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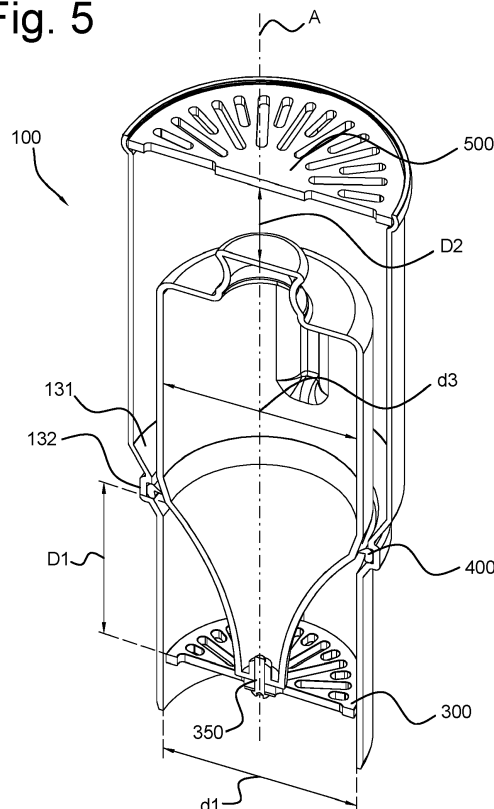
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(54) **DEVICE FOR RELIEVING A SEWER**

(57) The invention involves an device for relieving a sewer comprising a collection chamber (100) suitable for the collection of rainwater or sewer water, which has at least a first connection opening for connection to a rain-water or sewer water outlet, as well as a relieve opening

in or near a top side of the collection chamber for discharging water from the collection chamber at ground level. The device comprises a float (200) and a sub-chamber with a variable diameter, the sub-chamber comprising sealing means.

Fig. 5



Description

[0001] The invention involves an device for relieving a sewer comprising a collection chamber suitable for the collection of rainwater or sewer water, which has at least a first connection opening for connection to a rainwater or sewer water outlet, as well as a relieve opening in or near a top side of the collection chamber for discharging water from the collection chamber at ground level.

State of the Art of Technology

[0002] This type of device is also called a relief well. In the Netherlands in particular, as set forth in so-called building codes and NEN standards, every residence has a so-called relief well in its connection to the sewer system. If there is excess water (such as heavy rainfall) and the great quantity of water cannot be processed by the interior and exterior sewer system, the relief well as described above ensures that this excess of water does not enter the residence through the interior sewer system but can be discharged on ground level through the discharge opening of the relief well. This prevents flooding in the residence. These types of devices are known from patent publications NL 2014554 B1 and NL 2016253 B1.

[0003] The disadvantage of the current relief wells is that these devices are complicated in constructions and that the way these devices must be produced or installed involves a great deal of work, time and expenses.

Objective of the invention

[0004] The current invention and the preferred designs of it have the objective of offering a solution for one or more of the aforementioned disadvantages. One objective of the invention can therefore be to create an device of the aforementioned type with an improved design. Another objective of the invention can therefore be to create an device of the aforementioned type that can be more easily produced and installed.

Description of the invention

[0005] This objective is achieved, according to the invention, with a reinforcement fabric that displays the technical characteristics of the independent claims. The current invention is an device for relieving a sewer.

[0006] In a first aspect of the invention, which can occur in combination with the other embodiments of the invention described here, there is an device for relieving a sewer comprising a collection chamber suitable for the collection of rainwater or sewer water, which has at least a first connection opening for connection to a rainwater or sewer water outlet, as well as a relieve opening in or near a top side of the collection chamber for discharging water from the collection chamber at ground level.

[0007] The collection chamber comprises two substantially cylindrical sub-chambers that extend in the same

axial direction, wherein the first diameter of the first cylindrical sub-chamber is smaller than the second diameter of the second cylindrical sub-chamber. The connection opening is in or near the bottom side of the collection chamber and opens into the first sub-chamber, and the discharge opening is in or near the top side of the collection chamber and opens into the second sub-chamber.

[0008] There is a float in the collection chamber that is substantially formed by a hollow body, preferably a hollow rotational body that extends in the axial direction from a first axial position in the first sub-chamber to a second axial position in the second sub-chamber, wherein the maximum dimension of the hollow body in one direction perpendicular to the axial direction is larger than the first diameter of the first cylindrical sub-chamber and smaller than the second diameter of the second cylindrical sub-chamber. Preferably, the float weighs between 500 and 600 grams.

[0009] The float is configured to move between a closed position and a maximum relief position by a translation in the axial direction over a predetermined distance, wherein the closed position closes off the first and second sub-chambers from each other. The advantage of this is that in this way, the escape of odours from the sewer is prevented.

[0010] The inventors have found that an device for relieving a sewer using a collection chamber in which a float extends as described above is particularly advantageous and saves much work, time and money. The design according to the preferred embodiments described here ensure a better and more reliable functionality of the relief well.

[0011] In a first embodiment, which may occur in combination with the other aspects and embodiments of the invention described here, comprises an aforementioned device, wherein the collection chamber has a third sub-chamber formed by a revolving body with a variable diameter, which third sub-chamber extends in the axial direction between a bottom opening that opens into the first sub-chamber and a top opening that opens into the second sub-chamber.

[0012] On an inner surface of a wall surrounding the third sub-chamber there are sealing means provided for creating an airtight seal in the closed position of the space between the inner surface and the outer surface of the hollow body of the float and for partially providing space between the inner surface and the outer surface of the hollow body of the float in a relieve state. Preferably, the sealing means are made of a flexible plastic. For example, a thermoplastic elastomer (TPE) or technical rubber, preferably a cross-linked thermoplastic elastomer based on an olefin (TPV), preferably ethylene propylene diene monomer (EPDM) optionally mixed with polypropylene (PP). Alternatives are the sealing means made of SBR, NBR, silicones or PUR.

[0013] In embodiments that may occur in combination with the other aspects and embodiments of the invention described here, the third sub-chamber comprises a sub-

stantially cylindrical ring chamber with a diameter greater than the first diameter of the first cylindrical sub-chamber and smaller than the second diameter of the second cylindrical sub-chamber. The third sub-chamber can widen conically from the bottom opening to the ring chamber and constrict conically from the top opening to the ring chamber.

[0014] A second embodiment, which may occur in combination with the other aspects and embodiments of the invention described herein, comprises an aforementioned device, wherein the hollow body has a substantially cylindrical-symmetrical float part that extends in the axial direction A from a bottom end of the hollow body. Preferably, the cylindrical-symmetrical float part is designed as a rotational body with a curved outer circumference in the axial direction, such as a paraboloid, hyperboloid or part thereof. In an advantageous embodiment, the cylindrical-symmetrical float part is designed as a truncated, hollow hyperboloid with an increasing diameter from the bottom end of the hollow body, also called funnel-shaped. In particular, the funnel-shaped designs provide for a better distribution of forces when water rises from the sewer and a better and more even response of the float.

[0015] A third embodiment, which may occur in combination with the other aspects and embodiments of the invention described herein, comprises an aforementioned device, wherein the hollow body has a substantially conical float part that extends in the closed state in the axial direction, wherein in the closed state the sealing agent is configured to engage the outer surface of the float part. In embodiments, which may occur in combination with the other aspects and embodiments of the invention described herein, the hollow body comprises a substantially cylindrical float part that extends in the axial direction from the conical float part, wherein the cylindrical float part is provided with a number of spacers that are configured to engage to the inner surface of a wall surrounding the second sub-chamber. Preferably, the conical float part extends in the axial direction A between the cylindrical-symmetrical float part and the cylindrical float part.

[0016] A fourth embodiment, which can occur in combination with the other aspects and embodiments of the invention described herein, involves an aforementioned device, wherein a disc-shaped filter is provided on a bottom end of the hollow body. In the closed state, the disc-shaped grid filter is located in the axial direction at a filter distance from the top end of the first sub-chamber, wherein the filter distance is greater than the predetermined distance necessary to bring the float into the maximum relieve state. In embodiments that may occur in combination with the other aspects and embodiments of the invention described herein, the disc-shaped filter has a diameter nearly the same as the first cylindrical sub-chamber. Preferably, the smallest distance of the disc-shaped filter to a wall surrounding the first sub-chamber is smaller than the smallest filter opening.

[0017] A fifth embodiment, which can occur in combination with the other aspects and embodiments of the invention described herein, involves an aforementioned device, wherein on the bottom of the hollow body and on the top side of the disc-shaped grid filter there are complementary connection elements. The complementary connection means can be formed by a recess or opening equipped with a screw thread at the bottom of the funnel-shaped float part, a central passage through the disc-shaped grid filter and a longitudinal connection element with a screw thread, such as a bolt, which extends through the central passage and into the recess or opening on the bottom of the funnel-shaped float part.

[0018] A sixth embodiment, which can occur in combination with the other aspects and embodiments of the invention described herein, involves an aforementioned assembly, wherein the second sub-chamber at the top end is closed off by a disc-shaped grid cover and wherein the predetermined distance necessary to bring the float into the maximum relief position is consistent with the distance in the axial direction between the top side of the float in the closed state and the bottom of the grid cover. In embodiments that may occur in combination with the other aspects and embodiments of the invention described herein, the grid cover is configured to prevent the float moving past the grid cover and thus defining the maximum relief state. To do this, the grid cover can be clicked or even glued into a groove provided in the second sub-chamber.

[0019] A seventh embodiment, which may occur in combination with the other aspects and embodiments of the invention described herein, is an aforementioned device, wherein float has a handle that extends in the axial direction A and shrinks in diameter from a bottom end of the float. Preferably, the handle is designed as a rotational body with a curved outer circumference in the axial direction, such as a paraboloid, hyperboloid or part thereof.

[0020] In a second aspect of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention involves a structure with a wastewater system containing an aforementioned device.

[0021] In a third aspect of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention contains an aforementioned float.

[0022] In a fourth aspect of the invention, which may occur in combination with the other aspects and designs of the invention described here, the invention includes a method for producing an aforementioned float, involving producing the float of plastic using rotation casting in a die to a product formed by rotation. The plastic is preferably a thermoplastic, even more preferably polyethylene (PE), polypropylene (PP) or polyvinyl chloride (PVC) or poly lactic acid (PLA). The plastic is optionally reinforced by adding fibres and/or glass particles. Alternatively, the aforementioned float can be produced using 3D printing

or injection moulding.

[0023] In a fifth aspect of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, involves a method for producing an aforementioned device involving the steps of providing an aforementioned float and attaching a disc-shaped filter to the bottom end of the float. In embodiments that may occur in combination with the other aspects and embodiments of the invention described herein, the method also involves insertion of the float with the disc-shaped filter into an aforementioned collection chamber.

Summary description of the figures

[0024] The invention will be explained in more detail using an example embodiment shown in the figure.

Figure 1 shows a perspective view of a relief well according to one embodiment of the current invention;

Figure 2 shows the relief well shown in figure 1 with the grid cover removed;

Figure 3 shows the relief well shown in figure 2 without the walls of the collection chamber;

Figure 4 shows an exploded view of the relief well shown figure 1;

Figure 5 shows an openwork view of the relief well shown in figure 1; and

Figure 6 shows an exploded view of the relief well shown in figure 2;

Detailed description of the figures

[0025] The current invention will be described with regard to particular embodiments and with reference to certain figures, but the invention is not limited to these and is only determined by the claims. The figures described are only schematic and non-limiting. In the figures, the size of certain element is exaggerated and not drawn to scale for illustrative purposes. The dimensions and the relative dimensions are not necessarily consistent with actual practical designs of the invention.

[0026] In addition, the terms first, second, third and the like are used in the description and claims to differentiate between similar elements and not necessarily to describe a sequential or chronological sequence. The terms are interchangeable under fitting circumstances and the embodiments of the invention can be applied in sequences other than those described or illustrated here.

[0027] In addition, the terms, top, bottom, over, under and the like in the description and claims are used for illustrative purposes and not necessarily to describe relative positions. The terms used are interchangeable under fitting circumstances and the embodiments of the invention described can be applied in other orientations than described or illustrated here.

[0028] Furthermore, the various embodiments, even

though called "preferred designs" must be considered rather as a manner of example of how the invention can be designed than as a limitation of the range of the invention.

[0029] The term "comprising", used in the claims, must not be interpreted as being limited to the resources or steps listed after it. The term does not exclude other elements or steps. The term should be interpreted as specifying for the presence of the listed features, elements, steps or components which are referenced, but does not exclude the presence or addition of one or more other features, elements, steps or components or groups thereof. The range of the expression "a design comprising resources A and B" must thus not be limited to designs that consist only of A and B. The intention is that, with regard to the current invention, only the components A and B of the design are summarized, and the claim must be further interpreted as they also contain equivalents of these components.

[0030] The term cylindrical-symmetrical in this document must be understood as rotational-symmetrical over each angle around an axis. The term cylindrical in this document must be understood as cylindrical-shaped, wherein a cylinder must be understood as a rotational body with a constant diameter. The term conical must be understood in this document as a cone-shape or partially cone-shaped, wherein a cone must be understood as a rotational body with a linear varying diameter. The term paraboloid in this document must be understood as a rotational body formed by the rotation of a parabola around its axis. The term hyperboloid in this document must be understood as a rotational body formed by the rotation of a hyperbola around its axis.

[0031] The devices shown in the figures are relief wells or elements thereof for relief of a sewer.

[0032] Figures 1-6 show a relief well comprising a collection chamber 100 and a float 200, 300 in it, where the collection chamber is closed off on the top side by a grid cover 500. To create an airtight seal around the collection chamber, a sealing ring 400 is provided on the inner surface of the wall 100 surrounding the collection chamber.

[0033] The collection chamber is formed by multiple sub-chambers that extend sequentially in an axial direction A. Therefore, the wall 100 surrounding the collection chamber is formed by a wall 110 surrounding the first sub-chamber at the bottom end, and the wall 130 surrounding the third sub-chamber and the wall 120 surrounding the second sub-chamber at a top end. The wall 130 surrounding the third sub-chamber is formed by a conical narrowing wall section 131 at a top end, a wall 132 surrounding a ring chamber and a conical narrowing wall section 133 at the bottom end.

[0034] The float comprises a hollow float body 200 and a grid filter 300 attached to the bottom end of it. In the embodiment shown, the grid filter 300 is secured to the float body using a bolt 350. The grid filter 300 is secured so that it directly grips the bottom end of the float body 200.

[0035] The hollow float body 200 is formed by multiple parts that extend sequentially in an axial direction A. Therefore, the float body is formed sequentially by a funnel-shaped float part 210 on a bottom end, a conical float part 220, a cylindrical float part 230 and a cylindrical-symmetrical handle 240 on a top side. In addition, the hollow float body 200 comprises multiple symmetrical spacers 250 that extend in a direction vertical to the axial direction.

[0036] The first sub-chamber extends in the axial direction A over a first length 11, such as about 15 cm, and has a first diameter d1, such as about 11.5 cm. The second sub-chamber extends in the axial direction A over a second length 12, such as about 20 cm, and has a second diameter d2, such as about 15 cm. The hollow body of the float extends in the axial direction A over a third length 13, such as about 30.5 cm, and has a maximum diameter d3, such as about 12.5 cm. The third sub-chamber extends in the axial direction A over a fourth length 14, such as about 6 cm..

List with reference numbers

[0037]

10. Relief well

- 100. Wall of the collection chamber
- 110. Wall of the first sub-chamber
- 120. Wall of the second sub-chamber
- 130. Wall of the third sub-chamber
- 131. Conically narrowing wall section
- 132. Wall of the ring chamber
- 133. Conically widening wall section

- 200. Hollow float body
- 210. Funnel-shaped float section
- 220. Conical float section
- 230. Cylindrical float section
- 240. Handle
- 250. Spacer

- 300. Grid filter
- 350. Bolt

400. Sealing ring

500. Grid cover

[0038] Varying aspects of the current invention are explained in more detail in the following clauses:

1. Device for relieving a sewer comprising a collection chamber suitable for the collection of rainwater or sewer water, which has at least a connection opening for connection to a rainwater or sewer water outlet, as well as a relieve opening in or near a top side of the collection chamber for discharging water

from the collection chamber at ground level,

wherein the collection chamber comprises two cylindrical sub-chambers that extend in the same axial direction A, wherein the first diameter (d1) of the first cylindrical sub-chamber is smaller than the second diameter (d2) of the second cylindrical sub-chamber, wherein the connection opening is in or near the bottom side of the collection chamber and opens into the first sub-chamber, and the discharge opening is in or near the top side of the collection chamber and opens into the second sub-chamber, and

wherein a float is provided in the collection chamber that is substantially formed by a hollow body that extends in the axial direction A from a first axial position (A1) in the first sub-chamber to a second axial position (A2) in the second sub-chamber, wherein the maximum dimension (d3) of the hollow body in one direction perpendicular to the axial direction is between the first diameter (d1) of the first cylindrical sub-chamber and the second diameter (d2) of the second cylindrical sub-chamber,

wherein the float is configured to move between a closed position and a maximum relief position by a translation in the axial direction A over a predetermined distance (D2), wherein in the closed position, the first and second sub-chambers are sealed off airtight from each other.

2. Device according to clause 1, wherein the collection chamber comprises a third cylindrical-symmetrical sub-chamber extending in the axial direction A with a variable diameter, which third sub-chamber extends between a bottom opening that opens into the first sub-chamber and the top opening that opens into the second sub-chamber, wherein on an inner surface of a wall surrounding the third sub-chamber, sealing means are provided for creating an airtight seal of the space between the inner surface and the outer surface of the hollow body of the float in the closed position and for partially providing space between the inner surface and the outer surface of the hollow body of the float in a relieve state.

3. Device according to clause 2, wherein the third sub-chamber comprises a cylindrical ring chamber with a diameter between the first diameter(d1) of the first cylindrical sub-chamber and the second diameter (d2) of the second cylindrical sub-chamber.

4. Device according to clause 3, wherein the third sub-chamber expands from the bottom opening conically to the ring chamber and wherein the third sub-chamber narrows from the top opening conically toward the ring chamber.

5. Device according to one of the preceding clauses, wherein the hollow body comprises a substantially cylindrical-symmetrical float part that extends in the axial direction A from a bottom end of the hollow body.

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6. Device according to clause 2, wherein the hollow body comprises a substantially conical float part that extends in the axial direction A, wherein, in the closed state, the sealing means are configured to engage the outer surface of the conical float part.

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7. Device according to clause 6, wherein the hollow body comprises a substantially cylindrical float part that extends in the axial direction A from the conical float part, wherein the cylindrical float part is provided with a number of spacers that are configured to engage to the inner surface of a wall surrounding the second sub-chamber.

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8. Device according to clauses 5, 6 and 7 wherein the conical float part extends in the axial direction A between the cylindrical-symmetrical float part and the cylindrical float part.

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9. Device according one of to the preceding clauses, wherein at a bottom end of the hollow body a disc-shaped filter is provided, wherein, in the closed state, in the axial direction A the disc-shaped grid filter is located at a filter distance (D1) from the top end of the first sub-chamber, wherein the filter distance (D1) is greater than the predetermined distance (D2) necessary to bring the float into the maximum relieve state.

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10. Device according to the preceding clause 9, wherein the disc-shaped filter has a diameter nearly the same as the diameter (d1) of the first cylindrical sub-chamber.

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11. Device according to the preceding clauses 5 and 9, wherein on the bottom of the hollow body and on the top of the disc-shaped grid filter complementary connection means are provided.

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12. Device according to the preceding clause 11, wherein the complementary connection means are formed by a recess or opening equipped with a screw thread at the bottom of the funnel-shaped float part, a central passage through the disc-shaped grid filter and a longitudinal connection element equipped with a screw thread that extending through the central passage and into the recess or opening on the bottom of the funnel-shaped float part.

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13. Device according to one of the preceding clauses, wherein the second sub-chamber on the top end is closed off by a disc-shaped grid cover and wherein

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the predetermined distance (D2) necessary to bring the float into the maximum relief position corresponds to the distance in the axial direction A between the top side of the float in the closed state and the bottom of the grid cover.

14. Device according to clause 13, wherein the grid cover is configured to prevent the movement of the float past the grid cover to define the maximum relief status.

15. Device according to one of the preceding clauses, wherein the float has a circular-symmetrical handle extending in the axial direction A.

16. Structure comprising a water sewer system with an device according to one of the preceding clauses 1-14.

17. Float as described in one of the preceding clauses 1-15.

18. Method for producing a float according to clause 17, comprising the production of the float using rotational moulding using a material that contains a temperable base material.

19. Method for the production of an Device according to one of the preceding clauses, comprising the steps of:

(a) providing a float as described in one of the preceding clauses 1-15; and

(b) attaching a disc-shaped filter on the bottom end of the float.

20. Method according to clause 19, wherein the disc-shaped filter is attached to the bottom end of the float using complementary connection means formed by a recess or opening equipped with a screw thread at the bottom of the funnel-shaped float part, a central passage through the disc-shaped grid filter and a longitudinal connection element equipped with a screw thread that extending through the central passage and into the recess or opening on the bottom of the funnel-shaped float part.

21. Method according to clause 19 or 20, further comprising the insertion of the float provided with disc-shaped filter into a collection chamber as described in one of the preceding clauses 1-15.

22. Method according to one of the preceding clauses 18-21 wherein step (a) comprises the rotation moulding of the float.

Claims

1. Device for relieving a sewer comprising a collection chamber suitable for the collection of rainwater or sewer water, which has at least a connection opening for connection to a rainwater or sewer water outlet, as well as a relieve opening in or near a top side of the collection chamber for discharging water from the collection chamber at ground level,

wherein the collection chamber comprises two cylindrical sub-chambers that extend in the same axial direction A, wherein the first diameter (d1) of the first cylindrical sub-chamber is smaller than the second diameter (d2) of the second cylindrical sub-chamber, wherein the connection opening is in or near the bottom side of the collection chamber and opens into the first sub-chamber, and the discharge opening is in or near the top side of the collection chamber and opens into the second sub-chamber, and

wherein a float is provided in the collection chamber that is substantially formed by a hollow body that extends in the axial direction A from a first axial position (A1) in the first sub-chamber to a second axial position (A2) in the second sub-chamber, wherein the maximum dimension (d3) of the hollow body in one direction perpendicular to the axial direction is between the first diameter (d1) of the first cylindrical sub-chamber and the second diameter (d2) of the second cylindrical sub-chamber,

wherein the float is configured to move between a closed position and a maximum relief position by a translation in the axial direction A over a predetermined distance (D2), wherein in the closed position, the first and second sub-chambers are sealed off airtight from each other, **characterised in, that** the collection chamber comprises a third cylindrical-symmetrical sub-chamber extending in the axial direction A with a variable diameter, which third sub-chamber extends between a bottom opening that opens into the first sub-chamber and the top opening that opens into the second sub-chamber, wherein, on an inner surface of a wall surrounding the third sub-chamber, sealing means are provided for creating an airtight seal between the inner surface and the outer surface of the hollow body of the float in the closed position and for partially providing space between the inner surface and the outer surface of the hollow body of the float in a relieve state.

2. Device according to claim 1, wherein the third sub-chamber comprises a cylindrical ring chamber with a diameter between the first diameter (d1) of the first cylindrical sub-chamber and the second diameter

(d2) of the second cylindrical sub-chamber.

3. Device according to claim 2, wherein the third sub-chamber expands from the bottom opening conically to the ring chamber and wherein the third sub-chamber narrows from the top opening conically toward the ring chamber.
4. Device according to one of the preceding claims, wherein the hollow body comprises a substantially cylindrical-symmetrical float part that extends in the axial direction A from a bottom end of the hollow body.
5. Device according to one of the preceding claims, wherein the hollow body comprises a substantially conical float part that extends in the axial direction A, wherein, in the closed state, the sealing means are configured to engage the outer surface of the conical float part.
6. Device according to claim 5, wherein the hollow body comprises a substantially cylindrical float part that extends in the axial direction A from the conical float part, wherein the cylindrical float part is provided with a number of spacers that are configured to engage to the inner surface of a wall surrounding the second sub-chamber.
7. Device according to claims 4 and 6, wherein the conical float part extends in the axial direction A between the cylindrical-symmetrical float part and the cylindrical float part.
8. Device according to one of the preceding claims, wherein at a bottom end of the hollow body a disc-shaped filter is provided, wherein, in the closed state, in the axial direction A the disc-shaped grid filter is located at a filter distance (D1) from the top end of the first sub-chamber, wherein the filter distance (D1) is greater than the predetermined distance (D2) necessary to bring the float into the maximum relieve state.
9. Device according to the preceding claim 8, wherein the disc-shaped filter has a diameter nearly the same as the diameter (d1) of the first cylindrical sub-chamber.
10. Device according to the preceding claims 4 and 8, wherein on the bottom of the hollow body and on the top of the disc-shaped grid filter complementary connection means are provided.
11. Device according to the preceding claim 10, wherein the complementary connection means are formed by a recess or opening equipped with a screw thread at the bottom of the funnel-shaped float part, a central

passage through the disc-shaped grid filter and a longitudinal connection element equipped with a screw thread extending through the central passage and into the recess or opening on the bottom of the funnel-shaped float part.

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12. Device according to one of the preceding claims, wherein the second sub-chamber on the top end is closed off by a disc-shaped grid cover and wherein the predetermined distance (D2) necessary to bring the float into the maximum relief position corresponds to the distance in the axial direction A between the top side of the float in the closed state and the bottom of the grid cover.
13. Device according to claim 12, wherein the grid cover is configured to prevent the movement of the float past the grid cover to define the maximum relief status.
14. Device according to one of the preceding claims, wherein the float has a circular-symmetrical handle extending in the axial direction A.
15. Structure comprising a water drainage system with a device according to one of the preceding claims 1-13.

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Fig. 1

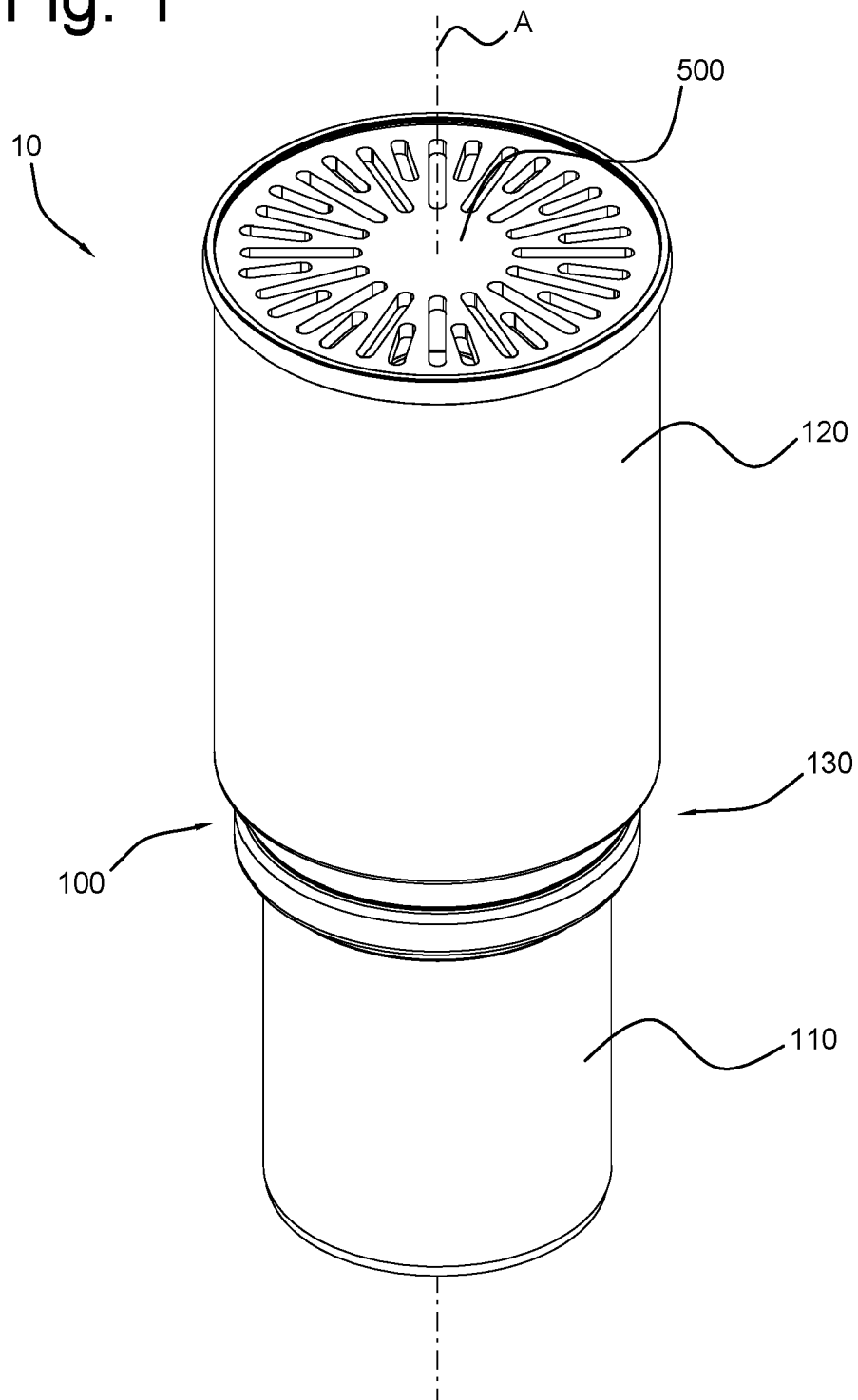


Fig. 2

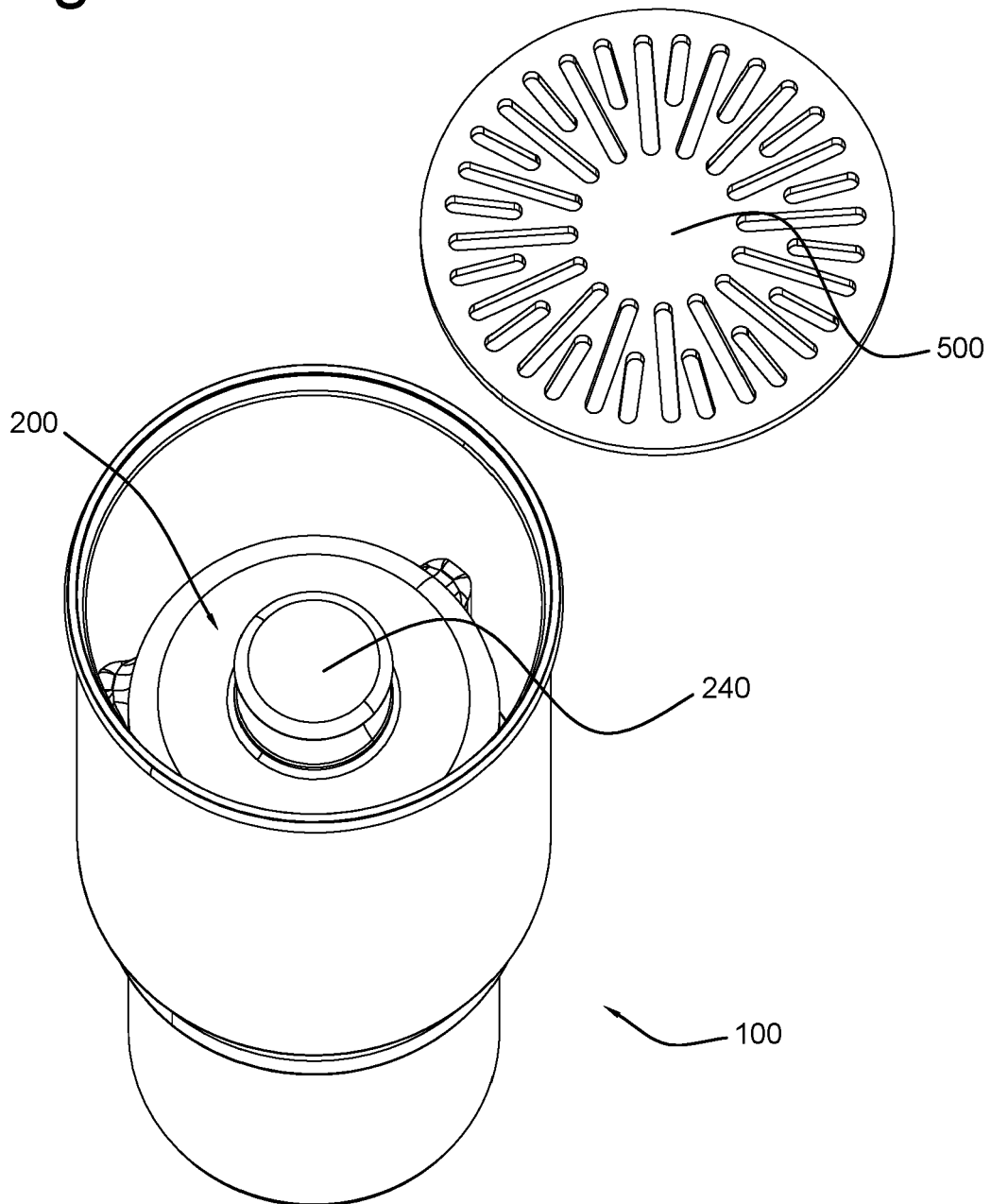


Fig. 3

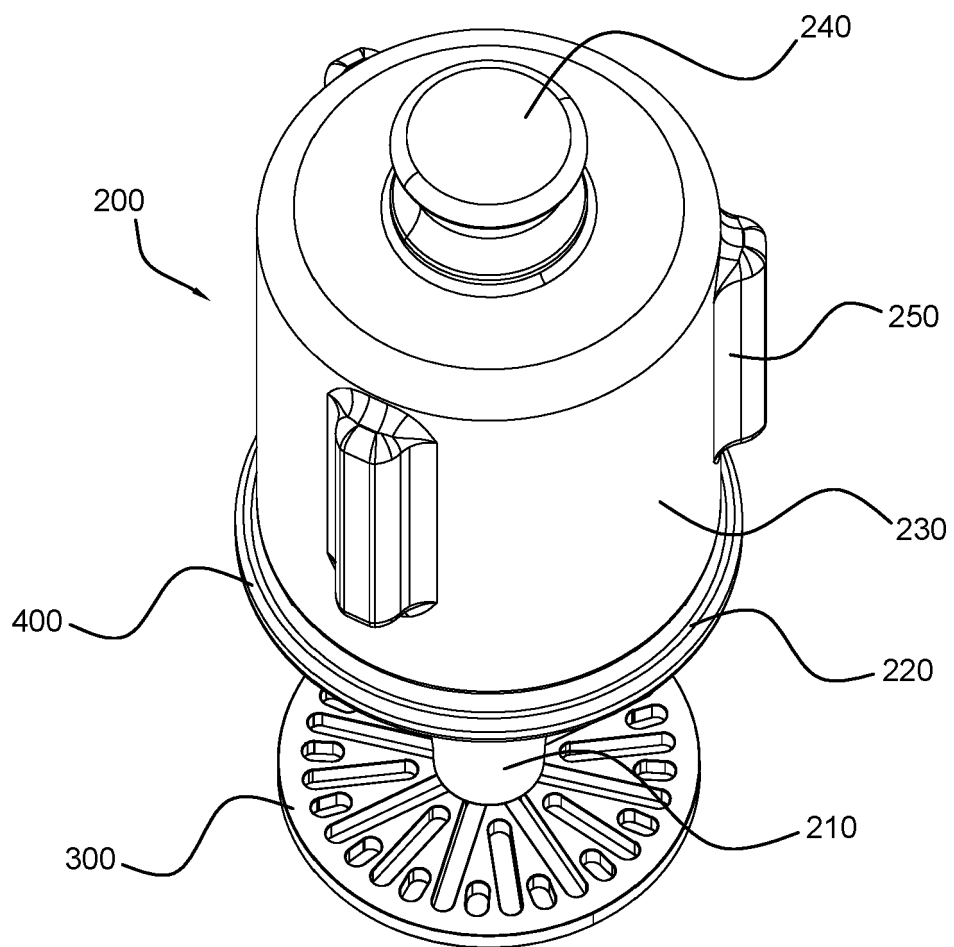


Fig. 4

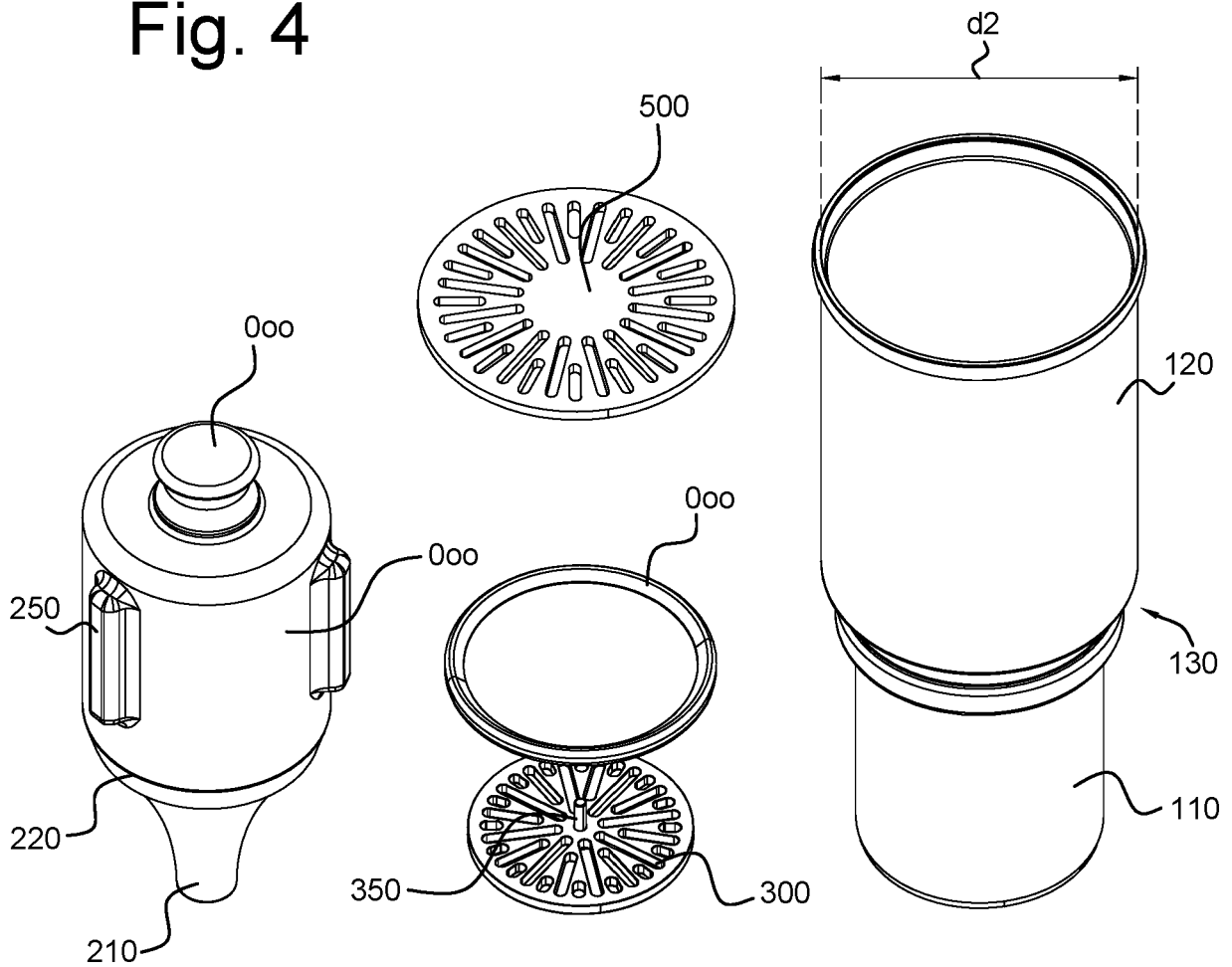


Fig. 5

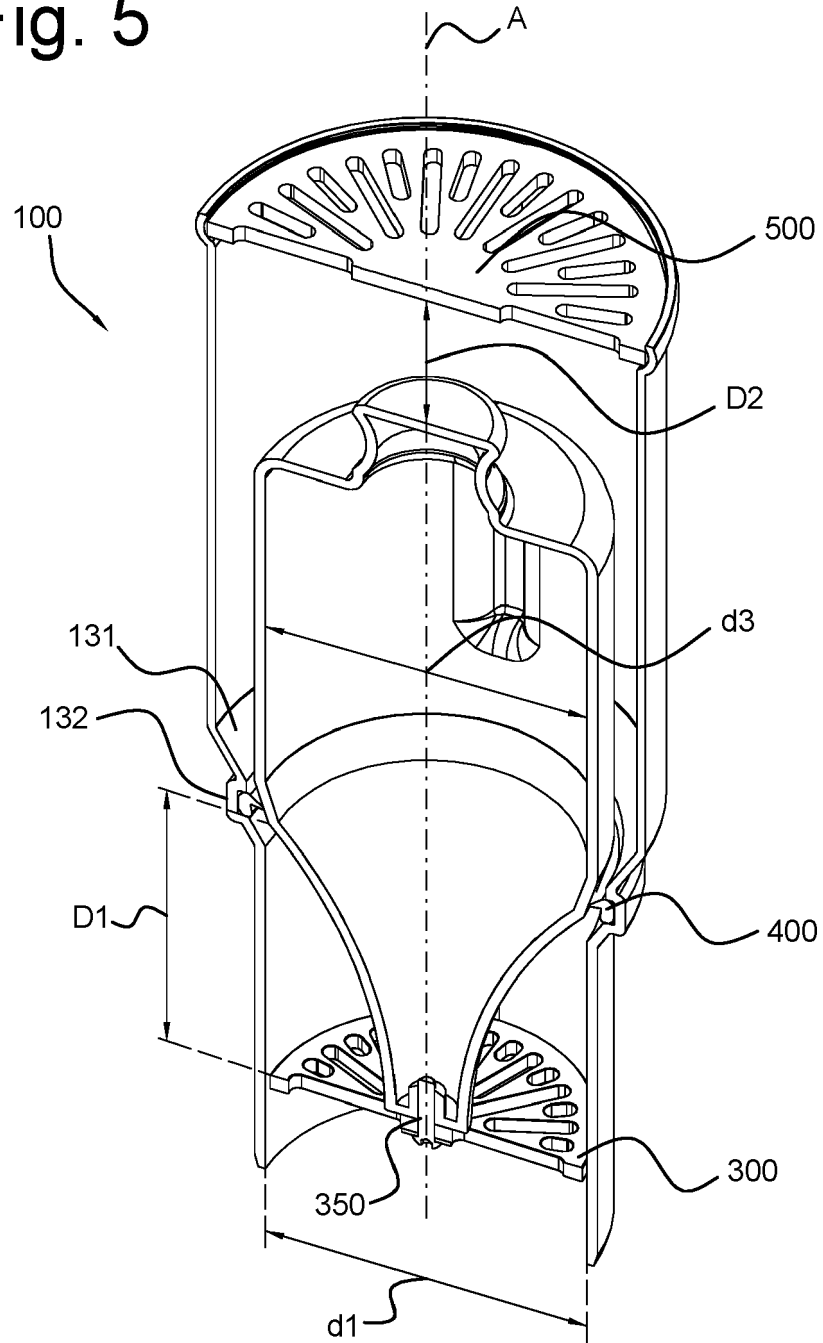
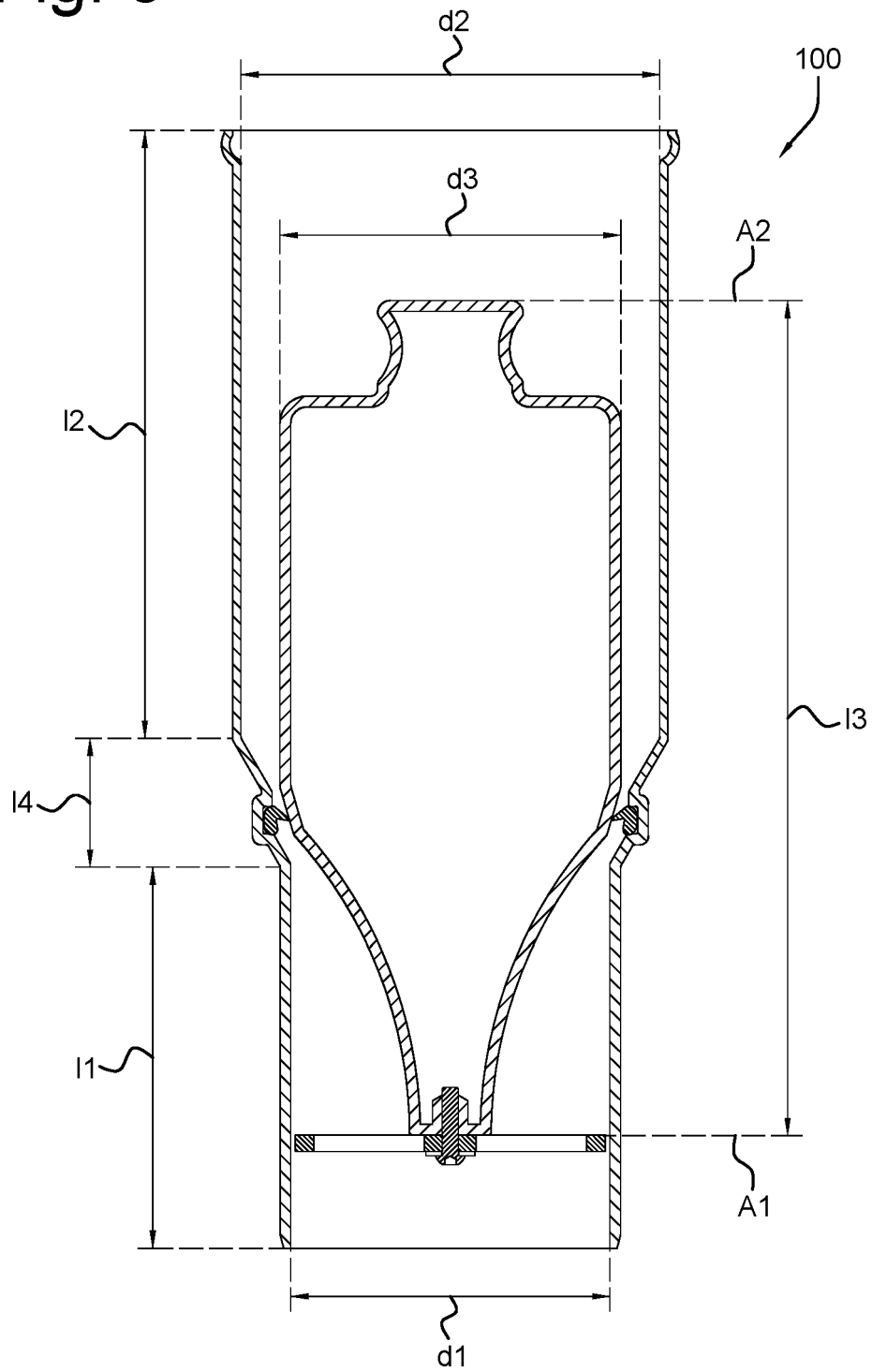


Fig. 6





EUROPEAN SEARCH REPORT

Application Number

EP 23 16 4940

DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | E03F |
| The present search report has been drawn up for all claims | | | |
| Place of search | | Date of completion of the search | Examiner |
| Munich | | 13 September 2023 | Flygare, Esa |
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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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