

(19)



(11)

EP 3 967 617 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.03.2022 Bulletin 2022/11

(51) International Patent Classification (IPC):
B65D 5/44^(2006.01) B65D 5/68^(2006.01)

(21) Application number: **20196206.5**

(52) Cooperative Patent Classification (CPC):
B65D 5/685; B65D 5/443

(22) Date of filing: **15.09.2020**

(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

(72) Inventors:

- **HOEFTE, Paulus Antonius Augustinus**
1853 Strombeek-Bever (BE)
- **NG PAK LEUNG, Clara Sophie**
1853 Strombeek-Bever (BE)
- **LEFLERE, Joost**
1853 Strombeek-Bever (BE)

(71) Applicant: **The Procter & Gamble Company**
Cincinnati, OH 45202 (US)

(74) Representative: **Plasseraud IP**
66, rue de la Chaussée d'Antin
75440 Paris Cedex 09 (FR)

(54) **CARDBOARD LID AND SUPPORT ELEMENT STRUCTURE**

(57) Examples include a cardboard lid (100) for a container, the cardboard lid comprising side panels (101-104) forming lid flanks and lid flaps connected to the side panels by lid flaps fold lines, two of the lid flaps forming a lid top panel (105). The cardboard lid also com-

prises a support element structure (106) extending away from the top panel and positioned between the side panels, whereby the lid flaps, side panels, and support element structure pertain to a single blank.

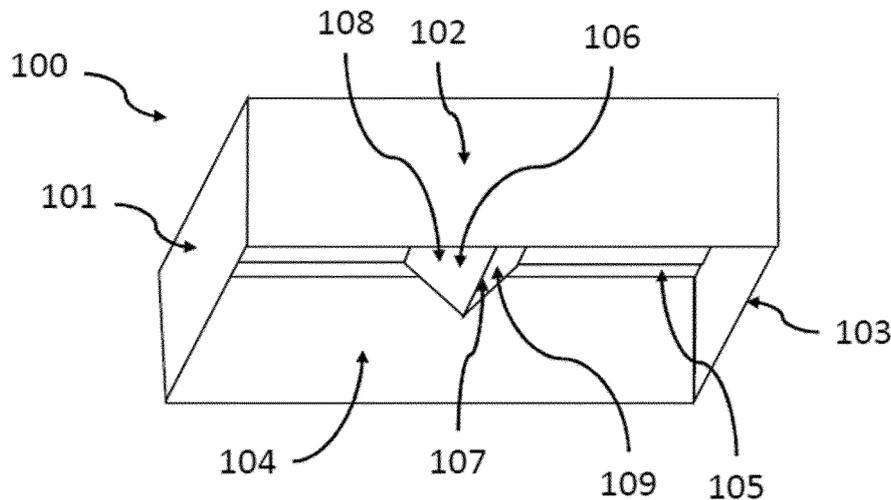


FIG. 1

EP 3 967 617 A1

Description

BACKGROUND

[0001] This invention generally relates to packaging using cardboard material. Cardboard is a widely used packaging material which is particularly suited for recycling, in particular recycling in a paper recycling stream which may involve a reduced non fiber content, for example a maximum non fiber content of 5% by weight, and thereby is particularly environmentally friendly. Cardboard has however limitations compared to other packaging materials such as plastic materials, in particular as far as mechanical characteristics are concerned.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002]

FIG. 1 illustrates a first example cardboard lid.
 FIG. 2A illustrates a second example cardboard lid.
 FIG. 2B illustrates a third example cardboard lid.
 FIG. 3 illustrates a fourth example cardboard lid.
 FIG. 4 illustrates an example cardboard blank.
 FIG. 5 illustrates another example cardboard blank.
 FIG. 6 illustrates an example consumer product.
 FIG. 7A-J illustrates an example method for manufacturing an example consumer product.

DETAILED DESCRIPTION

[0003] Cardboard is, mechanically speaking, a relatively flexible material, meaning that a wall of a container made of cardboard may offer little resistance to getting bent under an external pressure. In some applications where resistance to getting bent is of importance, a material different from cardboard may be used. Materials different from cardboard may however not be as straightforward to recycle. Such choice of material thereby results of a compromise. An objective of the present disclosure is to propose a cardboard support element structure for a cardboard container, whereby the inclusion of such a support element structure in a cardboard container leads to reinforcement of the cardboard structure, permitting use of cardboard in applications which would otherwise be compromised by using another material, while avoiding compromising recyclability.

[0004] Cardboard container design may address strengthening mechanical characteristics by applying separate three dimensional pieces. Such three dimensional pieces may be applied in a lid, for example by gluing. Gluing may happen prior to or after lid formation. When gluing a three dimensional piece on a planar structure such as a blank at a supplier location, transportation from the supplier location may result less space efficient, hence less cost efficient, due to the three dimensional nature of the three dimensional pieces compromising stacking. If such gluing would take place after transpor-

tation from a supplier location, for example on a manufacturing line, gluing a three dimensional piece on a blank or inside an erected lid during manufacturing may add complexity to a manufacturing operation and slow down a speed of a manufacturing line, compromising a manufacturing plant productivity accordingly. The cardboard lid comprising a support element structure according to the present disclosure was surprisingly identified as a way to create a three dimensional reinforcement structure which reduces or suppresses a negative impact on transportation efficiency or on manufacturing line speed in a manufacturing location. As the cardboard lid comprising a support element structure according to this description may be shaped using folding machinery which is likely to be already in place at a manufacturing location, little or no additional capital is required at a manufacturing location to implement the structures according to this disclosure. In addition to this, the cardboard lid comprising a support element structure according to this disclosure pertains to a single blank, thereby facilitating manufacturing of such cardboard lid comprising a support element structure. The cutting of such a single blank may take place at a supplier facility prior to transportation to a manufacturing facility where blanks may be erected. In addition to this, a single blank may be in the form of a flat blank and transportation may also be facilitated, and weight and hence cost may be optimized. In addition to this, a single flat blank may be partially pre-folded, for example at a supplier facility, to further optimize transportation efficiency through a decreased 2D (two dimensional) footprint or reducing elements of a blank sticking out of a given footprint while sustaining the flat nature hence stackability of the blank.

[0005] A cardboard lid or blank according to this disclosure may be made of the same material as a material used for a box according to this disclosure. A blank, lid, box or container according to this disclosure may be made from paper or cardboard materials wherein the paper material is for example selected from paperboard, cardboard, laminates comprising at least one paper board or cardboard layer, cellulose pulp materials or a mixture thereof. The material used to make the blank, lid, box or container may comprise other ingredients, such as colorants, preservatives, plasticisers, UV stabilizers, Oxygen, perfume, recycled materials and moisture barriers or a mixture thereof. The blank, lid, box or container may comprise areas of external or internal printing. The blank, lid, box or container may be made for example by cardboard making. Suitable cardboard blank, lid, box or container manufacturing processes may include, but are not limited to, tube forming from a flat cardboard or paper sheet with a gluing step, folding or a mixture thereof. The cardboard blank, lid, box or container is opaque, for example to protect content from external light. In some examples the blank, lid, box or container is constructed at least in part and in some specific examples in its entirety from paper-based material. By paper-based material, we herein mean a material comprising paper. With-

out wishing to be bound by theory, by 'paper' we herein mean a material made from a cellulose-based pulp. In some examples, the paper-based material comprises paper, cardboard, or a mixture thereof, wherein preferably, cardboard comprises paper-board, corrugated fiber-board, or a mixture thereof. Corrugated fiber-board comprises a series of flutes. Each flute can be understood to be a channel. The flutes run parallel to one another, with the flute direction being the direction travelled along each channel. The paper-based material may be a laminate comprising paper, cardboard, or a mixture thereof, wherein in some examples, cardboard comprises paper-board, corrugated fiber-board, or a mixture thereof, and at least another material. In some examples, the at least another material comprises a plastic material. In some examples, the plastic material comprises polyethylene, polyethylene terephthalate, polypropylene, polyvinylalcohol or a mixture thereof. In some examples the plastic material comprises a copolymer of ethane and vinyl alcohol, or EVOH. A barrier material may be used as the at least another material. The barrier material may be a biaxially orientated polypropylene, a metallised polyethylene terephthalate or a mixture thereof. The at least another material may comprise a wax, a cellulose material, polyvinylalcohol, silica dioxide, casein based materials, or a mixture thereof. In some examples, the paper-based laminate comprises greater than 50%, preferably greater than 85%, and more preferably greater than 95% by weight of a laminate of fiber-based materials. In some examples, the barrier material may comprise plastic material having a thickness of between 10 micron and 40 micron. In some examples, the barrier material may comprise plastic material having a thickness of between 10 micron and 35 micron. The paper-based material may be a laminate. In some examples, the internal surface of a blank, lid, box or container comprises paper, cardboard, or a mixture thereof, wherein, in specific examples, cardboard comprises paper-board, corrugated fiber-board and lamination of polyethylene, or a mixture thereof, and, in some examples, the external surface of the blank, lid, box or container or a combination thereof comprises the at least another material. Alternatively, the at least another material might also be laminated in-between two paper-based material layers. Without wishing to be bound by theory this at least another material might act as a barrier for leaked liquid absorbed by the paper-based material facing the interior side of the blank, lid, box or container, to prevent or reduce a contaminating flow through a wall of the blank, lid, box or container. Other structures may be found efficient to avoid leakage from the content or to protect the content from external fluids, for example from a shower, a sink, or by handling the container or the lid with wet hands. Contamination of a wall, flap or panel of the blank, lid, box or container might be unsightly to consumers or may contaminate the storage area. Other structures might be found efficient to avoid exposure of the enclosed detergent product towards outside relative humidity. This is of special impor-

tance if the enclosed detergent product is sensitive to humidity by nature such as for example water soluble unit dose detergent articles in which a detergent composition is enclosed in a water soluble film, the water soluble film being sensitive to premature rupture when exposed to higher percentages of outside relative humidity. In some examples, the blank, lid, box or container is made of a paper-based material comprising the at least another material laminated in between two corrugated fiberboard layers. In some examples, the material used for the blank, lid, box or container comprises a core cardboard flute material sandwiched between two plain cardboard layers and polyethylene laminate. A cardboard box, lid or blank according to this disclosure may be made from or comprise recycled material or recycled cellulose fibres.

[0006] Figure 1 illustrates an example cardboard lid 100 for a container. Cardboard lid 100 comprises side panels 101-104 forming lid flanks. In this example, each side panel 101-104 is a rectangular side panel. In this example, four side panels are provided, each side panel forming a respective lid flank. In this example, each lid flank is connected to two other lid flanks by a lid corner, each lid corner forming a 90 degrees angle. In this example, all lid flanks are perpendicular to a same plane. Cardboard lid 100 further comprises lid flaps connected to the side panels by lid flaps fold lines, two of the lid flaps forming a lid top panel 105, whereby, in this example, the two lid flaps forming the lid top panel are two opposite lip flaps, such two opposite lid flaps forming the top panel being in this case connected to long side panels, this example comprising two long side panels and two short side panels, a short side panel being shorter than a long side panel along a first direction, the first direction according to this disclosure being a direction perpendicular to fold lines connecting side panels to each other. In this example, the lid top panel is rectangular. In this example, the lid top panel is perpendicular to each lid flank. Example lid flaps forming the top panel will be illustrated in more details in other figures hereby described. It is important to note that the lid flaps are connected to the side panels by lid flaps fold lines due to pertaining to a single blank as will be discussed in more details. A flap should be understood as a piece of cardboard connected to the remaining lid structure. A flap may be connected to the remaining lid structure by a folding line, the lid being made of an integral cardboard piece. The flap may be connected to the cardboard structure by a segment, for example the folding line. A flap may also be connected to a part of the lid by glue.

[0007] Normal or perpendicular should be understood in this description as substantially normal or substantially perpendicular. In some examples, normal or perpendicular comprises angles of less than 120 and of more than 60 degrees. In some examples, normal or perpendicular comprises angles of less than 110 and of more than 70 degrees. In some examples, normal or perpendicular comprises angles of less than 100 and of more than 80 degrees. In some examples, normal or perpendicular

comprises angles of less than 95 and of more than 85 degrees.

[0008] Cardboard lid 100 further comprises a support element structure 106 extending away from the top panel and positioned between the side panels. By extending away from the top panel, it should be understood that the support element structure comprises at least a part extending away from the top panel, the support element structure developing a three dimensional shape, the cardboard material of the support element structure defining some boundaries of this three dimensional shape. In some examples the support element structure comprises a part separated from the top panel by at least 5 mm. In some examples the support element structure comprises a part separated from the top panel by at least 10 mm. In some examples the support element structure comprises a part separated from the top panel by at least 15 mm. In some examples the cardboard structure comprises a part separated from the base plane by at least 20 mm. In some examples the support element structure comprises a part separated from the top panel by at least 30 mm. In some examples the support element structure comprises a part separated from the top panel by at least 35 mm. In some examples the support element structure comprises a part separated from the top panel by less than 10 cm, for example to avoid a cantilever situation when the support element structure is acting as such. In this example, the support element structure 106 has a triangular cross section in a plane perpendicular to the top panel 105. In other examples, the support element structure may comprise a portion of a cylinder or a portion of a prism, such as a triangular, tetragonal or pentagonal prism for example. Such prisms may be obtained by folding successive portions of the support element structure along parallel lines, while a shape of a portion of a cylinder may be obtained by tensing a single panel of the support element structure. In some examples the support element structure comprises an arcuate shape due to the support element structure being tensed between other elements, such other elements being part of the lid.

[0009] The support element structure according to this disclosure is aimed at providing mechanical support for a cardboard wall, for example a cardboard wall of a container or of a lid of a container, such cardboard wall lying against the support element if submitted to a force or to a pressure.

[0010] The illustrated support element structure 106 corresponds to a portion of a prism, more specifically a triangular prism when taking the top panel 105 into account. In this example, the support element structure comprises a linear ridge 107, the ridge 107 corresponding to an edge of the prism, a first 108 and second 109 sides of the prism defining the ridge 107, the first 108 and second 109 sides of the prism each preferably making an angle of more than 15 degrees (respectively -15 degrees) with the top panel. In this case, the first side 108 of the prism makes an angle of about 30 degrees with the top panel. In some examples the ridge is sepa-

rated from the top panel by at least 5 mm. In some examples the ridge is separated from the top panel by at least 10 mm. In some examples the ridge is separated from the top panel by at least 15 mm. In some examples the ridge is separated from the top panel by at least 20 mm. In some examples the ridge is separated from the top panel by at least 30 mm. In some examples the ridge is separated from the top panel by at least 35 mm. In some examples the ridge is separated from the top panel by less than 10 cm, for example to avoid a cantilever situation when the support element is acting as such.

[0011] It should be understood that features such as number of flaps, flap orientations, number of panels and angles of various examples hereby described may be combined to produce alternative examples.

[0012] Cardboard lid 100 is such that the lid flaps, side panels, and support element structure pertain to a single blank.

[0013] Having the the lid flaps, side panels, and support element structure pertaining to a single blank permits limiting complexity in erecting such a lid, whereby a lid comprising a plurality of blanks may involve additional gluing steps or adjustment between different independent structures for example.

[0014] Figure 2A illustrates another example cardboard lid 200 according to this description. Cardboard lid 200 comprises elements 101-109 as described in the case of cardboard lid 100, such elements being numbered using the same reference numerals. Cardboard lid 200 further comprises a reinforced lid flank 104, the reinforced lid flank 104 comprising a reinforced section 204. Indeed, in some examples, at least one of the lid flanks, preferably some of the lid flanks, and most preferably each of the lid flanks comprise a reinforcing panel, the reinforcing panel being connected to the respective side panel by a side panel fold line, such as side panel fold line 214, the reinforcing panel being folded back onto the respective side panel, the reinforcing panel pertaining to the single blank. In some examples, the lid comprises two opposite long flanks parallel to each other and two opposite short flanks parallel to each other, the long flanks being perpendicular to the short flanks, the long flanks are reinforced whereas the short flanks are not reinforced, or thinner than the long flanks, or comprise a lesser number of layers than the long flanks, in order to take into account the facts that a user or consumer may be more likely to apply pressure on long flanks, and that long flanks are more likely to be submitted to deformation given that their middle point along the first direction is farther away from corners of the same long flank than the middle point of a short flank from the respective short flank corners.

[0015] Cardboard lid 200 further comprises an actuation area 210. Indeed, in some examples, at least one flank comprises an actuation area. In this example, an apex of the support element structure, such as ridge 107, is in line with the actuation area 210. Such an actuation area may permit actuating a lock of a container compris-

ing a lid according to this disclosure as will be described in further details in this disclosure. In a preferred example, two flanks comprise such actuation areas, preferably opposite two flanks, more preferably two opposite long flanks, whereby, in some examples, consumers tend to use a single hand span to actuate both actuation areas at a same time, whereby a hand span may in such example fit over a short flanks length along the first direction to reach across both actuation areas simultaneously.

[0016] Figure 2B illustrates another example cardboard lid 220 according to this description. Cardboard lid 220 comprises elements 101-109 as described in the case of cardboard lid 100 and elements 204, 214 and 210 as described in the case of cardboard lid 200, such elements being numbered using the same reference numerals. Cardboard lid 220 further comprises reinforcing panel 213 connected to the respective side panel 103, and further reinforcing panels connected to respective side panels 102 and 101 which are not visible in this Figure. Cardboard lid 220 is thereby such that each of the lid flanks comprises a reinforcing panel, the reinforcing panel being connected to the respective side panel by a side panel fold line, the reinforcing panel being folded back onto the respective side panel, the reinforcing panel pertaining to the single blank. Cardboard lid 220 also further comprises a further or additional actuation area 210B, the apex 107 being in line with the actuation area 210B, actuation area 210B being in this case a round aperture into side panel 102 opposite to side panel 104 which comprises actuation area 210, also taking the form of a round aperture in this case.

[0017] Figure 3 illustrates another example cardboard lid 300 according to this description. Cardboard lid 300 comprises elements 101-105 as described in the case of cardboard lid 100, such elements being numbered using the same reference numerals. Lid 300 comprises support element structure 306 according to this disclosure which is a portion of a cylinder. Support element structure 306 may be formed by a flap 306 connected by a fold line to side panel 101 and tucked between top panel 105 and a flap 307 connected by a fold line to side panel 103, such flap 306 being tensed into an arcuate shape to form the support element structure.

[0018] Figure 4 illustrates an example cardboard blank 400 for a cardboard lid according to this disclosure, in particular according to a cardboard lid similar to the example cardboard lid 300. The cardboard blank 400 comprises:

- four side panels 104, 101, 102, 103, the four side panels following each other along a first direction D1, each side panel being connected to at least another side panel by a respective side panel fold line perpendicular to the first direction;
- a side flap 401 connected to one of the side panels, in this case side panel 103, along a fold line perpendicular to the first direction, the side flap 401 following or preceding, in this case following, the four side pan-

els along the first direction;

- three lid flaps 404, 402, 307, the lid flaps following each other along the first direction, each lid flap being connected to a respective regular side panel 104, 102, 103 of the four side panels by a respective lid flap fold line parallel to the first direction, the lid flap fold lines being aligned with each other; the four side panels comprising the regular side panels and a specific side panel;
- a support element structure, the support element structure comprising a support element first panel 306 connected to the specific side panel 101 by a specific fold line aligned with the lid flap fold lines, the support element structure further comprising a support element opposite panel 307 comprised in the lid flap 307 of the three lid flaps 404, 402, 307, lid flap 307 being connected to an opposite side panel 103, the opposite side panel 103 being the regular side panel separated from the specific side panel 101 by a single other regular side panel 102, the support element structure having a combined length $L2A+L2B$ along a direction D2 perpendicular to the first direction D1 exceeding a length L1 of the single other regular side panel 102 along the first direction D1.

[0019] It should be understood that a number of other configurations may be considered. For example, in some cases flap 401 may be linked to panel 104. A function of a flap such as flap 401 permits for example gluing to obtain the four flank structure ready for erection, and also permits forming a flat reduced footprint structure as illustrated for example in Figure 7B.

[0020] It should be understood that in this disclosure, "aligned" may encompass fold lines in a same direction which may be slightly shifted from each other, for example in order to take material thickness into account. In some examples, such shift considered to maintain alignment may be of less than thrice the thickness of the material forming the blank. In some examples, such shift considered to maintain alignment may be of less than twice the thickness of the material forming the blank. In some examples, such shift considered to maintain alignment may be of less the thickness of the material forming the blank.

[0021] The combined length according to this disclosure is a combined length along the direction perpendicular to the first direction of one or more elements forming the erected support element structure, without double counting of eventual sections of such elements configured to be superposed, or glued to each other, in such erected support element, in particular a combined length summing the length along the direction perpendicular to the first direction of elements connected to the specific side panel 101 and to the opposite side panel 103 and extending beyond the respective side panels along this direction perpendicular to the first direction. Such a combined length may correspond to a peripheral length of

the erected support element structure, the peripheral length for example running from corner to corner of the erected lid, passing by an apex of the support element structure, along a cross section of the erected support element structure along a plane parallel to the erected single other regular side panel, while following the support element structure. The fact that such combined length is exceeding a length of the single other regular side panel along the first direction reflects the fact that the support element structure extends away from the top panel and therefor has a peripheral length from one end of the top panel to an opposite end of the top panel along the first direction exceeding the length of the top panel itself along this same direction. In the case of lid 300 for example, the length along the cylindrical portion, corresponding to a curve, indeed exceeds a length of a segment between points of the cylindrical portion intersection the top panel. Similarly, in the case of lid 100, 200 or 220, the length along the triangular section of the support element structure will exceed the length of a segment separating points of the triangular structure intersecting the top panel. The fact that the support element structure extends away from the top panel in the erected lid is thereby equivalent to the fact that the combined length exceeds, in the blank, the length of the single other regular side panel. It should be understood that such combined length corresponds to the total length of elements, in the blank, of the various elements forming the support element, which precisely differs from a length of the erected support element in the erected lid. It should also be noted that some of the various elements forming the support element may be configured to be wholly or partially glued to each other when forming the erected support element, in which case a length of such whole or partial section configured to be glued to form a double layer structure may not contribute to such combined length in a double manner. In some examples, all elements in the blank connected to the specific side panel, and extending beyond the specific side panel, have a specific combined length along the direction perpendicular to the first direction exceeding a length of the single other regular side panel along the first direction, thereby ensuring that the combined length is exceeding a length of the single other regular side panel along the first direction, whereby the combined length comprises the specific combined length. In other words, even if the support element opposite side panel 307 of length L2B were to be entirely glued, to erect the support element, to the support element first panel 306 of length L2A, the support element would get erected due to L2A, corresponding in this case exactly to the peripheral length of the erected support element structure, being longer than L1.

[0022] Figure 5 illustrates an example cardboard blank 500 for a cardboard lid according to this disclosure, in particular according to a cardboard lid similar to the example cardboard lid 220. The cardboard blank 500 comprises the following elements, some of which correspond to corresponding elements of cardboard blank 400 and

are therefore corresponding to the same reference number:

- 5 - four side panels 102, 103, 104, 101, the four side panels following each other along a first direction D1, each side panel being connected to at least another side panel by a respective side panel fold line perpendicular to the first direction;
- 10 - a side flap 401 connected to one of the side panels, in this case side panel 101, along a fold line perpendicular to the first direction, the side flap 401 following or preceding, in this case following, the four side panels along the first direction (in another example, such side flap 401 could precede side panel 102);
- 15 - three lid flaps 402, 507, 404, the lid flaps following each other along the first direction, each lid flap being connected to a respective regular side panel 102, 103, 104 of the four side panels by a respective lid flap fold line parallel to the first direction, the lid flap fold lines being aligned with each other; the four side panels comprising the regular side panels and a specific side panel;
- 20 - a support element structure, the support element structure comprising a support element first panel 506 connected to the specific side panel 101 by a specific fold line aligned with the lid flap fold lines and by an additional fold line parallel to the specific fold line, the support element structure further comprising a support element opposite panel 507 comprised in the lid flap of the three lid flaps and connected to an opposite side panel 103, the opposite side panel 103 being the regular side panel separated from the specific side panel 101 by a single other regular side panel 104, the support element structure having a combined length (corresponding in this case exactly to the peripheral length of the erected support element structure, L2C+L2D-L2D2 as will be explained below) along a direction D2 perpendicular to the first direction D1 exceeding a length L1 of the single other regular side panel 104 along the first direction D1.
- 25
- 30
- 35
- 40

[0023] Cardboard blank 500 further comprises a first wing 510, the first wing 510 being adjacent to the support element first panel 506 and connected to the support element first panel 506 by a first wing fold line perpendicular to the first direction.

[0024] An example wing such as first wing 501 may for example contribute to the support element structure acting as a centering patch on the lid in order to correctly place and align the lid onto the corresponding container, thereby guiding the lid during closure of the container. An example wing such as first wing 501 may also contribute to increasing manufacturing tolerance by compensating some degree of misalignment. An example wing such as first wing 501 may also contribute to increasing consumer experience by facilitating the closing of the container.

[0025] Such a first wing may be comprised in different example blanks according to this disclosures to obtain different example lids according to this disclosure, whereby the support element structure of such lids would comprise a support element first panel and the first wing, the first wing being adjacent to the support element first panel and separated from the support element first panel by a first wing fold line, the first wing comprising a first wing end distal from the first wing fold line, the first wing end being in contact with the top panel to maintain the support element first panel extended away from the top panel. When folded in place from the blank, such first wing would fold parallel to a lid flank (in the example of blank 500, parallel to lid flank 104), the distal end (for example distal end 511) would lie against the top panel 105 (for example formed from flaps 402 and 404), pushing the support element first panel (for example 506) away from such top panel to realise an example lid according to this disclosure. In some examples, the distal end may be curved to facilitate sliding of the first wing against the top panel when erecting the lid. In other examples, the distal end may be straight, for example to facilitate blank cutting.

[0026] Cardboard blank 500 comprises a second second wing 520, the second wing being adjacent to the support element first panel and connected to the support element first panel by a second wing fold line perpendicular to the first direction and on a side of the support element first panel opposite to the first wing 510. One should note that while example blank 500 comprises both a first and a second wing, another example blank, not illustrated here, may comprise a single wing.

[0027] Such a first wing may be comprised in different example blanks according to this disclosure to obtain different example lids according to this disclosure, whereby the support element structure of such lids would comprise the second wing, the second wing being adjacent to the support element first panel and separated from the support element first panel by a second wing fold line, the second wing comprising a second wing end distal from the second wing fold line, the second wing end being in contact with the top panel to maintain the support element first panel extended away from the top panel, the second wing fold line and the first wing fold line being on opposite sides of the support element first panel.

[0028] In this example blank 500, the first wing end and the second wing end are rounded to facilitate erecting of the lid. In this example, the shape of the second wing mirrors a shape of the first wing along a direction D2 perpendicular to the first direction D1 in order to extend the support element structure in a balanced manner.

[0029] In example blank 500, the first wing 510 corresponds to a cut out in one of the three lid flaps adjacent to the support element first panel, specifically in this case to a cut out in flap 404. In this example blank 500, the second wing 520 corresponds to a cut out in one of the three lid flaps adjacent to the support element first panel, specifically in this case to a cut out in flap 402. In some other examples, such a cut out may correspond to a sin-

gle wing.

[0030] In example blank 500, the support element structure comprises a connecting panel 508 between the support element first panel 506 and the specific side panel 101. Such a connecting panel is, in this example, directly connected to the specific panel by the specific fold line and directly connected to the support element first panel by the additional fold line parallel to the specific fold line. Directly connected should be understood in that a single fold line is making such connection. The connected panel may, when the blank is erected to form a lid, remain essentially parallel to the top panel, while the support element first panel extends away from the top panel.

[0031] In the example blank 500, the support element structure comprises an opposite connecting panel 509 between the support element opposite panel 507 and the opposite side panel 103. Such a structure may for example permit retaining the support element first panel 506 in place when the lid is erected from the blank. In this example, the opposite panel 507 may match an additional panel 530 when the blank is erected into a lid, such additional panel 530 being directly connected to the support element first panel on a side opposite to the connecting panel 508. Such relationships will be explained in more details in an example method of manufacturing. One should note that in some examples, connecting panel 508 and opposite connecting panel 509 have substantially a same length along direction D2 in order to place the support element in a central position such that an apex of the support element may get placed in alignment with an aperture for an actuation area which may be placed at a mid-point, along the direction D1, of the corresponding side panel. Similarly, a desired positioning of the apex may be obtained by varying respective length of panels 508 and 509 accordingly.

[0032] In this example blank 500, and as discussed in the context of blank 400, it should be understood that the combined length corresponds to the total length of elements, in the blank, of the various elements forming the support element, which precisely differs from a length of the erected support element in the erected lid. It should also be noted that some of the various elements forming the support element may be configured to be wholly or partially glued to each other when forming the erected support element, in which case a length of such whole or partial section configured to be glued to form a double layer structure may not contribute to such combined length in a double manner. In some examples, all elements in the blank connected to the specific side panel, and extending beyond the specific side panel, have a specific combined length along the direction perpendicular to the first direction exceeding a length of the single other regular side panel along the first direction, thereby ensuring that the combined length is exceeding a length of the single other regular side panel along the first direction, whereby the combined length comprises the specific combined length. In other words, even if the support

element opposite side panel 507 were to be glued, to erect the support element, to the additional panel 530, the support element would get erected due to L2D+L2C minus a length L2D2 along D2 of the glued section between 507 and 530 being longer than L1.

[0033] Example blank 500 further comprises four reinforcing flaps 540, each reinforcing flap being connected to a respective side panel by a respective reinforcing flap fold line, the reinforcing flap fold lines being aligned with each other and parallel to the first direction, the reinforcing flaps being situated on a side of the side panels opposite to the lid flaps and to the support element structure. In this representation, in order to facilitate the illustration, the reinforcing flaps are illustrated folded back onto the respective side panels. It should be noted that a blank having such a configuration of folded flaps may be used for ease of blank transportation to reduce blank size while maintaining the blank substantially flat. Such reinforcing flaps may be glued to the respective side panels. Such reinforcing flaps may reinforce the respective side panels and thereby the whole structure.

[0034] In the example blank 500, the specific side panel 101 and the opposite side panel 103 are shorter side panels, the shorter side panels having a same panel length along the first direction, this same panel length being shorter than a panel length of the other two side panels 102 and 104 along the first direction, the other two side panels being long side panels, the long side panels having the same length L1 along the first direction. In some examples, the length of the short panels is less than 80% of the length of the long panels along the first direction. In some examples, the length of the short panels is less than 70% of the length of the long panels along the first direction. In some examples, the length of the short panels is less than 60% of the length of the long panels along the first direction. In some examples, the length of the short panels is less than 50% of the length of the long panels along the first direction. In some examples, the length of the short panels is of more than 10% of the length of the long panels along the first direction. In some examples, the length of the short panels is of more than 20% of the length of the long panels along the first direction. In some examples, the length of the short panels is of more than 30% of the length of the long panels along the first direction. Using a relatively short length for the short panels which carry the support element structure permit making such support element structure relatively more resilient in that cantilever is reduced. In some examples, the length of the short panel preferably fits a hand span of a consumer, an internal volume or cavity of the corresponding container being set by setting a length of the long panels in order to reach a desired capacity or fill level at a given container height.

[0035] In the example blank 500, each long side panel comprises a respective aperture for an actuation area, whereby each respective aperture preferably is a through aperture intersecting flutes comprised in the long side panels. Such a configuration not only permits providing

actuation areas, but also doing so in relationship with the positioning of the support element, and permitting ventilation of the long side panels through such intersected flutes, such long side panels being more likely to be weakened in a humid environment, compared to the short panels, due to their longer length which makes them less resilient. Such relative positioning of the apertures, support element, short and long panels all work together and contribute to make the cardboard structure sturdier.

[0036] Blanks according to this disclosure may conveniently be transported as a stack of a plurality of planar or substantially planar blanks. In some examples, the blanks in a stack comprise folded back and preferably glued reinforcement flaps in order to reduce the 2D footprint of the blank, resulting in a non-perfectly planar but still stackable blank. Such stacks facilitate the erection of the corresponding lids at a manufacturing facility separate from a facility making the blanks.

[0037] Figure 6 illustrates an example consumer product 600 comprising a detergent product (not visible in Figure 6) and a container, the container comprising a box 601 and lid corresponding, in this example, to lid 220, even though other lids according to this disclosure may be considered. The box 601 comprising a lock 610 to maintain the lid in a closed position, the lock comprising an actuator aligned with a portion of the support element structure when the lid is in the closed position, the support element structure fitting within the box when the lid is in the closed position. Lock 610 cooperates with actuation area 210B. A further lock may be provided to cooperate with aperture 210, such further lock being in the back side of the box, mirroring lock 610 located on the front side of the box.

[0038] Detergent products are products which may be relatively heavy, for example when a container for such product is carrying the full weight of such detergent products, in particular when the consumer product is recently acquired and thereby holds a significant quantity of detergent product. While some consumers may lift and transport such a consumer product holding a base of a box containing such detergent product, such lifting and transport may also occur by holding such consumer product by a lid, without holding the base. In such cases, it is possible that the lid, submitted to the force of gravity of the detergent product, gets released and opens the box, the box falling and possibly spreading its content. Such situations should be avoided. Beyond avoiding such unintentional lid unlocking, the structure of the container of a consumer product should preserve or improve opening ergonomics and prevent or reduce a permanent side wall deformation upon excessive or repetitive application of forces applied to the consumer product, for example during transport, in a grocery shopping bag against other objects, when submitted to external pressure, or when dropped. At the same time, containers may be elaborated in order to preserve the environment. The consumer product according to this disclosure aims at taking these different aspects into account.

[0039] A consumer product should in this disclosure be understood as a product which is provided, among others, to end consumers. Such consumer products may for example be available for purchase in supermarkets and end consumers may store such consumer products in their homes. Consumer products may be provided in large quantities and should thereby be designed taking environmental concerns into account. Consumer products should also be designed taking transportation to a retail store into account. Consumer products should also be designed taking on the shelf storage in a retail store into account. Consumer products should also be designed taking transportation from a retail store to a consumer home into account. Consumer products should also be designed taking storage at a private end consumer home into account. Consumer products should also be designed taking use of the consumer product at a private end consumer home into account. Consumer products should also be designed taking disposal into account.

[0040] The consumer product according to this disclosure comprises a detergent product. Detergent products should be understood in this disclosure as products comprising a surfactant. Detergent products may also comprise a bleach or other ingredients. Example detergent product compositions are described in more detail herein. In some examples, the detergent product comprises unit dose detergent pouches, preferably water soluble unit dose detergent pouches, more preferably flexible water soluble unit dose detergent pouches. Example unit dose detergent pouches are described in more detail herein.

[0041] The consumer product according to this disclosure further comprises a container. A container should be understood in this disclosure as an object housing a content, for example in a cavity of the container. The container facilitates protection, transport, storage, access and disposal of the consumer product. In this disclosure, the container comprises a box. A box should be understood as a generally parallelepiped, barrel shaped, cylindrical, round, oval or cubical three dimensional object defining a cavity. The use of parallelepiped boxes may facilitate storage and transportation by permitting piling up boxes in a space efficient manner. In some examples, a box may be a parallelepiped provided with some rounded, tapered trapezium or chamfered edges. The box according to this disclosure comprises the detergent product. It should be understood that the detergent product is contained or stored in the box. The box according to this disclosure may comprise a base, sidewalls and an opening. A base according to this disclosure should be understood as a surface on which the box may lie when placed on a supporting surface such as a shelf or a floor. In some examples, the base is flat. In some examples, the base is rectangular. In some examples, the base is oval or round. In some examples, the base is flat. In some examples, the base has an embossed profile standing in or out in relief. The sidewalls according to this disclosure should be understood as extending

from the base, and connecting the base to the opening, to a transition piece or to the lid. It should be understood that the connection of the base to the opening may include a transition piece in addition to a sidewall. A transition piece may be glued or otherwise attached to the sidewall for example. In some examples, the sidewalls are perpendicular to the base. In some examples, the base is rectangular and has four sides, four sidewalls extending perpendicular from the base, each sidewall being rectangular, each side wall being connected by a sidewall side to a side of the base, and by two other sidewall sides to two other of the four sidewalls. In some examples the base is oval or circular and the sidewalls form a generally cylindrical wall extending from the base in a direction normal or perpendicular to the base. In some examples, sidewalls have a shape corresponding to one of a square, a rectangle, a trapeze, a section of a sphere, a section of an ovoid, or a section of an ellipsoid. The opening according to this disclosure should be understood as an aperture providing access to the detergent product comprised in the box. In some examples, the opening faces the base. In some examples, the opening has a surface of less than the surface of the base. In some examples, the opening has a surface larger than the surface of the base in order to provide an improved access, for example using sidewalls extending from the base at angle of more than 90 degrees from the base. In some examples, the opening is provided after removal of a tamper proof feature, for example comprising a perforated piece to be removed at first use or a tamper evident sticker locking the lid to the box or tray. In some examples, the opening is placed on a top panel of the box, the top panel of the box facing the base of the box, the top panel of the box being separated from the base of the box by at least the sidewalls, the top panel of the box being generally coplanar with the base of the box, whereby the opening covers a portion of the top panel, the top panel comprising a peripheral section surrounding the opening, the peripheral section being a transition piece between a sidewall and the opening for example. In some examples, the opening is rectangular. In some examples, the opening is rectangular with rounded edges. In some examples, the opening is round or oval. The lid according to this disclosure should be understood as an element permitting to repeatedly close or open the opening of the container. In some examples the lid may be connected to the box, for example by a hinge, or may be separated from the box. The lid according to this disclosure may comprise a top and flanks or lid flanks. It should be understood that the top of the lid is aimed at covering the opening of the box when the lid is in a closed position. In some examples, the top of the lid is rectangular. In some examples the top of the lid is round, hexagonal, octagonal, or oval, structures such as round or oval being for example approximated by multiplying a number of side panels and lid flaps. In some examples, the lid comprises beveled edges. In some examples, the top of the lid is rectangular with rounded edges. It should

be understood that while being named "top", the top of the lid may be positioned in different orientations. The lid may comprise flanks. It should be understood that the flanks according to this disclosure are elements connected to the top of the lid and extending from the lid in order to engage one or more sidewalls of the box. The flanks participate in placing the top of the lid onto the opening. In some examples, the flanks extend perpendicularly from the top of the lid. In some examples, the flanks surround an entire perimeter of the top of the lid. In some examples, the flanks partially surround an entire perimeter of the top of the lid, a portion of the top of the lid being flankless. The top of the lid may cover the opening, and at least a portion of the flanks may cover at least a specific portion of the sidewalls when the lid is in the closed position, the lid being moveable from the closed position to an open position. Movement of the lid may be restrained by a connection to the box such as a hinge, or may be entirely removable, for example to provide an improved access to the content of the box. The box and lid cooperate to participate in fulfilling the role of the container to store, transport and facilitate access to the content of the container.

[0042] The container according to this disclosure comprises a lock. A lock should be in this disclosure understood as a mechanism preventing or reducing the likelihood of an accidental opening. The lock according to this disclosure is to maintain the lid in a closed position. It should be understood that the lock according to this disclosure is expected to function under normal use of the container. It should be understood that the lock may not fulfill its function when for example unusual use is made of the box, or when the box is under unusual conditions. According to this disclosure, the lock comprises an actuator moveable from a locking position to an opening position by applying an actuation pressure onto the actuator when the lid is in the closed position. The actuator should be understood in this disclosure as a mechanical structure submitted to a movement upon actuation by an outside force or actuation pressure, such movement leading to the opening of the lock when such movement takes place. In some examples, the actuator according to this disclosure is resilient and has a default position, such default position corresponding to the lid remaining closed, the resilience being vanquished by an outside force or actuation pressure in order to open the lid. In some examples, the actuator is resilient in that the actuator comprises a flexible element, the flexible element having a default position corresponding to the lid remaining closed, the flexible element being pressed to open the lid, the flexible element springing back to the default position when releasing pressure. It should be understood that a pressure is generated by the application of a force onto a surface. The actuator according to this disclosure has at least two positions being an opening position and a locking position, whereby the opening position corresponds to a position permitting opening of the lid, the locking position preventing opening of the lid or

reducing the possibility of an accidental opening of the lid.

[0043] The actuator according to this disclosure is may be connected to a specific portion of sidewalls of the box, which may be a specific portion covered by at least a portion of the flanks when the lid is in the closed position, the actuator abutting against a locking tab of the flanks when in the locking position, the actuator being maintained away from the locking tab when in the opening position, the actuator being displaceable by the actuation pressure by an unlocking displacement distance in a direction normal to the specific portion of the sidewalls. The connection of the actuator to the specific portion of the sidewall is due to the actuator participating in locking or unlocking the specific portion of the sidewall from the portion of the flanks covering the specific portion of the sidewall, thereby permitting releasing the lid from the box. The flanks may comprise a locking tab. A locking tab should be understood as a mechanical element which interlocks with the actuator. In some examples the locking tab extends away from the flanks and may be in the form of a bulge, a ridge, an embossment or an additional material layer sticking out of the flanks of the lid and towards the specific portion of the side wall such that the actuator may abut against the tab when in the locking position to prevent separating the specific portion of the sidewalls from the flank in the area of the actuator. In some examples, the locking tab is comprised in the flank itself, the locking tab being for example formed by an aperture in the flanks. Abutment according to this disclosure should be understood as a contact between the actuator or part of the actuator and the tab, such contact preventing opening of the lid. The actuator is maintained away from the locking tab when in the opening position, in order to release the locking tab. Such release of the locking tab permits opening the lid. Displacement or movement of the actuator from the locking to the opening position is by application on the actuator (directly or indirectly) of an actuation pressure or force such that the actuator is displaced by a distance sufficient to suppress contact of the actuator with the locking tab, such distance corresponding to the displacement distance, in a direction normal to the specific portion of the side wall. It should be understood that the force or pressure leading to the displacement may have a number of different directions, such different directions contributing to the displacement if a component of such force or pressure is in a direction normal to the specific portion of the side wall. Such force or pressure may also comprise a component which may be parallel to the side wall. The actuation is however triggered by a component of such force or pressure being normal to the portion of the side wall. Such presence of a component normal to the portion of the sidewall participates in the role of the lock of avoiding an accidental opening by lifting the container through lifting the lid by applying a force parallel to the sidewall, whereas desired opening would take place by the consumer "pushing" the actuator and apply the unlocking force or pressure permitting opening of the lid. In other words, while a con-

sumer may apply a force on the actuator along a direction which may not be normal to the sidewall, if a component of such force is normal to the sidewall such component may participate in applying the pressure leading to the displacement.

[0044] Such a lock would participate in suppressing or reducing the risk of accidental opening of the lid while permitting desired opening by a consumer, the functioning of such a lock depending on ensuring that the actuator maintains abutting against the locking tab even in case of pulling strongly on the lid in a direction parallel to the side wall in order to transport or lift the consumer product. The avoidance or reduction of the risk of accidental opening would also apply to a force being applied in a direction parallel to the sidewalls for example by friction with another box located side to side with a box according to this disclosure, or by a box falling over during transportation, or by internal movements of the content of the box pushing the lid during transportation. Strong pulling in a direction parallel to the sidewall may however impact the structure of the sidewall, for example resulting in bending of the side wall, whereby such bending may produce undesired disengagement of the locking tab from the activator, due to the fact that the actuator is connected to the specific portion of the sidewall. This would lead to an undesired opening of the lid. Such undesired opening of the lid may be more likely if the sidewall is made of a material such as cardboard used to form the sidewalls, in particular when the box is a cardboard box.

[0045] In some examples, the lock is placed in a central area of a sidewall of the box. A central area should be understood as substantially equidistant from opposite edges of the sidewall concerned, such edges being along a direction normal to the base of the box. In such examples, it should be understood that the lock is located closest to an edge of the sidewall close to the opening than to an edge of the sidewall close to the base, while being in a central area in respect to the edges normal to the base. Such central location of the lock may participate in avoiding sliding of the lid from the box if the box is lifted by holding the lid by applying pressure onto the actuator, whereby such pressure presses the actuator against the support element structure centrally, thereby balancing the forces maintaining the connection between the lid and the box and participating in avoiding accidental opening. In some examples, the lock may be located on a sidewall and between two edges of the sidewall, such edges being normal to the base, the lock being closer to one edge than to the other edge of the two edges, for example located closer to the one edge at a 1/3 of the distance between the two edges. In some examples one sidewall may comprise two locks. In some examples two locks may be provided offset versus each versus a centreline to increase a distance separating the two locks. In some examples more than two locks may be provided. In some examples, three locks are provided, for example corresponding to a first lock for a thumb of a user hand and two other locks on the other side of the lid for an

index and middle finger of the same user hand so such user may actuate the three locks one handed and simultaneously.

[0046] The present disclosure aims at resolving this apparent contradiction between, on one hand, the use of materials for the sidewalls which would resist accidental opening, and the use of materials for the sidewalls which are particularly environmentally friendly.

[0047] The container may be made from rigid cardboard material, flexible cardboard material or a mixture thereof. In some example, the material forming the box or the lid has a wall thickness of more than 220 microns and of less than 3mm. In some example, the material forming the box or the lid has a wall thickness of more than 1mm and of less than 2mm. In some example, the material forming the box or the lid is folded on itself, for example to reinforce parts of or the whole of the box or the lid. The container may be made from paper materials, bio based material, bamboo fibres, cellulose fibres, cellulose based or fibre based materials, or a mixture thereof. The container may be made from materials comprising recycled materials, for example recycled cellulose fiber based materials.

[0048] The lid according to this disclosure indeed comprises a support element structure, the support element structure entering the opening when the lid is in the closed position, at least part of the specific portion of the sidewalls being located between the flanks and the support element structure when the lid is in the closed position, a clearance distance separating the sidewalls from the support element structure in a direction normal to the specific portion of the sidewalls when the lid is in the closed position and when no actuation pressure is applied, the clearance distance being reduced to zero by flexing of the specific portion of the sidewalls when the actuation pressure is applied above a pressure threshold when the lid is in the closed position. Both the support element structure and the flanks are structurally part of the lid, the support element structure and the flanks permitting sandwiching the specific portion of the sidewall, thereby preventing sinking in of the specific portion of the sidewall and undesired disengagement of the actuator from the locking tab. It is important to take note of the fact that in case of an actuation pressure being applied while lifting the box through the lid, the pressure applied will catch the sandwiched specific portion of the sidewall against the support element structure, thereby compensating a force of gravity which would otherwise disconnect the lid from the box, such compensation of the gravity force being through a resisting static friction force between the specific portion of the sidewall and the support element structure. In some examples, the use of the support element structure permits using for making the box a relatively flexible material, whereby such flexible material would flex in the absence of the support element structure to the point that the box would fall off if lifted by its lid. Permitting using a relatively flexible material also permits using a lesser quantity of such material due to

the presence of the support element structure which compensates for such flexibility. The presence of such support element structure thereby prevents or reduces the risk of accidental opening even if the actuation pressure is applied onto the actuator of the lock, for example as the box is lifted while applying pressure on the actuator of the lock.

[0049] The support element structure enters the opening when the lid is in the closed position, fitting within the box when the lid is in the closed position. Such entering the opening should be understood in that the support element structure comprises a support element structure portion which enters the opening when the lid is moved from the open to the closed position, and whereby such support element structure portion exits the opening when the lid is moved from the closed to the open position. At least part of the specific portion of the sidewalls is located between the flanks and the support element structure when the lid is in the closed position. This structure permits capturing the specific portion of the sidewall between the flanks and the support element structure, the specific portion of the sidewall getting inserted between the flanks and the support element structure when the lid moves from the open to the closed position, the specific portion of the side wall being released from between the flanks and the support element structure when the lid moves from the closed to the open position. A clearance distance separates the sidewalls from the support element structure in a direction normal to the specific portion of the sidewalls when the lid is in the closed position, such direction corresponding for example to a direction of the linear ridge, and when no actuation pressure is applied. Such clearance distance would exist on a first side, and be repeated additionally on a second side of the support element structure. Such clearance distance permits insertion of the support element structure through the opening as the lid gets closed, such that the support element structure does not collide with the specific portion of the sidewall when the lid gets closed. The clearance is reduced to zero by flexing of the specific portion of the sidewalls when the actuation pressure is applied above a pressure threshold when the lid is in the closed position. When such pressure threshold is reached, the sidewall lays against the support element structure through the clearance distance being reduced to zero, the sidewall thereby being prevented from being exceedingly distorted and being prevented from sinking in to the point of the actuator releasing the locking tab. The clearance distance according to this disclosure relates in some examples to a tolerance distance between the lid and the box which both permits placing the lid onto the box without undue difficulty, while avoiding that the lid be loose when in the closed position. While the clearance distance according to this disclosure is considered in a region of the lock, the tolerance distance between the lid and the box may be considered along an entire perimeter of the opening of the box. In some examples, the tolerance is of at least 0.1 mm and of less than 5 mm. In some examples

the tolerance is of at least 1mm and of less than 3 mm. Such tolerance would for example be measured when the lid is in the closed position and between an internal surface of the flanks and an external surface of the sidewalls, understanding that such tolerance may take a different value in a region of the lock.

[0050] In some examples, the clearance distance is of at least 1mm and of less than 1cm when the lid is in the closed position and no actuation pressure is applied. Such a range permits both easing the closing of the lid and preventing sinking of the specific portion of the sidewall leading to undesired unlocking. In some examples, the clearance distance is of at least 1.5mm and of less than 0.5cm when the lid is in the closed position and no actuation pressure is applied. In some examples, the clearance distance is of at least 2mm and of less than 0.4cm when the lid is in the closed position and no actuation pressure is applied.

[0051] In some examples, as for example illustrated in Figure 6, the actuator comprises a flap 603 connected by a hinge portion to a specific portion of the sidewalls of the box, the flap extending from the hinge portion to a distal edge of the flap, the hinge portion being located between the flanks and the support element structure when the lid is in the closed position, the distal edge extending away from the specific portion of the sidewalls and the distal edge of the flap abutting against the locking tab of the flanks when in the locking position, the flap lying flush against the specific portion of the sidewalls and the distal edge being maintained away from the locking tab when in the opening position, the actuation pressure displacing the flap by an acute actuation angle from the closing position to the opening position, the acute angle corresponding to displacing the distal edge by the unlocking displacement distance. In some examples, the acute angle is between 5 and 60 degrees. In some examples, the acute angle is between 5 and 45 degrees. In some examples, the acute angle is between 5 and 20 degrees. In some examples the acute angle is a function of the length of the locking flap in a direction generally parallel to the specific portion and of a thickness of the locking tab and of tolerances between the sidewalls of the box and the flanks of the lid and of a tolerance between the sidewalls of the box and the flap, or patch as disclosed below. In some examples horizontal displacement (along a direction substantially normal to a sidewall comprising the specific section) measured at the end of the locking flap abutting with the locking tab is of at least a thickness of the locking tab along a direction substantially normal to a sidewall comprising the specific section. In some examples such horizontal displacement is comprised between 0.3mm and 30mm. In some examples a length of the flap has a length along a direction generally normal to the base of the box larger than the sum of different tolerances comprising a play between the locking tab and the flap in the abutment area when the lid is in the closed position and the container is not submitted to external pressure, a tolerance between the flanks of

the lid and the sidewalls of the box, and the tolerance between the side walls of the box and the flap and a bending deformation of the flap. In some examples the locking flap has a length along a direction generally normal to the base of the box of at least 3 mm and of less than 60mm. In some examples the locking flap has a length along a direction generally normal to the base of the box of at least 15 mm and of less than 45 mm. In some examples the locking flap has a length along a direction generally normal to the base of the box of at least 25 mm and of less than 35 mm. In some examples, the flap has a width along a direction perpendicular to its length and parallel to the specific portion of between 5mm and 60mm. Such example width dimensions may permit easing disengaging the lock by limiting its width while avoiding a risk of the lock getting distorted by pressure by providing the lock with a sufficient width. Such dimensioning selection may be dependent on the material selected for the different parts forming the container. Such a flap may be used in examples or configurations differing from the ones illustrate in Figure 6.

[0052] In some examples, not illustrated here, the actuator comprises a patch glued to the specific portion of the sidewalls. Such patch may for example be a piece of material of the same nature as a material used for the making of the box or of the lid, such piece of material being for example glued to the box, the piece of material being structurally separate from the box, the piece of material interacting with the locking tab, the piece of material comprising for example a fold line defining a first part interacting with the locking tab and a second part glued to the box, thereby functioning as the flap hereby described.

[0053] In some examples such as illustrated in Figure 6, the support element structure 200 comprises a support area, the support area comprising an area of contact with the specific portion of the sidewall when the clearance is reduced to zero by flexing of the specific portion of the sidewalls when the actuation pressure is applied above the pressure threshold when the lid is in the closed position, whereby the area of contact faces the actuator 603 along a direction normal to the specific portion of the side walls. Bringing such area of contact at the level of the actuator permits improving the resiliency of the structure, whereby the actuation pressure will be directly absorbed by the support element structure once the clearance distance which separates the sidewalls from the support element structure is reduced to zero and the actuator makes direct contact with the support element structure at the area of contact.

[0054] The example consumer product 600 comprises a lock 610 as illustrated in Figure 6. The consumer product 600 also comprises an additional lock (not illustrated). Indeed, in this example and in some other examples, the consumer product comprises an additional lock, the additional lock comprising an additional actuator connected to an additional specific portion of the sidewalls, the specific portion of the sidewalls being comprised in a first

sidewall of the box, the additional specific portion of the sidewalls being comprised in a second sidewall of the box, the first sidewall being opposite to the second sidewall. The consumer product 600 comprises actuator 603 of the lock 610 and additional actuator of lock. It should be understood that in this example and in some other examples comprising an additional lock, such additional lock may have a structure similar to or different from the lock according to this disclosure. In some examples, the additional lock has a structure corresponding to the structure of the lock according to this disclosure. In some examples, the additional lock has a structure differing from the structure of the lock according to this disclosure. In some examples, an additional lock is provided according to this disclosure on a same sidewall as the lock according to this disclosure. In some examples, an additional lock is provided on a sidewall adjacent to the sidewall comprising the lock.

[0055] In the example illustrated in Figure 6, the flanks of the lid comprise an actuation area 210B and an additional actuation area 210. Indeed, in this example and in some other examples, the flanks of the lid comprise an actuation area facing the actuator and permitting displacing the actuator from the closing position to the opening position by applying the actuation pressure at the actuation area when the lid is in the closed position, whereby the actuation area comprises one or more of an actuation aperture, an actuation flap, an actuation slit or an actuation membrane, whereby the actuation area further comprises a visual indication indicating the location of the actuation area. In the example illustrated in Figures 5 and 6, the actuation areas 210B and 210 each comprise an actuation aperture. The visual indication may be printed on an external surface of the flanks and may comprise one or more arrows or one or more areas printed in a striking colour or a specific text providing instructions such as "push here to open" for example, or a combination of any of these indications.

[0056] In the example illustrated in Figure 6 and in some other examples not illustrated here, the flanks comprise the additional actuation area 210 facing the additional actuator and permitting displacing the additional actuator, the actuation area 210B and the additional actuation area 210 being separated by a peripheral path along an exterior surface of the lid, the peripheral path measuring less than 20 cm and more than 9 cm. In some examples, this peripheral path is the shortest peripheral path between a top of the actuation area and a top of the additional actuation area, such top being a point of the respective actuation area or additional actuation area closest to the top of the lid. In some examples, the peripheral path measures less than 15 cm and more than 11 cm. In some examples, the peripheral path measures less than 14 cm and more than 12 cm. The length of such peripheral path may advantageously permit an adult user to apply a thumb of one hand on the actuator and the index (or middle finger) of the same one hand on the additional actuator at the same time in order to press on

both the actuator additional and the additional actuator simultaneously with one hand in order to unlock the lid and open the lid. In other examples, two locks may be provided on a same sidewall, opening taking place by actuating on both locks, for examples using both thumbs.

[0057] In the example consumer product 600, actuation areas 210B and 210 are separated in a straight line from the outside surface of the respective flanks where they are located by a distance, whereby such distance is of more than 6cm and of less than 12cm. In some examples, the distance is of about 8cm. In some examples, the distance is of more than 7.5 cm and of less than 8.5 cm. In some examples, the distance is of more than 8.4 cm and of less than 10.4 cm. In some examples, the distance is of more than 8.9 cm and of less than 9.9 cm. In some examples, the distance is of about 9.4 cm. In some examples, the clearance distances which separates the sidewalls from the support element structure are each of between 1 mm and 4 mm when no actuation pressure is applied. In some examples, the clearance distances are each of between 3mm and 4 mm when no actuation pressure is applied.

[0058] In the example illustrated in Figure 6, each lock is separated from a respective gable of the support element structure by a clearance distance. In this example and in some other examples according to this disclosure, the support element structure comprises a resilient structure concurrently in contact with both the specific portion and the additional specific portion when flexing of both the specific portion of the first sidewall and the additional specific portion of the second sidewall when the actuation pressure is applied above the pressure threshold on both the actuator and the additional actuator when the lid is in the closed position. In such a configuration the resilient structure of the actuator absorbs any excess pressure applied onto the actuators in order to open the lid. In some examples, the resilient structure, or cardboard structure, is unitary, for example to facilitate manufacturing. Unitary should be understood as being made from an integral piece of material. In some examples, the resilient structure comprises a plurality of substructures, for example to facilitate assembly.

[0059] In some examples the flanks of the lid cover about 30% of the sidewalls of the box, 30% corresponding in this case to a ratio between on one hand a height of the flanks in a direction normal to both the top of the lid and the base of the box and on the other hand the height of the sidewalls in the direction normal to both the top of the lid and the base of the box. In an example, the flanks completely surround the sidewalls around the opening. Such coverage of the flanks participates in ensuring lid placement, structural resiliency and protection of the content. In some examples, the flanks cover at least 30% of the sidewalls when the lid is in the closed position. In some examples, the flanks cover at least 35% of the sidewalls when the lid is in the closed position. In some examples, the flanks cover at least 40% of the sidewalls when the lid is in the closed position. In some ex-

amples, the flanks cover at most 90% of the sidewalls when the lid is in the closed position. In some examples, the flanks cover at most 80% of the sidewalls when the lid is in the closed position. In some examples, the flanks cover at most 70% of the sidewalls when the lid is in the closed position. In some examples, a manufacturing process comprises providing different box sizes, for example boxes having a sidewall height of either 10cm, 11.5 cm, 13.5 cm or 16cm, whereby each box may be provided with a same lid fitting all box sizes provided, such as a lid having a flank height of 7 cm. In some examples, flank height is of more than 3cm. In some examples, flank height is of more than 5cm. In some examples, flank height is of more than 6cm.

[0060] The support element structure as per this disclosure may comprise a support element structure distal end located when the lid is in the closed position at a certain depth. In some examples, the depth is of at least 3mm and of less than 50 mm from the top of the lid. In some examples, the depth is of at least 5 mm and of less than 50 mm from the top of the lid. In some examples, the depth is of at least 15 mm and of less than 40 mm from the top of the lid. In some examples, the depth is of at least 20 mm and of less than 35 mm from the top of the lid. The depth of the support element structure participates in reinforcing the structure of the consumer product. A combination of the depth and shape of the support element structure as well as amount of clearance distance may permit avoiding twisting the lid.

[0061] In some cases, a force is applied to the flanks in a direction normal to the base of the box, in a direction from the base of the box and towards the top of the lid. Such force may be applied for example when lifting the box from a floor to transport it. In such a situation the clearance distances which separates the sidewalls from the support element structure may be reduced to zero due to the weight of the content and of the box being applied to the locking tabs through the actuators. In such a situation, the support element structure permits avoiding accidental opening of the box due to sidewalls sinking in to a point that the actuators would be released from the locking tab, the box falling on the floor, the lid remaining in the hands of the person lifting the box by holding it by the lid. In this example and in some other examples, the detergent product weights more than 50% of the weight of the consumer product, whereby a gravity force produced on the base of the box by the detergent product in the absence of a reaction force on the base of the box produces a flexing of the specific portion of the sidewalls and a reduction of the clearance to zero, the actuator maintaining abutment against the locking tab when the clearance is reduced to zero and when no actuation pressure is applied. In some examples, the detergent product weights more than 70% of the weight of the consumer product in such a situation. In some examples, the detergent product weights more than 80% of the weight of the consumer product in such a situation.

[0062] In some cases, a force is applied to the actua-

tors in a direction normal to the sidewalls, in a direction towards the inside of the box, for example by gripping the lid with one hand, a thumb on one side and the other fingers on the other. Such force may be applied for example when lifting the box from a floor to transport it. In such a situation the clearance distances may be reduced to zero due to the force sandwiching the sidewalls between the support element structure and the actuators. In such a situation, the static friction force between the side walls and the support element structure permits avoiding accidental opening of the box due to the lid getting disconnected from the sidewalls, the box falling on the floor, the lid remaining in the hand of the person lifting the box by holding it by the lid.

[0063] In an example, the container is made from cardboard materials and is thereby made from materials which may be recycled.

[0064] Example support element structures according to this disclosure may be described using vocabulary used in roof types. Example support element structures according to this disclosure may comprise a cardboard structure forming an inverted gable roof shape. Example support element structures according to this disclosure may comprise a cardboard structure forming an open gable shape. Example support element structures according to this disclosure may comprise a cardboard structure forming a gambrel shape. Example support element structures according to this disclosure may comprise a cardboard structure forming a saltbox shape.

[0065] In some examples, the support element structure is located centrally, for example in cases of a lid comprising an actuator or actuation area located in a centre of a flank, whereby such lid may be placed in one sense or in another sense while remaining functional due to its symmetrical structure.

[0066] In some examples, the consumer product comprises at least one water-soluble unit dose article and the container. The consumer product can be sold 'as is', in other words the consumer product is the item that the consumer picks up from the shelf. Alternatively, the consumer product could be housed as one unit of a multi-component product. For example, more than one consumer product could be housed within an outer package and the multiple packaged consumer products sold together in a single purchase. The consumer product may comprise aesthetic elements, for example shrink sleeves or labels attached to the container. Alternatively, the container may be coloured or printed with aesthetic elements or informative print such as usage instructions.

[0067] In some examples a water-soluble unit dose article comprises at least one water-soluble film orientated to create at least one-unit dose internal compartment, wherein the at least one-unit dose internal compartment comprises a detergent composition. The water-soluble film and the detergent composition are described in more detail below. In some examples the consumer product comprises at least one water-soluble unit dose article, in some cases at least two water-soluble unit dose articles,

in some cases at least 10 water-soluble unit dose articles, in some cases at least 20 water-soluble unit dose articles, in some cases at least 30 water-soluble unit dose articles, in some cases at least 40 water-soluble unit dose articles, in some cases at least 45 water-soluble unit dose articles. A water-soluble unit dose article is in some examples in the form of a pouch. A water-soluble unit dose article comprises in some examples a unitary dose of a composition as a volume sufficient to provide a benefit in an end application. The water-soluble unit dose article comprises in some examples one water-soluble film shaped such that the unit-dose article comprises at least one internal compartment surrounded by the water-soluble film. The at least one compartment comprises a cleaning composition. The water-soluble film is sealed such that the cleaning composition does not leak out of the compartment during storage. However, upon addition of the water-soluble unit dose article to water, the water-soluble film dissolves and releases the contents of the internal compartment into the wash liquor. The unit dose article may comprise more than one compartment, at least two compartments, or at least three compartments, or at least four compartments, or even at least five compartments. The compartments may be arranged in superposed orientation, i.e. one positioned on top of the other. Alternatively, the compartments may be positioned in a side-by-side orientation, i.e. one orientated next to the other. The compartments may be orientated in a 'tyre and rim' arrangement, i.e. a first compartment is positioned next to a second compartment, but the first compartment at least partially surrounds the second compartment, but does not completely enclose the second compartment. Alternatively, one compartment may be completely enclosed within another compartment. In some examples the unit dose article comprises at least two compartments, one of the compartments being smaller than the other compartment. In some examples the unit dose article comprises at least three compartments, two of the compartments may be smaller than the third compartment, and in some examples the two smaller compartments being superposed on the larger compartment. In some examples the unit dose article comprises at least four compartments, three of the compartments may be smaller than the fourth compartment, and in some examples the three smaller compartments being superposed on the larger compartment. The superposed compartments are in some examples orientated side-by-side. In some examples each individual unit dose article may have a weight of between 10g and 40g, or even between 15g and 35g. The water soluble film may be soluble or dispersible in water. Prior to being formed into a unit dose article, the water-soluble film has in some examples a thickness of from 20 to 150 micron, in other examples 35 to 125 micron, in further examples 50 to 110 micron, in yet further examples about 76 micron. Example water soluble film materials comprise polymeric materials. The film material can, for example, be obtained by casting, blow-moulding, extrusion or blown extrusion of the poly-

meric material. In some examples, the water-soluble film comprises polyvinyl alcohol polymer or copolymer, for example a blend of polyvinylalcohol polymers and/or polyvinylalcohol copolymers, for example selected from sulfonated and carboxylated anionic polyvinylalcohol copolymers especially carboxylated anionic polyvinylalcohol copolymers, for example a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer. In some examples water soluble films are those supplied by Monosol under the trade references M8630, M8900, M8779, M8310. In some examples the film may be opaque, transparent or translucent. The film may comprise a printed area. The area of print may be achieved using techniques such as flexographic printing or inkjet printing. The film may comprise an aversive agent, for example a bittering agent. Suitable bittering agents include, but are not limited to, naringin, sucrose octaacetate, quinine hydrochloride, denatonium benzoate, or mixtures thereof. Example levels of aversive agent include, but are not limited to, 1 to 5000ppm, 100 to 2500ppm, or 250 to 2000ppm. The water-soluble film or water-soluble unit dose article or both may be coated with a lubricating agent. In some examples, the lubricating agent is selected from talc, zinc oxide, silicas, siloxanes, zeolites, silicic acid, alumina, sodium sulphate, potassium sulphate, calcium carbonate, magnesium carbonate, sodium citrate, sodium tripolyphosphate, potassium citrate, potassium tripolyphosphate, calcium stearate, zinc stearate, magnesium stearate, starch, modified starches, clay, kaolin, gypsum, cyclodextrins or mixtures thereof.

[0068] In some examples the container comprises a first part, wherein the first part comprises a first compartment in which the at least one water-soluble unit dose article is contained. In some examples the first compartment comprises at least two water-soluble unit dose articles. The first compartment may comprise between 1 and 80 water-soluble unit dose articles, between 1 and 60 water-soluble unit dose articles, between 1 and 40 water-soluble unit dose articles, or between 1 and 20 water-soluble unit dose articles. The volume of the first compartment may be between 500ml and 5000ml, in some examples between 800ml and 4000ml.

[0069] Figures 7A-J illustrate an example method for manufacturing a consumer product and a container, the container containing the detergent product, the detergent product preferably comprising flexible water soluble unit dose articles, the container comprising a box, a lid, and a lock to maintain the lid in a closed position, the method comprising folding the blank 500 to erect the support element structure as part of the lid. While this specific example method refers to blank 500, other blanks hereby described may be submitted to such a method.

[0070] In figure 7A, starting from blank 500, side panel 101, which is connected to the side flap 401, is folded back along a fold line separating side panel 101 from adjacent side panel 104 onto side panel 104. Side flap 401 comprises glue 411 which may for example be ap-

plied after the folding back.

[0071] In Figure 7B, starting from the structure obtained as illustrated in Figure 7A, side panel 102 is folded back along a fold line separating side panel 102 from adjacent side panel 103 and onto side panel 103, side panel 102 being glued onto side flap 401 once folded back.

[0072] As illustrated for example in Figures 7A and 7B, The example method indeed comprises folding the side flap and two of the side panels (in this case 102 and 101) over the other two side panels (in this case, 103 and 104) so the side flap faces one of the other two side panels (in this case, 102) in order to close the flank structure by gluing the side flap to the one of the other two side panels. This may be followed by opening the closed flank structure to erect the flanks, leading to a structure as illustrated in Figure 7C. It should be noted that the configuration as illustrated in Figure 7B is particularly space efficient for transport due to being flat and compact, for example in case where initial manufacturing steps are conducted at a supplier facility. Alternatively, these folding steps can also be done at a single manufacturer location.

[0073] After opening the closed flank structure, one may start forming the top panel by folding a first lid flap of the three lid flaps, the first lid flap being the lid flap connected to the opposite side panel 103, as illustrated in Figure 7D.

[0074] After folding the first lid flap as illustrated in Figure 7D, one may proceed with folding the support element first panel so that the support element first panel meets the first lid flap to form the support element structure, as illustrated in Figure 7E. It is important to realize that the proceeding of the folding of the lid flap connected to the opposite side panel precedes the folding of the support element first panel so the support element first panel will end up tucked in between the opposite side panel and the top panel as will be illustrated.

[0075] After folding the support element structure, as illustrated in Figure 7E, one may proceed with folding the remaining two lid flaps, pushing the support element structure away from the top panel, the remaining lid flaps forming the top panel, as illustrated successively by Figures 7F-I. In this example, the wings push the support element structure away from the side panel.

[0076] The lid obtained as illustrated in Figure 7J may then be combined with the box as illustrated in Figure 6 to obtain a consumer product as per this disclosure.

[0077] In some examples the detergent product comprises a detergent composition. The detergent composition may be a laundry detergent composition, an automatic dishwashing composition, a hard surface cleaning composition, or a combination thereof. The detergent composition may comprise a solid, a liquid or a mixture thereof. The term liquid includes a gel, a solution, a dispersion, a paste, or a mixture thereof. The solid may be a powder. By powder we herein mean that the detergent composition may comprise solid particulates or may be a single homogenous solid. In some examples, the pow-

der detergent composition comprises particles. This means that the powder detergent composition comprises individual solid particles as opposed to the solid being a single homogenous solid. The particles may be free-flowing or may be compacted. A laundry detergent composition can be used in a fabric hand wash operation or may be used in an automatic machine fabric wash operation, for example in an automatic machine fabric wash operation. Example laundry detergent compositions comprise a non-soap surfactant, wherein the non-soap surfactant comprises an anionic non-soap surfactant and a non-ionic surfactant. In some examples, the laundry detergent composition comprises between 10% and 60%, or between 20% and 55% by weight of the laundry detergent composition of the non-soap surfactant. Example weight ratio of non-soap anionic surfactant to non-ionic surfactant are from 1:1 to 20:1, from 1.5:1 to 17.5:1, from 2:1 to 15:1, or from 2.5:1 to 13:1. Example non-soap anionic surfactants comprises linear alkylbenzene sulphonate, alkyl sulphate or a mixture thereof. Example weight ratio of linear alkylbenzene sulphonate to alkyl sulphate are from 1:2 to 9:1, from 1:1 to 7:1, from 1:1 to 5:1, or from 1:1 to 4:1. Example linear alkylbenzene sulphonates are C₁₀-C₁₆ alkyl benzene sulfonic acids, or C₁₁-C₁₄ alkyl benzene sulfonic acids. By 'linear', we herein mean the alkyl group is linear. Example alkyl sulphate anionic surfactant may comprise alkoxyated alkyl sulphate or non-alkoxyated alkyl sulphate or a mixture thereof. Example alkoxyated alkyl sulphate anionic surfactant comprise an ethoxyated alkyl sulphate anionic surfactant. Example alkyl sulphate anionic surfactant may comprise an ethoxyated alkyl sulphate anionic surfactant with a mol average degree of ethoxylation from 1 to 5, from 1 to 3, or from 2 to 3. Example alkyl sulphate anionic surfactant may comprise a non-ethoxyated alkyl sulphate and an ethoxyated alkyl sulphate wherein the mol average degree of ethoxylation of the alkyl sulphate anionic surfactant is from 1 to 5, from 1 to 3, or from 2 to 3. Example alkyl fraction of the alkyl sulphate anionic surfactant are derived from fatty alcohols, oxo-synthesized alcohols, Guerbet alcohols, or mixtures thereof. In some examples, the laundry detergent composition comprises between 10% and 50%, between 15% and 45%, between 20% and 40%, or between 30% and 40% by weight of the laundry detergent composition of the non-soap anionic surfactant. In some examples, the non-ionic surfactant is selected from alcohol alkoxyate, an oxo-synthesized alcohol alkoxyate, Guerbet alcohol alkoxyates, alkyl phenol alcohol alkoxyates, or a mixture thereof. In some examples, the laundry detergent composition comprises between 0.01% and 10%, between 0.01% and 8%, between 0.1% and 6%, or between 0.15% and 5% by weight of the liquid laundry detergent composition of a non-ionic surfactant. In some examples, the laundry detergent composition comprises between 1.5% and 20%, between 2% and 15%, between 3% and 10%, or between 4% and 8% by weight of the laundry detergent composition of soap, in some examples a fatty acid salt,

in some examples an amine neutralized fatty acid salt, wherein in some examples the amine is an alkanolamine for example selected from monoethanolamine, diethanolamine, triethanolamine or a mixture thereof, in some examples monoethanolamine. In some examples, the laundry detergent composition is a liquid laundry detergent composition. In some examples the liquid laundry detergent composition comprises less than 15%, or less than 12% by weight of the liquid laundry detergent composition of water. In some examples, the laundry detergent composition is a liquid laundry detergent composition comprising a non-aqueous solvent selected from 1,2-propanediol, dipropylene glycol, tripropyleneglycol, glycerol, sorbitol, polyethylene glycol or a mixture thereof. In some examples, the liquid laundry detergent composition comprises between 10% and 40%, or between 15% and 30% by weight of the liquid laundry detergent composition of the non-aqueous solvent. In some examples, the laundry detergent composition comprises a perfume. In some examples, the laundry detergent composition comprises an adjunct ingredient selected from the group comprising builders including enzymes, citrate, bleach, bleach catalyst, dye, hueing dye, brightener, cleaning polymers including alkoxyated polyamines and polyethyleneimines, soil release polymer, surfactant, solvent, dye transfer inhibitors, chelant, encapsulated perfume, polycarboxylates, structurant, pH trimming agents, and mixtures thereof. In some examples, the laundry detergent composition has a pH between 6 and 10, between 6.5 and 8.9, or between 7 and 8, wherein the pH of the laundry detergent composition is measured as a 10% product concentration in demineralized water at 20°C. When liquid, the laundry detergent composition may be Newtonian or non-Newtonian. In some examples, the liquid laundry detergent composition is non-Newtonian. Without wishing to be bound by theory, a non-Newtonian liquid has properties that differ from those of a Newtonian liquid, more specifically, the viscosity of non-Newtonian liquids is dependent on shear rate, while a Newtonian liquid has a constant viscosity independent of the applied shear rate. The decreased viscosity upon shear application for non-Newtonian liquids is thought to further facilitate liquid detergent dissolution. The liquid laundry detergent composition described herein can have any suitable viscosity depending on factors such as formulated ingredients and purpose of the composition.

[0078] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm".

Claims

1. A cardboard lid for a container, the cardboard lid

comprising:

- side panels forming lid flanks;
 - lid flaps connected to the side panels by lid flaps fold lines, two of the lid flaps forming a lid top panel; and
 - a support element structure extending away from the top panel and positioned between the side panels;
- whereby the lid flaps, side panels, and support element structure pertain to a single blank.
2. The cardboard lid according to claim 1, whereby the support element structure comprises a support element first panel and a first wing, the first wing being adjacent to the support element first panel and separated from the support element first panel by a first wing fold line, the first wing comprising a first wing end distal from the first wing fold line, the first wing end being in contact with the top panel to maintain the support element first panel extended away from the top panel.
 3. The cardboard lid according to claim 2, whereby the support element further comprises a second wing, the second wing being adjacent to the support element first panel and separated from the support element first panel by a second wing fold line, the second wing comprising a second wing end distal from the second wing fold line, the second wing end being in contact with the top panel to maintain the support element first panel extended away from the top panel, the second wing fold line and the first wing fold line being on opposite sides of the support element first panel.
 4. The cardboard lid according to claim 3, whereby the first wing end and the second wing end are rounded.
 5. The cardboard lid according to any of the above claims, whereby at least one of the lid flanks, preferably some of the lid flanks, and most preferably each of the lid flanks comprise a reinforcing panel, the reinforcing panel being connected to the respective side panel by a side panel fold line, the reinforcing panel being folded back onto the respective side panel, the reinforcing panel pertaining to the single blank.
 6. The cardboard lid according to any of the above claims, whereby at least one flank comprises an actuation area, an apex of the support element structure being in line with the actuation area.
 7. A cardboard blank for a cardboard lid according to any of the above claims, the cardboard blank comprising:
 - four side panels, the four side panels following each other along a first direction, each side panel being connected to at least another side panel by a respective side panel fold line perpendicular to the first direction;
 - a side flap connected to one of the side panels along a fold line perpendicular to the first direction, the side flap following or preceding the four side panels along the first direction;
 - three lid flaps, the lid flaps following each other along the first direction, each lid flap being connected to a respective regular side panel of the four side panels by a respective lid flap fold line parallel to the first direction, the lid flap fold lines being aligned with each other; the four side panels comprising the regular side panels and a specific side panel;
 - a support element structure, the support element structure comprising a support element first panel connected to the specific side panel by a specific fold line aligned with the lid flap fold lines, the support element structure further comprising a support element opposite panel comprised in the lid flap of the three lid flaps connected to an opposite side panel, the opposite side panel being the regular side panel separated from the specific side panel by a single other regular side panel, the support element structure having a combined length along a direction perpendicular to the first direction exceeding a length of the single other regular side panel along the first direction.
 8. The cardboard blank according to claim 7, the support element structure comprising a first wing, the first wing being adjacent to the support element first panel and connected to the support element first panel by a first wing fold line perpendicular to the first direction.
 9. The cardboard blank according to claim 8, the support element structure comprising a second wing, the second wing being adjacent to the support element first panel and connected to the support element first panel by a second wing fold line perpendicular to the first direction and on a side of the support element first panel opposite to the first wing.
 10. The cardboard blank according to either one of claims 8 or 9, the first wing corresponding to a cut out in one of the three lid flaps adjacent to the support element first panel.
 11. The cardboard blank according to either one of claims 9 or 10, the second wing corresponding to a cut out in one of the three lid flaps adjacent to the support element first panel.

12. The cardboard blank according to any of claims 7 to 11, the support element structure comprising a connecting panel between the support element first panel and the specific side panel.
13. The cardboard blank according to any of claims 7 to 12, whereby the support element structure comprises an opposite connecting panel between the support element opposite panel and the opposite side panel.
14. The cardboard blank according to any of claims 7 to 13, the cardboard blank further comprising four reinforcing flaps, each reinforcing flap being connected to a respective side panel by a respective reinforcing flap fold line, the reinforcing flap fold lines being aligned with each other and parallel to the first direction, the reinforcing flaps being situated on a side of the side panels opposite to the lid flaps and to the support element structure.
15. The cardboard blank according to any of claims 7 to 14, whereby the specific side panel and the opposite side panel are shorter side panels, the shorter side panels having a same panel length along the first direction, this same panel length being shorter than a panel length of the other two side panels along the first direction, the other two side panels being long side panels, the long side panels having the same length along the first direction.
16. The cardboard blank according to claim 15, whereby each long side panel comprises a respective aperture for an actuation area, whereby each respective aperture preferably is a through aperture intersecting flutes comprised in the long side panels.
17. A stack of a plurality of planar blank assemblies according to any of claims 7 to 16.
18. A consumer product comprising a detergent product and a container, the container comprising a box and a lid according to any of claims 1 to 6, the box comprising a lock to maintain the lid in a closed position, the lock comprising an actuator aligned with a portion of the support element structure when the lid is in the closed position, the support element structure fitting within the box when the lid is in the closed position.
19. A method for manufacturing a consumer product comprising a detergent product and a container, the container containing the detergent product, the detergent product preferably comprising flexible water soluble unit dose articles, the container comprising a box, a lid, and a lock to maintain the lid in a closed position, the method comprising folding the blank according to any of claims 7 to 16 to erect the support element structure as part of the lid.
20. The method according to claim 19, wherein the folding of the blank comprises
- folding the side flap and two of the side panels over the other two side panels so the side flap faces one of the other two side panels in order to close the flank structure by gluing the side flap to the one of the other two side panels;
 - opening the closed flank structure to erect the flanks;
 - after opening the closed flank structure, start forming the top panel by folding a first lid flap of the three lid flaps, the first lid flap being the lid flap connected to the opposite side panel;
 - after folding the first lid flap, folding the support element first panel so that the support element first panel meets the first lid flap to form the support element structure;
 - after folding the support element structure, folding the remaining two lid flaps, pushing the support element structure away from the top panel, the remaining lid flaps forming the top panel.

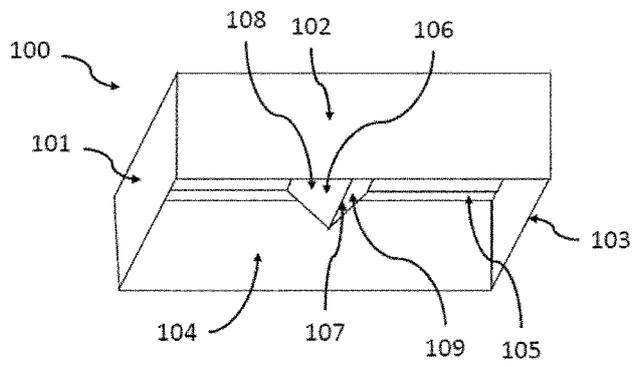


FIG. 1

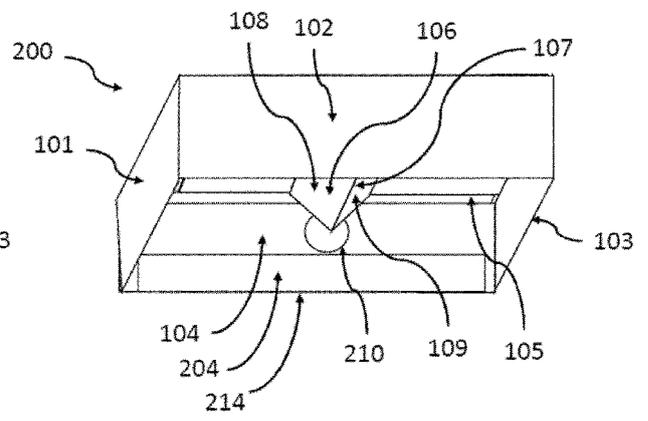


FIG. 2A

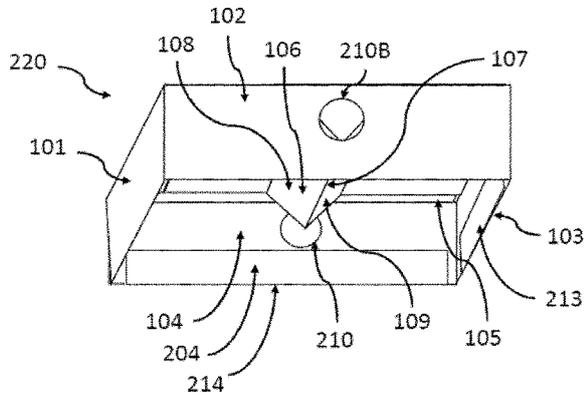


FIG. 2B

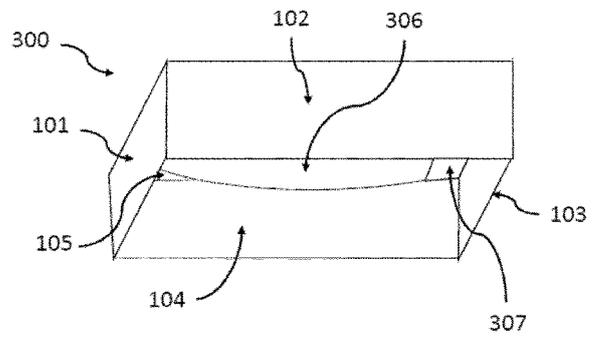
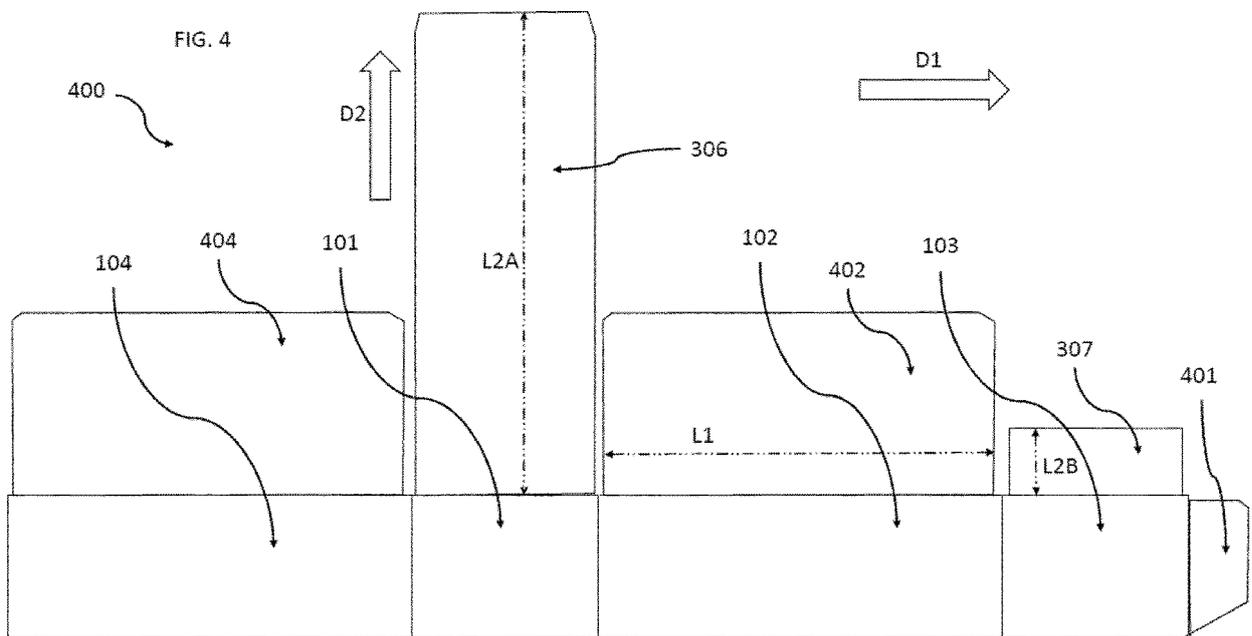
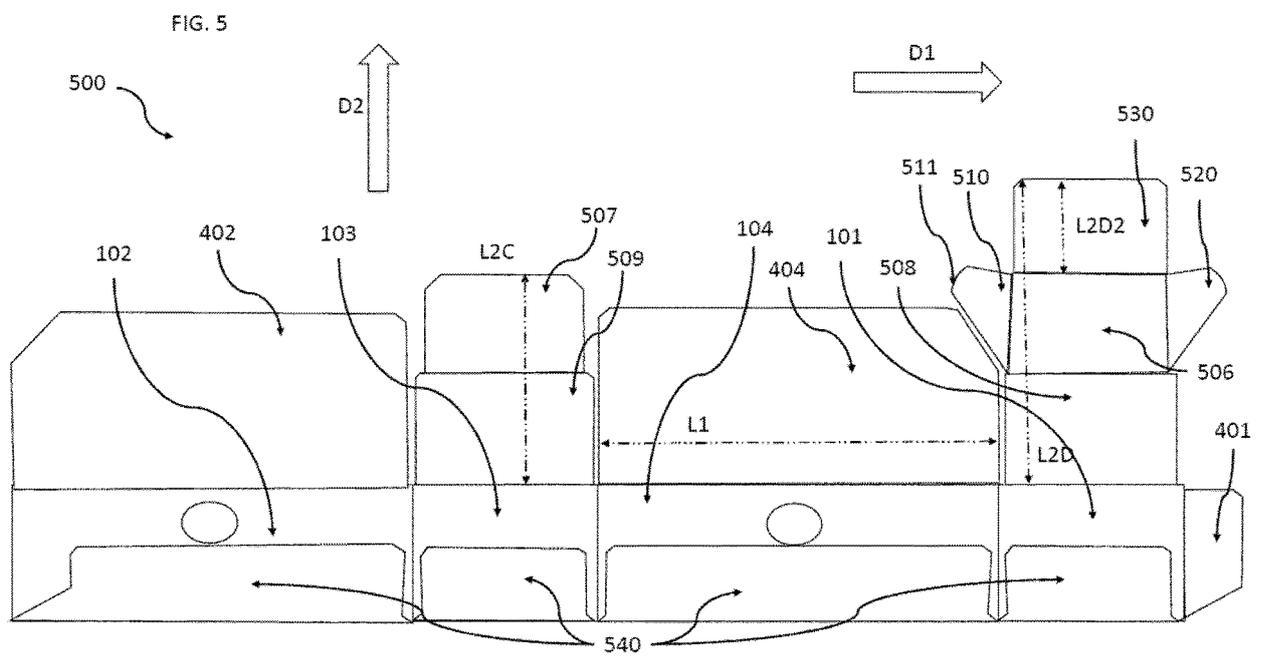


FIG. 3





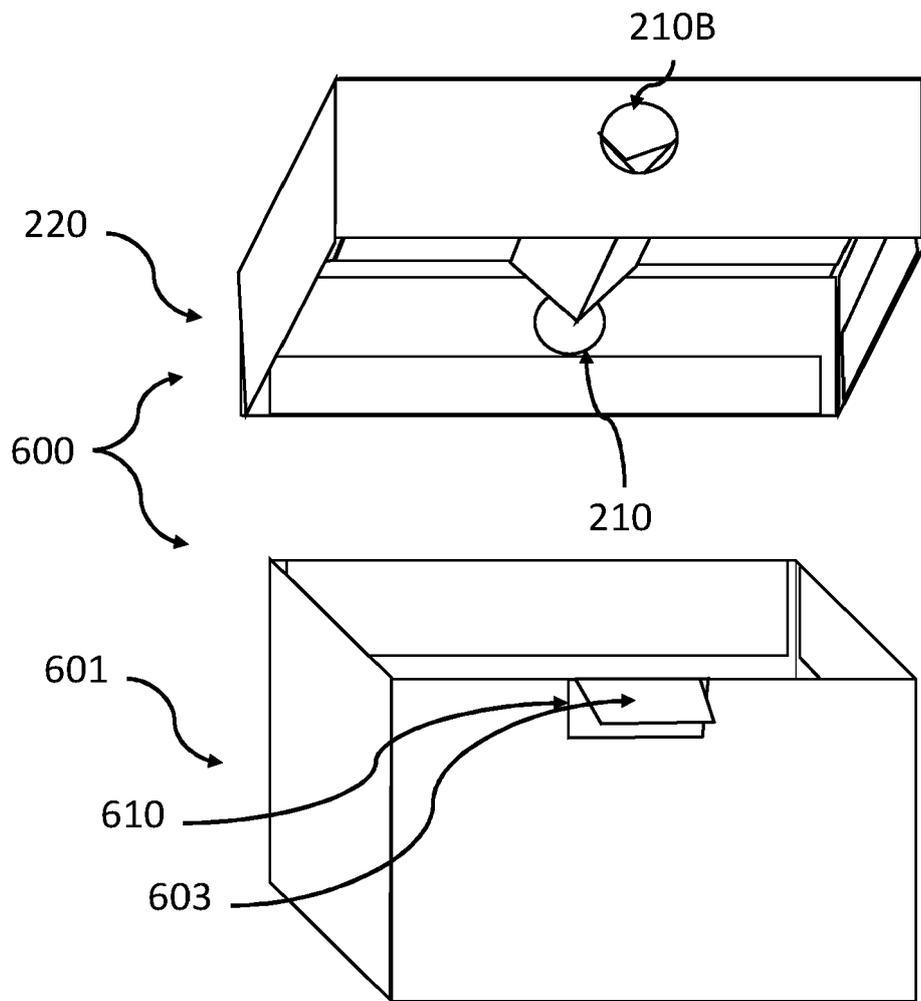


FIG. 6

FIG. 7A

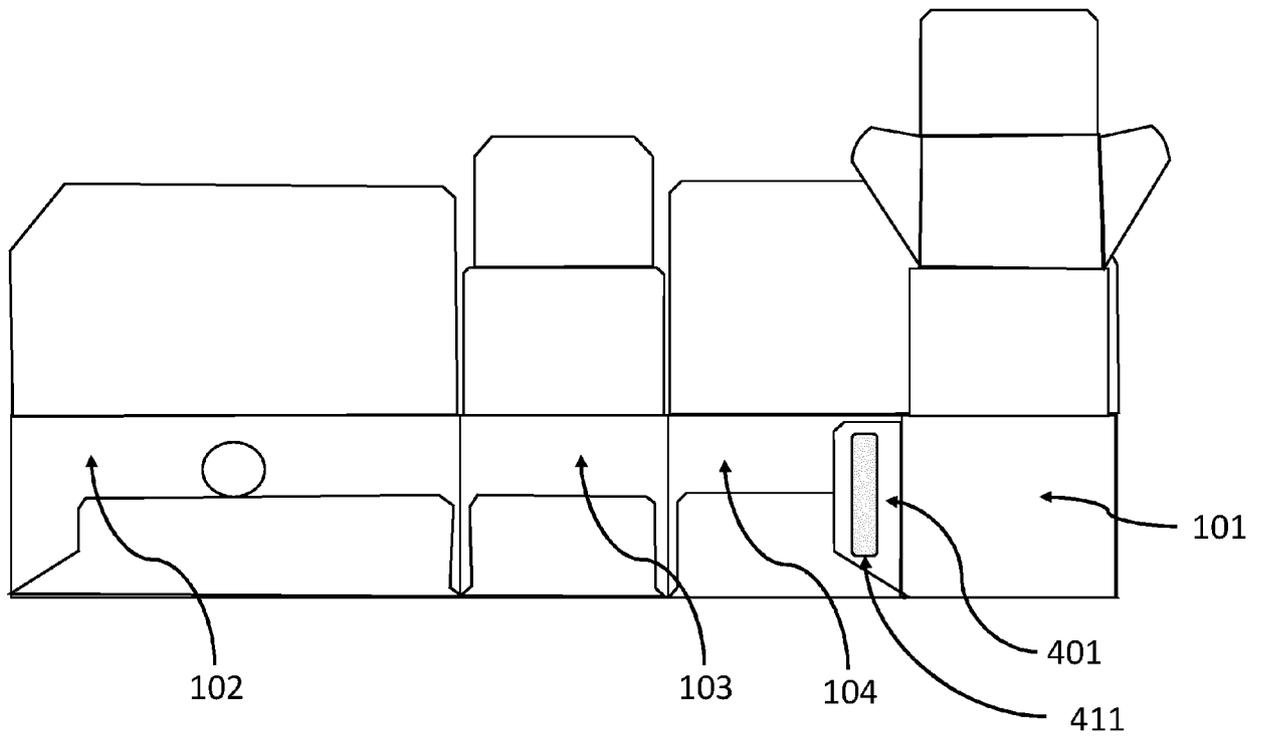
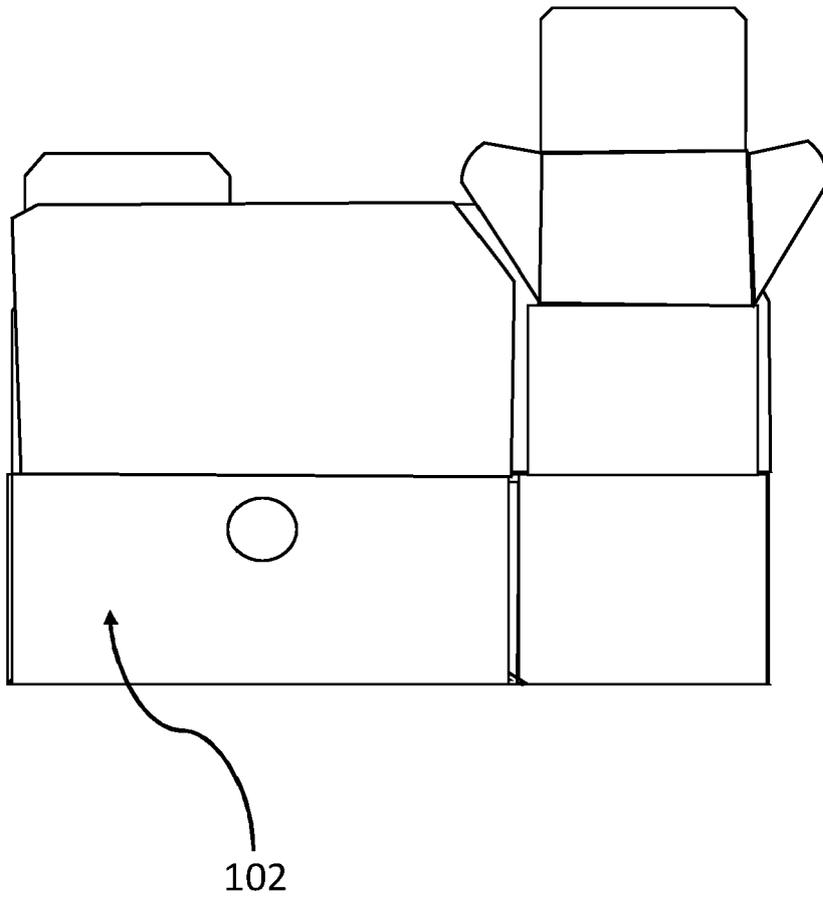


FIG. 7B



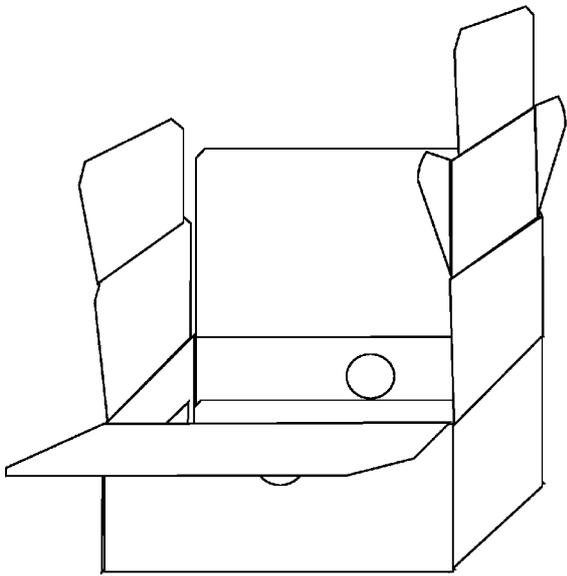


FIG. 7C

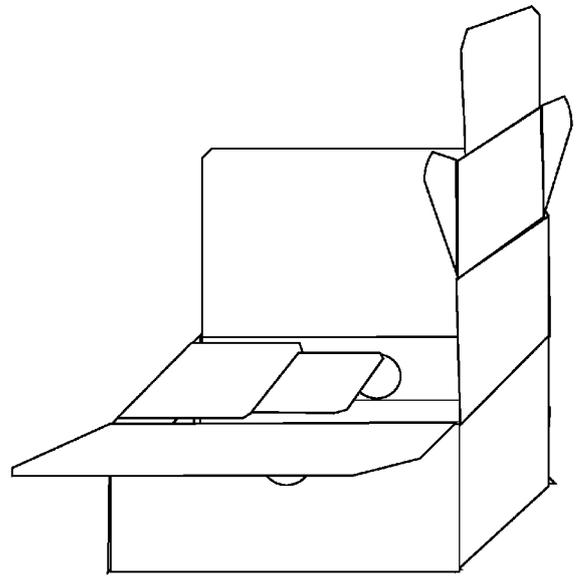


FIG. 7D

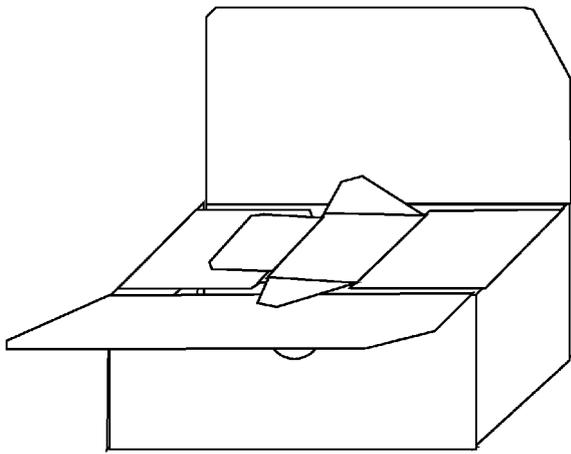


FIG. 7E

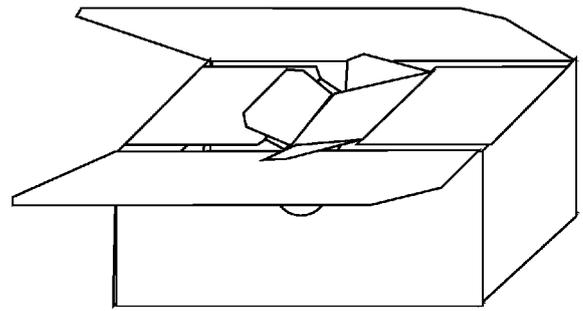


FIG. 7F

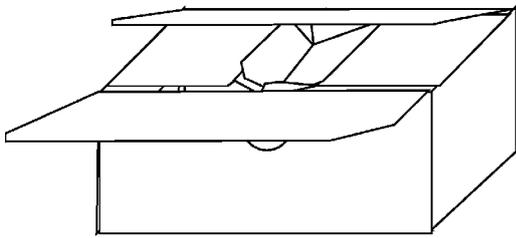


FIG. 7G

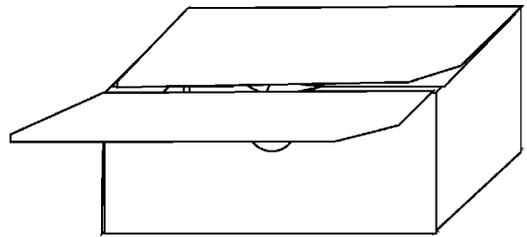


FIG. 7H

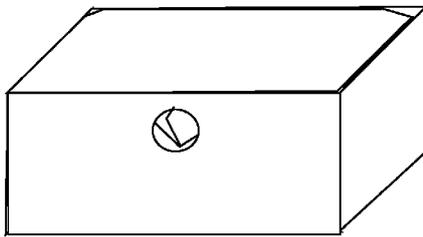


FIG. 7I

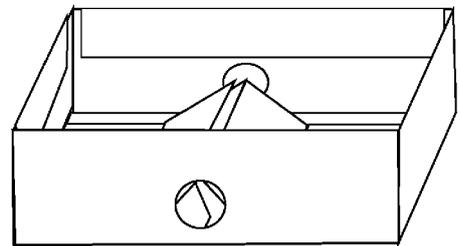


FIG. 7J



EUROPEAN SEARCH REPORT

Application Number
EP 20 19 6206

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)
A	DE 20 2005 014737 U1 (SEDA SPA [IT]) 8 February 2007 (2007-02-08) * paragraph [0040] - paragraph [0063]; figures 1,2 *	1-20	INV. B65D5/44 B65D5/68
A	US 2008/265010 A1 (MONTAGUE KISCH RAYMOND GEORGE [US]) 30 October 2008 (2008-10-30) * paragraph [0032] - paragraph [0036]; figures 1,2 *	1-17	
A	DE 92 14 668 U1 (BEIERSDORF AG [DE]) 3 March 1994 (1994-03-03) * paragraph [0043] - paragraph [0055]; figures 1-4 *	1,7, 18-20	
			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 18 February 2021	Examiner Segerer, Heiko
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	

1
EPO FORM 1503 03.82 (P04C01)

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

EP 20 19 6206

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.

18-02-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202005014737 U1	08-02-2007	AT 487665 T	15-11-2010
		AU 2006294069 A1	29-03-2007
		BR PI0616209 A2	14-06-2011
		CA 2622515 A1	29-03-2007
		CN 101312884 A	26-11-2008
		DE 202005014737 U1	08-02-2007
		DK 1948519 T3	28-02-2011
		EP 1948519 A1	30-07-2008
		ES 2354989 T3	21-03-2011
		IL 190164 A	31-07-2011
		JP 4856707 B2	18-01-2012
		JP 2009508767 A	05-03-2009
		KR 20080063332 A	03-07-2008
		NZ 566703 A	29-04-2011
		PL 1948519 T3	29-04-2011
		PT 1948519 E	26-01-2011
		SI 1948519 T1	31-03-2011
		UA 92366 C2	25-10-2010
		US 2009032575 A1	05-02-2009
		WO 2007033796 A1	29-03-2007

US 2008265010 A1	30-10-2008	NONE	

DE 9214668 U1	03-03-1994	NONE	
