Coupling piece 77 has a flange 78 on one side, and openings 79 are provided in the wall on the other side. Arranged in siphon 75 are protrusions 80 which extend through openings 79 and thus lock drain 71 against displacement relative to siphon 75.

[0053] Figure 7 shows a cross-sectional view of a seventh embodiment 90 of a combination according to the invention. The combination 90 has a drain with a bottom 91 and an upright wall 92. Provided on the bottom is an outflow 93 having a peripheral groove 94 close to the end.

[0054] Outflow 93 is inserted into an outlet pipe 95 which is provided on the inner wall with a peripheral groove 96. A sealing ring 97, which is an O-ring with a sealing lip, is placed in groove 96. Sealing ring 97 seals against outflow 93 and in combination with groove 94 also forms a bounding element when outflow 93 is pulled too far out of outlet pipe 95. By giving O-ring 97 with sealing lip sufficiently thick dimensions a seal is even preserved when O-ring 97 lies in groove 94.

[0055] Figure 8 shows a cross-sectional view of an eighth embodiment 130 of the invention. In this embodiment 130 the outlet pipe 131 is provided on the upper

side with a groove in which a sealing ring with lip 132 is arranged. An outflow 133 of a first part 134 of a drain is placed in outlet pipe 131. This first part 134 of the drain can for instance be arranged in a foam plate 135. The lower edge of outflow 133 is provided with a groove 136 into which lip 132 of the sealing ring will fall when outflow 133 is pulled out of outlet pipe 131. The pull-out movement will hereby be bounded, and outflow 133 will be prevented from being wholly separated from outlet pipe 131.

[0056] Further formed in first part 134 is an opening in which a second seal 137 is placed and wherein an outflow 138 of a second part 139 of the drain can be placed. The height of the second part 139 can thus be adjusted to the height of the surrounding tiles.

[0057] Figure 9 shows a cross-sectional view of a ninth embodiment 140 of the invention.

[0058] The outlet pipe of embodiment 140 is formed by a collecting tray 141 which can be connected to a further outlet pipe, and wherein an opening with depending wall 142 is provided on the upper side of collecting tray 141.

[0059] The drain has two parts 143, 144. The first part 143 of the drain is arranged in a foam plate 145 and is provided with an opening 146. Arranged round opening 146 is a rubber sleeve 147 which is provided on the inner side with sealing lips 148 for sealing against the outflow 149 of the second part 144 of the drain.

[0060] Rubber sleeve 147 has on the upper side an outward directed flange 150 with which rubber sleeve 147 is attached to the first part 143 of the drain. Provided on the underside of rubber sleeve 147 is an outward directed thickened portion 151 which bounds the displacement of sleeve 147 out of the depending wall 142.

Claims

1. Combination of a drain and an outlet pipe, wherein the drain comprises a collecting tray with a bottom, a wall standing upright along the periphery of the bottom, and a tubular outflow arranged in the bottom, wherein the tubular outflow extends into the outlet pipe,
   characterized by
   a bounding element extending in radial direction between the tubular outflow and the outlet pipe for the purpose of bounding the axial displacement of the tubular outflow relative to the outlet pipe.

2. Combination as claimed in claim 1, wherein the bounding element is a protrusion protruding from the peripheral wall of the outflow and wherein the protrusion is arranged in axial direction of the outflow and, as seen from the collecting tray, beyond the sealing ring.

3. Combination as claimed in claim 2, wherein the protrusion is bent out of the peripheral wall.

4. Combination as claimed in claim 2, wherein at least one opening is arranged in the peripheral wall and wherein a pin protruding to a position outside the periphery of the outflow is arranged in the at least one opening.

5. Combination as claimed in claim 2, further comprising a radially resilient ring with an interruption extending in axial direction, wherein the protrusion is arranged on the periphery of the radially resilient ring and wherein an opening through which the protrusion extends is arranged in the peripheral wall of the outflow.

6. Combination as claimed in claim 5, wherein a recess into which the protrusion extends is provided in the inner wall of the outlet pipe.

7. Combination as claimed in claim 1, wherein the bounding element comprises a groove arranged in the outlet pipe, a sealing ring, such as an O-ring, arranged in the groove, and, parallel to the groove, a peripheral groove arranged in the outflow, wherein, in bounding state, the sealing ring lies both in the groove and in the peripheral groove in the outflow.

8. Combination as claimed in claim 7, wherein the sealing ring comprises a radially inward directed sealing lip, wherein, in bounding position, the sealing lip extends into the groove.

9. Combination as claimed in claim 8, wherein the groove comprises a large number of parallel grooves.

10. Combination as claimed in claim 1, wherein the bounding element comprises a protrusion directed radially inward in the outlet pipe and a tubular coupling piece with a radial external flange at one axial end and with an opening arranged in the wall at the other axial end, wherein the tubular coupling piece is placed in the outflow and the protrusion extends into the opening of the coupling piece.

11. Combination as claimed in claim 10, wherein the other axial end of the coupling piece comprises slots extending at least axially.

12. Combination as claimed in any of the foregoing claims, wherein the outlet pipe is at least partially formed by the inflow opening of a siphon.

13. Combination as claimed in any of the foregoing claims, further comprising a foam plate with a cavity arranged in a surface, wherein the outlet pipe extends through the foam plate into the cavity and

wherein the drain is arranged at least above the cavity.

14. Combination as claimed in any of the foregoing claims, wherein the outlet pipe comprises a second groove arranged in the wall and a sealing ring arranged in the second groove, and wherein the outer wall of the outflow lies sealingly against the sealing ring.

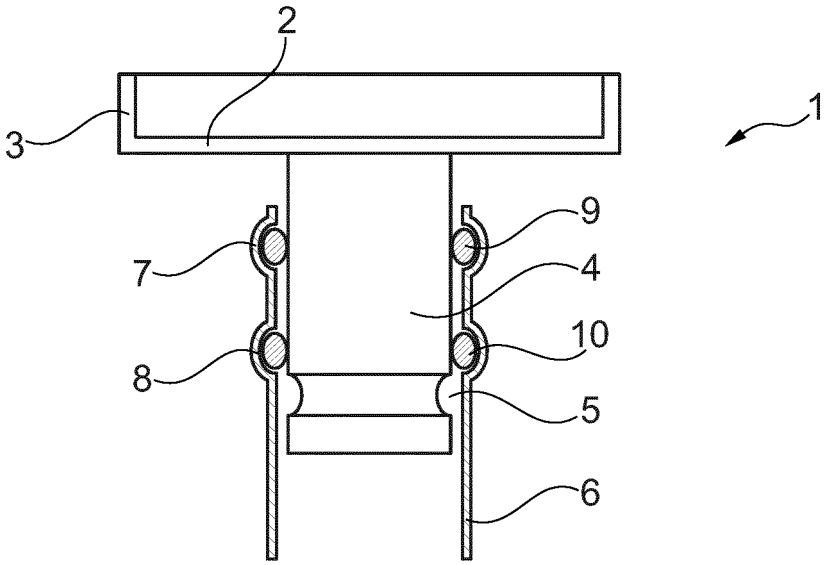

Fig. 1A

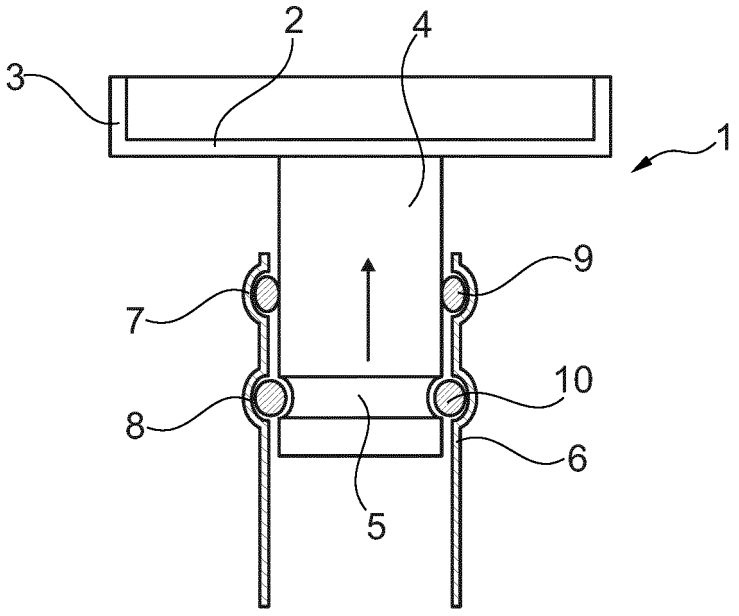

Fig. 1B

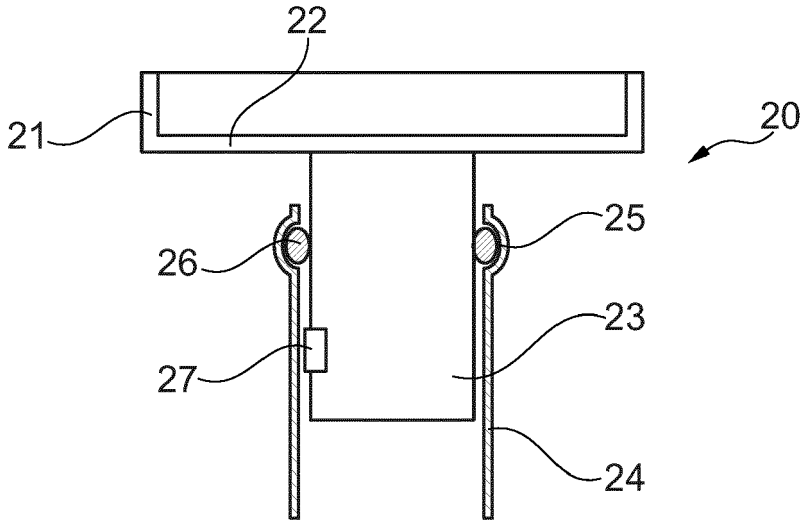

Fig. 2

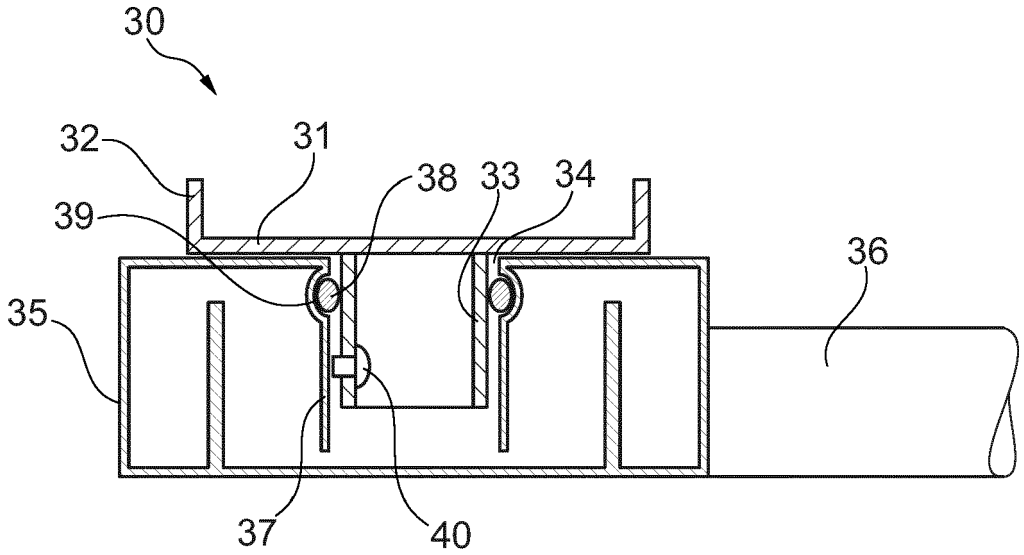

Fig. 3

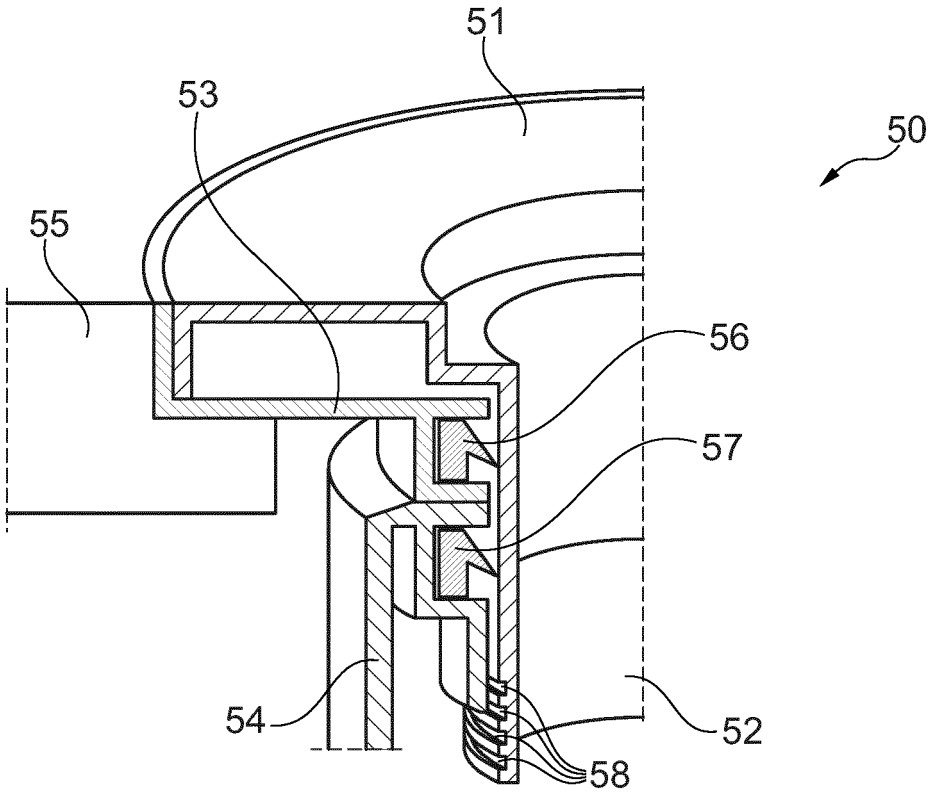

Fig. 4

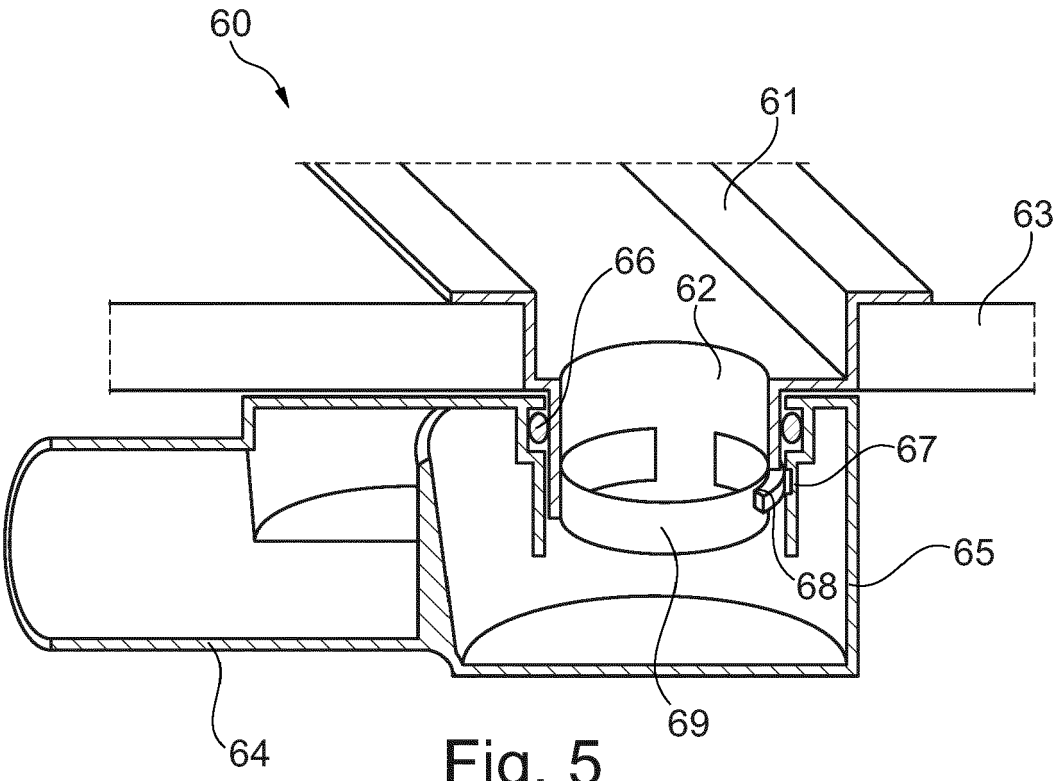

Fig. 5

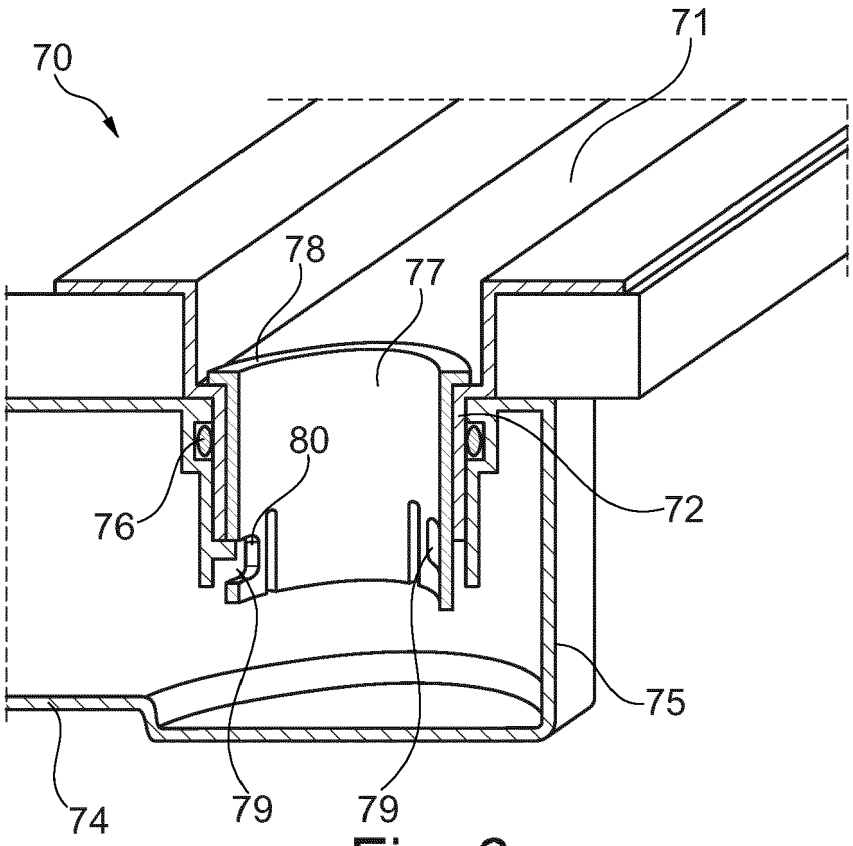

Fig. 6

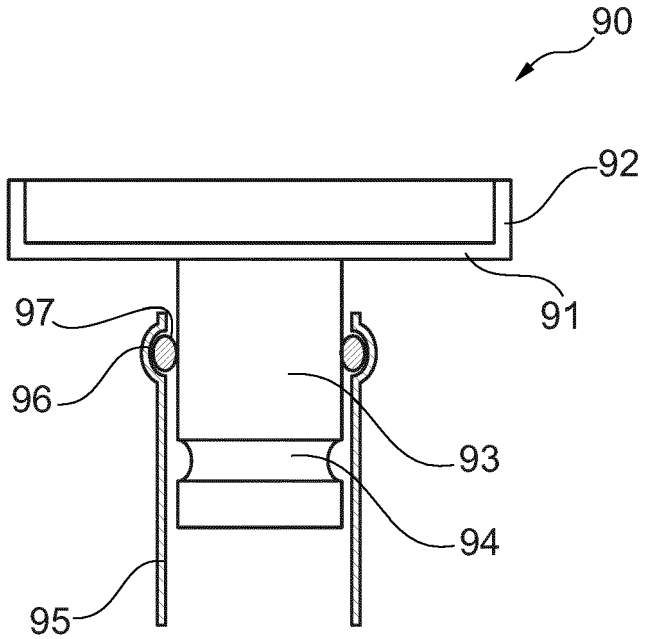

Fig. 7

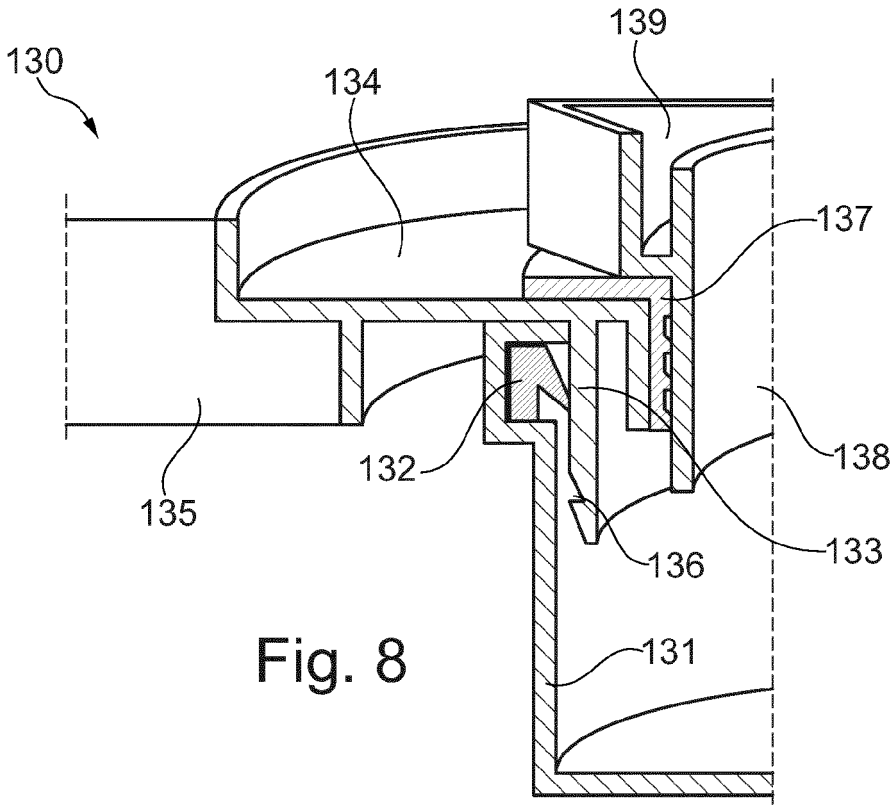
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Fig. 8

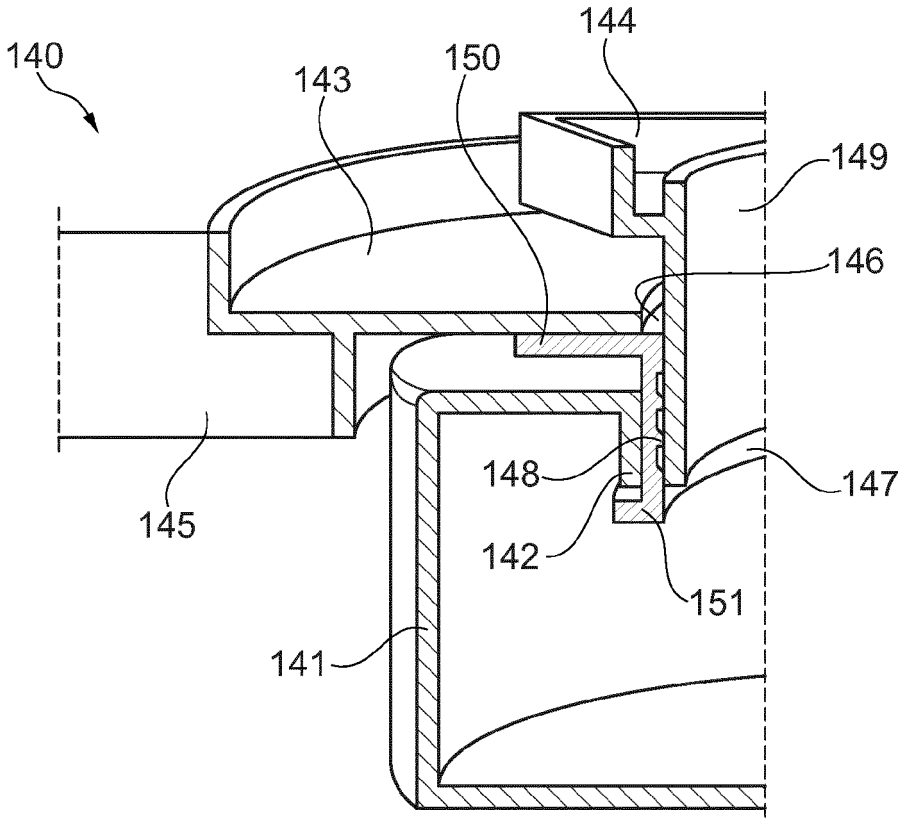
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Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 18 16 7510

DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	DE 83 17 189 U1 (OTTO SCHLOTTER) 18 September 1986 (1986-09-18) * claim 5; figures 1,2 *	2	
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TECHNICAL FIELDS SEARCHED (IPC)
E03F E03C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 September 2018	Flygare, Esa

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 16 7510

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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14-09-2018

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