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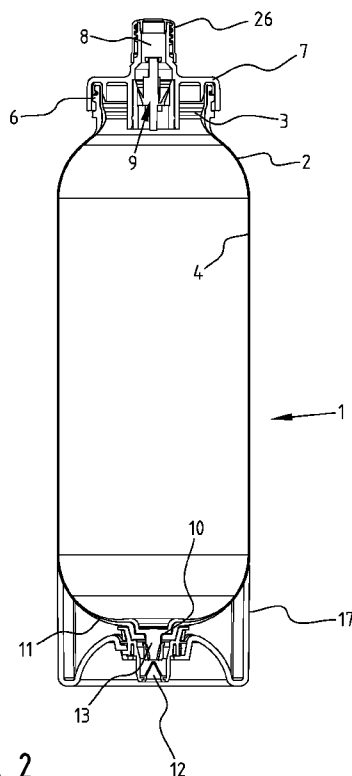
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[Continued on next page]

(54) Title: SQUEEZE BOTTLE COMPRISNG A FLEXIBLE INNER CONTAINER



**FIG. 2**

(57) Abstract: The invention relates to a squeeze bottle (1), which consists of a resiliently deformable outer container (2) with a dispensing opening (3) and a flexible inner container (4) connected to the outer container (2) close to the dispensing opening. The dispensing opening is provided with a valve (7) comprising a first non-return valve (9). The outer container (2) further has an aerating opening (10) closable by a second non-return valve (12). The inner container (4) is also connected to the outer container (2) at the position of the aerated opening (10). A sleeve (15) which the second non-return valve (12) is received can be arranged around the aerating opening (10). This sleeve (15) can be mounted in a foot (17) supporting the outer container (2). The second non-return valve (12) can be integrated with the inner container.



ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, **Published:**

MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR),

OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,

MR, NE, SN, TD, TG).

— *with international search report (Art. 21(3))*

## SQUEEZE BOTTLE COMPRISING A FLEXIBLE INNER CONTAINER

The invention relates to a squeeze bottle, comprising a resiliently deformable outer container with a dispensing opening and a flexible inner container connected to the outer container close to the dispensing opening, wherein the  
5 dispensing opening is provided with a valve comprising a first non-return valve, and wherein the outer container further has an aerating opening closable by a second non-return valve.

Such a squeeze bottle is known, for instance from WO 2006/107403. In this known squeeze bottle, which is intended  
10 primarily for liquids such as soft drinks, but is also suitable for more viscous products such as pastes, the flexible inner container or bag is attached to a collar mounted in the dispensing opening of the outer container or bottle. This collar, which extends about halfway into the bottle, comprises the actual  
15 outflow opening which is closed by a so-called duckbill valve. This valve allows the outflow of the content of the bag as long as the bottle is being squeezed, but snaps shut as soon as the pressure on the bottle decreases. Formed in the bottom of the bottle is an aerating opening closed by a so-called umbrella  
20 valve which admits air when the bottle is released but retains the air in the bottle when the bottle is being squeezed.

The invention has for its object to improve a squeeze bottle of the above described type. The invention provides for this purpose a squeeze bottle as described in claim 1. Preferred  
25 embodiments of the squeeze bottle according to the invention form the subject-matter of the sub-claims.

Connecting the inner container to the outer container not only at the dispensing opening but also at another location prevents the inner container becoming crumpled during dispensing

of product therefrom, whereby product could be left behind in folds of the inner container. Thus is ensured that the inner container can be completely emptied without use having to be made for this purpose of a collar to be incorporated in the outer container. An efficient construction is obtained by having the connection between inner container and outer container coincide with the aerating opening.

The invention will now be elucidated on the basis of two examples, wherein reference is made to the accompanying drawing in which corresponding components are designated with reference numerals increased by 100, and in which:

Fig. 1 shows a perspective view of a squeeze bottle according to a first embodiment of the invention,

Fig. 2 shows a section through the squeeze bottle along line II-II in fig. 1,

Fig. 3 shows a perspective view with exploded parts of the squeeze bottle of fig. 1,

Fig. 4 shows a section through the squeeze bottle along line IV-IV in fig. 3,

Fig. 5 shows a section on enlarged scale through the dispensing opening and valve of the squeeze bottle,

Fig. 6 shows a section through the upper part of the squeeze bottle during squeezing of the outer container,

Fig. 7 shows a view corresponding to fig. 6 of the squeeze bottle during movement back to its normal shape,

Fig. 8 shows a section through the lower part of the squeeze bottle during squeezing of the outer container,

Fig. 9 shows a view corresponding to fig. 8 of the squeeze bottle during movement back to its normal shape,

Fig. 10A-10D show sections through the squeeze bottle in full and gradually increasingly emptied state,

Fig. 11 shows a section through the lower part of an alternative embodiment of the squeeze bottle, and

Fig. 12 shows on enlarged scale a detail view according to arrow XII in fig. 11.

A squeeze bottle 1 (fig. 1) comprises a resiliently deformable outer container 2 which can be manufactured from a plastic such as PE or PP. On one side, referred to here as the top side, outer container 2 is provided with a dispensing opening 3. Squeeze bottle 1 further comprises a flexible inner container 4 (fig. 2) which can be manufactured from a suitable plastic foil. This inner container 4 is connected close to dispensing opening 3 to outer container 2 by means of a clamping edge 5 which is clamped round a neck 6 of outer container 2 bounding dispensing opening 3 (fig. 5). Further arranged on neck 6 is a valve 7 in which an outflow channel 8 is formed. A first non-return valve 9 is arranged in this outflow channel 8. Outer container 2 further has an aerating opening 10, formed here in the bottom 11 of outer container 2, opposite dispensing opening 3. Aerating opening 10 is closed by a second non-return valve 12.

Inner container 4, which in its filled state lies against the inner side of outer container 2, is connected to outer container 2 at the position of aerating opening 10. For this purpose inner container 4 has a protruding part 13 which protrudes through aerating opening 10 and on which is arranged a fixing element 14 (fig. 8, 9). In the shown example a sleeve 15, which is connected airtightly to outer container 2, is arranged around aerating opening 10. Received in an opening 16 on the underside of this sleeve 15 is the second non-return valve 12, which can for instance be embodied as an inward directed butterfly valve. Sleeve 15 is in turn mounted in a foot 17 which supports outer container 2.

As stated, the first non-return valve 9 is received in outflow channel 8 in valve 7. In the shown embodiment this first non-return valve 9 comprises a stem 18 around which is arranged an apron 19. This apron 19 faces away from inner container 4.

Stem 18 is slidable in two rings 20, 21 which function as guides and as stops. The first ring 20 is here received in a bush 22 which is in turn clamped in outflow channel 8 in valve 7. Bush 22 forms a valve seat 23 for non-return valve 9. The second ring 21 is received directly in outflow channel 8. Valve stem 18 further has a thickened portion 24 which bounds the outward movement of valve 9 when it comes into contact with ring 21, and the inward movement when it comes into contact with ring 20. Apron 19 is attached to this thickened portion 24.

Finally, outflow channel 8 is provided on the outer side with screw thread 25 so that a cap 26 can be screwed thereon.

In an alternative embodiment of squeeze bottle 101 (fig. 11) the second non-return valve 112 is integrated with inner container 104. A sealing edge 127 is formed for this purpose around aerating opening 110, while inner container 104 is strengthened locally around its protruding part 113. The strengthened part 128 of inner container 104 herein co-acts with sealing edge 127 in order to close aerating opening 110 when squeeze bottle 101 is being squeezed (fig. 12). In this embodiment outer container 102 is otherwise provided with a petal-shaped bottom 111 which defines a number of feet 117 integrated therewith.

The operation of squeeze bottle 1 is now as follows. Once inner container 4 and outer container 2 have been formed and mutually connected, inner container 4 is filled with a product for dispensing, after which valve 7 is mounted on dispensing opening 3.

When outer container 2 is then squeezed, the pressure in outer container 2 and in inner container 4 is increased. This has the result that the first non-return valve 9 is opened (fig. 6) and the product can flow out of inner container 4. The second non-return valve 12 is simultaneously closed (fig. 8) so that no air can escape from outer container 2 and the squeezing force

on outer container 2 is thus converted by the enclosed air into a pressure force from all sides on inner container 4.

When outer container 2 is released, it returns to its original position as a result of its resilient nature. An  
5 underpressure is created here, whereby the first non-return valve 9 is closed and product can therefore no longer flow out of inner container 4. Nor can outside air penetrate into inner container 4. The second non-return valve 12 is simultaneously opened so that the space between inner container 4 and outer  
10 container 2 is filled with air from outside.

Inner container 4 can be emptied in steps by repeated squeezing of squeeze bottle 1 (fig. 10A-10D). The connection of inner container 4 to outer container 2 at the position of aerating opening 10 herein ensures that inner container 4 does not become  
15 crumpled, so that no product can be left therein.

Although the invention has been elucidated above on the basis of a number of examples, it will be apparent that it can be varied in many ways within the scope of the following claims.

**Claims**

1. Squeeze bottle, comprising a resiliently deformable outer container with a dispensing opening and a flexible inner container connected to the outer container close to the dispensing opening, wherein the dispensing opening is provided with a valve comprising a first non-return valve, and wherein the outer container further has an aerating opening closable by a second non-return valve, **characterized in that** the inner container is also connected to the outer container at the position of the aerating opening.

2. Squeeze bottle as claimed in claim 1, **characterized in that** the inner container has a part which protrudes through the aerating opening and on which a fixing element is arranged.

3. Squeeze bottle as claimed in claim 1 or 2, **characterized in that** a sleeve in which the second non-return valve is received is arranged around the aerating opening.

4. Squeeze bottle as claimed in claim 3, **characterized in that** the sleeve is mounted in a foot supporting the outer container.

5. Squeeze bottle as claimed in claim 1 or 2, **characterized in that** the second non-return valve is integrated with the inner container.

6. Squeeze bottle as claimed in claim 5, **characterized in that** a sealing edge with which a strengthened part of the inner container co-acts is formed around the aerating opening.

7. Squeeze bottle as claimed in any of the foregoing claims, **characterized in that** the first non-return valve is received slidably in an outflow channel in the valve.

8. Squeeze bottle as claimed in claim 7, **characterized in that** the first non-return valve comprises a stem with an apron arranged therearound and directed away from the inner container.



9. Squeeze bottle as claimed in any of the foregoing claims, characterized in that in its filled state the inner container lies substantially over its whole surface against the outer container.

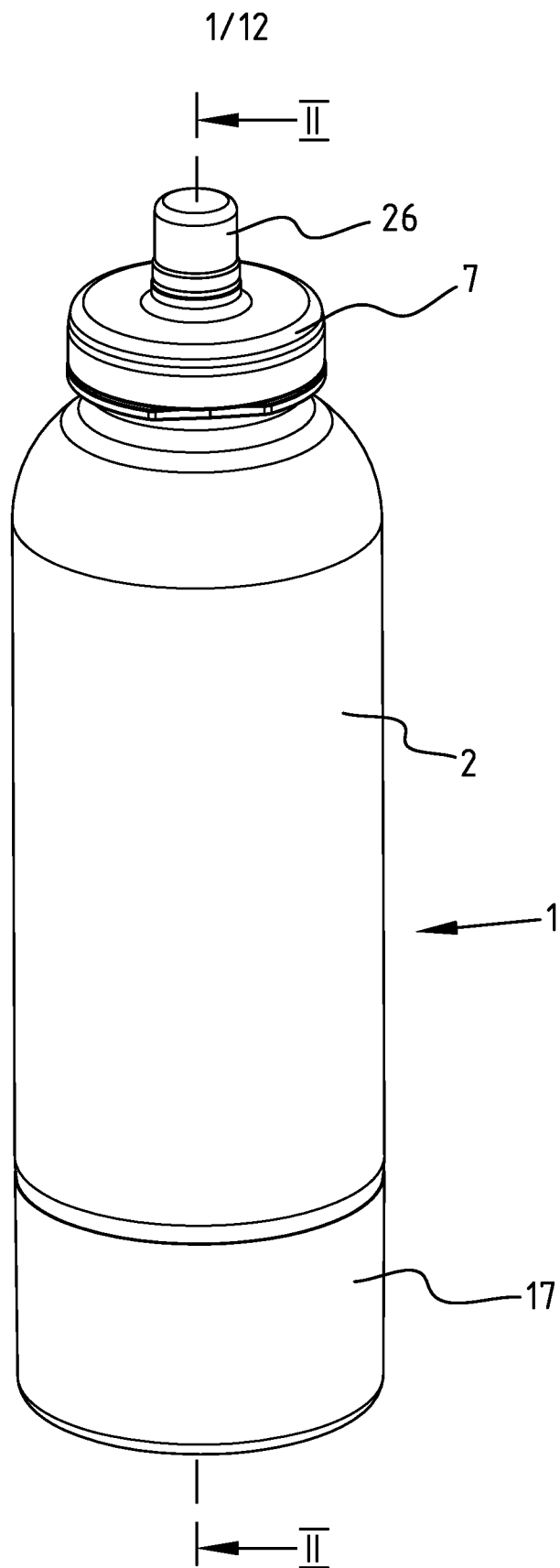


FIG. 1

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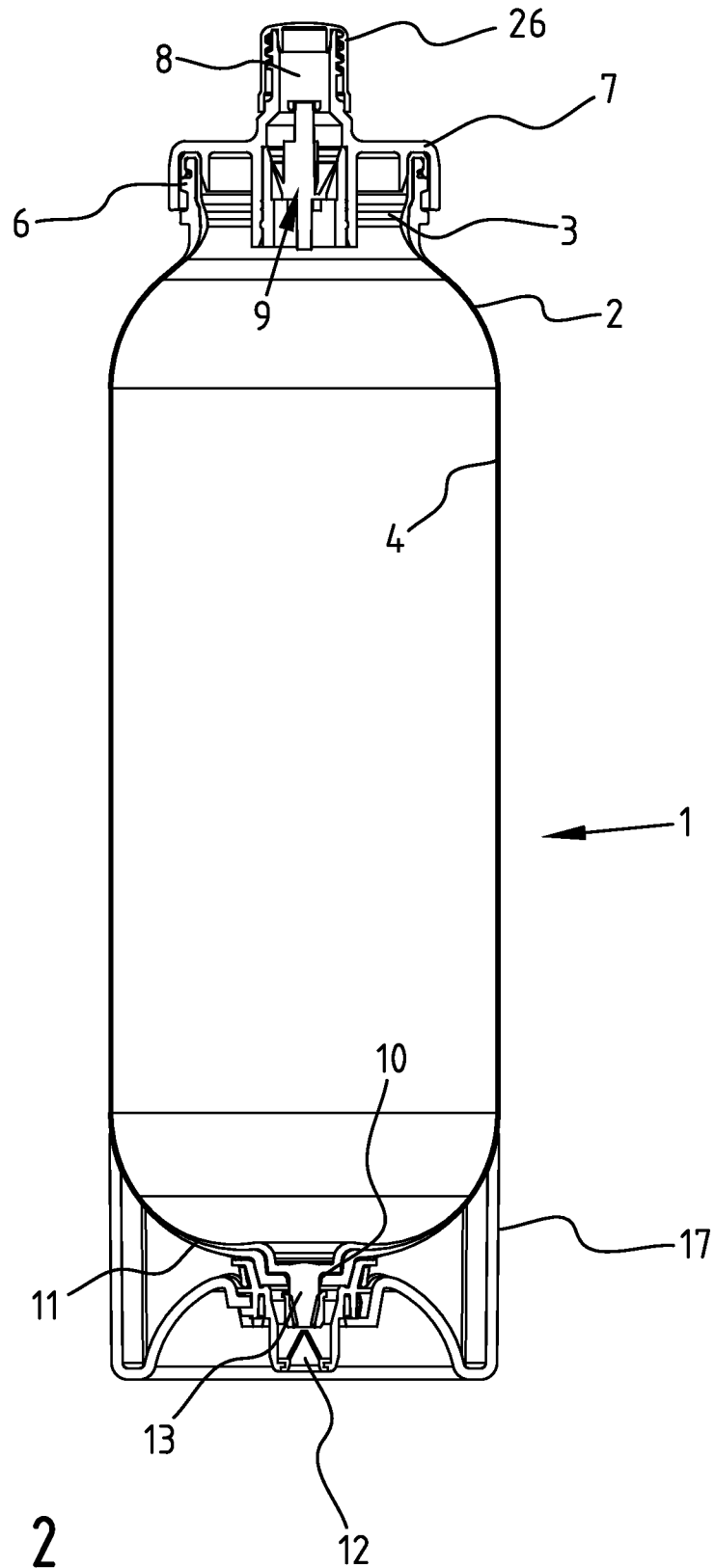


FIG. 2

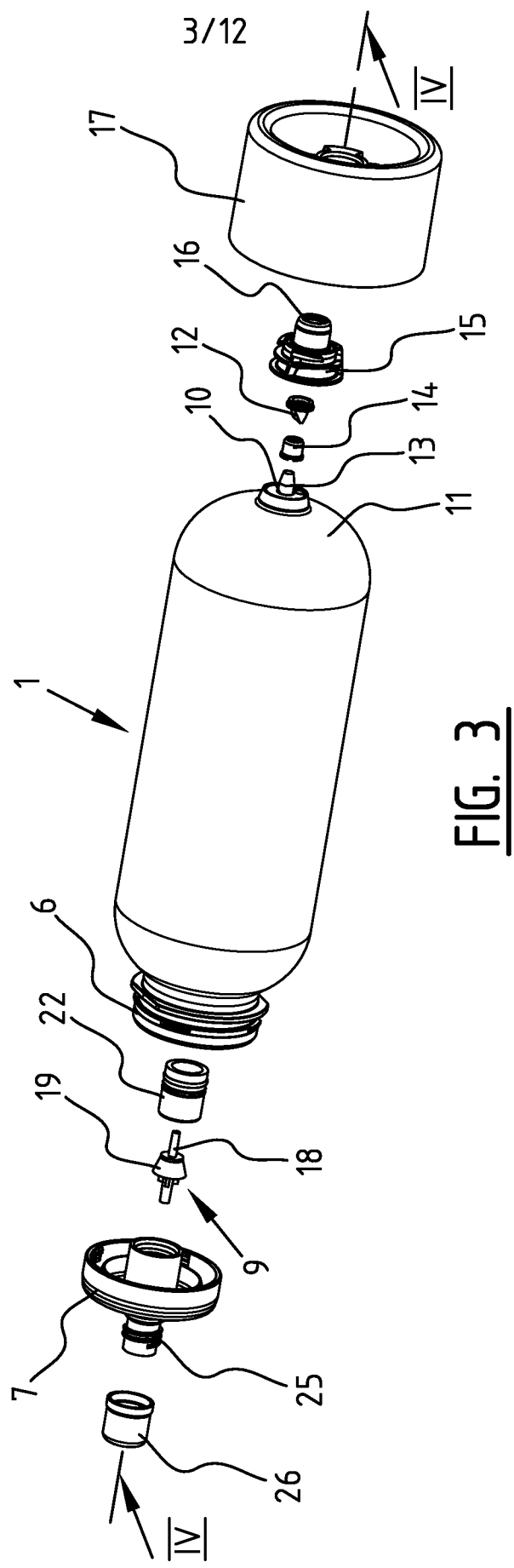


FIG. 3

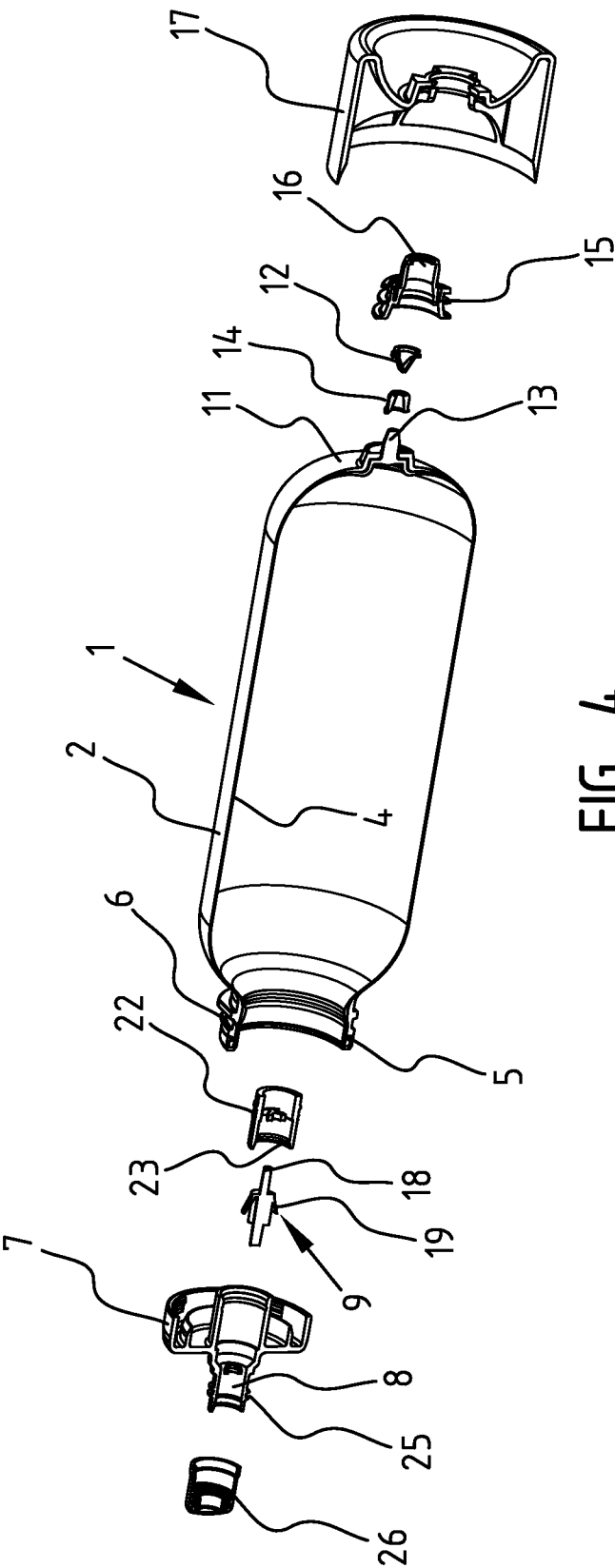


FIG. 4

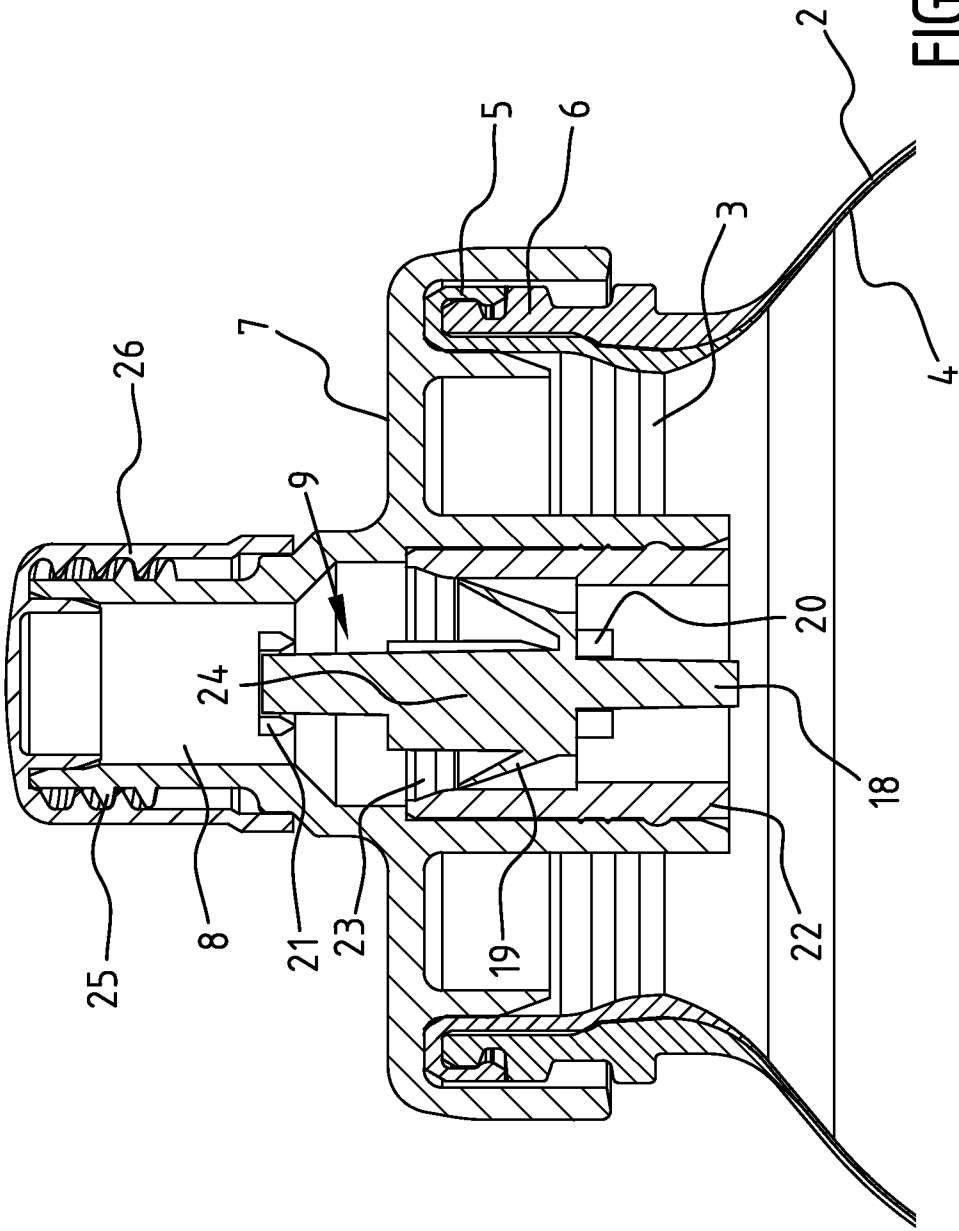


FIG. 5

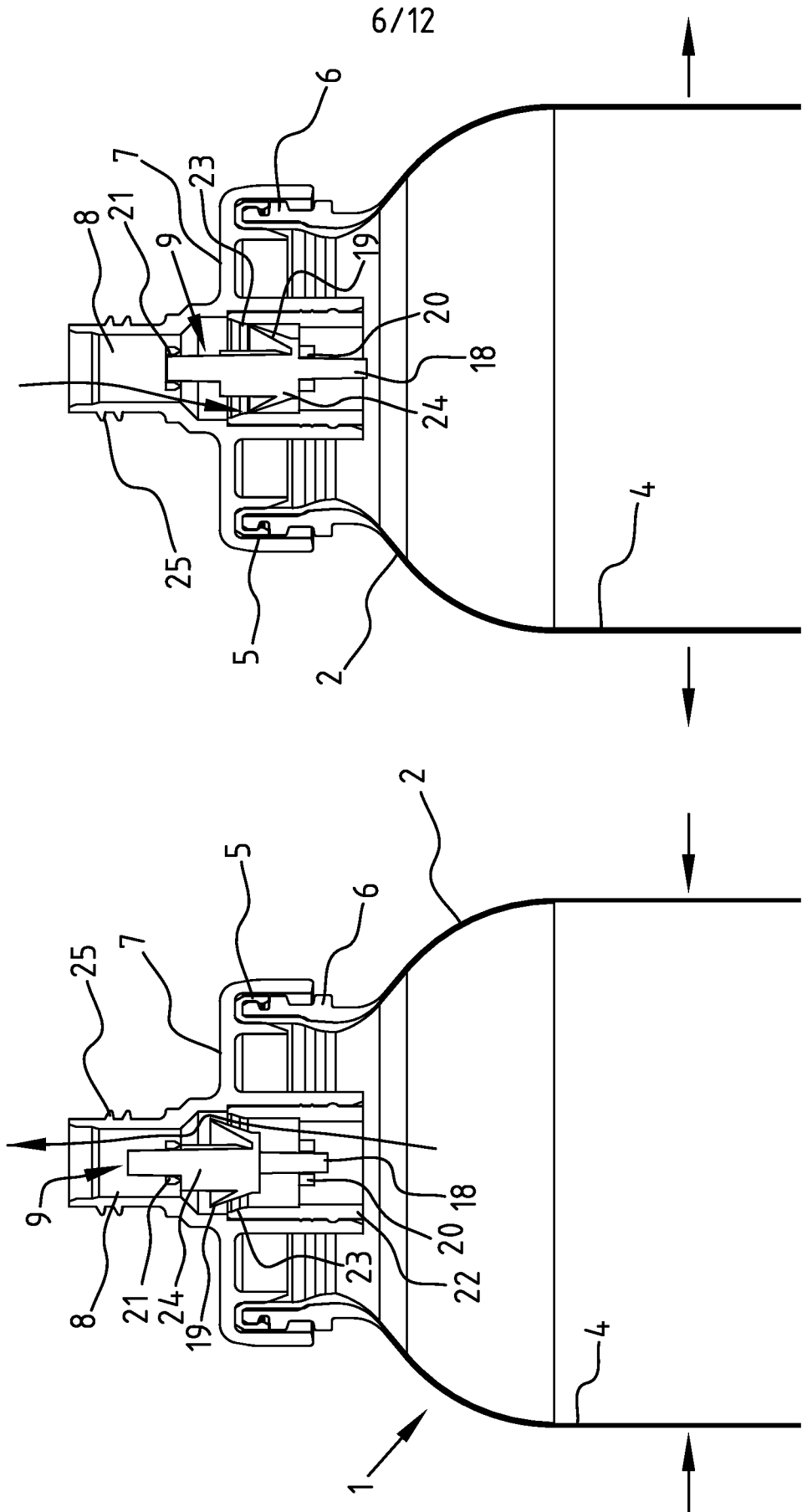


FIG. 7

FIG. 6

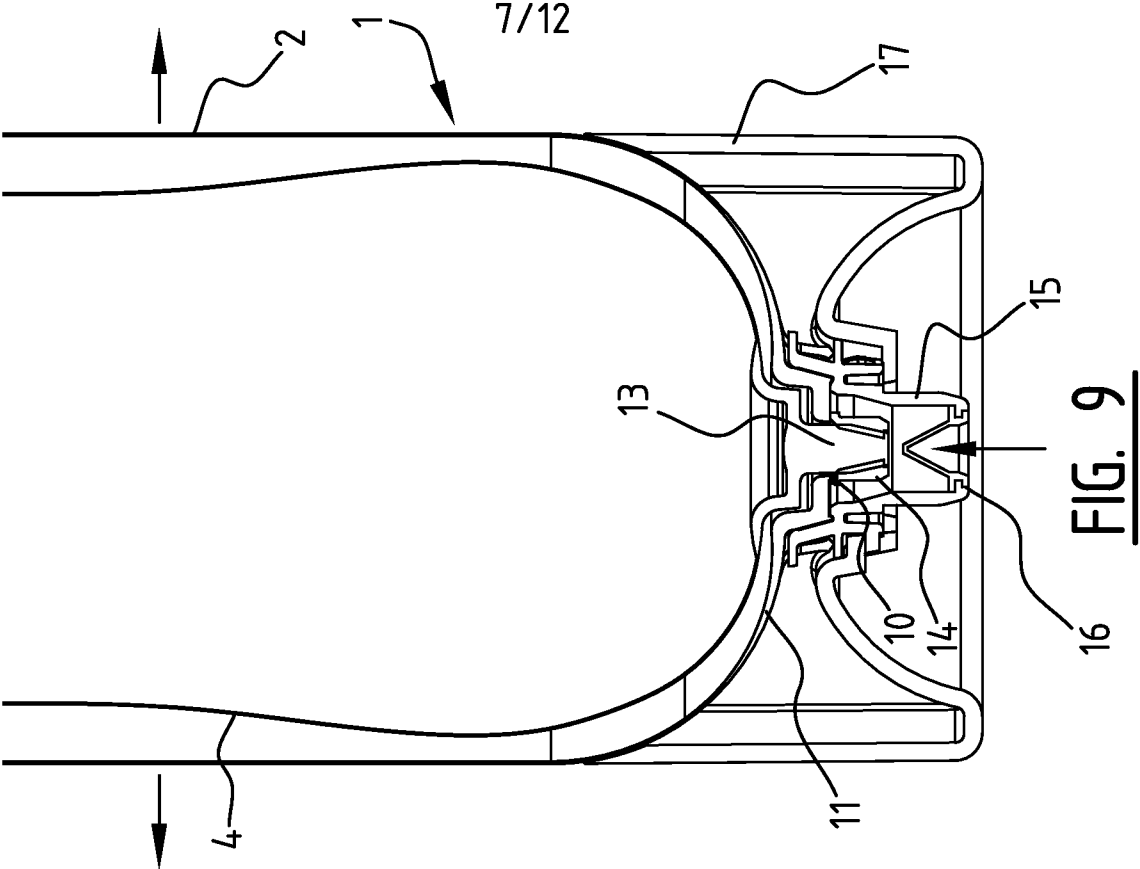


FIG. 9

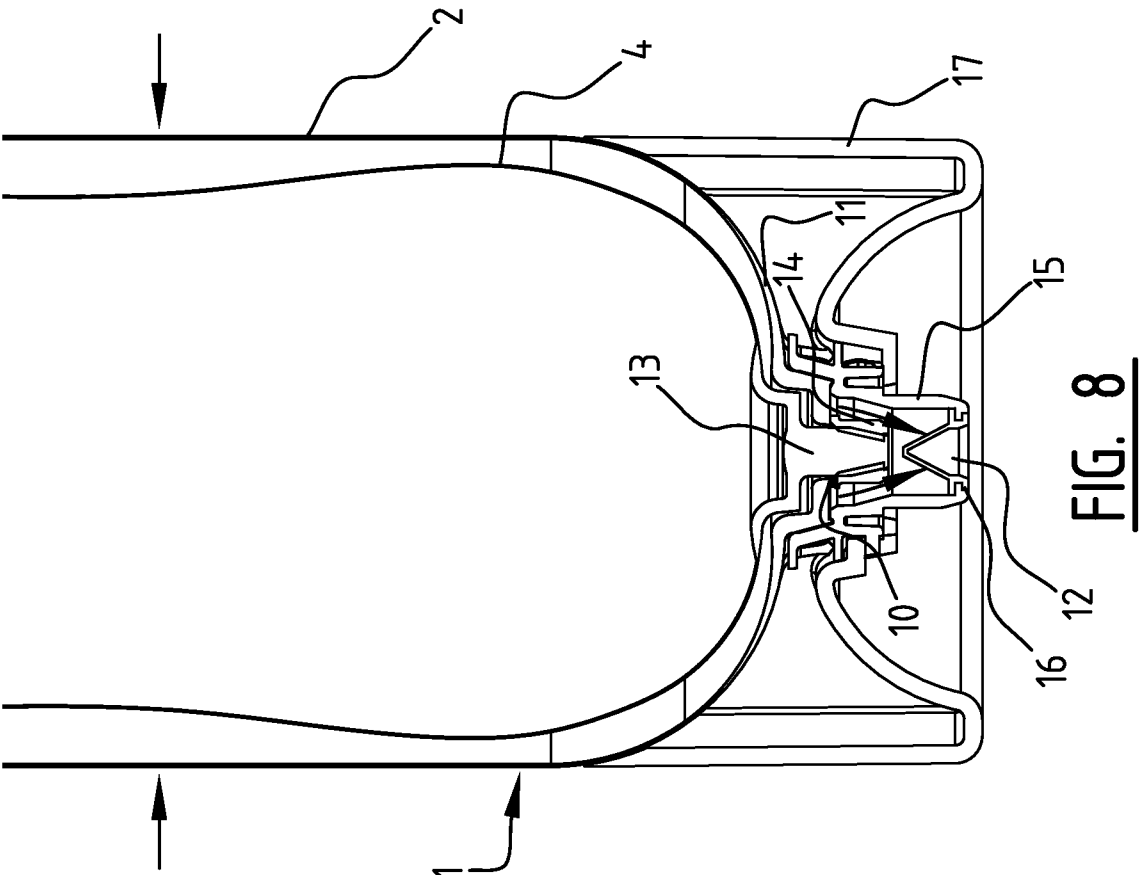


FIG. 8



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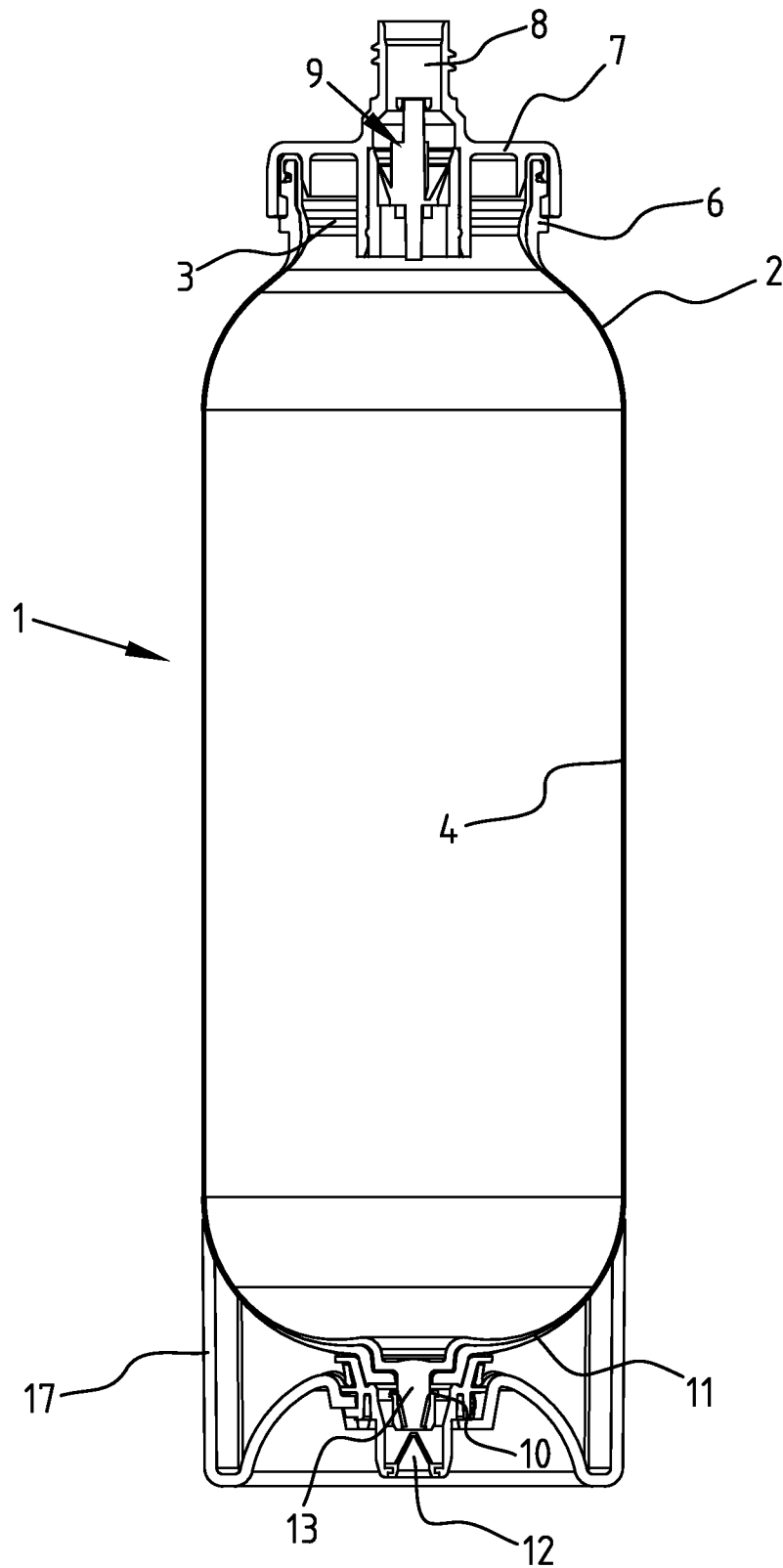


FIG. 10A

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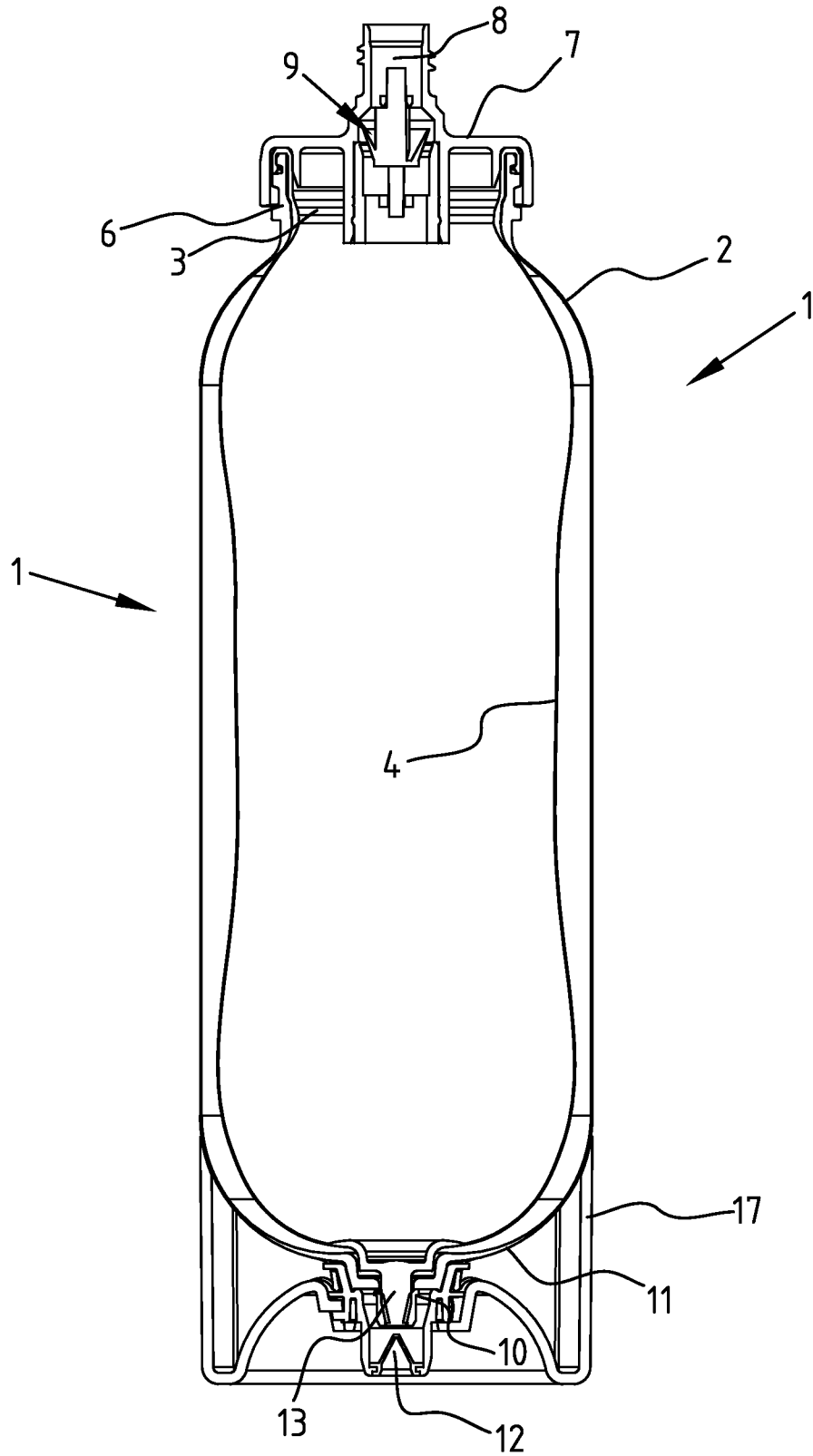


FIG. 10B

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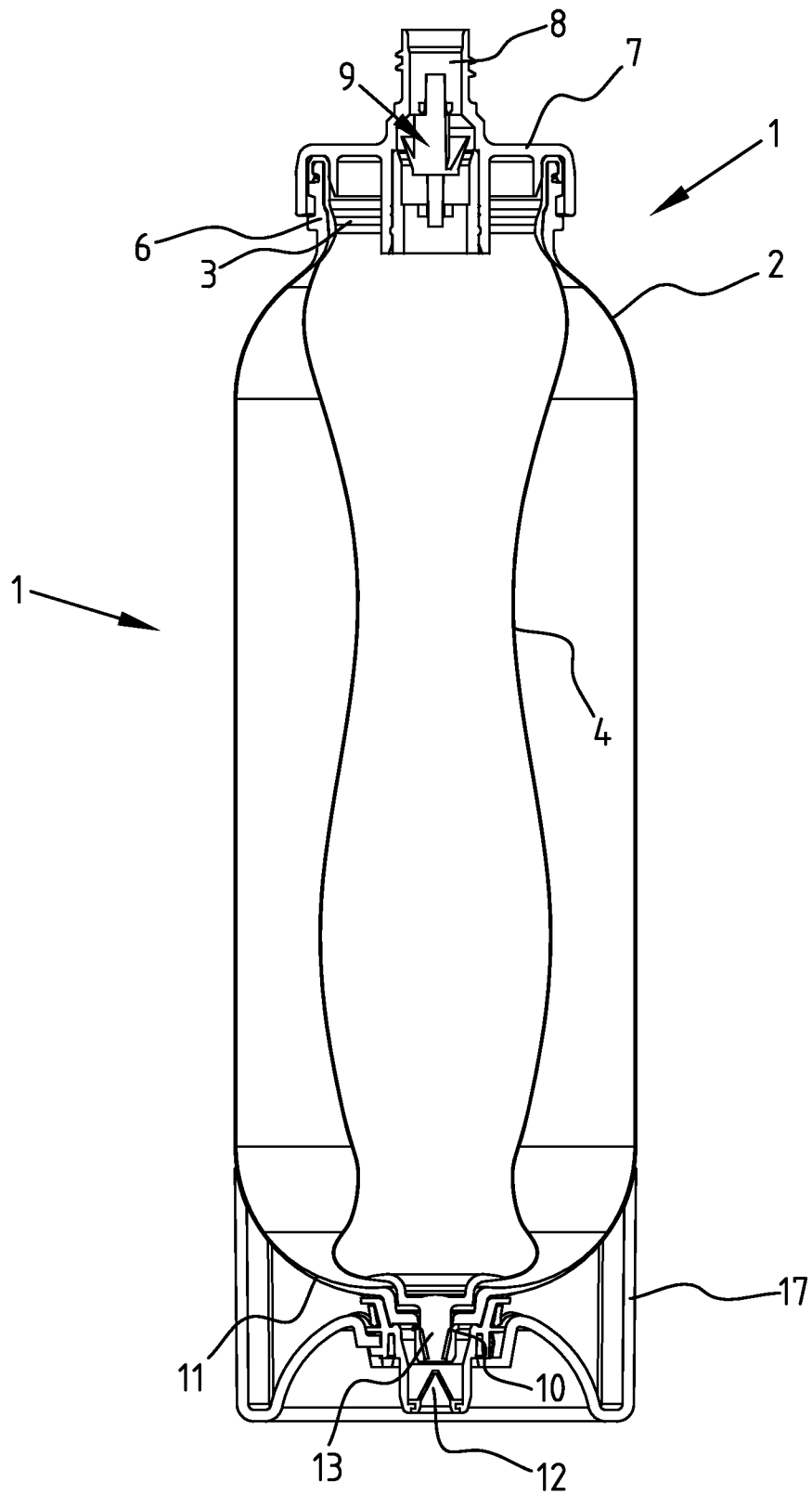


FIG. 10C

11/12

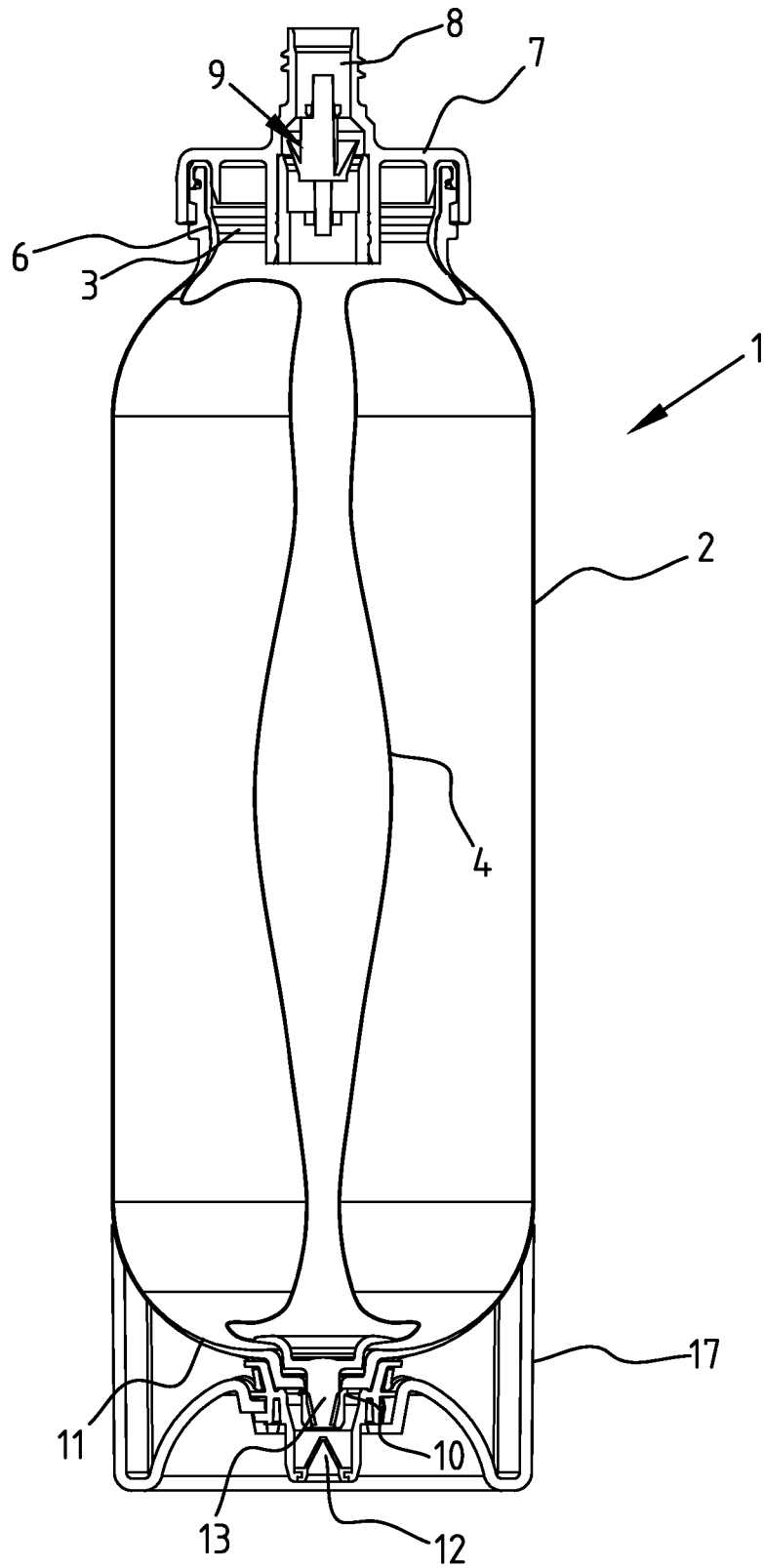
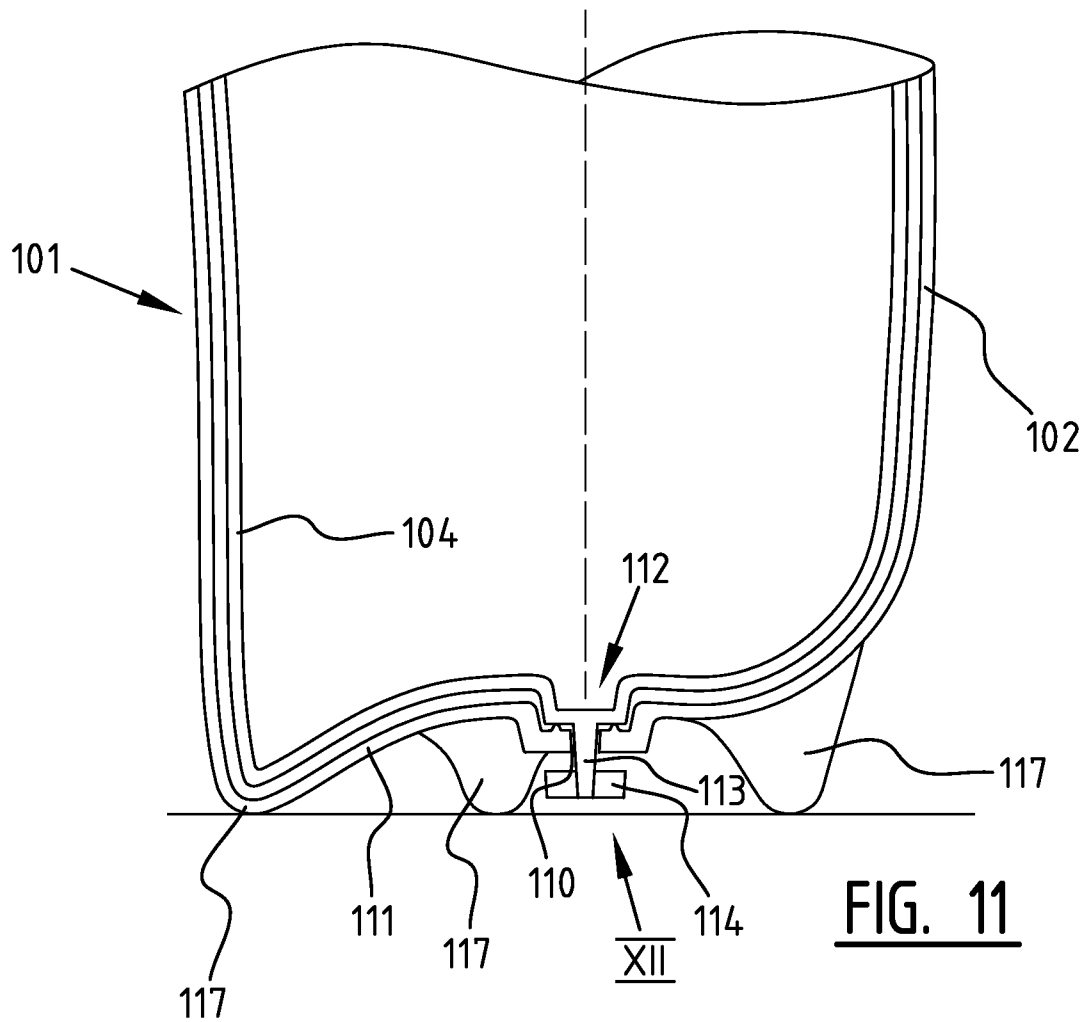
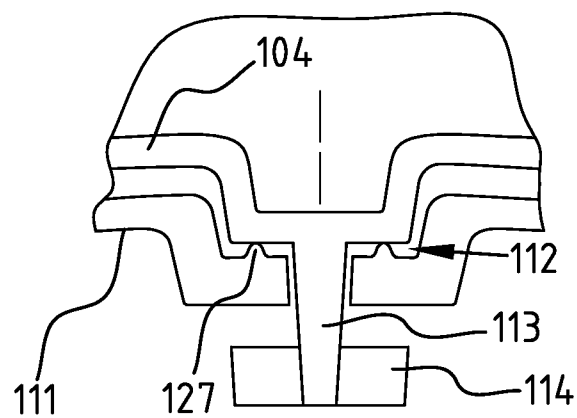


FIG. 10D

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**FIG. 11**



**FIG. 12**

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/NL2009/050233

A. CLASSIFICATION OF SUBJECT MATTER  
INV. B65D83/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2 743 038 A (FERRIES JACK R) 24 April 1956 (1956-04-24)	1,9
A	column 1, last line - column 2, line 62; figures 3,4	2
Y	WO 2006/107403 A (FUN DAMENTAL TOO LTD [US]; STERNBERG HARRY W [US]) 12 October 2006 (2006-10-12)	1,9
A	cited in the application abstract; figures 2-6 page 5, line 4 - page 7, paragraph 1	2
Y	US 3 223 289 A (BERNARD BOUET) 14 December 1965 (1965-12-14)	1,9
A	column 2, line 20 - line 66; figure 1	2
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Further documents are listed in the continuation of Box C.



See patent family annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
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- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Date of the actual completion of the international search

16 July 2009

Date of mailing of the international search report

27/07/2009

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No

PCT/NL2009/050233

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 458 830 A (WERDING WINFRIED J [CH]) 10 July 1984 (1984-07-10) abstract; figures 1,3-5 column 3, line 15 - column 8, line 44 -----	1-9

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2009/050233

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2743038	A	24-04-1956	NONE	
WO 2006107403	A	12-10-2006	US 2006226171 A1	12-10-2006
US 3223289	A	14-12-1965	FR 1314002 A	04-01-1963
US 4458830	A	10-07-1984	NONE	



# INTERNATIONAL SEARCH REPORT

International application No.

PCT/NL2009/050233

Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

The invention relates to a squeeze bottle (1), which consists of a resiliently deformable outer container (2) with a dispensing opening (3) and a flexible inner container (4) connected to the outer container (2) close to the dispensing opening. The dispensing opening is provided with a valve (7) comprising a first non-return valve (9). The outer container (2) further has an aerating opening (10) closable by a second non-return valve (12). The inner container (4) is also connected to the outer container (2) at the position of the aerated opening (10).

A sleeve (15) which the second non-return valve (12) is received can be arranged around the aerating opening (10). This sleeve (15) can be mounted in a foot (17) supporting the outer container (2).

The second non-return valve (12) can be integrated with the inner container.