



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
01.02.2023 Bulletin 2023/05

(51) International Patent Classification (IPC):
B65D 5/74 (2006.01)

(21) Application number: **22183094.6**

(52) Cooperative Patent Classification (CPC):
B65D 5/748

(22) Date of filing: **05.07.2022**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

- **GORI, Luca**
40134 Bologna (IT)
- **CANI, Franco**
14100 Asti (IT)
- **VIANI, Tiziano**
42021 Bibbiano (IT)
- **SORBARA, Angelo**
42048 Rubiera (IT)

(30) Priority: **29.07.2021 EP 21188474**

(71) Applicant: **Tetra Laval Holdings & Finance S.A.**
1009 Pully (CH)

(74) Representative: **Tetra Pak - Patent Attorneys SE**
AB Tetra Pak
Patent Department
Ruben Rausing's gata
221 86 Lund (SE)

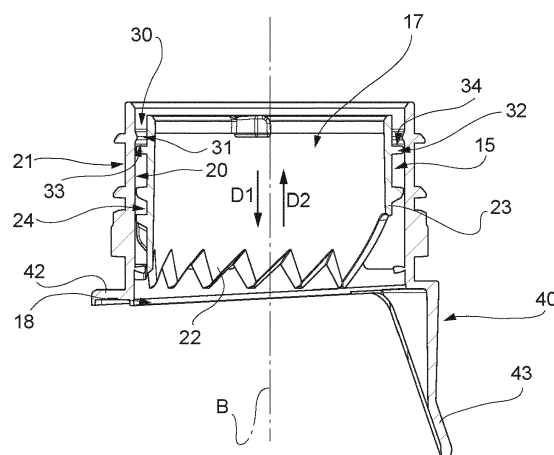
(72) Inventors:
• **LINGUITI, Martina**
41019 Soliera (IT)

(54) **OPENING DEVICE FOR A PACKAGE AND PACKAGE**

(57) There is described an opening device (3) for a package (1) having a designated pour opening covered with a separation membrane and filled with a pourable product. The opening device (3) comprises at least a collar (15, 15') delimiting a flow channel (16) extending between an inlet opening (18) of the collar (15, 15') configured to allow for the inlet of the pourable product into the flow channel (16) and a pouring outlet (19) of the collar

(15, 15') configured to allow for an outflow of the pourable product from the flow channel (16) and a cutter (17) configured to break the separation membrane and being at least partially arranged within the flow channel (16). The opening device (3) comprises a retaining device (30) having a retaining element (31, 31') protruding from an inner surface (20) of the collar (21) and an interaction element (32) connected to the cutter (17).

FIG. 3



Description

TECHNICAL FIELD

[0001] The present invention relates to an opening device for a package, in particular for a composite package, filled with a pourable product, even more particular filled with a pourable food product.

[0002] The present invention also relates to a package having a main body filled with a pourable product, even more particular filled with a pourable food product, and an opening device arranged on the main body.

BACKGROUND ART

[0003] As is known, many liquid or pourable food products, such as fruit juice, UHT (ultra-high-temperature treated) milk, wine, tomato sauce, etc., are sold in packages made of composite packaging material.

[0004] A typical example is the parallelepiped-shaped package for pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by sealing and folding a laminated strip packaging material. The packaging material has a multilayer structure comprising a carton and/or paper base layer, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene. In the case of aseptic packages for long-storage products, the packaging material also comprises a layer of oxygen-barrier material, e.g. an aluminum foil, which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material forming the inner face of the package eventually contacting the food product.

[0005] Some of the known packages, in particular a respective sealed main body of the packages formed from the packaging material, comprises a designated pour opening, which allows the outpouring of the pourable product from the package. Typically, the designated pour opening is covered by a separation membrane, which isolates an inner space of the main body from an outer environment and which is to be opened or to be removed or to be ruptured or to be cut or to be pierced prior to the first outpouring of the pourable product. It is also known to arrange an opening device having a collar and a closure on the main body about the designated pour opening so as to be able control the outpouring of the pourable product out of the main body and through the collar. Therefore, the collar has a pouring outlet so as to allow for a controlled outpouring of the pourable product from the package and the closure allows to selectively close and open the pouring outlet.

[0006] Some of the known opening devices comprise a cutter so as to pierce and/or open and/or cut the separation membrane covering the designated pour opening in a controlled manner.

[0007] Even though such opening devices work satisfyingly well, a need is felt in the sector to further improve the opening devices and/or the packages having opening

devices.

DISCLOSURE OF INVENTION

[0008] It is therefore an object of the present invention to provide in a straightforward and low-cost manner an improved opening device for a package, in particular a composite package, filled with a pourable product, even more particular filled with a pourable food product.

[0009] It is a further object of the present invention to provide in a straightforward and low-cost manner a package having a main body filled with a pourable product, in particular filled with a pourable food product, and an opening device applied on the main body.

[0010] According to the present invention, there is provided an opening device according to the independent claim.

[0011] Further advantageous embodiments of the opening device are specified in the respective dependent claims.

[0012] According to the present invention, there is also provided a package according to claim 14 or 15.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Two non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a package having a main body and an opening device according to a first embodiment of the present invention, with parts removed for clarity;

Figure 2 is an exploded view of the opening device of Figure 1, with parts removed for clarity;

Figure 3 is a sectioned view of the opening device of Figure 1, with parts removed for clarity;

Figure 4 is a perspective view of a portion of the opening device of Figure 1, with parts removed for clarity;

Figure 5 is a perspective view of a portion of an opening device according to a second embodiment of the present invention, with parts removed for clarity.

BEST MODES FOR CARRYING OUT THE INVENTION

[0014] Number 1 indicates as a whole a package, in particular a composite package, comprising:

- a main body 2, in a particular a composite main body, even more particular a sealed composite main body, being filled with a pourable product, in particular a pourable food product, and in particular having a designated pour opening (not shown and known as such) configured to allow for the outpouring of the pourable product from main body 2; and
- an opening device 3, in particular an opening device formed from a polymer, fitted to main body 2, in par-

ticalar to main body 2 about the designated pour opening.

[0015] Main body 2 may be obtained from a multilayer packaging material, in particular being provided in the form of a web. The packaging material may comprise at least a layer of fibrous material, such as e.g. paper or cardboard, and at least two layers of heat-seal plastic material, e.g. polyethylene, interposing the layer of fibrous material in between one another. One of these two layers of heat-seal plastic material may define an inner face of main body 2 contacting the pourable product.

[0016] Preferentially, the packaging material may also comprise a layer of gas- and light-barrier material, e.g. aluminum foil or ethylene vinyl alcohol (EVOH) film, in particular being arranged between one of the layers of the heat-seal plastic material and the layer of fibrous material. More preferentially, the packaging material may also comprise a further layer of heat-seal plastic material being interposed between the layer of gas- and light-barrier material and the layer of fibrous material.

[0017] According to a preferred non-limiting embodiment, opening device(s) 3 is(are) applied to main body(ies) 2 prior, during or after the formation, filling and sealing of main body(ies) 2 by means of a molding process and/or adhesive bonding and/or ultrasonic bonding and/or welding.

[0018] Alternatively, opening device(s) 3 can be applied onto the packaging material prior to arranging the packaging material within or during advancement of the packaging material within a packaging machine for forming, filling and sealing main body(ies) 2 from the packaging material.

[0019] According to some possible non-limiting embodiments, main body 2 may contain a pourable food product such as water, milk, milk-based drinks, yoghurt drinks, coffee-based drinks, fruit juice, beverages with pulp, tomato sauce, salt, sugar and the like.

[0020] With particular reference to Figure 1, main body 2 may extend along a central (longitudinal) axis A.

[0021] In particular, package 2 may comprise a first wall 4, in particular being transversal, even more particular perpendicular, to central axis A, from which main body 2 extends along central axis A. Preferentially, first wall 4 may define a support surface of package 2, which, in use, can be put in contact with a support, such as e.g. a shelf, when, in use, being e.g. exposed within a sales point, placed within a storage chamber, placed within a refrigerator or similar. In particular, when being arranged on a support, first wall 4 may define a bottom wall.

[0022] Moreover, main body 2 may also comprise a side wall 5 being (fixedly) connected to first wall 4 and extending, in particular substantially parallel to central axis A, from first wall 4.

[0023] Additionally, main body 2 may also comprise a second wall 6 opposite to first wall 4 and being (fixedly) connected to side wall 5. In other words, side wall 5 may be interposed between first wall 4 and second wall 6. In

particular, when being arranged on a support, second wall 6 may define a top wall.

[0024] According to a non-limiting embodiment, first wall 4 and second wall 6 may be parallel to one another.

[0025] Alternatively, first wall 4 and second wall 6 may be inclined with respect to one another. In other words, second wall 6 may define a slanted-top or a gable-top.

[0026] In particular, second wall 6 may comprise the designated pour opening.

[0027] Furthermore, main body 2 may comprise a separation membrane covering the designated pour opening so as to isolate an inner space 7 of main body 2 from an outer environment. Additionally, the separation membrane is at least partially (and non-reversibly) breakable (i.e. openable and/or rupturable and/or cuttable and/or pierceable), in particular so as to allow a loss of the integrity of the separation membrane, which again allows the outpouring of the pourable product out of main body 2.

[0028] Preferentially, the separation membrane may comprise a gas- and light-barrier material, e.g. aluminum foil or ethylene vinyl alcohol (EVOH) film.

[0029] According to a preferred non-limiting embodiment, the separation membrane is defined by a portion of the packaging material, in particular a portion of the layers of the packaging material being different from the layer of fibrous material. Preferentially, a portion of the layer of the gas- and light-barrier material may define the separation membrane.

[0030] With particular reference to Figures 1 to 4, opening device 3 comprises at least:

- a collar 15, in particular aligned with the designated pour opening, delimiting a flow channel 16 for the pourable product; and
- a (ring-shaped) cutter 17 configured to break (i.e. to rupture and/or cut and/or pierce and/or open) the separation membrane and being at least partially arranged within collar 15 and/or flow channel 16.

[0031] In more detail, collar 15 may comprise an inlet opening 18 configured to allow for an inlet of the pourable product, in particular from inner space 7, into flow channel 16 and a pouring outlet 19 configured to allow an outflow of the pourable product from flow channel 16 (and collar 15).

[0032] In even more detail, in use and once the integrity of the separation membrane is lost due to operation of cutter 17 (see for more details further below), the pourable product can flow from inner space 7 through the designated pour opening and/or inlet opening 18 into flow channel 16 and then through flow channel 16 and out of pouring outlet 19.

[0033] More specifically, flow channel 16 may extend between inlet opening 18 and pouring outlet 19.

[0034] In more detail, collar 15 may comprise an inner surface 20 facing and/or delimiting flow channel 16, and in particular also an outer surface 21 opposite to inner surface 20 (i.e. facing away from flow channel 16).

[0035] Moreover, collar 15 and/or flow channel 16 may extend along a central axis B.

[0036] Preferentially, collar 15 may have an annular cross-section profile with respect to a cross-sectional plane being perpendicular to central axis B.

[0037] Even more preferentially, collar 15 and/or inlet opening 18 and/or pouring outlet 19 may have a (substantially) circular cross-sectional profile, in particular with respect to a cross-sectional plane perpendicular to central axis B.

[0038] Cutter 17 is arranged, in particular moveably arranged, within flow channel 16.

[0039] Preferentially, cutter 17 may comprise at least a cutting section 22 configured to break the separation membrane. In particular, cutting section 22 may comprise, in particular consist of, a (curved) saw blade.

[0040] In particular, cutter 17 may be arranged in a rest position in which cutter 17 is detached from the separation membrane (so as to guarantee integrity of the separation membrane) and an active position in which cutter 17, in particular cutting section 22, is configured to break the separation membrane.

[0041] Even more particular, when package 1 is provided to an end customer, cutter 17 may be arranged in the rest position and the separation membrane is intact.

[0042] Cutter 17 may be arranged at a first axial position and a second axial position with respect to central axis B when being in respectively the rest position and the active position.

[0043] Preferentially, cutter 17, when being in the rest position and/or the first axial position, may be (substantially) fully arranged within flow channel 16.

[0044] Cutter 17, when being in the active position and/or the second axial position, may at least partially extend out of flow channel 16 and through inlet opening 18. In particular, at least cutting section 22 may extend out of flow channel 16 and through inlet opening 18.

[0045] In further detail, cutter 17, when being in the rest position, may be closer to pouring outlet 19 than when being in the active position.

[0046] Preferentially, cutter 17 is coaxially arranged within collar 15 and/or flow channel 16.

[0047] As will be explained in more detail further below, cutter 17 may be configured to at least translate along central axis B when, in use, moving between the rest position and the active position. Preferentially, cutter 17 may be configured to translate along and rotate about central axis B when, in use, moving between the rest position and the active position.

[0048] In particular, in use, during movement between the rest position and the active position cutter 17 moves along a first direction D1.

[0049] More specifically, cutter 17 may comprise a ring-shaped main portion 23 (i.e. having a cross-section with respect to central axis B with an annular shape) comprising and/or carrying cutting section 22.

[0050] Cutter 17, in particular main portion 23, may comprise an outer surface 24 facing inner surface 20, in

particular at least with cutter 17 being in the rest position.

[0051] Preferentially, opening device 3 may comprise an actuation device 25 configured to actuate and guide movement of the cutter 17 from the rest position to the active position.

[0052] Opening device 3 further comprises a retaining device 30 configured to block movement of cutter 17 out of flow channel 16 and through pouring outlet 19. In other words, retaining device 30 guarantees that cutter 17 cannot (accidentally) exit flow channel 16 through pouring outlet 19.

[0053] In more detail, retaining device 30 comprises:

- a retaining element 31 connected to, in particular protruding from, inner surface 20 (and into flow channel 16); and
- an interaction element 32 connected to, in particular protruding from, cutter 17, in particular outer surface 24.

[0054] Furthermore, retaining element 31 and interaction element 32 are configured to interact with one another so as to block movement of cutter 17 out of flow channel 16 and through pouring outlet 19.

[0055] Preferentially, retaining element 31 may be integral to collar 15 and/or interaction element 32 may be integral to cutter 17. Even more preferentially, retaining element 31 and collar 15 may be molded in a single piece and/or cutter and interaction element 32 may be molded in a single piece.

[0056] Preferentially, retaining element 31 and/or interaction element 32 may be interposed between outer surface 24 and inner surface 20.

[0057] According to some preferred non-limiting embodiments, interaction element 32 may be interposed between retaining element 31 and inlet opening 18 and/or retaining element 31 may be interposed between interaction element 32 and pouring outlet 19.

[0058] In more detail, interaction element 32 and retaining element 31 may be configured to interact with one another such that cutter 17 can unintentionally move, if at all, along a second direction D2 opposite to first direction D1 only to a certain degree (to a limit axial position) and to guarantee that cutter 17 cannot exit through pouring outlet 19.

[0059] More specifically, interaction element 32 and retaining element 31 may be configured to interact with one another with cutter 17 being positioned in and/or moved to a limit axial position with respect to central axis B. In particular, with cutter 17 being in the limit axial position, cutter 17 may be in the rest position or in a position in which cutter 17 is closer to pouring outlet 19 than when being in the rest position.

[0060] Furthermore, the limit axial position may define the axial position of cutter 17 at which cutter 17 is closer to pouring outlet 19 than in any other axial position. In particular, it should be considered that retaining element 31 is configured such to define and/or delimit the limit

axial position, even more particular as the interaction between interaction element 32 and retaining element 31 guarantees that cutter 17 cannot further move into second direction D2 once cutter 17 has reached the limit axial position.

[0061] Additionally, cutter 17 when being in the limit axial position may have the maximum possible distance from inlet opening 18.

[0062] Moreover, interaction element 32 and retaining element 31 may interact with one another with cutter 17 being in the limit axial position. In other words, once cutter 17 has reached the limit axial position, a possible movement of cutter 17 along second direction D2 is blocked by the interaction between interaction element 32 and retaining element 31.

[0063] With particular reference to Figures 2 to 4, retaining element 31 may comprise an abutment surface 33, in particular facing inlet opening 18, and interaction element 32 may have an engagement surface 34, in particular facing pouring outlet 19. In particular, engagement surface 34 may be configured to abut against abutment surface 33, in particular in the limit axial position, so as to block the movement of cutter 17 out of flow channel 16 and through pouring outlet 19.

[0064] Preferentially, retaining element 31 may comprise a curved transition surface 35 facing pouring outlet 19 and being configured to allow for insertion of cutter 17 into flow channel 16 during assembly of opening device 3. In particular, by having curved transition surface 35 one guarantees that a force acting between retaining element 31, in particular curved transition surface 35, and cutter 17 can be (easily) overcome.

[0065] According to the embodiment of Figures 2 to 4, retaining element 31 comprises, in particular consists of, a continuous ring. Thus, engagement surface 33 may have a continuous ring shape.

[0066] Alternatively, retaining element 31 may be arc-shaped.

[0067] Furthermore, interaction element 32 may comprise a single portion. Accordingly, engagement surface 34 may comprise a single engagement surface 34.

[0068] Alternatively, interaction element 32 may comprise a plurality of distinct, and in particular separated, portions. Accordingly, engagement surface 34 may comprise a plurality of distinct, and in particular also separated, surface portions.

[0069] In further detail and with particular reference to Figures 1 to 4, opening device 3 may also comprise

- a base frame 40 configured to be fitted and/or being fitted on main body 2, in particular second wall 6, and about the designated pour opening and carries collar 15; and
- a closure 41 configured to selectively open and close pouring outlet 19.

[0070] In more detail, base frame 40 may comprise at least a first wall portion 42 having a passage aligned, in

particular coaxial, with collar 15, in particular inlet opening 18. First wall portion 42 may be configured to be fitted and/or being fitted on main body 2, in particular second wall 6, and about the designated pour opening and may carry collar 15.

[0071] Additionally, but not necessarily, base frame 40 may also comprise a second wall portion 43 fixed to first wall portion 42 and configured to be and/or fitted onto side wall 5.

[0072] Moreover, opening device 3 may also comprise:

- a coupling ring 44 rotatably arranged around collar 15, in particular such that coupling ring 44 is inseparable from collar 15; and
- a connection element, in particular a tethering element, connected to, in particular non-rupturably connected to, coupling ring 44 and closure 41.

[0073] Advantageously, closure 41 may be controllable in at least:

- a closing position (see Figure 1) in which closure 41 may be configured to cover and/or may cover pouring outlet 19, in particular for impeding an outflow of the pourable product from collar 15; and
- an opening position (not specifically shown) in which closure 41 may be configured to be and/or may be detached from pouring outlet 19 so as to allow for an outflow of the pourable product.

[0074] In particular, closure 41 may be rotatably coupled (about central axis B) to collar 15 when being in the closing position.

[0075] Advantageously, opening device 3 may comprise an interaction device 45 (only partially shown) partially associated to (and/or connect to and/or carried by) collar 15 and partially associated to (and/or connect to and/or carried by) closure 41 and being configured such that a rotation of closure 41 about central axis B may move closure 41 from the closing position into and/or towards the opening position.

[0076] Opening device 3 may further comprise a tooth protrusion 48, associated to collar 15, and configured to cooperate with interaction device 45 to move closure 41 from the closing position into the opening position, upon rotation of closure 41. In particular, closure 41 comprises an interaction protrusion (not shown), configured to slide between the interaction device 45 and the tooth protrusion 48 upon rotation of closure 41. In other words, the tooth protrusion 48 and the interaction device 45 provide a guidance for the interaction protrusion, so to move closure 41 from the closing position to the opening position.

[0077] According to some preferred non-limiting embodiments, actuation device 25 may comprise first interaction members (not shown), in particular flaps, connected to closure 41, and second interaction members 46 connected to, in particular integrally connected to, cutter 17, in particular main portion 23.

[0078] Preferentially, actuation device 25 may also comprise a cam mechanism connected to collar 15 and/or cutter 17 and configured to guide movement of cutter 17 from the rest position to the active position.

[0079] In particular, the first interaction members and second interaction members may be configured to interact with one another for actuating movement of cutter 17 from the rest position to the active position.

[0080] Even more particular, a rotation of the first interaction members about central axis B may be actuated for moving cutter 17, in particular by means of a rototranslatory movement, from the rest position to the active position.

[0081] In use, outpouring of the pourable product from package 1, in particular main body 2, requires to open pouring outlet 19 and to break the separation membrane.

[0082] The separation membrane is broken by moving the cutter 17 from the rest position to the active position. This is achieved by the first interaction members rotating about central axis B.

[0083] With reference to Figure 5, number 15' indicates the collar of an opening device 3 according to an alternative embodiment of an opening device according to the present invention; as collar 15' is similar to collar 15, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0084] In particular, collar 15' differs from collar 15 in comprising retaining element 31'. Retaining element 31' is similar to retaining element 31 and therefore we limit the description of retaining element 31' to the differences with retaining element 31.

[0085] In particular, retaining element 31' comprises two or more ring portions 47. Even more particular, ring portions 47 may be detached from one another, i.e. ring portions 47 do not contact one another.

[0086] Preferentially, ring portions 47 may be angularly displaced from one another about central axis B.

[0087] According to the specific embodiment disclosed, ring portions 47 may have different dimensions and/or extensions. In the specific case, one can identify two groups of ring portions 47 being alternately arranged about central axis B.

[0088] Alternatively, all ring portions 47 could have the same dimensions or all ring portions 47 may have different dimensions or some ring portions 47 may have different dimensions.

[0089] Preferentially, each ring portion 47 may comprise a respective portion of abutment surface 33 and/or a respective portions of transition surface 35.

[0090] Base frame 40 of the specific embodiment of Figure 5 comprises first wall portion 42, but not second wall portion 43.

[0091] Alternatively, collar 15' could be part of an opening device 3 that comprises a base frame 40 having both first wall portion 42 and second wall portion 43.

[0092] The advantages of opening device 3 and/or package 1 according to the present invention will be clear

from the foregoing description.

[0093] In particular, by providing for retaining device 30 one guarantees that cutter 17 cannot exit from flow channel 16 and through pouring outlet 19.

[0094] Furthermore, retaining element 31 or retaining element 31' may be easily combined with respectively collar 15 and collar 15'.

[0095] Clearly, changes may be made to opening device 3 and/or package 1 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. Opening device (3) for a package (1), in particular a composite package, having a designated pour opening covered with a separation membrane and filled with a pourable product;
the opening device (3) comprises at least:

- a collar (15, 15') delimiting a flow channel (16) extending between an inlet opening (18) of the collar (15, 15') configured to allow for the inlet of the pourable product into the flow channel (16) and a pouring outlet (19) of the collar (15, 15') configured to allow for an outflow of the pourable product from the flow channel (16); and
- a cutter (17) configured to break the separation membrane and being at least partially arranged within the flow channel (16);

wherein the collar (15, 15') comprises an inner surface (20) facing the flow channel (16);

wherein the opening device (3) further comprises a retaining device (30) configured to block movement of the cutter (17) out of the flow channel (16) and through the pouring outlet (19);

wherein the retaining device (30) comprises a retaining element (31, 31') protruding from the inner surface (20) of the collar (21) and an interaction element (32) connected to the cutter (17);

wherein the retaining element (31, 31') and the interaction element (32) are configured to interact with one another so as to block movement of the cutter (17) out of the flow channel (16) and through the pouring outlet (19).

2. Opening device according to claim 1, wherein the collar (15, 15') extends along a central axis (B); wherein the interaction element (32) and the retaining element (31, 31') are configured to interact with one another with the cutter (17) being positioned in and/or moved to a limit axial position with respect to

the central axis (B).

3. Opening device according to claim 1 or 2, wherein the retaining element (31, 31') comprises an abutment surface (33) facing the inlet opening (18) and the interaction element (32) has an engagement surface (34); wherein the engagement surface (34) is configured to abut against the abutment surface (33) so as to block the movement of the cutter (17) out of the flow channel (16) and through the pouring outlet (19).
4. Opening device according to any one of the preceding claims, wherein the cutter (17) comprises a main body (23) carrying a cutting section (22) of the cutter (17) and having a cross-section with an annular shape; wherein the interaction element (32) protrudes from an outer surface (24) of the main portion (23) facing the inner surface (20) of the collar (15, 15').
5. Opening device according to any one of the preceding claims, wherein the retaining element (31, 31') is integrally connected to the collar (15, 15') and/or the interaction element (32) is integrally connected to the cutter (17).
6. Opening device according to any one of the preceding claims, wherein the retaining element (31) comprises and/or is a continuous ring or is arc-shaped.
7. Opening device according to any one of claims 1 to 5, wherein the retaining element (31') comprises at least two ring portions (47), the ring portions (47) being detached from one another.
8. Opening device according to claim 7, wherein the retaining element (31') comprises a plurality of ring portions (47) angularly displaced from one another about a central axis (B) of the collar (15').
9. Opening device according to any one of the preceding claims, wherein the retaining element (31, 31') comprises a transition surface (35) facing the pouring outlet (19) and being configured to allow for insertion of the cutter (17) into the flow channel (16) during assembly of the opening device (3).
10. Opening device according to any one of the preceding claims, wherein the interaction element (32) is interposed between the retaining element (31, 31') and the inlet opening (18) and/or the retaining element (31, 31') is interposed between the pouring outlet (19) and the interaction element (32).
11. Opening device according to any one of the preceding claims, wherein the cutter (17) is arrangeable in a rest position in which the cutter (17) is detached from the separation membrane and an active position in which the cutter (17) is configured to break the separation membrane.
12. Opening device according to claim 11, and further comprising an actuation device (25) configured to actuate movement of the cutter (17) from the rest position to the active position.
13. Opening device according to any one of the preceding claims, and further comprising:
 - a base frame (40) configured to be fitted and/or being fitted on the main body (2) and about the designated pour opening and carrying collar (15, 15'); and
 - a closure (41) configured to selectively open and close the pouring outlet (19).
14. Package (1) comprising:
 - a main body (2) filled with a pourable product and having a designated pour opening covered with a separation membrane; and
 - an opening device (3) according to any one of the preceding claims fitted about the designated pour opening.
15. Package according to claim 14, wherein the main body (2) is formed from a multilayer packaging material.

FIG. 1

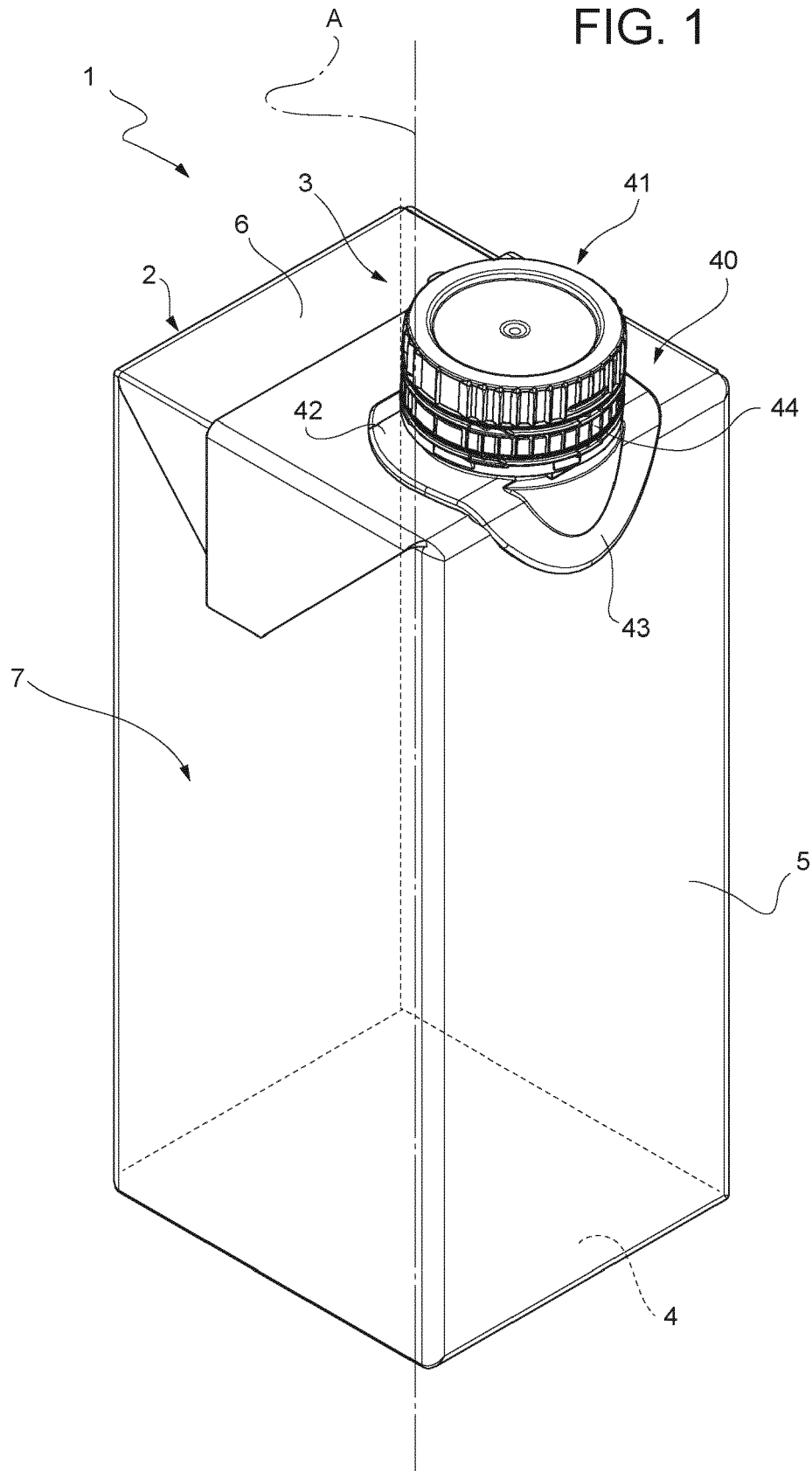


FIG. 2

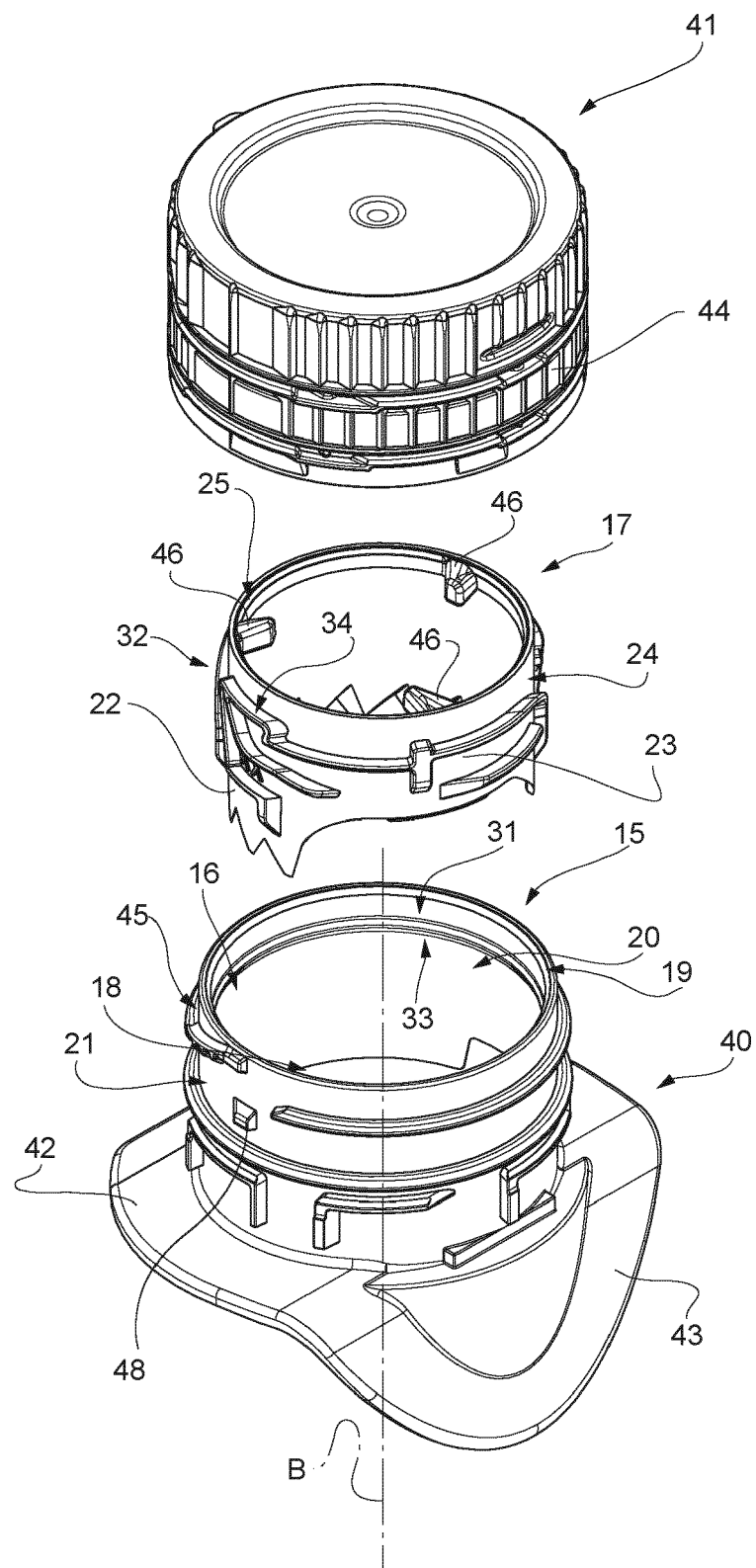


FIG. 3

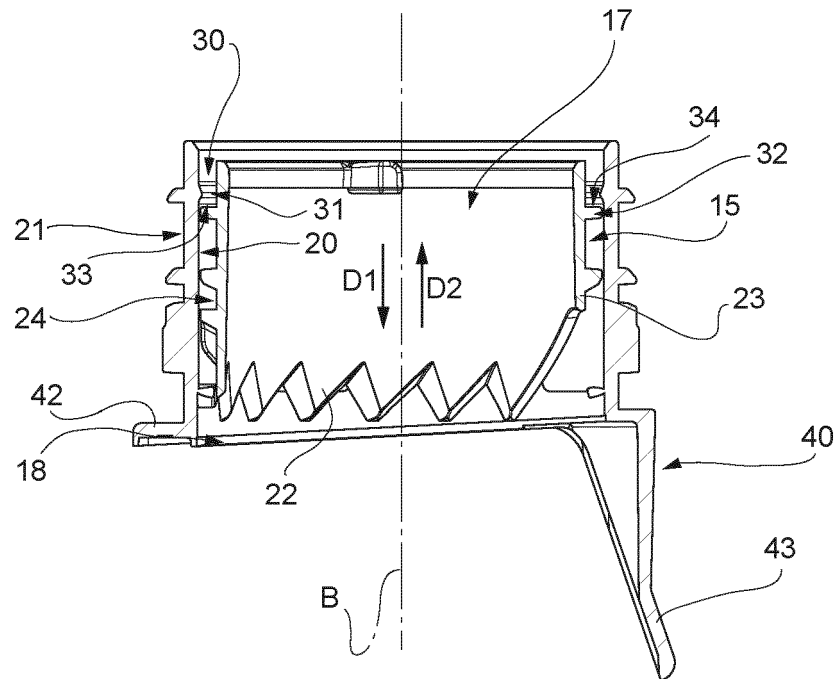


FIG. 4

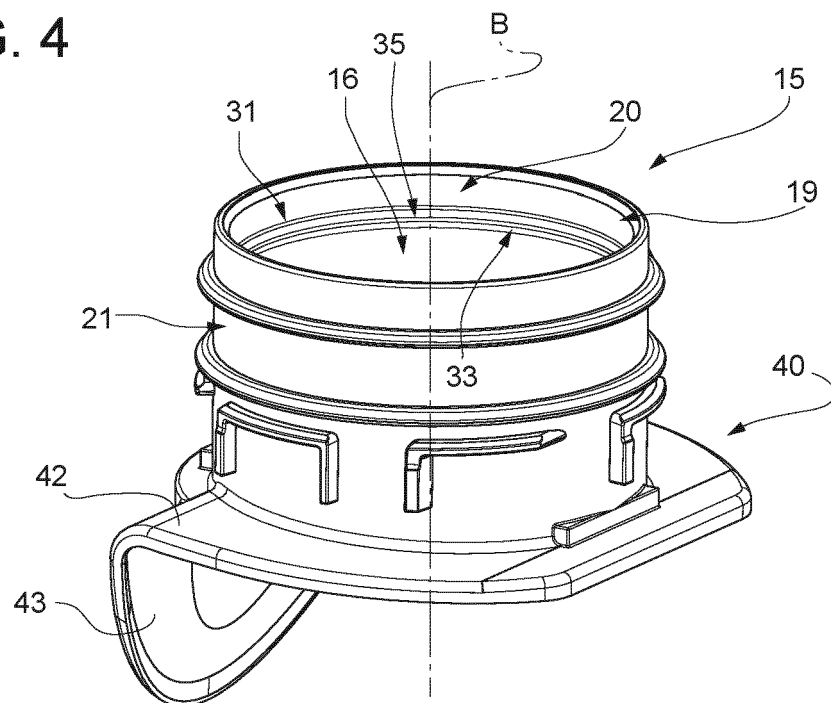
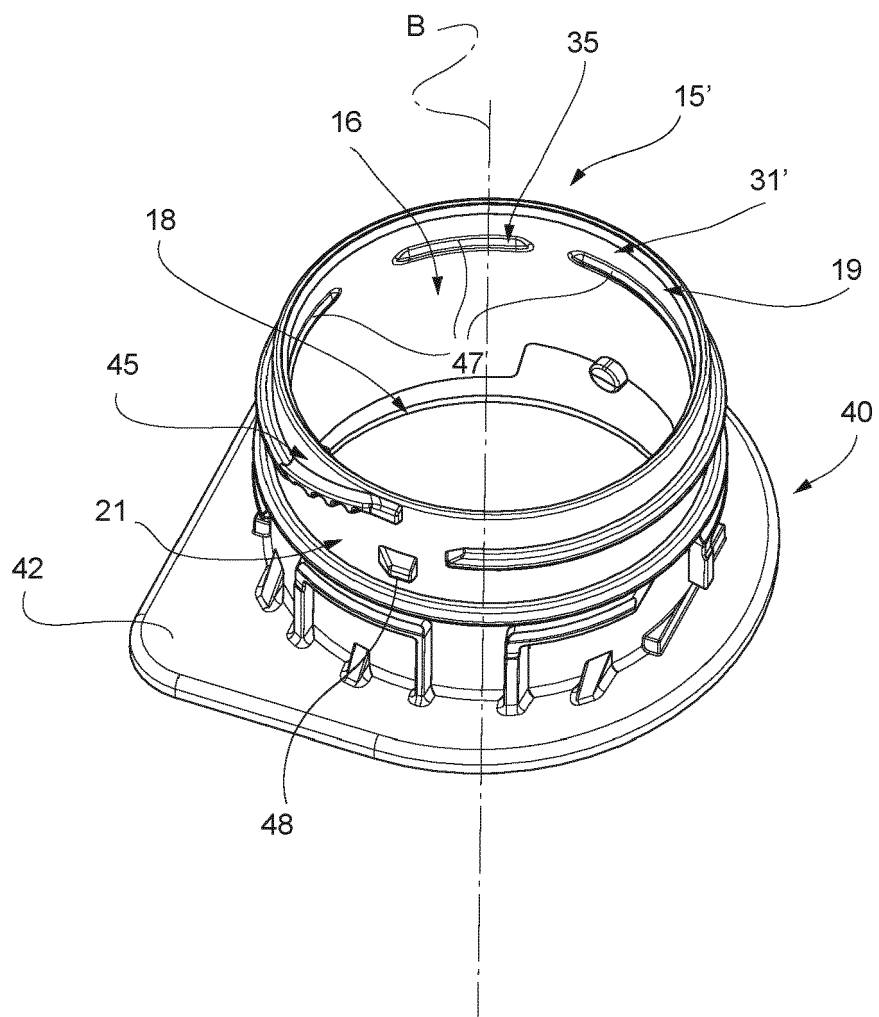


FIG. 5





EUROPEAN SEARCH REPORT

Application Number

EP 22 18 3094

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 297 696 A (BERNSTEIN LINDA A [US] ET AL) 29 March 1994 (1994-03-29) * column 1, line 40 - column 4, line 35 * * figures 1-6 *	1-15	INV. B65D5/74
X	US 2005/242113 A1 (WEIST MARIO [DE]) 3 November 2005 (2005-11-03) * paragraphs [0001] - [0020] * * figures 1-7 *	1-15	
X	US 2016/200491 A1 (DUBACH WERNER F [CH]) 14 July 2016 (2016-07-14) * paragraphs [0001] - [0043] * * figures 1-13 *	1-15	
X	JP H08 133324 A (DAINIPPON PRINTING CO LTD) 28 May 1996 (1996-05-28) * paragraphs [0001] - [0028] * * figures 1-8 *	1-5, 7-15	
X	WO 2020/206215 A1 (NYPRO INC [US]) 8 October 2020 (2020-10-08) * pages 1-10 * * figures 1-19C *	1-15	TECHNICAL FIELDS SEARCHED (IPC) B65D
X,P	EP 3 943 408 A1 (SIG TECHNOLOGY AG [CH]) 26 January 2022 (2022-01-26) * paragraphs [0001] - [0038] * * figures 1-7C *	1-15	
The present search report has been drawn up for all claims			

4

Place of search Munich	Date of completion of the search 2 December 2022	Examiner Duc, Emmanuel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 18 3094

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-12-2022

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5297696 A	29-03-1994	US 5297696 A	29-03-1994
		US 5366114 A	22-11-1994
US 2005242113 A1	03-11-2005	AU 2003222713 A1	19-12-2003
		BR 0311396 A	15-03-2005
		CA 2485300 A1	11-12-2003
		CN 1655991 A	17-08-2005
		EP 1509456 A1	02-03-2005
		ES 2270005 T3	01-04-2007
		KR 20040106581 A	17-12-2004
		MX PA04011678 A	05-07-2005
		RU 2314238 C2	10-01-2008
		US 2005242113 A1	03-11-2005
		WO 03101843 A1	11-12-2003
US 2016200491 A1	14-07-2016	CH 708556 A2	13-03-2015
		EP 3041753 A1	13-07-2016
		US 2016200491 A1	14-07-2016
		WO 2015032754 A1	12-03-2015
JP H08133324 A	28-05-1996	JP 3562775 B2	08-09-2004
		JP H08133324 A	28-05-1996
WO 2020206215 A1	08-10-2020	CN 113853343 A	28-12-2021
		EP 3947180 A1	09-02-2022
		US 2022177188 A1	09-06-2022
		WO 2020206215 A1	08-10-2020
EP 3943408 A1	26-01-2022	CN 113968415 A	25-01-2022
		EP 3943408 A1	26-01-2022
		WO 2022017662 A1	27-01-2022