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- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN,

KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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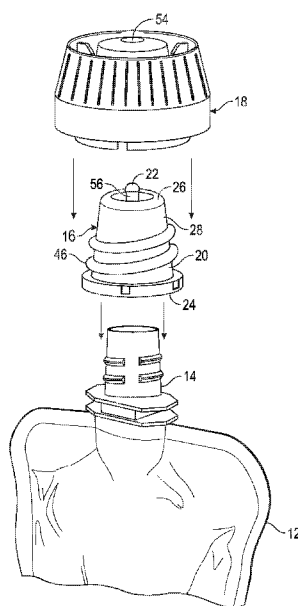
(54) **Title:** CLOSURE CAP ASSEMBLY

FIG. 2

(57) **Abstract:** A closure cap assembly (10) for a container (12) having a spout (14) is described. The closure cap assembly includes a spout adapter (16) and a cap (18). The spout adapter has a tubular body portion (20) and a pull portion (22). The body portion is configured to be fixed to the spout of the container, and the pull portion is positioned in a flow passage (32) of the body portion. A proximal end (34) of the pull portion is connected to the body portion to form a seal across the flow passage. The distal end (36) extends beyond the distal end (26) of the body portion. The cap has a top end (50) and a bottom end (52), is connected to the external surface (28) of the body portion, and is connected to the pull portion in a way that the pull portion separates from the body portion as the cap is removed from the body portion.

CLOSURE CAP ASSEMBLY

BACKGROUND

[0001] Flexible pouches for containing food and beverage products are frequently marketed for use by infants and small children. The flexible pouches are convenient, inexpensive, and provide ease of use. Typically, the flexible pouches include a spout for discharging the material and a removable closure cap for sealing the pouch. With the closure cap removed, product is able to flow from the spout of the pouch by the user pouring or squeezing the pouch.

[0002] The closure caps used for flexible pouches are generally sized to prevent the possibility that they are swallowed by a child. In addition, they are generally provided with a tamper evident feature in the form of a band that becomes separated from a cap body when the cap body is unscrewed from the spout to indicate whether the closure cap has been removed from the spout. For the closure caps currently known, once the closure cap is unscrewed, the tamper evident features breaks into a set of broken sections that remain associated to the cap body so the possibility that such sections are swallowed by a child is reduced. While these sections usually remain associated with the cap body, they can nevertheless be sharp and protrude from the cap body in a way that could harm a child, or they could become detached from the cap body and swallowed. In addition, with the cap body positioned on the spout, the broken sections can be re-positioned to appear as if the seal formed between the closure cap and the spout is not broken.

[0003] Another drawback of current closure caps is that that they do not extend into the spout. As such, with the closure cap secured to the spout, the food product

contained in the pouch is able to flow into the spout where it is susceptible to oxidation and discoloration.

[0004] To this end, a need exists for a closure cap assembly with a tamper evident feature positionable in the spout of a container to provide an audible sound to indicate the breaking of a seal and to create a barrier to product settling in the spout. It is to such a closure cap assembly that the inventive concepts disclosed herein are directed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a perspective view of a closure cap assembly constructed in accordance with the inventive concepts disclosed herein shown positioned on a container in a sealed condition.

[0006] FIG. 2 is an exploded, perspective view of the closure cap assembly and the container.

[0007] FIG. 3 is a vertical sectional view of the closure cap assembly shown in the sealed condition relative to a spout of the container.

[0008] FIG. 4 is a perspective view of the closure cap assembly shown with a cap removed from a spout adapter in an unsealed condition.

[0009] FIG. 5 is a vertical sectional view of the closure cap assembly of FIG. 1 shown in an unsealed condition.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0010] In the following detailed description of embodiments of the inventive concepts, numerous specific details are set forth in order to provide a more thorough understanding of the inventive concepts. However, it will be apparent to one of ordinary skill in the art that the inventive concepts disclosed and claimed herein may be practiced without these specific details. In other instances, well-

known features have not been described in detail to avoid unnecessarily complicating the instant disclosure.

[0011] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having" or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of elements or steps is not necessarily limited to only those elements or steps and may include other elements, steps, or features not expressly listed or inherently present therein.

[0012] Unless expressly stated to the contrary, "or" refers to an inclusive or and not to an exclusive or. For example, a condition A or B is satisfied by anyone of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B is true (or present).

[0013] In addition, use of the "a" or "an" are employed to describe elements and components of the embodiments herein. This is done merely for convenience and to give a general sense of the inventive concepts. This description should be read to include one or at least one and the singular also includes the plural unless it is obvious that it is meant otherwise.

[0014] Throughout this disclosure and the claims, the terms "about," "approximately," and "substantially" are intended to signify that the item being qualified is not limited to the exact value specified, but includes some slight variations or deviations therefrom, caused by measuring error, manufacturing tolerances, stress exerted on various parts, wear and tear, or combinations thereof, for example.

[0015] The use of the term "at least one" will be understood to include one as well as any quantity more than one, including but not limited to each of, 2, 3, 4, 5,

10, 15, 20, 30, 40, 50, 100, and all integers there between. The term "at least one" may extend up to 100 or 1000 or more, depending on the term to which it is attached; in addition, the quantities of 100/1000 are not to be considered limiting, as higher limits may also produce satisfactory results. Singular terms shall include pluralities and plural terms shall include the singular unless indicated otherwise.

[0016] The term "or combinations thereof" as used herein refers to all permutations and/or combinations of the listed items preceding the term. For example, "A, B, C, or combinations thereof" is intended to include at least one of: A, B, C, AB, AC, BC, or ABC, and if order is important in a particular context, also BA, CA, CB, CBA, BCA, ACB, BAC, or CAB. Continuing with this example, expressly included are combinations that contain repeats of one or more item or term, such as BB, AAA, AAB, BBC, AAABCCCC, CBBAAA, CABABB, and so forth. The skilled artisan will understand that typically there is no limit on the number of items or terms in any combination, unless otherwise apparent from the context.

[0017] Finally, as used herein any reference to "one embodiment" or "an embodiment" means that a particular element, feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily referring to the same embodiment, although the inventive concepts disclosed herein are intended to encompass all combinations and permutations including one or more of the features of the embodiments described herein.

[0018] Referring now the drawings, and more particularly to FIG. 1, a closure cap assembly 10 constructed in accordance with the inventive concepts disclosed herein is illustrated in sealing engagement with a spout 12 of a container 14, such

as a flexible pouch. The closure cap 10 is particularly well suited for sealing containers used for flowable foods and juices which are marketed for infants and children. Flexible pouches are well known by those having ordinary skill in the art and, therefore, will not be described in detail herein. In general, the container 14 may be comprised of any non-permeable flexible material. For example, the container 14 may be made of one or more flexible sheets, such as polymer sheets or foil sheets. The container 14 may be used to contain any flowable material. Non-exclusive examples of flowable material include food, beverages, granules, and gases. In one example, the flowable material may be pureed food products or beverages designed for consumption by children.

[0019] Referring now to FIGS. 1-5, in an exemplary embodiment, the closure cap assembly 10 includes a spout adapter 16 and a cap 18. The spout adapter 16 is designed to be fixed to the spout 14 of the container 12 after the container 12 has been filled with a selected food product via the spout 14. The cap 18 is initially positioned on the spout adapter 16, but is selectively removable from the spout adapter 16 to permit the food product of the container 12 to be dispensed from the container 12 via the spout 14 and the spout adapter 16 in a manner to be described below. The cap 18 can be re-positioned on the spout adapter 16 to close the spout 14 and the spout adapter 16.

[0020] Referring now to FIGS. 2 and 3, the spout adapter 16 has a tubular body portion 20 and a pull portion 22. The tubular body portion 20 is characterized as having a proximal end 24, a distal end 26, an external surface 28, and an internal surface 30 defining a flow passage 32 extending through the body portion 20 from the proximal end 26 to the distal end 28. The body portion 20 can be threaded or press-fit or snap-fit to the spout 14 and otherwise fixed to the spout 14 in a variety

of ways. For example, the body portion 20 can be fixed to the spout 14 with a suitable adhesive or by welding. In one version, the proximal end 24 may be provided with a plurality of spikes 33 (FIGS. 3 and 5) to facilitate fixation between the spout adapter 16 and the spout 14.

[0021] As best shown in FIG. 3, the pull portion 22 is illustrated as being generally cylindrically shaped and positioned in the flow passage 32 of the body portion 20 in a coaxial relationship to the body portion 20. The pull portion 22 has a proximal end 34 and a distal end 36. The proximal end 34 of the pull portion 20 is connected to the body portion 20 in a way to form a seal across the flow passage 32 between the proximal end 26 and the distal end 28 of the body portion 20. The pull portion 22 has a length such that the distal end 36 of the pull portion 22 extends beyond the distal end 26 of the body portion 20.

[0022] In one embodiment, the base portion 20 and the pull portion 22 are formed as a monolithic unit with the pull portion 22 being connected to the base portion 20 with a membrane 38 extending around the pull portion 22 to form the seal across the flow passage 32 until a user initially opens the container 12. The membrane 38 is provided with a circumferential line of weakness or tear line 40 that frangibly connects the pull portion 22 with the body portion 20. The circumferential line of weakness 40 is spaced outwardly from the proximal end of the pull member 22 such that the proximal end 34 of the pull member 22 is flared after the pull portion 22 separates from the body portion 20 (FIG. 5). In the illustrated embodiment, the membrane 38 includes an annular wall 42 extending downwardly from the distal end 26 of the body portion 20 toward the proximal end 24 of the body portion 20 so as to cooperate with the internal surface 30 of the body portion 30 to define an annular groove 43 for receiving at least a portion of

the spout 14 in a way that causes the proximal end 34 of the pull portion 22 to be positioned within the spout 14. The line of weakness 40 is formed by a groove 44 that extends around an underside of the membrane 38 between the annular wall 42 and the proximal end 34 of the pull portion 22. The line of weakness 40 may have other configurations. For example, a groove may be formed in the topside of the membrane 38. The pull portion 22 is connected to membrane 38 in a way that the membrane 38 is torn along the line of weakness 40 by the application of an upward pulling force on the pull portion 22 in a manner to be described below.

[0023] The membrane 38, and thus the seal, is shown to extend approximately midway into the flow passage 32. This configuration provides the advantage of positioning the seal within the spout 14 so as to maintain the food product in the lower portion of the flow passage 32 while the seal membrane 38 remains intact, thereby keeping the upper end of the flow passage 32 free of food product where the food product is more susceptible to discoloration from oxidation. It will be appreciated, however, that the membrane 38 may be located at any location in the flow passage 32 between the proximal end 24 and the distal end 26 of the body portion 20. Also, the membrane 38 may be connected to the body portion 20 and the pull portion 22 at other locations along the length of the body portion 20 and the pull portion 22.

[0024] The spout adapter 16 can be molded from a variety of suitable polymers and plastics, such as, for example, polyethylene. The body portion 20 may include external threads 46 for threaded engagement with corresponding internal threads 48 of the cap 18. However, it should be appreciated that the cap 18 may engage with the spout adapter 16 in other ways, such as snap-fit.

[0025] The cap 18 has a top end 50 and a bottom end 52. As discussed above, the cap 18 is threadingly connected to the external surface 28 of the body portion 20. In addition, the cap 18 is connected to the pull portion 22 in a way that the distal end 36 of the pull portion 22 extends beyond the top end 50 of the cap 18. More particularly, the top end 50 of the cap 18 has an opening 54 through which the pull portion 22 extends. The distal end 36 of the pull portion 22 is tapered to facilitate assembly of the cap 18 with the spout adapter 16 and in particular the cap 18 with the pull portion 22. The pull portion 22 has an annular groove 56 forming a top shoulder 58 and a bottom shoulder 60. The opening 54 of the cap 18 is sized so that the top end 50 of the cap 18 is captured between the top shoulder 58 and the bottom shoulder 60 upon moving the cap 18 past the distal end 36 of the pull portion 22 and so that the cap 18 is rotatable relative to the pull portion 22.

[0026] When the closure cap assembly 10 is assembled to the spout 14 by fixing the spout adapter 16 to the spout 14, the distal end 36 of the pull portion 22 extends beyond the top end 50 of the cap 18. Because the pull portion 22 is connected to the body portion 20, the pull portion 22 is non-slidable relative to the cap 18 thereby indicating to a user that the seal across the flow passage 32 is intact.

[0027] To open the spout 14 to permit the contents of the container 14 to be dispensed, a user removes the cap 18 from the spout adapter 16 by rotating the cap 18 relative to the spout adapter 16. Rotation of the cap 18 causes the cap 18 to move distally along the body portion 20 of the spout adapter 16. Because the pull portion 22 is connected to the cap 18, the distal movement of the cap 18 causes an upward force to be applied to the pull portion 22. Upon sufficient force being applied to the pull portion 22, the membrane 38 tears along the circumferential line of weakness 40 thereby separating the pull portion 22 from the

body portion 20 and opening the flow passage 32. Tearing of the membrane 38 creates an audible sound to the user indicating breaking of the seal. In addition to the audible indicator that the seal is broken, the annular groove 56 of the pull portion 22 has a length such that the pull portion is able to slide relative to the cap 18. Thus, movement of the distal end 36 of the pull portion 22 relative to the cap 18 provides a visual indicator to the user that the seal is broken.

[0028] With the cap 18 and the pull portion 22 removed from the body portion 20 of the spout adapter 16 (FIG. 4), the contents of the container 12 are able to be dispensed from the container 12 through the flow passage 32 of the body portion 22.

[0029] If desired, the cap 18 can be re-positioned on the body portion 20 of the spout adapter 16 to close the flow passage 32 of the spout adapter 16 by screwing the cap 18 on the body portion 20 (FIG. 5). Because the pull portion 22 remains connected to the cap 18, the flared end of the proximal end 34 of the pull portion 22 serves to push the food product from the upper portion of the flow passage 32 down into the container 12 as the cap 18 travels proximally along the body portion 20 thereby removing the food product from the upper portion of the flow passage 32 where the food product is more susceptible to discoloration from oxidation.

[0030] From the above description, it is clear that the inventive concepts disclosed and claimed herein are well adapted to carry out the objects and to attain the advantages mentioned herein, as well as those inherent in the invention. While exemplary embodiments of the inventive concepts have been described for purposes of this disclosure, it will be understood that numerous changes may be made which will readily suggest themselves to those skilled in the art and which

are accomplished within the spirit of the inventive concepts disclosed and claimed herein.

Exemplary Claims:

1. A closure cap assembly for a container having a spout, comprising:
 - a spout adapter comprising:
 - a tubular body portion having a proximal end, a distal end, an external surface, and an internal surface defining a flow passage extending through the body portion from the proximal end to the distal end, the body portion configured to be fixed to the spout of the container; and
 - a pull portion positioned in the flow passage of the body portion and having a proximal end and a distal end, the proximal end connected to the body portion to form a seal across the flow passage between the proximal end and the distal end of the body portion, the distal end extending beyond the distal end of the body portion; and
 - a cap having a top end and a bottom end, the cap connected to the external surface of the body portion and connected to the pull portion in a way that the pull portion separates from the body portion as the cap is removed from the body portion.
2. The closure cap assembly of claim 1, wherein base portion and the pull portion are formed as a monolithic unit.
3. The closure cap assembly of claim 1, wherein separation of the pull portion from the body portion creates an audible sound indicating breaking of the seal.

4. The closure cap assembly of claim 1, wherein the pull portion is connected to the body portion with a membrane having a circumferential line of weakness.

5. The closure cap assembly of claim 4, wherein the circumferential line of weakness is spaced outwardly from the proximal end of the pull member such that the proximal end of the pull member is flared after the pull portion separates from the body portion.

6. The closure cap assembly of claim 1, wherein the distal end of the pull portion extends beyond the top end of the cap.

7. The closure cap assembly of claim 6, wherein the pull portion is slidably connected to the cap after the pull portion separates from the body portion.

8. The closure cap assembly of claim 7, wherein the pull portion has an annular groove defining a top shoulder and a bottom shoulder, and wherein the top end of the cap has an opening through which the pull portion extends and which is sized so that the top end of the cap is captured between the top shoulder and the bottom shoulder.

9. A closure cap assembly in combination with a spout for a container, the spout defining a flow passage, the closure cap comprising:
a spout adapter comprising:

a tubular body portion having a proximal end, a distal end, an external surface, and an internal surface defining a flow passage extending through the body portion from the proximal end to the distal end, the body portion fixed to the spout of the container; and

a pull portion positioned in the flow passage of the body portion and having a proximal end and a distal end, the proximal end connected to the body portion to form a seal across the flow passage between the proximal end and the distal end of the body portion, the distal end extending beyond the distal end of the body portion; and

a cap having a top end and a bottom end, the cap connected to the external surface of the body portion and connected to the pull portion in a way that the pull portion separates from the body portion as the cap is removed from the body portion.

10. The combination of claim 9, wherein separation of the pull portion from the body portion creates an audible sound indicating breaking of the seal.

11. The combination of claim 9, wherein the pull portion is connected to the body portion with a membrane having a circumferential line of weakness.

12. The combination of claim 11, wherein circumferential line of weakness is positioned within the spout.

13. The combination of claim 11, wherein the circumferential line of weakness is spaced outwardly from the proximal end of the pull member such

that the proximal end of the pull member is flared after the pull portion separates from the body portion.

14. The combination of claim 9, wherein the pull portion is slidably connected to the cap after the pull portion separates from the body portion.

15. The combination of claim 14, wherein the pull portion has an annular groove defining a top shoulder and a bottom shoulder, and wherein the top end of the cap has an opening through which the pull portion extends and which is sized so that the top end of the cap is captured between the top shoulder and the bottom shoulder.

16. A method of sealing the flow of material from a container having a spout defining a flow passage from the container, the method comprising:
obtaining a spout adapter comprising:

a tubular body portion having a proximal end, a distal end, an external surface, and an internal surface defining a flow passage extending through the body portion from the proximal end to the distal end; and

a pull portion positioned in the flow passage of the body portion and having a proximal end and a distal end, the proximal end connected to the body portion to form a seal across the flow passage between the proximal end and the distal end of the body portion, the distal end extending beyond the distal end of the body portion; and

connecting a cap having a top end and a bottom to the external surface of the body portion and to the pull portion in a way that the pull portion separates from the body portion as the cap is removed from the body portion; and
fixing the body portion of the spout adapter to the spout.

17. The method of claim 16, wherein in the step of obtaining the spout adapter, the pull portion is connected to the body portion with a membrane having a circumferential line of weakness.

18. The method of claim 16, wherein in the step of obtaining the spout adapter, the pull portion is slidably connected to the cap after the pull portion is detached from the body portion.

19. The method of claim 18, wherein in the step of obtaining the spout adapter, the pull portion has an annular groove defining a top shoulder and a bottom shoulder, and wherein the top end of the cap has an opening through which the pull portion extends and which is sized so that the top end of the cap is captured between the top shoulder and the bottom shoulder.

20. The method of claim 16, wherein detachment of the pull portion from the body portion creates an audible sound indicating breaking of the seal.

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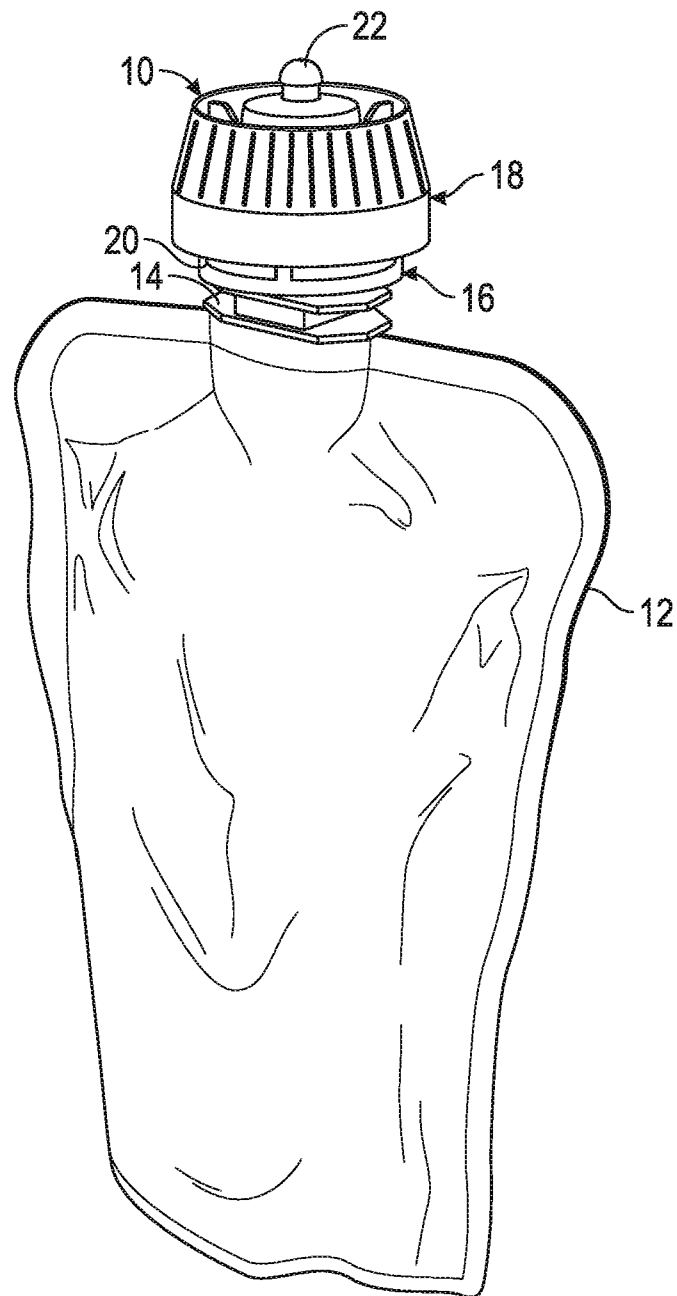


FIG. 1

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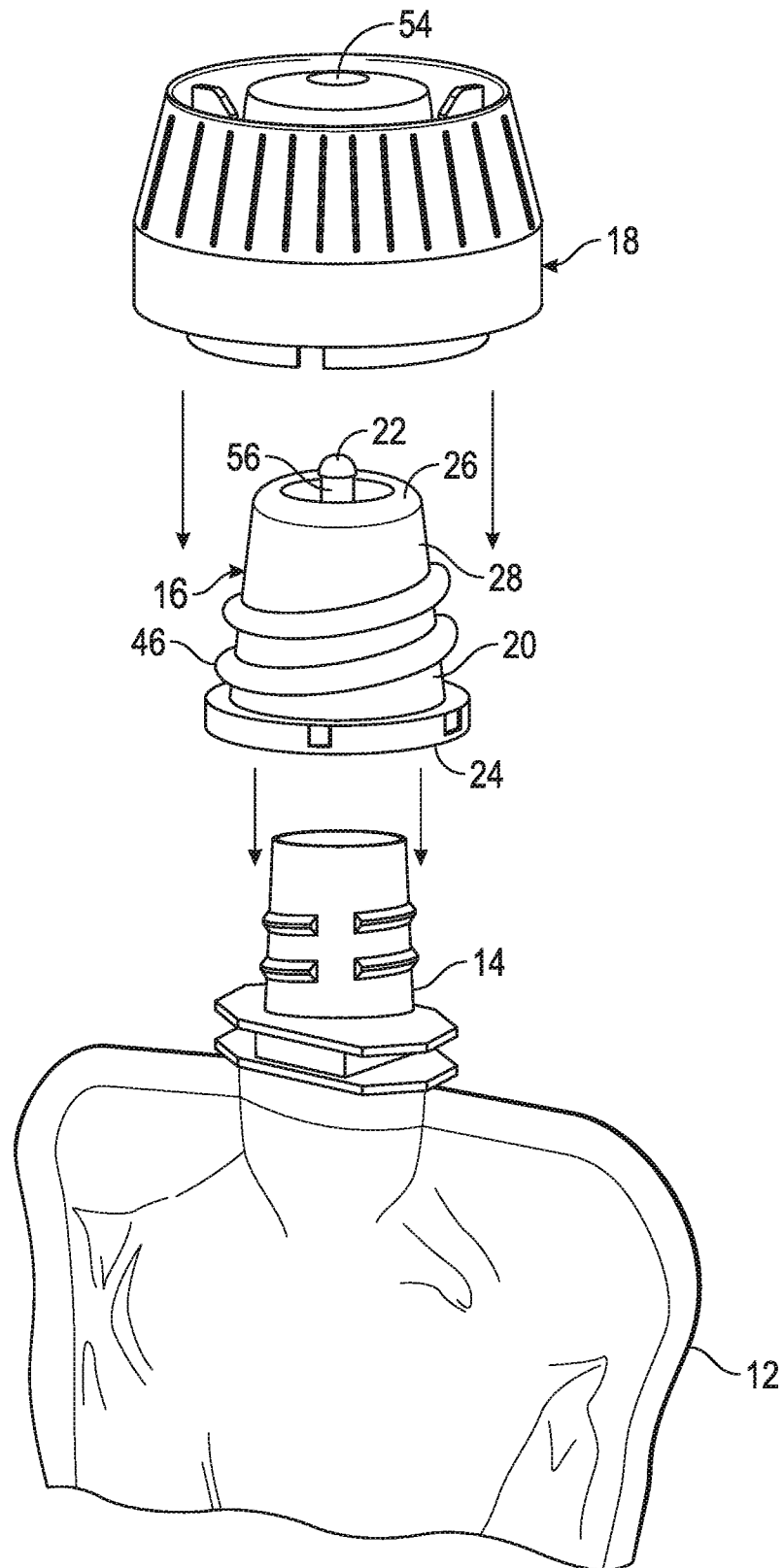


FIG. 2

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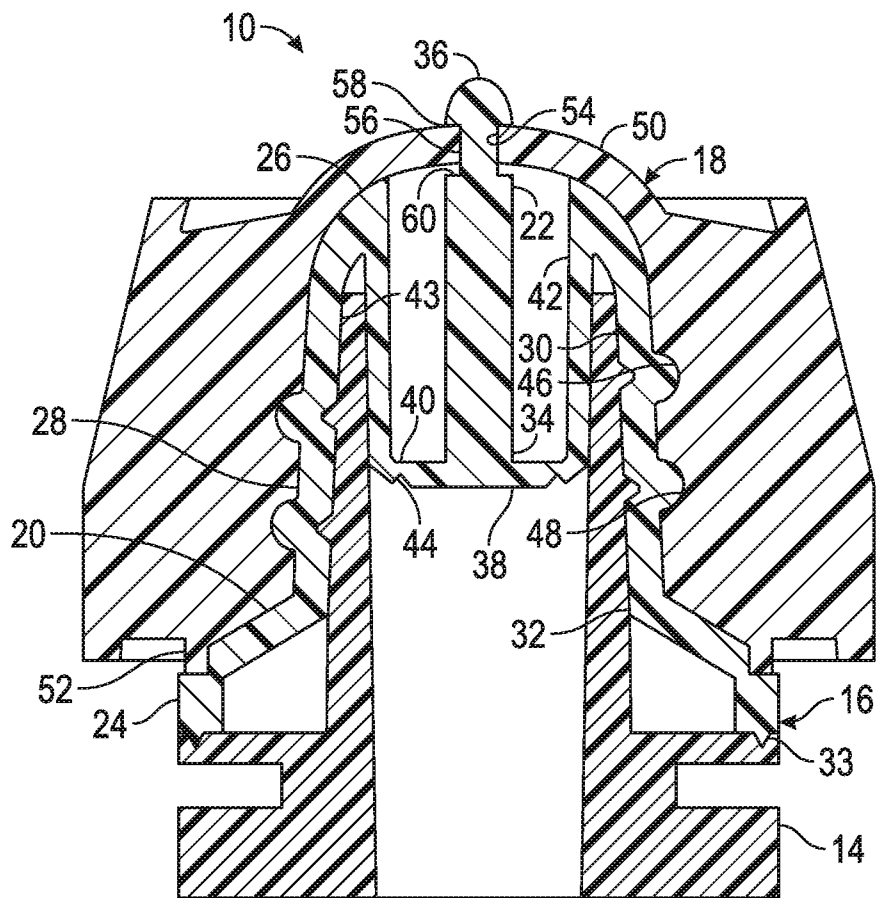


FIG. 3

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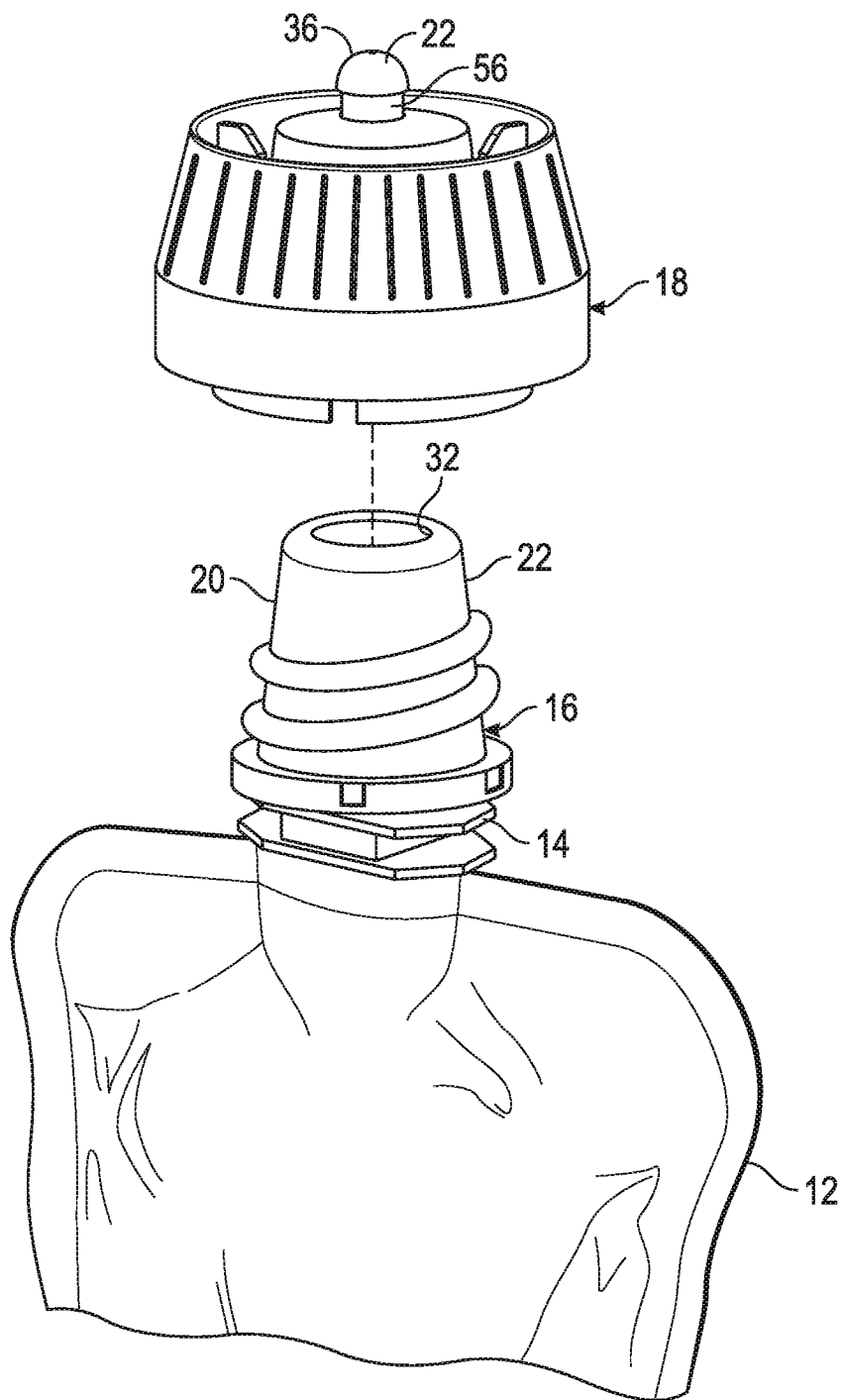


FIG. 4

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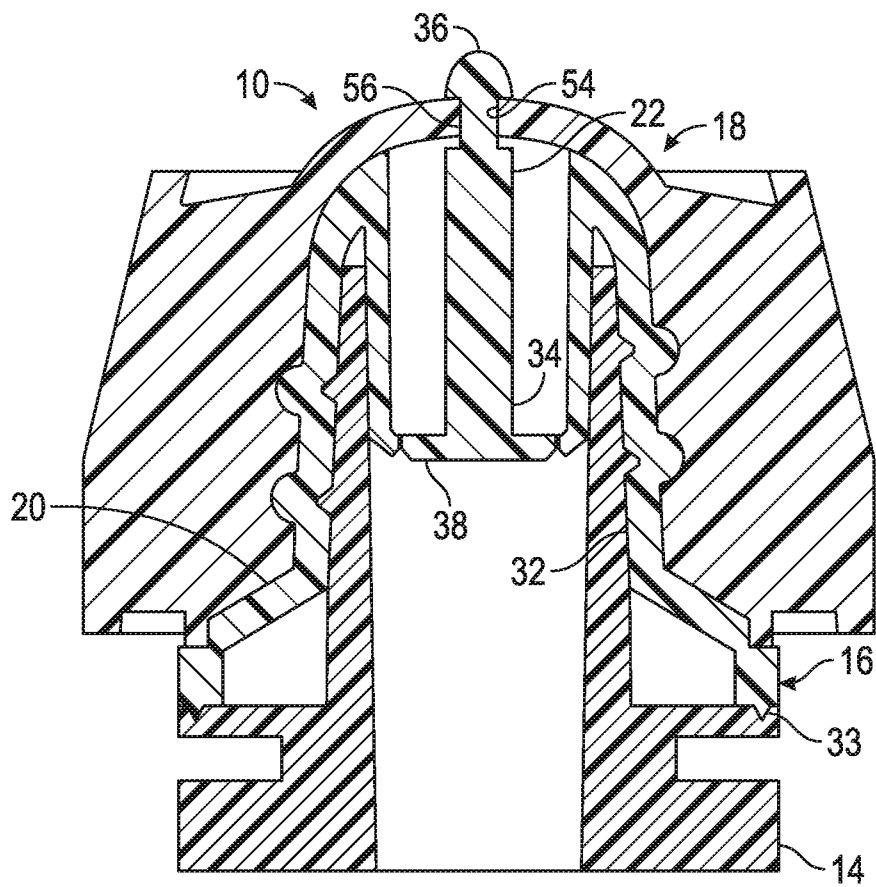


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2017/050544

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D51/22 B65D55/02 B65D75/58
ADD.

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2015/083724 A1 (TOKAN KOGYO CO LTD) 11 June 2015 (2015-06-11)	1-5, 9-13,16, 17,20
Y	abstract; figures 1,2a,10a	6-8,14, 15,18,19
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Y	----- GB 2 171 680 A (SUNBEAM PLASTICS CORP) 3 September 1986 (1986-09-03)	6-8,14, 15,18,19
A	page 1, line 100 - page 2, line 47; figures 1,2 ----- -/--	1,9,16

☒ 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 application or patent but published on or after the international filing date

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Date of the actual completion of the international search

2 March 2017

Date of mailing of the international search report

10/03/2017

Name and mailing address of the ISA/

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Zanghi, Amedeo

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2017/050544

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2007/114692 A1 (IPN IP BV [NL]; LAST LAURENS [NL]; VAN DER MOLEN PETER-JAN [NL]) 11 October 2007 (2007-10-11) page 7, line 5 - page 12, line 35; figure 3 pages 141-24	1-20
A	----- DE 10 2005 002471 A1 (BMF GES FUER INNOVATIVE TECHNO [DE]) 27 July 2006 (2006-07-27) paragraphs [0050] - [0054]; figure 2a	1-20
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INTERNATIONAL SEARCH REPORT

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