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(54) **ODOUR TRAP**

(57) Trap with removable and flexible non-return valve (7), intended for carrying away waste water and preventing unpleasant smells and vermin coming from a drain or sewer, said trap (1) comprising a housing (2) with an inlet opening (3) and an outlet opening (4) provided in walls (5), (6) of the housing (2), whereby the

flexible non-return valve (7) is mounted to or in a panel (8) with a passage (9) for carrying away waste water, whereby the passage (9) is covered by the flexible non-return valve (7) and whereby the trap (1) is provided with fasteners (10) for sliding the panel (8) into or against the housing (2) of the trap (1).

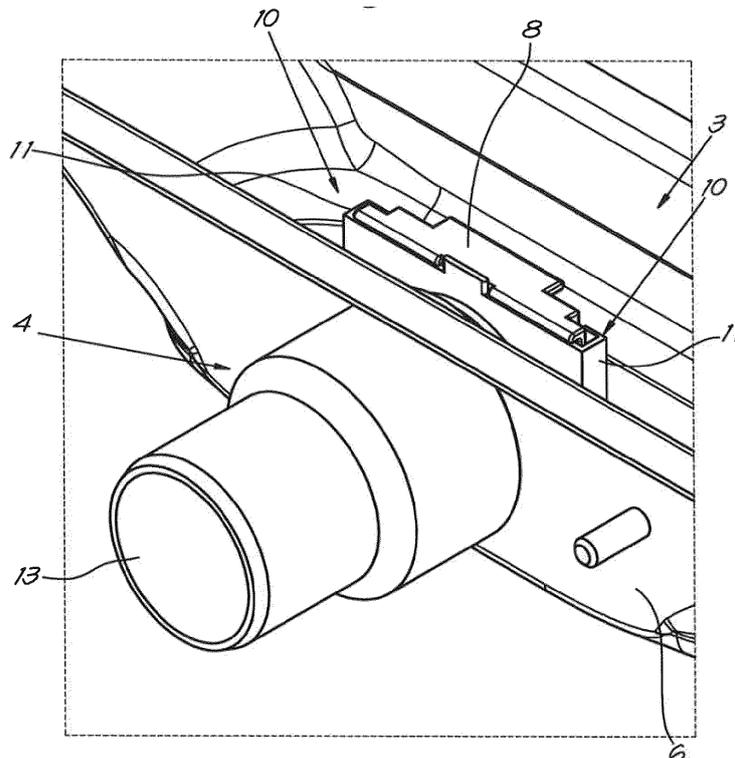


Fig. 2

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Description

[0001] The present invention relates to a trap.

[0002] In particular, the invention relates to a trap for carrying away waste water and stopping smells and vermin. The trap is intended for assembly under a shower tray or wash basin, although the invention is not limited to this.

[0003] Traps with a flexible flap that acts as a sort of non-return valve, sometimes also referred to as dry traps, which require considerably less mounting depth than traditional S- or U-traps in which an amount of water remains trapped, are already known.

[0004] Furthermore, the traps with flexible flap are handier because said traps are easily accessible, for example for cleaning or removing dirt, such as hair or other elements that can obstruct the flow through the trap or drainpipe.

[0005] Traps of this type are susceptible to improvement.

[0006] Indeed, the disadvantage of the known traps with flexible flap is that considerable dexterity is required when mounting or inserting the flexible flap in the housing of the trap.

[0007] In such traps one edge of the flexible flap is mounted to the housing of the trap or can be slid into a slit in the housing provided for this purpose.

[0008] The disadvantage of flaps fixedly connected to the housing, is that said flaps are difficult to access and thus also difficult to clean.

[0009] The disadvantage of flaps that can be slid into a slit of the housing is that inserting said flaps requires the necessary dexterity and care. Such flaps can easily get doubled up or end up sideways during assembly, such that said flaps no longer fulfil their function well.

[0010] The purpose of the present invention is to provide a solution for the aforementioned and other disadvantages.

[0011] To this end, the invention relates to a trap with removable and flexible non-return valve, intended for carrying away waste water and preventing unpleasant smells and vermin coming from a drain or sewer, comprising a housing with an inlet opening and an outlet opening provided in walls of the housing, whereby the flexible non-return valve is mounted to or in a panel with a passage for carrying away waste water, whereby the passage is covered by the flexible non-return valve and whereby the trap is provided with fasteners for sliding the panel into or against the housing of the trap, whereby a tube piece extends perpendicularly to the panel for coupling with a drainpipe.

[0012] This has the advantage that the flexible flap is very simple to insert into the trap and can also be easily removed from it. As the flap is mounted in or to a panel, the flap cannot end up sideways or get doubled up while inserting the flap into the trap.

[0013] In a preferred embodiment, the passage in the panel is provided with a grill in order to stop the transit

of larger elements or hair in the waste water to the drainpipe and thus prevent blockage of the drainpipe, however, said grill is not necessary for the invention.

[0014] Preferably, the flexible non-return valve is executed as a silicone flap, an edge of which is suspended to the panel, such that the flap comes to hang vertically under the influence of gravity and completely seals the passage in the panel when no waste water is flowing through.

[0015] Such configuration will ensure that the flexible flap forms a physical barrier for smells when there is no waste water flowing through the trap. When waste water is flowing through the trap, the flap will come to lie on the flowing water surface as a blanket as it were, such that then also the smell from a sewer or drain is unable to penetrate into the trap.

[0016] Preferably, the passage in the panel and the flexible flap is circular. Preferably, the diameter of the flap is at least as great as, or greater than, the diameter of the passage, such that the flexible flap completely seals the passage when no waste water is flowing through the trap.

[0017] Moreover, when the diameter of the flap is greater than the diameter of the passage and the flap is resting against the panel, the additional advantage is that the flap can only let water through in one direction and will block water in the other direction. In case of a flood or backflow from water of the sewer to the trap, the flexible flap will stop said water.

[0018] In a preferred embodiment, the flap is detachable from the panel, such that the flap can be replaced in a simple manner and the panel can be reused.

[0019] Preferably, the flexible flap is provided with a pin, which extends approximately perpendicularly to the plane formed by the flexible flap, whereby the pin can be applied in a hole in the panel provided for this purpose. The diameter of the pin and the diameter of the hole are aligned such that after assembly the pin is clamped in the hole for mounting the flexible flap to the panel.

[0020] In this way the flexible flap can be mounted to, or removed from, the panel quickly and easily, without tools.

[0021] In a preferred embodiment, the smallest included angle between the plane formed by the panel and the axis of the outlet opening is located between 45° and 90°, and ideally is located between 70° and 90°.

[0022] With the intention of better showing the characteristics of the invention, a preferred embodiment of a trap according to the invention is described hereinafter, by way of an example without any limiting nature, with reference to the accompanying drawings wherein:

figure 1 schematically shows a perspective view of a trap according to the invention;

figure 2 shows a detail of the trap of figure 1 indicated with the arrow F2;

figure 3 shows a front view of the trap of figure 1;

figure 4 shows the trap of figure 1 in disassembled

condition;

figure 5 shows a panel with a flexible flap;

figure 6 shows the panel and flexible flap of figure 5 but in disassembled condition

figure 7 shows a perspective view of a variant of a trap according to the invention in assembled condition;

figure 8 shows the same trap as figure 7 but in disassembled condition.

[0023] The trap shown in figure 1 trap comprises a housing 2 for collecting and carrying away waste water and is provided with an inlet opening 3 and an outlet opening 4 provided in walls of the housing 2.

[0024] The inlet opening 3 is situated in the upper wall 5 of the housing 2 and is executed, in this case, in an oblong and narrow way. In this embodiment, the upper wall 5 of the trap 1 is intended for mounting under a shower channel, shower tray or wash basin for example. The outlet opening 4 is situated in a sidewall 6 of the housing 2.

[0025] The trap 1 is further provided with a flexible non-return valve 7 which is mounted in a panel 8 with a passage 9 for carrying away the waste water. This is more visible in the detail shown in figure 2.

[0026] The passage 9 in the panel 8 is covered by the flexible non-return valve 7, as shown in figures 3 to 5.

[0027] The trap 1 is provided with fasteners 10 for detachably mounting the panel 8 against or on the housing 2.

[0028] In this embodiment, a tube piece 12 extends through the outlet opening 4, said tube piece 12 being removable from the trap 1 in this embodiment. This is clearly visible on the disassembled trap 1, as shown in figure 4.

[0029] Said tube piece 12 is intended for coupling with a drainpipe 13. In the embodiment shown the panel 8 and the tube piece 12 are manufactured as two separate components. At one end 14 the tube piece 12 is hereby provided with a flange 15 with a flange passage on which the aforementioned fasteners 10 are provided for mounting the panel 8 against the flange 15. In the example shown the fasteners 10 are executed as two hooks 11 facing each other. Two side edges of the panel 8 can be slid between said hooks 11 after which the hooks 11 fixedly clamp the panel 8 against the flange 15.

[0030] After assembly of the panel 8 against the flange 15, the flange passage will be approximately concentric with the passage 9 in the panel 8.

[0031] In this embodiment, after assembly in the trap 1, the tube piece 12 extends through the outlet opening 4, in such a way that the flange 15 fits closely against the inner wall of the housing 2 as shown in figure 1. The hooks 11 are provided on a flange wall that is facing away from the tube piece 12.

[0032] In this embodiment, said hooks 11 extend over the complete height of the panel 8 such that the complete length of the two aforementioned side edges of the panel

8 is clamped by the hooks 11.

[0033] As shown in figure 4, the tube piece 12 is provided with exterior screw thread 16 for connecting a drainpipe 13 with corresponding internal thread.

5 **[0034]** However, it is also possible that the tube piece 12 is provided with internal thread and the drainpipe 13 with corresponding exterior screw thread. Alternatively, the tube piece 12 may possess a smoothly finished outer sheathing such that the tube piece 12 can also be coupled to the drainpipe 13 by means of gluing or the drainpipe 13 may be welded to the tube piece 12 or directly to the outlet opening 4. In this way a very slim trap 1 can be constructed.

10 **[0035]** In this shown example the outer contour of the tube piece 12 is also provided with a first sealing ring 17 which is applied such that said first sealing ring 17, after assembly, is enclosed between the inner wall of the housing 2 and the flange 15.

20 **[0036]** Over the tube piece 12 or on the end of the drainpipe 13 which is intended for coupling with the tube piece 12, a second sealing ring 18 is applied in this shown variant, such that said second sealing ring 18, after assembly, is enclosed between the outer wall of the housing 2 and the drainpipe 13.

25 **[0037]** The panel 8 and the flexible non-return valve 7 are shown separately in figures 5 and 6. This embodiment shows that the panel 8, on the side facing the outlet opening 4 after assembly, is provided with a peripheral groove 19 which is intended for applying a third sealing ring 20. After assembly of the panel 8 in the trap 1, said third sealing ring 20 is enclosed between the panel 8 and the flange wall facing away from the tube piece 12.

30 **[0038]** In this example, the passage 9 in the panel 8 is provided with a grill 21 in order to stop the transit of greater elements, such as hair, little stones and the like, in the waste water to the drainpipe 13 to prevent a blockage of the drainpipe 13.

35 **[0039]** In this embodiment, the flexible non-return valve 7 is executed as a flexible silicone flap 7, an edge of which is suspended to the panel 8, such that the flap 7 completely seals the passage 9 in the panel 8 under the influence of gravity.

40 **[0040]** In this example, the passage 9 in the panel 8 and the flap 7 are executed in a circular way whereby the diameter of the flap 7 is as great as, or a fraction greater, for example 1 to 5 millimetres, than the diameter of the passage 9 such that the flap 7 completely seals the passage 9.

45 **[0041]** In this embodiment, the flexible flap 7 is detachable from the panel 8, such that the flap 7 can be replaced and the panel 8 can be reused.

50 **[0042]** To this end, the flexible flap 7 is provided with a pin 22, which extends approximately perpendicularly to the plane formed by the flexible flap 7. Said pin 22 is applied in a hole 23 in the panel 8 provided to this end whereby the diameter of the pin 22 and the diameter of the hole 23 are aligned such that after assembly the pin 22 is clamped in the hole 23, such that the flexible flap 7

is mounted or suspended to the panel 8.

[0043] In this embodiment, the panel 8 is provided with a lip 24 along one of its edges, such that the panel 8 can only be slid into the facing hooks 11 in one possible way. After assembly of the panel 8, the lip 24 connects to the flange 15, such that the panel 8 cannot be slid too deeply such that the passage 9 of the panel 8 would not be aligned with the outlet opening 4.

[0044] In the embodiment shown, the smallest included angle, between the plane formed by the panel 8 and the axis of the outlet opening 4, is equal to 90°. However, it is not excluded that said angle is between 45° and 90°.

[0045] In the variant shown in figure 7, the panel 8 is directly mounted on one end 14 of the tube piece 12. Preferably, the tube piece 12 and the panel 8 are made as one piece in this variant. Thus there is no need for a flange 15 and a third sealing ring 20 like in the first shown variant of figures 1 to 6. The pin 22 of the flap 7 is mounted to a side of the panel 8 facing away from the tube piece 12.

[0046] In this variant, the fasteners 10 are applied on the housing 2 and on the panel 8 and in this case comprise two hooks 11 facing each other on the level of the lower edge of the housing 2 and two openings 25 on the level of the upper edge of the housing 2. In this case, the panel 8 is provided with two projections 26 that can be fittingly inserted in the openings 25.

[0047] The panel 8 can be slid between the hooks 11 until the projections 26 are wholly or partly applied in the openings 25. After assembly the side of the panel 8 facing away from the tube piece 12 fits closely against the outer wall of the housing through the agency of a first sealing ring. To this end, the outer wall of the housing 2 and/or the panel 8 can also be provided with a peripheral groove 19 for applying the first sealing ring 17 between the housing 2 of the trap 1 and the panel 8. Just like with the first variant, a second sealing ring 18 can be applied over the outer contour of the tube piece 12 or alternatively on the end of the drainpipe 13.

[0048] The number of hooks 11, openings 25 and projections 26 is not necessarily equal to two, but is unlimited in practice.

[0049] The assembly and the use of the trap 1 are very simple and as follows.

[0050] The flap 7 is mounted to the panel 8. The necessary sealing rings 17, 18 and if relevant sealing ring 20 are applied and the panel 8 is subsequently slid into the trap 1. Finally, the drainpipe 13 is connected to the tube piece 12.

[0051] The trap 1 is now ready for use and waste water to be carried away will flow into the housing 2 of the trap 1 via the inlet opening 3.

[0052] The housing 2 will partially fill up with waste water and the prevalent water pressure will push the flexible flap 7 away in the direction of the drainpipe 15.

[0053] The waste water can now flow from the inlet opening 3 toward the outlet opening 4 and the drainpipe 15. The flexible flap 7 will hereby come to lie on the flowing water surface as a blanket.

[0054] When there is no new supply of waste water the flexible flap 7, under the influence of gravity, will again seal the passage 9 in the panel 8 and form a barrier for unpleasant smells and vermin coming from the drainpipe 15 or sewer.

[0055] It is understood that the trap 1 can come in many possible forms. The form of the trap 1 or the housing 2 is not limited to the aforementioned examples.

[0056] Although the description always talks about water or waste water, the invention is also applicable for other fluids.

[0057] The present invention is by no means limited to the embodiments described as an example and shown in the figures, but a trap with removable and flexible non-return valve according to the invention can be realised in all kinds of forms and dimensions, without departing from the scope of the invention.

20 Claims

1. Trap with removable and flexible non-return valve (7), intended for carrying away waste water and preventing unpleasant smells and vermin coming from a drain or sewer, said trap (1) comprising a housing (2) with an inlet opening (3) and an outlet opening (4) provided in walls (5), (6) of the housing (2), whereby the flexible non-return valve (7) is mounted to or in a panel (8) with a passage (9) for carrying away waste water, whereby the passage (9) is covered by the flexible non-return valve (7) and whereby the trap (1) is provided with fasteners (10) for sliding the panel (8) into or against the housing (2) of the trap (1), **characterised in that** a tube piece (12) extends perpendicularly to the panel (8) for coupling with a drainpipe (13).
2. Trap according to claim 1, **characterised in that** the fasteners (10) are executed as two hooks (11) facing each other, provided against or on a wall (6) of the housing (2) and which are positioned at a distance from each other such that two side edges of the panel (8), after sliding into the trap (1), are enclosed between said hooks (11) and/or that the fasteners (10) are executed as openings (25) provided in the housing (2) and projections (26) provided on the panel (8) or vice versa, whereby the openings (25) and projections (26) are positioned such that, after sliding the panel (8) into the trap (1), the projections (26) are wholly or partly enclosed in the openings (25).
3. Trap according to any one of the previous claims, **characterised in that** the tube piece (12) and the passage (9) are concentrically positioned in the panel (8).
4. Trap according to any one of the previous claims, **characterised in that** the panel (8) and the tube

- piece (12) are two separate parts, whereby the tube piece (12) is provided with a flange (15) at one end on which the aforementioned fasteners (10) are applied for mounting the panel (8) against the flange (15) and whereby the tube piece (12), after assembly in the trap (1) extends through the outlet opening (4) in such a way that the flange (15) fits closely against the inner wall of the housing (2).
5. Trap according to any one of the previous claims, **characterised in that** the aforementioned hooks (11) extend over the complete height of the panel (8) such that the complete length of the two aforementioned side edges of the panel (8) is enclosed by the hooks (11).
 6. Trap according to any one of the previous claims, **characterised in that** the tube piece (12) is provided with an exterior screw thread (16) for connecting a drainpipe (13) with corresponding internal thread or vice versa or that the tube piece (12) is provided with a smooth outer sheathing for connecting the drainpipe (13) by means of gluing or by a welded joint.
 7. Trap according to any one of the previous claims, **characterised in that** a first sealing ring (17) is applied over the outer contour of the tube piece (12) such that said first sealing ring (17), after assembly, is enclosed between the inner wall of the housing (2) and the flange (15) or is enclosed between the outer wall of the housing (2) and the panel (8).
 8. Trap according to any one of the previous claims, **characterised in that** a second sealing ring (18) is applied over the tube piece (12) or on the end of the drainpipe (13) which is intended for coupling with the tube piece (12), such that said second sealing ring (18), after assembly, is enclosed between the outer wall of the housing (2) and the drainpipe (13) or is enclosed between the panel (8) and the drainpipe (13).
 9. Trap according to any one of the previous claims 4 to 8, **characterised in that** the panel (8) is provided with a peripheral groove (19) which is intended for applying a third sealing ring (20), such that said third sealing ring (20), after assembly, is enclosed between the panel (8) and the flange (15).
 10. Trap according to any one of the previous claims, **characterised in that** the passage (9) in the panel (8) is provided with a grill (21) in order to prevent the transit of greater elements in the waste water to the drainpipe (13).
 11. Trap according to any one of the previous claims, **characterised in that** the flexible non-return valve (7) is executed as a silicone flap (7), an edge of which is suspended in or to the panel (8), such that under the influence of gravity, the flap (7) completely seals the passage (9) in the panel (8).
 12. Trap according to any one of the previous claims, **characterised in that** the passage (9) in the panel (8) is circular and that the non-return valve (7) is also executed in a circular way and that the diameter of the non-return valve (7) is at least as great as, or is greater than, the diameter of the passage (9), such that the non-return valve (7) completely seals the passage (9).
 13. Trap according to any one of the previous claims, **characterised in that** along one of its edges the panel (8) is provided with a lip (24), such that the panel (8) can only be slid into the trap (1) in one possible way and that, after assembly of the panel (8), the lip (24) fits closely against the flange (15) or against the housing (2) such that the panel (8) cannot be slid in too deeply.
 14. Trap according to any one of the previous claims, **characterised in that** the non-return valve (7) is detachable from the panel (8), such that it is possible to replace the non-return valve (7) and reuse the panel (8).
 15. Trap according to any one of the previous claims, **characterised in that** the flexible non-return valve (7) is provided with a pin (22) which extends approximately perpendicularly to the plane formed by the flexible non-return valve (7), said pin (22) being able to be applied in a hole (23) provided in the panel (8) to this end, whereby the diameter of the pin (22) and the diameter of the hole (23) are aligned such that the pin (22) is clamped in the hole (23) after assembly for mounting the flexible non-return valve (7) to the panel (8).

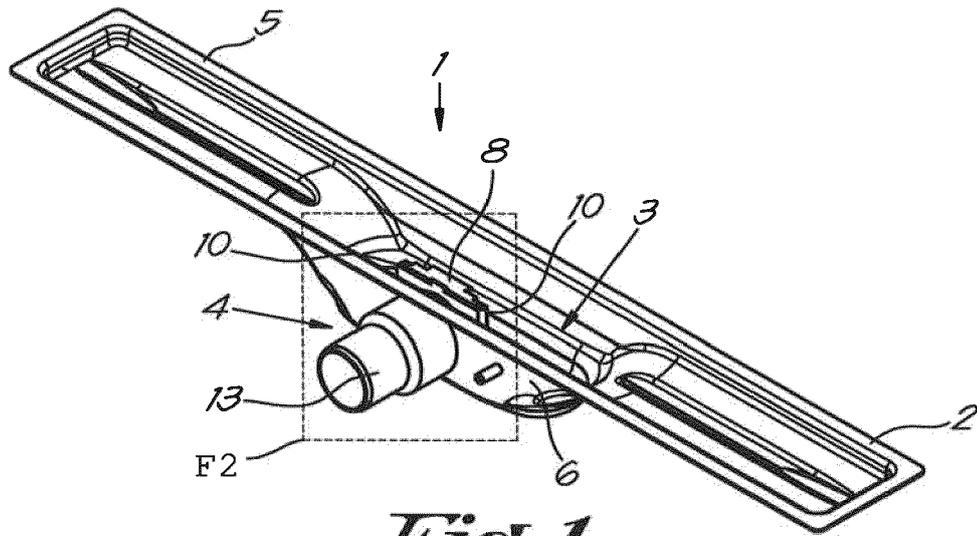


Fig. 1

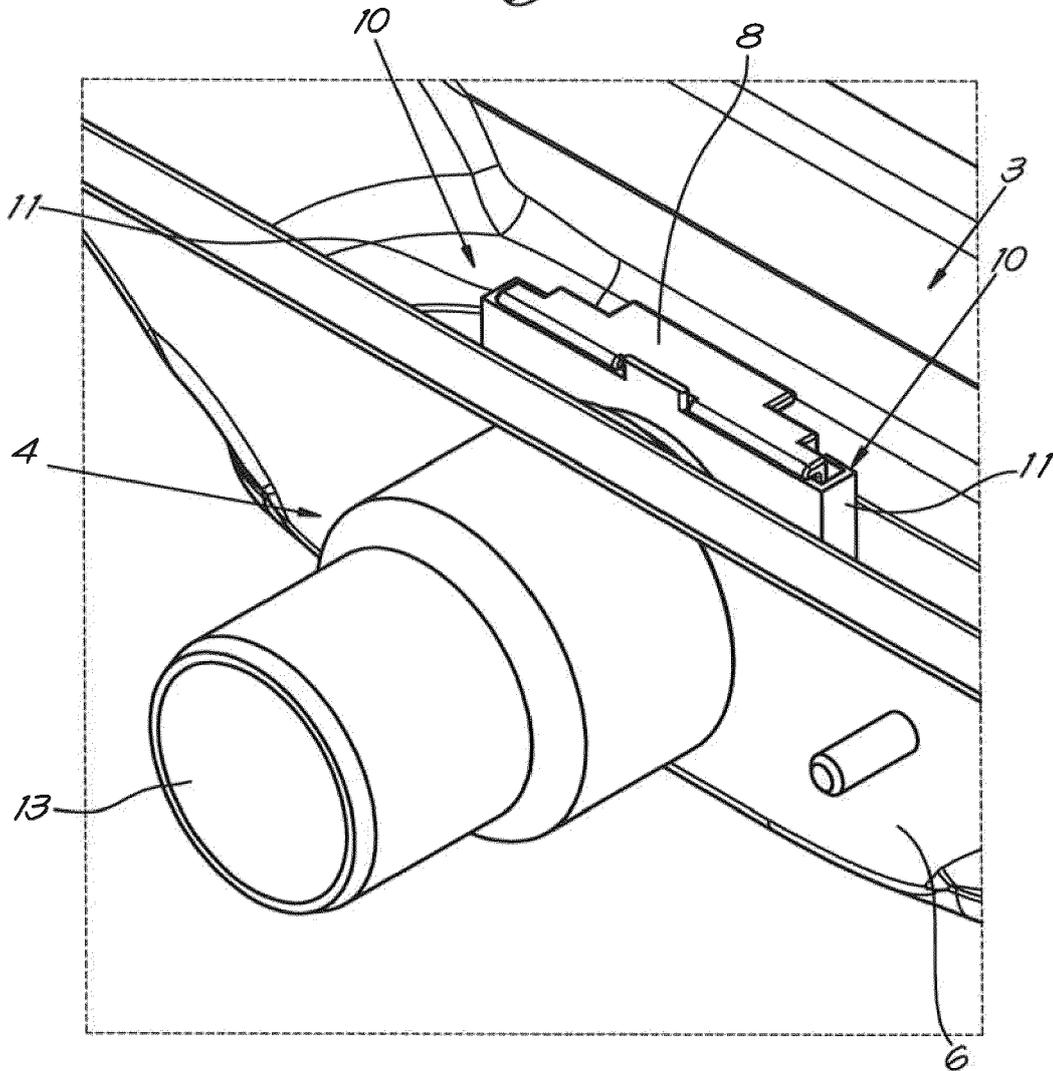


Fig. 2

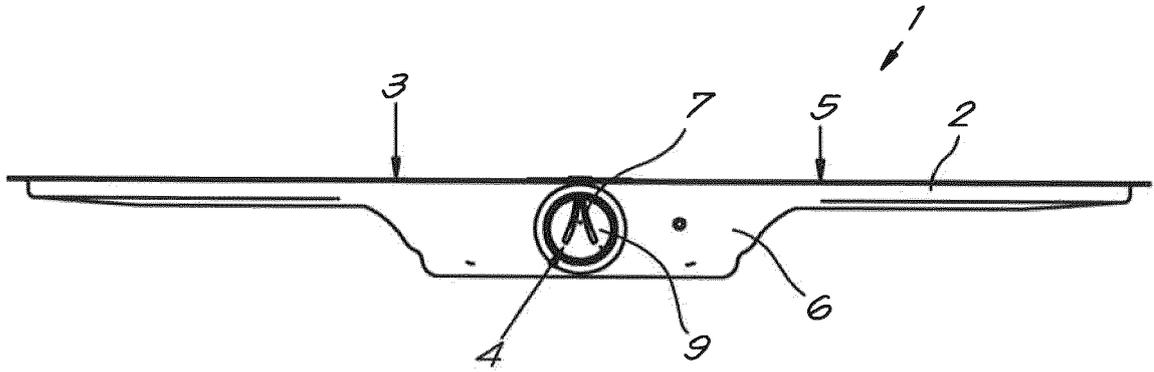


Fig. 3

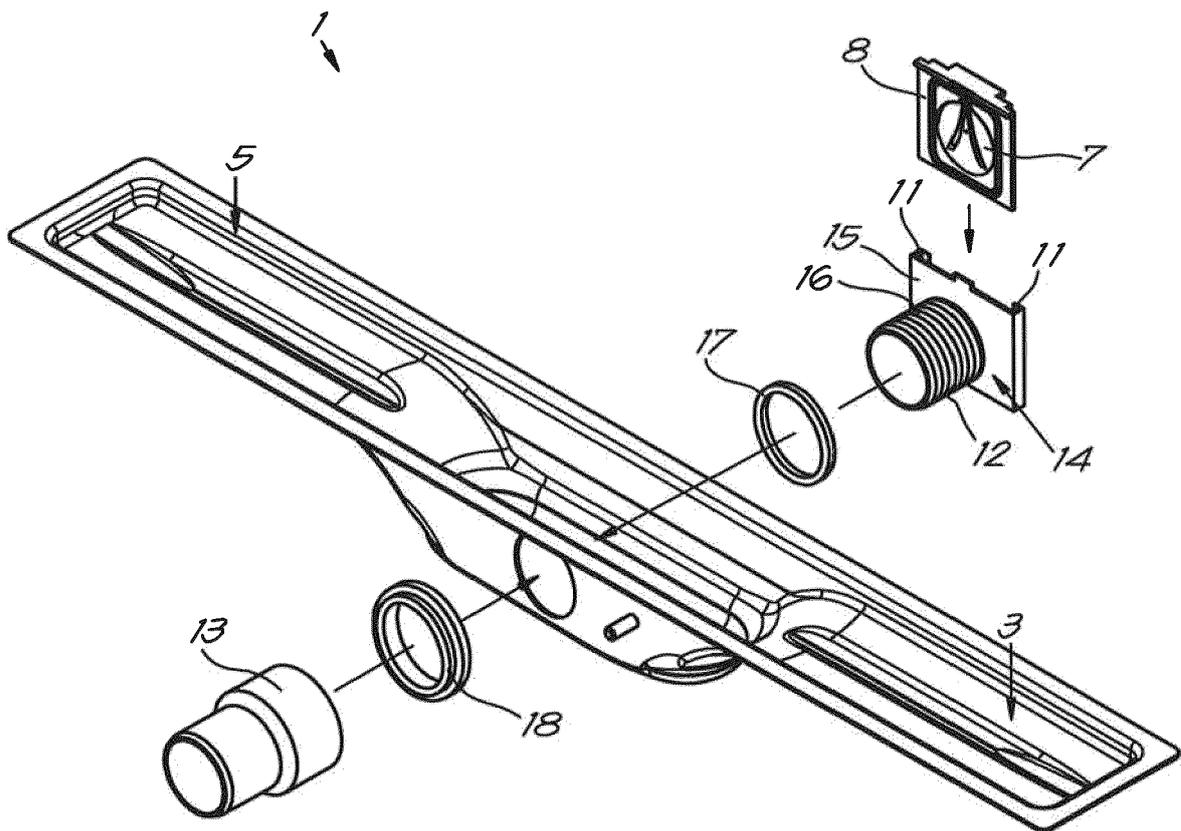


Fig. 4

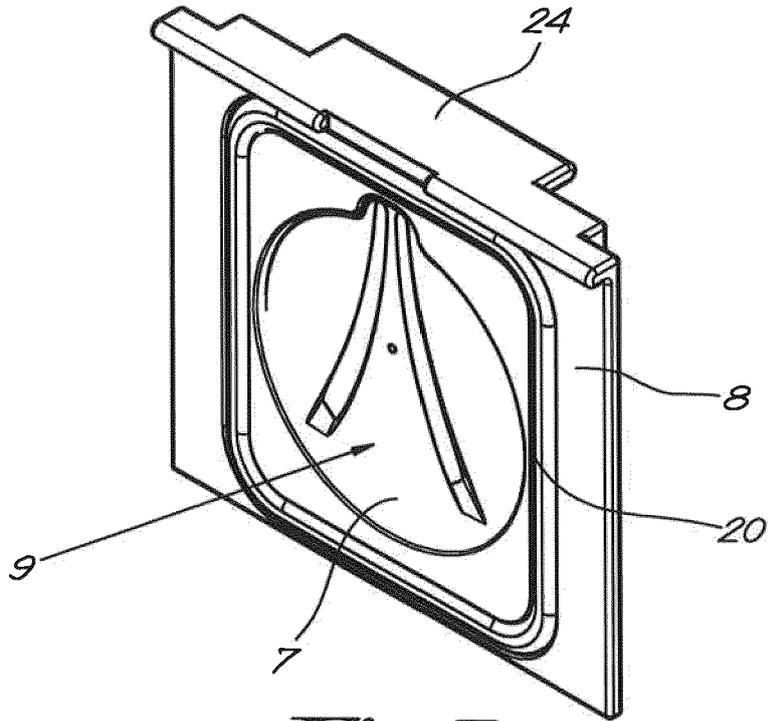


Fig. 5

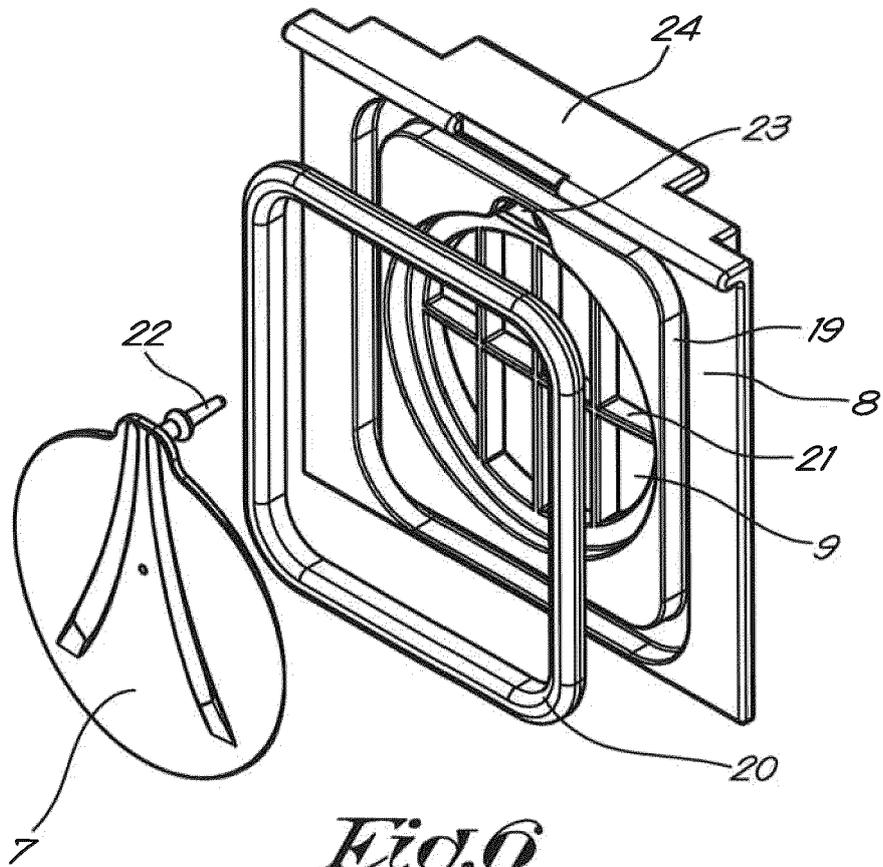


Fig. 6



EUROPEAN SEARCH REPORT

Application Number

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	KR 2013 0082225 A (MIRAE IND CO LTD [KR]) 19 July 2013 (2013-07-19)	1, 3, 6-8, 11-14	INV. E03F5/04
A	* figures 1, 6 *	2, 4, 5, 9, 10, 15	E03C1/298

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	* figure 1.2 *		

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	* figure 2 *		

			TECHNICAL FIELDS SEARCHED (IPC)
			E03F E03C E01C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		29 January 2024	Flygare, Esa
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention	
X : particularly relevant if taken alone		E : earlier patent document, but published on, or	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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