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(54) **TAMPER-EVIDENT PACKAGING AND FLEXIBLE MATERIAL SHEET FOR SUCH PACKAGING**

(57) According to an example aspect of the present invention, there is provided a packaging (1) comprising a first main panel (2), a first side panel (3), a second main panel (4), and a second side panel (5), defining a box body and being separated from one another by folding lines (6) formed on a flexible material sheet, at least one closure cover for said box body, wherein the closure cover includes a tongue (7) projecting from a closure panel (8) in turn projecting from the first main panel (2), the closure panel (8) being separated from the tongue (7) and from the first main panel (2) by folding lines (6), a portion of the tongue (7) being configured to be introduced into the box body under the second main panel

(4), and a first dust panel (11) projecting from the first side panel (3) and a second dust panel (12) projecting from the second side panel (5), wherein each dust panel (11, 12) is provided for turning about a folding line (6) and is configured to be arranged under the closure panel (8) of the cover, and wherein a cut portion (9) is provided in a portion of the tongue (7), and an arrow tab (10) is provided projecting from the second main panel (4), which is opposite to the first main panel (2), to which the closure cover is connected, and wherein the second main panel (4) comprises a preset breakage line (13) for facilitating a separation of the arrow tab (10).

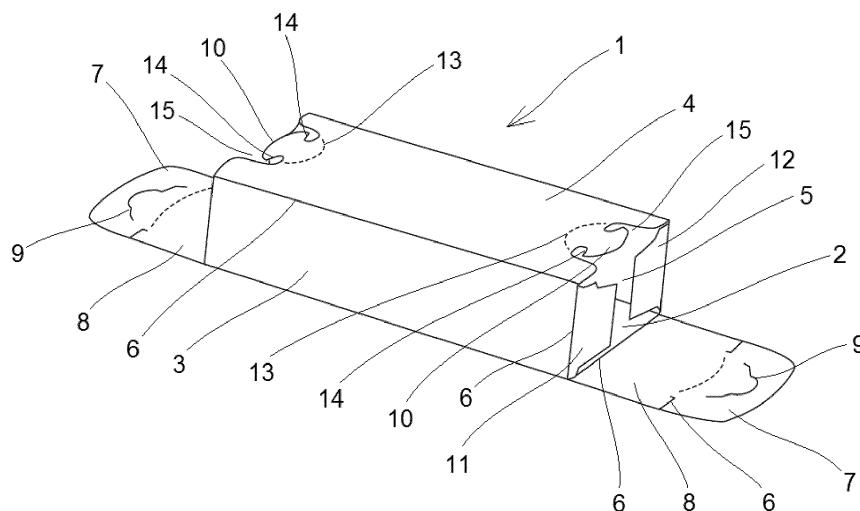


FIGURE 1

Description

FIELD

[0001] The present invention relates to a tamper-evident packaging. Further, the present invention relates to a cut flexible material sheet for a tamper-evident packaging.

BACKGROUND

[0002] In certain applications, for example in packaging of healthcare products, tamper-evident packaging is required. In such applications the user can easily detect unauthorized or previous access to the protected object in order to make sure that the product has not been altered since it left the manufacturer.

[0003] Many types of boxes are known provided with a security seal, the purpose of which is to make it evident by simple external examination that the initially closed box has already been opened for the first time, or to cause a portion of the box lid or a portion of the box itself to separate after initial opening, to prevent its reclosure.

[0004] Such known boxes are typically formed from a single piece of punched and crease-lined cardboard or the like. Document US 2009/0072018 A1, for example, discloses a box formed from a single piece of punched and crease-lined cardboard sheet, the box having an inviolable security seal which is broken when the closed box is opened for the first time. The closed box presents a high resistance to deformation when subjected to external stresses. Additionally, document WO 2015/170203 A1 describes a tamper-evident container comprising a storehouse defining an internal volume and exhibiting a predetermined number of lateral walls which define a passage opening delimited by a free edge, and a closure system engaged at the free edge and rotatably movable with respect to the storehouse. The closure system is configured for defining a closed condition in which the system itself prevents the communication between the internal volume of the storehouse and the external environment. The closure system is further configured for defining an open condition in which the system itself enables the communication between the internal volume and the external environment. Further, the container comprises a safety device made of a sheet material comprising a removable portion configured for being separated from the safety device upon a first open condition of the closure system, following a first closed condition, for providing an evidence of a tampering of the container.

[0005] In view of the foregoing, it would be beneficial to provide a packaging which is more compact and for which less material is required for fabrication of the packaging.

SUMMARY OF THE INVENTION

[0006] The invention is defined by the features of the

independent claims. Some specific embodiments are defined in the dependent claims.

[0007] According to a first aspect of the present invention, there is provided a packaging comprising a first main panel, a first side panel, a second main panel, and a second side panel defining a box body and being separated from one another by folding lines formed on a flexible material sheet, at least one closure cover for said box body, wherein the closure cover includes a tongue projecting from a closure panel in turn projecting from the first main panel, the closure panel being separated from the tongue and from the first main panel by folding lines, a portion of the tongue being configured to be introduced into the box body under the second main panel, a first dust panel projecting from the first side panel and a second dust panel projecting from the second side panel, wherein each dust panel is provided for turning about a folding line and is configured to be arranged under the closure panel of the cover, and wherein a cut portion is provided through a portion of the tongue, and an arrow tab is provided projecting from the second main panel, which is opposite to the first main panel the closure cover is connected to, and wherein the second main panel comprises a preset breakage line for facilitating a separation of the arrow tab.

[0008] Various embodiments of the first aspect may comprise at least one feature from the following bulleted list:

- the preset breakage line is configured to break when the packaging is opened
- the arrow tab is arranged in an indentation of the second main panel
- at least a portion of the arrow tab extends through the cut portion and projects under the tongue as the box body is closed
- the arrow tab comprises two undercuts which are configured to be hooked in a portion of the tongue
- a portion of the tongue is configured to move out of the plane of the remaining portion of the tongue when the tongue is inserted under the second main panel
- the preset breakage line is in the form of a portion of a circle
- the packaging comprises two closure covers on opposite sides of the box body

[0009] According to a second aspect of the present invention, there is provided a cut flexible material sheet for manufacturing a packaging according to any one of claims 1-8, wherein the sheet comprises a first main panel, a first side panel, a second main panel, and a second side panel, and a clamping strip projecting from one of said panels, said panels and the clamping strip being separated from one another by folding lines formed on the flexible material sheet, a tongue projecting from a closure panel in turn projecting from the first main panel, the closure panel being separated from the tongue and from the first main panel by folding lines, a first dust panel

projecting from the first side panel and a second dust panel projecting from the second side panel, wherein the first dust panel is separated from the first side panel by a folding line and the second dust panel is separated from the second side panel by a folding line, and wherein a cut portion is provided through a portion of the tongue, and an arrow tab is provided projecting from the second main panel, and wherein the second main panel comprises a preset breakage line for facilitating a separation of the arrow tab.

[0010] Various embodiments of the second aspect may comprise at least one feature from the following bulleted list:

- the arrow tab is arranged in an indentation of the second main panel
- the arrow tab comprises two undercuts
- the preset breakage line is in the form of a portion of a circle

[0011] Considerable advantages are obtained by certain embodiments of the invention. A tamper-evident packaging is provided. Contrary to prior solutions, no additional panels or other material parts are arranged under the main panel within the box body. Instead, the arrow tab directly projects from one of the main panels and the respective cut is made directly through the tongue. Thus, the packaging according to certain embodiments of the present invention is more compact and less material is required for fabrication of the packaging. The blank, in the following also referred to as "cut flexible material sheet", can be further punched or cut from a flexible material sheet using high-speed machinery.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIGURE 1 illustrates a schematic perspective view of a packaging in accordance with at least some embodiments of the present invention,

FIGURE 2 illustrates a schematic perspective view of another packaging in accordance with at least some embodiments of the present invention,

FIGURE 3 illustrates a schematic perspective view of a closed packaging in accordance with at least some embodiments of the present invention,

FIGURE 4 illustrates a schematic perspective view of a closed packaging during opening of the packaging in accordance with at least some embodiments of the present invention,

FIGURE 5 illustrates a schematic perspective view

of an opened packaging in accordance with at least some embodiments of the present invention, and

FIGURE 6 illustrates a schematic top view of a cut flexible material sheet in accordance with at least some embodiments of the present invention.

EMBODIMENTS

[0013] Certain embodiments of the present invention relate to a tamper-evident packaging. The packaging comprises an arrow tab which is formed as a portion of one of the main panels of a box body. In closed position, the arrow tab extends through a cut of a cut portion in a tongue of a closure cover and is hooked via two undercuts with the tongue. In order to open the packaging the arrow tab may be separated from said main panel by breaking a preset breakage line between said main panel and the arrow tab. Subsequently, the box cannot be re-closed as previously, thus providing a tamper-evident packaging, because a user can see by simple inspection of the packaging that the packaging has been previously opened.

[0014] In FIGURE 1 a schematic perspective view of a packaging 1 in accordance with at least some embodiments of the present invention is illustrated. The packaging 1 comprises a first main panel 2, a first side panel 3, a second main panel 4, and a second side panel 5. The four adjoining panels define a box body and are separated from one another by folding lines 6 formed on a flexible material sheet. The packaging 1 further comprises two closure covers for said box body. The closure covers each include a tongue 7 projecting from a closure panel 8 in turn projecting from the first main panel 2. The closure panel 8 is separated from the tongue 7 and from the first main panel 2 by folding lines 6. A portion of the tongue 7 of each closure cover is configured to be introduced into the box body under the second main panel 4. The packaging 1 furthermore comprises a first dust panel 11 projecting from the first side panel 3 and a second dust panel 12 projecting from the second side panel 5. Each dust panel 11, 12 is provided for turning about a folding line 6 and is configured to be arranged under the closure panel 8 of the cover.

[0015] Additionally, the packaging 1 comprises a cut portion 9 wherein the cut extends through a portion of the tongue 7. In other words, a cut having a specific form is made through a portion of the tongue 7. Further, two arrow tabs 10 are provided directly projecting from the second main panel 4. The second main panel 4 is arranged on the opposite side of the first main panel 2. The second main panel 4 comprises two preset breakage lines 13 for facilitating a separation of the arrow tabs 10 from the second main panel 4, respectively. The preset breakage lines 13 may be, for example, in the form of a portion of a circle. The arrow tabs 10 are each arranged in an indentation 15 of the second main panel 4. When the packaging is closed, at least a portion of an arrow tab 10 extends through the cut of the portion 9 and

projects under the respective tongue 7.

[0016] The arrow tabs 10 each comprise two undercuts 14 which are configured to be hooked in a portion of the respective tongue 7. In other words, the cuts of the cut portions 9 are formed such that the undercuts 14 of the arrow tabs 10 are configured to be hooked with the respective cut as the box is closed. The combination of the cut of the cut portion 9 and the hooked undercuts 14 prevent opening of each closure cover.

[0017] According to certain embodiments, the packaging 1 comprises only one closure cover on one side. In this case the box body is permanently closed on the other side. According to certain other embodiments, the packaging 1 comprises two closure covers on opposite sides of the box body.

[0018] In FIGURE 2 a schematic perspective view of another packaging 1 in accordance with at least some embodiments of the present invention is illustrated. As shown in FIGURE 1, the arrow tabs 10 are each arranged in an indentation 15 of the second main panel 4. When the packaging is closed, a portion of the tongue 7 is inserted under the second main panel 4. Additionally, at least a portion of a respective arrow tab 10 extends through the cut of a portion 9 and projects under the respective tongue 7. Consequently, a second portion of the tongue 7 is arranged above the second main panel 4 as the box body is closed. The arrow tab 10 is formed such that it is easy to insert the arrow tab 10 through the cut of the cut portion 9. In particular, because due to tension in the flexible material, the second portion of the tongue 7 is configured to move out of the plane of the remaining portion of the tongue 7, thus providing an opening in the tongue 7, when the remaining portion of the tongue 7 is inserted under the second main panel 4.

[0019] In FIGURE 3 a schematic perspective view of a closed packaging 1 in accordance with at least some embodiments of the present invention is illustrated. Both closure covers are arranged in closed position. In other words, a portion of each tongue 7 is arranged under the second main panel 4. The undercuts of each arrow tab are hooked in a portion of the respective tongue 7. The combination of the cut of a cut portion 9 and the hooked undercuts 14 prevent opening of each closure cover. For opening a closure cover of the packaging 1 it is necessary to break the respective preset breakage line 13.

[0020] In FIGURE 4 a schematic perspective view of a closed packaging 1 during opening of the packaging 1 in accordance with at least some embodiments of the present invention is illustrated. For opening a closure cover of the packaging 1 it is necessary to break the respective preset breakage line 13. This can be e.g. easily done by breaking the breakage line 13 with a thumb or any other finger of a user.

[0021] In FIGURE 5 a schematic perspective view of an opened packaging 1 in accordance with at least some embodiments of the present invention is illustrated. The arrow tab 10 has been separated from the second main panel 4 by breaking the preset breakage line. Subse-

quently, the closure cover comprising the closure panel 8, the tongue 7, and the arrow tab 10 can be moved out of their fixed position. It is not possible to reconnect the arrow tab 10 to the main panel 4, and thus a tamper-evident packaging 1 is provided. A user can see by simple inspection of the packaging 1 that the packaging 1 has been previously opened.

[0022] In FIGURE 6 a schematic top view of a cut flexible material sheet 16 in accordance with at least some embodiments of the present invention is illustrated. The cut flexible material sheet 16 is designed for manufacturing a packaging according to any one of claims 1-8. The sheet 16 comprises a first main panel 2, a first side panel 3, a second main panel 4, a second side panel 5, and a clamping strip 17 projecting from the second main panel 4. Said panels 2, 3, 4, 5, and the clamping strip 17 are separated from one another by folding lines 6 formed on the flexible material sheet 16. The clamping strip 17 further comprises a glue area 19 for assembling the box body of the packaging. The sheet 16 furthermore comprises a tongue 7 projecting from a closure panel 8 in turn projecting from the first main panel 2. The closure panel 8 is separated from the tongue 7 and from the first main panel 2 by folding lines 6. Furthermore, the sheet 16 comprises a first dust panel 11 projecting from the first side panel 3 and a second dust panel 12 projecting from the second side panel 5. The first dust panel 11 is separated from the first side panel 3 by a folding line 6 and the second dust panel 12 is separated from the second side panel 5 by a folding line 6.

[0023] A cut portion 9 is provided in a portion of the tongue 7. In other words, a cut is made through a portion of the tongue 7. Additionally, an arrow tab 10 is provided projecting from the second main panel 4. The second main panel 4 comprises a preset breakage line 13 for facilitating a separation of the arrow tab 10 from the second main panel 4. The preset breakage line 13 may be, for example, in the form of a circle. The arrow tab 10 is arranged in an indentation 15 of the second main panel 4 and comprises two undercuts 14.

[0024] The flexible material may be, for example, cardboard or any other material which can be punched or cut. The material has to be suitable for folding.

[0025] The cut flexible material sheet 16 shown in FIGURE 6 is designed to provide two separate closure covers for the packaging.

[0026] The above embodiments employ flexible materials for the packaging. Any material which allows for breakage of the panels along the breakage lines, as explained above, can be used. Typical examples of suitable materials include paperboard, which can be coated or uncoated, on one or both sides. The paperboard can be selected from a number of paperboard grades, for example from the group of folding box boards, white lined chipboards, greyboards, liquid packaging boards, solid bleached boards and coated unbleached boards and carrier boards. The grammage of the paperboard can vary for example in the range from about 50 to 750 g/m², for

example 60 to 350 g/m². In addition to, or instead of, sheets of paperboard, sheets of plastic materials, as well as sheets of composite materials comprising both paperboard and plastic layers, can be used.

[0027] It is to be understood that the embodiments of the invention disclosed are not limited to the particular structures, process steps, or materials disclosed herein, but are extended to equivalents thereof as would be recognized by those ordinarily skilled in the relevant arts. It should also be understood that terminology employed herein is used for the purpose of describing particular embodiments only and is not intended to be limiting.

[0028] 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. Where reference is made to a numerical value using a term such as, for example, about or substantially, the exact numerical value is also disclosed.

[0029] As used herein, a plurality of items, structural elements, compositional elements, and/or materials may be presented in a common list for convenience. However, these lists should be construed as though each member of the list is individually identified as a separate and unique member. Thus, no individual member of such list should be construed as a de facto equivalent of any other member of the same list solely based on their presentation in a common group without indications to the contrary. In addition, various embodiments and example of the present invention may be referred to herein along with alternatives for the various components thereof. It is understood that such embodiments, examples, and alternatives are not to be construed as de facto equivalents of one another, but are to be considered as separate and autonomous representations of the present invention.

[0030] Furthermore, the described features, structures, or characteristics may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided, such as examples of lengths, widths, shapes, etc., to provide a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that the invention can be practiced without one or more of the specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

[0031] While the forgoing examples are illustrative of the principles of the present invention in one or more particular applications, it will be apparent to those of ordinary skill in the art that numerous modifications in form, usage and details of implementation can be made without

the exercise of inventive faculty, and without departing from the principles and concepts of the invention. Accordingly, it is not intended that the invention be limited, except as by the claims set forth below.

[0032] The verbs "to comprise" and "to include" are used in this document as open limitations that neither exclude nor require the existence of also un-recited features. The features recited in depending claims are mutually freely combinable unless otherwise explicitly stated. Furthermore, it is to be understood that the use of "a" or "an", that is, a singular form, throughout this document does not exclude a plurality.

INDUSTRIAL APPLICABILITY

[0033] At least some embodiments of the present invention find industrial application in tamper-evident packaging for healthcare products. The present packages can also be used for other products, such as foodstuff, confections and sweets, tobacco products, as well as electronics and other consumer goods which may be subject to counterfeiting.

REFERENCE SIGNS LIST

[0034]

- 1 packaging
- 2 first main panel
- 3 first side panel
- 4 second main panel
- 5 second side panel
- 6 folding line
- 7 tongue
- 8 closure panel
- 9 cut portion
- 10 arrow tab
- 11 first dust panel
- 12 second dust panel
- 13 preset breakage line
- 14 undercut
- 15 indentation
- 16 sheet
- 17 clamping strip
- 18 opening
- 19 glue area

CITATION LIST

Patent Literature

[0035]

US 2009/0072018 A1

WO 2015/170203 A1

Claims**1.** A packaging (1) comprising:

- a first main panel (2), a first side panel (3), a second main panel (4), and a second side panel (5), defining a box body and being separated from one another by folding lines (6) formed on a flexible material sheet,
- at least one closure cover for said box body, wherein the closure cover includes a tongue (7) projecting from a closure panel (8) in turn projecting from the first main panel (2), the closure panel (8) being separated from the tongue (7) and from the first main panel (2) by folding lines (6),
- a portion of the tongue (7) being configured to be introduced into the box body under the second main panel (4), and
- a first dust panel (11) projecting from the first side panel (3) and a second dust panel (12) projecting from the second side panel (5), wherein each dust panel (11, 12) is provided for turning about a folding line (6) and is configured to be arranged under the closure panel (8) of the cover,

characterized by

- a cut portion (9) provided in a portion of the tongue (7), and
- an arrow tab (10) projecting from the second main panel (4), which is opposite to the first main panel (2), to which the closure cover is connected, and wherein the second main panel (4) comprises a preset breakage line (13) for facilitating a separation of the arrow tab (10).

- 2.** The packaging (1) according to claim 1, wherein the preset breakage line (13) is configured to break when the packaging (1) is opened.
- 3.** The packaging (1) according to claim 1 or 2, wherein the arrow tab (10) is arranged in an indentation (15) of the second main panel (4).
- 4.** The packaging (1) according to any one of claims 1-3, wherein at least a portion of the arrow tab (10) extends through the cut portion (9) and projects under the tongue (7) as the box body is closed.
- 5.** The packaging (1) according to claim 4, wherein the arrow tab (10) comprises two undercuts (14) which are configured to be hooked in a portion of the tongue (7).
- 6.** The packaging (1) according to any one of claims 1-5, wherein a portion of the tongue (7) is configured

to move out of the plane of the remaining portion of the tongue (7) when the tongue (7) is inserted under the second main panel (4).

- 7.** The packaging (1) according to any one of claims 1-6, wherein the preset breakage line (13) is in the form of a portion of a circle.
- 8.** The packaging (1) according to any one of claims 1-7, wherein the packaging (1) comprises two closure covers on opposite sides of the box body.
- 9.** A cut flexible material sheet (16) for manufacturing a packaging according to any one of claims 1-8, wherein the sheet comprises:

- a first main panel (2), a first side panel (3), a second main panel (4), and a second side panel (5), and a clamping strip (17) projecting from one of said panels (2, 3, 4, 5), said panels (2, 3, 4, 5) and the clamping strip (17) being separated from one another by folding lines (6) formed on the flexible material sheet (16),
- a tongue (7) projecting from a closure panel (8) in turn projecting from the first main panel (2), the closure panel (8) being separated from the tongue (7) and from the first main panel (2) by folding lines (6), and
- a first dust panel (11) projecting from the first side panel (3) and a second dust panel (12) projecting from the second side panel (5), wherein the first dust panel (11) is separated from the first side panel (3) by a folding line (6) and the second dust panel (12) is separated from the second side panel (5) by a folding line (6),

characterized in that

- a cut portion (9) is provided in a portion of the tongue (7), and
 - an arrow tab (10) is provided projecting from the second main panel (4), and wherein the second main panel (4) comprises a preset breakage line (13) for facilitating a separation of the arrow tab (10).
- 10.** The sheet (16) according to claim 9, wherein the arrow tab (10) is arranged in an indentation (15) of the second main panel (4).
 - 11.** The sheet (16) according to claim 9 or 10, wherein the arrow tab (10) comprises two undercuts (14).
 - 12.** The sheet (16) according to any one of claims 9-11, wherein the preset breakage line (13) is in the form of a portion of a circle.

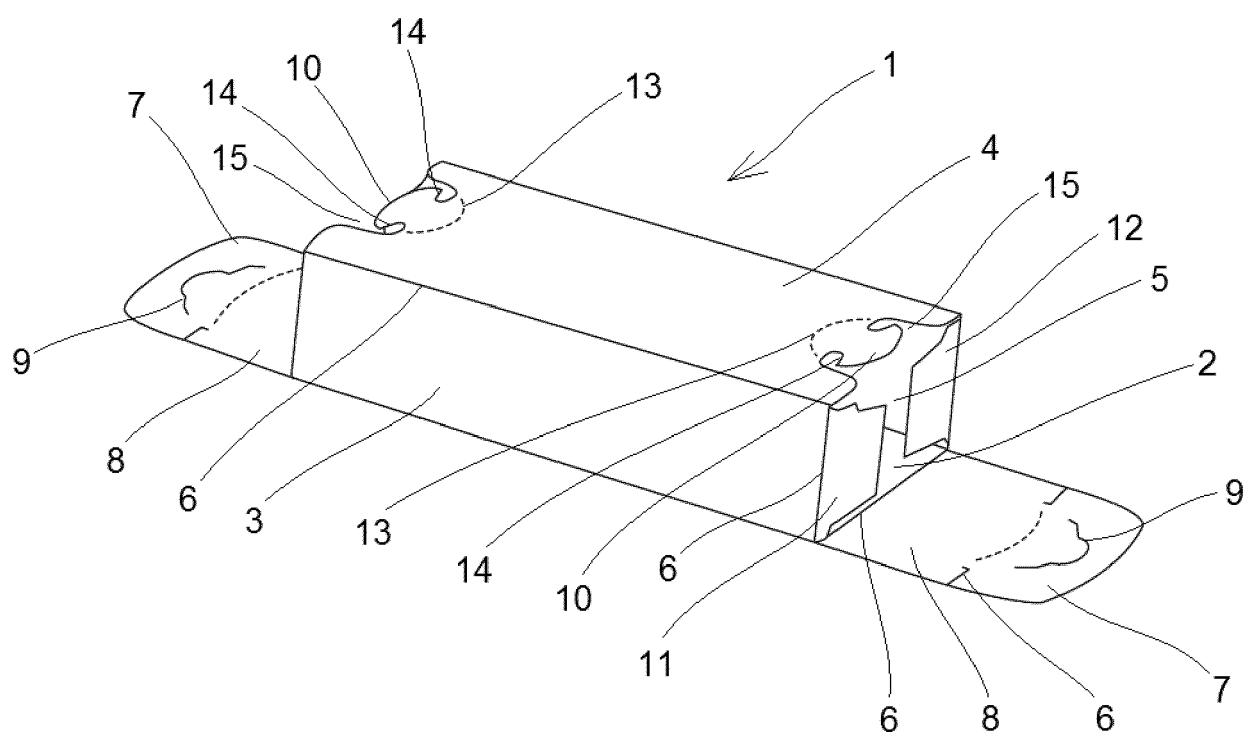


FIGURE 1

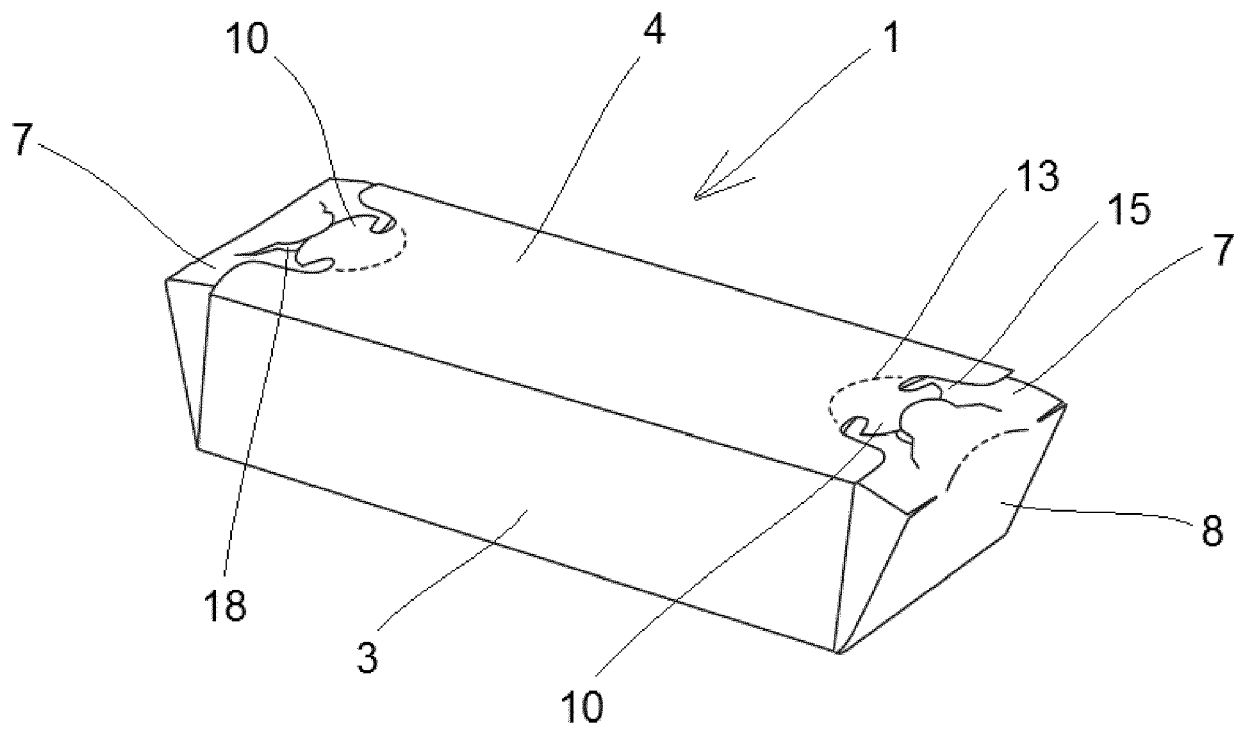


FIGURE 2

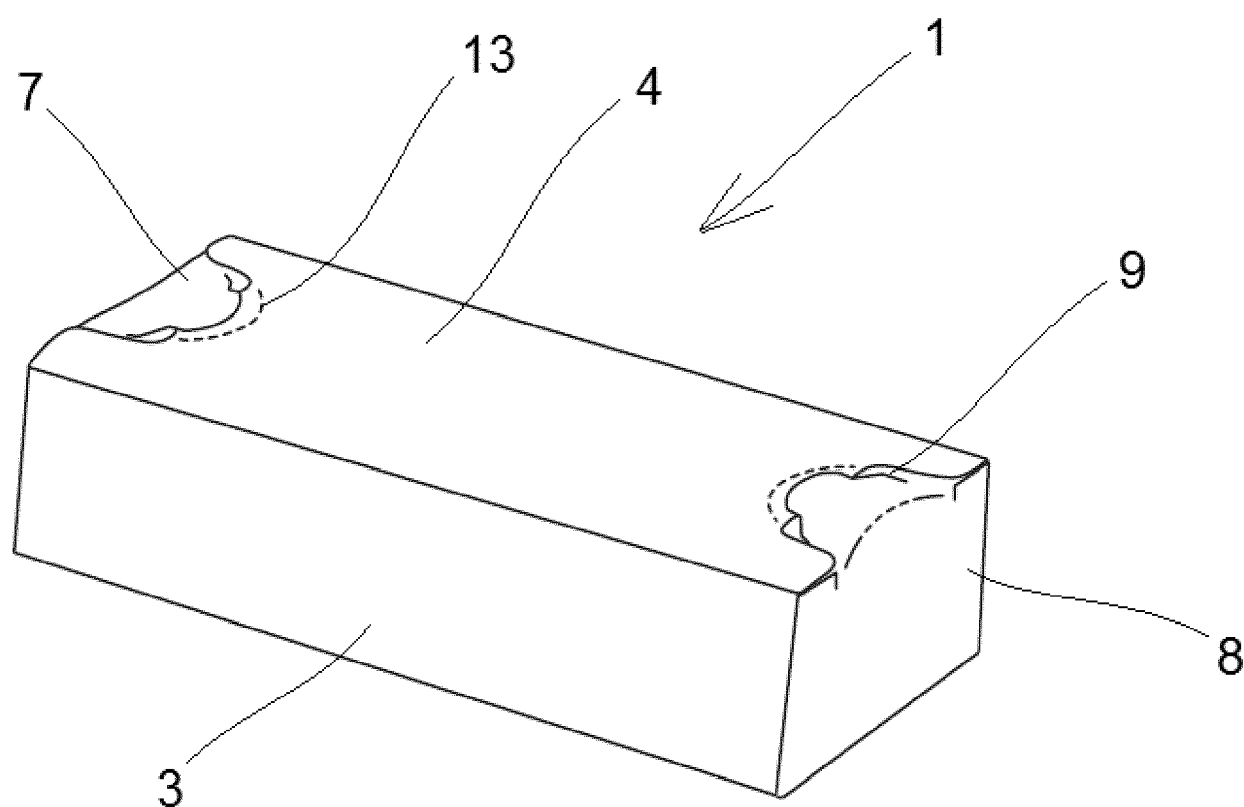


FIGURE 3

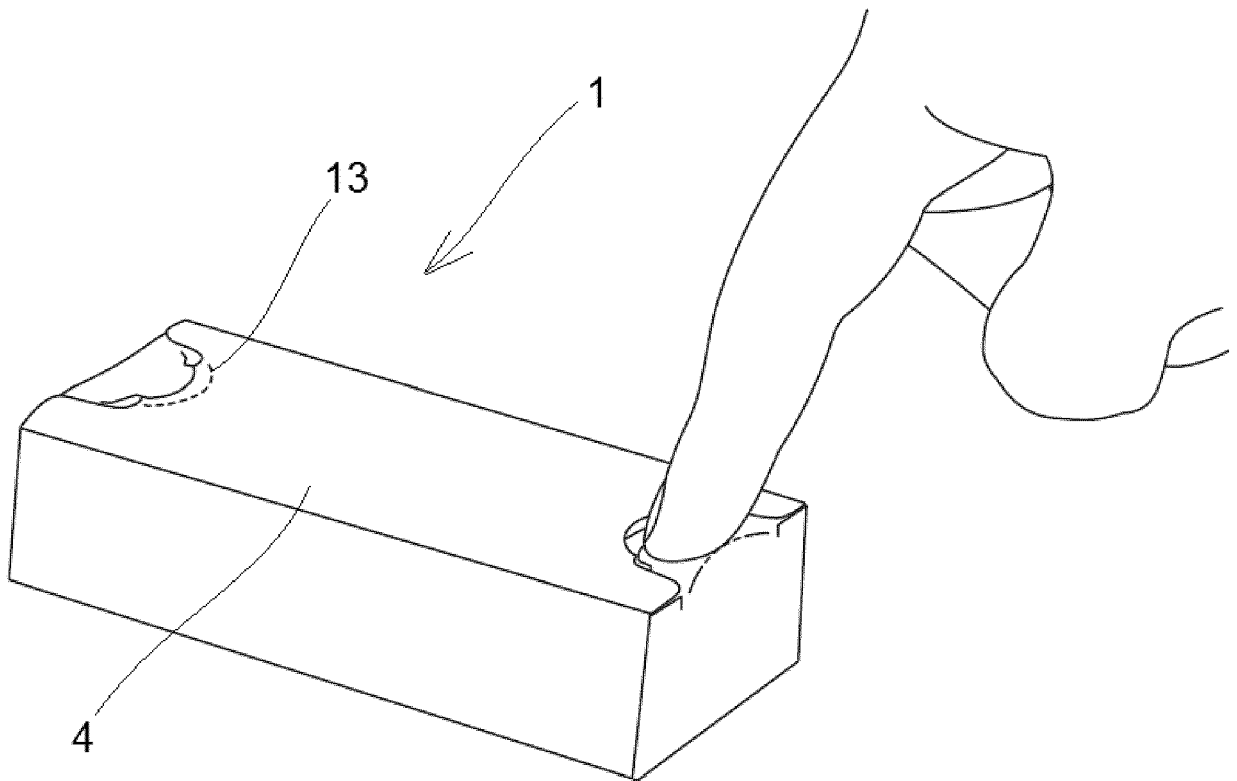


FIGURE 4

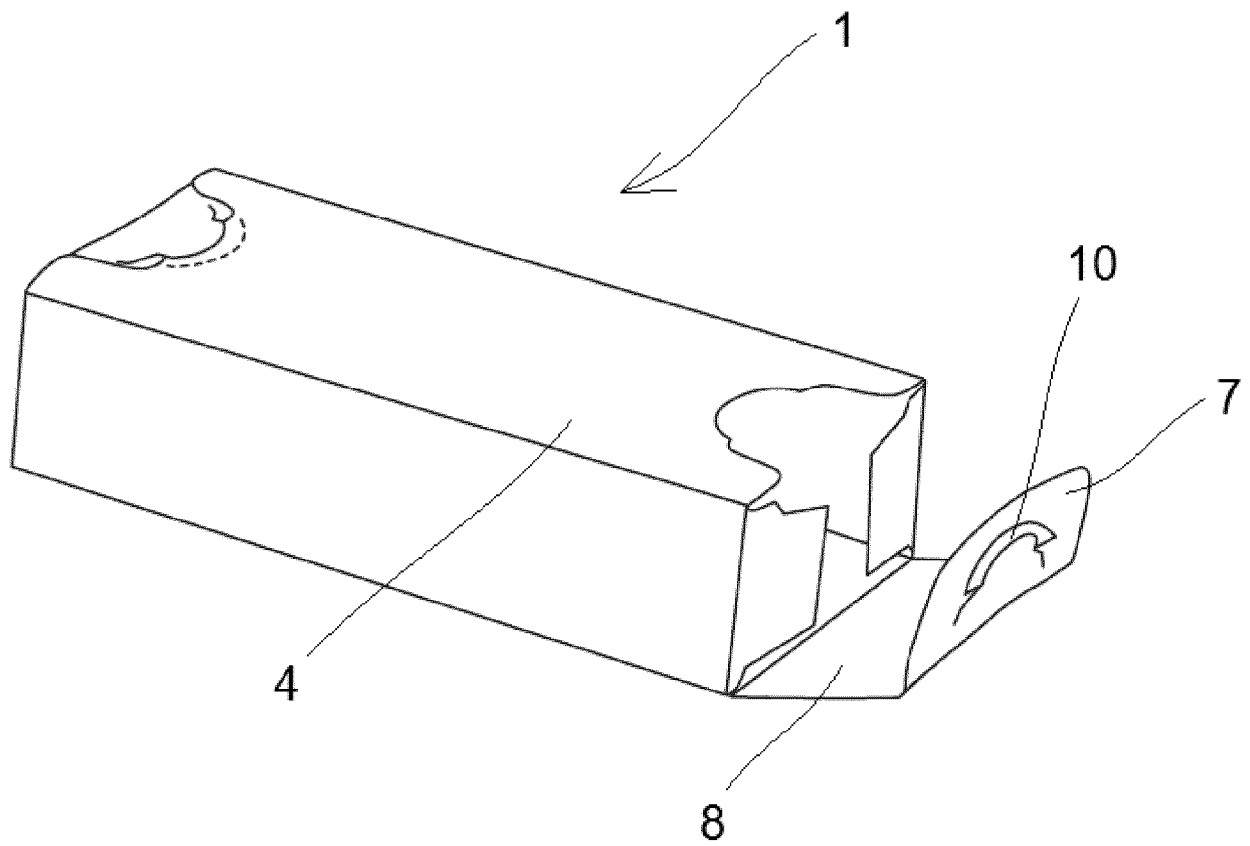


FIGURE 5

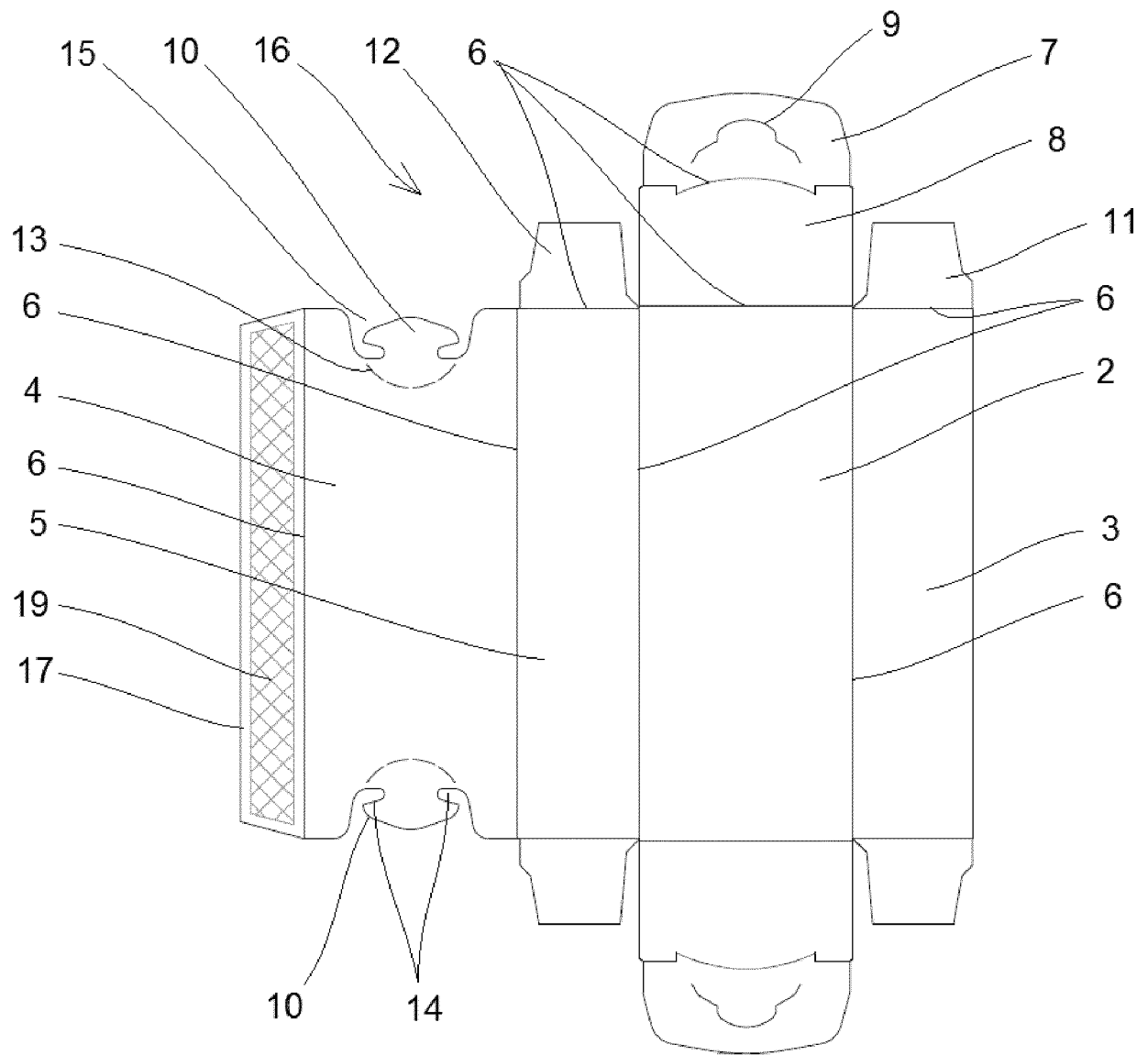


FIGURE 6



EUROPEAN SEARCH REPORT

Application Number
EP 17 17 2650

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 504 892 A1 (MARS ALIMENTAIRE [FR]) 5 November 1982 (1982-11-05) * the whole document *	1-12	INV. B65D5/10 B65D5/54 B65D5/66
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A	DE 84 11 183 U1 (HOEHN GMBH K [DE]) 7 June 1984 (1984-06-07) * the whole document *	1-12	
			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 8 November 2017	Examiner Ngo Si Xuyen, G
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EPO FORM 1503 03/82 (P04C01)

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

EP 17 17 2650

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The members are as contained in the European Patent Office EDP file on
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08-11-2017

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DE 8411183	U1	07-06-1984	NONE

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- WO 2015170203 A1 [0004] [0035]