Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2720147 A1 2011/05/02

(21) 2 720 147

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2010/11/02

(41) Mise à la disp. pub./Open to Public Insp.: 2011/05/02

(30) Priorité/Priority: 2009/11/02 (US61/257,171)

(51) Cl.Int./Int.Cl. *B65D 41/38* (2006.01),
B65D 1/02 (2006.01)

(71) Demandeur/Applicant:
INTERNATIONAL PLASTICS AND EQUIPMENT CORP., US

(72) Inventeur/Inventor:
LONG, CHARLES J., US

(74) Agent: RIDOUT & MAYBEE LLP

(54) Titre : FERMETURE ANTIDEGAGEMENT
(54) Title: ANTI-BACKOFF CLOSURE

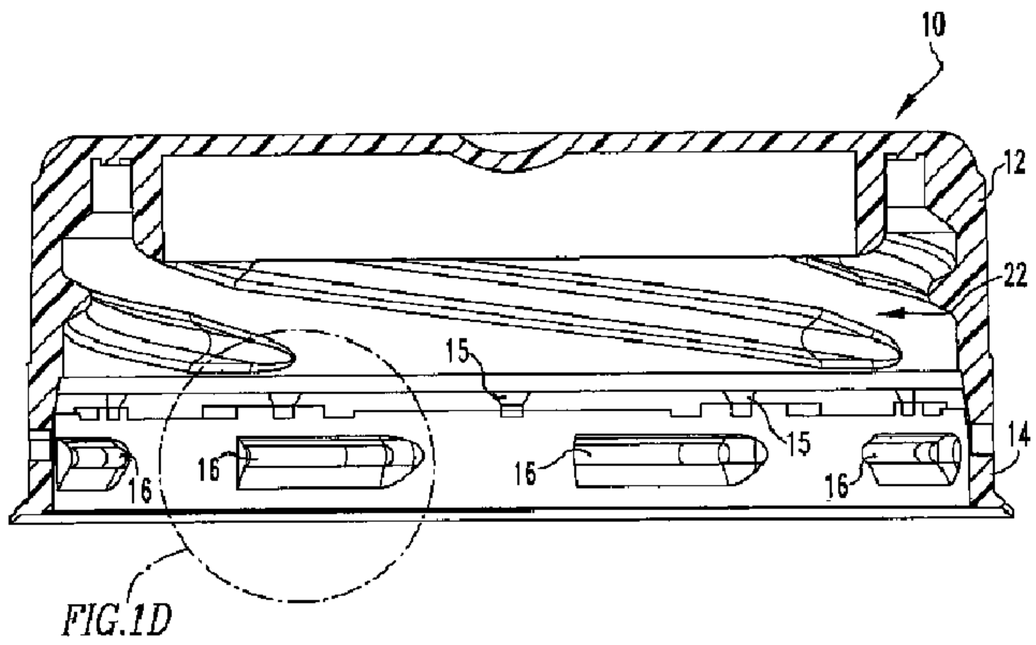
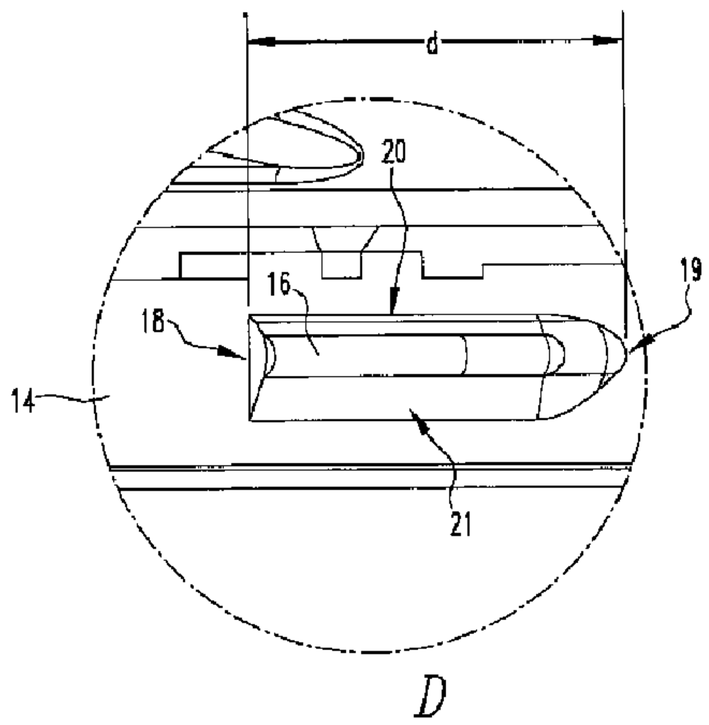


FIG.1D



D

(57) Abrégé/Abstract:
The invention generally relates to a closure assembly for use with a container. The closure includes a generally cylindrical cap portion and an annular skirt extending from, and frangibly coupled to, the cap portion. The annular skirt includes a number of lugs

CA 2720147 A1 2011/05/02

(21) 2 720 147

(13) A1

(57) Abrégé(suite)/Abstract(continued):
extending inward from an inner portion of the annular skirt. At least one lug of the number of lugs extends circumferentially along the inner portion and includes a top portion, a bottom portion and a generally flat portion that extends therebetween. The generally flat portion is structured to engage a corresponding portion that extends outward from a neck of the container.

ABSTRACT

The invention generally relates to a closure assembly for use with a container. The closure includes a generally cylindrical cap portion and an annular skirt extending from, and frangibly coupled to, the cap portion. The annular skirt includes a number of lugs extending inward from an inner portion of the annular skirt. At least one lug of the number of lugs extends circumferentially along the inner portion and includes a top portion, a bottom portion and a generally flat portion that extends therebetween. The generally flat portion is structured to engage a corresponding portion that extends outward from a neck of the container.

ANTI-BACKOFF CLOSURE

CLAIM TO PRIORITY

This application claims priority to U.S. provisional application number 61/257,171 filed November 2, 2009, entitled "Anti-Backoff Closure/Container", the contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates generally to closures, containers and combinations thereof. More particularly, the invention relates to a closure assembly for use with a container and a combination of a closure assembly and a container that includes an anti-backoff mechanism along with a tamper evident retention band.

Background Information

Drop lock tamper evident mechanical bands used on containers such as water/soda bottles and milk bottles normally spin with the related closure until the band engages the retention ring of the bottle. The vertical movement of the closure during unscrewing of the closure causes the band to engage the retention ring of the bottle and ultimately break and separate from the closure.

High density bottles, such as HDPE bottles used in the dairy sector for packaging milk for retail, generally have a very thin sealing area due to the inherent properties of the bottle and cap (closure) material. As a result of such thin sealing area, any vertical movement of the cap with respect to the bottle may allow leaking of the fluid contained therein from the bottle or conversely allow contaminants to enter the bottle. Such vertical movement of the cap may commonly occur in known cap and retention ring designs without any indication (such as through visual indication of a broken retention band) that such unsealing of the container has occurred.

Accordingly, there exists a need for an improved cap and bottle combination that overcomes the shortcomings of the known designs.

SUMMARY OF THE INVENTION

As one aspect of the invention, a closure assembly for use with a container is provided. The closure assembly comprises: a generally cylindrical cap portion and an annular skirt extending from, and frangibly coupled to, the cap portion. The annular skirt comprises a number of lugs extending inward from an inner portion of the annular skirt. At least one lug of the number of lugs extends circumferentially along the inner portion and includes a top portion, a bottom portion and a generally flat portion extending therebetween. The generally flat portion is structured to engage a corresponding portion extending outward from a neck of the container.

The flat portion of the at least one lug may be oriented generally perpendicular to the top portion of the at least one lug. The at least one lug of the number of lugs may comprise an inclined front portion opposite the generally flat portion. The top portion of the at least one lug of the number of lugs may comprise a generally flat surface structured to engage a corresponding portion extending outward from the neck of the container. The bottom portion of the at least one lug of the number of lugs may comprise a surface generally inclined inward and upward. The annular skirt may be frangibly coupled to the cap portion via a number of frangible connection points. The annular skirt may be frangibly coupled to the cap portion via a membrane. The number of lugs may comprise a plurality of lugs of identical or similar form as the at least one lug.

As another aspect of the invention, a closure in combination with a container is provided. The combination comprises a container having a neck portion disposed about an opening. The neck portion having a number of retention lugs extending outward therefrom, at least one retention lug of the number of retention lugs having a generally flat portion. The combination further comprises a closure assembly comprising: a generally cylindrical cap portion threadedly coupled to the neck portion of the container and an annular skirt extending from, and frangibly coupled to, the cap portion. The annular skirt comprises a number of lugs extending inward from an inner portion of the annular skirt. At least one lug of the number of lugs extends circumferentially along the inner portion and includes a top portion, a bottom portion and a generally flat portion extending therebetween. The generally flat portion of the at least one lug cooperatively engages the flat portion of the at least one retention lug in a manner that inhibits

movement of the at least one lug with respect to the at least one retention lug in a direction corresponding to removing the cap portion from the neck portion.

The neck portion may comprise a retention ring that extends outward therefrom and the top portion of the at least one lug may cooperatively engage the retention ring in a manner that inhibits movement of the at least one lug with respect to the retention ring in a direction corresponding to removing the cap portion from the neck portion. The engagement between the generally flat portion of the at least one lug and the flat portion of the at least one retention lug may result in separation of the annular skirt from the cap portion upon rotation of the cap portion with respect to the container in a direction corresponding to removing the cap portion from the container. The rotation may comprise one degree or less of rotation. The annular skirt may be moveable on the neck portion of the container from a first position in which the annular skirt is coupled to the cap portion to a second position in which the annular skirt is uncoupled and spaced a distance from the cap portion when the cap portion is tightly threadedly coupled to the neck portion.

BRIEF DESCRIPTION OF THE DRAWINGS

A full understanding of the invention can be gained from the following description of the preferred embodiments when read in conjunction with the accompanying drawings in which:

FIG 1A shows an isometric view of a cap and retention ring assembly in accordance with an embodiment of the invention;

FIG 1B shows a top view of the cap and retention ring assembly of FIG 1A;

FIG 1C shows a sectional view of the cap and retention ring assembly of FIG 1A as viewed along line 1C of FIG 1B;

FIG 1D shows a detailed view of the portion of the interior of the cap and retention ring assembly as indicated in FIG 1C;

FIG 2A shows an isometric view of a bottle neck and opening of a container in accordance with an embodiment of the invention;

FIG 2B shows a detailed view of the portion of the bottle neck as indicated in FIG 2A;

FIG 3A shows an isometric view of the combination of the cap and retention ring assembly of FIG 1A disposed on the bottle neck and opening of FIG 2A in accordance with an embodiment of the invention;

FIG 3B shows a side view of the assembly of FIG 3A;

FIG 3C shows a sectional view of the combination of FIG 3A as viewed along line 3C of FIG 3B; and

FIG 3D shows a detailed view of the portion of the combination as indicated in FIG 3C.

It is to be appreciated that the figures described above are provided to increase understanding of the present invention and are not meant to limit the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Directional phrases used herein, such as, for example, left, right, front, back, top, bottom and derivatives thereof, relate to the orientation of the elements shown in the drawings and are not limiting upon the claims unless expressly recited therein. Identical parts are provided with the same reference number in all drawings.

FIGS. 1A-1D show a closure assembly 10 in accordance with a non-limiting embodiment of the present invention. Closure assembly 10 includes a cap 12 and a retention ring in the form of an annular skirt 14 extending from cap 12 according to a non-limiting embodiment of the present invention. Annular skirt 14 is frangibly coupled to cap 12 via one or more frangible connection points 15, frangible membrane(s), or other suitable mechiansm(s), and includes a number of lugs 16 disposed on an inward facing portion 17. As used herein, the nomenclature "(s)" shall be used to represent one or more. As also used herein, the term "number" shall mean one or an integer greater than one (*i.e.*, a plurality). As shown in the cut view of FIG. 1C and the detailed view of FIG. 1D, at least one, and preferably all, of the number of lugs 16 extend circumferentially a distance d along inward facing portion 17 and include a generally flat portion 18 at one end, a generally inclined portion 19 at an opposite end, and top and bottom portions 20, 21 between which portions 18 and 19 generally extend. In the example embodiment shown in the FIGS., flat portion 18 is oriented generally parallel to the axis (not shown) around which closure 10, and thus cap 12, would be rotated during installation or removal from a container. It is to be appreciated, however, that flat portion 18 may be oriented at other angles with respect to such axis, as long as such

angle is not perpendicular to such axis, without varying from the scope of the present invention. Top portion 20 preferably comprises a generally flat surface oriented generally perpendicular to the axis (not shown) around which closure 10 would be rotated during installation and removal. Accordingly, in the example embodiment shown, flat portion 18 is oriented generally perpendicular to top portion 20. Bottom portion 21 preferably comprises an inclined bottom surface inclined generally inward and upward toward cap 12. The general purpose and function of the lugs 16 as well as their specific structure is discussed in detail below.

As shown in FIG. 1C, cap 12 includes a threaded portion 22 on an interior surface (not numbered) that is adapted to cooperatively engage a corresponding threaded portion of the neck of a container, as will be discussed in further detail below.

FIGS. 2A and 2B show a neck portion 30 and opening 32 of a container 33 (only partially shown) such as that commonly used for storage of a liquid (e.g., without limitation, milk) in accordance with a non-limiting embodiment of the present invention. Neck portion 30 includes a threaded portion 34 having a number of individual threads 35 disposed at or near the opening 32 that cooperatively engage threaded portion 22 of cap 12 when closure assembly 10 is installed on the container having neck portion 30. Neck portion 30 further includes a number of retention lugs 36 disposed generally around neck portion 30 below the threaded portion 34, and a generally outward protruding retention ring 37 disposed therebetween. As shown in FIG 2B, at least one, and preferably all, of retention lugs 36 includes a generally flat portion 38. Additionally, each retention lug preferably includes an inclined portion 40. Although shown as a generally triangular shaped member, it is to be appreciated that one or more of retention lugs 36 could be of different general shape while still including a flat portion 38 (e.g., without limitation, rectangular) without varying from the scope of the present invention.

FIGS 3A-3D show the closure assembly 10 and neck portion 30 previously described installed together via cooperative engagement of threaded portions 22 (FIG. 1C) and 34 (FIG. 2A). closure assembly 10 is preferably installed on neck portion 30 via a rotational installation process in which closure assembly is rotated and thus tightened down on neck portion 30. During such installation, lugs 16 move downward on neck portion 30 toward the container. As lugs 16 encounter retention ring 37, the inclined bottom portion 21 of lugs 16 tend to assist in each of lugs 16 passing over retention ring 37. In contrast, the generally flat top portion 20 of each lug 16 inhibits passing of the

lugs 16 over retention ring 37, such as would attempt to occur if closure assembly were to be unscrewed from, and thus moved axially away from, neck portion 30.

After passing retention ring 37, each of the lugs 16 of annular skirt 14 encounter retention lugs 36 of neck portion 30. As each of lugs 16 encounter retention lugs 36, the inclined portion 19 of each lug 16 tends to assist in each of lugs 16 passing over retention lugs 36 as closure assembly 10 is rotated onto neck portion 30. Similarly, when structured as shown in the FIGS., the inclined portion 40 of each retention lug 36 tends to also assist in the passage of each lug 16 thereover. In contrast, the generally flat portion 18 of each lug 16 inhibits passing of a lug 16 over a respective one of the retention lugs 36, such as would attempt to occur if closure assembly were to be rotated in a direction corresponding to removal from neck portion 30.

As shown in the detailed cut view of FIG 3D, when the closure assembly 10 is threaded and sufficiently tightened down on neck portion 30, the flat 18 of at least one lug 16 on annular skirt 14 engages the flat portion 38 of a corresponding one of the number of retention lugs 36 on neck portion 30, thus restricting rotational movement of closure assembly 10 in a direction that would open the container. Such tight interaction between flat 18 and flat portion 38 provides for the annular skirt 14 to break away from cap 12 upon slight horizontal (rotational) movement (preferably less than a degree of rotation) of cap 12 with respect to neck portion 30, as when cap 12 is unscrewed from neck portion 30 upon opening the container. Such quick break away of the annular skirt 14 resulting from the present invention is in contrast to known designs which generally rely on vertical movement of the cap away from the neck portion 30, and as such generally require at least 90 degrees of cap rotation before separation of the annular skirt.

Accordingly, the present invention provides an indication when cap 12 has been rotated only a small amount relative to neck portion 30 of the container and thus possibly compromised the sealed contents. Such indication is provided by the visible separation between the annular skirt 14 and cap 12. The separation between the annular skirt 14 and cap 12 may be magnified by providing an increased spaced region 42 (FIG. 3B) on neck portion 30 that allows for annular skirt 14 to drop a predetermined distance (not numbered) down from cap 12 upon separation from cap 12, even when cap 12 is disposed at its most tightly threaded position on neck portion 30. Accordingly, such separation would still be obvious to an observer even if cap 12 has been removed (either partially or completely) and retightened down on the container.

While embodiments of the invention have been described herein, it will be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. Accordingly, the particular arrangements disclosed are meant to be illustrative only and not limiting as to the scope of invention which is to be given the full breadth of the claims appended and any and all equivalents thereof.

What is claimed is:

1. A closure assembly for use with a container, the closure assembly comprising:

a generally cylindrical cap portion; and

an annular skirt extending from, and frangibly coupled to, the cap portion, the annular skirt comprising a number of lugs extending inward from an inner portion of the annular skirt, at least one lug of the number of lugs extending circumferentially along the inner portion and including a top portion, a bottom portion and a generally flat portion extending therebetween, the generally flat portion being structured to engage a corresponding portion extending outward from a neck of the container.

2. The closure assembly of claim 1 wherein the flat portion of the at least one lug is oriented generally perpendicular to the top portion of the at least one lug.

3. The closure assembly of claim 1 wherein the at least one lug of the number of lugs comprises an inclined front portion opposite the generally flat portion.

4. The closure assembly of claim 1 wherein the top portion of the at least one lug of the number of lugs comprises a generally flat surface structured to engage a corresponding portion extending outward from the neck of the container.

5. The closure assembly of claim 1 wherein the bottom portion of the at least one lug of the number of lugs comprises a surface generally inclined inward and upward.

6. The closure assembly of claim 1 wherein the annular skirt is frangibly coupled to the cap portion via a number of frangible connection points.

7. The closure assembly of claim 1 wherein the annular skirt is frangibly coupled to the cap portion via a membrane.

8. The closure assembly of claim 1 wherein the number of lugs comprises a plurality of lugs of identical or similar form as the at least one lug.

9. A closure in combination with a container, the combination comprising:

a container having a neck portion disposed about an opening, the neck portion having a number of retention lugs extending outward therefrom, at least one retention lug of the number of retention lugs having a generally flat portion; and

a closure assembly comprising:

a generally cylindrical cap portion threadedly coupled to the neck portion of the container; and

an annular skirt extending from, and frangibly coupled to, the cap portion, the annular skirt comprising a number of lugs extending inward from an inner portion of the annular skirt, at least one lug of the number of lugs extending circumferentially along the inner portion and including a top portion, a bottom portion and a generally flat portion extending therebetween, the generally flat portion of the at least one lug cooperatively engaging the flat portion of the at least one retention lug in a manner that inhibits movement of the at least one lug with respect to the at least one retention lug in a direction corresponding to removing the cap portion from the neck portion.

10. The combination of claim 9 wherein the neck portion comprises a retention ring extending outward therefrom and wherein the top portion of the at least one lug cooperatively engages the retention ring in a manner that inhibits movement of the at least one lug with respect to the retention ring in a direction corresponding to removing the cap portion from the neck portion.

11. The combination of claim 9 wherein the engagement between the generally flat portion of the at least one lug and the flat portion of the at least one retention lug results in separation of the annular skirt from the cap portion upon rotation of the cap portion with respect to the container in a direction corresponding to removing the cap portion from the container.

12. The combination of claim 11 wherein the rotation comprises one degree or less of rotation.

13. The combination of claim 9 wherein the annular skirt is moveable on the neck portion of the container from a first position in which the annular skirt is coupled to the

cap portion to a second position in which the annular skirt is uncoupled and spaced a distance from the cap portion when the cap portion is tightly threadedly coupled to the neck portion.

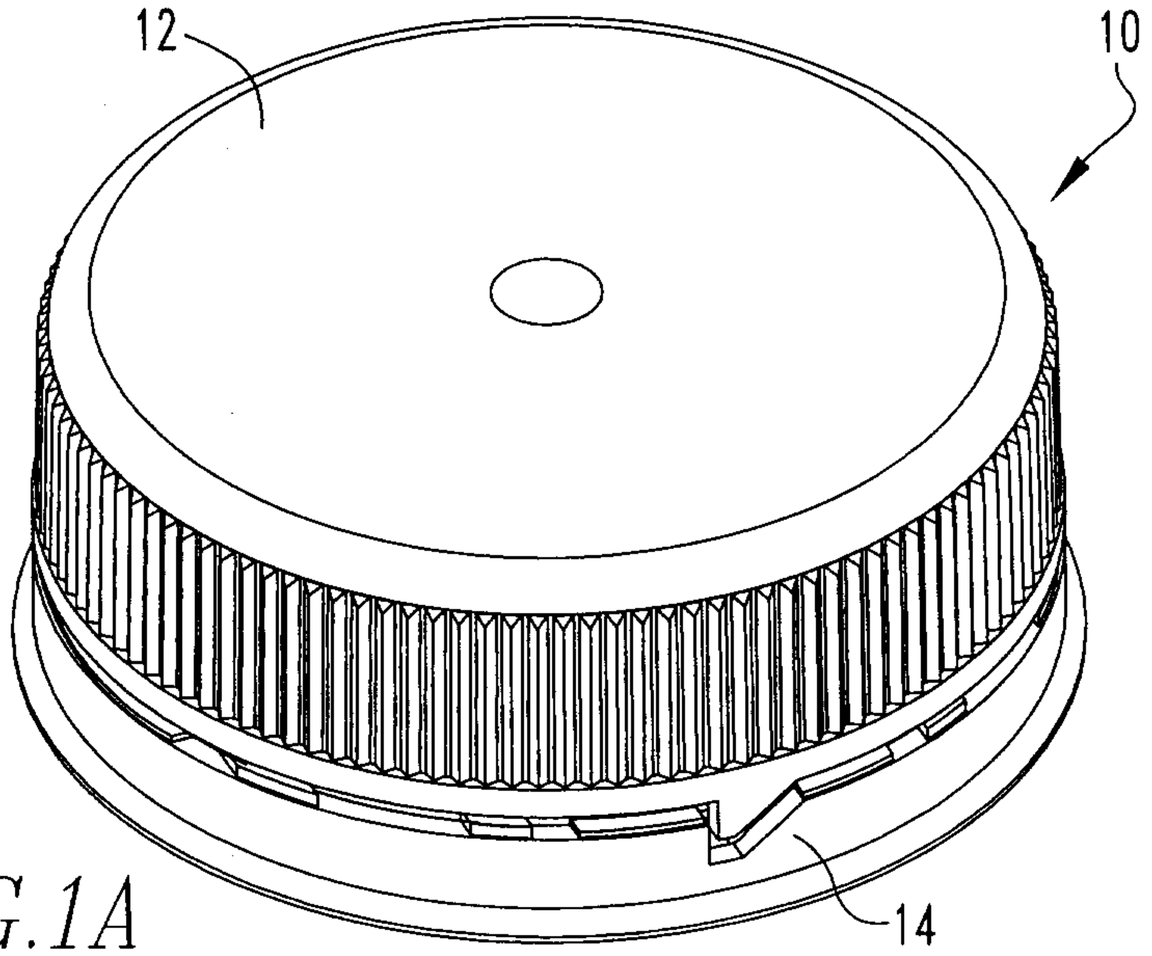


FIG.1A

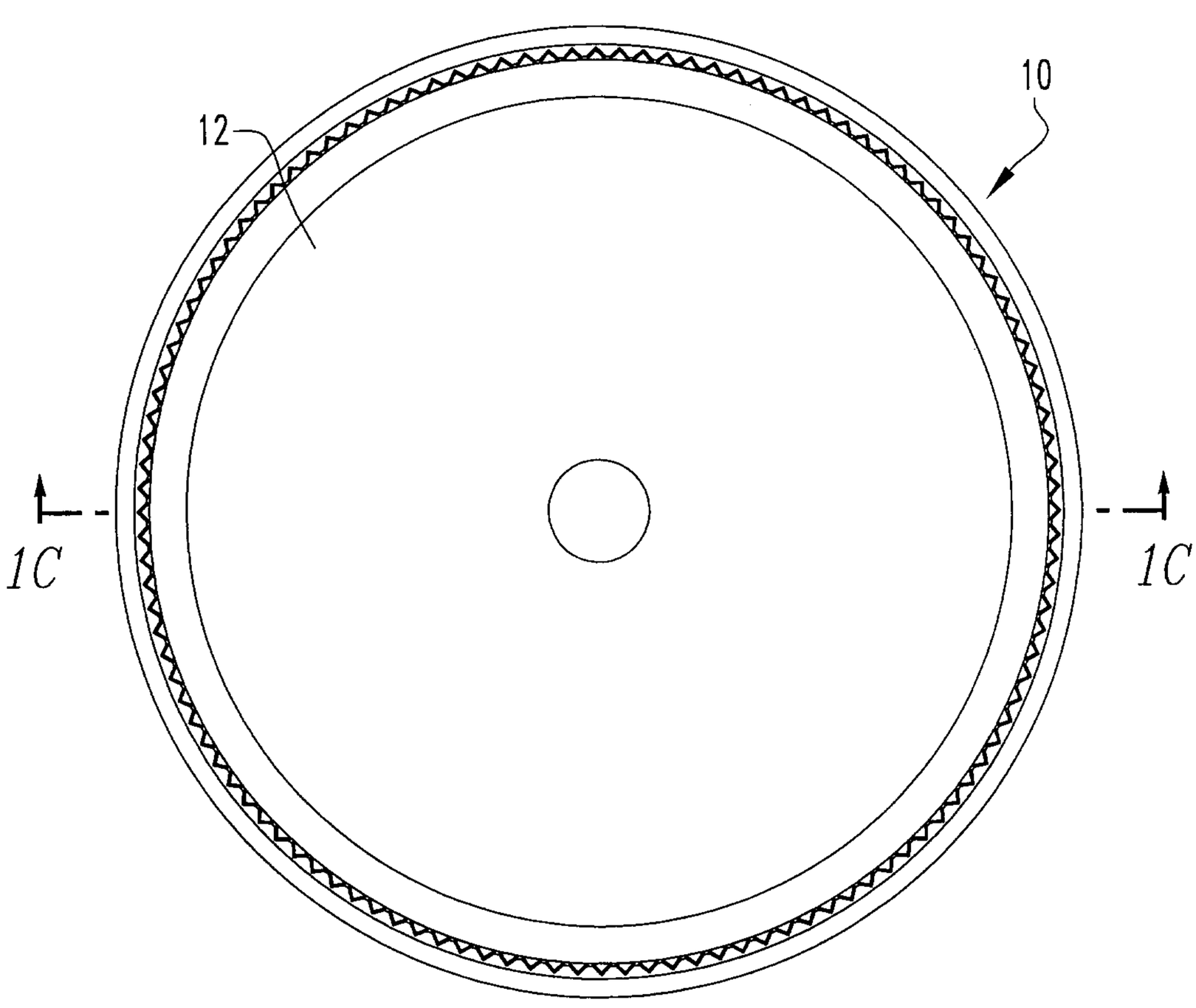


FIG.1B

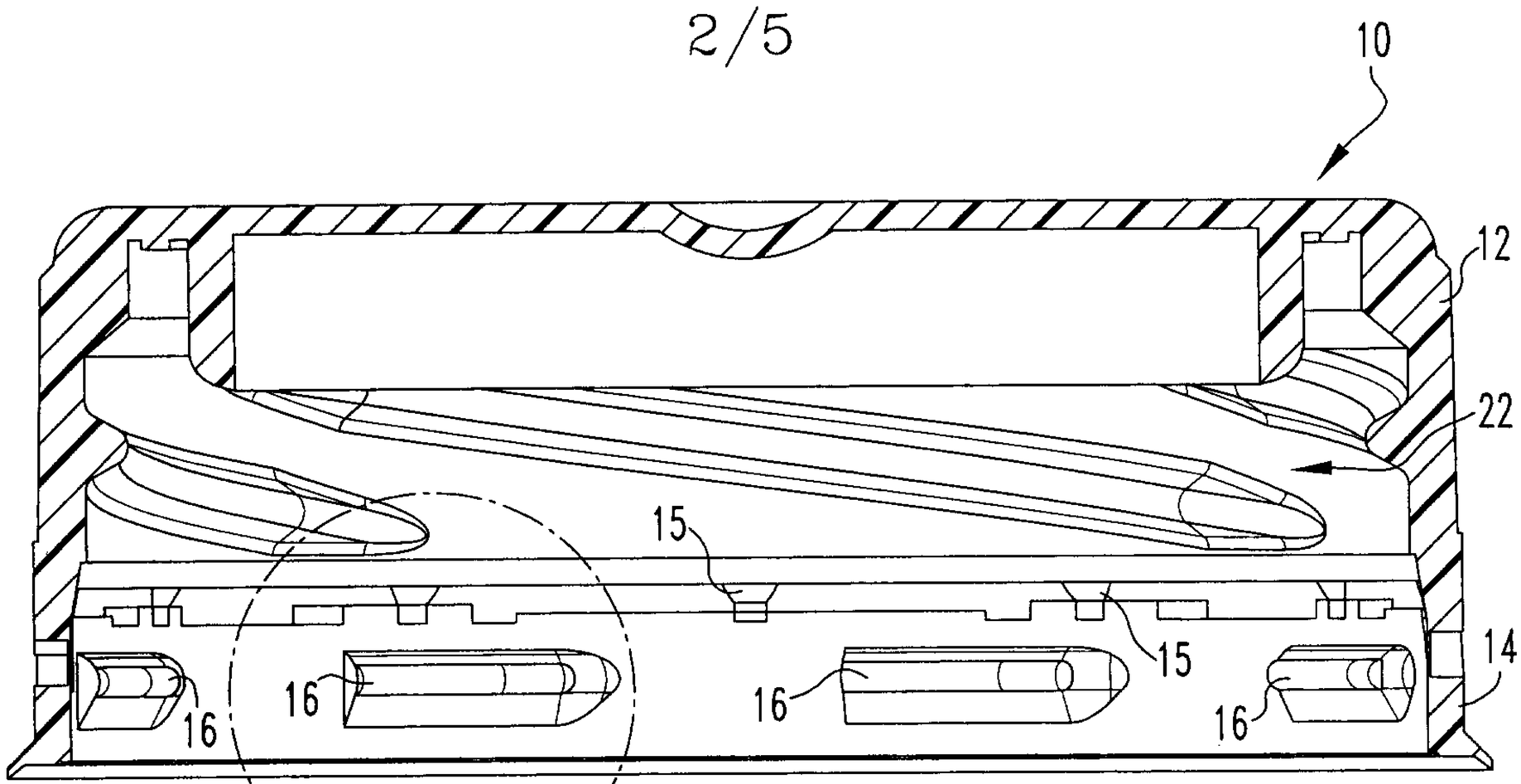


FIG.1C

FIG.1D

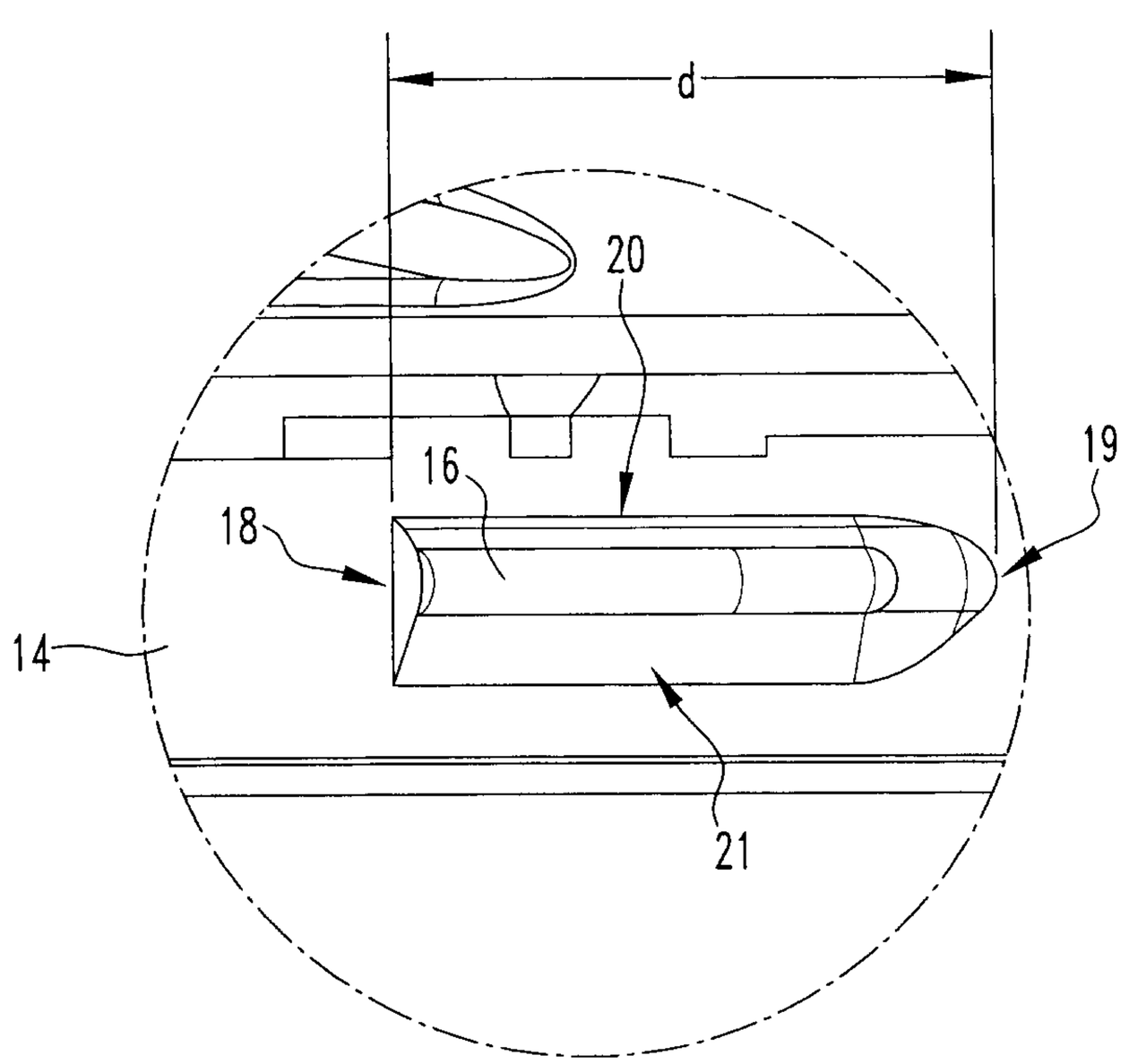


FIG.1D

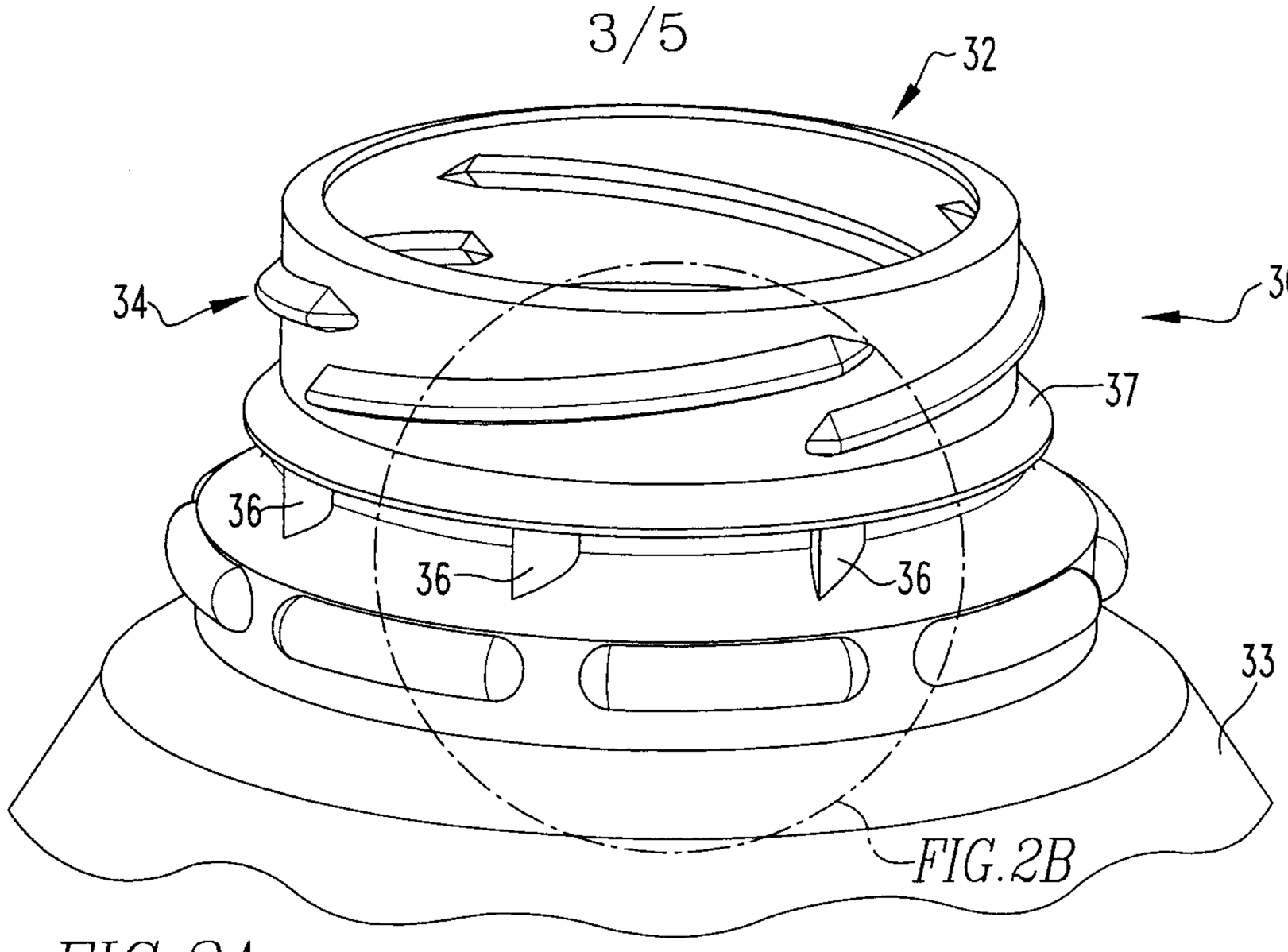


FIG.2A

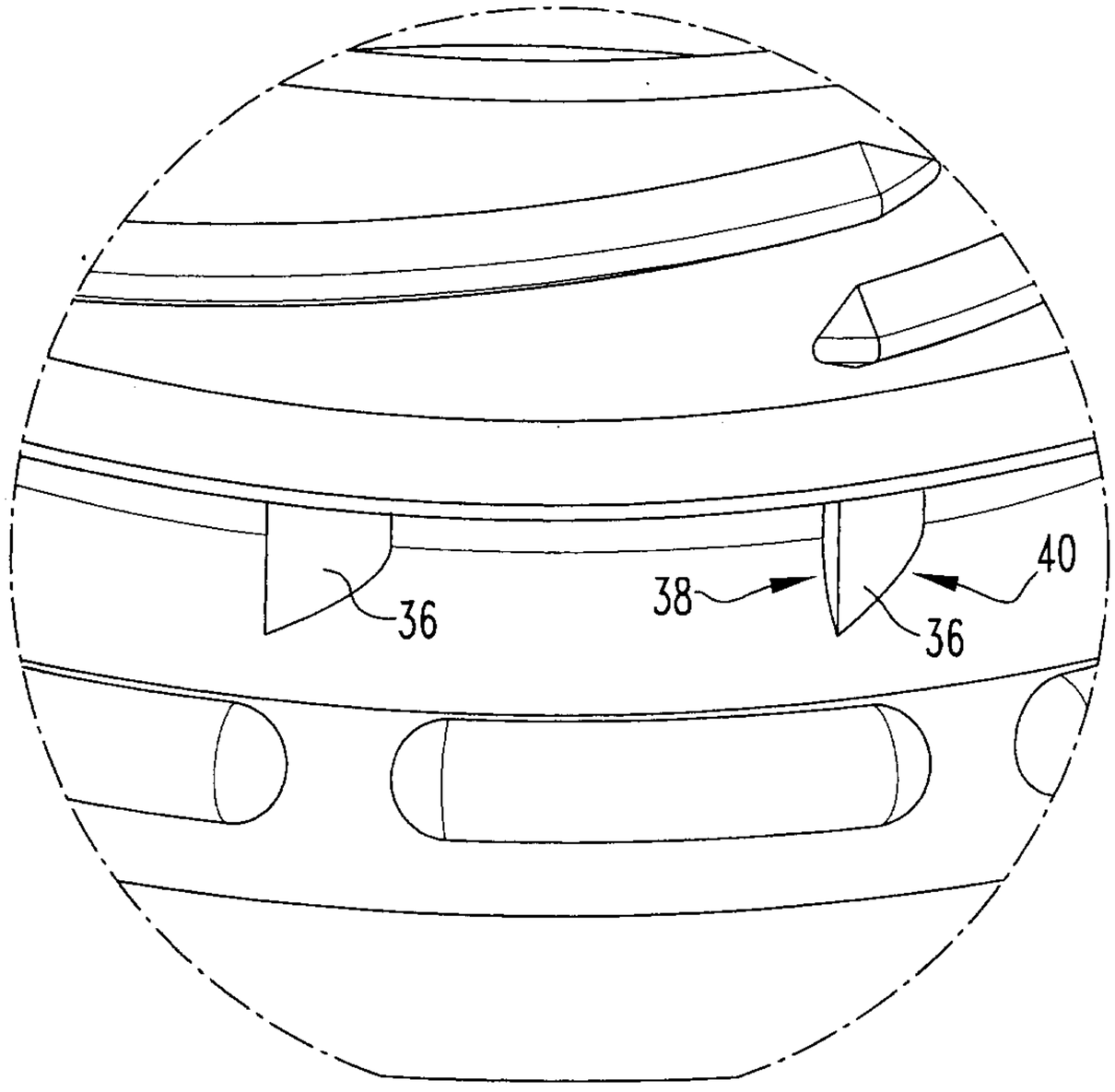


FIG.2B

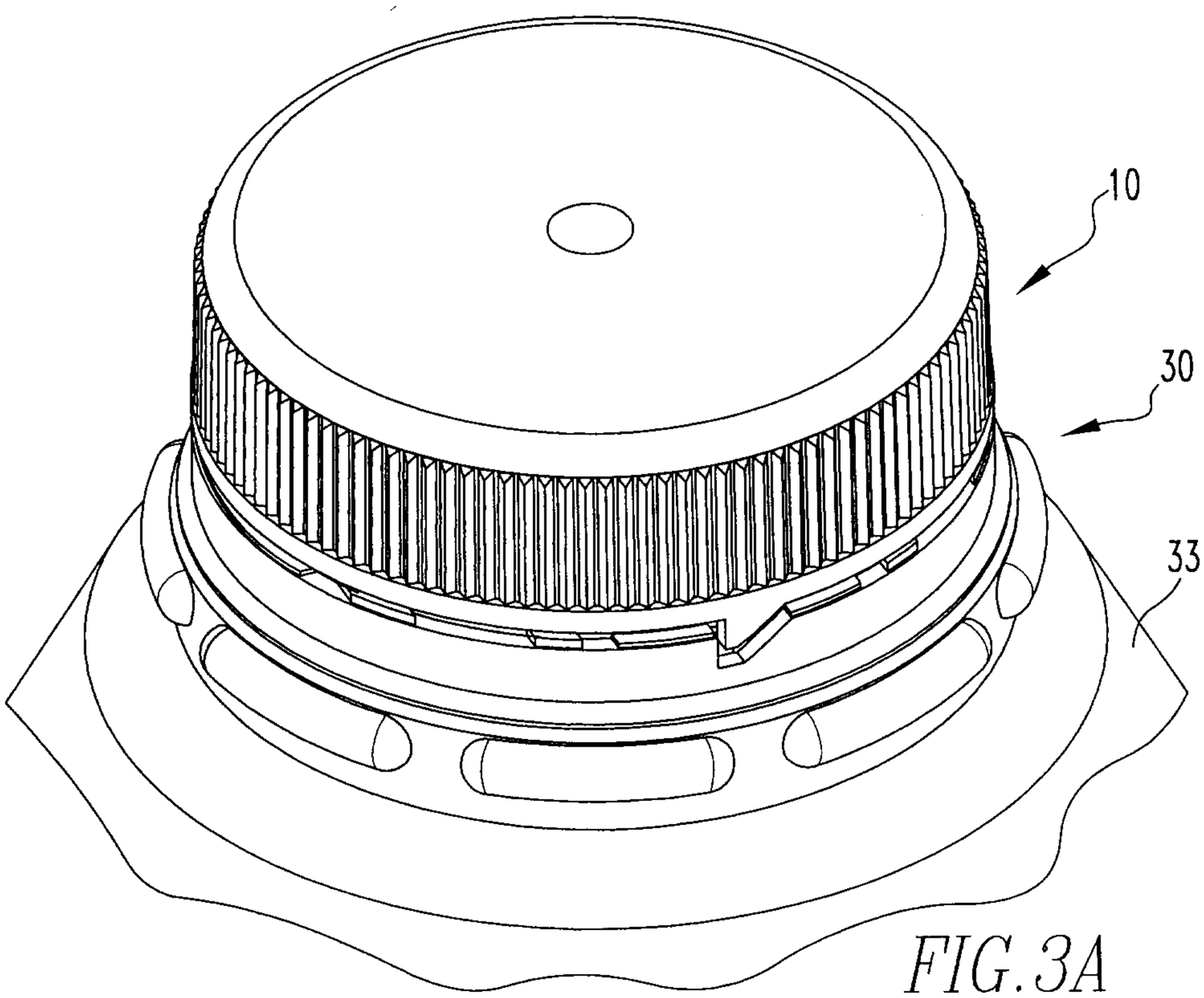


FIG.3A

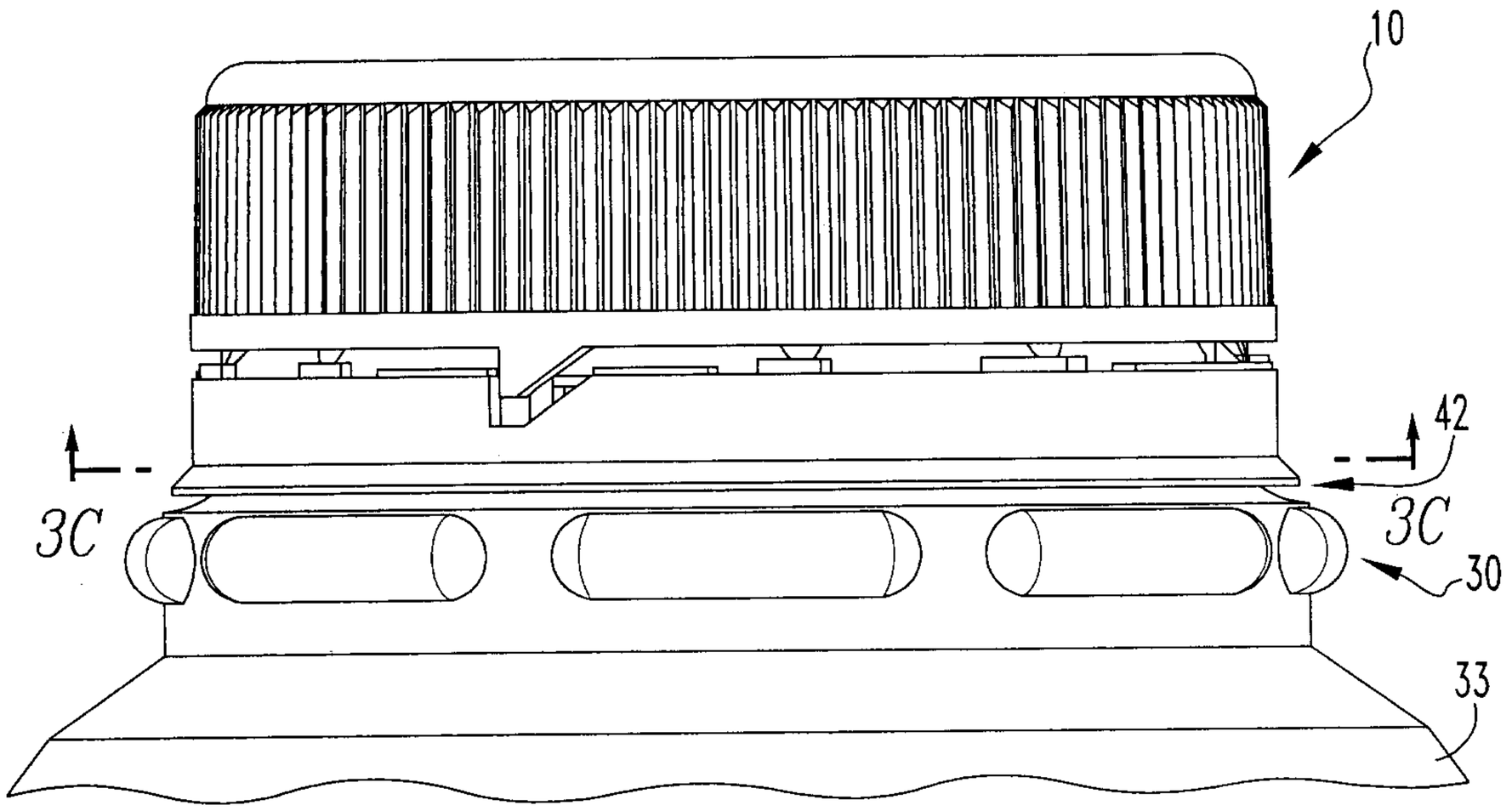


FIG.3B

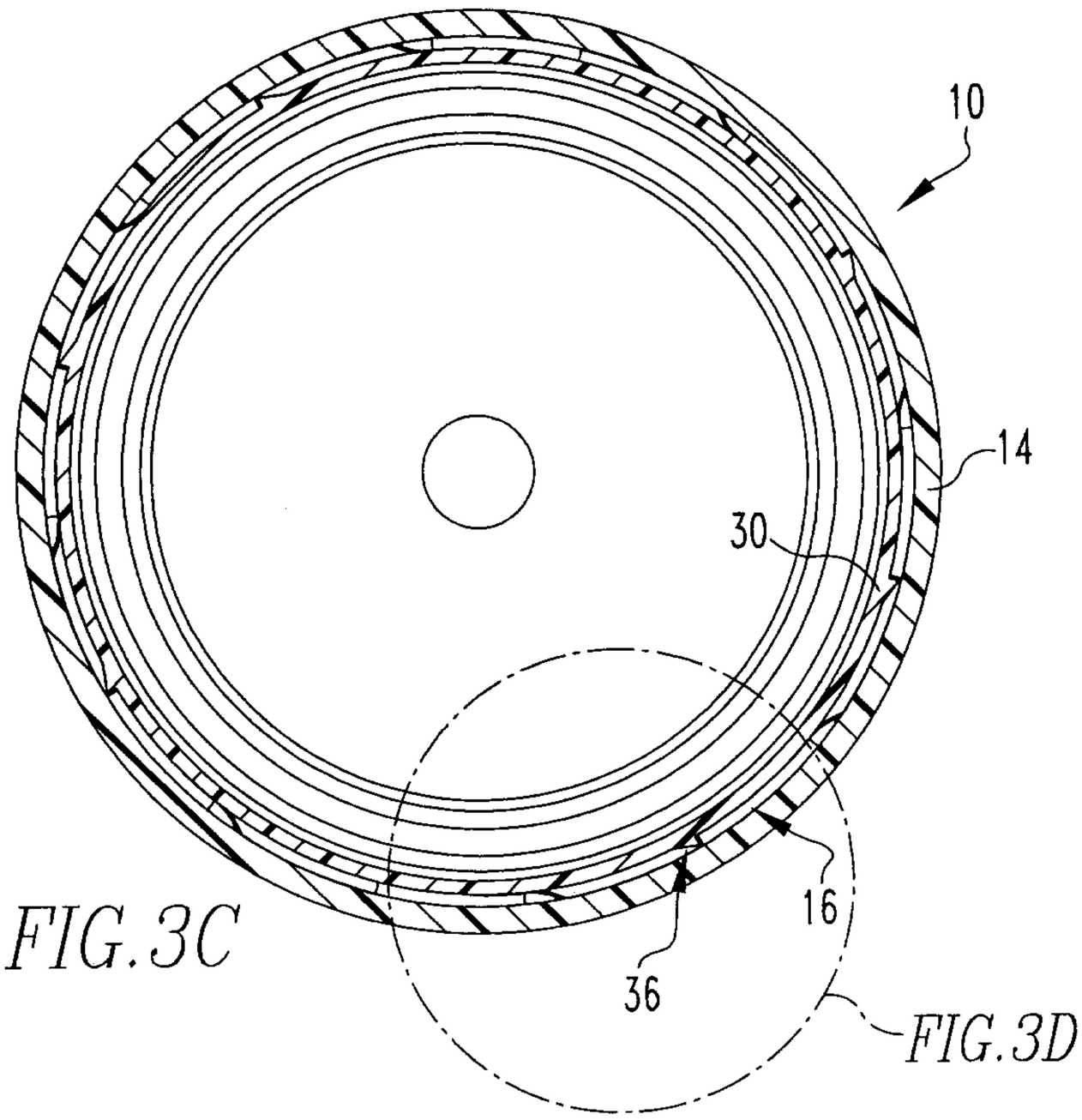


FIG.3C

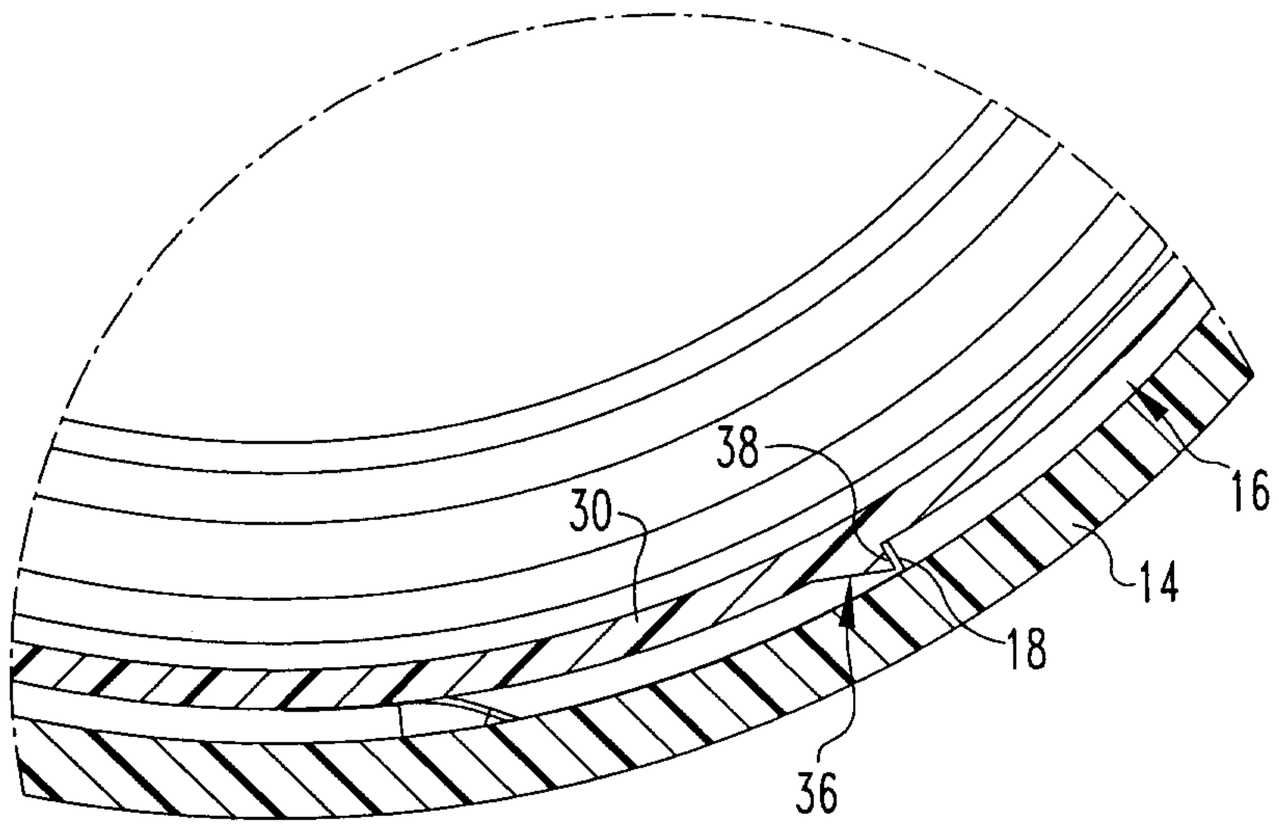


FIG.3D

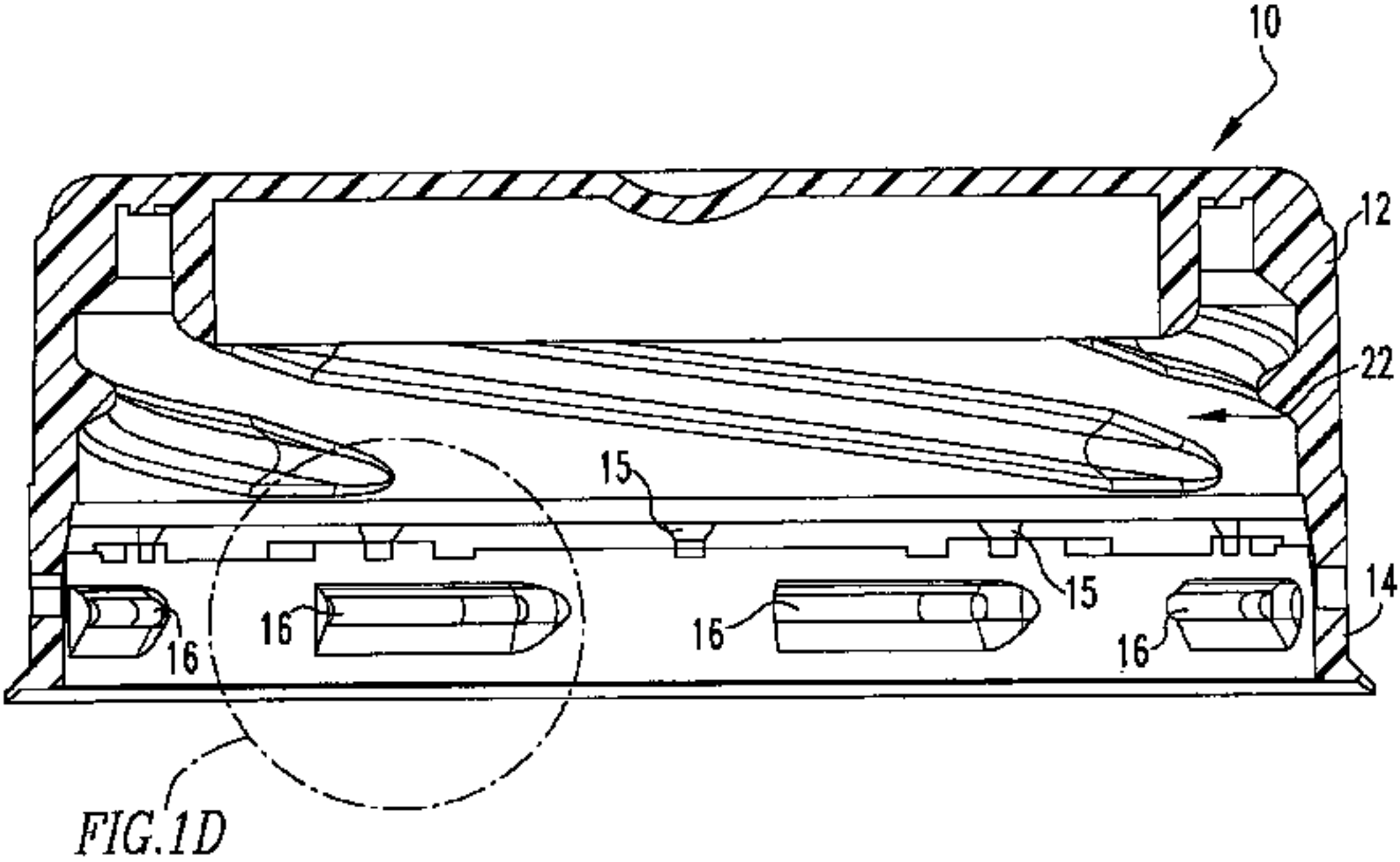
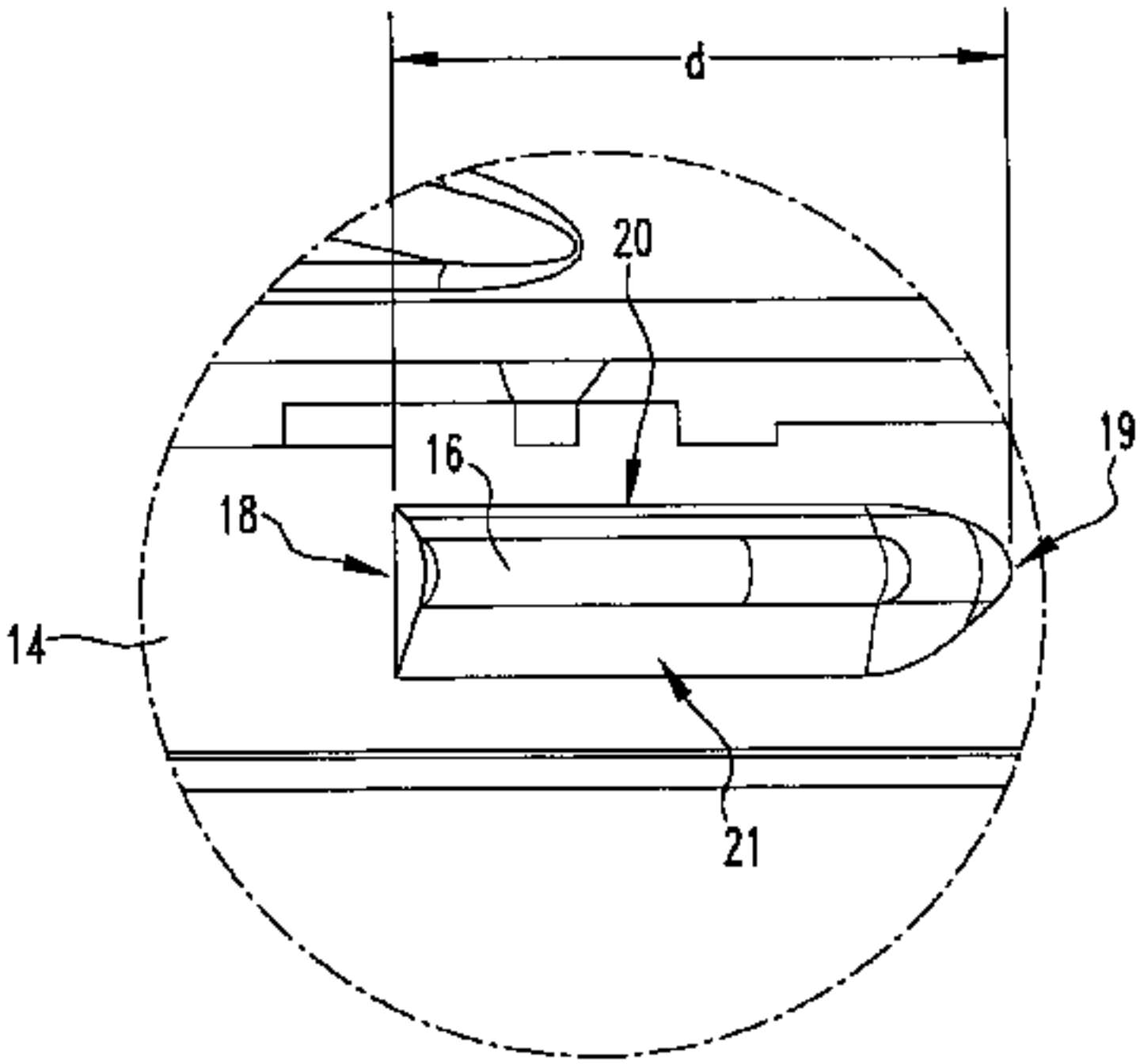


FIG.1D



D