United States Patent Application Publication	20250256885
Kind Code	A1
Publication Date	August 14, 2025
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OPENING DEVICE FOR A PACKAGE AND PACKAGE THEREWITH

Abstract

An opening device includes a collar and a cutter at least partially arranged within a flow channel delimited by the collar. The opening device further comprises a retaining device configured to block movement of the cutter out of the flow channel and through a pouring outlet of the collar. The opening device, also comprises a flange protruding from the cutter.

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Appl. No.: **18/856980**

Filed (or PCT Filed): **June 21, 2023**

PCT No.: **PCT/EP2023/066845**

Foreign Application Priority Data

EP	22182243.0	Jun. 30, 2022

Publication Classification

Int. Cl.: **B65D5/74** (20060101); **B65D51/22** (20060101)

U.S. Cl.:

CPC **B65D5/748** (20130101); **B65D51/226** (20130101); B65D2251/0015 (20130101); B65D2251/0093 (20130101)

Background/Summary

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 to 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 break 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 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 **15**.

Description

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:
[0014] FIG. **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;
[0015] FIG. **2** is an exploded view of the opening device of FIG. **1**, with parts removed for clarity;
[0016] FIG. **3** is a top perspective view of portions of the opening device of FIG. **1**, with parts removed for clarity;
[0017] FIG. **4** is a sectioned view of a portion of the opening device of FIG. **1**, with parts removed for clarity;
[0018] FIG. **5** is a top perspective view of a portion of an opening device according to a second embodiment of the present invention, with parts removed for clarity; and
[0019] FIG. **6** is a sectioned view of portions of the opening device of FIG. **5**, with parts removed for clarity.
BEST MODES FOR CARRYING OUT THE INVENTION
[0020] Number **1** indicates as a whole a package, in particular a composite package, comprising:
[0021] 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 [0022] an opening device **3**, in particular an opening device formed from a polymer, fitted to main body **2**, in particular to main body **2** about the designated pour opening.
[0023] 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. a 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.
[0024] 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, i 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.
[0025] According to a preferred non-limiting embodiment, each opening device **3** is applied to the respective main body **2** prior, during or after forming, filling and sealing of the respective main body **2** by means of a molding process and/or adhesive bonding and/or ultrasonic bonding and/or welding.
[0026] Alternatively, each opening device **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 the respective main body **2** from the packaging material.
[0027] 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.
[0028] With particular reference to FIG. **1**, main body **2** may extend along a central (longitudinal) axis A.
[0029] 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 supporting surface of package **2**, which, in use, can be put in contact with a support element, 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 element first wall **4** may define a bottom wall.
[0030] Moreover, main body **2** may also comprise a side wall **5** being (fixedly) connected to first wall **4** and extending from first wall **4**.
[0031] 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 element, second wall **6** may define a top wall.
[0032] According to a non-limiting embodiment, first wall **4** and second wall **6** may be parallel to one another.
[0033] 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.
[0034] In particular, second wall **6** may comprise the designated pour opening.
[0035] 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 may be 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 therefore allows the outpouring of the pourable product out of main body **2**.
[0036] Preferentially, the separation membrane may comprise a gas- and light-barrier material, e.g. aluminum foil or ethylene vinyl alcohol (EVOH) film.
[0037] According to a preferred non-limiting embodiment, the separation membrane may be 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, the separation membrane may comprise a portion of the layer of the gas- and light-barrier material.
[0038] With particular reference to FIGS. **1** to **4**, opening device **3** comprises at least: [0039] a collar **15**, in particular aligned with the designated pour opening, delimiting a flow channel **16** for the pourable product; and [0040] 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**.
[0041] In more detail, collar **15** may comprise an inlet opening **18** configured to allow for an inflow 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**).
[0042] Preferentially, flow channel **16** may extend between inlet opening **18** and pouring outlet **19**.
[0043] 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**.
[0044] 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**).
[0045] In particular, inner surface **20** may also face cutter **17** with cutter **17** being at least partially

arranged within flow channel **16**.
[0046] Moreover, collar **15** and/or flow channel **16** may extend along a central axis B.
[0047] Preferentially, collar **15** may have an annular cross-section profile in a cross-sectional plane being perpendicular to central axis B.
[0048] 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 in a cross-sectional plane perpendicular to central axis B.
[0049] Cutter **17** may be arranged, in particular moveably arranged, within flow channel **16**.
[0050] Preferentially, cutter **17** may extend along and/or have a central axis C.
[0051] In particular, central axis C may be coaxial to central axis B with cutter **17** being at least partially placed within flow channel **16**. In other words, cutter **17** when being at least partially arranged within flow channel **16** may be coaxial to collar **15**.
[0052] 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.
[0053] Moreover, cutting section **22** may be arranged at a first end portion **23** of cutter **17**.
[0054] Preferentially, cutter **17** may be controlled 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**, may be configured to break the separation membrane.
[0055] 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. Moreover, control of cutter **17** from the rest position to the active position may be actuated once. After the separation membrane has been broken, it is not necessary to repeatedly control cutter **17** between the active position and the rest position.
[0056] Cutter **17** may be arranged in 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.
[0057] Preferentially, cutter **17**, when being in the rest position and/or the first position, may be axial (substantially) fully arranged within flow channel **16**.
[0058] 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**.
[0059] 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.
[0060] 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.
[0061] In particular, in use, during movement between the rest position and the active position cutter **17** moves along a first direction D**1**.
[0062] More specifically, cutter **17** may be ring-shaped (i.e. have a cross-section with an annular shape in a plane perpendicular to central axis B).
[0063] Cutter **17** may comprise an outer surface **24** facing inner surface **20**, in particular at least with cutter **17** being in the rest position.
[0064] Preferentially, opening device **3** may comprise an actuation device configured to actuate and guide movement of the cutter **17** from the rest position to the active position.
[0065] Opening device **3** further comprises a retaining device configured to block movement of cutter **17** out of flow channel **16** and through pouring outlet **19**. In other words, the retaining device guarantees that cutter **17** cannot (accidently) exit from flow channel **16** through pouring outlet **19**.
[0066] In more detail, the retaining device may comprise: [0067] a retaining group **31** connected to,

in particular protruding from, inner surface **20** (and into flow channel **16**); and [0068] an interaction group **32** connected to, and in particular protruding from, cutter **17**, in particular outer surface **24**.
[0069] Furthermore, retaining group **31** and interaction group **32** may be configured to interact with one another so as to block movement of cutter **17** out of flow channel **16** and through pouring outlet **19**.
[0070] Preferentially, retaining group **31** may be integral to collar **15** and/or interaction group **32** may be integral to cutter **17**. Even more preferentially, retaining group **31** and collar **15** may be molded in a single piece and/or cutter **17** and interaction group **32** may be molded in a single piece.
[0071] Preferentially, retaining group **31** and/or interaction group **32** may be interposed between outer surface **24** and inner surface **20**.
[0072] According to some preferred non-limiting embodiments, interaction group **32** may be interposed between retaining group **31** and inlet opening **18** and/or retaining group **31** may be interposed between interaction group **32** and pouring outlet **19**.
[0073] In more detail, interaction group **32** and retaining group **31** may be configured to interact with one another such that cutter **17** can move only to a certain degree, if at all, along a second direction D**2** opposite to first direction D**1** and to guarantee that cutter **17** cannot exit through pouring outlet **19**.
[0074] More specifically, interaction group **32** and retaining group **31** may be configured to interact with one another with cutter **17** being positioned in and/or moved to an end axial position with respect to central axis B. In particular, with cutter **17** being in the end 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.
[0075] Furthermore, the end axial position may define the axial position of cutter **17** in which cutter **17** is closer to pouring outlet **19** than in any other axial position. In particular, it should be considered that retaining group **31** may be configured such to define and/or delimit the end axial position, even more particular as the interaction between interaction group **32** and retaining group **31** guarantees that cutter **17** cannot move further along second direction D**2** once cutter **17** has reached the end axial position.
[0076] Additionally, cutter **17** when being in the end axial position may have the maximum possible distance from inlet opening **18**.
[0077] Moreover, interaction group **32** and retaining group **31** may interact with one another only with cutter **17** being in the end axial position. In other words, once cutter **17** has reached the end axial position, a possible movement of cutter **17** along second direction D**2** is blocked by the interaction between interaction group **32** and retaining group **31**.
[0078] With particular reference to FIGS. **2** to **4**, retaining group **31** may comprise one or more retaining elements **33**, in the specific case shown two retaining elements **33**, being displaced from one another.
[0079] Cutter **17** can be easily placed within flow channel **16** owing to the fact that retaining elements **33** are mutually spaced apart, i.e. spaced apart from each other.
[0080] Preferentially, retaining elements **33** may be angularly displaced from one another about central axis B.
[0081] Preferentially, retaining elements **33** may face one another.
[0082] According to the specific example shown, retaining elements **33** may be displaced by substantially 180° from one another (in particular, when considering the angular displacement of respective center points of retaining elements **33** from one another).
[0083] According to some alternative embodiments not shown, retaining group **31** may comprise one annular retaining element **33**. Preferentially, according to such an embodiment, annular retaining element **33** may have a circular cross-section and may be continuous.
[0084] According to some preferred non-limiting embodiments, each retaining element **33** may be formed as a hollow protuberance. In other words, each retaining element **33** may comprise a

respective cavity **39**.
[0085] In particular, since each retaining element **33** is hollow it is possible to reduce the amount of plastic used.
[0086] In more detail, each retaining element **33** may comprise, in particular may consists of, a respective curved solid wall **47**. In particular, each solid wall **47** may delimit and/or define the respective hollow protuberance and/or the respective cavity **39**.
[0087] Preferentially, each solid wall **47** may protrude towards the center of collar **15** and/or towards central axis B.
[0088] More specifically, each retaining element **33**, in particular the respective solid wall **47**, may be convexly shaped towards the center of collar **15** and/or towards central axis B.
[0089] Advantageously, each solid wall **47** may be integral to inner surface **20**.
[0090] In more detail, each retaining element **33**, in particular the respective solid wall **47**, may define a respective indentation and/or groove in outer surface **22**.
[0091] Moreover, each solid wall **47** may have a thickness, preferentially a (substantially) constant thickness. Preferentially, the thickness of solid wall **47** corresponds to the thickness of the portions of collar **15** adjacent to and connected to solid wall **47** and/or of one or more other portions of collar **15**.
[0092] According to some preferred non-limiting embodiments, each interaction group **32** may comprise one or more interaction elements, preferentially integrally connected to and protruding from cutter **17**.
[0093] According to some preferred non-limiting embodiments, opening device **3**, preferentially the respective cutter **17**, may also comprise a flange **30**.
[0094] Flange **30** may be designed to stabilize movement of cutter **17** within flow channel **16**.
[0095] In more detail, flange **30** may interact with collar **15**, in particular inner surface **20** for stabilizing movement of cutter **17**, in particular when moving from the respective rest position to the respective active position.
[0096] Preferentially, flange **30** may comprise at least two flange elements **34** angularly displaced from one another about central axis C.
[0097] In particular, as central axis C and central axis B are coaxial (with cutter **17** being at least partially arranged within flow channel **16**), flange elements **34** may also be angularly displaced from one another about central axis B.
[0098] By having spaced apart flange elements **34** it is possible to easily arrange cutter **17** within flow channel **16** and to guarantee a correct operation of the retaining device.
[0099] According to some preferred non-limiting embodiments, the number of retaining elements **33** and the number of flange elements **34** may equal one another.
[0100] In particular, respective first interspaces are present between retaining elements **33** and/or respective second interspaces may be present between flange elements **34**.
[0101] In more detail and with particular reference to FIG. **2**, each flange element **34** may radially protrude from cutter **17**, in particular from a second end portion **35** of cutter **17** opposed to first end portion **23**.
[0102] Preferentially, each flange element **34** may radially protrude away from the respective central axis C.
[0103] More specifically, each flange element **34** may radially protrude from a rim **36** of second end portion **35**.
[0104] Preferentially, each flange element **34** may protrude towards inner surface **20** and/or away from a center of cutter **17**.
[0105] According to the example embodiment shown, each flange element **34** may comprise and/or or may be defined by a plate, in particular a plate perpendicular to central axis C.
[0106] Preferentially, each flange element **34** may be arc-shaped.
[0107] In further detail, each flange element **34** may extend between a respective first angular

position and a respective second angular position, in particular with regard to central axis C.
[0108] Additionally, each first angular position and the respective second angular position may define a respective first angular extension of each flange element **34**. Preferentially, each first angular extension may be measured in arc degrees (°).
[0109] Preferentially, each flange element **34** may have the same size as the other flange element(s) **34**. In other words, the respective first angular extension of each flange element **34** corresponds to the respective first angular extensions of the other flange elements **34**.
[0110] With particular reference to FIGS. **2** to **4**, each retaining element **33** may radially protrude from inner surface **20**, in particular towards a center of collar **15** and/or towards central axis B.
[0111] Preferentially, each retaining element **33** may be arc-shaped.
[0112] In more detail, each retaining element **33** may extend between a respective third angular position and a respective fourth angular position.
[0113] Additionally, each third angular position and the respective fourth angular position may define a respective second angular extension of each retaining element **33**. Preferentially, each second angular extension may be measured in arc degrees (°).
[0114] Preferentially, each retaining element **33** may have the same size as the other retaining element(s) **33**. In other words, the respective second angular extension of each retaining element **33** may correspond to the respective second angular extensions of the other retaining element(s) **33**.
[0115] Advantageously, each first angular extension may be larger than each second angular extension.
[0116] According to some preferred non-limiting embodiments, an angular distance between two flange elements **34** may be larger than the second angular extension. In particular, the angular distance is determined between the respective second angular position of a first flange element **34** and the respective first angular position of a second flange element **34**, in particular with regard to central axis C. Moreover, no other flange element **34** is interposed between the first flange element **34** and the second flange element **34**.
[0117] In further detail, retaining group **31** may comprise an abutment surface **37**, in particular facing inlet opening **18**.
[0118] In particular, each retaining element **33** may comprise a respective portion of abutment surface **37** (in other words, abutment surface **37** is discrete, i.e. having non-connected portions).
[0119] Moreover, interaction group **32** may have an engagement surface **38**, in particular facing pouring outlet **19**.
[0120] Engagement surface **38** may be configured to abut against abutment surface **37** so as to block the movement of cutter **17** out of flow channel **16** and through pouring outlet **19**, in particular with cutter **17** being in the end axial position. In particular, in use, engagement surface **38** may abut against abutment surface **37** with cutter **17** being in the end axial position.
[0121] Preferentially, each interaction element may carry a portion of engagement surface **38**.
[0122] In further detail and with particular reference to FIGS. **1** to **4**, opening device **3** may also comprise [0123] 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 [0124] a closure **41** configured to selectively open and close pouring outlet **19**.
[0125] Moreover, opening device **3** may also comprise a coupling ring **42** rotatably arranged around collar **15**, in particular such that coupling ring **42** is inseparable from collar **15**.
[0126] According to some possible non-limiting embodiments not shown, each opening device **3** may also comprise a connection element, preferentially a tethering element, connected to, preferentially non-rupturably connected to, coupling ring **42** and closure **41**.
[0127] Advantageously, closure **41** may be controllable in at least: [0128] a closing position (see FIGS. **1** and **2**) 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 [0129] 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.
[0130] In particular, closure **41** may be rotatably coupled (about central axis B) to collar **15** when being in the closing position.
[0131] Advantageously, opening device **3** may comprise an actuation device partially associated to (and/or connected to and/or carried by) collar **15**, partially associated to (and/or connected to and/or carried by) closure **41** and partially associated to cutter **17** and being configured such that a rotation of closure **41** about central axis B may move closure **41** from the closing position to and/or towards the opening position.
[0132] According to some preferred non-limiting embodiments, the actuation device may comprise first interaction members (not shown), in particular flaps, connected to closure **41**, and second interaction members **43** connected to, in particular integrally connected to, cutter **17**, in particular main portion **23**.
[0133] Preferentially, the actuation device 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.
[0134] Preferentially, cam mechanism may comprise a cam structure **45** connected to, preferentially integrally connected to, and protruding from cutter **17** and a plurality of cam elements (not shown) connected to, in particular integrally connected to, collar **15**.
[0135] According to some preferred non-limiting embodiments, at least one or more portions of cam structure **45** may define one or more interaction elements of interaction group **32**. In other words, at least one or more portions of cam structure **45** may define engagement surface **38**.
[0136] In particular, the first interaction members and second interaction members **43** may be configured to interact with one another for actuating movement of cutter **17** from the rest position to the active position.
[0137] 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.
[0138] Preferentially, when assembling opening device **3**, cutter **17** may be approached towards collar **15** and flange elements **34** may be aligned with respect to the first interspaces. Afterwards, cutter **17** is pressed into flow channel **16**, thereby flange elements **34** pass through the respective first interspaces. Moreover, interaction group **32** and/or cam structure **45** is pressed over retaining elements **33** and afterwards cutter **17** cannot move out of flow channel **16** and through pouring outlet **19**.
[0139] In particular, due to the retaining device it is guaranteed that cutter **17** cannot move out of flow channel **16** and through pouring outlet **19**.
[0140] 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.
[0141] 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.
[0142] With reference to FIGS. **5** and **6**, number **3′** indicates an alternative embodiment of an opening device according to the present invention; as opening device **3′** is similar to opening device **3**, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.
[0143] In particular, opening device **3′** differs from opening device **3** in that the retaining device, in particular retaining group **31** comprises at least one retaining element **33′**, preferentially at least two retaining elements **33′**.
[0144] Retaining elements **33′** are similar to retaining elements **33** and therefore we limit the description of retaining elements **33′** to the differences with regard to retaining elements **33′**.
[0145] In particular, each retaining element **33′** differs from each retaining element **33** in being formed as a solid protuberance.

[0146] In other words, outer surface **21** is void of any groove, or cavity delimiting an outer portion of retaining elements **33**′.
[0147] The advantages of opening device **3** and/or opening device **3**′ and/or package **1** according to the present invention will be clear from the foregoing description.
[0148] In particular, by providing for the retaining device one guarantees that cutter **17** cannot exit from flow channel **16** and through pouring outlet **19**.
[0149] Additionally, during mounting of opening device **3** or opening device **3**′ cutter **17** can be easily placed within flow channel
[0150] Clearly, changes may be made to opening device **3** or **3**′ and/or package **1** as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. An opening device for a package having a designated pour opening covered with a separation membrane and filled with a pourable product; the opening device comprises at least: a collar delimiting a flow channel extending between an inlet opening of the collar configured to allow for an inflow of the pourable product into the flow channel and a pouring outlet of the collar configured to allow for an outflow of the pourable product from the flow channel; and a cutter configured to break the separation membrane and being at least partially arranged within the flow channel; wherein the collar comprises an inner surface facing the flow channel; wherein the opening device further comprises a retaining device configured to block movement of the cutter out of the flow channel and through the pouring outlet; wherein the retaining device comprises a retaining group protruding from the inner surface of the collar and an interaction group connected to the cutter; wherein the retaining group and the interaction group are configured to interact with one another so as to block movement of the cutter out of the flow channel and through the pouring outlet; wherein the opening device also comprises a flange protruding from the cutter.
2. The opening device according to claim 1, wherein the flange comprises at least two flange elements angularly displaced from one another about a first central axis of the cutter and protruding towards the collar.
3. The opening device according to claim 2, wherein the retaining group comprises at least two retaining elements being angularly displaced from one another about a second central axis of the collar.
4. The opening device according to claim 3, wherein each flange element extends between a respective first angular position and a respective second angular position; wherein each retaining element extends between a respective third angular position and a respective fourth angular position; wherein a respective first angular extension of each flange element between the respective first angular position and the respective second angular position is larger than a respective second angular extension of each retaining element between the respective third angular position and the respective fourth angular position.
5. The opening device according to claim 3, wherein each flange element extends between a respective first angular position and a respective second angular position; wherein each retaining element extends between a respective third angular position and a respective fourth angular position; wherein an angular distance between two flange elements is larger than an angular extension of the retaining elements.
6. The opening device according to claim 3, wherein the number of the retaining elements and the number of the flange elements equal one another.
7. The opening device according to claim 3, wherein each flange element radially protrudes from the cutter.
8. The opening device according to claim 3, wherein each flange element is arc-shaped and/or the

retaining group comprises at least two arc-shaped retaining elements being angularly displaced from one another about the second central axis of the collar.

9. The opening device according to claim 1, wherein the cutter comprises a cutting section configured to break the separation membrane and being arranged at a first end portion of the cutter; wherein the flange protrudes from a second end portion of the cutter opposed to the first end portion of the cutter.

10. The opening device according to claim 1, wherein the retaining group comprises an abutment surface and the interaction group comprises an engagement surface; wherein the engagement surface is configured to abut against the abutment surface so as to block the movement of the cutter out of the flow channel and through the pouring outlet.

11. The opening device according to claim 1, wherein the retaining group is integrally connected to the collar and/or the flange is integrally connected to the cutter.

12. The opening device according to claim 1, wherein the retaining group may be formed by at least one hollow protuberance or as at least one solid protuberance.

13. The opening device according to claim 1, wherein the cutter is arrangeable in a rest position in which the cutter is detached from the separation membrane and an active position in which the cutter is configured to break the separation membrane; wherein the opening device also comprises an actuation device configured to actuate movement of the cutter from the rest position to the active position.

14. The opening device according to claim 1, and further comprising: a base frame configured to be fitted and/or being fitted on the main body and about the designated pour opening and carrying collar; and a closure configured to selectively open and close the pouring outlet.

15. A package comprising: a main body filled with a pourable product and having a designated pour opening covered with a separation membrane; and an opening device according to claim 1 fitted about the designated pour opening.