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(54) A BOX FOR PACKING CAKES AND PASTRIES

(57) In the unfolded and opened state, the box (1) comprises a container portion (2) and a lid portion (3), the container portion (2) being formed of a base panel (4) and four sidewalls (5-7), the lid portion (3) being formed of a top panel (15) and three sidewalls (16-17), with the top panel being pivotably attached to the rear wall (5) of the container portion by a fold line (8). The front wall (7) of the container portion is pivotable with respect to the base panel (4) while not being attached to the side walls (6) of the container portion, so that the lid portion (3) can be closed with the container's front wall (7) being pivoted downward. Said front wall (7) of the container portion and the front wall (16) of the lid portion are respectively provided with a foldable cut-out lip (20) and a slit (22). The lip comprises tooth sections (28) having tips (29) which are configured to be inserted in the slit by a snap action enabled by the shape of the slit (22) and the tooth sections (28) and by the relative dimensions of the interlocking parts, thereby securing the closure of the box and preventing unwanted or accidental opening whilst still enabling the deliberate opening and re-closing of the box.

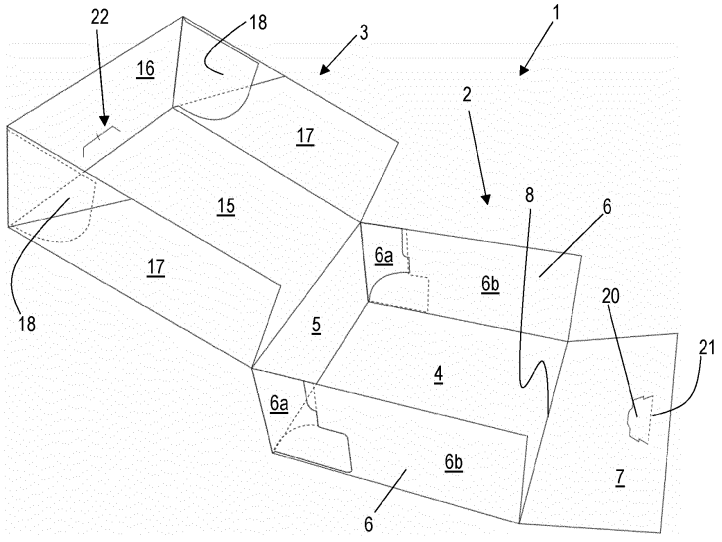

FIG. 1

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Description

Field of the invention

[0001] The invention relates to a rectangular folding box primarily for packing cakes and pastries and usually produced from a foldable cardboard sheet. The invention is in particular related to the closure of a box of this type.

Background to the invention

[0002] Rectangular cardboard folding boxes for packing cakes are known in various types and sizes. One much-used type comprises a container part and a lid part, both the container and the lid being formed of cardboard panels. The box is made from a pre-cut sheet of cardboard that is pre-folded in a manner to enable the quick unfolding of the box so that it is directly ready for use. In the unfolded state, the container comprises a rectangular or square base panel for placing the cakes or pastries thereon, and four upstanding sidewall panels surrounding the base panel. The lid comprises a top panel of equal dimensions to the base panel and configured to be placed above and parallel to the base panel when the box is closed. The lid further comprises three sidewall panels and the lid is connected to one of the sidewall panels of the container via a fold line, so that when the box is closed, the three sidewalls of the lid overlap and lie against corresponding sidewalls of the container.

[0003] In many designs, the overlapping sidewalls have the same height, i.e. they overlap across the full height of the box.

[0004] Securing the closed box against accidental opening has been traditionally done by using a piece of adhesive tape, but this is difficult to remove without a cutter, and re-closing the box after the first opening is usually not possible without using more tape.

[0005] Boxes have therefore been designed which include a built-in closure that can be opened and closed multiple times without requiring any tools.

[0006] One example of the latter development is disclosed in patent publication document EP3061698, which shows a box having the above-named characteristics, including the fully overlapping sidewalls of the lid and container. The front wall of the container is attached by a fold line to the base panel but not to the adjacent sidewalls of the container. The box is configured therefore to be closed by closing the lid onto the container with the front wall of the container folded down, i.e. lying flat on a table or other support surface. When the lid is in the closed condition, the box is secured by folding the front wall of the container upward until it lies against the front wall of the lid. Both these front walls are provided with cooperating securing means. The container wall is provided with a pushing lip comprising a gripping part and a lip part protruding from the gripping part and suitable for being inserted in an opening provided in the front wall of the lid. While this solution prevents the box from opening during most manipulations when closed for the first time, the pushing lip is not secured against slipping out of the opening when the gripping part is inadvertently pivoted forward. Also, the gripping part needs to be pivoted quite far before the lip part can be inserted or drawn out of the opening. As a consequence, the gripping part may not return fully to being coplanar with the front wall of the container and stick out from said front wall after multiple openings and closures, which increases the probability that the lip part is inadvertently pulled out of the opening.

Summary of the invention

[0007] The present invention aims to solve the problems highlighted above. This aim is achieved by a folding box and methods for opening and closing thereof, as set out in the appended claims. In the unfolded and opened state, the box comprises a container portion and a lid portion, the container portion being formed of a base panel and four sidewalls, the lid portion being formed of a top panel and three sidewalls, with the top panel being pivotably attached to the rear wall of the container portion by a fold line. The front wall of the container portion is pivotable with respect to the base panel while not being attached to the side walls of the container portion, so that the lid can be closed with the container's front wall being pivoted downward. Said front wall of the container portion and the front wall of the lid portion are respectively provided with a foldable cut-out lip and a slit. The lip comprises tooth sections having tips which are configured to be inserted in the slit by a snap action enabled by the shape of the slit and the tooth sections and by the relative dimensions of the interlocking parts, thereby securing the closure of the box and preventing unwanted or accidental opening whilst still enabling the deliberate opening and re-closing of the box.

Figure Legends

[0008]

Figure 1 shows a box according to an embodiment of the invention, in the unfolded and opened state.

Figures 2a to 2d illustrate a sequence of images reflecting how the box is closed and secured.

Figures 3a and 3b show detail images of the lip and the corresponding slit according to an embodiment of the invention. Figure 3c is a transparent view of the lid interlocked with the slit in the closed and secured condition of the box.

Detailed description of invention

[0009] Before the present system and method of the invention are described, it is to be understood that this invention is not limited to particular systems and methods or combinations described, since such systems and

methods and combinations may, of course, vary. It is also to be understood that the terminology used herein is not intended to be limiting, since the scope of the present invention will be limited only by the appended claims.

[0010] As used herein, the singular forms "a", "an", and "the" include both singular and plural referents unless the context clearly dictates otherwise.

[0011] The terms "comprising", "comprises" and "comprised of' as used herein are synonymous with "including", "includes" or "containing", "contains", and are inclusive or open-ended and do not exclude additional, non-recited members, elements or method steps. It will be appreciated that the terms "comprising", "comprises" and "comprised of' as used herein comprise the terms "consisting of", "consists" and "consists of".

[0012] Whereas the terms "one or more" or "at least one", such as one or more or at least one member(s) of a group of members, is clear *per se,* by means of further exemplification, the term encompasses *inter alia* a reference to any one of said members, or to any two or more of said members, such as, *e.g.*, any ≥3, ≥4, ≥5, ≥6 or ≥7 etc. of said members, and up to all said members.

[0013] All references cited in the present specification are hereby incorporated by reference in their entirety. In particular, the teachings of all references herein specifically referred to are incorporated by reference.

[0014] Unless otherwise defined, all terms used in disclosing the invention, including technical and scientific terms, have the meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. By means of further guidance, term definitions are included to better appreciate the teaching of the present invention.

[0015] In the following passages, different aspects of the invention are defined in more detail. Each aspect so defined may be combined with any other aspect or aspects unless clearly indicated to the contrary. In particular, any feature indicated as being preferred or advantageous may be combined with any other feature or features indicated as being preferred or advantageous.

[0016] Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment, but may. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner, as would be apparent to a person skilled in the art from this disclosure, in one or more embodiments. Furthermore, while some embodiments described herein include some but not other features included in other embodiments, combinations of features of different embodiments are meant to be within the scope of the invention, and form different embodiments, as would be understood by those in the art. For example, in the appended claims, any of the claimed embodiments can be used in any combination.

[0017] In the present description of the invention, reference is made to the accompanying drawings that form a part hereof, and in which are shown by way of illustration only of specific embodiments in which the invention may be practiced. Parenthesized or emboldened reference numerals affixed to respective elements merely exemplify the elements by way of example, with which it is not intended to limit the respective elements. Unless otherwise indicated, all figures and drawings in this document are not to scale and are chosen for the purpose of illustrating different embodiments of the invention. In particular the dimensions of the various components are depicted in illustrative terms only, and no relationship between the dimensions of the various components should be inferred from the drawings, unless so indicated.

[0018] It is to be understood that other embodiments may be utilised and structural or logical changes may be made without departing from the scope of the present invention. The following detailed description, therefore, is not to be taken in a limiting sense, and the scope of the present invention is defined by the appended claims.

[0019] Figure 1 shows a folding box 1 according to an embodiment of the invention in the unfolded and opened state. The box comprises a container portion 2 and a lid portion 3. The container portion comprises a square base panel 4, a rear wall 5 and two sidewalls 6, and a front wall 7 that is connected only to the base panel 4 by a fold line 8, and not to the sidewalls 6. The sidewalls 6 are formed of a short part 6a and a long part 6b which are cut out according to specific patterns and glued together in a manner to enable easy unfolding of the box. The shape of these patterns may be in accordance with known designs, and the shapes shown in the drawings are not limiting the scope of the present invention.

[0020] The lid portion 3 comprises a top panel 15, a front wall 16 and two sidewalls 17. The sidewalls are formed of pre-folded panels and flaps 18 glued to these panels, again to enable easy unfolding in a manner known as such from existing designs.

[0021] The characteristic features of the embodiment shown in Figure 1 are related to the closure of the box. As seen in Figure 1, the front wall 7 of the container portion 2 is provided with a lip 20 in the form of a foldable cut-out that is pivotable about a fold line 21. The front wall 16 of the lid portion 3 comprises a slit 22 positioned so that the lip 20 is insertable in the slit 22.

[0022] Figures 2a to 2d illustrate the closing sequence : after placing a cake or pastries (not shown) on the base panel 4 with the box 1 placed on a table or other support surface, the lid portion 3 is pivoted towards the container portion 2, while the container portion's front wall 7 is pivoted downward about fold line 8, said front wall 7 either lying flat on the table or pivoted slightly upward due to the stiffness of the fold line 8, as shown in Figure 2a. When the lid portion 3 is in the closed position,

the sidewalls 17 of the lid portion are overlapping the sidewalls 6 of the container portion on the outside thereof, as shown in Figure 2b, and the top panel 15 is essentially parallel to the base panel 4. Then the front wall 7 of the container portion is pivoted upwards manually, as shown in Figure 2c. The lip 20 is manually pushed inward as the front wall 7 of the container portion approaches the front wall 16 of the lid portion. Finally, the lip 20 is inserted into the slit 22, thereby securing the box, as shown in Figure 2d.

[0023] While the described sequence is similar to the closing sequence of the box disclosed in EP3061698, the shape of the lip 20 and of the slit 22 is different, as will be described in more detail hereafter, with reference to the images shown in Figures 3a to 3c.

[0024] Figure 3a shows the shape of the lip 20 in detail. The fold line 21 forms the rear edge of the lip 20. The fold line 21 is preferably a pre-folded fold line or a connection comprising multiple aligned incisions which facilitate the pivoting of the lip 20 about fold line 21 out of the face of the front wall 7. The front edge 25 of the lip comprises a central trapezoid-shaped protrusion 26. The side edges 27 are inclined towards each other, so that the lip 20 becomes narrower from the fold line 21 toward the front edge 25. Each side edge 27 comprises an inclined base part 27a, a step 27b and an inclined top part 27c. The step 27b is preferably parallel to the fold line 21. The step 27b and the inclined top part 27c can thus be regarded as forming a tooth section 28, extending laterally outward with respect to the base part 27a of each side edge 27. The tips 29 of the tooth sections 28 are defined as the intersections between the steps 27b and the inclined top part 27c of the edges 27. The tooth sections 28 are equal in size and shape and symmetrically placed with respect to centre line 19 of the lip 20.

[0025] With reference to Figure 3b, the slit 22 comprises a flat part 30 and two upwardly inclined lateral parts 31 ('upwardly' meaning towards the top edge of the lip portion's front wall 16). The lateral parts 31 are of equal length and inclined at equal oblique angles with respect the flat part 30. The slit 22 further comprises two centrally placed incisions 32 arranged symmetrically with respect to each other on either side of the flat part 30 and oriented perpendicularly with respect to said flat part 30. Because of the inclined lateral parts 31, the slit 22 forms a cut-out 33 in the lid's front wall 16. The cut-out 33 is delimited by the flat slit part 30, the inclined slit parts 31 and a bend line 34. The bend line 34 is represented as a thin dotted line which is only a representation intended to indicate the line's position. In reality, this line is not visible, i.e. it is not a pre-defined fold line like line 21. The length and orientation of the inclined parts 31 is such that the cut-out 33 has sufficient stiffness so that it can be bent essentially elastically about bend line 34 during closing and securing of the box. In other words, the cut-out 33 bends out of the plane of the wall 16 when pushed inward during closure of the box and essentially returns to its in-plane position when the bending force is removed. The length of the incisions 32 is preferably lower than the height of the cut-out 33 (i.e. the distance between the lines 34 and 30).

[0026] When inserting the lip 20 into the slit 22, the protrusion 26 enters first, thereby slightly bending the cut-out 33 backwards. At this point, the lip 20 is manually pivoted out of the plane of the wall 7, as illustrated in Figure 2c. The lip 20 and the slit 22 are preferably positioned with respect to each other so that the lip 20 is not perpendicular to the wall 7 at the moment of entry into the slit 22, but rather inclined downward relative to said wall 7. The incisions 32 facilitate the entry of the protrusion 26 without bending the cut-out 33 too much. The distance a between the tips 29 of the tooth sections 28 is slightly larger than the width w of the flat part 30 of the slit 22. This means that when the lip 20 is further inserted, a resistance is met when the tips 29 reach the ends of the flat part 30 of the slit. The difference between the distance a and the width w is chosen so that this resistance can be overcome by snapping the tips 29 past the ends of the flat part 30, which is further enabled by the cut-out 33 being slightly bent backwards at this point. The snap action is jointly realized by the tips 29 moving past the ends of flat slit part 30 and by the cut-out 33 elastically closing off the slit 22 on the inside thereof.

[0027] The lip 20 is then pivoted back towards the in-plane condition, illustrated in the transparent view in Figure 3c, which shows the lip 20 as it is inserted in the slit 22 and pivoted back to the in-plane condition (parallel to the wall 7). In reality this condition will not be reached 100% because the lip is now inserted into the slit, but the condition will in any case be approximated sufficiently closely to ensure that the box is securely closed while no parts are protruding excessively outward from the front of the closed box. The snap action ensures a more secured closure of the box compared to the prior art solutions and a better protection against unwanted or accidental opening of the box.

[0028] Nevertheless, opening the box deliberately can be done without difficulties, by pulling the front wall 7 of the container portion 2 away from the front wall 16 of the lid portion 3, thereby pulling the lip 20 partly out of the slit 22. When the tips 29 of the tooth sections 28 reach the ends of the flat slit portion 30, a resistance is once again felt, and subsequently overcome by further pulling the front wall 7 away from the lid portion 3. At this point, the cut-out 33 is again bent backwards, facilitating the overcoming of the resistance without overly deforming the tips 29. The protrusion 26 ensures that the cut-out 33 remains bent backwards long enough to allow pulling out the lip fully from the slit 22. The incisions 32 remove a portion of the strength from the center of the cut-out 33 so that the lip 20 can be removed from the slit 22 with relative ease, while the slit 22 still gives enough resistance to prohibit unwanted or accidental opening of the box.

[0029] This closure and securing system thereby allows multiple openings and closures of the box whilst

prohibiting unwanted or accidental opening of the box when closed.

[0030] Not all the details described above are required in every embodiment according to the invention. The shape of the protrusion 26 may be different from the trapezoid shape shown in the drawings. This protrusion 26 could for example have a curved shape or a half-circle shape. The position of the tips 29 of the tooth portions 28 is shown to be more or less halfway along the side edges 27, but these tips 29 could be placed a bit closer or further away from this half-way position and still enable the above-described functionality.

[0031] The incisions 32 are preferred but could be omitted if the material of the box enables the desired degree of elastic bending of the cut-out 33. Another alternative is to include only one of the incisions 32, i.e. an incision either above the flat part 30 of the slit or below the flat part 30 of the slit.

[0032] The invention is equally related to a method for closing and opening a box according to the invention. The method for closing the box comprises the steps of :

- pivoting the lid portion 3 until the sidewalls 17 of the lid portion overlap the sidewalls 6 of the container portion 2, while the front wall 7 of the container portion is folded down,
- folding up the container portion's front wall 7, while pivoting the lip 20 out of the in-plane position about the fold line 21 so that the lip is oriented towards the lid portion 3,
- inserting the lip 20 into the slit 22 until a resistance is felt,
- overcoming the resistance, thereby snapping the lip 20 into the slit 22,
- pivoting the lid 20 back towards the in-plane position

[0033] Opening the box takes place by the following steps :

- pulling the container portion's front wall 7 away from the lid portion's front wall 16, thereby partially pulling the lip 20 out of the slit 22, until a resistance is felt,
- overcoming said resistance and pulling the lip 20 further out of the slit 22.

[0034] Both the closure and the opening is thereby done in two stages separated by the snap action, i.e. the tips 29 of the tooth sections 28 being forced into and out of the slit 22. The two-step closing action in particular allows the user to physically experience the securing of the box, so that inadequate closing is less likely to occur.

[0035] The invention is equally related to a pre-cut sheet of a suitable material, preferably cardboard, configured to be pre-folded so as to form a folding box in accordance with the invention. The outward shape of the sheet can be in accordance with presently known designs. The sheet is characterized by the presence of a foldable lip 20 and a corresponding slit 22 according to any embodiment of the invention.

Claims

1. A folding box (1) for packing food products such as cakes, comprising a container portion (2) and a lid portion (3), the container portion comprising a base panel (4) and four sidewalls, namely a rear wall (5), a front wall (7) and two sidewalls (6), the lid portion (3) comprising a top panel (15) and three sidewalls, namely a front wall (16) and two sidewalls (17), the top panel (15) being pivotably attached to an upper edge of the rear wall (5) of the container portion (2), so that the lid portion (3) can be closed by pivoting said lid portion forward until the top panel (15) is essentially parallel to the base panel (4), and wherein :

   - the front wall (7) of the container portion (2) is pivotably attached to the base panel (4) and not to the sidewalls (6) of the container portion (2),
   - the front walls (7,16) of the container portion and the lid portion are respectively provided with a lip (20) and an opening (22), the lip being configured to be inserted in said opening for securing the box after closing the lid portion (3) and folding up the front wall (7) of the container portion (2),

   characterized in that :

   - the lip (20) is a foldable cut-out of the container portion's front wall (7) comprising a rear edge formed by a fold line (21) connected to said container portion's front wall (7), two side edges (27) and a front edge (25),
   - the front edge (25) comprises a centrally placed protrusion (26),
   - the side edges (27) are inclined towards each other and provided with symmetrically placed tooth sections (28),
   - the opening in the front wall of the lid is a slit (22) comprising a flat portion (30) and two upwardly inclined side portions (31), the flat portion being configured to first receive therein the protrusion (26) of the lip (20) when the lip is inserted in the slit (22),
   - the distance (a) between the tips (29) of the tooth sections is slightly higher than the length (w) of the flat portion (30) of the slit, so that the continued insertion of the lip (20) into the slit (22) requires overcoming a resistance by snapping the tips of the tooth sections past the ends of the flat portion (30) of the slit (22).

2. The box (1) according to claim 1 wherein the slit (22) comprises at least one incision (32) oriented perpendicularly with respect to the flat part (30) of the slit

and placed centrally with respect to said flat part (30).

3. The box (1) according to claim 1, wherein the slit (22) further comprises two incisions (32) of equal length placed symmetrically with respect to the flat part (30) of the slit, and oriented perpendicularly with respect to said flat part (30).

4. The box (1) according to any one of the preceding claims, wherein the protrusion (26) is trapezoid shaped.

5. The box (1) according to any one of the preceding claims, wherein the tips (29) of the tooth sections (28) are located about half-way along the length of the lip's side edges (27).

6. The box (1) according to any one of the preceding claims, wherein each of the side edges (27) of the lip comprises an inclined base portion (27a), a step (27b) and an inclined top portion (27c) extending outward from the base portion (27c), so that the tooth section (28) is formed by the step (27b) and the outwardly extending top portion (27c).

7. A method for closing a box (1) according to any one of the preceding claims, the method comprising the steps of :

- pivoting the lid portion (3) until the sidewalls (17) of the lid portion overlap the sidewalls (6) of the container portion (2), while the front wall (7) of the container portion is folded down,
- folding up the container portion's front wall (7), and pivoting the lip (20) out of the in-plane position about the fold line (21),
- inserting the lip (20) into the slit (22) until a resistance is felt,
- overcoming the resistance, thereby snapping the lip (20) into the slit (22),
- pivoting the lid (20) back towards the in-plane position.

8. A method for opening a box (1) according to any one of claims 1 to 6, the method comprising the steps of :

- pulling the container portion's front wall (7) away from the lid portion's front wall (16), thereby partially pulling the lip (20) out of the slit (22), until a resistance is felt,
- overcoming said resistance and pulling the lip (20) further out of the slit (22).

9. A sheet suitable for forming a pre-folded folding box (1) in accordance with any one of the preceding claims.

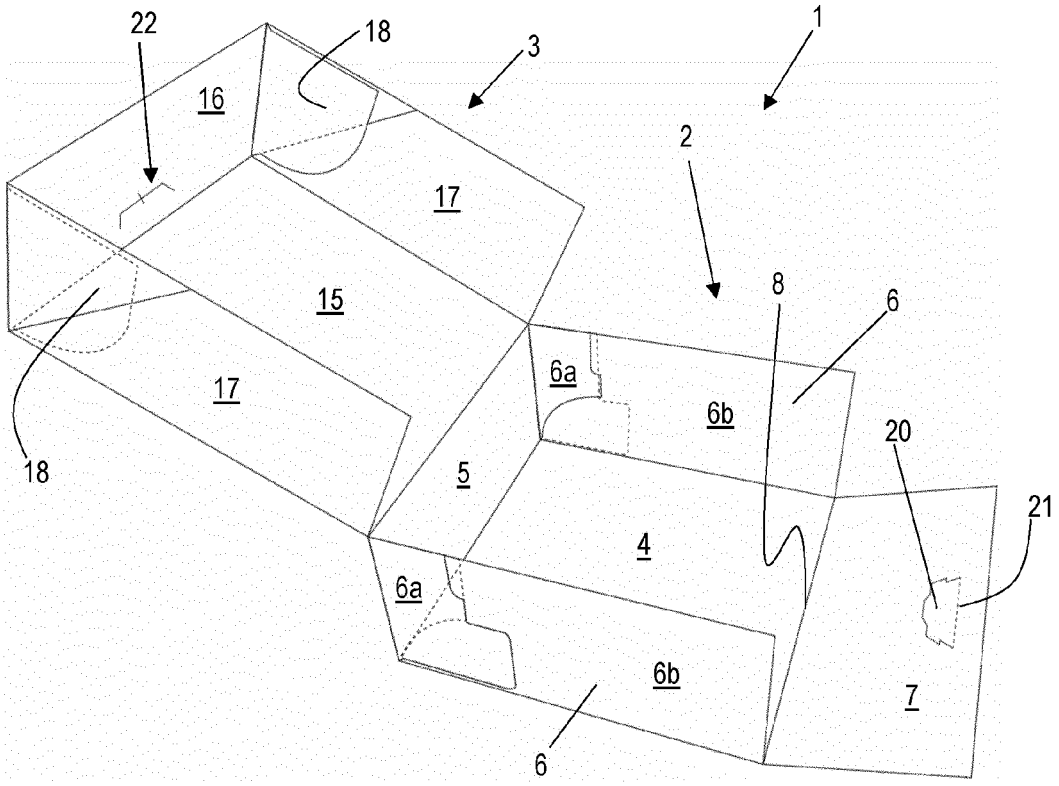

FIG. 1

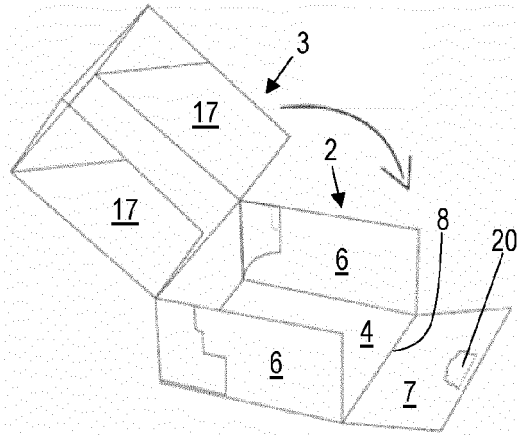

FIG. 2a

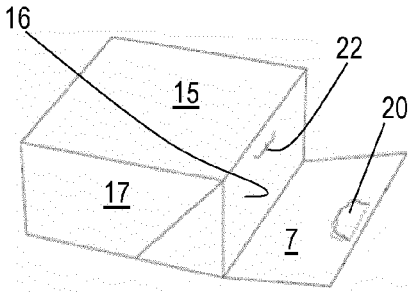

FIG. 2b

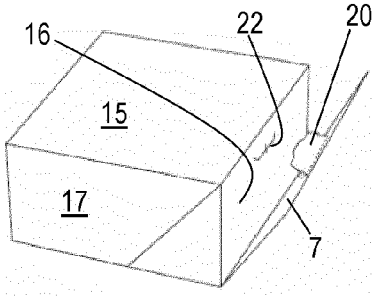

FIG. 2c

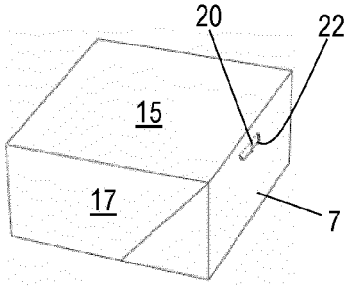

FIG. 2d

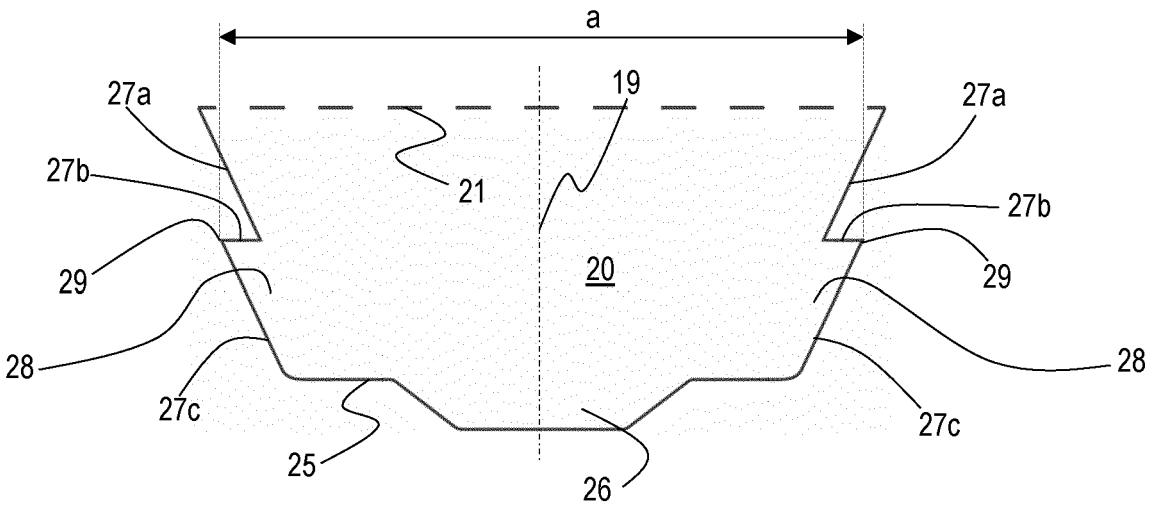

FIG. 3a

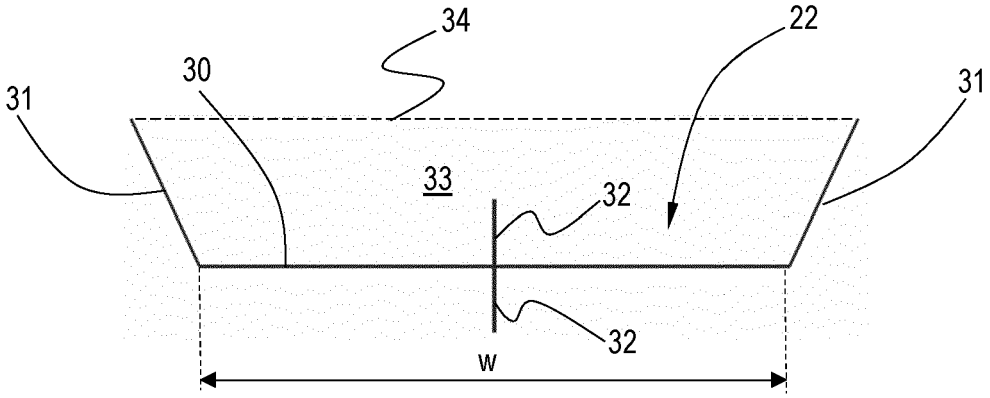

FIG. 3b

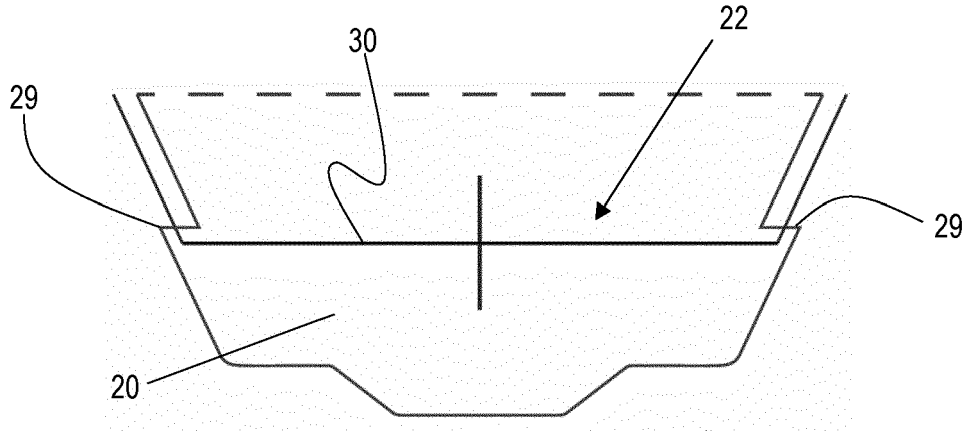

FIG. 3c

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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 6025

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,D	EP 3 061 698 A1 (V DE V NV [BE]) 31 August 2016 (2016-08-31) * figure 1 *	1-9	INV. B65D5/66 B65D85/36
A	US 1 984 371 A (HAZARD THEODORE C ET AL) 18 December 1934 (1934-12-18) * figures 1-6 *	1-9	
A	US 5 467 916 A (BEALES JONATHAN T [US]) 21 November 1995 (1995-11-21) * figures 1-5 *	1-9	
A	US 2 028 677 A (LUPTON ELMER H) 21 January 1936 (1936-01-21) * figures 1-4 *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 August 2023	Jervelund, Niels

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 16 6025

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
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22-08-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3061698 A1	31-08-2016	BE 1022768 B1	31-08-2016
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REFERENCES CITED IN THE DESCRIPTION

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