



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
12.08.2020 Bulletin 2020/33

(51) Int Cl.:
B65D 23/14 (2006.01) **B65D 25/20** (2006.01)
B65D 75/54 (2006.01) **B65D 33/00** (2006.01)
B65D 77/28 (2006.01)

(21) Application number: **20154453.3**

(22) Date of filing: **30.01.2020**

(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

- **ZANON, Paolo**
41122 Modena (IT)
- **BELLEI, Renzo**
41124 Modena (IT)
- **POLIZZI, Andrea**
41123 Modena (IT)
- **MAMELI, Alberto**
41121 Modena (IT)
- **ORLANDI, Ivan**
41056 Savignano sul Panaro (IT)
- **DE PAOLA, Rocco**
41122 Modena (IT)
- **VERONESI, Livio**
41038 San Felice sul Panaro (IT)

(30) Priority: **06.02.2019 EP 19155754**

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

- (72) Inventors:
- **BERTANI, Giulio**
41012 Carpi (IT)
 - **MARTINI, Pietro**
43122 Parma (IT)
 - **SORBARA, Angelo**
42048 Rubiera (IT)

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

(54) **PACKAGE ASSEMBLY**

(57) There is described a package assembly (1, 1', 1'') comprising a package (2) filled with a pourable food product and a drinking straw (3, 3'). The package (2) comprises at least a main opening (6) configured to allow for the insertion and/or introduction of the drinking straw (3, 3') through the main opening (6) into the package (2) and the drinking straw (3, 3') comprises at least an inlet opening (11) and a tubular main portion (16) configured to be inserted, in use, into the package (2), and having the inlet opening (11). The package assembly (1, 1', 1'') also comprises a retention group (22) comprising at least a first retention member (23) associated to the package (2) and a second retention member (24) associated to the drinking straw (3, 3'). The first retention member (23) and the second retention member (24) are configured to interact with one another in such a manner to impede and/or block the separation and/or removal of the drinking straw (3) from the package (2) after, in use, the introduction and/or insertion of the main portion (16) into the package (2).

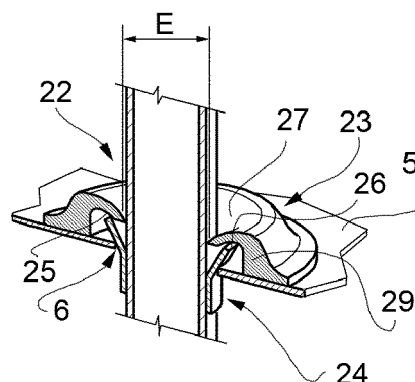


FIG. 2d

Description

TECHNICAL FIELD

[0001] The present invention relates to a package assembly having a drinking straw and a package filled with a pourable food product, in particular for the consumption on-the-go.

BACKGROUND ART

[0002] 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 sterilized packaging material.

[0003] 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.

[0004] There are known package assemblies, in particular for the consumption on-the-go, comprising a package filled with a pourable product and a drinking straw. The package comprises a main opening configured to allow the introduction and/or insertion of the drinking straw into the package. The package also comprises a separation membrane covering the opening for separating the inner space of the package from an outer environment and which is configured to be pierced and/or opened and/or ruptured by the drinking straw so as to allow the introduction and/or insertion of the drinking straw through the main opening and into the package and the subsequent extraction of the pourable food product through the drinking straw.

[0005] The drinking straw of each package assembly is typically attached to the respective package within a closed plastic envelope. Prior to its use a consumer extracts the drinking straw from the envelope and introduces the drinking straw into the package by piercing and/or opening and/or rupturing at least partially the separation membrane.

[0006] A drawback of these package assemblies is that the drinking straws may be littered independently (voluntarily or involuntarily) from the package after the complete or partial consumption of the pourable food product.

[0007] Therefore, a need is felt in the sector to improve the known packaging assemblies so as to overcome at least one of the above-mentioned drawbacks.

DISCLOSURE OF INVENTION

[0008] It is therefore an object of the present invention to provide in a straightforward and low-cost manner an improved package assembly solving the above-mentioned drawback.

[0009] According to the present invention, there is provided a package assembly according to the independent claim.

[0010] Further advantageous embodiments of the package assembly are specified in the respective dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Three 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 perspective view of a package assembly according to a first embodiment of the present invention having a package and a drinking straw, with parts removed for clarity;

Figure 2a is a perspective view of details of the package assembly of Figure 1 prior to a partial insertion of the drinking straw into the package, with parts removed for clarity;

Figure 2b is a perspective view of details of the package assembly of Figure 1 after insertion of the drinking straw into the package, with parts removed for clarity;

Figure 2c is a perspective view of details of the package assembly of Figure 1 after an attempt of removing the drinking straw from the package, with parts removed for clarity;

Figure 2d is an enlarged sectionized view of details of the package assembly of Figure 1 after an attempt of removing the drinking straw from the package, with parts removed for clarity;

Figure 3 is a perspective view of a package assembly having a package and a drinking straw according to a second embodiment of the present invention, with parts removed for clarity;

Figure 4a is a perspective view of details of the package assembly of Figure 3 prior to a partial insertion of the drinking straw of Figure 3 into the package, with parts removed for clarity;

Figure 4b is a perspective view of details of the package assembly of Figure 3 after insertion of the drinking straw into the package, with parts removed for clarity;

Figure 4c is a perspective view of details of the package assembly of Figure 3 after an attempt of removing the drinking straw from the package, with parts removed for clarity;

Figure 4d is an enlarged sectionized view of details of the package assembly of Figure 3 after an attempt of removing the drinking straw from the package,

with parts removed for clarity;

Figure 5 is a perspective view of a package assembly according to a third embodiment of the present invention, with parts removed for clarity;

Figure 6a is a perspective view of details of the package assembly of Figure 5 prior to a partial insertion of the drinking straw of Figure 5 into the package, with parts removed for clarity;

Figure 6b is a perspective view of details of the package assembly of Figure 5 after insertion of the drinking straw into the package, with parts removed for clarity;

Figure 6c is a perspective view of details of the package assembly of Figure 5 after an attempt of removing the drinking straw from the package, with parts removed for clarity; and

Figure 6d is an enlarged sectionized view of details of the package assembly of Figure 5 after an attempt of removing the drinking straw from the package, with parts removed for clarity.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0012] Reference numeral 1 indicates as a whole a package assembly having a package 2, in particular a carton package, and a drinking straw 3. In particular, package assembly 1 is adapted for the consumption on-the-go.

[0013] According to a preferred non-limiting embodiment, package assembly 1 also comprises an envelope or a pocket for housing the drinking straw 3 prior to its use.

[0014] Preferably but not necessarily, the envelope or the pocket is provided on and/or fixed to package 2.

[0015] According to a preferred non-limiting embodiment, package 2 is filled with a pourable food product, in particular a sterilized and/or a sterile-processed pourable food product, such as water, pasteurized milk, fruit juice, beverages with pulp or other pourable food products (other beverages) suitable for consumption on-the-go.

[0016] Package 2 may be obtained from a web of packaging material having a multilayer structure (not shown), and comprises at least a layer of fibrous material, such as paper or cardboard, and at least two layers of polymeric plastic material, e.g. polyethylene, interposing the layer of fibrous material in between one another. One of these two layers of polymeric material defines the inner face of package 2 contacting the pourable food product in the filled package 2.

[0017] Preferably but not necessarily, the web of packaging material also comprises a layer of gas- and light-barrier material, e.g. aluminum foil or a film layer comprising ethylene vinyl alcohol (EVOH), in particular being arranged between one of the layers of the polymeric material and the layer of fibrous material. Preferentially but not necessarily, the web of packaging material also comprises a further layer of polymeric material being interposed between the layer of gas- and light-barrier material and the layer of fibrous material.

[0018] With particular reference to Figures 1 to 2d, package 2 extends along a longitudinal axis A. In particular, package 2 comprises a first wall portion, in particular being transversal, even more particular perpendicular, to axis A, from which package 2 extends along axis A. Preferably but not necessarily, the first wall portion defines a support surface of package 2, which, in use, can be put in contact with a support, such as a shelf, when, in use, being e.g. exposed within a sales point. In particular, when being arranged on a support and/or, in use, during consumption of the pourable food product by a consumer from package 2 the first wall portion defines a bottom wall portion.

[0019] Preferably but not necessarily, package 2 also comprises a plurality of lateral walls 4 being (fixedly) connected to the first wall portion and extending, in particular substantially parallel to axis A, from the first wall portion.

[0020] Preferably but not necessarily, package 2 also comprises a second wall portion 5 opposite to the first wall portion and being (fixedly) connected to lateral walls 4. In other words, lateral walls 4 are interposed between the first wall portion and second wall portion 5. In particular, when being arranged on a support and/or, in use, during consumption of the pourable food product by a consumer from package 2, second wall portion 5 defines a top wall portion.

[0021] According to a preferred non-limiting embodiment, the first wall portion and second wall portion 5 may be parallel to one another.

[0022] According to a non-limiting alternative embodiment, the first wall portion and second wall portion 5 could be inclined with respect to one another.

[0023] Preferentially but not necessarily, package 2 is parallelepiped-shaped.

[0024] With particular reference to Figures 1 to 2d, package 2 comprises a (sealed) main opening 6 allowing for the insertion and/or introduction of drinking straw 3 through main opening 6 itself into package 2.

[0025] According to a preferred non-limiting embodiment, main opening 6 has a circular cross-sectional profile. In alternative, the cross-sectional profile of main opening 6 could have any other shape.

[0026] Preferentially but not necessarily, main opening 6 is provided on second wall portion 5.

[0027] According to a preferred non-limiting embodiment, main opening 6 is defined by a respective hole within the layer of fibrous material.

[0028] According to a preferred non-limiting embodiment, a transversal extension of main opening 6 is delimited by a rim of main opening 6 itself. In particular, the rim has a circular shape.

[0029] According to a preferred non-limiting embodiment, the transversal extension of main opening 6 is determined with respect to axis A. Even more particular, the transversal extension of main opening 6 is determined and/or measured considering the rim delimiting main opening 6. According to the non-limiting embodiment disclosed in Figures 1 to 2d, the transversal extension

sion of main opening 6 corresponds to a diameter of main opening 6.

[0030] According to a preferred non-limiting embodiment, package 2 also comprises a separation membrane covering main opening 6 and being configured to be ruptured and/or opened and/or cut and/or pierced, in particular by drinking straw 3, so as to allow the insertion of drinking straw 3 (through main opening 6) into package 2. In particular, the separation membrane separates, prior to losing its integrity, an inner environment of package 2 containing the pourable food product from an outer environment. In this manner, the pourable food product is protected from the outer environment.

[0031] Preferentially but not necessarily, the separation membrane comprises a gas- and light-barrier material, e.g. aluminum foil or a film comprising ethylene vinyl alcohol (EVOH).

[0032] According to a preferred non-limiting embodiment, the separation membrane is defined by a portion of the web of packaging material, in particular a portion of the layers of the web of packaging material being different from the layer of fibrous material.

[0033] Preferentially but not necessarily, the separation membrane has a circular shape.

[0034] With particular reference to Figures 1 to 2d, drinking straw 3 comprises at least a tubular body 10 defining and/or delimiting a passage for the pourable food product, an inlet opening 11 and an outlet opening 12 provided at opposite ends of drinking straw 3 itself. In particular, tubular body 10 comprises inlet opening 11 and outlet opening 12.

[0035] According to a preferred non-limiting embodiment, inlet opening 11 is configured to allow for the introduction of the pourable food product into drinking straw 3 and in particular, outlet opening 12 is configured to allow for the outlet of the pourable food product from drinking straw 3 (i.e., in use, a consumer receives the pourable food product through outlet opening 12).

[0036] According to the non-limiting embodiment shown, tubular body 10 has a circular cross-section.

[0037] In an alternative embodiment not shown, tubular body 10 could have a rectangular or square cross-section or a more complex cross-section.

[0038] According to a preferred non-limiting embodiment, drinking straw 3, in particular tubular body 10, comprises

- a mouthpiece 15 having and/or carrying outlet opening 12; and
- a tubular main portion 16 having and/or carrying inlet opening 11 and being configured to be inserted and/or introduced, in use, into package 2.

[0039] According to a preferred non-limiting embodiment, tubular main portion 16 comprises an outer lateral surface.

[0040] According to a preferred non-limiting embodiment, at least a portion of tubular main portion 16 and/or

tubular body 10 extends along a longitudinal axis B.

[0041] Preferentially but not necessarily, drinking straw 3 comprises a tip section 17 configured to rupture and/or open and/or cut and/or pierce, in use, the separation membrane, in particular by means of a consumer arranging tip section 17 on the separation membrane (see Figure 2a) and exerting a force on drinking straw 3, in particular tubular main portion 16, even more particular tip section 17, for directing at least tubular main portion 16 through the separation membrane and into package 2 (see Figure 2b), in particular towards the first wall portion.

[0042] Preferentially but not necessarily, tip section 17 is wedge-shaped.

[0043] According to a preferred non-limiting embodiment, drinking straw 3, in particular tubular body 10, comprises a corrugated portion 18 interposed between mouthpiece 15 and tubular main portion 16.

[0044] Preferentially but not necessarily, corrugated portion 18 is configured to allow for a relative movement between mouthpiece 15 and tubular main portion 16. In particular, corrugated portion 18 allows a consumer to arrange mouthpiece 15 according to the consumer's needs and/or preferences. In other words, corrugated portion 18 allows inclining mouthpiece 15 with respect to tubular main portion 16 and/or longitudinal axis B.

[0045] Advantageously, package assembly 1 also comprises a retention group 22 configured to allow for the insertion and/or introduction of at least tubular main portion 16 of drinking straw 3 into package 2 and to impede and/or block the separation and/or removal of drinking straw 3 from package 2 after the introduction and/or insertion of main portion 16 into package 2; i.e. once tubular main portion 16 has been, in use, introduced and/or inserted into package 2 retention group 22 guarantees that drinking straw 3 cannot be separated and/or removed from package 2.

[0046] With particular reference to Figures 1 to 2d, retention group 22 comprises at least a first retention member 23 associated to package 2 and a second retention member 24 associated to tubular main portion 16. Preferentially but not necessarily, in use, with tubular main portion 16 being arranged within package 2, also second retention member 24 is at least partially arranged within package 2.

[0047] According to a preferred non-limiting embodiment, with tubular main portion 16 and second retention member 24 being arranged within package 2, main opening 6 is interposed between first retention member 23 and second retention member 24 (see Figure 2b).

[0048] According to a preferred non-limiting embodiment, package 2 comprises first retention member 23.

[0049] According to a preferred non-limiting embodiment, drinking straw 3 comprises second retention member 24.

[0050] According to a preferred non-limiting embodiment, first retention member 23 comprises a first engagement surface 25 and second retention member 24 com-

prises a second engagement surface 26 configured to abut against first engagement surface 25 during, in use, a movement of tubular main portion 16 out of package 2 for impeding and/or blocking the separation and/or removal of drinking straw 3 from package 2 after, in use, the introduction and/or insertion of tubular main portion 16 into package 2 (see Figures 2c and 2d).

[0051] Preferentially but not necessarily, first engagement surface 25 and second engagement surface 26 face one another with tubular main portion 16 being arranged within package 2 (see Figure 2b). In particular, with tubular main portion 16 and second retention member 24 being arranged within package 2, main opening 6 is interposed between first engagement surface 23 and second engagement surface 24.

[0052] With particular reference to Figures 1 to 2d, first retention member 23 is arranged adjacent to, in particular at, main opening 6.

[0053] Preferentially but not necessarily, first retention member 23 is arranged on and/or is coupled to an outer surface of package 2, in particular second wall portion 5.

[0054] Alternatively, first retention member 23 could be arranged on and/or be coupled to an inner surface of package 2.

[0055] Preferentially but not necessarily, first retention member 23 is coupled to and/or is arranged on the outer surface or the inner surface through adhesive bonding and/or ultrasonic bonding and/or molding or the like.

[0056] According to a preferred non-limiting embodiment, first engagement surface 25 is spaced apart from main opening 6 and, in particular faces main opening 6 and/or second wall 5.

[0057] According to a preferred non-limiting embodiment, first retention member 23 comprises a collar 27 defining and/or having an aperture of retention member 23 being aligned with, in particular being coaxial with, main opening 6 and being configured to allow for the passage of at least tubular main portion 16, in particular together with retention member 23. More specifically, the aperture is delimited between a rim of collar 27.

[0058] Preferentially but not necessarily, the aperture has a circular shape.

[0059] Preferentially but not necessarily, the aperture has a transversal extension E, in particular measured transversal to axis A. In particular, transversal extension E is determined by the rim of collar 27. Preferentially but not necessarily, transversal extension E corresponds to a diameter of the aperture.

[0060] According to a preferred non-limiting embodiment, transversal extension E is smaller than the transversal extension of main opening 6.

[0061] According to a preferred non-limiting embodiment, collar 27 carries and/or comprises first engagement surface 23.

[0062] According to the non-limiting embodiment shown in Figures 1 to 2d, first engagement surface 23 is substantially inclined with respect to axis A. In particular, first engagement surface 23 extends along a plane, the

plane defining an acute angle with axis A, the acute angle ranging between 10° and 90°, in particular between 30° to 90°.

[0063] According to a preferred non-limiting embodiment, collar 27 has a substantially hook-like configuration.

[0064] According to a preferred non-limiting embodiment, collar 27 is designed to (slightly) deflect for (slightly) enlarging the aperture during insertion and/or introduction of tubular main portion 16 (together with second retention member 24) into package 2.

[0065] According to a preferred non-limiting embodiment, first retention member 23 comprises a support ring 29 surrounding main opening 6 and carrying collar 27. In particular, support ring 29 is connected to the outer surface of package 2, in particular adjacent to main opening 6.

[0066] Preferentially but not necessarily, support ring 29 extends away from the outer surface of package 2 and collar 27 protrudes from support ring 29 towards a center of support ring 29.

[0067] Preferentially but not necessarily, support ring 29 is coaxially arranged with respect to main opening 6.

[0068] According to a preferred non-limiting embodiment, support ring 29 is connected to the outer surface of package 2 by means of adhesive bonding, ultrasonic bonding, molding or the like.

[0069] According to a preferred non-limiting embodiment, second retention member 24 comprises a sleeve 33 superimposed on and/or surrounding at least a section of tubular main portion 16. In particular, sleeve 33 is configured to interact with first retention member 23 in such a manner to allow for the introduction and/or insertion of tubular main portion 16 (and sleeve 33) into package 2 (see Figures 2a and 2b) and to impede and/or hinder and/or block the removal and/or separation of drinking straw 3 from package 2 after insertion and/or introduction of tubular main portion 16 into package 2 (see Figures 2c and 2d).

[0070] According to a preferred non-limiting embodiment, sleeve 33 is designed such to allow the insertion and/or introduction of tubular main portion 16 together with sleeve 33 into package 2 through the aperture and main opening 6, and to impede and/or hinder and/or block the removal and/or separation of drinking straw 3 from package 2 after insertion and/or introduction of tubular main portion 16 into package 2 by means of interaction and/or abutment with first retention member 23 during a movement of tubular main portion 16 out of package 2 (see Figures 2c and 2d).

[0071] According to a preferred non-limiting embodiment, sleeve 33 is coupled and/or connected to tubular main portion 16, in particular in a non-removable manner, so that an insertion and/or introduction of tubular main portion 16 also results in at least a partial insertion and/or introduction of sleeve 33 into package 2.

[0072] According to a preferred non-limiting embodiment, drinking straw 3 comprises sleeve 33.

[0073] Preferentially but not necessarily, sleeve 33 is non-removably coupled and/or connected to tubular main portion 16 by means of mechanical friction, gluing, (solvent) bonding, welding (e.g. ultrasonic, hot plate or laser welding), mechanical deformation (e.g. cold forming or hot forming (infrared heating, induction heating, flow of heated gas)) or similar.

[0074] According to a preferred non-limiting embodiment, sleeve 33, in particular coupling portion 35, and/or tubular main portion 16 define tip section 17 and/or delimit inlet opening 11.

[0075] According to the non-limiting embodiment shown, sleeve 33 and tubular main portion 16 define in cooperation tip section 17 (i.e. both sleeve 33 and tubular main portion 16 extend from inlet opening 11). In particular, in this manner the opening and/or cutting and/or perforation of main opening 6, in particular the separation membrane, is facilitated.

[0076] According to an alternative embodiment not shown, tubular main portion 16 carries and/or comprises tip section 17 and/or inlet opening 11; i.e. sleeve 33 does not extend from inlet opening 11 towards mouth piece 15.

[0077] According to another alternative embodiment not shown, sleeve 33 carries and/or comprises tip section 17 and/or inlet opening 11; i.e. sleeve 33 extends away from tubular main portion 16.

[0078] According to a preferred non-limiting embodiment, tubular main portion 16 together with sleeve 33 is configured to be inserted into package 2 through main opening 6 of package 2, thereby rupturing and/or cutting and/or piercing and/or opening the separation membrane. In particular, tubular main portion 16 and sleeve 33 are configured to form, in use, during insertion and/or introduction of tubular main portion 16 into package 2, a hole within the separation membrane having a size substantially corresponding to a maximum outer size, in particular a maximum outer diameter, of at least a portion of tubular main portion 16 and/or sleeve 33.

[0079] According to a preferred non-limiting embodiment, the maximum size and/or extension of this hole is limited by the transversal extension of main opening 6 covered by the separation membrane. In particular, the size and/or extension of the hole may be smaller than the transversal extension of main opening 6 (but not larger).

[0080] According to a preferred non-limiting embodiment, sleeve 33 carries second engagement surface 26.

[0081] According to a preferred non-limiting embodiment, sleeve 33 comprises an abutment portion 34 having second engagement surface 26 and being configured to abut onto first engagement surface 25 during a movement of tubular main portion 16 and sleeve 33 out of package 2 for impeding and/or hindering and/or blocking separation and/or removal of drinking straw 3 from package 2. In particular, sleeve 33 and abutment portion 34 are designed to pass through main opening 6 and the aperture and abutment portion 34 is configured to impede and/or hinder and/or block the extraction of sleeve 33 out

of package 2 and consequently to impede and/or hinder and/or block the removal and/or separation of tubular main portion 16 and drinking straw 3 from package 2 by abutting against first retention member 23, in particular collar 27.

[0082] Preferentially but not necessarily, in use, during insertion and/or introduction of tubular main portion 16 together with second retention member 23 and/or sleeve 33 into package 2, drinking straw 3 is moved along a first direction D1 transversal to the separation membrane and/or main opening 6 and/or the first wall portion and/or second wall portion 5 (see Figures 2a and 2b). In the ideal case, after the complete or partial consumption of the pourable food product present within package 2, the consumer disposes of package 2 together with drinking straw 3 without the attempt to remove drinking straw 3 from package 2. In the non-ideal case that a consumer tried to remove and/or separate drinking straw 3 from package 2 by moving drinking straw 3 along a second direction D2 opposite to first direction D1 and out of package 2, second retention member 24, in particular sleeve 33, even more particular abutment portion 34, would limit the possible extraction by abutting, at some degree of the extraction of tubular main portion 16 and/or second retention member 24 and/or sleeve 33 out of package 2, against first retention member 23 (see Figures 2c and 2d).

[0083] According to a preferred non-limiting embodiment, sleeve 33 comprises a coupling portion 35 having an inner coupling surface being in contact with an outer coupling surface of tubular main portion 16 and/or the outer lateral surface of tubular main portion 16. In particular, coupling portion 35 and abutment portion 34 are connected to one another.

[0084] Preferentially but not necessarily, coupling portion 35 is closer to inlet opening 11 than abutment portion 34. In other words, abutment portion 34 is closer to mouthpiece 15 than coupling portion 35.

[0085] According to a preferred non-limiting embodiment, sleeve 33 also comprises a transition portion 36 interposed between and connecting coupling portion 35 and abutment portion 34 with one another. In particular, transition portion 36 is configured to allow and/or allows a continuous transition between abutment portion 34 and coupling portion 35.

[0086] According to a preferred non-limiting embodiment, abutment portion 34 has a maximum transversal extension F, in particular determined and/or measured with respect to longitudinal axis B. In particular, maximum transversal extension F is determined and/or measured considering the cross-sectional extensions of abutment portion 34 with respect to longitudinal axis B.

[0087] According to the preferred non-limiting embodiment disclosed in Figures 1 to 2d, abutment portion 34 has a substantially circular cross-sectional profile and maximum transversal extension F equals the maximum outer diameter.

[0088] According to the preferred non-limiting embod-

iment shown, maximum transversal extension F is larger than transversal extension E.

[0089] According to a preferred non-limiting embodiment, coupling portion 35 also comprises a respective maximum transversal extension being smaller than maximum transversal extension F. In other words, sleeve 33 comprises a thickening defining abutment portion 34.

[0090] According to the preferred non-limiting embodiment shown in Figures 1 to 2d, sleeve 33 comprises an enlarged end defining abutment portion 34.

[0091] According to a preferred non-limiting embodiment, transition portion 36 is configured to guarantee a progressive transition between coupling portion 35 and abutment portion 34.

[0092] According to the preferred non-limiting embodiment shown in Figures 1 to 2d, sleeve 33 comprises a collar defining abutment portion 34. In particular, the collar is rigid; i.e. during insertion of tubular main portion 16 and sleeve 33 into package 2, the collar does not substantially change shape (passage of sleeve 33 through the aperture of collar 27 is possible due to collar 27 deflecting during the passage of sleeve 33). In alternative, the collar could be configured to be compressible so as to adapt to the aperture during insertion and/or introduction of tubular main portion 16 and sleeve 33 into package 2 and to return to its initial configuration and/or shape after insertion and/or introduction of tubular main portion 16 and sleeve 33 into package 2.

[0093] In use, during insertion and/or introduction of tubular main portion 16 and sleeve 33 into package 2 and through main opening 6 and the aperture (i.e. movement of tubular main portion 16 and sleeve 33 along direction D1), the consumer exerts a force sufficient to overcome the resistance due to second retention element 24, in particular sleeve 33, even more particular abutment portion 34, needing to pass through the aperture. In particular, the passing through of sleeve 33 as a whole is facilitated by the presence of transition portion 36 and, in particular a (slight) deflection of collar 27 for enlarging the aperture. Even more particular, in use, during insertion and/or introduction of tubular main portion 16 and sleeve 33 into package 2 at first coupling portion 35 and then abutment portion 34 pass through the aperture and/or enter into package 2.

[0094] Then upon movement of tubular main portion 16 out of package 2 (i.e. along direction D2) at some point second retention member 24, in particular sleeve 33, even more particular abutment portion 34 abuts against first retention member 23, in particular collar 27 (see Figures 2c and 2d). In this way, a further movement of tubular main portion 16 and, consequently of drinking straw 3, along direction D2 is blocked.

[0095] With reference to Figures 3 and 4a to 4d, number 1' indicates an alternative embodiment of a package assembly according to the present invention; as package assembly 1' is similar to package assembly 1, the following description is limited to the differences between them, and using the same references, where pos-

sible, for identical or corresponding parts.

[0096] In particular, package assembly 1' differs from package assembly 1 in that second retention member 24 comprises sleeve 33'.

[0097] According to a preferred non-limiting embodiment, drinking straw 3 comprises sleeve 33'.

[0098] As second sleeve 33' is similar to sleeve 33, the following description is limited to the difference between them, and using the same reference, where possible, for identical or corresponding parts.

[0099] According to a preferred non-limiting embodiment, sleeve 33' comprises a plurality of, in particular elastically deformable, abutment elements 37, in the example shown four. In particular, abutment elements 37 define the respective abutment portion 34 of sleeve 33'. Preferentially but not necessarily, abutment elements 37 define in collaboration with one another second engagement surface 26.

[0100] Preferentially but not necessarily, abutment elements 37 are connected to the respective coupling portion 35 of sleeve 33'. In particular, abutment elements 37 transversally protrude from coupling portion 35. In other words, abutment elements 37 are inclined with respect to longitudinal axis B.

[0101] According to a preferred non-limiting embodiment, abutment elements 37 are movable between at least:

- an initial position in which abutment elements 37 transversally protrude away from tubular main portion 16 and/or coupling portion 35; and
- an insertion position in which abutment elements 37 are approached to and/or lie against tubular main portion 16, in particular the outer lateral surface of tubular main portion 16.

[0102] In particular, each abutment element 37 forms and/or defines an acute angle with longitudinal axis B, the acute angle being larger when the abutment element 27 is arranged in the initial position than when the abutment element 27 is arranged in the insertion position.

[0103] According to a preferred non-limiting embodiment, abutment elements 37 are designed such that abutment elements 37 are biased into the initial position (in the absence of an external force acting on abutment elements 37).

[0104] In particular, prior to the insertion and/or introduction of tubular main portion 16 and sleeve 33' into package 2, abutment elements 37 are arranged in the initial position (see Figure 3a). During the movement of tubular main portion 16 (i.e. along direction D1) into package 2 and the movement of abutment portion 37, in particular abutment elements 37, through main opening 6 and the aperture, abutment elements 37 are moved to the insertion position and move back to the initial position at least after tubular main portion 16 and sleeve 33', in particular abutment portion 34, are arranged within package 2 (see Figure 3b).

[0105] According to a preferred non-limiting embodiment, each abutment element 37 comprises a respective engagement surface. The respective engagement surfaces define in collaboration with one another second engagement surface 26.

[0106] Preferentially but not necessarily, abutment elements 37 are also movable to an abutment position in which the engagement surfaces are pressed onto first engagement surface 25. In particular, in use, upon movement of tubular main portion 16 and sleeve 33' out of package 2 (i.e. along direction D2), at some degree of extraction abutment elements 37 start to contact first engagement surface 25. Upon further movement out of package 2, abutment elements 37 move due to the interaction with first engagement surface 25 to the abutment position. Thereby, the effective interaction area between first engagement surface 25 and second engagement surface 26 increases (see Figure 4d).

[0107] According to a preferred non-limiting embodiment, each abutment element 37 forms and/or defines a respective acute angle with longitudinal axis B. Preferentially but not necessarily, the respective acute angles are smaller with abutment elements 37 being arranged in the respective initial positions than with abutment elements 37 being arranged in the abutment position.

[0108] With reference to Figures 5 and 6a to 6d, number 1" indicates an alternative embodiment of a package assembly according to the present invention; as package assembly 1" is similar to package assembly 1, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0109] In particular, package assembly 1" differs from package assembly 1 in comprising drinking straw 3".

[0110] As drinking straw 3" is similar to drinking straw 3, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0111] In particular, drinking straw 3" differs from drinking straw 3 in that tubular main portion 16 comprises a groove 38 defining second retention member 24 of package assembly 1".

[0112] According to a preferred non-limiting embodiment, groove 38 divides tubular main portion 16 into a first portion 39 carrying inlet opening 11 and a second portion 40, in particular interposed between first portion 39 and outlet opening 12. In other words, groove 38 is interposed between first portion 39 and second portion 40.

[0113] According to a preferred non-limiting embodiment, groove 38 comprises a first edge surface defining second engagement surface 26, the first edge surface being connected to first portion 39.

[0114] Preferentially but not necessarily, groove 38 comprises a tapering portion 41 being connected to second portion 40 and tapering towards first portion 39. In particular, by providing for tapering portion 41 it is possible to support insertion and/or introduction of tubular

main portion 16 through the aperture (defined by collar 27) and into package 2. In particular, tapering portion 41 is configured to interact with collar 27. Even more particular, by providing for tapering portion 41 it is possible to avoid the presence of a second edge surface opposite to the first edge surface. In this manner, in use, during insertion and/or introduction of tubular main portion 16 into package 2, tapering portion 41 assures an uninterrupted introduction of second portion 40 into package 2. In other words, in use, during the insertion and/or introduction of tubular main portion 16 into package 2, at first the rim of collar 27 contacts at least a part of tapering portion 41 prior to contacting second portion 40.

[0115] According to a preferred non-limiting embodiment, groove 38 results in a restriction of an inner size of the passage of drinking straw 3".

[0116] In use, during insertion and/or introduction of tubular main portion 16 into package 2 and through main opening 6 and the aperture (i.e. movement of tubular main portion 16 along direction D1), the consumer exerts a force sufficient to pass through the aperture and to rupture and/or cut and/or pierce the separation membrane. In particular, once groove 38 is adjacent to the rim of collar 37 at some point the rim of collar 37 contacts tapering portion 41 until the second portion 40 is adjacent to the rim of collar 38

[0117] Then upon a movement of tubular main portion 16 out of package 2 (i.e. along direction D2) at some point the first edge surface (second engagement surface 26) abuts against first retention member 23, in particular collar 27. In this way, a further movement of tubular main portion 16 and, consequently of drinking straw 3, along direction D2 is blocked.

[0118] The advantages of package assembly 1, 1' and 1" according to the present invention will be clear from the foregoing description.

[0119] In particular, by providing for retention group 22 a simple and efficient mechanism is offered, allowing to impede the separation and/or release of drinking straws 3 and 3" from the respective package 2 after insertion and/or introduction of the respective tubular main portion 16 into the respective package 2. In this way, littering of drinking straws 3 and 3" is avoided.

[0120] Clearly, changes may be made to package assembly 1, 1' and 1" without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. Package assembly (1, 1', 1") comprising a package (2) filled with a pourable food product and a drinking straw (3, 3");
- the package (2) comprises at least a main opening (6) configured to allow for the insertion and/or introduction of the drinking straw (3, 3") through the main opening (6) into the package (2);

wherein the drinking straw (3, 3'') comprises at least:

- an inlet opening (11) for allowing the introduction of the pourable food product into the drinking straw (3, 3''); and
- a tubular main portion (16) configured to be inserted, in use, into the package (2), and having the inlet opening (11);

wherein the package assembly (1, 1', 1'') also comprises a retention group (22) configured to allow for the insertion and/or introduction of at least the tubular main portion (16) of the drinking straw (3) into the package (2) and to impede and/or block the separation and/or removal of the drinking straw (3) from the package (2) after, in use, the introduction and/or insertion of the main portion (16) into the package (2); wherein the retention group (22) comprises at least a first retention member (23) associated to the package (2) and a second retention member (24) associated to the drinking straw (3, 3''); wherein the first retention member (23) and the second retention member (24) are configured to interact with one another in such a manner to impede and/or block the separation and/or removal of the drinking straw (3) from the package (2) after, in use, the introduction and/or insertion of the main portion (16) into the package (2).

2. Package assembly according to claim 1, wherein the first retention member (23) comprises a first engagement surface (25) and the second retention member (24) comprises a second engagement surface (26); wherein the second engagement surface (26) is configured to abut against the first engagement surface (25) during, in use, a movement of the tubular main portion (16) out of the package (2) for impeding and/or blocking the separation and/or removal of the drinking straw (3) from the package (2) after the introduction and/or insertion of the main portion (16) into the package (2).

3. Package assembly according to claim 2, wherein the first engagement surface (25) and the second engagement surface (26) face one another with the tubular main portion (16) being arranged within the package (2).

4. Package assembly according to any one of the preceding claims, wherein the first retention member (23) is arranged adjacent to the main opening (6) and the second retention member (24) is coupled and/or connected to the tubular main portion (16).

5. Package assembly according to claim 4, wherein the first retention member (23) is arranged on and/or is coupled to an outer surface or an inner surface of

the package (2).

6. Package assembly according to claim 5, wherein the first retention member (23) is coupled to the outer surface or the inner surface through adhesive bonding and/or ultrasonic bonding and/or molding.

7. Package assembly according to any one of the preceding claims, wherein the first retention member (23) comprises a collar (37) defining an aperture aligned with, in particular being coaxial to, the main opening (6) and being configured to allow for the passage of at least the tubular main portion (16).

8. Package assembly according to claim 7, wherein a transversal extension (E) of the aperture is smaller than a transversal extension of the main opening (6).

9. Package assembly according to claim 7 or 8, wherein the first retention member (23) comprises a support ring (39) surrounding the main opening (6) and carrying the collar (37).

10. Package assembly according to any one of the preceding claims, wherein the second retention member (24) comprises a sleeve (33, 33') superimposed on and/or surrounding at least a section of the tubular main portion (16).

11. Package assembly according to claim 10, wherein the sleeve (33, 33') comprises an abutment portion (34) configured to abut onto an engagement surface (25) of the first retention member (23) during a movement of the tubular main portion (16) out of the package (2) for impeding and/or hindering and/or blocking a separation and/or removal of the drinking straw (3) from the package (2).

12. Package assembly according to claim 11, wherein the sleeve (33') comprises a plurality of abutment elements (37) defining the abutment portion; wherein the abutment elements (37) are movable between an initial position in which the abutment elements (37) protrude away from the tubular main portion (16) and an insertion position in which the abutment elements (37) are approached to and/or lie against the tubular main portion (16).

13. Package assembly according to any one of claims 1 to 9, wherein the tubular main portion (16) comprises a groove (38) defining the second retention member (24).

13. Package assembly according to claim 12, wherein the groove (38) divides the tubular main portion (16) into a first portion (39) carrying the inlet opening (11) and a second portion (40); wherein the groove (38) comprises a first edge sur-

face being connected to the first portion (39).

14. Package assembly according to claim 13, where-
in the groove (38) also comprises a tapering portion
(41) being connected to the second portion (40). 5

10

15

20

25

30

35

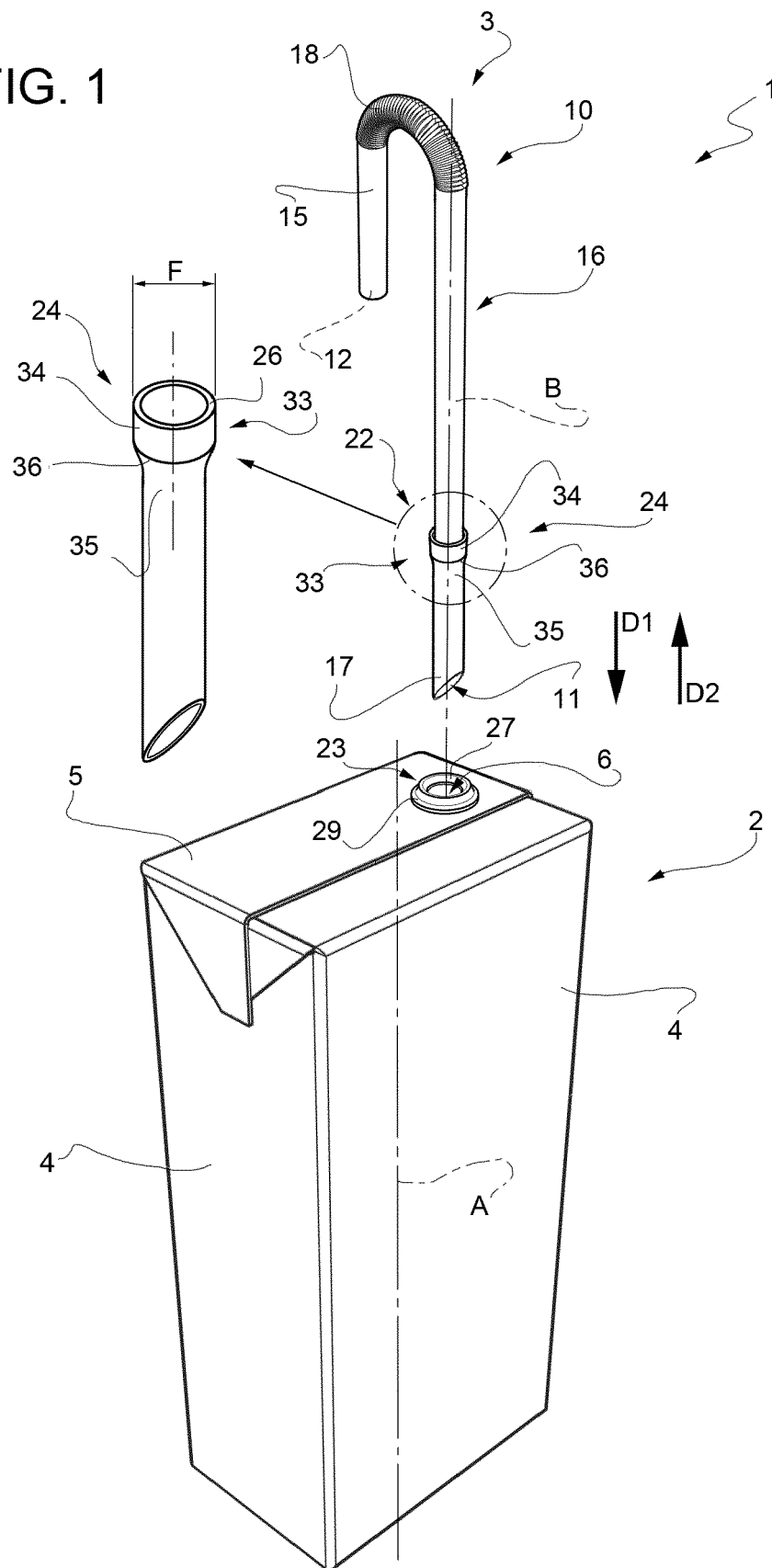
40

45

50

55

FIG. 1



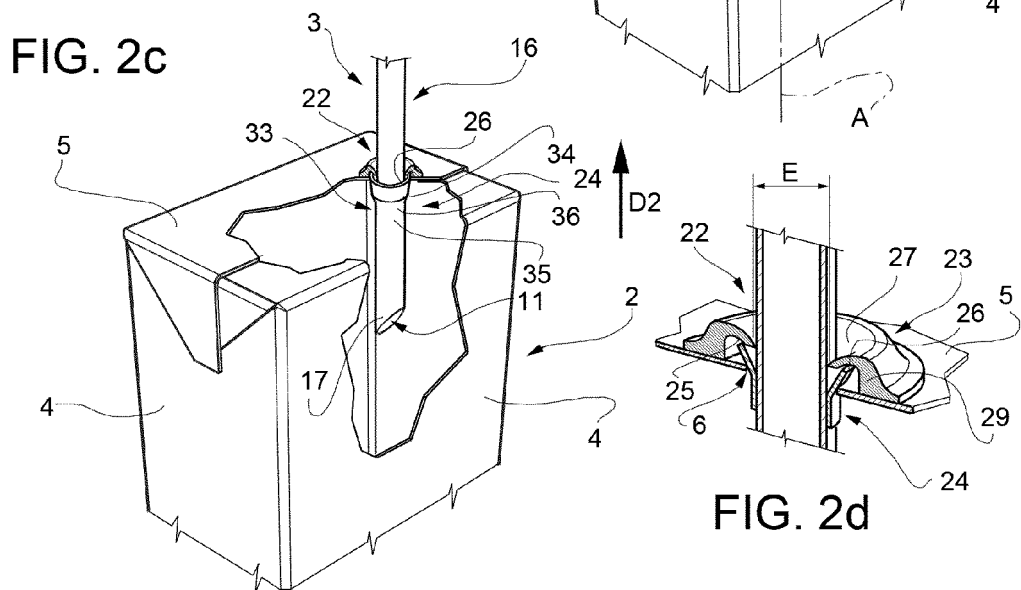
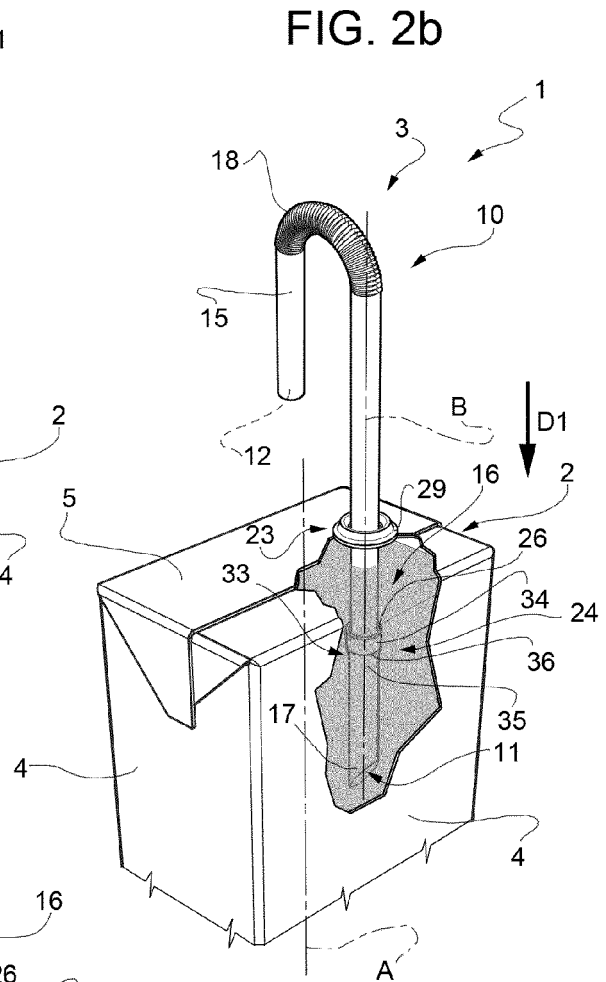
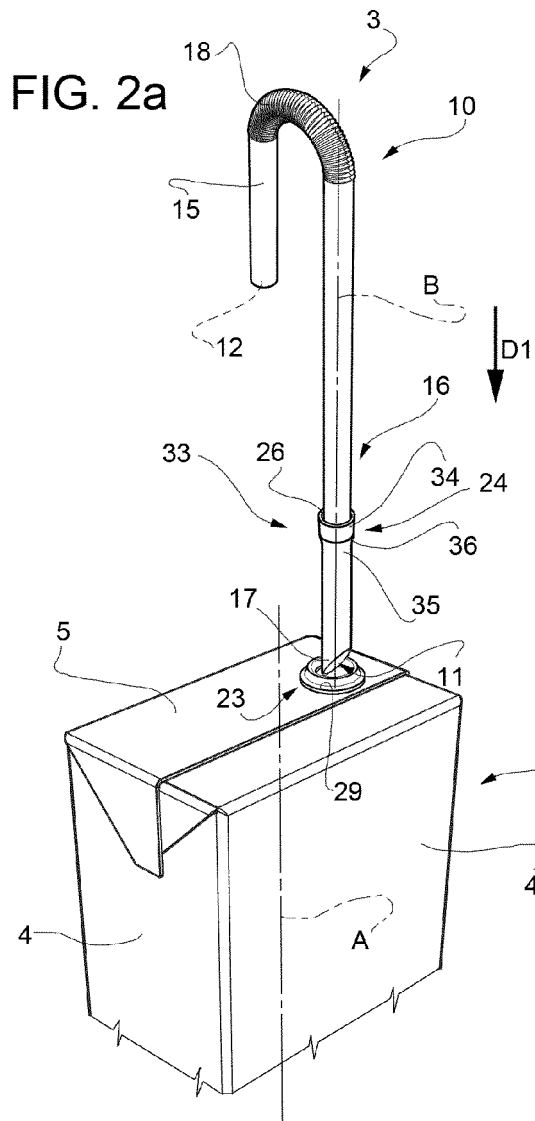
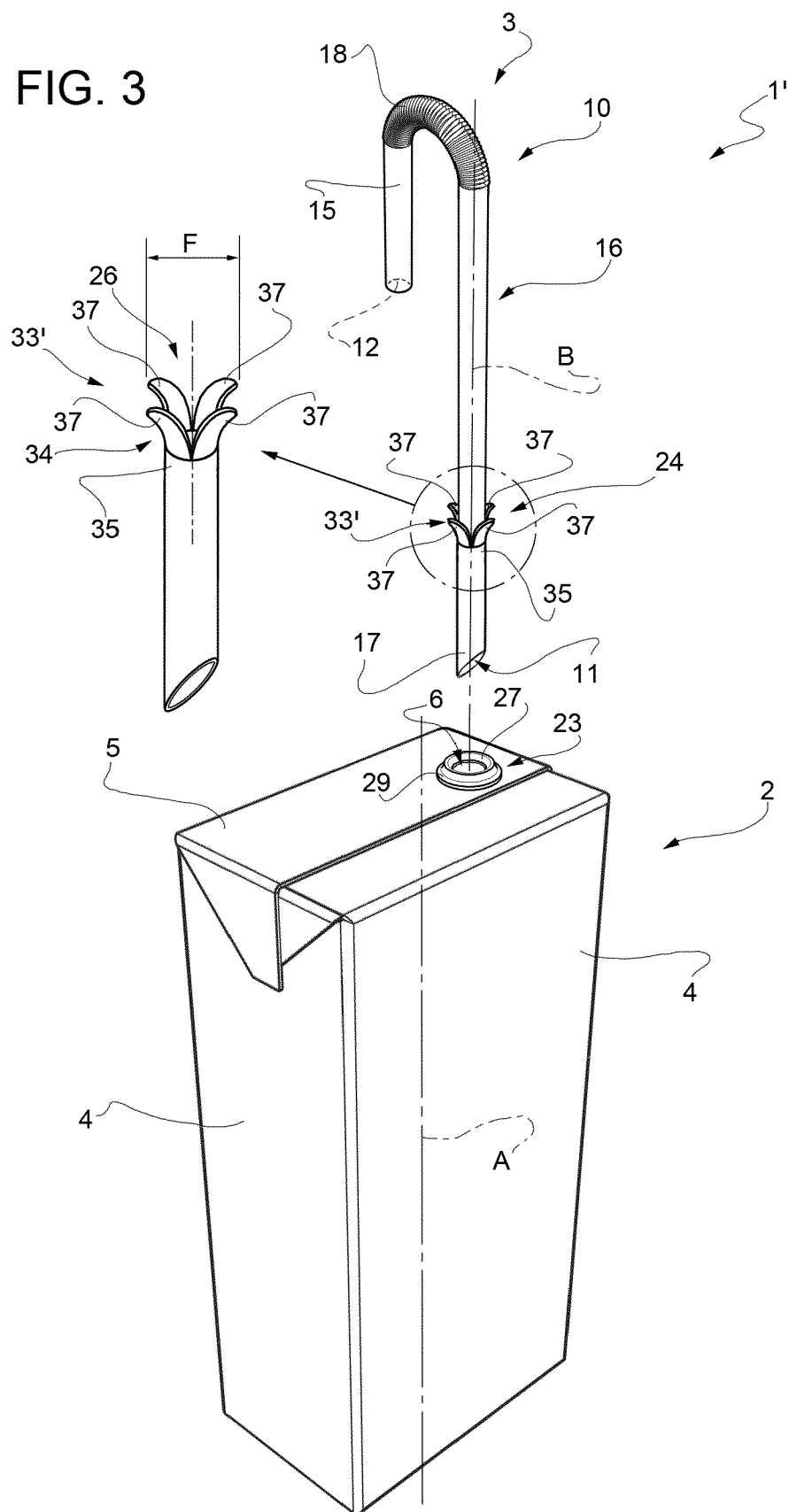


FIG. 3



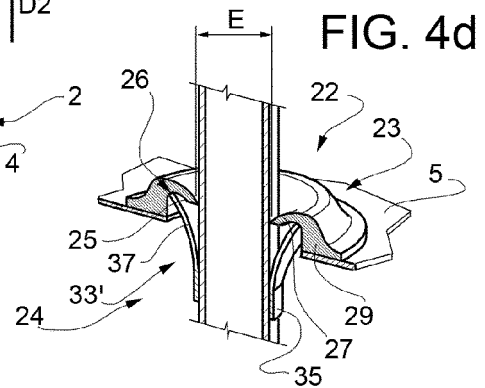
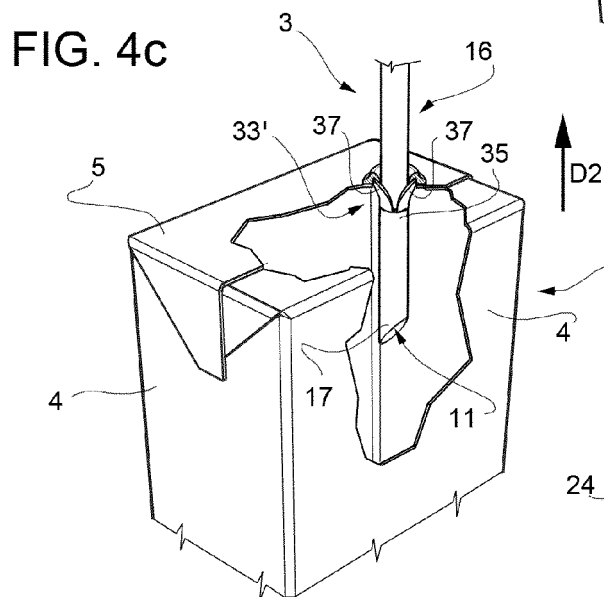
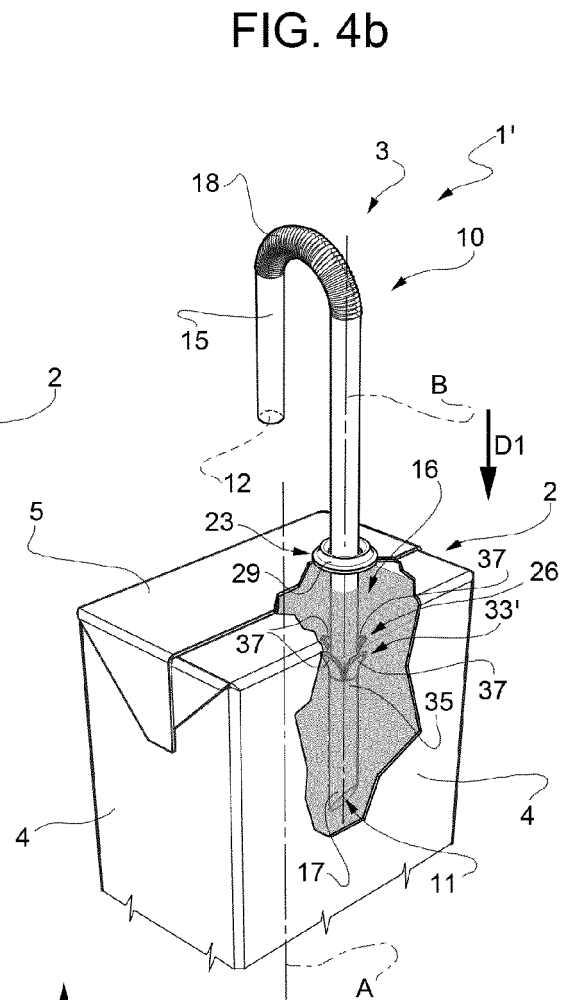
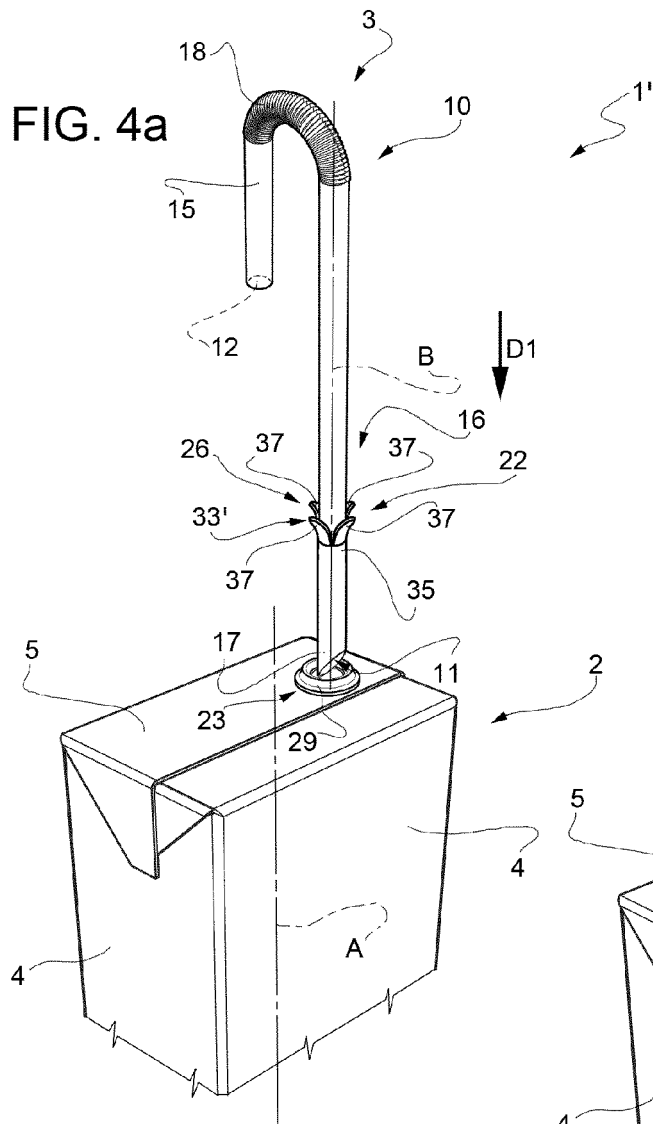
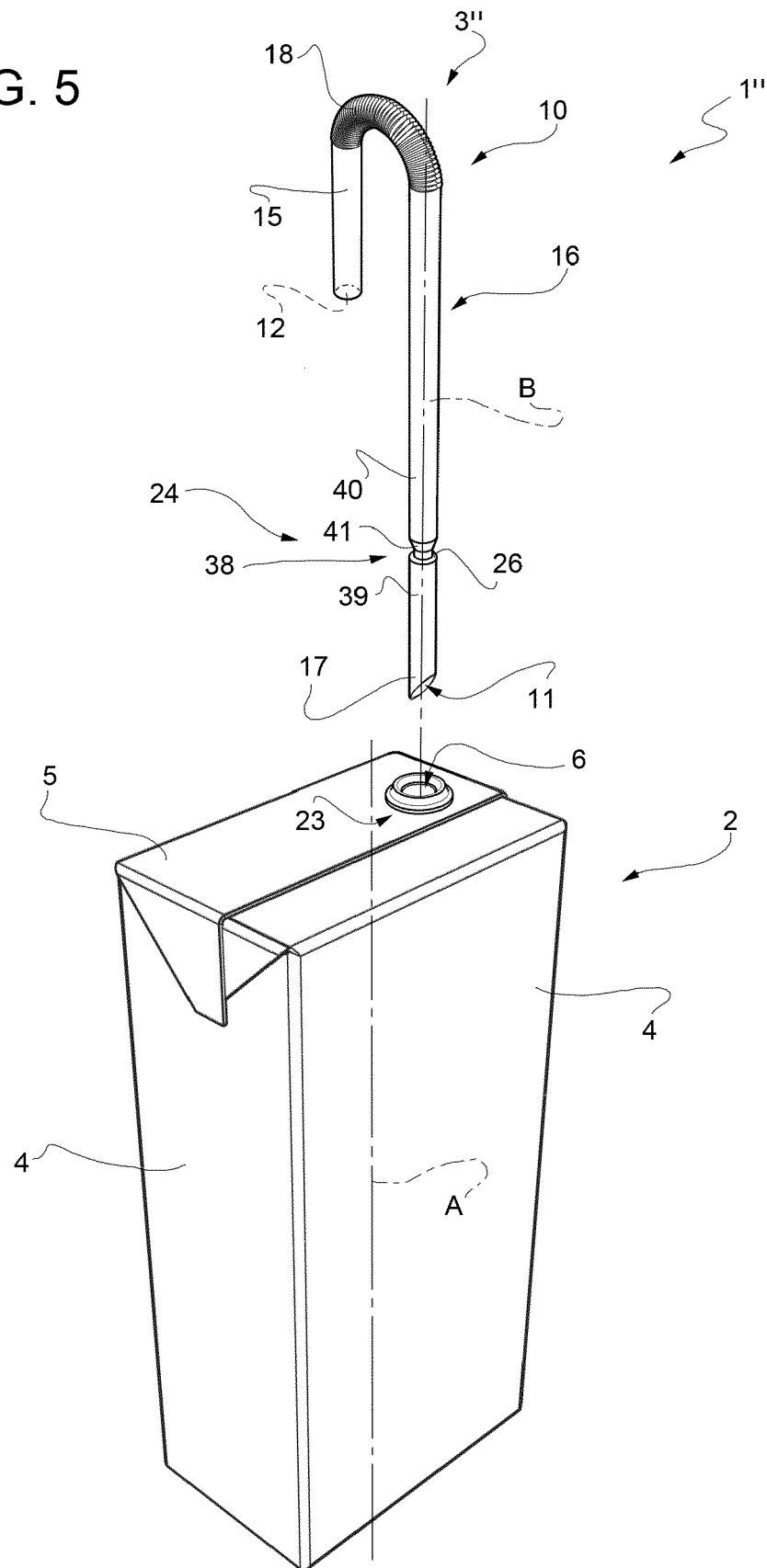
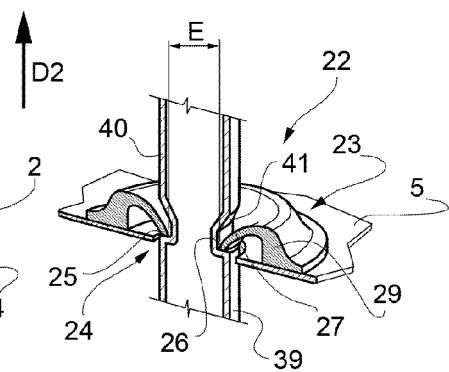
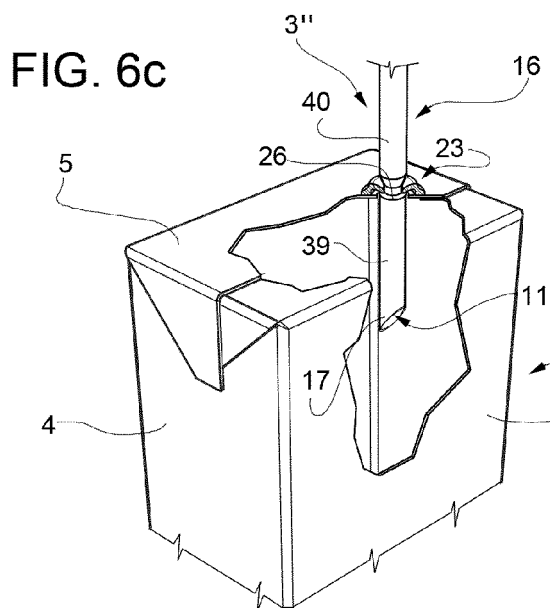
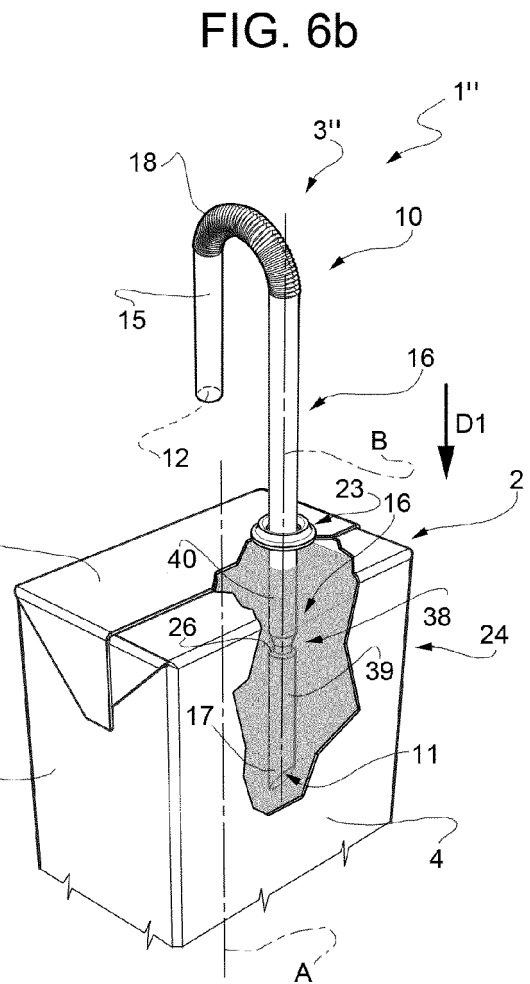
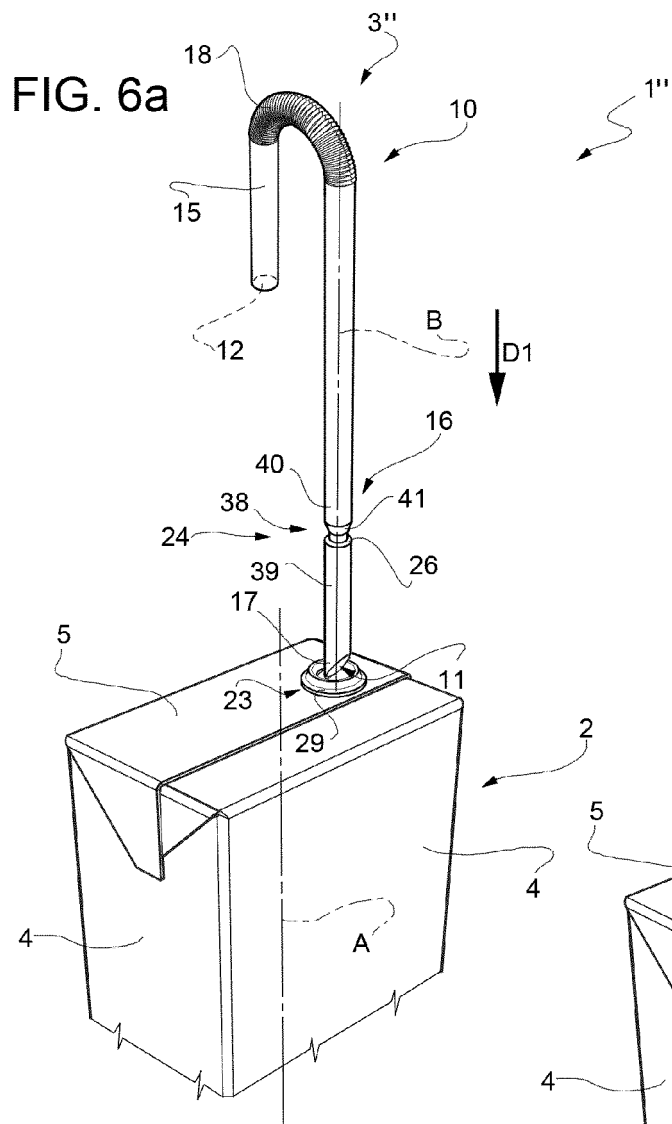


FIG. 5







EUROPEAN SEARCH REPORT

 Application Number
 EP 20 15 4453

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 A	US 2016/100703 A1 (FENNER TODD A [US]) 14 April 2016 (2016-04-14) * paragraph [0008] - paragraph [0012]; claims 1-14; figures 1-3 *	1-5, 13-15 6-12	INV. B65D23/14 B65D25/20 B65D75/54 B65D33/00 B65D77/28
X	WO 03/049583 A1 (NAESJE KJETIL [NO]) 19 June 2003 (2003-06-19) * page 7, paragraph 2 * * page 9, paragraph 4 - page 10, line 2; figures 1,2,4 *	1-5,10, 11,13-15	
X	US 2009/256000 A1 (WALLACE JAMIE M [US]) 15 October 2009 (2009-10-15) * paragraph [0033] - paragraph [0038]; claims 1-23; figures 1a-9 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 April 2020	Examiner Janosch, Joachim
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 03.02 (P04C01)

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

EP 20 15 4453

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.

02-04-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2016100703 A1	14-04-2016	US 2016100703 A1	14-04-2016
		US 2016102518 A1	14-04-2016
		WO 2017065964 A1	20-04-2017

WO 03049583 A1	19-06-2003	AU 2002366627 A1	23-06-2003
		BR 0214723 A	31-08-2004
		CA 2469105 A1	19-06-2003
		CN 1604749 A	06-04-2005
		EP 1460919 A1	29-09-2004
		JP 4173448 B2	29-10-2008
		JP 2005511182 A	28-04-2005
		KR 20050044715 A	12-05-2005
		MX PA04005407 A	23-03-2005
		NO 315511 B1	15-09-2003
		RU 2293506 C2	20-02-2007
		US 2005061822 A1	24-03-2005
		WO 03049583 A1	19-06-2003

US 2009256000 A1	15-10-2009	JP 2011516240 A	26-05-2011
		US 2009256000 A1	15-10-2009
		WO 2009129322 A2	22-10-2009
