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(54) **WATER DISTRIBUTOR AND TOILET BOWL**

(57) Water distributor (1, 1', 1") for distributing flush water to a rimless inner wall (21', 21") of a toilet bowl (2', 2"), the water distributor (1, 1', 1") comprising a tubular body (10, 10', 10") having a main tubular portion (100, 100', 100") extending from at least one water discharge opening (101, 101', 101", 102, 102', 102") placed at one longitudinal end to an outwardly directed wall (103, 103', 103") arranged at the other longitudinal end, the tubular body (10, 10', 10") comprising an auxiliary tubular portion (104, 104', 104"), which is attached to the outwardly directed wall (103, 103', 103") of the main tubular portion (100, 100', 100") of said tubular body (10, 10', 10"), and the water distributor (1, 1', 1") comprising a seal ring (11, 11', 11") including a first seal ring portion (110, 110', 110") arranged on at least part of said auxiliary tubular portion (104, 104', 104") and configured to seal the tubular body (10, 10', 10") against an inner wall of a rear bore (22', 22") and a second seal ring portion (112, 112', 112") arranged and configured to cover at least part of the outwardly directed wall (103, 103', 103"). Fig.2.

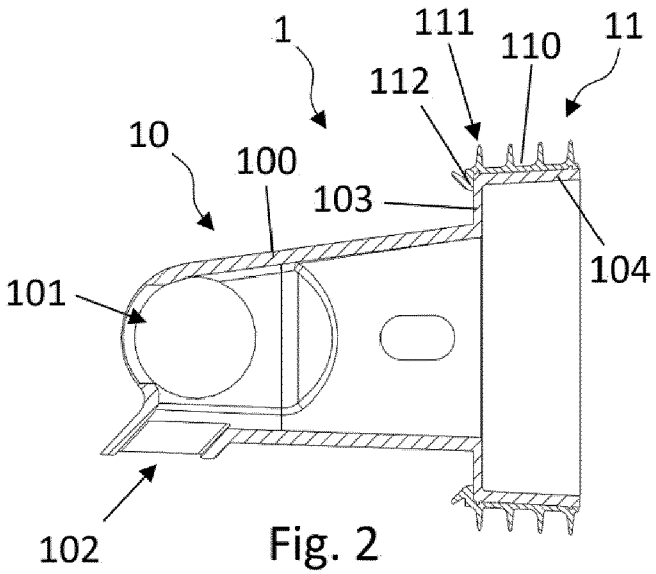

Fig. 2

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Description

[0001] The present invention relates, in a first aspect, to water distributors for toilet bowls and, in a second aspect, to toilet bowls comprising said water distributors. Particularly, the toilet bowl is of the kind comprising a rimless inner wall, wherein the water needs to be distributed in a specific way, so the water distributor needs to be fixed in a precise place.

Background of the invention

[0002] Water distributors for toilet bowls having rimless inner walls are known from the prior art. For example, patent documents EP0019449A1 and EP0080762A2 disclose water distributors comprising a tubular body extending from discharge openings, which are placed at one longitudinal end, to an outwardly directed wall arranged at the other longitudinal end, said outwardly directed wall being susceptible to act as a stop against a surface of the toilet bowl. Sealing ribs are placed between the water discharge openings and the outwardly directed wall, so the water distributor is sealed against the rear bore of a toilet bowl when inserted. Nevertheless, a supply pipe is needed for suppling water to the water distributor, wherein the sealing between the supply pipe and outwardly directed wall of the water distributor becomes complex or inefficient. Moreover, involuntary rotation of the water distributors around its longitudinal axis is not prevented, so misalignment of lateral discharge openings with respect to the horizontal plane may be produced.

[0003] Existing toilet bowls, as the one disclosed on patent document EP3486386A1, comprise a water distributor housed at the rear bore of the toilet bowl, wherein the rear bore comprises longitudinal guides configured for guiding and retaining longitudinal ribs provided at the water distributor, in order to prevent misalignment of lateral discharge openings due to involuntary rotation. Because of the longitudinal guides of the rear bore, the manufacturing of the toilet bowl becomes really complex.

[0004] Furthermore, patent documents EP3825479A1, EP3825480A1 and EP3825481A1 disclose water distributors comprising independently-manufactured anti-rotation parts, which increase the manufacturing costs.

[0005] Besides, patent document EP0142991A2 discloses a water distributor comprising an elbow section flush pipe structure provided with a top plate portion having fixing holes for fastening the water distributor to the back of the toilet bowl. However, this solution increases the manufacturing cost of the water distributor.

[0006] It is necessary to offer an alternative to the state of the art, which covers the gaps mentioned above, particularly by providing a water distributor able to prevent misalignment of lateral discharge openings due to involuntary rotation while having reduced manufacturing costs.

Description of the invention

[0007] The aim of the present invention is to solve the aforementioned drawbacks by providing a water distributor and a toilet bowl with said water distributor including the advantages that will be described below.

[0008] In accordance with this aim, according to a first aspect, the present invention provides a water distributor for distributing flush water to a rimless inner wall of a toilet bowl. The present water distributor comprises a tubular body having a main tubular portion extending from at least one water discharge opening which is placed at one longitudinal end to an outwardly directed wall arranged at the other longitudinal end.

[0009] In contrast to the water distributors known in the prior art, the water distributor of the present invention is characterized in that;

- the tubular body comprises an auxiliary tubular portion attached, preferably peripherally, to the outwardly directed wall, said auxiliary tubular portion having a diameter bigger than the main tubular portion configured to receive a water supply pipe or an elbow pipe linked to a cistern, and in that;
- the water distributor comprises a seal ring including:
    - a first seal ring portion arranged on at least part of said auxiliary tubular portion and configured to seal the rigid tubular body against an inner wall of a rear bore of the toilet bowl, and
    - a second seal ring portion, arranged and configured to cover at least part of the outwardly directed wall of the tubular body to retain in place the first seal ring portion when inserting the water distributor inside the rear bore of the toilet bowl.

[0010] Thanks to this configuration, while the first seal ring portion of the seal ring exerts pressure against the surface of the rear bore when an operator tries to introduce the water distributor into the toilet bowl, the second seal ring portion holds longitudinally the seal ring to the outwardly directed wall of the water distributor, so preventing the seal ring from squeezing outside the rear bore.

[0011] Moreover, said second seal ring portion helps to seal and fix longitudinally the water distributor against an inner wall of the rear bore of the toilet bowl, and the water distributor comprises a pipe portion pushing forward the outwardly directed wall of the tubular body. The achieved goal is that said at least one water discharge opening remains precisely placed at the right position, while the manufacturing of the rear bore of the toilet bowl is still simple.

[0012] Preferably, the tubular body is rigid, and advantageously, the first sealing ring portion of the sealing ring comprises sealing outer ribs.

[0013] For a first embodiment, the water distributor

comprises an elbow pipe including a first elbow pipe portion fluidically linked to the auxiliary tubular portion of the tubular body and a second elbow pipe portion configured to receive an outlet fitting of a cistern through which flushing water is delivered.

[0014] Preferably, the top end of the second elbow pipe portion comprises a ring portion configured to rest over a horizontal supporting surface of the toilet bowl, the ring portion comprising an upper annular groove or housing and an upper sealing ring placed at the upper annular grove or housing and configured to seal the outlet fitting of the cistern.

[0015] Thanks to this configuration, the ring portion may be firmly pressed between the horizontal supporting surface and the underside of a cistern, making the water distributor to be sealed and immovably retained in all directions with no need of comprising any perforated top plate portion, so reducing the manufacturing cost.

[0016] In a first implementation of the first embodiment, preferably, the tubular body and the elbow pipe are two easily-molded independent parts, so the auxiliary tubular portion of the tubular body defines an inlet opening inside of which the end of said first elbow pipe portion of the elbow pipe may be inserted. According to this implementation, advantageously, the water distributor comprises an inner seal ring configured and arranged to seal the first elbow pipe portion against the auxiliary tubular portion of the tubular portion body.

[0017] Preferably for said first implementation, the first elbow pipe portion is attached removably to the auxiliary tubular portion, for example by comprising corresponding removable attaching means for being mutually removably attached, so a possible misalignment of the at least one water discharge opening due to an involuntary rotation is prevented.

[0018] In a second implementation of the first embodiment, alternatively, the auxiliary tubular portion of the tubular body and the first elbow pipe portion of the elbow pipe are configured as a one-piece tubular body, so the inner seal ring is not needed.

[0019] As an option for any embodiment, especially when the water distributor does not comprise said elbow pipe portion, the water distributor may comprise anti-rotation means. In a possible implementation of the anti-rotation means, the end of the auxiliary tubular portion of the tubular body comprise at least one anti-rotation tab, which for example, may be provided with a protrusion susceptible to be retained in a hole of the toilet bowl. In another example, the at least one anti-rotation tab may comprise a hole, so it may be fixed to a boring of the toilet bowl by a screw. Preferably, this anti-rotation tab is defined as an integral part of the tubular body, so possible misalignment of the at least one water discharge opening due to an involuntary rotation is also prevented.

[0020] According to a second aspect, the present invention provides a toilet bowl comprising a rimless inner wall and a rear bore for receiving a flush water supply pipe, characterized in that it comprises a water distributor according to any previous embodiments totally or partially inserted inside the rear bore, wherein the at least one water discharge opening of the water distributor is configured to distribute flush water into the rimless inner wall, and the auxiliary tubular portion of the water distributor is sealed against the rear bore by at least the first seal ring portion of the sealing ring.

[0021] For one embodiment of the toilet bowl, the rear bore comprises an inner wall which acts as a stop wall for said second seal ring portion of the water distributor.

[0022] Thanks to this configuration, said second seal ring portion helps to seal and fix longitudinally the water distributor when the toilet bowl, or the water distributor, comprises a pipe or a pipe portion pushing forward its outwardly directed wall. The achieved goal is that said at least one water discharge opening remains precisely placed at the right position, while the manufacturing of the rear bore of the toilet bowl is still simple.

[0023] For another embodiment of the toilet bowl, the toilet bowl comprises a horizontal supporting surface placed next to the rear bore and configured to support the ring portion of the elbow pipe, said elbow pipe of the water distributor including:

- a first elbow pipe portion fluidically linked to the auxiliary tubular portion of the tubular body and,
- a second elbow pipe portion comprising the ring portion at its top end configured to rest over said horizontal supporting surface.

[0024] The ring portion comprises an upper annular groove or housing and an upper sealing ring placed at the upper annular grove or housing, so, when the second elbow pipe portion receives the outlet fitting of a cistern, the ring portion is firmly pressed between the horizontal supporting surface and the underside of the cistern, making the water distributor to be sealed and immovably retained in all directions.

[0025] Preferably, the horizontal supporting surface comprises at least one hole for receiving fastening means configured to fasten the underside of a cistern to the horizontal supporting surface, so the ring portion is held between the cistern and the horizontal supporting surface.

[0026] Advantageously, when the end of the auxiliary tubular portion of the tubular body of the water distributor comprises at least one anti-rotation tab provided with a protrusion integrally defined to the tubular body, the toilet bowl comprises at least one bore or hole next to the end of the rear bore configured to receive the protrusion of the water distributor, so misalignment of the at least one water discharge opening due to an involuntary rotation is prevented.

Brief description of the drawings

[0027] For the better understanding of the description made herein, a set of drawings has been provided where-

in, solely by way of a non-limiting example, several examples of embodiments for the water distributor and the toilet bowl of the invention are represented.
In these drawings:

- FIG. 1 shows a perspective illustration of a first embodiment of the present water distributor, constituted by a tubular body and a seal ring.
- FIG. 2 shows a longitudinal vertical section seen from one side of the first embodiment of the water distributor of figure 1.
- FIG. 3 shows a perspective illustration of a second embodiment of the present water distributor, including a tubular body, a seal ring, and an elbow pipe.
- FIG. 4 shows a horizontal section seen from above of the second embodiment of the water distributor of figure 3.
- FIG. 5 shows a longitudinal vertical section seen from one side of a toilet bowl comprising a rimless inner wall, a rear bore and water distributor according to the embodiment of figure 4 inserted into the rear bore.
- FIG. 6 shows a perspective illustration of a third embodiment of the present water distributor, wherein the tubular body comprises anti-rotation tabs.
- FIG. 7 shows a horizontal section seen from above of a toilet bowl comprising a water distributor according to the third embodiment of figure 6.

Description of preferred embodiments

[0028] Several embodiments of the water distributor and the toilet bowl of the present invention are described below with reference to figures 1 to 7.

[0029] The present invention relates to a water distributor (1, 1', 1") and a toilet bowl (2', 2") comprising said water distributor (1, 1', 1"). The water distributor (1, 1', 1") of all embodiments herein described comprises a tubular body (10, 10', 10"), preferably a rigid tubular body, having a main tubular portion (100, 100', 100") extending from three water discharge openings (101, 102, 101', 102', 101", 102"), which are placed at one longitudinal end, to an outwardly directed wall (103, 103', 103") arranged at the other longitudinal end.

[0030] The attached drawings show two of said three water discharge openings (101, 101', 101") are placed at corresponding sides of the main tubular body (100, 100', 100") and the third one water discharge opening (102, 102', 102") is placed facing downwards.

[0031] Figures 1 and 2 show a first embodiment of the water distributor (1), wherein the tubular body (10) comprises an auxiliary tubular portion (104) attached peripherally to the outwardly directed wall (103), so the auxiliary tubular portion (104) defines an inlet opening having a diameter bigger than the main tubular portion (100).

[0032] The water distributor (1) of all embodiments comprises a seal ring (11) including:

- a first seal ring portion (110, 110', 110") arranged on at least part of the auxiliary tubular portion (104, 104', 104") and configured to seal the tubular body (10, 10', 10") against an inner wall of a rear bore (22', 22") of a toilet bowl (2, 2"), and
- a second seal ring portion (112, 112', 112") extending inwardly from an end of the first seal ring portion (110, 110', 110") and arranged and configured to cover at least part of said outwardly directed wall (103, 103', 103").

[0033] Thanks to the described second seal ring portion (112, 112', 112"), the seal ring (11, 11', 11") is kept at the desired position of the tubular body (10, 10', 10"). In addition, the rear bore (22' 22") of the toilet bowl (2', 2") may comprise an inner wall which acts as a stop wall for said second seal ring portion (112, 112', 112"), so the second seal ring portion (112, 112', 112") of the seal ring (11, 11', 11") can help to seal the rear bore.

[0034] Preferably, the first sealing ring portion (110, 110', 110") includes sealing outer ribs (111) configured to be pressed against the rear bore (22', 22") of a toilet bowl (2, 2"), in order to seal the rear bore against the auxiliary tubular portion (104, 104', 104") of the tubular body (10, 10', 10"). Thus, when a water supply pipe is introduced at the auxiliary tubular portion (104, 104', 104") of the water distributor (1, 1', 1"), the outwardly directed wall (103, 103', 103") of the tubular body (10, 10', 10") is pressed forward, but the sealing outer ribs (111) would tend the seal ring (11, 11', 11") to be kept by the rear bore and not to move forward together with the tubular body (10, 10', 10").

[0035] Figures 3 and 4 show a second embodiment of the water distributor (1'), wherein the tubular body (10') comprises an auxiliary tubular portion (104') attached peripherally to the outwardly directed wall (103') and an elbow pipe (12') of which a first elbow pipe portion (121') is introduced into the auxiliary tubular portion (104') of the tubular body (10'), while a second elbow pipe portion (122') is configured to receive an outlet fitting of a cistern through which flushing water is delivered. As shown in figure 3, the top end of the second elbow pipe portion (122') comprises a ring portion (123') having an upper annular housing (124') and an upper sealing ring (125') placed at the upper annular housing (124') and configured to seal the outlet fitting of the cistern.

[0036] As shown at the horizontal section of figure 4, the first elbow pipe portion (121') comprises protrusions which act as removably attaching means (126') for said protrusions being removably attached to corresponding holes, so the tubular body (10') and the elbow pipe (12') may be configured as two removable independent parts.

[0037] As it can be seen in figures 4 and 5, the auxiliary tubular portion (104') of the tubular body (10') and the first elbow pipe portion (121') of the elbow pipe (12') are sealed by an inner seal ring (13'). In this embodiment, the inner seal ring (13') is configured as a portion of the seal ring (11'), although an independent inner seal ring

may be possible.

[0038] As an alternative embodiment to the embodiment of the water distributor (1') shown on figures 3 to 5, when the water distributor also comprises an elbow pipe, the auxiliary tubular portion of the tubular body and the first elbow pipe portion of the elbow pipe may be joined as a one-piece tubular body, so an inner seal ring is not needed, although the manufacturing of the water distributor becomes more complex.

[0039] Figure 5 shows a vertical section of a toilet bowl (2') which comprises a rimless inner wall (21') and a rear bore (22') wherein a water distributor (1') of the second embodiment shown on figures 3 and 4 is housed. The water distributor (1') is placed inside the rear bore (22') and the water discharge openings (101', 102') are next the rimless inner wall (21'). As it can be seen, the toilet bowl (2') comprises a horizontal supporting surface (24') placed next to the rear bore (22') configured to support the ring portion (123') of the elbow pipe (12'). Moreover, the rear bore (22') is defined by a first longitudinal bore portion (221') next to the rimless inner wall (21'), a second longitudinal bore portion (222') distal from the rimless inner wall (21') and an inner wall (23') joining the first longitudinal bore portion (221') and the second longitudinal bore portion (222'). As shown, the auxiliary tubular portion (104') of the water distributor (1') is sealed against the second longitudinal bore portion (222') by the first seal ring portion (110') of the sealing ring (11'), while said inner wall (23') acts as a stop wall which stops longitudinally the second seal ring portion (112').

[0040] Figure 6 shows a third embodiment of the water distributor (1") similar to the embodiment of figures 1 and 2, wherein the end of the auxiliary tubular portion (104") of the tubular body (10") additionally comprises two anti-rotation tabs (105") provided with a protrusion (106") defined as an integral part of the tubular body (10").

[0041] Figure 7 shows a horizontal section of a toilet bowl (2") which comprises a rimless inner wall (21") and a rear bore (22") wherein a water distributor (1") of the third embodiment is arranged inside the rear bore (22"). As shown, the toilet bowl (2") comprises two side bores (25") next to the end of the rear bore (22") configured to receive the corresponding protrusions (106") of the water distributor (1"). When the water distributor (1") is introduced into the toilet bowl (2") by an operator, it is difficult to see the position of the water discharge openings (101", 102"), but once the protrusions (106") are attached to the corresponding bores, it makes sure that the water discharge openings (101", 102") are placed and hold at the right position.

[0042] Despite the fact that reference has been made to specific embodiments of the invention, it is evident for a person skilled in the art that the set described is susceptible to numerous variations and modifications and that all the details mentioned can be replaced by other technically equivalent ones, without departing from the scope of protection defined by the attached claims.

Claims

1. Water distributor (1, 1', 1") for distributing flush water to a rimless inner wall of a toilet bowl, the water distributor (1, 1', 1") comprising a tubular body (10, 10', 10") having a main tubular portion (100, 100', 100") extending from at least one water discharge opening (101, 101', 101", 102, 102', 102") placed at one longitudinal end to an outwardly directed wall (103, 103', 103") arranged at the other longitudinal end, **characterized in that**;

   - the tubular body (10, 10', 10") comprises an auxiliary tubular portion (104, 104', 104"), which is attached to the outwardly directed wall (103, 103', 103") of the main tubular portion (100, 100', 100") of said tubular body (10, 10', 10"), said auxiliary tubular portion (104, 104', 104") having a diameter bigger than the main tubular portion (100, 100', 100"), and **in that**;
   - the water distributor (1, 1', 1") comprises a seal ring (11, 11', 11") including:

     ◦ a first seal ring portion (110, 110', 110") arranged on at least part of said auxiliary tubular portion (104, 104', 104") and configured to seal the tubular body (10, 10', 10") against an inner wall of a rear bore of the toilet bowl, and
     ◦ a second seal ring portion (112, 112', 112") arranged and configured to cover at least part of the outwardly directed wall (103, 103', 103") of the main tubular portion (100, 100', 100") of the tubular body (10, 10', 10") so that it is susceptible to retain in place the first seal ring portion (110, 110', 110") when inserting the water distributor (1) inside the rear bore of the toilet bowl.

2. Water distributor (1') according to claim 1, wherein it comprises an elbow pipe (12'), said elbow pipe (12') including a first elbow pipe portion (121') fluidically linked to the auxiliary tubular portion (104') and a second elbow pipe portion (122') configured to receive an outlet fitting of a cistern through which flushing water is delivered.

3. Water distributor (1') according to claim 2, wherein the top end of the second elbow pipe portion (122') comprises a ring portion (123'), the ring portion (123') comprising an upper annular groove or housing (124') and an upper sealing ring (125') placed at the upper annular grove or housing (124') and arranged and configured to seal the outlet fitting of the cistern.

4. Water distributor (1') according to claims 2 or 3, wherein the first elbow pipe portion (121') is attached

removably to the auxiliary tubular portion (104') of the tubular body (10').

5. Water distributor (1') according to any of claims 2 to 4, wherein it comprises an inner seal ring (13') configured and arranged to seal the first elbow pipe portion (121') against the auxiliary tubular portion (104').

6. Water distributor according to claims 2 or 3, wherein the auxiliary tubular portion of the tubular body and the first elbow pipe portion of the elbow pipe are configured as a one-piece tubular body.

7. Water distributor (1") according to claims 1 to 6, wherein the end of the auxiliary portion (104") comprises at least one anti-rotation tab (105") provided with a protrusion (106") susceptible to be retained in a hole of the toilet bowl.

8. Toilet bowl (2') comprising a rimless inner wall (21', 21") and a rear bore (22', 22"), **characterized in that** it comprises a water distributor (1', 1") according to any of the previous claims inserted inside the rear bore (22', 22"), the at least one water discharge opening (101', 101", 102', 102") of the water distributor (1', 1") being configured to distribute flush water into the rimless inner wall (21', 21"), and wherein the auxiliary tubular portion (104', 104") of the tubular body (10', 10") is sealed against the rear bore (22', 22") by the first seal ring portion (110', 110") of the sealing ring (11', 11").

9. Toilet bowl (2', 2") according to claim 8, wherein the rear bore (22', 22") comprises an inner wall (23', 23") which acts as a stop wall for said second seal ring portion (112', 112").

10. Toilet bowl (2') according to claim 8 or 9 when comprises a water distributor (1') according to any of claims 3 to 6, wherein the toilet bowl (2') comprises a horizontal supporting surface (24') placed next to the rear bore (22') and configured to support the ring portion (123') of the elbow pipe (12').

11. Toilet bowl (2') according to claim 10, wherein the horizontal supporting surface (24') comprises at least one hole for receiving fastening means configured to fasten the underside of a cistern to the horizontal supporting surface (24') and hold between them the ring portion (123'), so immovably retaining the elbow pipe (12').

12. Toilet bowl (2") according to any of claims 8 to 11 when comprises a water distributor (1") according to claim 7, wherein the toilet bowl (2") comprises at least one side bore next to the end of the rear bore (22") configured to receive the protrusion (106") of the water distributor (1").

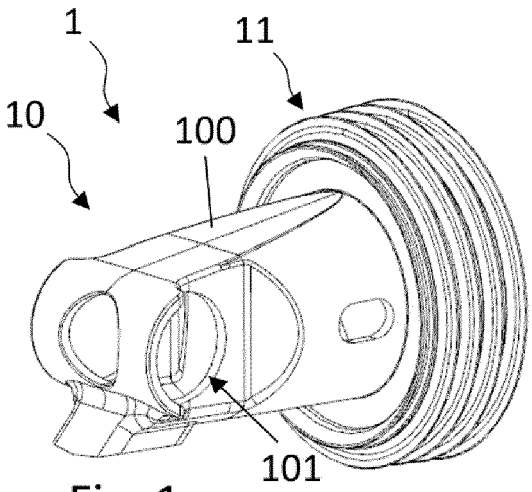

Fig. 1

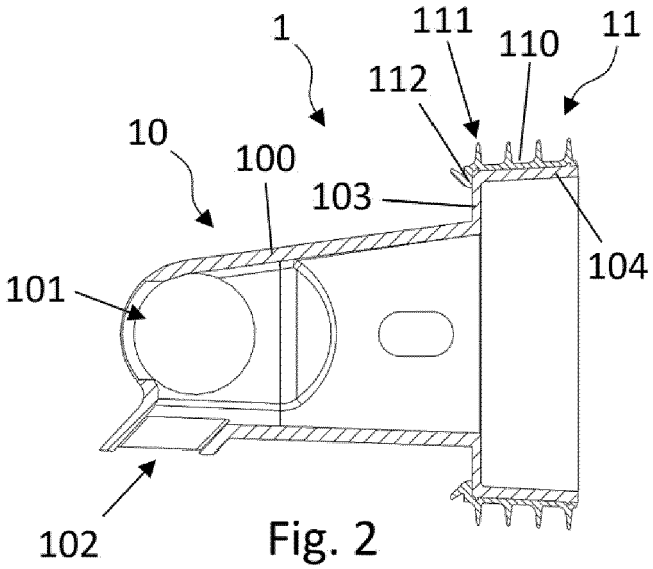

Fig. 2

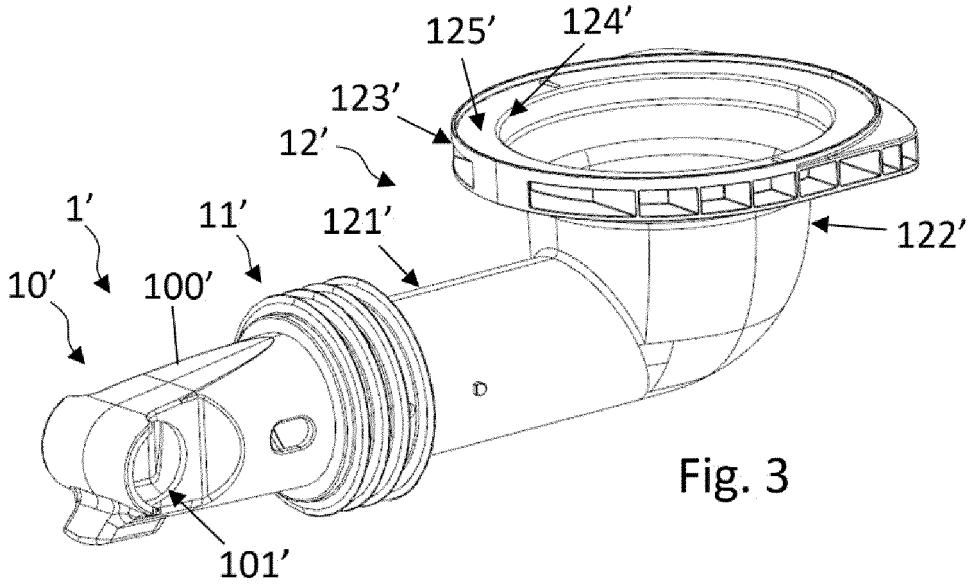

Fig. 3

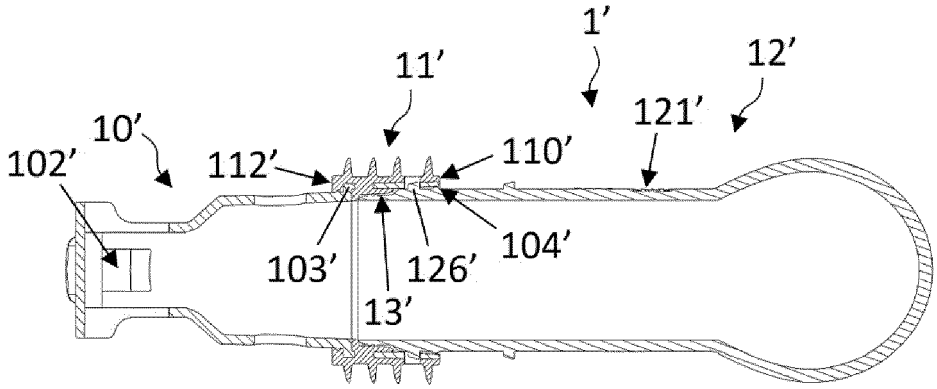

Fig. 4

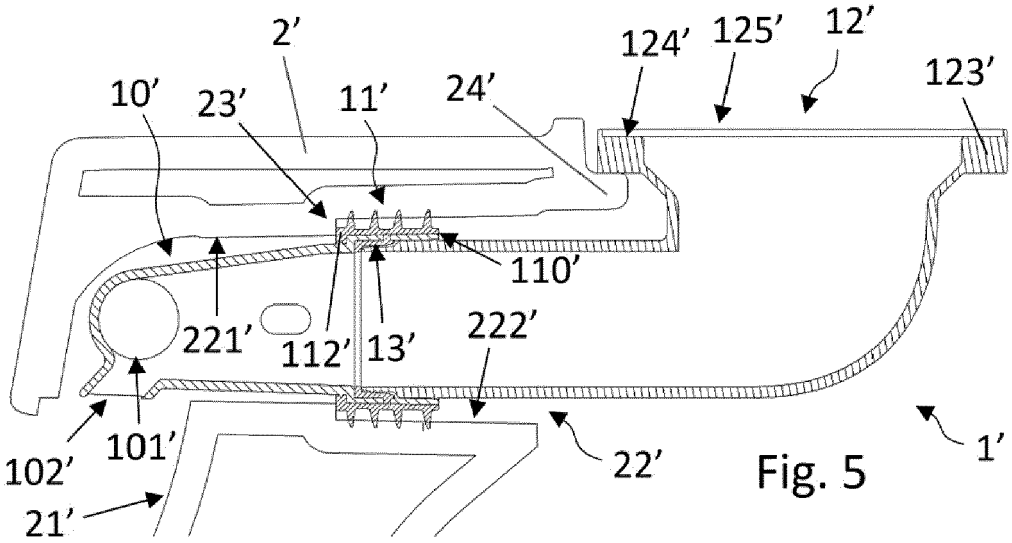

Fig. 5

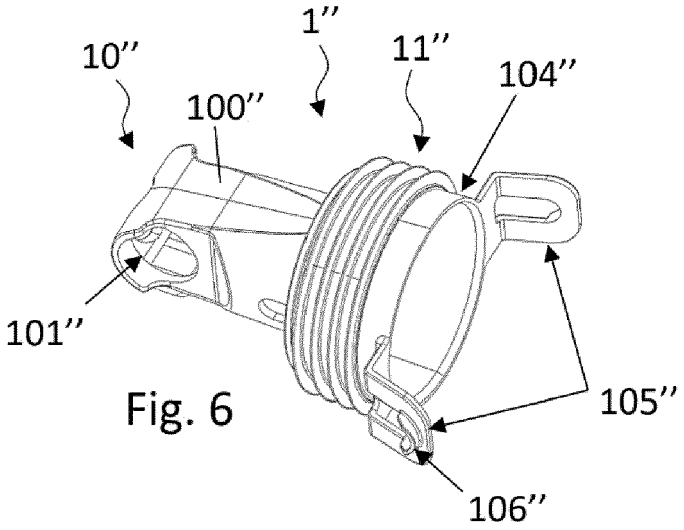
1''
10''
11''
104''
100''
101''
105''
106''

Fig. 6

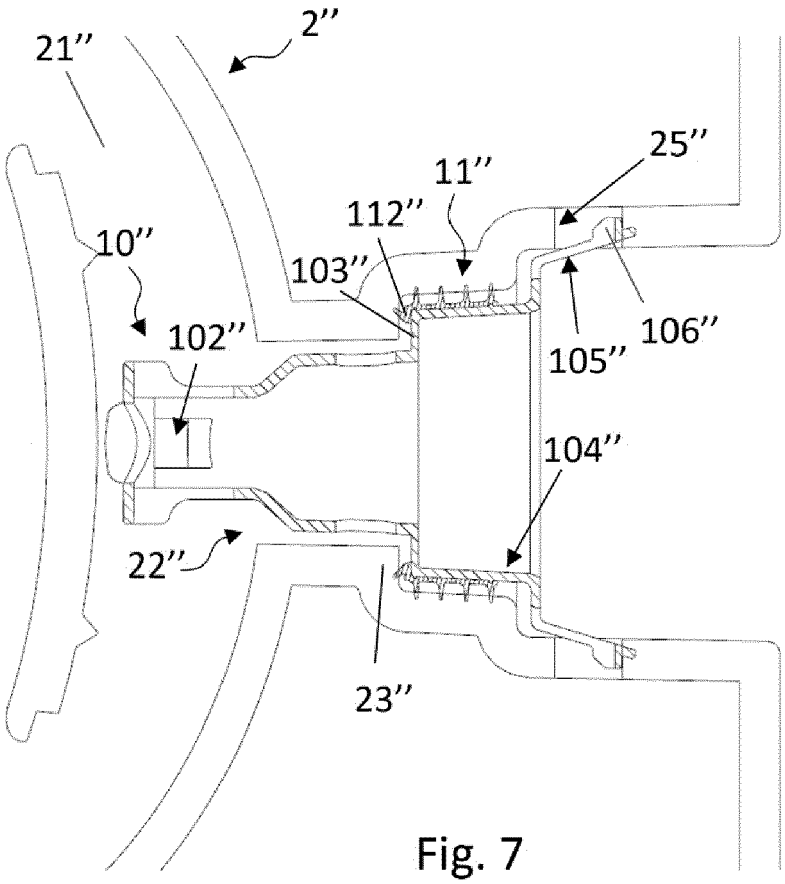
2''
21''
25''
11''
112''
10''
103''
102''
106''
105''
104''
22''
23''

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 23 38 3058

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	US 2004/068785 A1 (TOMITA KATSUNORI [JP] ET AL) 15 April 2004 (2004-04-15) * paragraphs [0264] - [0283]; figures 24-27 *	1-12	INV. E03D1/26 E03D11/08 E03D11/13 E03D11/17
A	EP 3 486 386 A1 (ROCA SANITARIO SA [ES]) 22 May 2019 (2019-05-22) * paragraphs [0001] - [0032]; figures 1-5 *	1-12	
A	EP 3 825 480 A1 (GEBERIT INT AG [CH]) 26 May 2021 (2021-05-26) * abstract; figures 1-10 *	1-12	
A	DE 33 15 926 A1 (TECH GEBAEUDEAUSRUESTUNG VEB K [DD]) 8 December 1983 (1983-12-08) * abstract; figure 2 *	1-12	
A	EP 3 543 412 A1 (LAUFEN KERAMIK HOLDING [CH]) 25 September 2019 (2019-09-25) * abstract; figures 5-7 *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)

E03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 April 2024	Posavec, Daniel

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 38 3058

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09-04-2024

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