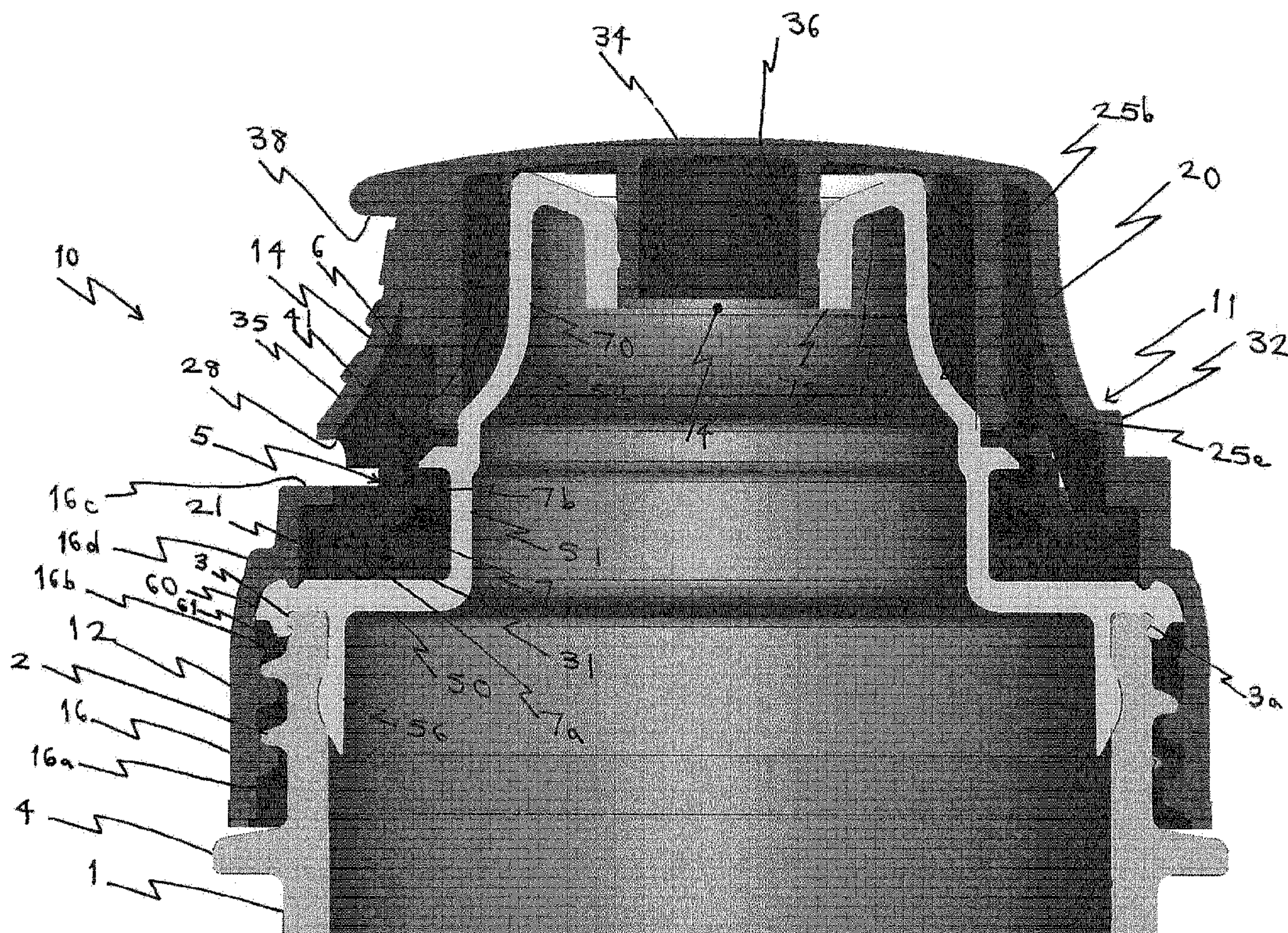




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(54) **Titre : FERMETURE A PREUVE D'EFFRACTION**
 (54) **Title: A TAMPER-EVIDENT CLOSURE**



(57) **Abrégé/Abstract:**

A flip-top dispensing closure (10) is provided. The closure comprises: a base (12) connectable to a container neck (1); a lid (14) hingedly connected to the base so as to be movable between a closed position and an open position; and a dispensing member (20). The closure further comprises a tamper-indicating member (5). The tamper-indicating member (5) activates either: upon first opening of the lid (14); or if the base (12) is removed from the neck (1).

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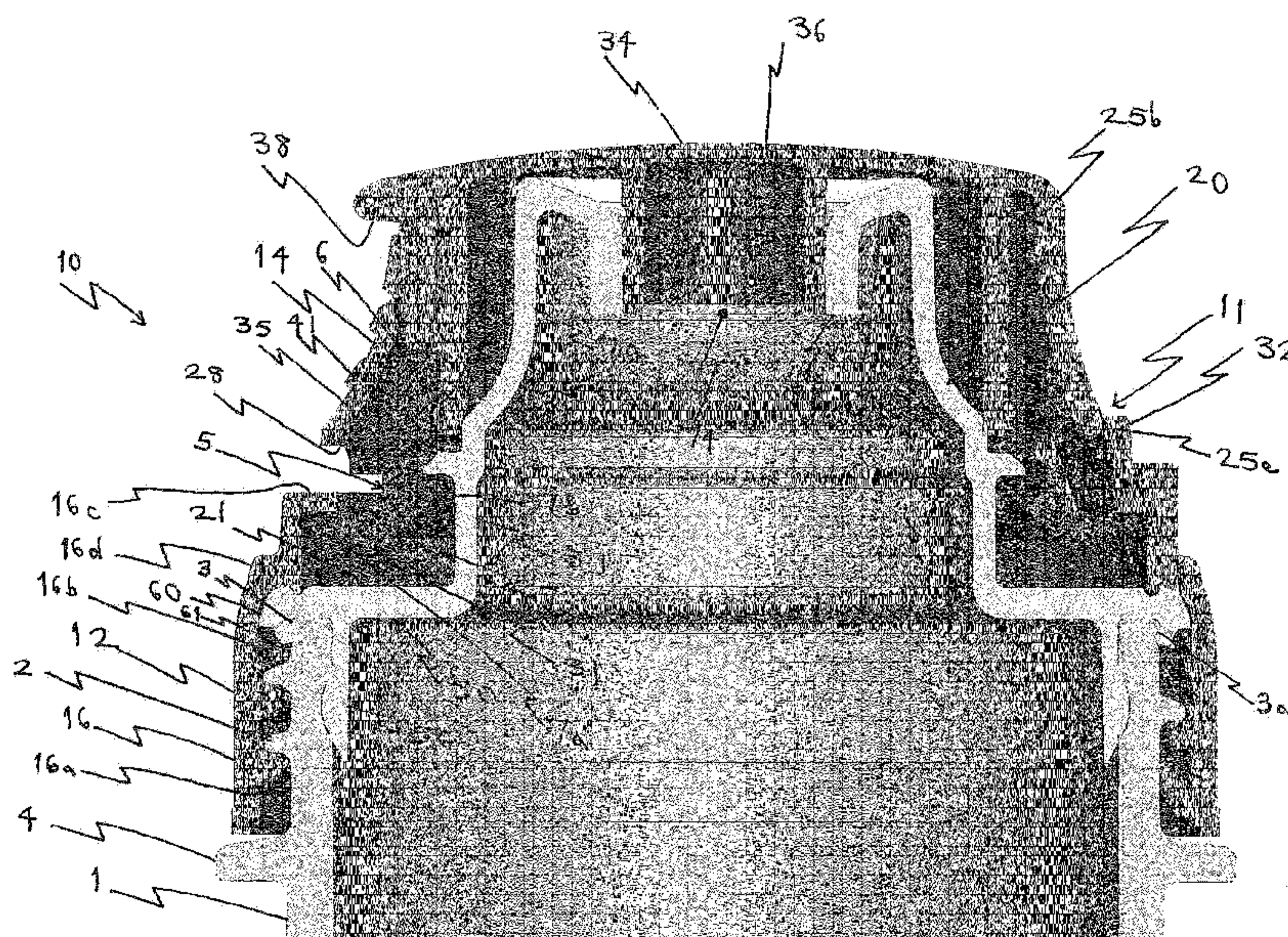
(54) **Title:** A TAMPER-EVIDENT CLOSURE

Figure 2

(57) **Abstract:** A flip-top dispensing closure (10) is provided. The closure comprises: a base (12) connectable to a container neck (1); a lid (14) hingedly connected to the base so as to be movable between a closed position and an open position; and a dispensing member (20). The closure further comprises a tamper-indicating member (5). The tamper-indicating member (5) activates either: upon first opening of the lid (14); or if the base (12) is removed from the neck (1).

A TAMPER-EVIDENT CLOSURE

The present invention relates generally to a closure and particularly, although not exclusively, to a container closure including one or more tamper-indicating features.

5

There is a widespread requirement within the field of closures for mechanisms which can be used to indicate to a consumer if a closure is unopened. One very common system uses a drop band which is frangibly connected to the open end of a closure base and which drops onto and remains on a container neck if the closure base is removed. There are also mechanisms for indicating if two parts of a closure
10 have been separated, for example, if a lid has been removed from a base.

The present invention seeks to provide improvements over known tamper-indicating closures.

According to an aspect of the present invention there is provided a flip-top dispensing closure
15 comprising: a base connectable to a container neck; a lid hingedly connected to the base so as to be movable between a closed position and an open position; and a dispensing member, the closure further comprising a tamper-indicating member, in which the tamper-indicating member activates either: upon first opening of the lid; or if the base is removed from the neck.

20 If the base is removed from the neck the dispensing member may be retained on the neck until after the tamper-indicating member is activated, and thereafter is removed together with the base.

The dispensing member may include a bead or the like for interacting with a corresponding bead or the like on the tamper-indicating member, the beads interacting to cause activation of the member if the lid
25 is opened or if the base is removed.

The dispensing member may have a bead or the like for retaining it on the container neck.

30 The base may include a bead for engaging the dispensing member so as to lift the dispensing member off the neck if the base is removed.

The base bead may be located axially spaced from the dispensing member so that as the base initially moves axially off the neck the dispensing member remains on the neck, whereby to cause the tamper-evident member to activate.

35

According to a further aspect of the present invention there is provide a flip-top dispensing closure comprising a base connectable to a container neck, and a lid hingedly connected to the base so as to be movable between a closed position and an open position, the closure comprises a bi-functional tamper-indicating member which breaks either upon first opening of the lid or if the base is removed from the
40 neck.

The present invention therefore provides a unitary tamper-indicating system capable of providing multiple functions.

5 The closure may comprise a dispensing member, for example a spout. The dispensing member may be separate from the base and lid.

In some embodiments the dispensing member may cause the tamper-evident member to break if the base is removed from the neck.

10

The dispensing member may be lifted off the container neck if the base is removed. The lifting may be delayed/retarded so as to cause activation of the tamper-evident member.

15 The member may comprise a double ring structure with two rings frangibly connected together that break apart in a tamper-indicating event.

When the tamper-indicating member is activated at least part of the member may fall into a pocket or void in the base. In some embodiments part of the member is visible in a gap prior to opening and moves out of the gap as a result of an opening event.

20

According to a further aspect there is provided a container closure comprising a base and a lid, the base is attachable to a container and the lid is attachable to the base, the closure has a tamper-evident member which is capable of indicating if the lid has been opened, in which the said tamper-evident member is also capable of indicating if the base is removed from the neck.

25

According to a further aspect there is provided a container closure comprising two or more parts and being connectable to a container, the closure being vulnerable to two or more different opening events, in which the closure includes a single, multi-functional tamper-indicating system activatable if any of the opening events occur.

30

In one embodiment there are important interactions between:

1. a bead on a spout and a bead on a lower part of a tamper-evident double ring, which causes the ring to break if the lid is opened or if the base is removed;

35

2. a bead/clip on a spout which holds it onto a container neck (until a bead on the base lifts it off); and

3. a bead on the base and part (e.g. an edge) of the spout, which cause the spout to be lifted off the neck after the tamper-evident ring has been broken due to interaction 1.

40

In some embodiments the member is the only tamper-indicating feature; in other embodiments further features may be provided.

5 Closures of the present invention may be formed from any suitable material, such as a plastics material (for example PP or PE). The closure may be formed by moulding, for example by injection or compression moulding. Closures with lids and bases may be formed with the lid in an open or closed position.

10 The present invention also provides a closure as described herein in combination with a container.

A further aspect provides a method of providing a container closure with multi tamper-evidencing functionality using only a single tamper-evident break event which occurs upon any of two or more different opening events.

15 A further aspect provides a neck or neck finish for a container, the finish having a height in the range 7mm to 11mm when measured from a transfer bead. The finish may have a height in the range 8 to 10mm, for example in the range 8mm to 9mm. In some embodiments the finish has a height of approximately 8.41mm.

20 A further aspect provides a neck or neck finish for a tamper-evident closure, the neck finish being formed with an absence of a tamper-evident bead. The neck finish may be formed in combination with a closure having a base and be part of a system that can still detect an attempt to remove the base and provide an indication that the base has been removed.

25 The finish of aspects and embodiments of the present invention may be a 29/25 finish.

Finishes of the present invention may include engagement means for enabling connection to a closure, for example they may include an external and/or internal screw thread formation, snap bead or the like.

30 A further aspect provides a container having a neck or neck finish as described herein.

The present invention also provides for a closure as described herein in combination with a neck, neck finish or container as described herein.

35 The container, neck or neck finish of the present invention may be formed from any suitable material, including plastics material (e.g. PET, PP or PE) or glass.

Different aspects and embodiments of the invention may be used separately or together.

Further particular and preferred aspects of the present invention are set out in the accompanying independent and dependent claims. Features of the dependent claims may be combined with the features of the independent claims as appropriate, and in combination other than those explicitly set out in the claims.

5

The present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

10

Figure 1 is a side view of a closure formed according to the present invention and shown in an unopened position;

Figure 2 is a section of the closure of Figure 1;

15

Figures 3 and 4 are further sectional and side views of the closure of Figures 1 and 2;

Figures 5 to 7 show side, perspective and sectional views of the closures of Figures 3 and 4 following a first type of premier opening event in which a lid is opened;

20

Figure 8 and 9 are side and sectional views of the closure of Figure 1 at the start of an alternative type of premier opening event in which a base is unscrewed;

Figures 10 and 11, 12 and 13, and 14 and 15, and 16 and 17 show side and sectional views as the base is progressively unscrewed;

25

Figures 18 and 19 show the closure after the base has been screwed back on;

Figure 20 is a perspective view of a container neck having a finish formed according to the present invention;

30

Figure 21 is a side view of the neck of Figure 20;

Figure 22 is a magnified view of the part labelled A in Figure 21;

35

Figures 23, 25 and 27 are front and side sectional views of a known container and closure and a side view of a known neck finish; and

Figures 24, 26 and 28 show views of a container and closure formed according to the present invention and corresponding to Figures 23, 25 and 27 respectively.

40

Referring first to Figures 1 and 2 there is shown a sportscap closure generally indicated 10.

The closure 10 comprises a body 11, a spout 20 and a tamper-evident member 5.

The closure 10 is connectable to a container neck 1.

5 The body 11 comprises a base 12 and a lid 14.

The base 12 comprises a generally cylindrical side wall 16. The side wall 16 terminates at one end with an annular shoulder 16c which extends radially inwards.

10 The interior of the base side wall 16 comprises internal screw thread formations 16a for engaging corresponding external screw thread formations 2 on the container neck located above a transfer bead 4. The interior of the side wall 16 further comprises an annular retention bead 16b positioned below a second shoulder 16d in the sidewall 16.

15 The lid 14 comprises a top plate 34 from which depends a curved outer sidewall 35; an inner skirt 25b depends from the underside of the top plate, radially inwards of the outer wall 35 and a spigot 36 depends from the underside of the centre of the plate 34, radially inwards of the inner skirt 25b.

20 Furthermore, the skirt 25d of the lid 25 has a projection 25e. This projection 25e projects radially outwards at the lower end of the skirt 25d.

The generally turret-like lid 14 is connected to the free end of the shoulder 16c via a hinge arrangement generally indicated 32.

25 A gap 27 is left between the lower end of the side skirt and the upper surface of the base 20 and the lid includes a shallow cut-out window 28 opposite the hinge 32.

Opposite the hinge 32 the lid 14 includes a small peak 38 used to lift the lid and flip it open with respect to the base 12.

30

The spout 20 comprises a lower portion 50, a central portion 51 and an upper portion 52.

The lower portion 50 comprises a ledge 21 with an annular seal 56 depending therefrom. In use, the seal 56 enters the bore of the container neck such that it seals against its inner surface.

35

The ledge 21 comprises a plurality of radially outwardly extending retention spokes 60 at its periphery. The spokes 60 abut against the shoulder 16d. It will be noted that the spokes 60 are spaced from the bead 16b and that they terminate with a "claw" 61 that allows them to grip onto the rim 3 of the container neck 1 which comprises a peripheral bead 3a.

40

The central section 51 includes a flange 41 which projects radially outward from the side of the spout 40 at approximately the same axial level, when assembled with the base and/or lid, as the gap 27 between the underside of the lid 25 and the upper surface of the base 20.

5 A void or pocket 31 is provided between the spout ledge 41 and the base 20.

The upper portion 52 comprises a curved, generally frusto conical outer surface defining a spout. At the end of the spout side wall opposite the central portion 51 is a cylindrical terminal portion 70. An inclined annular orifice wall 72 extends inwards from the free end of the portion 70 and from it an
10 annular wall 73 depends; the wall 73 defines an orifice 74. In the closed position the lid spigot 36 enters through the wall 73 to close the orifice 74.

The tamper-evident member 5 takes the form of a separate element having an upper ring 6 and a lower ring 7 connected together by frangible connections 8. The tamper-evident member 5 fits between the
15 base and the lid and radially outward of the spout 20. The upper ring 6 includes an upper projection 6a which projects radially inwardly. The lower ring includes a flange 7a on the which projects radially outwardly and a hook-like inner projection 7b which projects radially inwardly.

The upper projection 6a engages with the projection 25e provided on the radially inner surface of the
20 inner skirt 25b of the lid.

The flange 7a sits adjacent (and may or may not initially engage with) the underside of the shoulder 16c and the projection/bead 7b sits adjacent (and may or may not initially engage with) under the spout
25 flange 41.

As described below the lid cannot be opened without breaking the frangible connections 8 and separating the rings 6, 7.

When a user desires to drink from the spout they grasp the lid and flip it open to the position shown in
30 Figures 5 to 7 using the peak 38.

Due to the interaction between the member 5 and the base and spout the member 5 splits into the two rings 6, 7 as shown in Figures 5 to 7; and the lower ring 7 is no longer visible through the gap 27, having
35 dropped into the void 31 above the spout ledge 21.

The user can now access the spout freely and unencumbered by the lid. With the lid in the open position the ring 6 is retained in the lid by the projection 25e and is clearly visible in the lid. The ring 7 drops into and is retained in the void. The separated rings 6, 7 show that the closure lid has been
40 opened at least once.

Referring now to Figures 8 to 17, in addition to the lid opening being the premier opening event, the closure 10 is also capable of showing that the base has been removed (or an attempt has been made to remove the base) from the neck 1.

5 Initially as the base 12 is unscrewed the spout 20 remains on the neck. This means that as the base moves up the ring hook 7b contacts the underside of the spout flange 41 (Figures 8 and 9).

Continued unscrewing causes the ring to 7 to be broken away from the ring 6 (Figures 10 and 11).

10 The ring 7 drops into the void 31 and can no longer be seen in the gap/window 27/28. It will also be noted that frangible bridges 15 between the base and lid are unbroken i.e. the member 5 has broken due to removal of the base from the neck.

15 Also in Figures 10 and 11 it can be seen that because the base sidewall has moved up then bead 16b now abuts against the underside of the spokes 60. Up to this point the spout is retained on the neck by the interaction of the spoke bead 61 and the rim bead 3a.

20 As the base continues to be unscrewed the spout 20 now starts to be lifted off the neck rim (Figures 12 and 13) by the bead 16b, but this is only after the member 5 has been broken (i.e. the delay in the lifting of the spout allows the member to be broken). The bead/claw 61 of the spout is pulled over the rim bead 3a by the interaction of the wall bead 16b and the spoke 60.

The base now continues to be unscrewed (Figures 14 to 17) and may be completely removed.

25 When the base is replaced (Figures 18 and 19) the tamper-evidence remains as the breaking of the member 5 is an irreversible event.

30 The multi (in this embodiment double/dual) function of the member 5 removes the need for a separate tamper-evident band at the free end of the base sidewall and allows a reduction in weight of the closure and removes the need for a slitting step to form the band. By removing the need for a bead to cause breakage of a tamper band this also allow the weight of the neck finish to be reduced.

Referring now to Figures 20 to 22 there is shown a container neck 101 formed according to an aspect of the present invention.

35

The neck 101 includes a neck finish 102 and a transfer bead 103.

40 The finish 102 is the part of the container that holds a cap or closure in use, and surrounds the opening 104 in the container. It is so named because, in early hand glass manufacturing, it was the last part of the glass container to be made, hence the term "finish"

The exterior of the finish 102 includes a single start screw thread 105. In this embodiment this is a continuous spiral projecting ridge on the finish intended to mesh with the thread of a screw-type closure. Other screw thread formations, including multi-start threads, are possible.

The transfer bead 103 is a continuous horizontal ridge near the bottom of the finish used in transferring of a container from one part of a manufacturing operation to another.

It will be noted that the neck finish rim 106 includes an undercut 107 the purpose of which is described in more detail below.

In this embodiment dimension x is in the range 25mm to 30mm (for example 27.70mm), dimension y is in the range 30mm to 35mm (for example 32.50mm), dimension z is in the range 7mm to 11mm (for example 8.41mm) and dimension α is in the range 0.2mm to 0.3mm (for example 0.25mm). All dimensions are within certain tolerances, for example +/- 10%.

Figures 23 to 28 show a comparison of a known closure and neck finish with a closure and neck finish formed in accordance with aspects of the present invention.

The known closure 270 includes a tamper-evident band 271 at the free end of its sidewall 272. The band 271 includes a bead 273 that engages under a tamper band bead 274 necessarily formed on the neck finish 275 in addition to a transfer bead 276.

By contrast, the closure 210 does not have a tamper-evident band and accordingly the neck finish does not require a tamper band bead. This means that not only can the weight of the closure be significantly reduced, but the weight of the finish, formed without a tamper band bead, can also be significantly reduced.

It will be seen that the closure spout 220 is clipped under the neck finish undercut 207. The closure 210 operates in accordance with the principles set out in relation to Figures 1 to 19.

In this embodiment the provision of a dual function tamper system in the closure produces a height reduction of approximately 4.19mm over a corresponding tamper band closure. The short neck finish 202 gives a significant weight saving.

Some aspects and embodiments of the present invention consist of a closure and/or neck finish substantially exactly as shown in Figures 23 to 28 i.e. restricted to the dimensions shown in the drawings (within a tolerance of +/- 10%).

Although illustrative embodiments of the invention have been disclosed in detail herein, with reference to the accompanying drawings, it is understood that the invention is not limited to the precise embodiments shown and that various changes and modifications can be effected therein by one skilled in the art without departing from the scope of the invention as defined by the appended claims and their
5 equivalents.

CLAIMS

1. A flip-top dispensing closure comprising:
a body, the body comprising:
5 a base connectable to a container neck, and
a lid hingedly connected to the base so as to be movable between a closed
position and an open position;
a dispensing member engaged with the body; and
a tamper-indicating member that is a separate element and is provided internally of
10 the body, the tamper-indicating member comprising means for engaging both the body and
the dispensing member,
wherein the tamper-indicating member activates either: upon first opening of the lid;
or if the base is removed from the neck, to result in an irreversible unitary tamper-evident
break event if first opening of the lid is the premier opening event and alternatively if removing
15 the base from the neck is the premier opening event.
2. The closure as claimed in claim 1, in which the tamper-indicating member fits between
the body and the dispensing member.
- 20 3. The closure as claimed in claim 1 or claim 2, in which the tamper-indicating member
fits radially outward of the dispensing member.
4. The closure as claimed in any one of claims 1 to 3, in which if the base is removed
from the neck the dispensing member is retained on the neck until after the tamper-indicating
25 member is activated, and thereafter is removed together with the base.
5. The closure as claimed in any one of claims 1 to 4, in which the dispensing member
includes a bead for interacting with a corresponding bead on the tamper-indicating member,
the beads interacting to cause activation of the member if the lid is opened or if the base is
30 removed.
6. The closure as claimed in any one of claims 1 to 5, in which the dispensing member
has a bead for retaining the dispensing member on the container neck.

7. The closure as claimed in any one of claims 1 to 6, in which the base includes a bead for engaging the dispensing member so as to lift the dispensing member off the neck if the base is removed.

5

8. The closure as claimed in claim 7, in which the base bead is located axially spaced from the dispensing member so that as the base initially moves axially off the neck the dispensing member remains on the neck, whereby to cause the tamper-indicating member to activate.

10

9. The closure as claimed in any one of claims 2 to 8, in which the dispensing member comprises a spout.

15

10. The closure as claimed in any one of claims 1 to 9, in which the dispensing member is separate from the base and lid.

11. The closure as claimed in any one of claims 1 to 10, in which the dispensing member causes the tamper-indicating member to break if the base is removed from the neck.

20

12. The closure as claimed in any one of claims 1 to 11, in which the dispensing member is lifted off the container neck if the base is removed.

13. The closure as claimed in claim 12, in which the lifting is retarded so as to cause activation of the tamper-indicating member.

25

14. The closure as claimed in any one of claims 1 to 13, in which the tamper-indicating member comprises a double ring structure with two rings frangibly connected together.

30

15. The closure as claimed in any one of claims 1 to 14, in which when the tamper-indicating member is activated at least part of the member falls into a pocket or void in the base.

16. The closure as claimed in any one of claims 1 to 15, in combination with a container.

17. A flip-top dispensing closure comprising:
a body, the body comprising:
a base connectable to a container neck, and
5 a lid hingedly connected to the base so as to be movable between a closed position and an open position; and
a tamper-indicating member that is a separate element and is provided internally of the body, the tamper-indicating member being located between the base and the lid and comprising means for engaging both the base and the lid,
10 wherein the tamper-indicating member activates either: upon first opening of the lid; or if the base is removed from the neck, to result in an irreversible unitary tamper-evident break event if first opening of the lid is the premier opening event and alternatively if removing the base from the neck is the premier opening event.
- 15 18. A closure as claimed in claim 17, further comprising a dispensing member engaged with the body.
19. The closure as claimed in claim 18, in which the tamper-indicating member fits between the body and the dispensing member.
- 20 20. The closure as claimed in claim 18 or 19, in which the tamper-indicating member fits radially outward of the dispensing member.
21. The closure as claimed in any one of claims 18 to 20, in which if the base is removed
25 from the neck the dispensing member is retained on the neck until after the tamper-indicating member is activated, and thereafter is removed together with the base.
22. The closure as claimed in any one of claims 18 to 21, in which the dispensing member includes a bead for interacting with a corresponding bead on the tamper-indicating member,
30 the beads interacting to cause activation of the member if the lid is opened or if the base is removed.

23. The closure as claimed in any one of claims 18 to 22, in which the dispensing member has a bead for retaining the dispensing member on the container neck.

24. The closure as claimed in any one of claims 18 to 23, in which the base includes a
5 bead for engaging the dispensing member so as to lift the dispensing member off the neck if the base is removed.

25. The closure as claimed in claim 24, in which the base bead is located axially spaced from the dispensing member so that as the base initially moves axially off the neck the
10 dispensing member remains on the neck, whereby to cause the tamper-indicating member to activate.

26. The closure as claimed in any one of claims 18 to 25, in which the dispensing member comprises a spout.

15

27. The closure as claimed in any one of claims 18 to 26, in which the dispensing member is separate from the base and lid.

28. The closure as claimed in any one of claims 18 to 27, in which the dispensing member
20 causes the tamper-indicating member to break if the base is removed from the neck.

29. The closure as claimed in any one of claims 18 to 28, in which the dispensing member is lifted off the container neck if the base is removed.

25 30. The closure as claimed in claim 29, in which the lifting is retarded so as to cause activation of the tamper-indicating member.

31. The closure as claimed in any one of claims 17 to 30, in which the tamper-indicating member comprises a double ring structure with two rings frangibly connected together.

30

32. The closure as claimed in any one of claims 17 to 31, in which when the tamper-indicating member is activated at least part of the member falls into a pocket or void in the base.

33. The closure as claimed in any one of claims 17 to 32, in combination with a container.

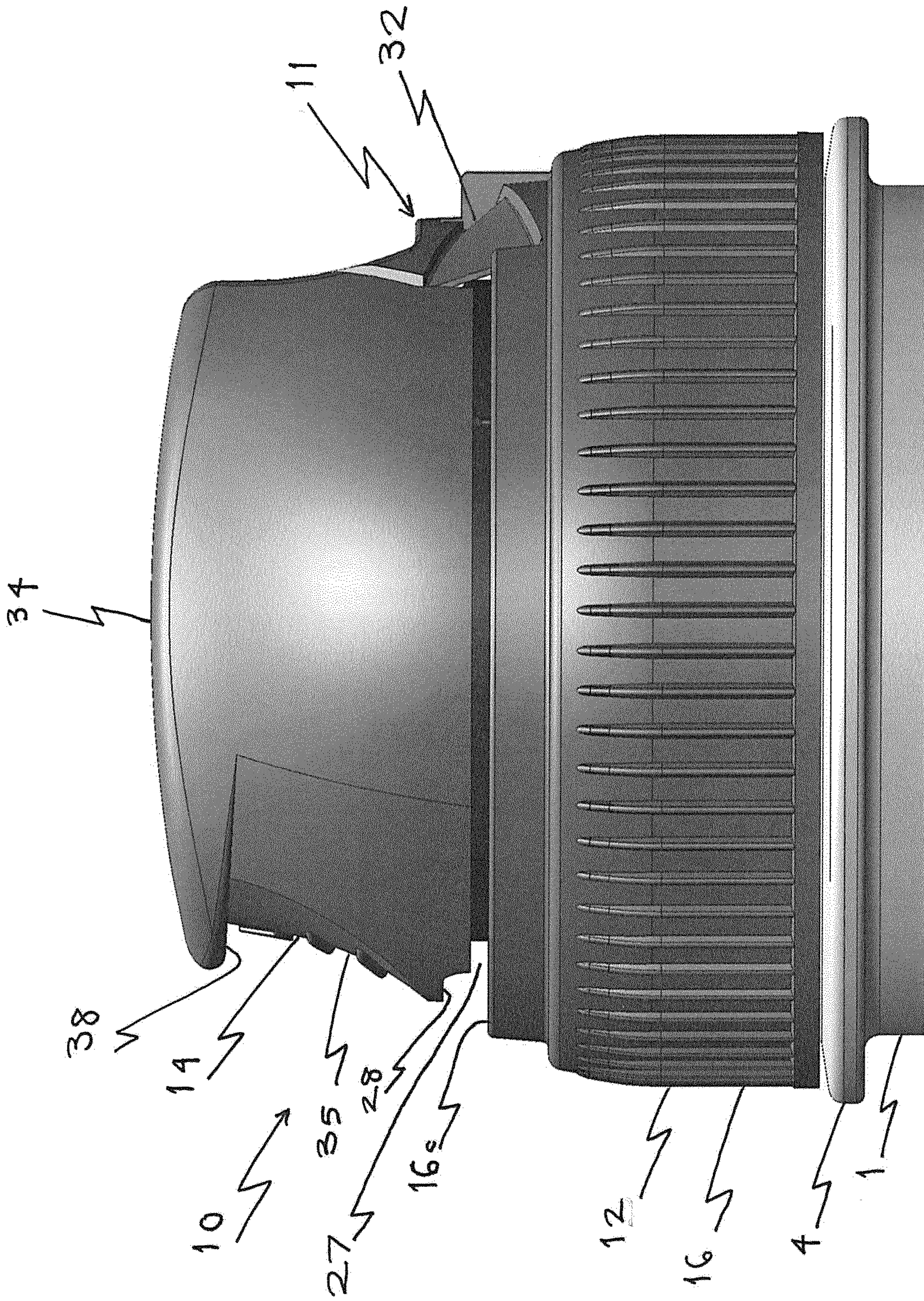


Figure 1

3/17

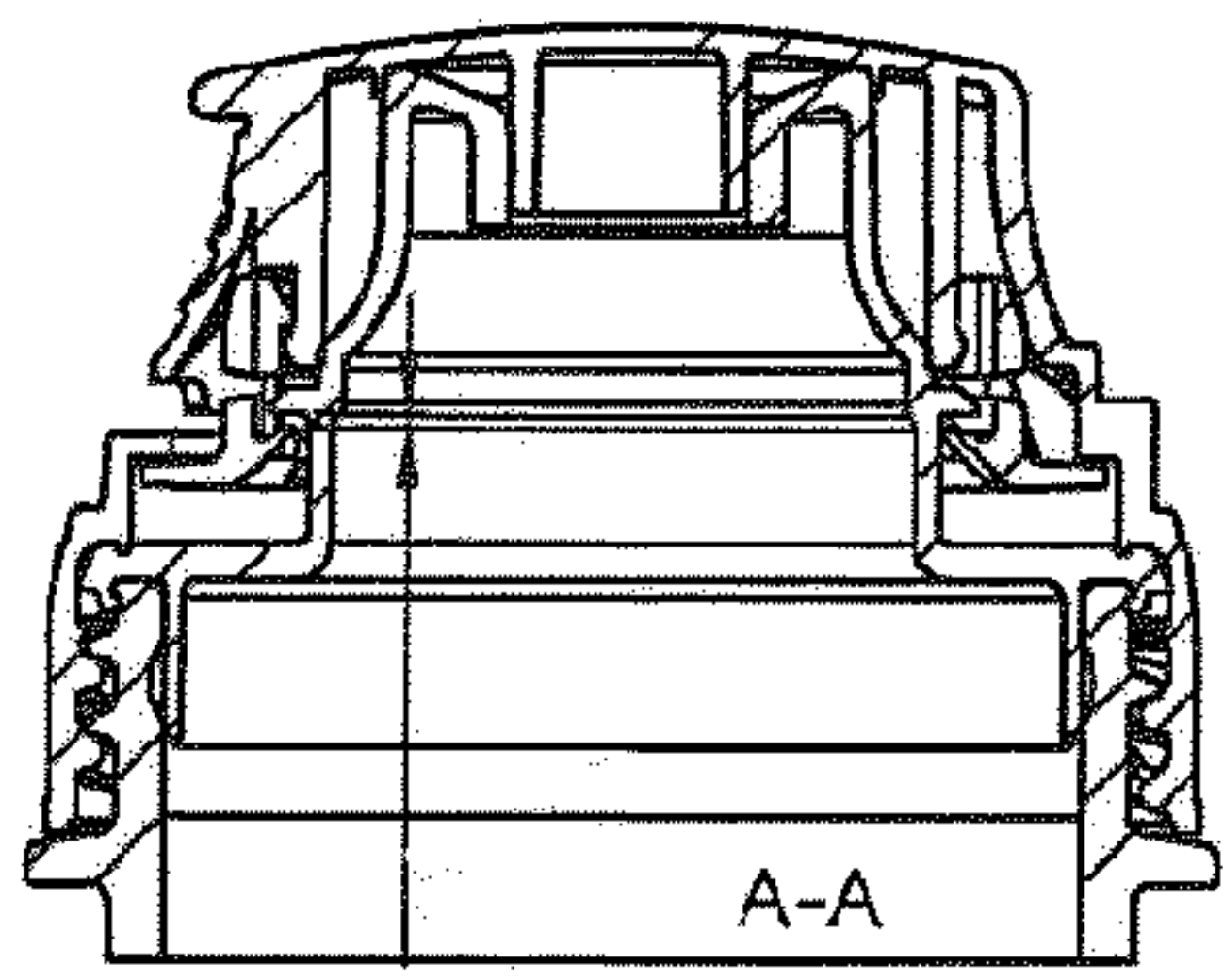


Figure 3

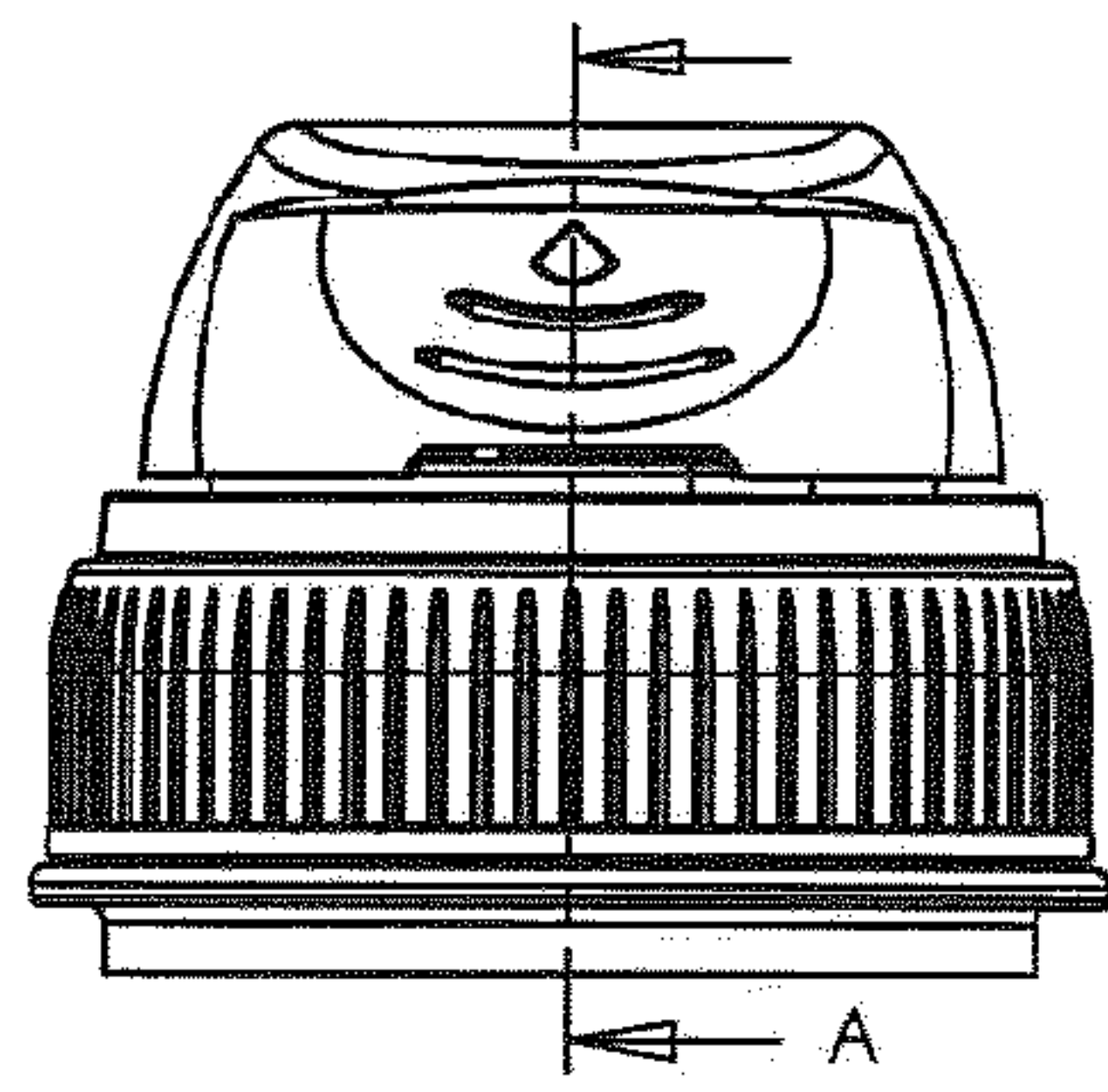
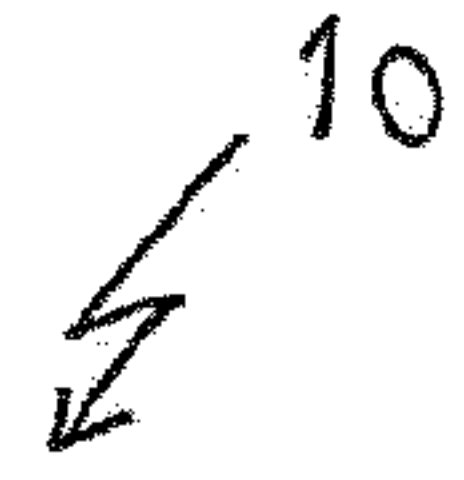


Figure 4

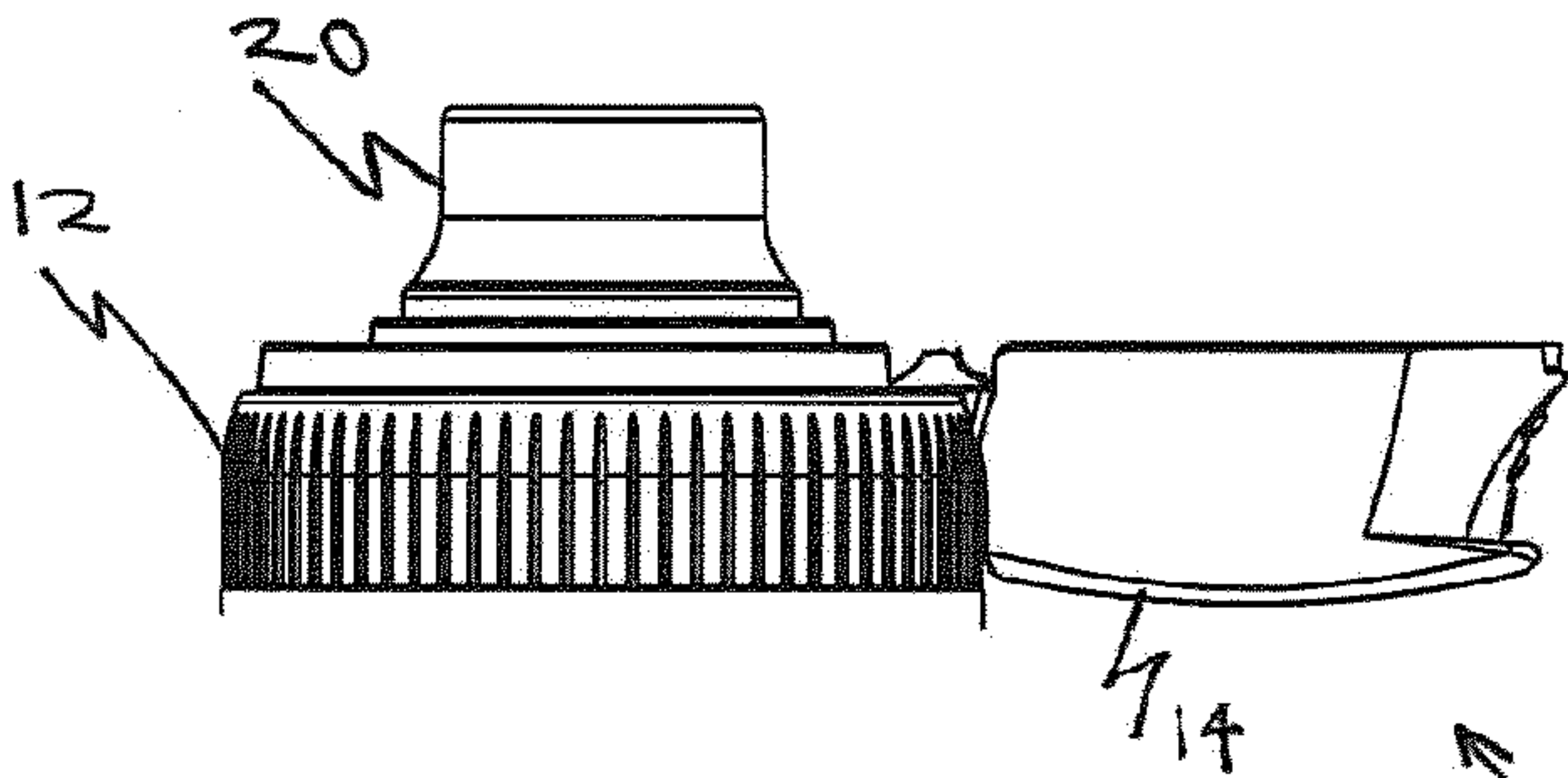


Figure 5

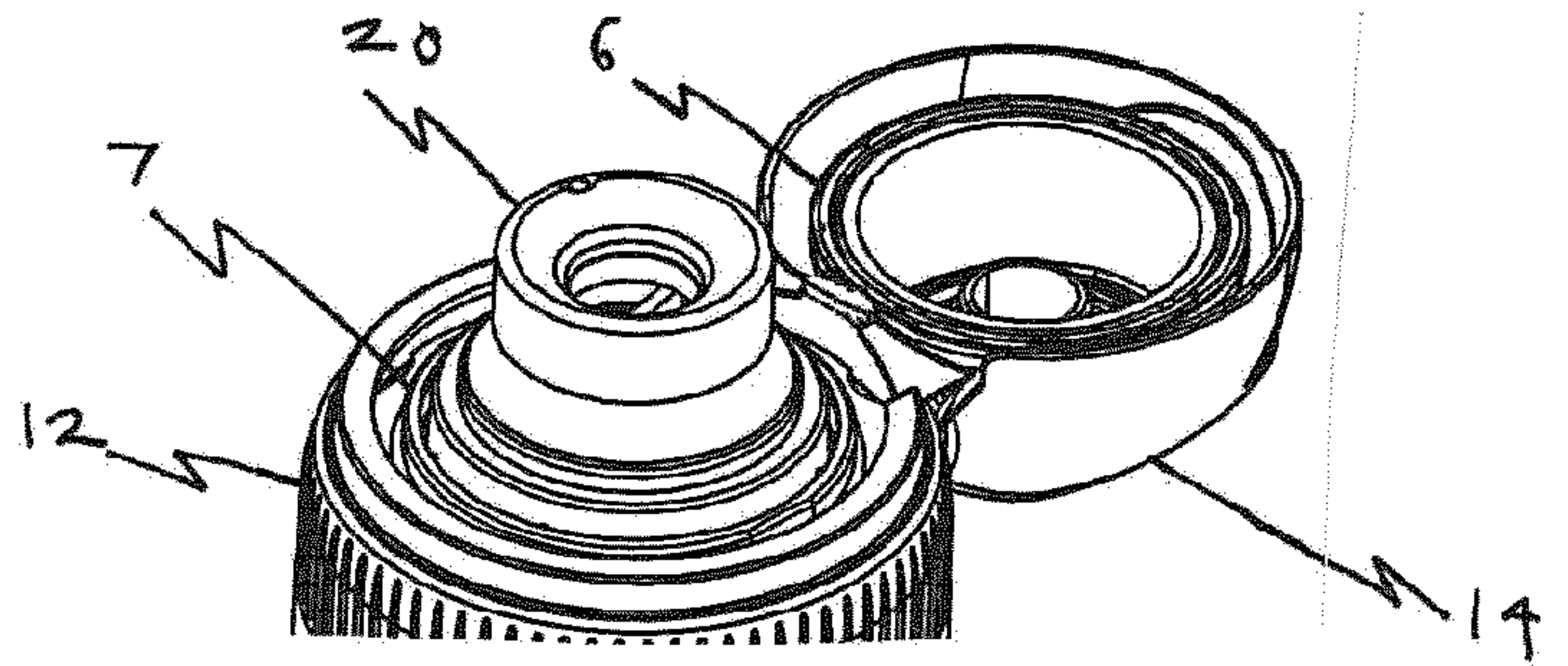


Figure 6

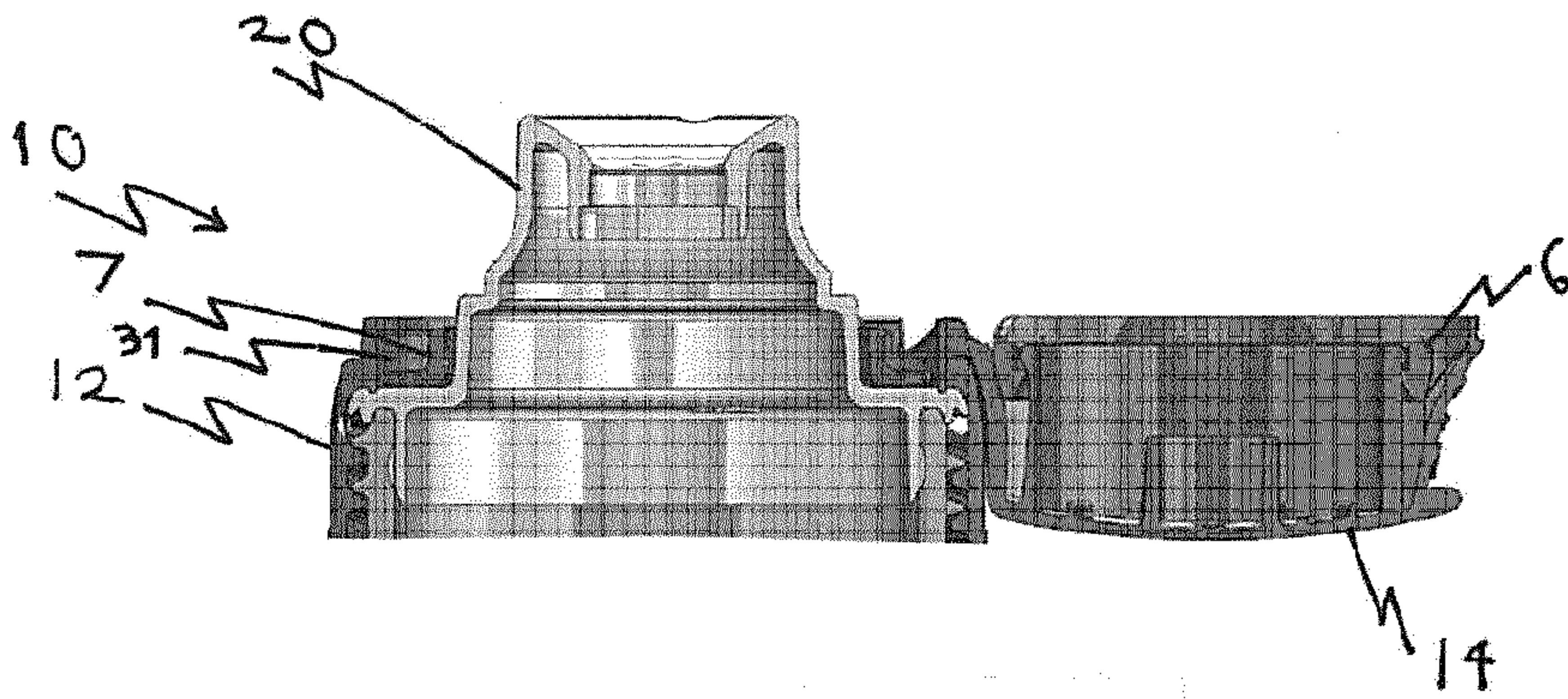


Figure 7

4/17

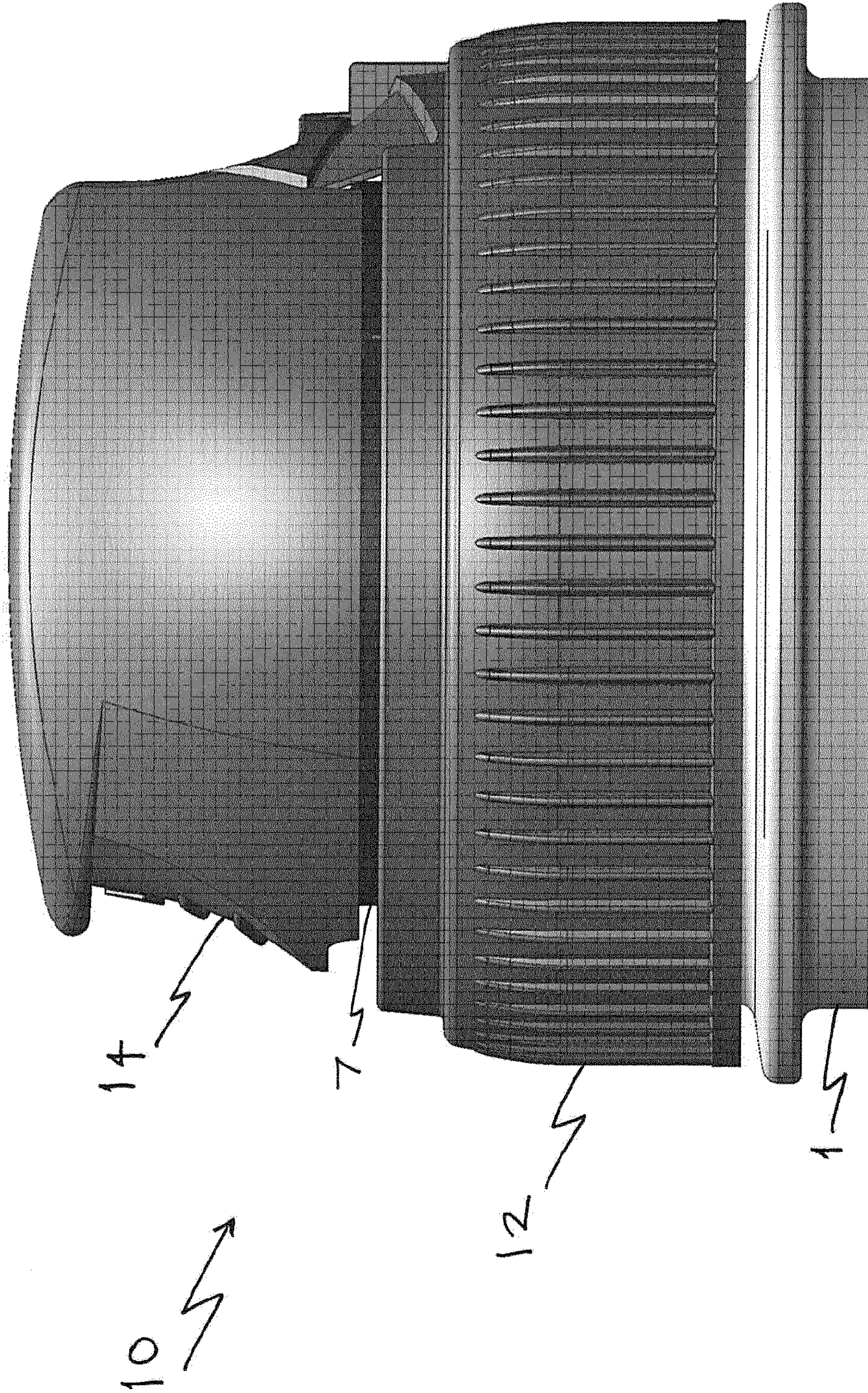


Figure 8

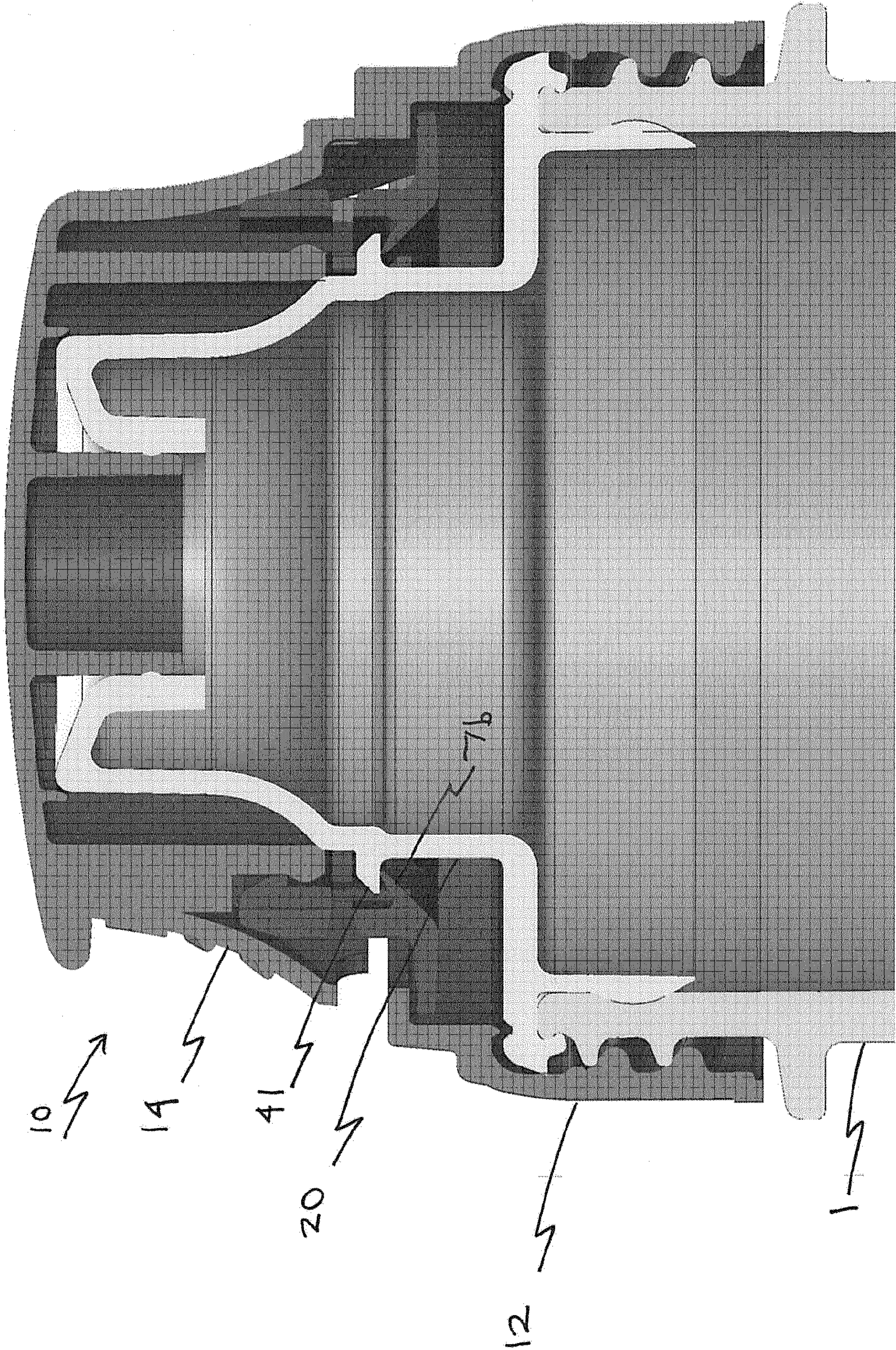


Figure 9

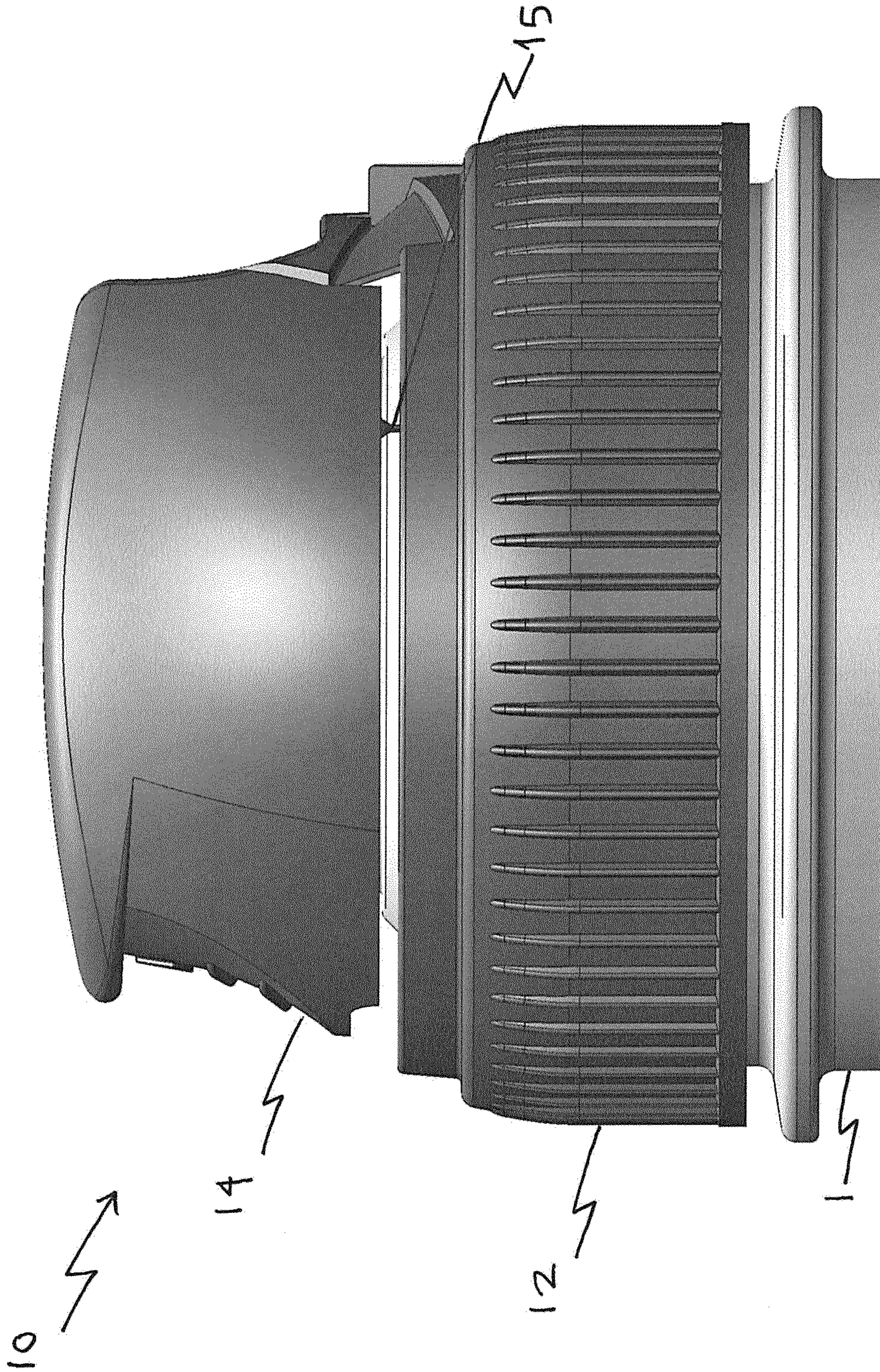


Figure 10

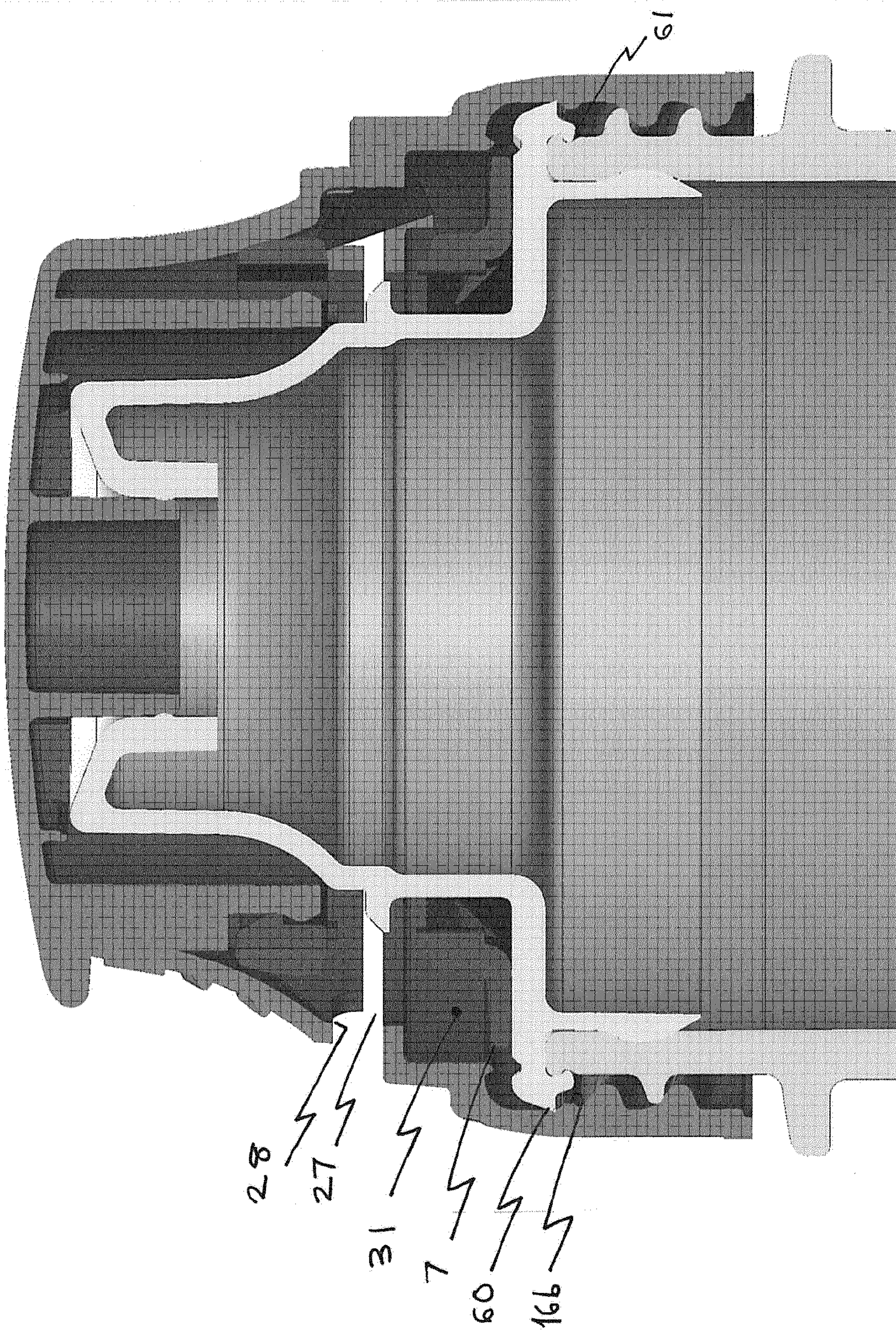


Figure 11

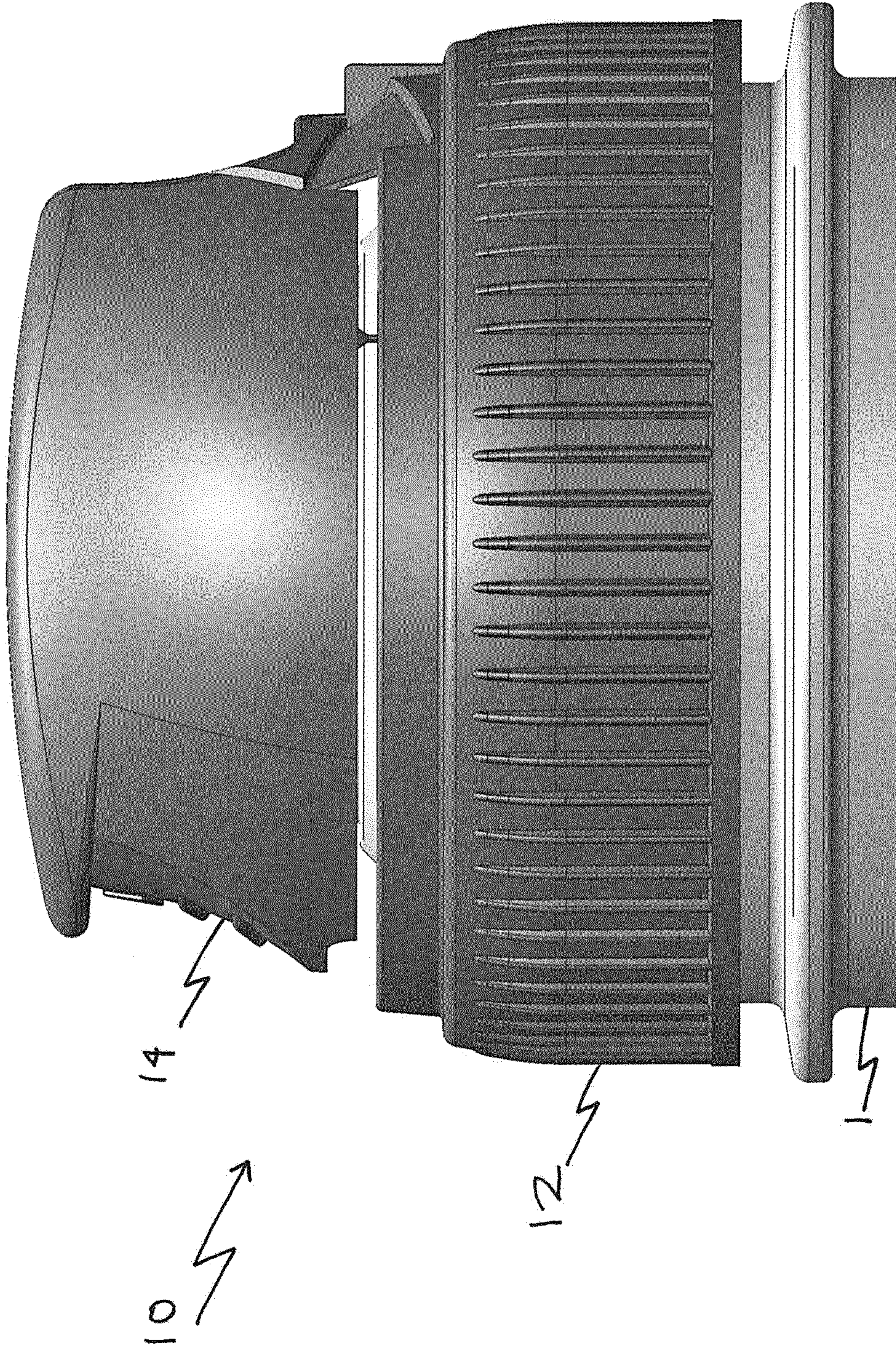


Figure 12

9/17

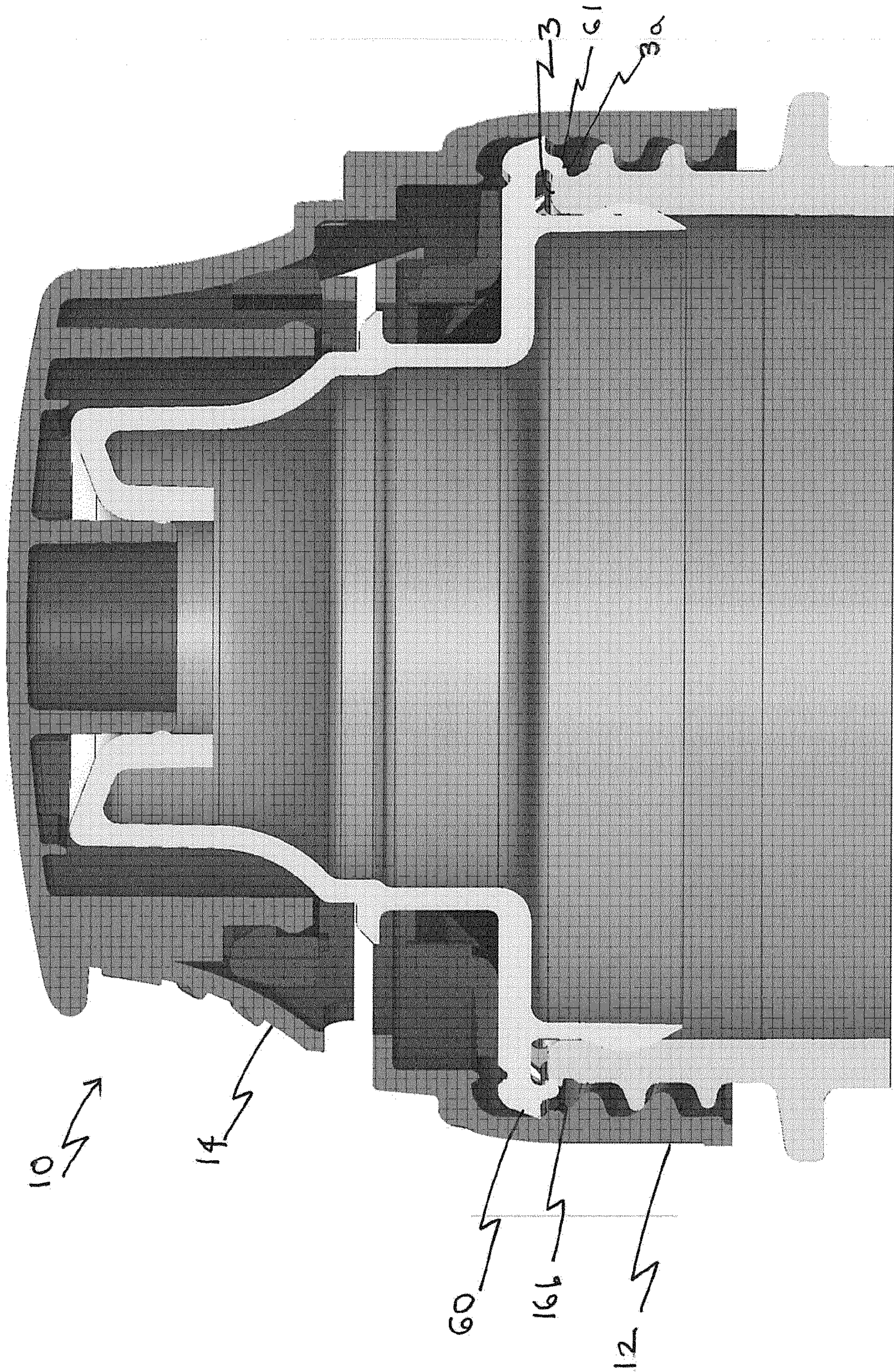


Figure 13

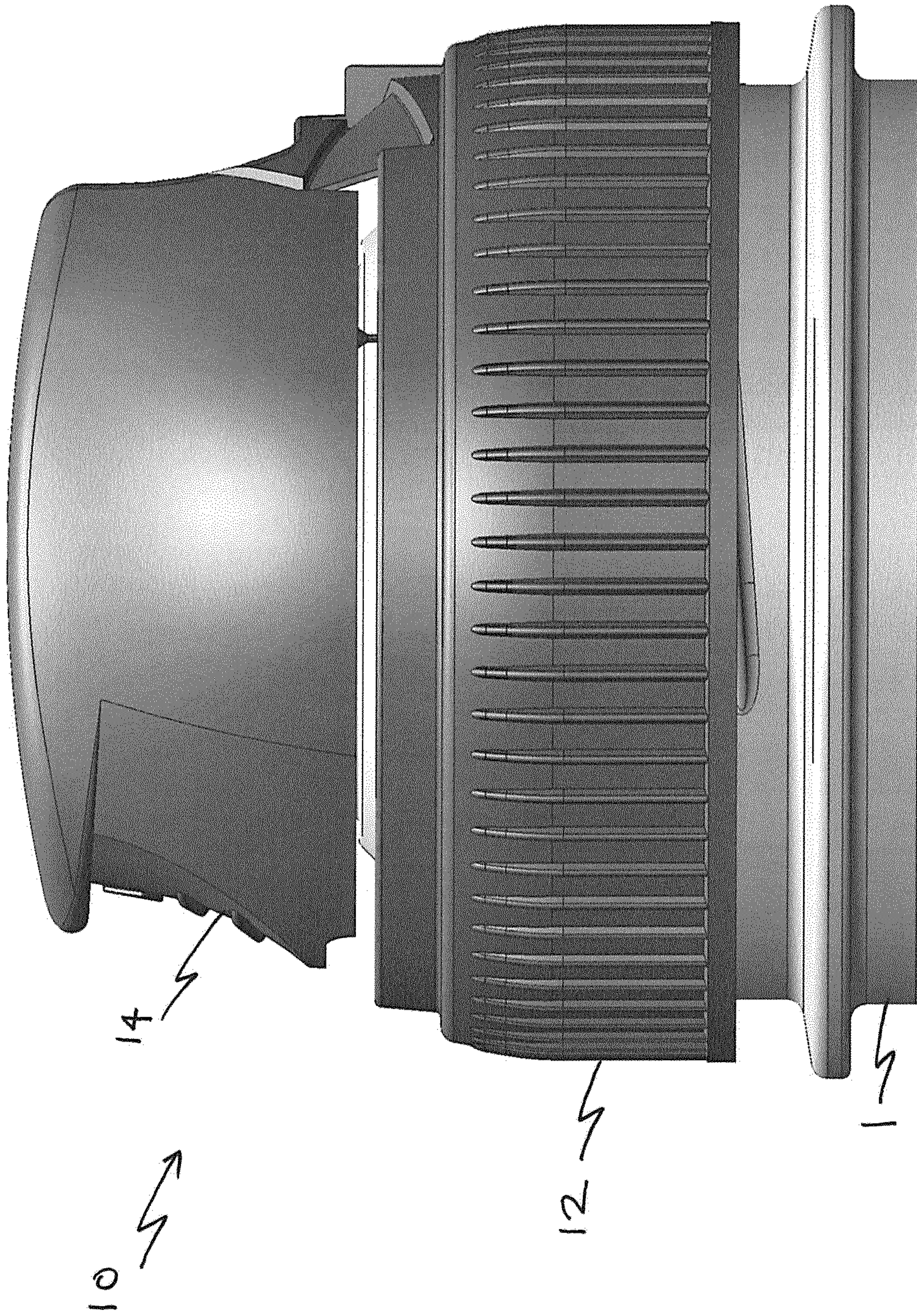


Figure 14

11/17

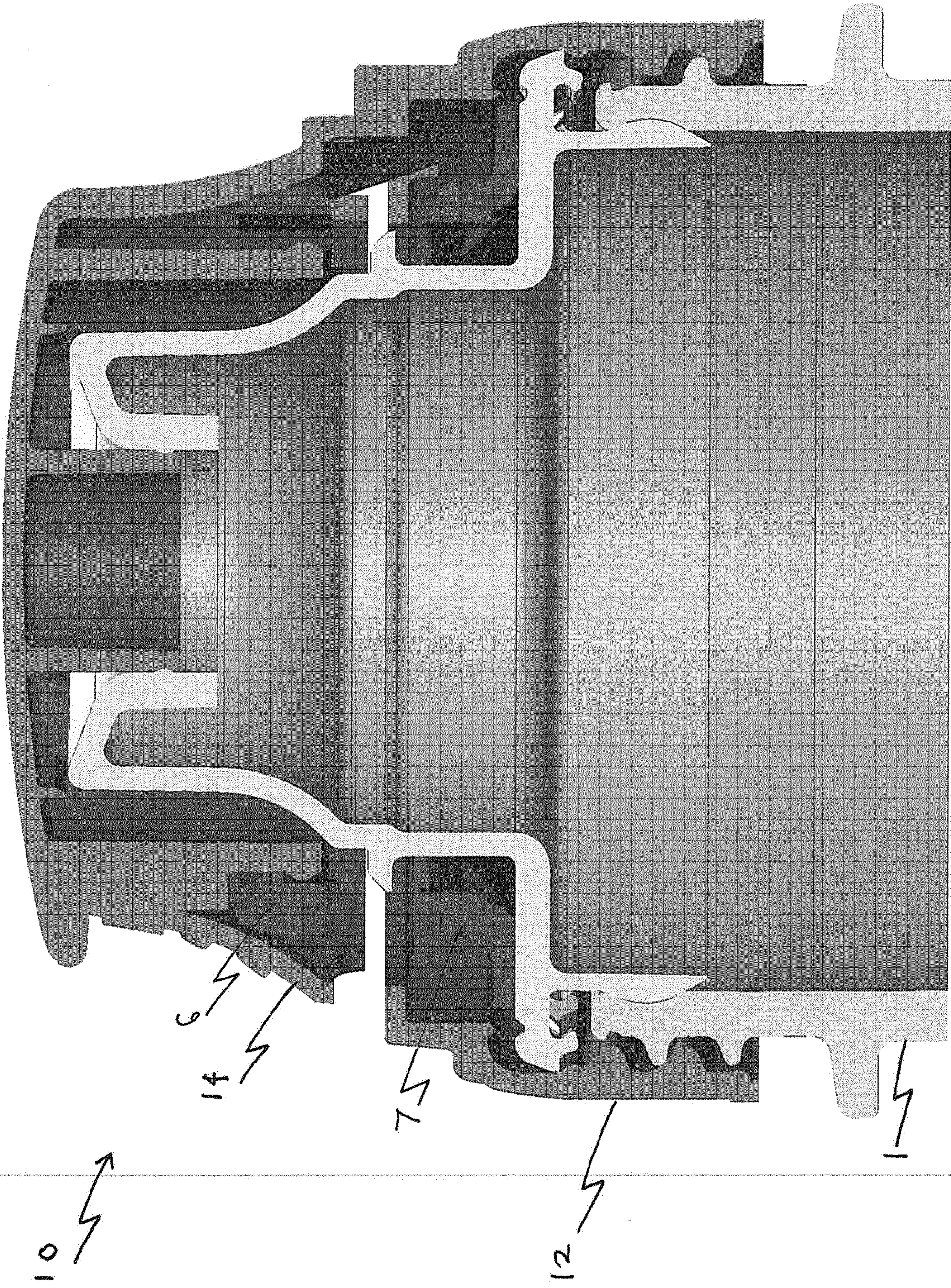


Figure 15

12/17

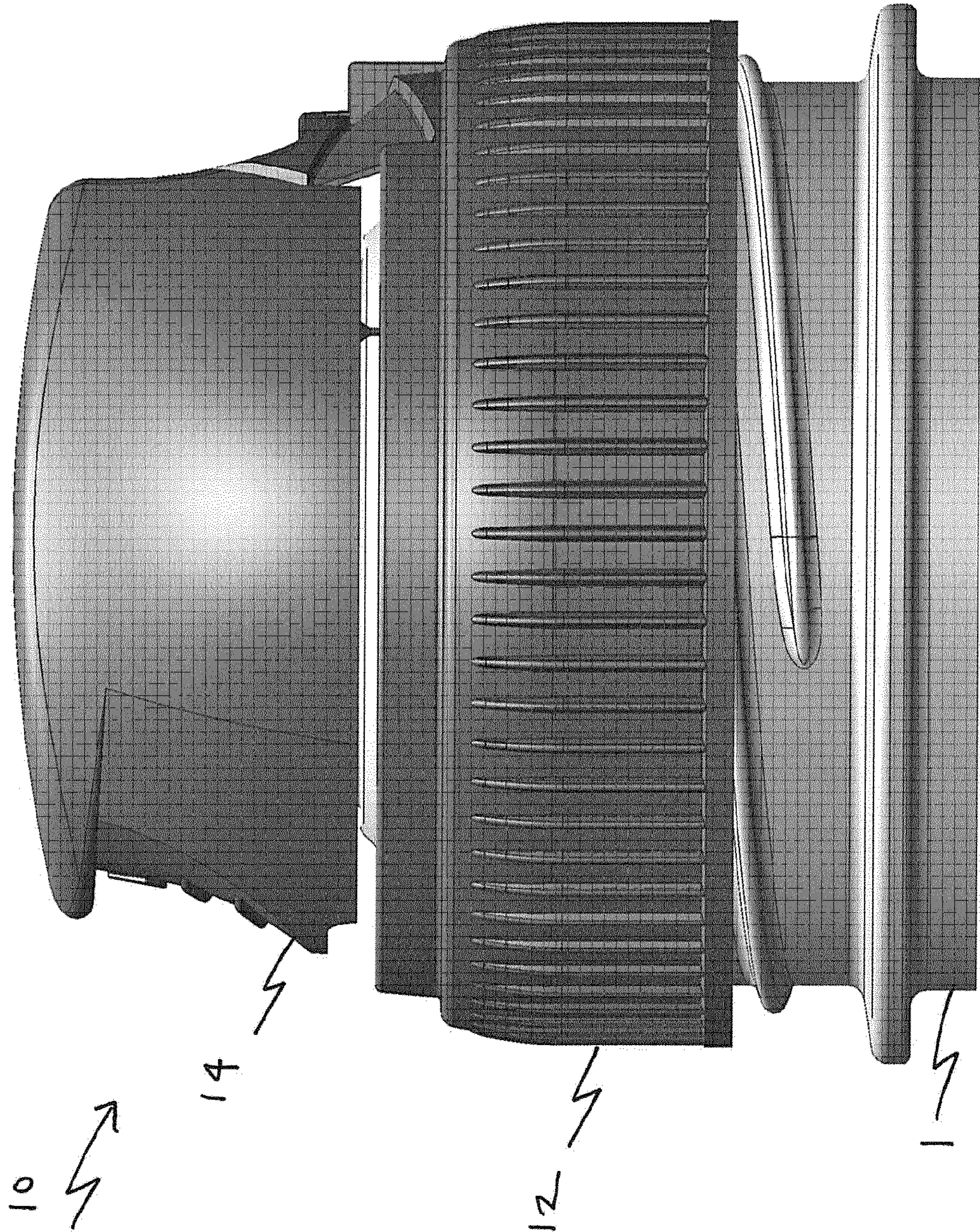


Figure 16

13/17

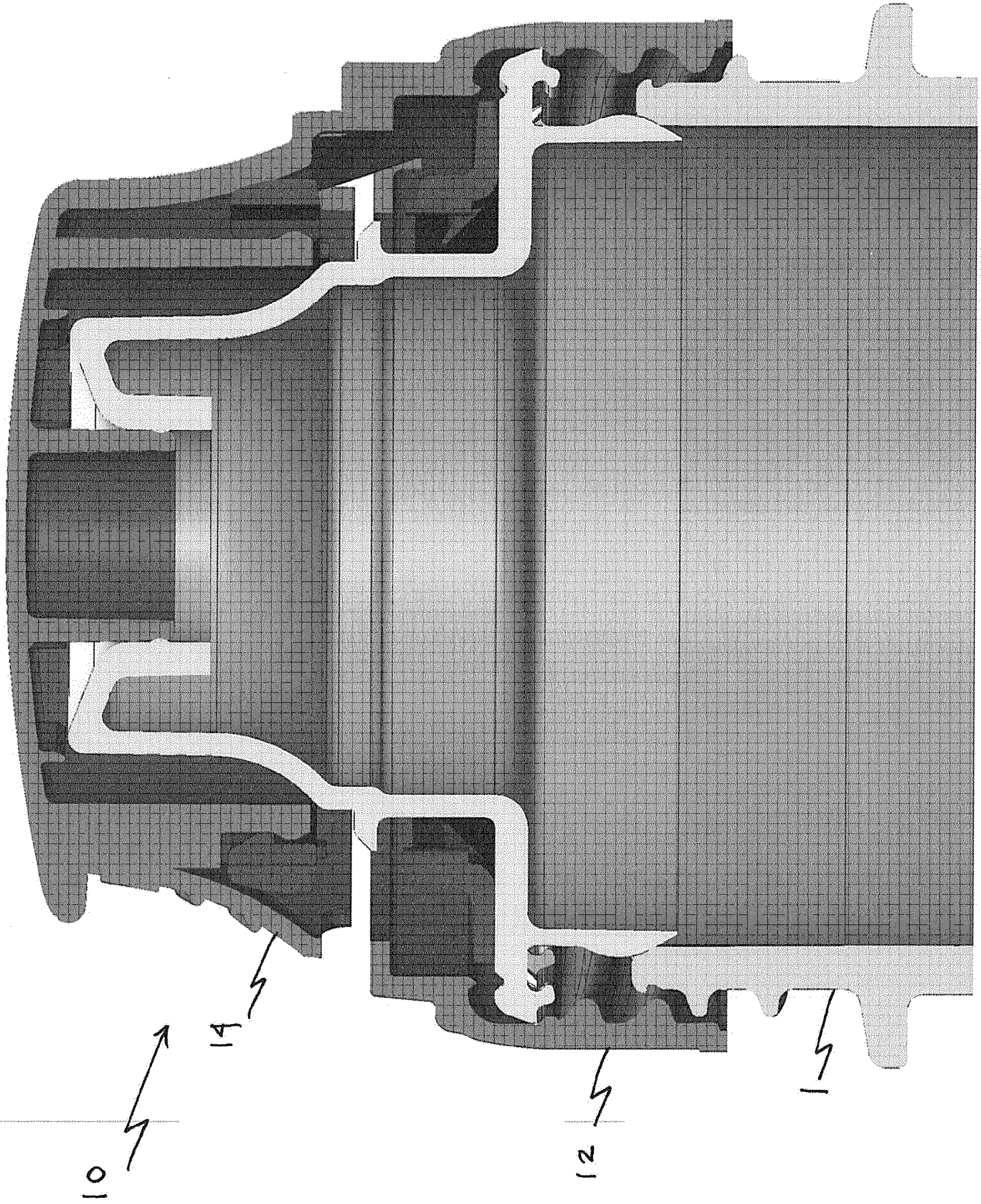


Figure 17

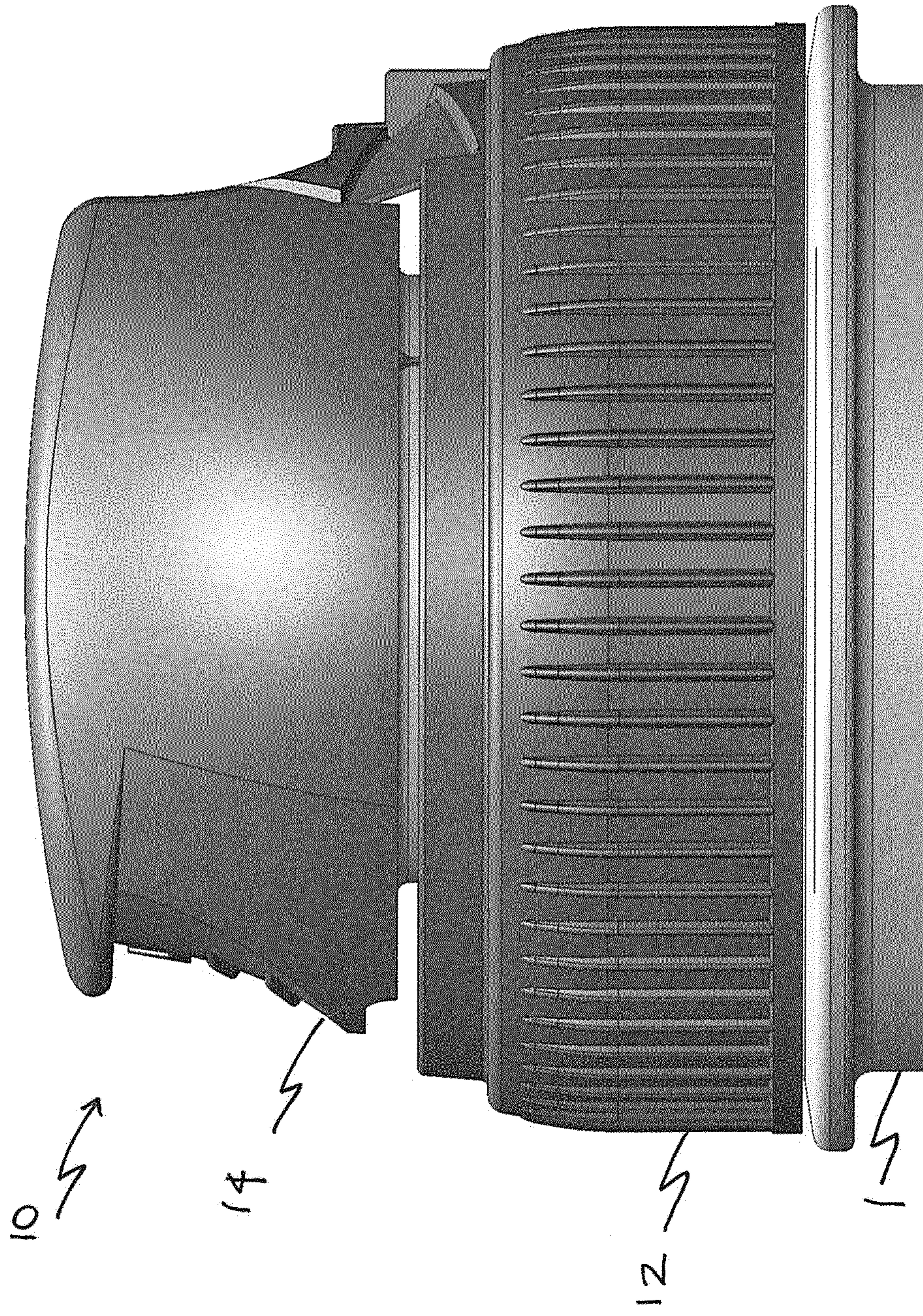


Figure 18

15/17

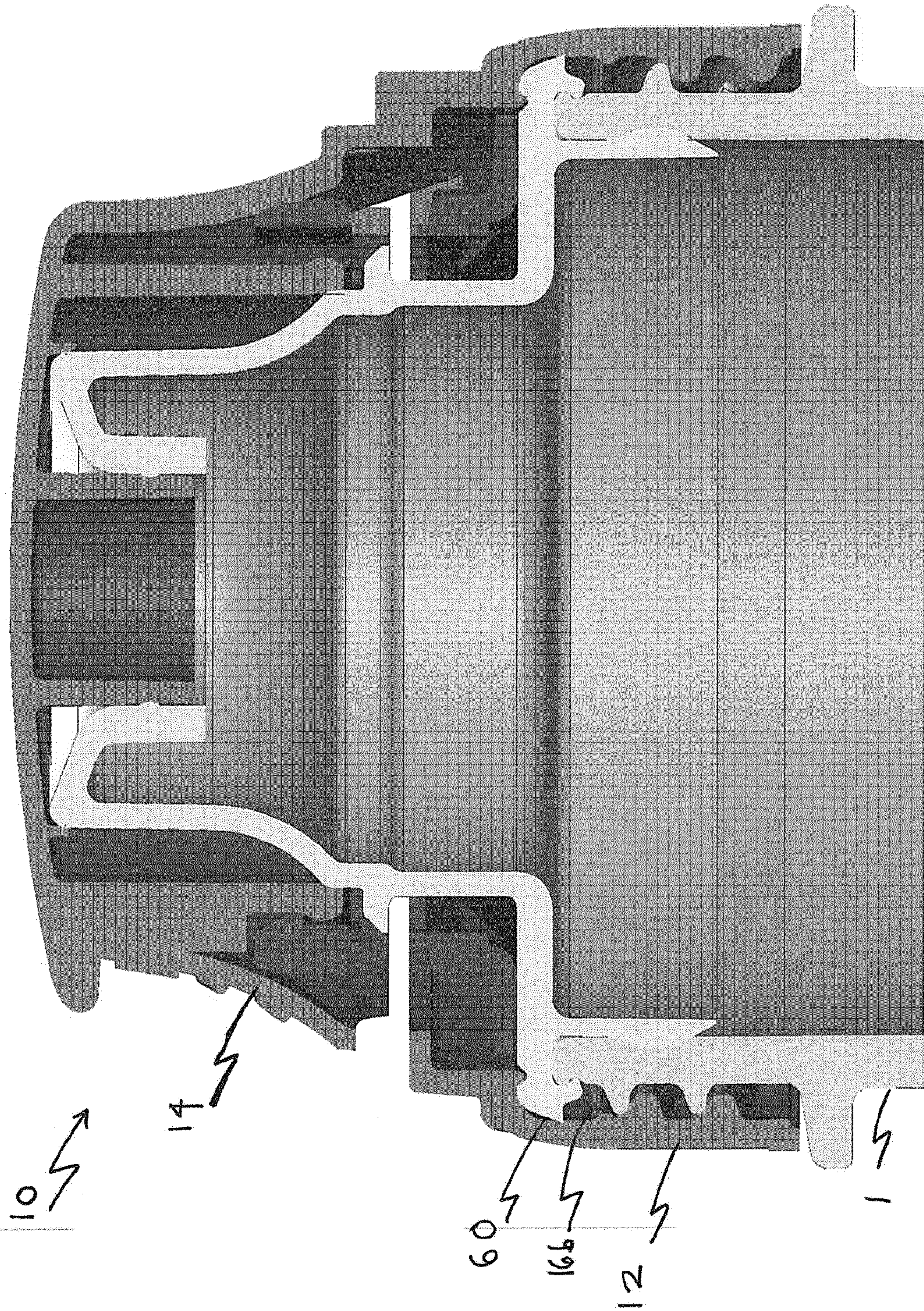


Figure 19

16/17

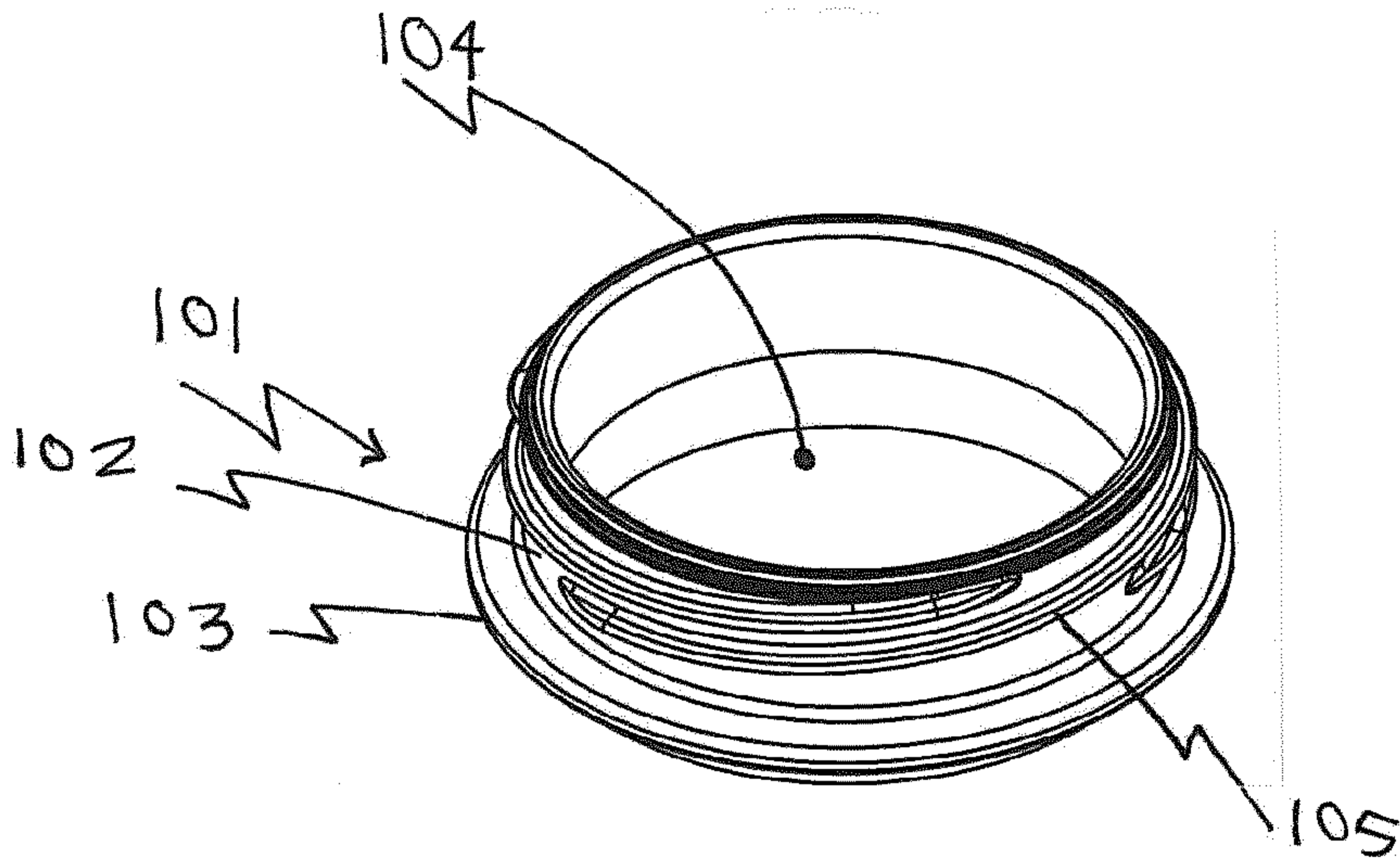


Figure 20

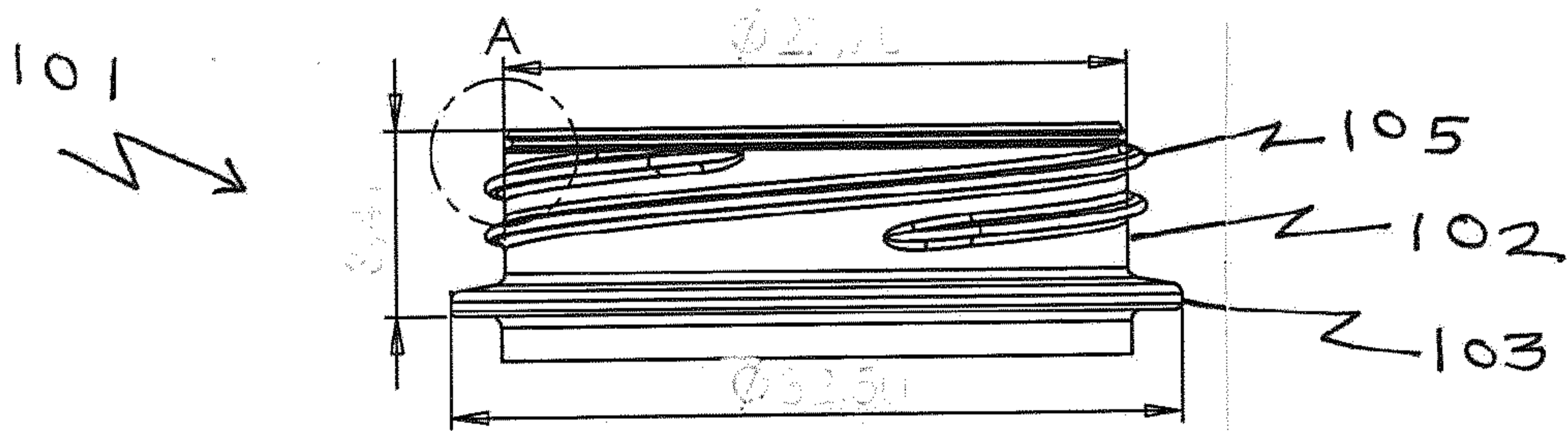


Figure 21

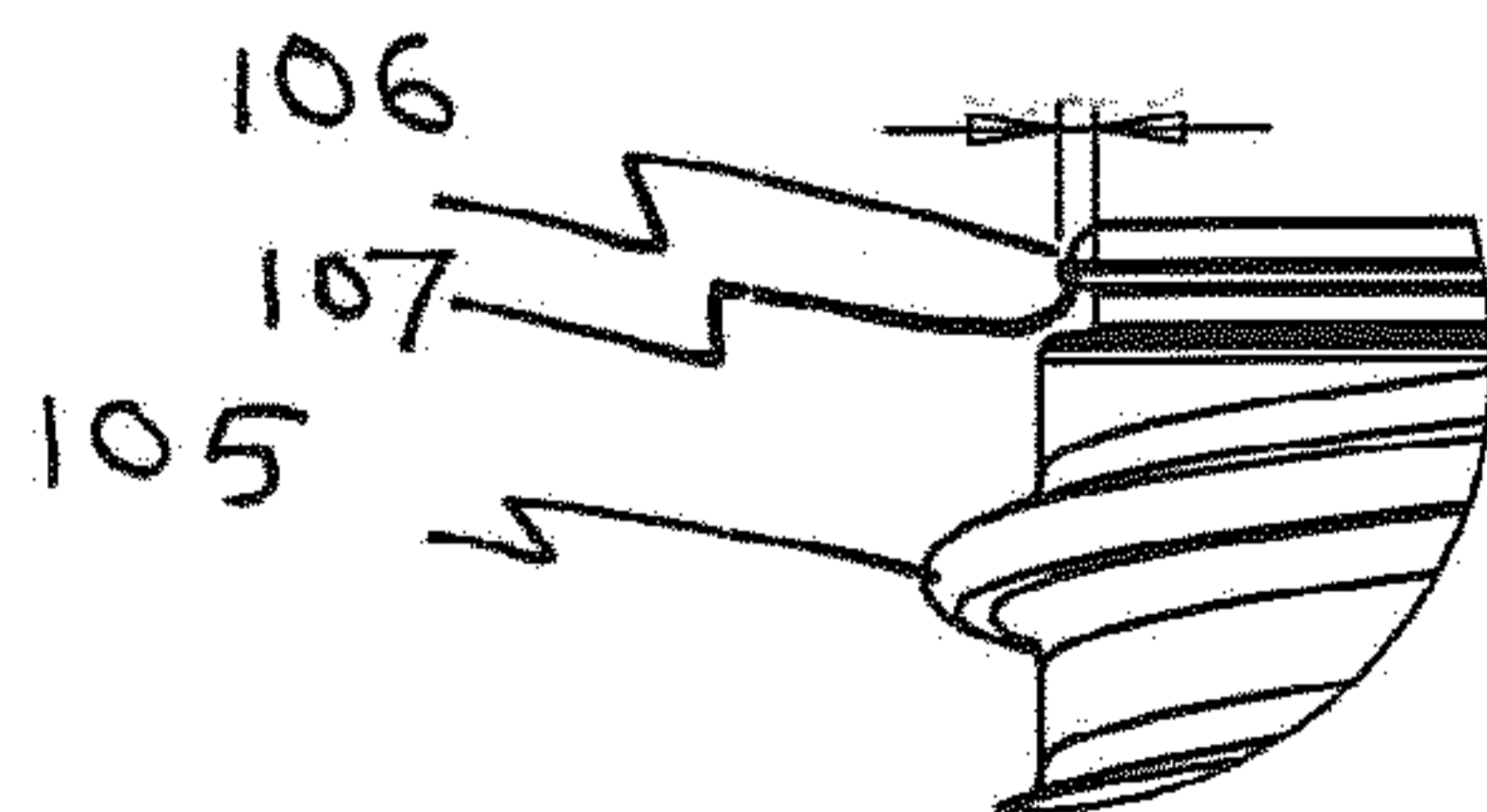


Figure 22

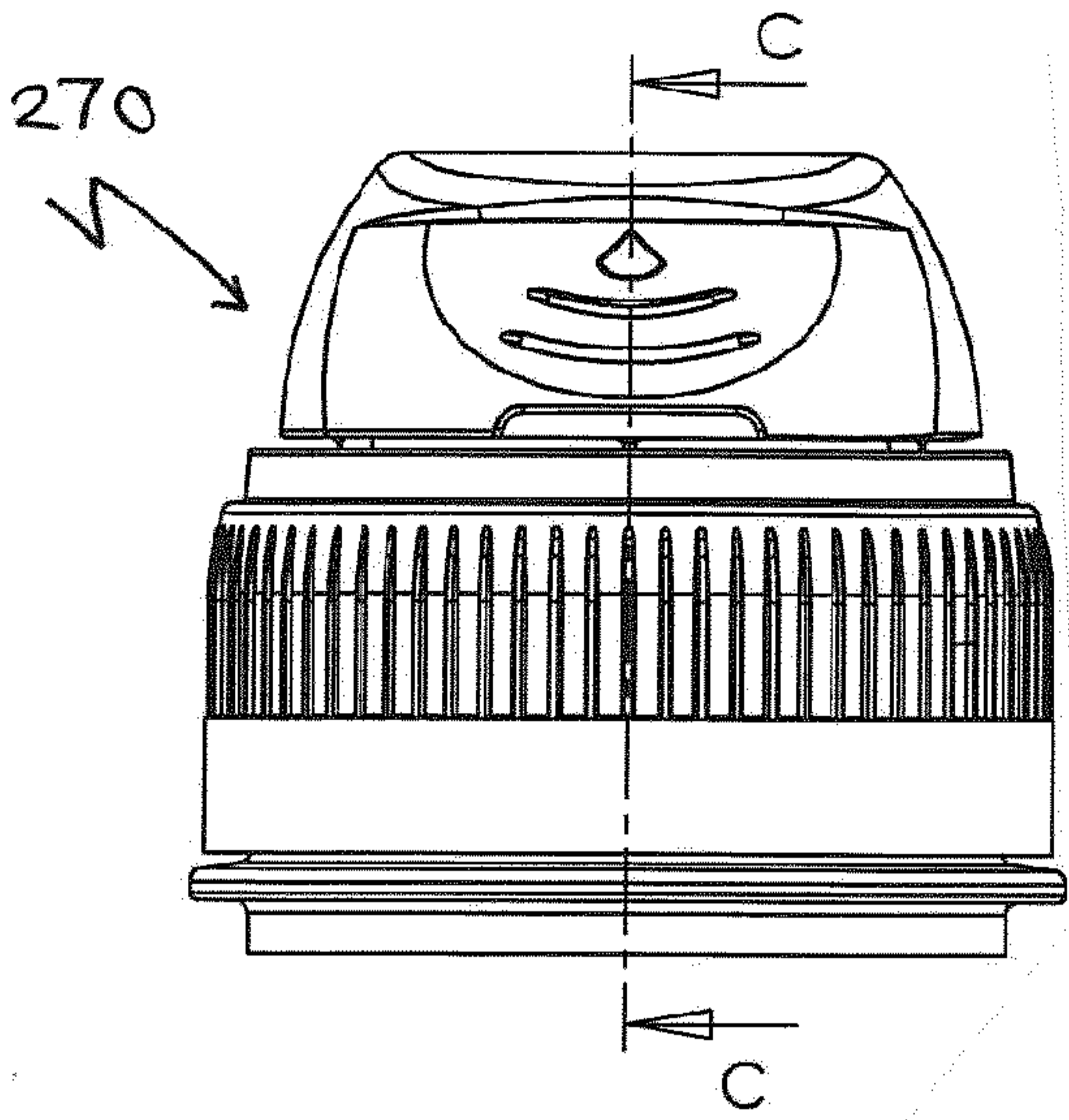


Figure 23

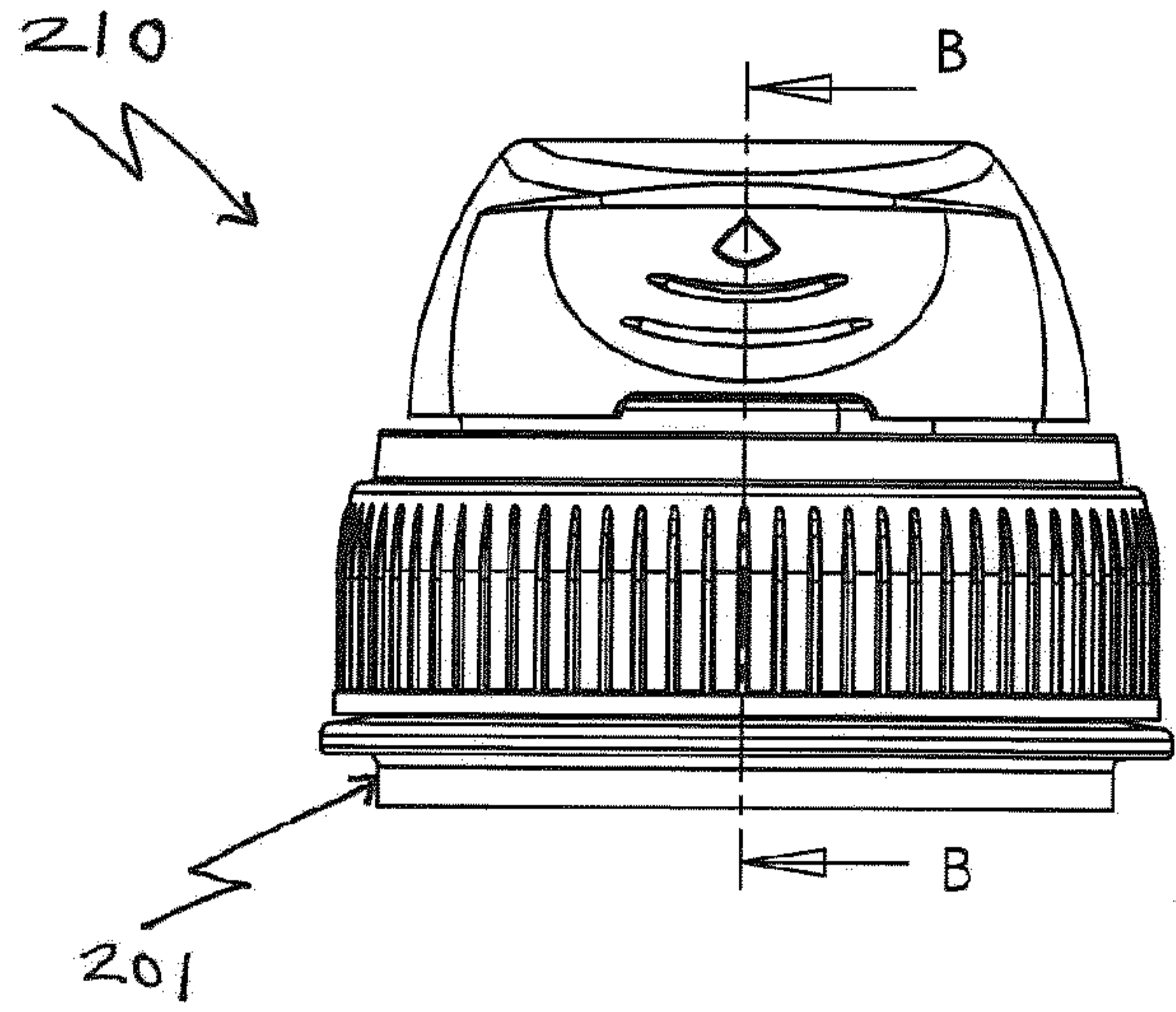


Figure 24

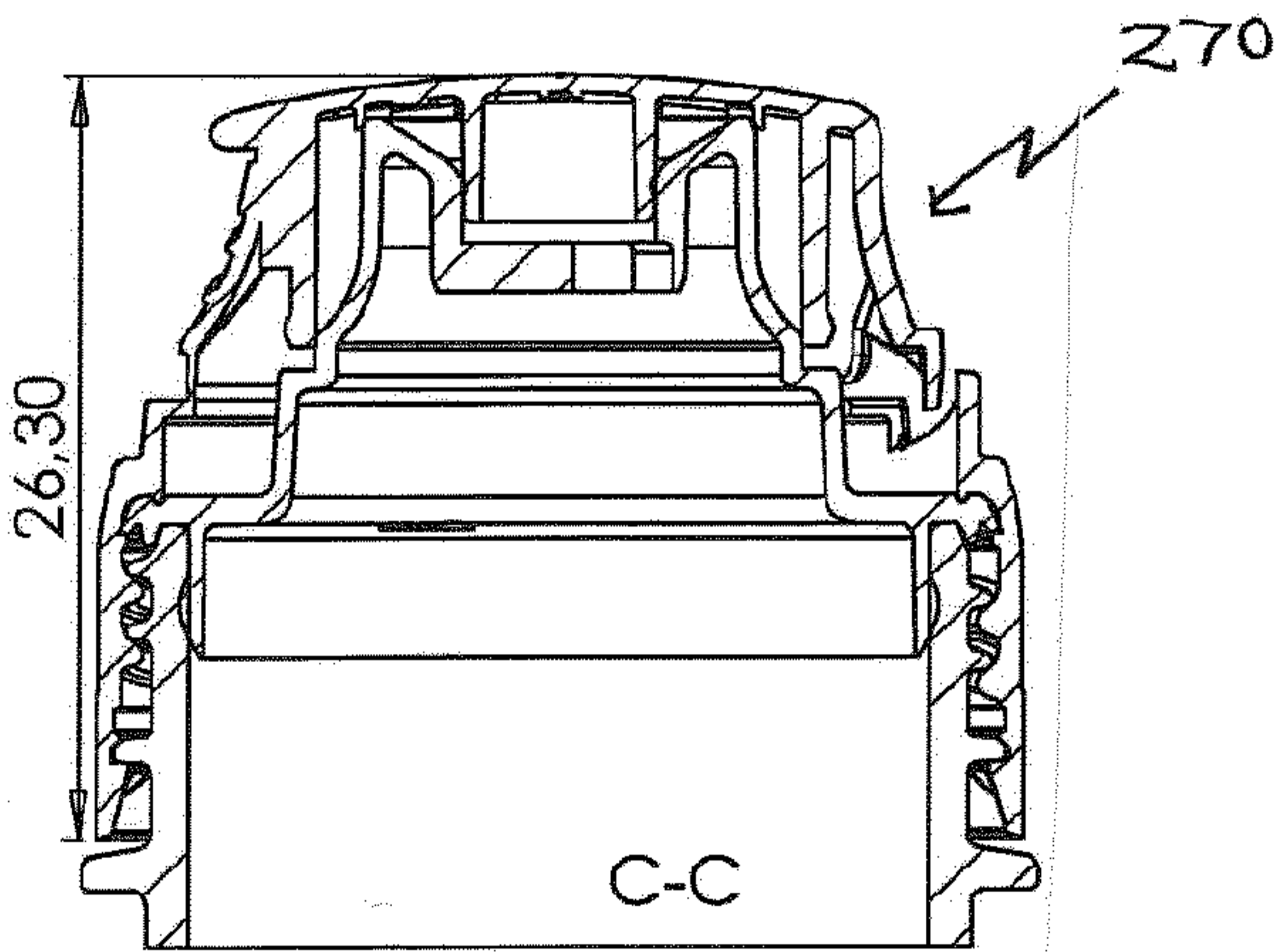


Figure 25

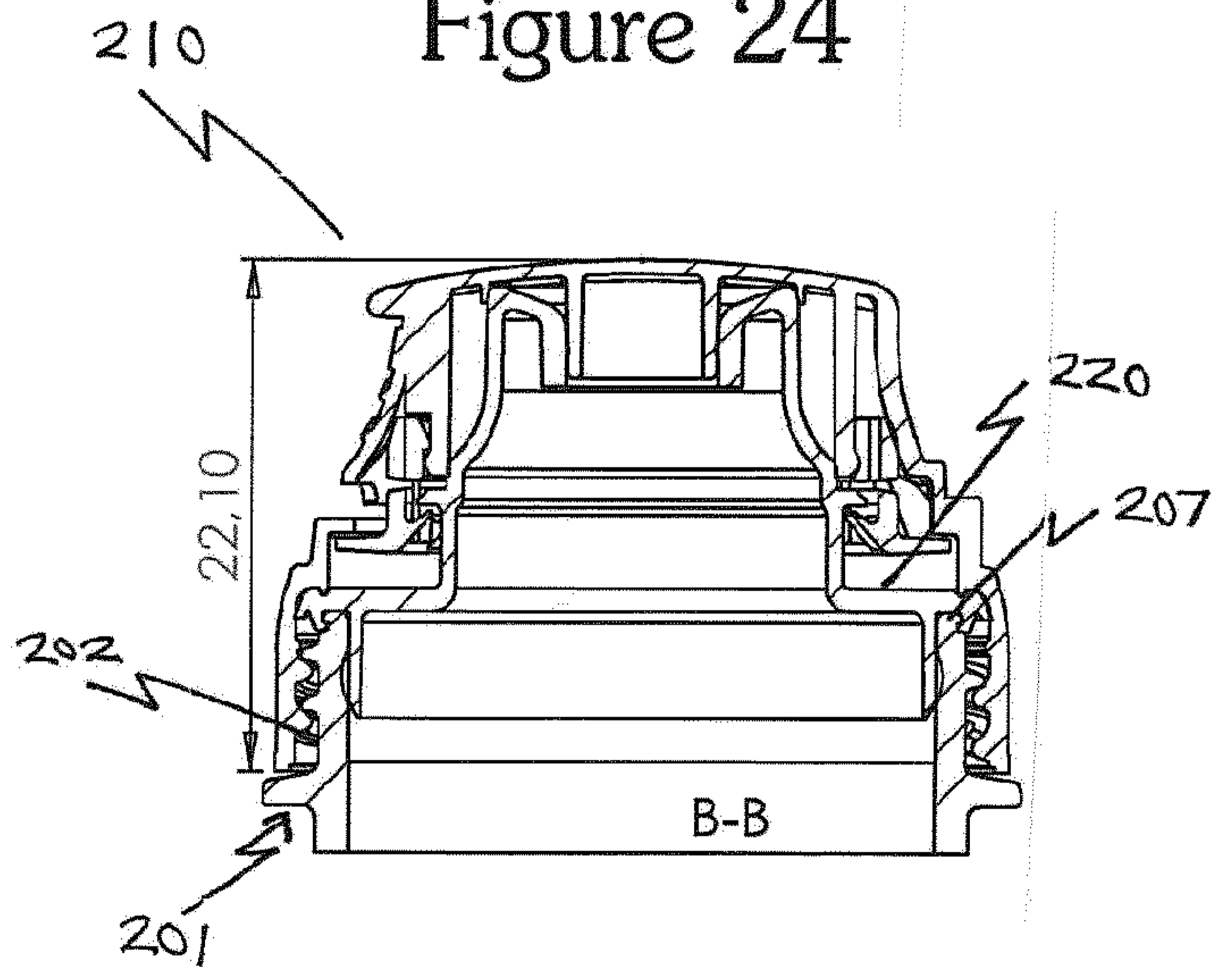


Figure 26

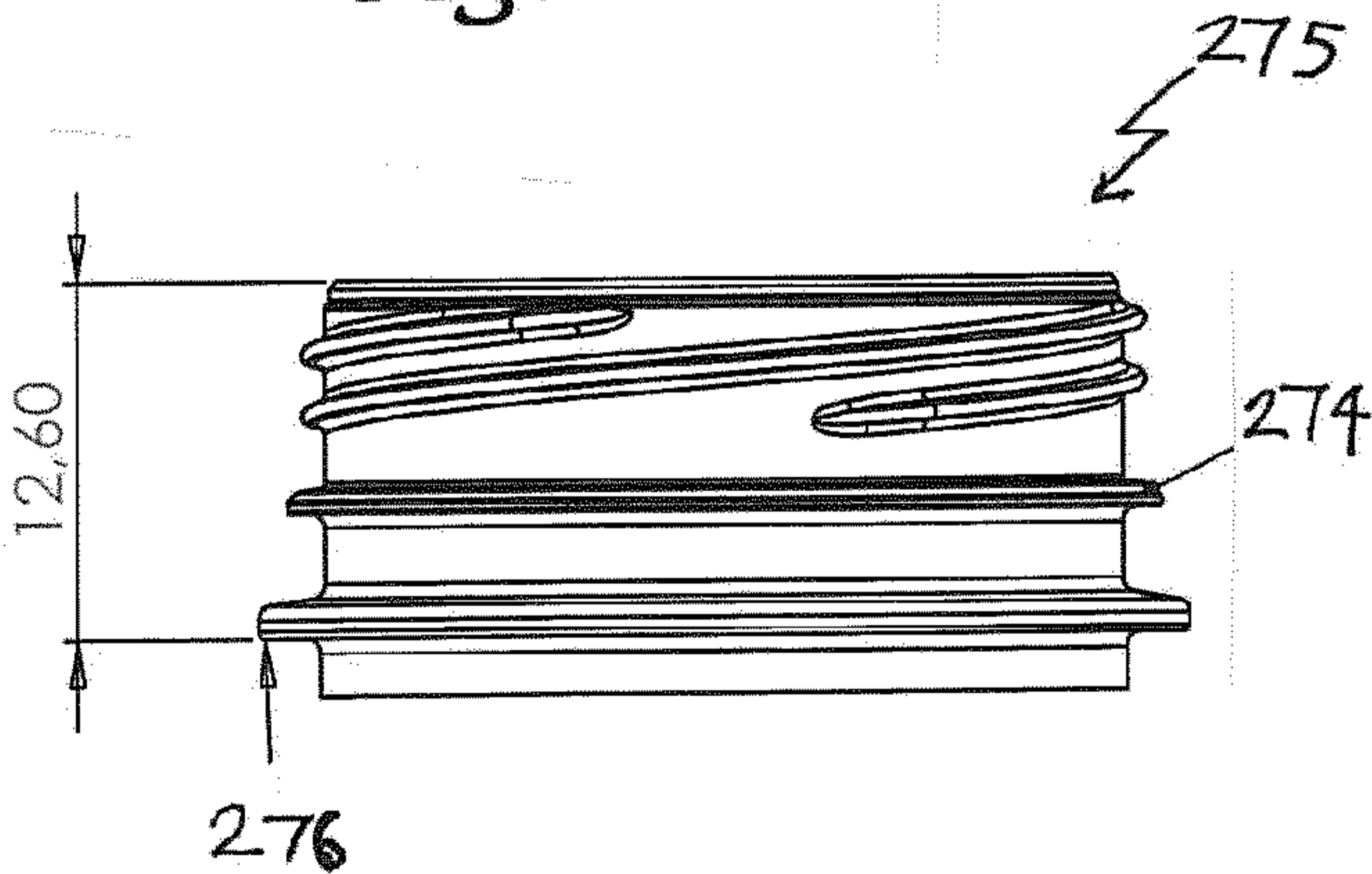


Figure 27

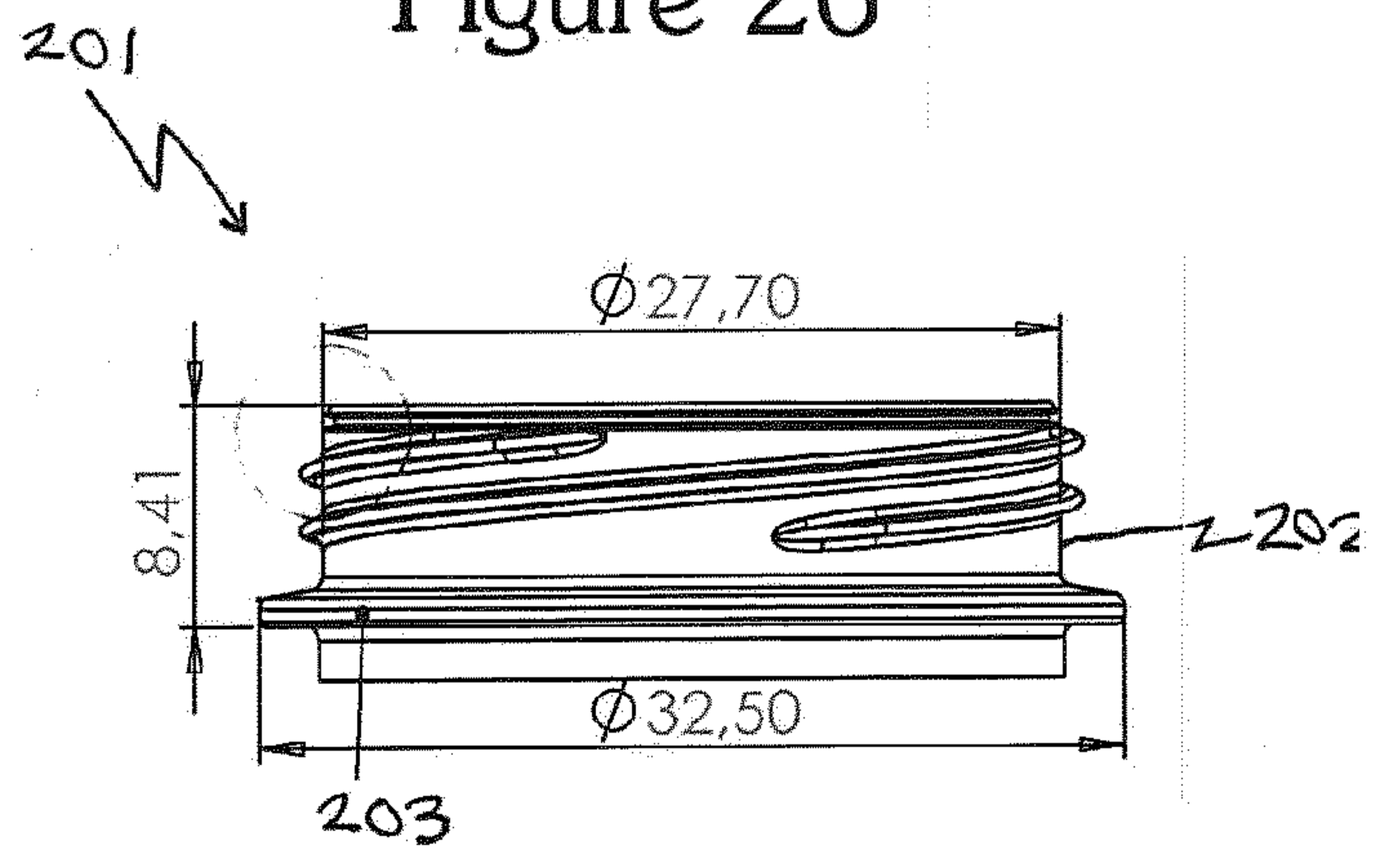


Figure 28

