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(54) **INSERT FOR REPAIRING A FLOOR DRAIN**

(57) Floor-drain renovation insert, which comprises a drain cup component (1) and a stench trap (11) inside the cup component (1). On the edge of the drain cup component (4) is a ring and inside the cup component (4) is a stench trap, which is formed of an open pipe (12, 13) and a flange (14, 17) at on edge of the pipe, in the outer edge of this flange are attachment members (9, 15) for attachment of the ring to the cup component.

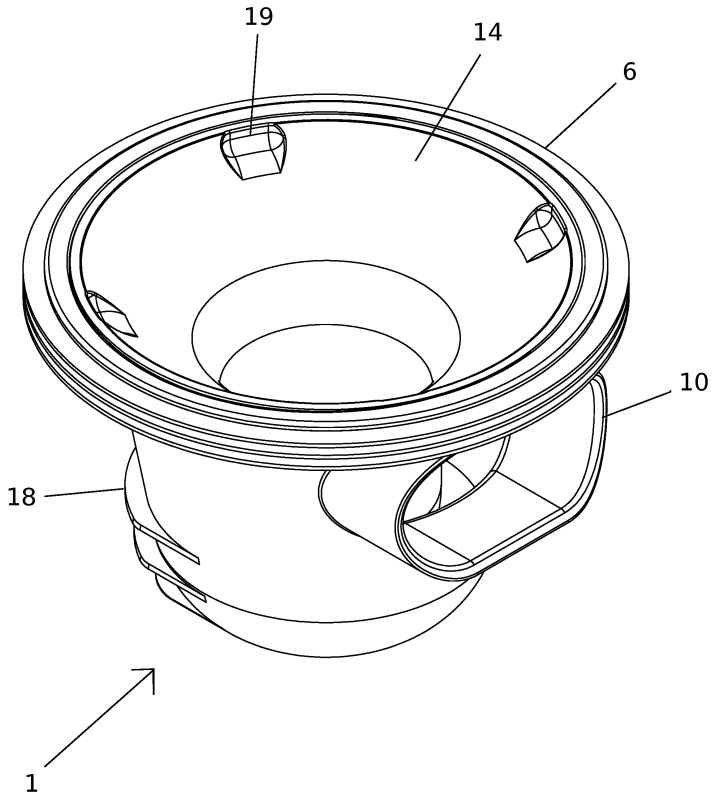

Fig. 1

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Description

[0001] The invention relates to a floor-drain insert according to the preamble to independent claim.

[0002] The drainage systems of buildings have a limited service life and, when the service life approaches its end, the drainage system must be replaced or renovated. Renovation can be carried out, for example, by surfacing or by relining the drainpipes on the inside. In relining, a liner is put inside the old drainpipe and is usually impregnated with a curable matrix material, for example epoxy. After the matrix material has cured, the liner forms a new durable surface inside the old drainpipe. The advantages of the method are speed and a minimal need to dismantle structures, as well as essentially reduced detriments to the residents of apartments compared to the complete replacement of the piping.

[0003] In connection with the renovation of drainpipes, the components of the drains connected to them are also renovated. Floor drains are one object requiring renovation. An old floor drain can be removed, completely replaced with a new one, or re-surfaced. The removal of a floor drain requires the partial dismantling of the surrounding structures, as a result of which the waterproofing layer is broken. The replacement of a floor drain thus leads to more extensive renovation measures. The service life of an old floor drain can be extended by surfacing, but making the surfacing in such a way that a similar result to the renovated pipeline is achieved, is difficult.

[0004] Finnish utility model 10292 discloses a floor-drain insert, in which there is a cup component of acid-resistant steel to be placed in the old floor drain, and a stench trap to be installed inside it. The attachment members of the stench trap are formed of a metallic grip part located in the middle of the stench trap and the cup component, in which there is an internal thread and a corresponding metal attachment bolt. With the aid of the attachment bolt the stench trap is pressed onto the cup component by means of a separate support component. Thanks to the acid-resistant steel cup component the structure is strong and also withstands chemical attack, but the attachment of the stench trap requires several parts and is therefore expensive. The attachment screw in the middle of the stench trap can collect dirt, while the compression force acts on the seal of the stench trap at only two points.

[0005] The intention of the present invention is to achieve an improved floor-drain renovation insert.

[0006] The invention is based on the renovation insert comprising a cup component, in the edge of which is a ring. Inside the cup component is a stench trap, which is formed of an open pipe and a flange in one edge of the pipe, in the outer edge of which flange are attachment members for attaching the cup component to the ring.

[0007] According to one preferred embodiment of the invention, there is a thread in the inner surface of the ring of the cup component, and in the flange of the stench trap there is a thread for attaching to the thread on the inside of the ring of the cup component.

[0008] According to one preferred embodiment of the invention, the inner surface of the cup component is smooth so that there are no protrusions extending from the surface.

[0009] According to one preferred embodiment of the invention, there is a seal in the outer surface of the ring of the cup component, for supporting the ring on the inner surface of the floor drain.

[0010] According to one preferred embodiment of the invention, there is at least one recess in the inner surface of the flange of the stench trap, for rotating the stench trap.

[0011] According to one preferred embodiment of the invention, at least the cup component and the stench trap are of plastic, preferably of the same plastic.

[0012] According to one preferred embodiment of the invention, there is at least one outwardly protruding grip in the outer surface of the cup component.

[0013] More specifically, the floor-drain renovation insert according to the invention is characterized by what is stated in the characterizing portion of the independent Claim.

[0014] Considerable advantages are gained with the aid of the embodiments of the invention.

[0015] The invention is intended to provide for the renovation of a floor drain an insert made from plastic, which is factory-made and therefore of constant quality. The use of the renovation insert makes it unnecessary to surface the old cast-iron floor drain with a surfacing mass. The renovation insert can be easily and quickly set in place and it facilitates maintenance due to the stench trap which is manually rotated open and shut. The installation and acquisition costs of the renovation insert according to the invention are cheaper than renovating a drain with a surfacing mass or using known metallic drain inserts. The renovation insert attaches the old floor tightly to the drain, by means of a seal and a sealing mass, urethane, or some other similar substance.

[0016] In the following, the invention is examined with the aid of examples and with reference to the accompanying drawings.

Figure 1 shows the renovation insert with the stench trap attached to the cup component.

Figure 2 shows the renovation insert seen from the direction of the bottom of the cup component.

Figure 3 is an illustration of the renovation insert of Figures 1 and 2.

Figure 4 is a cross-section of the renovation insert according to the above figures.

Figure 5 is an illustration of the renovation insert of Figures 1 and 2.

Figure 6 is an illustration of the renovation insert of Figures 1 and 2.

Figure 7 is an illustration of the renovation insert of Figures 1 and 2.

Figure 8 is an illustration of the renovation insert of

Figures 1 and 2.

Figure 9 is an illustration of the renovation insert of Figures 1 and 2 seen from the direction of the opening of the stench trap.

Figure 10 is an illustration of the renovation insert of Figures 1 and 2.

Figure 11 is an exploded view of the renovation insert.

[0017] In the embodiment according to the above figures, the cup component 1 of the renovation insert comprising a concave inner bottom 2, which is connected in a continuous curve to a conical body 3. Thus, no corners or angles remain in the bottom of the cup component, which could hinder the flow of liquid, or collect impurities. The inner surface of the cup component is even and smooth, so that there are no protrusions in it extending from the surface. In the edge of the cup component 1 (the upper edge in the figure) there is a circular ring 4, in the outer edge of which is a sealing groove 5 for a triple-grooved seal 6. The seal 6 is intended to seal the joint between the renovation insert and the old floor drain. The ring 4 is connected to the edge of the cup component by means of a shoulder 7. The shoulder 7 has an even counter surface 16 on the inside of the cup component for a seal 8. On the inner edge of the ring 4 is a thread 9. The thread 9 and the sealing groove are thus on opposite sides of the ring. In the side of the body 3 of the cup component 1 is a connection 10 for connecting to the drainpipe. The connection 10 extends outwards as a short pipe from the body 3 and, in this example, has an oval cross-section. The shape of the cross-section is of no significance other than to make it fit inside the opening of the drainpipe of the old floor drain. The lower edge of the opening of the connection 10 must be at a distance from the bottom of the cup component, in order to make in the cup component 1 the water space necessary to form a stench trap.

[0018] The stench trap 11 is formed of a cylindrical pipe 12, at one end of which is a curved narrowing 13 and at the opposite end to this is a horn-like cone 14. There is a transverse joint edge 17, oriented outwards to the centre axis of the cone 14, in which there is a thread 15 for joining to the thread 9 of the internal surface of the ring 4. The length of the stench trap 11 is so dimensioned that is extends below the edge of the opening of the connection 10 installed in the cup component. In this way, a water trap preventing odours from progressing is created, as water remains in the cup component when the new floor drain formed using the renovation insert is in use. The joint between the stench trap 11 and the cup component 1 is sealed by the thread joining them together and by the seal 8 between the counter surface 16 and the joint edge 17. With the aid of the threaded joint the pressure over the seal is even over its entire circumference. Thus an extremely reliable and tight joint is created with the aid of the double seal and the even compression.

[0019] The length of the thread can vary. The thread can be dimensioned to have a length of at least 1 - 2 rotations, so that the stench trap must be rotated correspondingly 1 - 2 revolutions in order to achieve sufficient tightness and sealing force. This solution has the advantage that the rotation need not stop at a specific point. However, the stench trap must be pressed to a sufficient depth so that an upward step does not remain at the edge. Alternatively, a short thread of at most one revolution can be used, the length of which can be only a few degrees in the direction of the circumference of the ring, for example, even as little as only 10 - 30 degrees. By means of a short thread a shorter rotational distance is achieved, but correspondingly the rotational force required increases as the thread steepens, if the pitch of the thread is kept the same.

[0020] Alternatively, instead of a thread other ways of attachment can be used, such as lugs and screws running through them, or the attachment thread can be made as a separate attachment element as a separate ring.

[0021] On the outer surface of the cup component 1 there are three outwardly protruding flange-like grips 18. In this case, there are three grips 18 and they are located on the opposite side of the cup component 1 relative to the connection 10 at different heights at a distance to each other. There can be one or several grips and they can, for instance, run around the cup component, or form stud-like protrusions.

[0022] The plastic floor-drain renovation insert has been developed for the needs of drains being renovated by relining or surfacing. The factory-made plastic drain is installed inside the old cast-iron drain, from which the stench plate has been removed. The plastic floor-drain renovation insert is in two parts, consisting of the cup component of the drain, which is attached to the old drain by an attachment mass or urethane, and a plastic stench trap, which is attached to the cup component by threads. The renovation insert is installed in the old floor drain before the piping is relined and is attached by relining to the piping by means of the connection 10. An attachment mass or similar need not be used, if it is felt that a sufficiently sturdy and tight installation can be achieved with the aid of the connection made by relining and the grips and seal 6 of the renovation drain insert.

[0023] The main parts of the renovation insert are a cup component 1, in which there is a connection (outlet to the drainpipe), which is installed inside the drainpipe of the old floor drain. In the upper edge of the cup component 1 is a thread 9, to which the stench trap 11 is attached. According to one embodiment of the invention, there are grips 18 on the outer surface of the cup component 1, which facilitate the attachment of the insert to the original cast-iron floor drain. In the upper edge of the renovation insert there is a counter surface 16 for the rubber seal 8, which acts as a sealing surface. The rubber seal 8 seals the cup component 1, when the stench trap 11 is screwed onto it. Screwing is facilitated by recesses 19 (in this case 4 recesses, the number may vary) formed in the conical surface 14 of the stench trap's flange 14,

17). In the outer edge of the cup component 1 is a groove 5 for a triple-grooved seal 6, which seals the joint between the drain and the old cast-iron drain.

[0024] The stench trap 11 is a cylindrically-shaped piece, with a hole in the centre. The stench trap 11 is attached to the body of the cup component 1 by screwing it into the thread 9. A seal 8 is located between the cup component and the stench trap and seals the cup component and stench trap. The bottom surface of the stench trap's 11 cylindrically-shaped pipe 12, 13 is lower than the outlet connection 10 of the cup component 1 leading to the drain.

[0025] The renovation insert according to the invention preferably comprises only two main components and two seals. The construction is thus quite simple and thus reliable in operation, easy to install, and cheap in price. It is preferable to use plastic as the material of the principal parts, the cup component 1 and the stench trap 11. The most suitable grades of plastic are the plastics generally used in plumbing fittings, in the manufacture of which efficient manufacturing methods can be used. An advantage of plastic structures is also the good tightness of a threaded joint between them. The principal parts 1, 11 are unified components manufactured as a single piece.

[0026] According to one preferred embodiment of the invention, the plastic floor-drain renovation insert has been developed for the needs of drains being renovated by relining or surfacing. The factory-made plastic drain is installed inside the old cast-iron drain, from which the stench plate has been removed. The plastic floor-drain renovation insert is in two parts, comprising a cup component, attached to the old drain by attachment mass or urethane, and a plastic stench trap, which is attached to the cup component by means of threads.

[0027] The principal shape of the cup component and the stench trap is rotationally symmetrical, in order to permit the threaded joint and because floor drains are usually circular in cross-section. But particularly the cross-section of the pipe part of the stench trap can be varied, if so desired.

Claims

1. Floor-drain renovation insert, which comprises the drain's cup component (1) and a stench trap (11) inside the cup component (1), **characterized in that**

   - the drain's cup component (1) has a ring (4) in its edge, and
   - inside the cup component (1) is a stench trap, which is formed of an open pipe and a flange at one edge of the pipe, in the outer edge of which flange are attachment members for attaching to the ring of the cup component.

2. Floor-drain renovation insert according to Claim 1, **characterized by** the ring (4) in the edge of the cup component (1) and by a thread (9) is the internal surface of the ring (4), and in that the stench trap (11) is formed of an open pipe (12, 13), and by a flange (14, 17) in one edge of the pipe (12, 13), in the outer edge of which flange (14, 17) is a thread (15) for attaching the cup component (1) to the thread (9) on the inside of the ring (4).

3. Renovation insert according to Claim 1 or 2, **characterized in that** the internal surface of the cup component (1) is smooth, **in that** there are no protrusions extending from the surface.

4. Renovation insert according to Claim 1, 2, or 3, **characterized in that** there is a seal (6) on the outer surface of the ring (4) of the cup component (1), in order to support the ring (4) on the internal surface of the old floor drain.

5. Renovation insert according to Claim 1, 2, 3, or 4, **characterized in that** in the surface of the flange (14, 17) of the stench trap (11) there is at least one recess (19) for rotating the stench trap (11).

6. Renovation insert according to any of the above Claims, **characterized in that** at least the cup component (1) and the stench trap (11) are of plastic, preferably of the same plastic.

7. Renovation insert according to any of the above Claims, **characterized in that** there is at least one outwardly protruding grip (18) on the outer surface of the cup component (1).

8. Renovation insert according to any of the above Claims, **characterized in that** it consists of a cup component (1), a stench trap (11) joined to it by a threaded joint (11), a seal (8) fitted between them, and a seal (6) for supporting the ring (4) on the internal surface of the old floor drain.

9. Renovation insert according to any of the above Claims, **characterized in that** the length of the thread (9) on the internal surface of the ring (4) in the edge of the cup component (1), and of the thread (15) of the outer edge of the flange (14, 17) in one edge of the pipe (12, 13) of the stench trap (11), is 1 - 2 revolutions.

10. Renovation insert according to any of the above Claims, **characterized in that** the length of the thread (9) on the internal surface of the ring (4) in the edge of the cup component (1), and of the thread (15) of the outer edge of the flange (14, 17) in one edge of the pipe (12, 13) of the stench trap (11), is 10 degrees - 1 revolution.

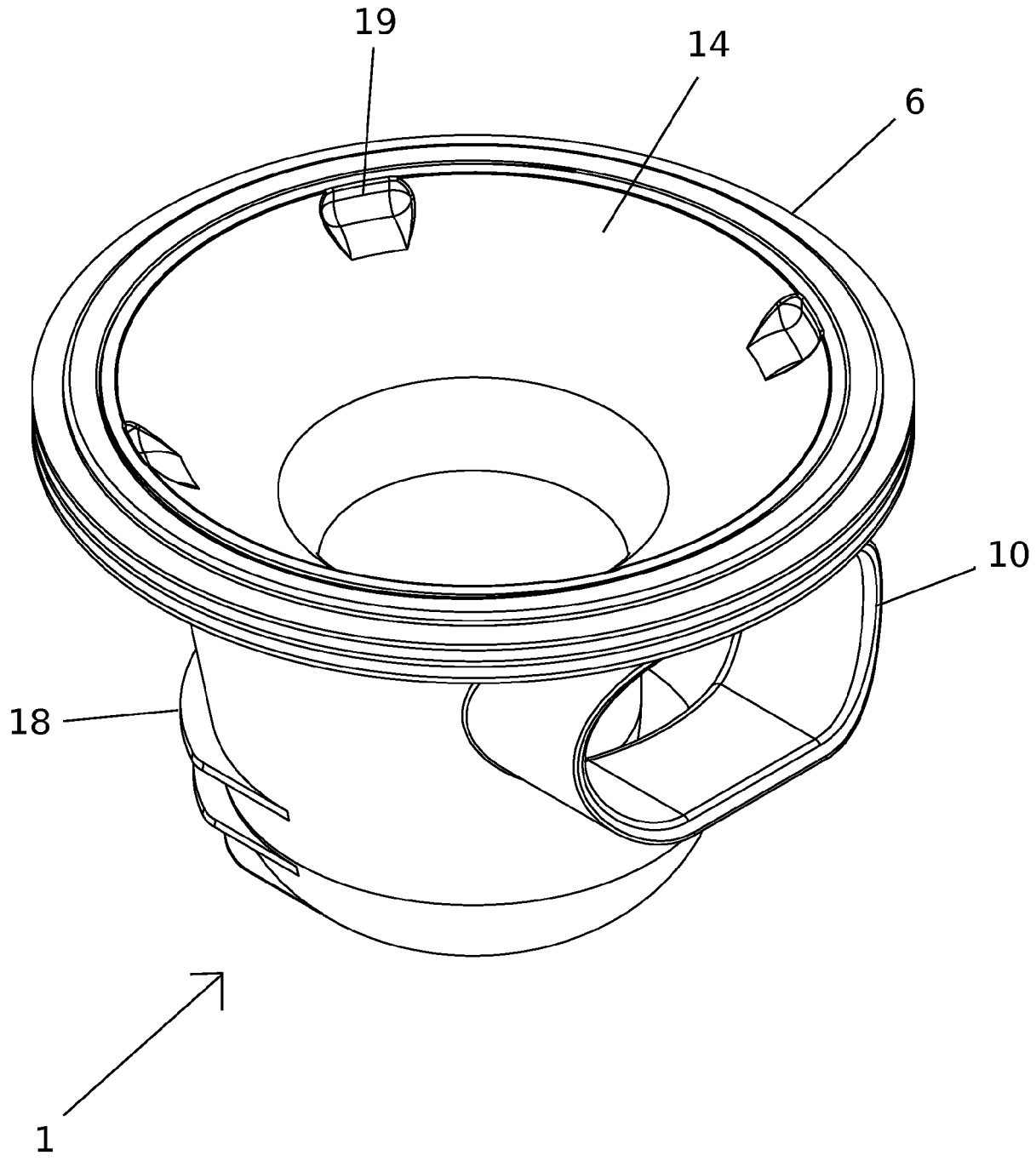

Fig. 1

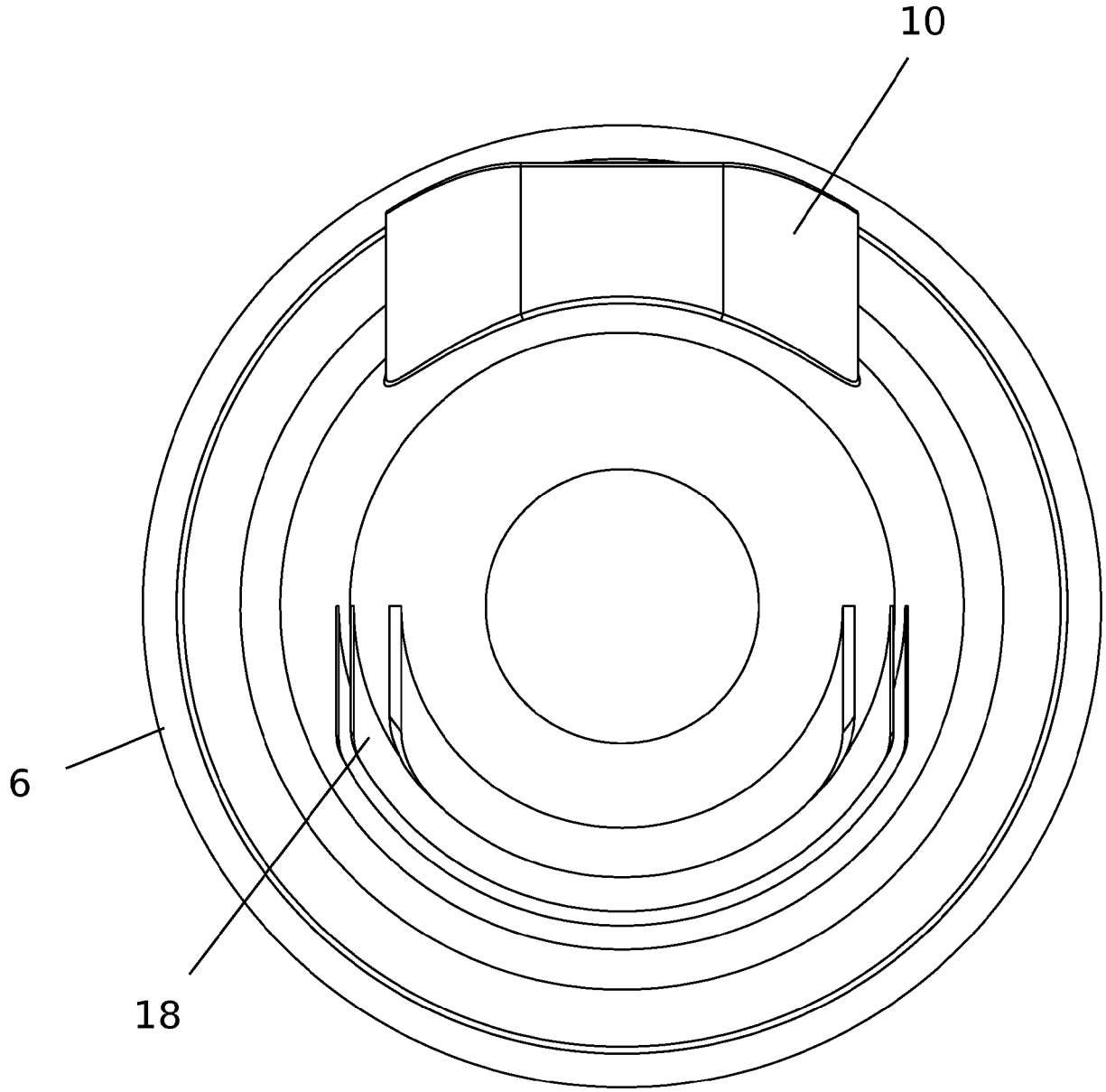

Fig. 2

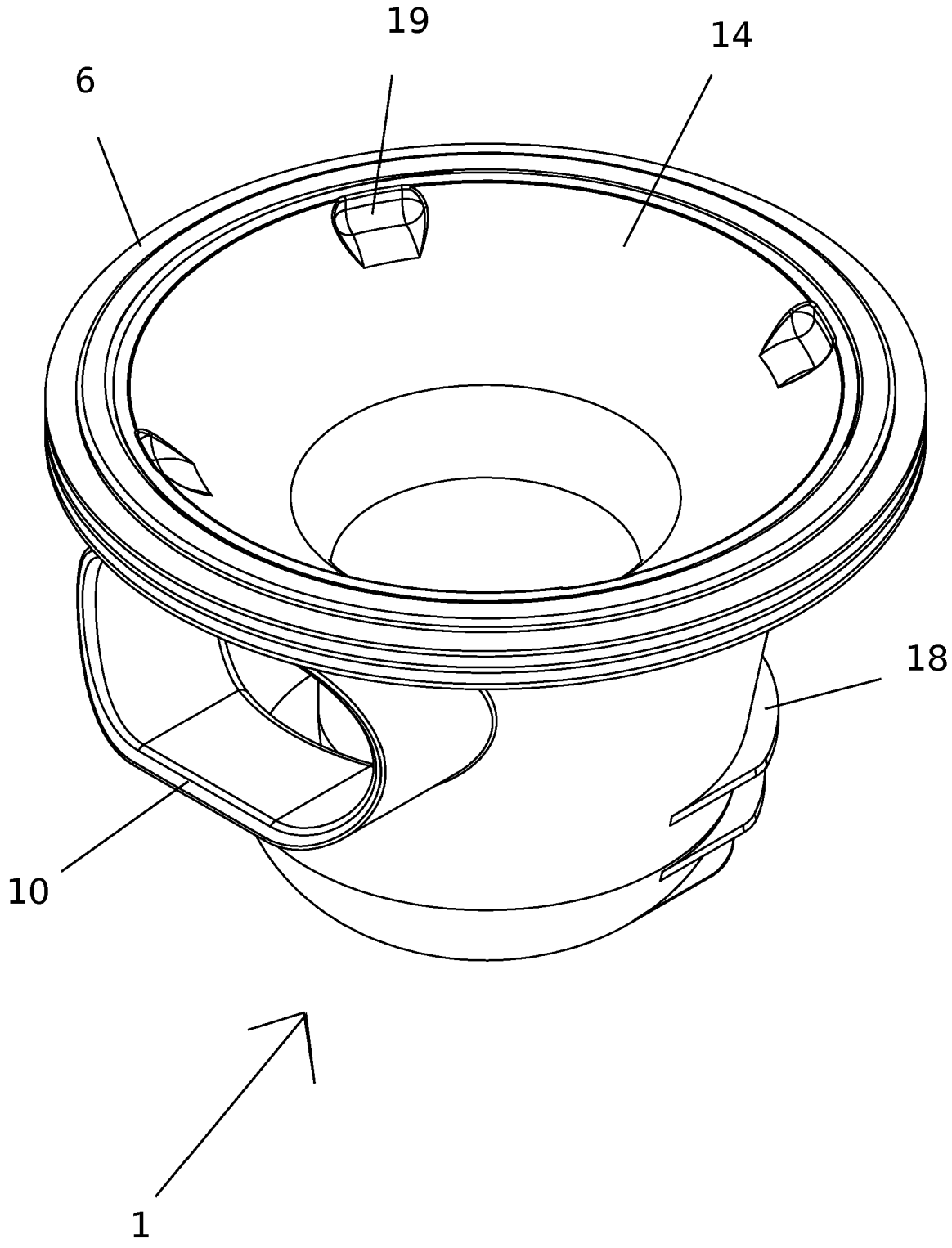

Fig. 3

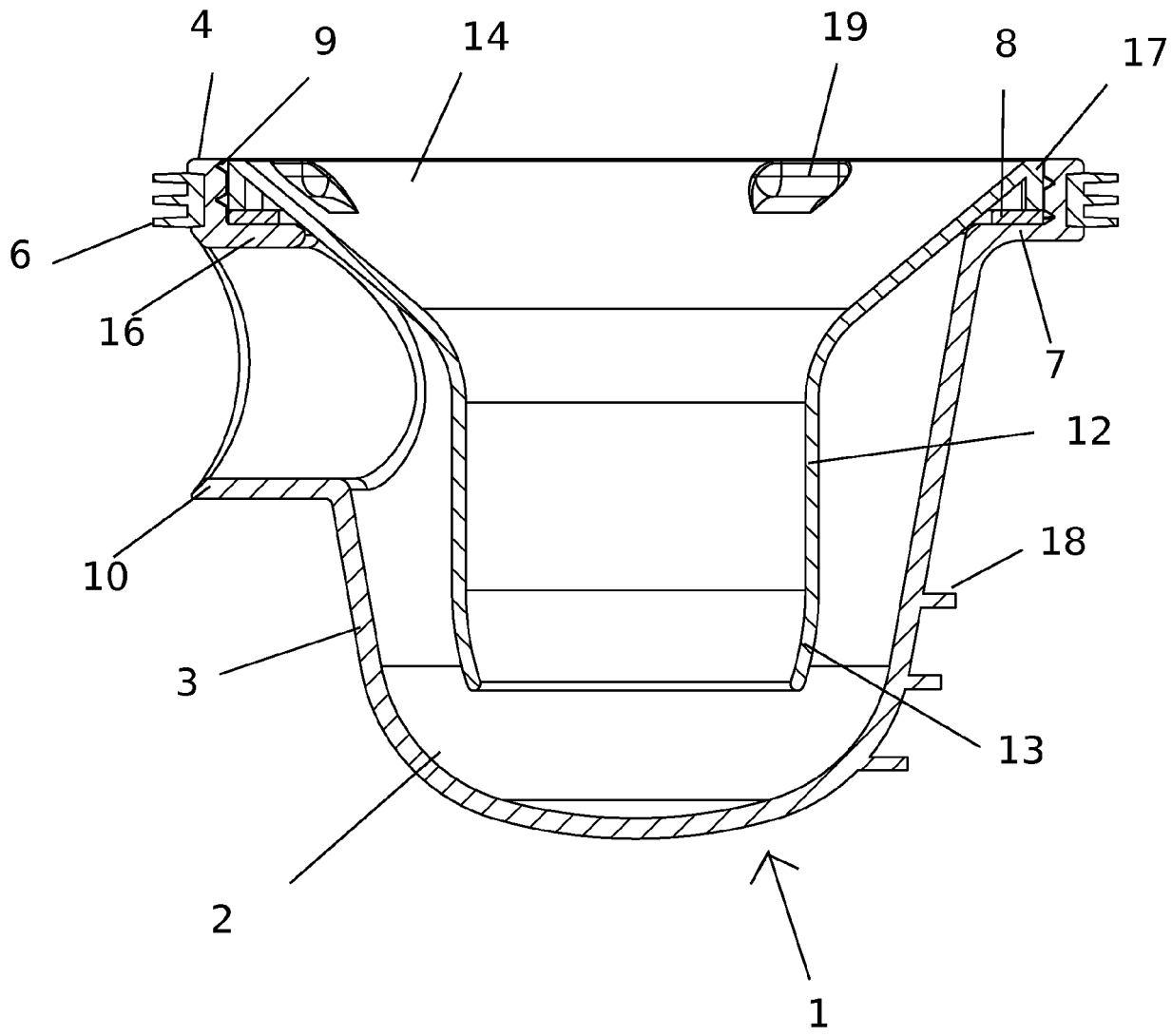

Fig. 4

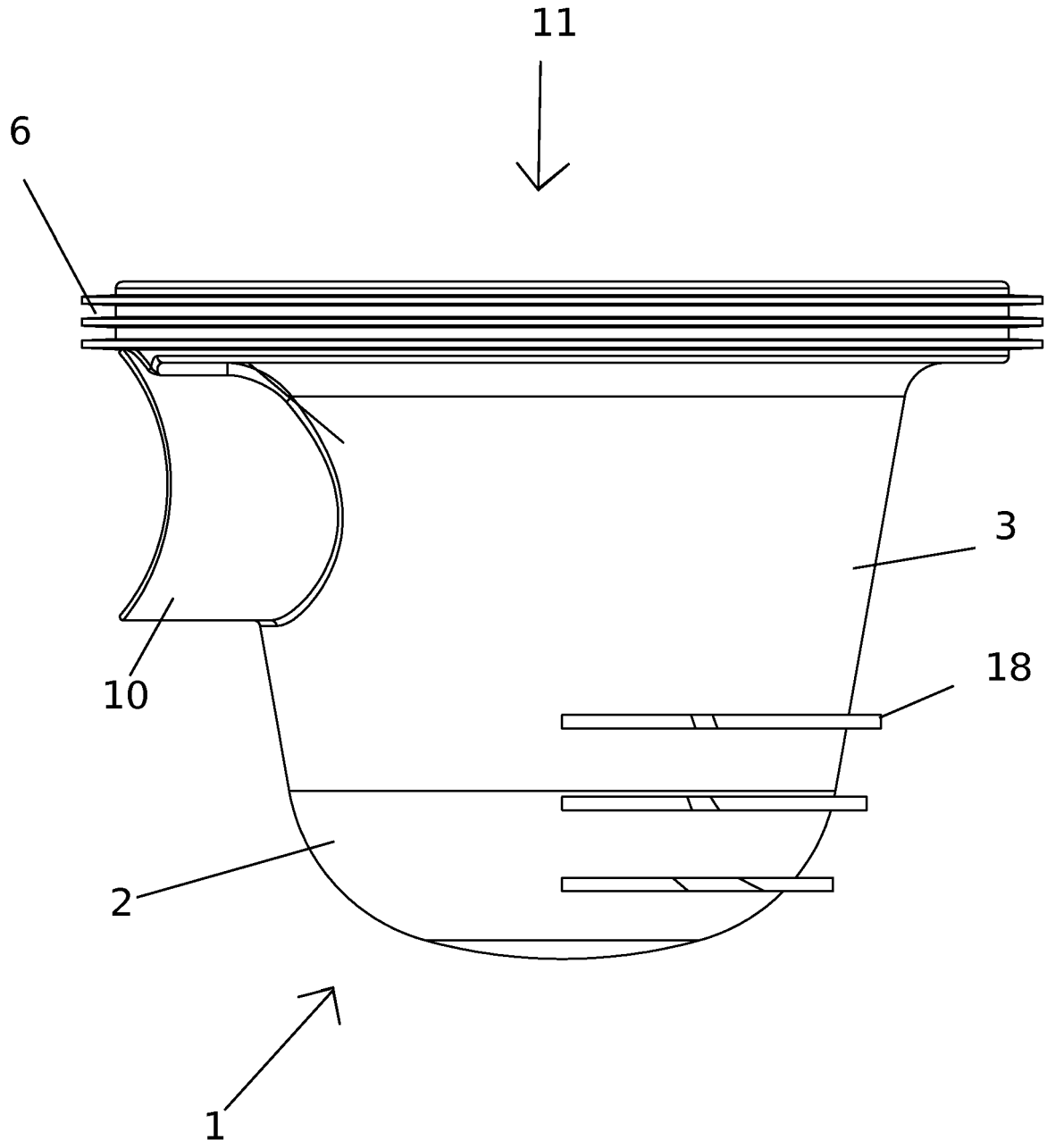

Fig. 5

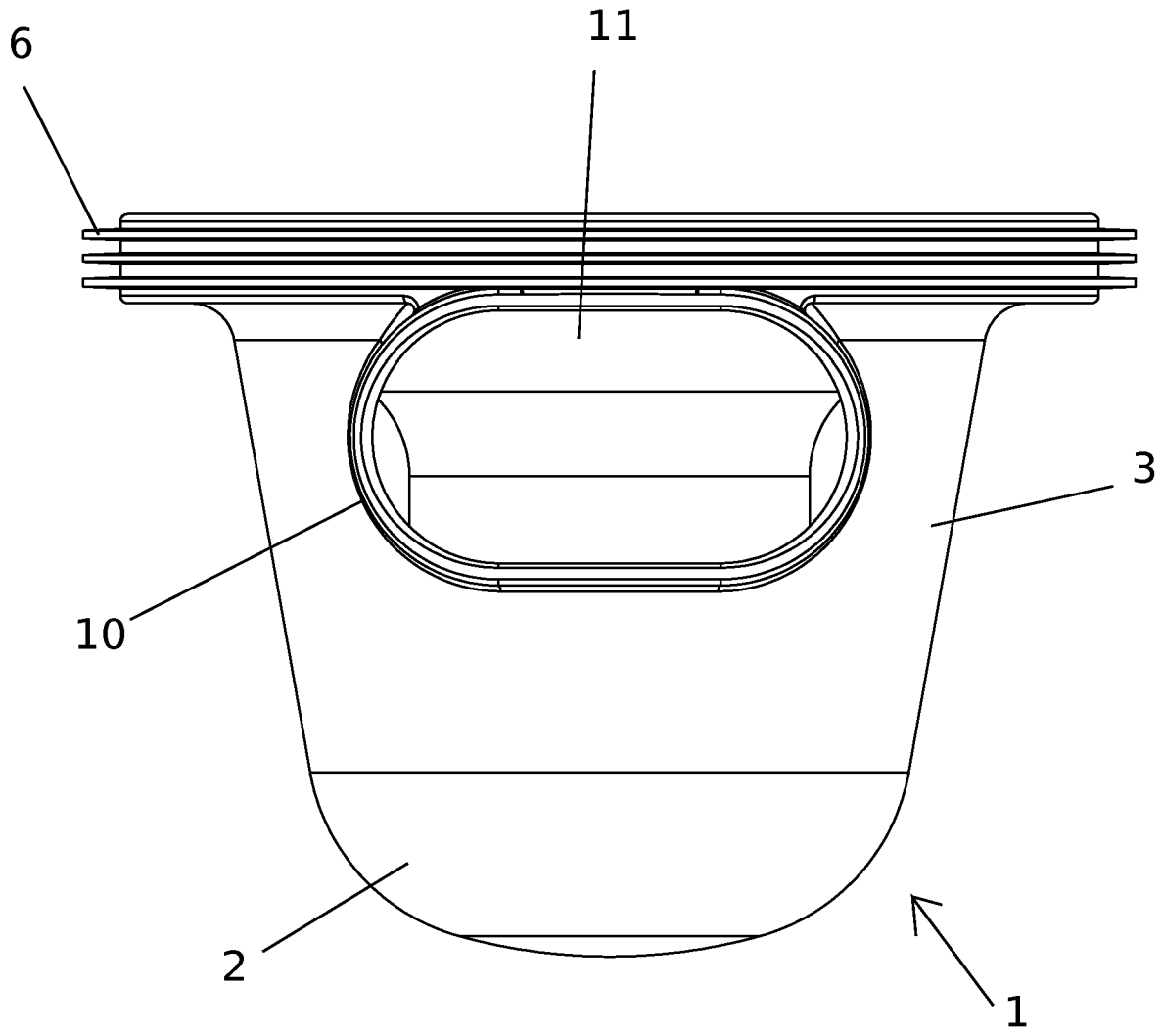

Fig. 6

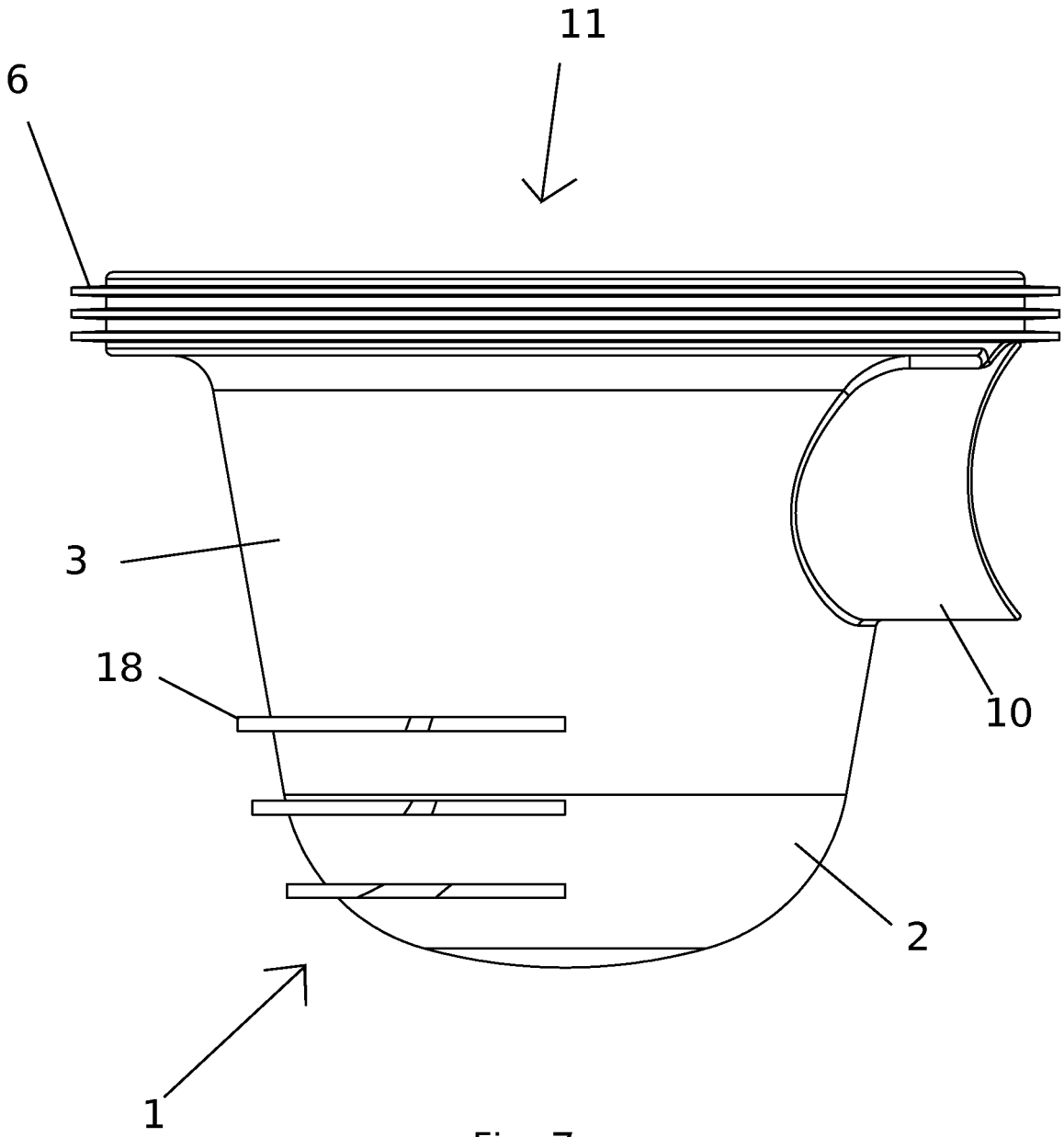

Fig. 7

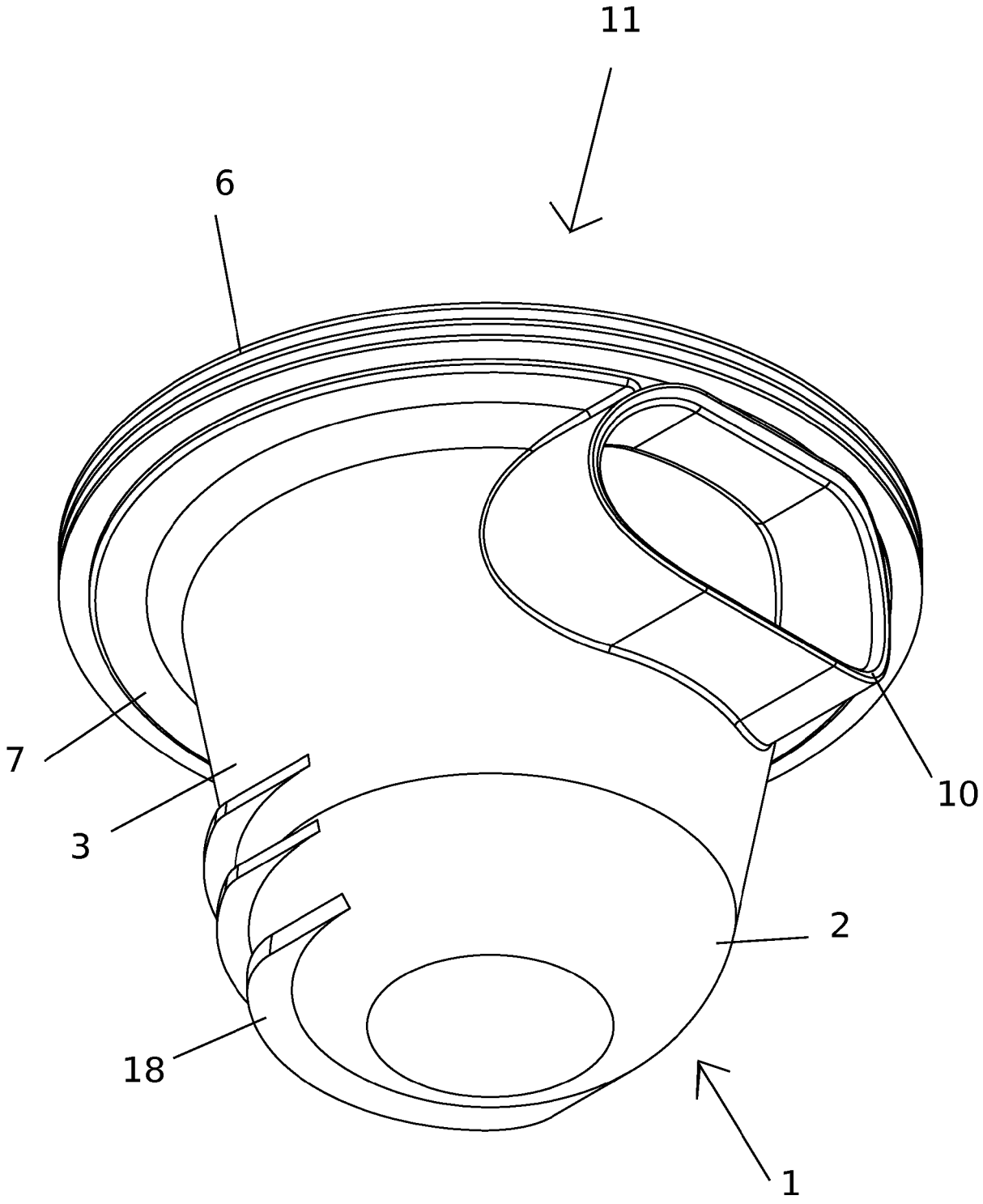

Fig. 8

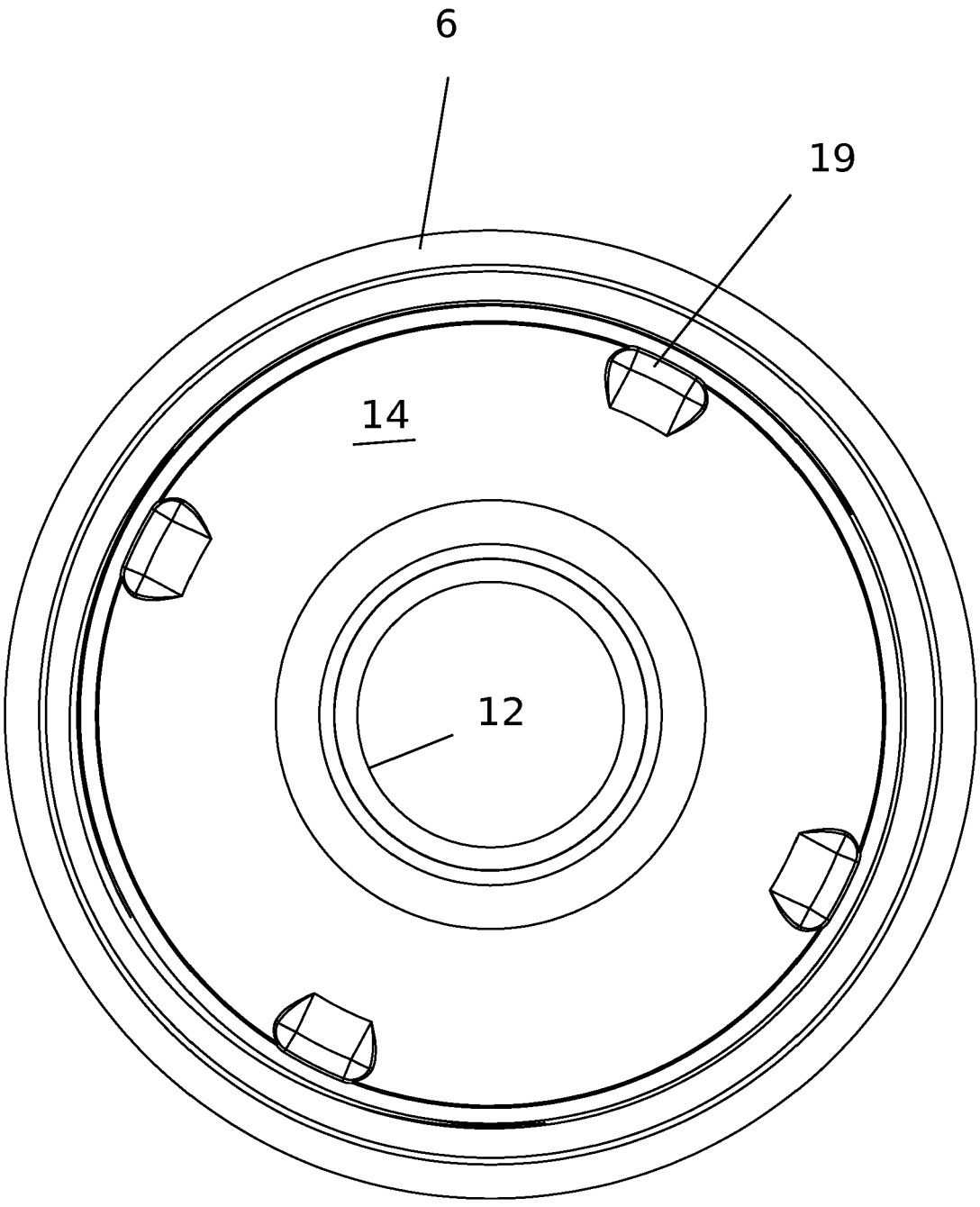

Fig. 9

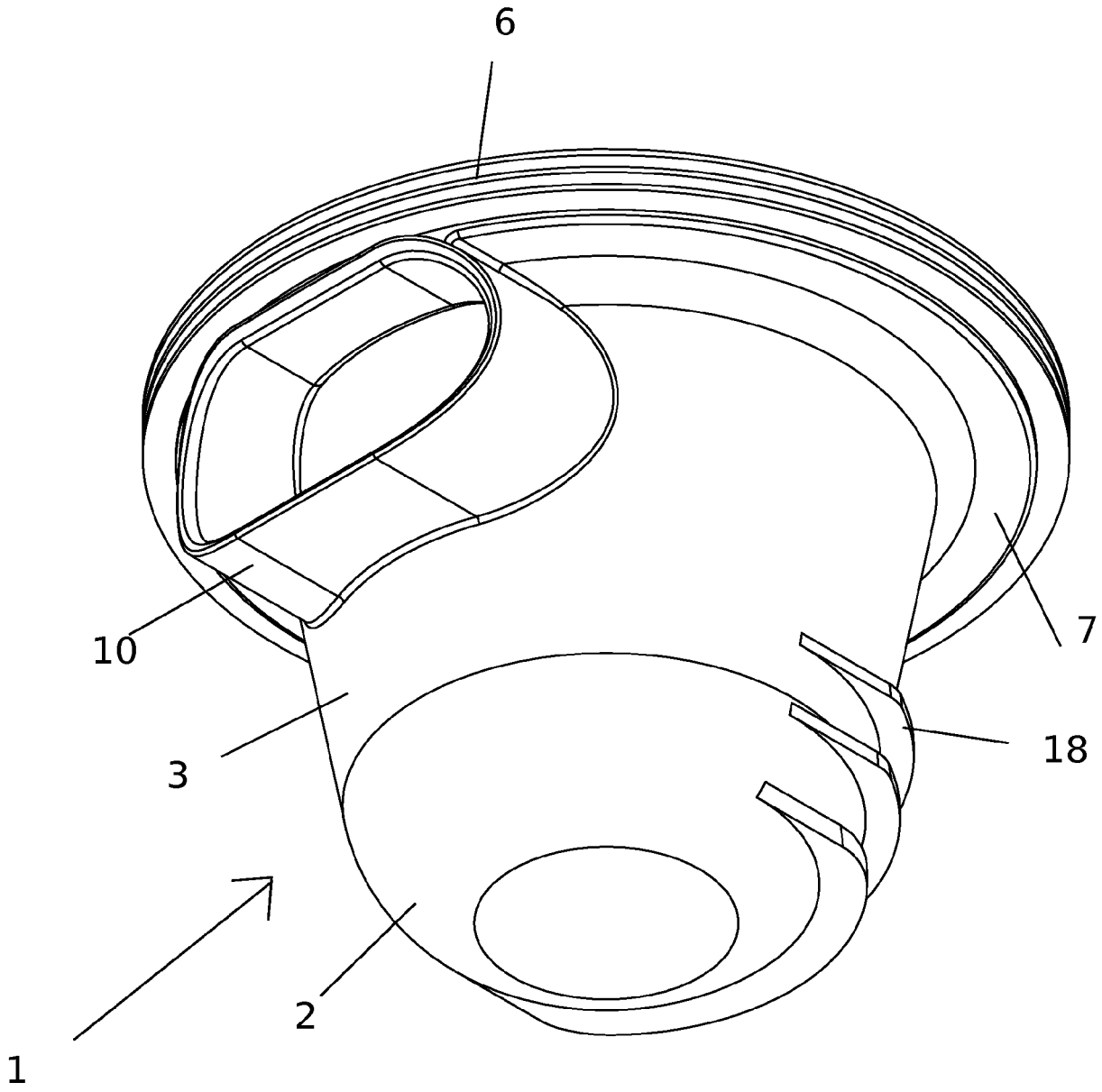

Fig. 10

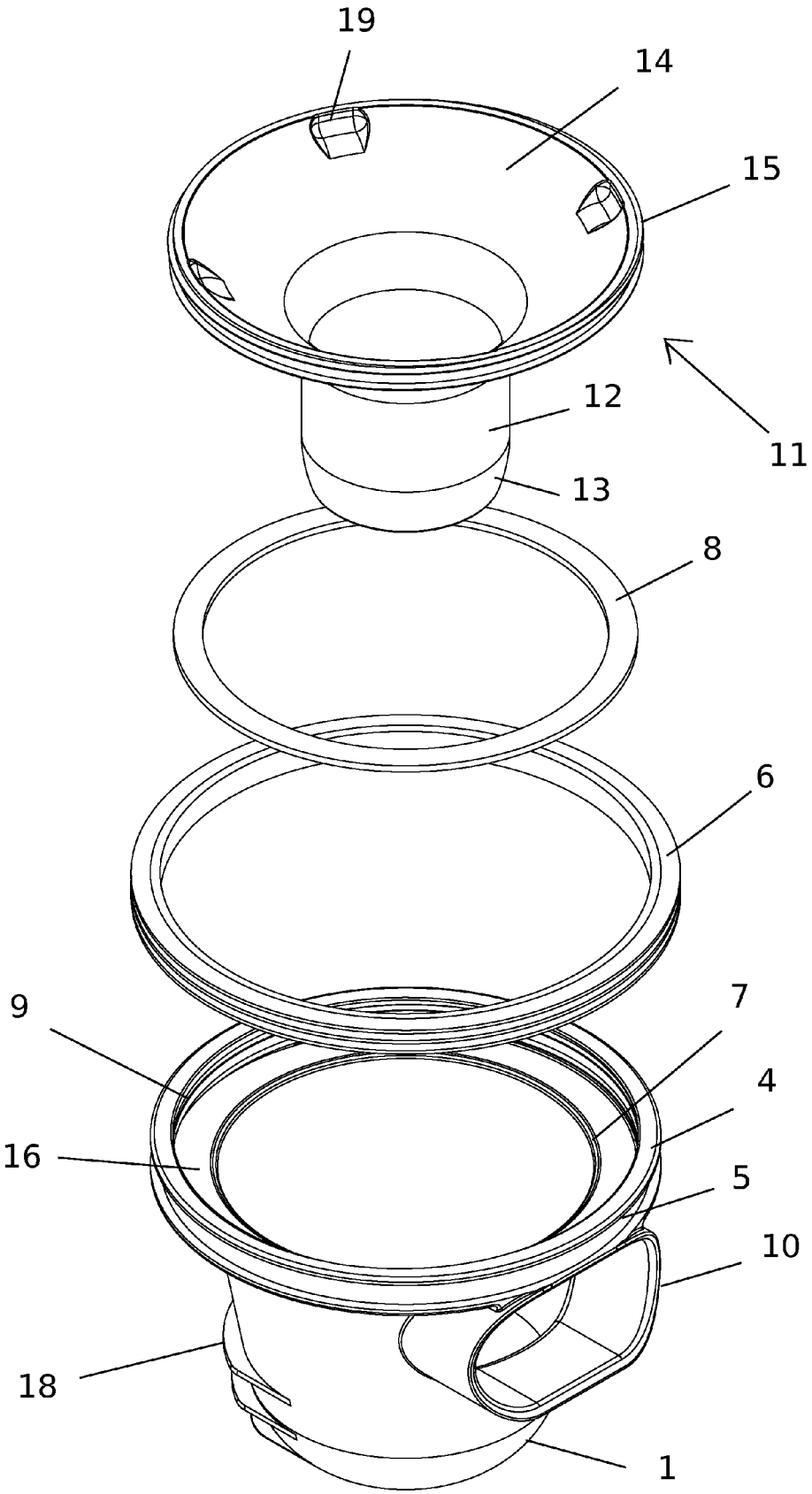

Fig. 11