



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.11.2022 Bulletin 2022/48

(51) International Patent Classification (IPC):
B65D 5/66 ^(2006.01) **B65D 5/50** ^(2006.01)

(21) Application number: **22173865.1**

(52) Cooperative Patent Classification (CPC):
B65D 5/6667; B65D 5/5021; B65D 5/6679

(22) Date of filing: **17.05.2022**

(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

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(30) Priority: **18.05.2021 IT 202100012815**

(54) **BOX MADE OF PAPER MATERIAL WITH A LID AND BLANK FOR MAKING A BOX MADE OF PAPER MATERIAL WITH A LID**

(57) A box (10) made of paper material with a lid comprises a containment body (11) having a base wall (14), a plurality of containment side walls (13), an access opening (16) defining a containment space (17), a lid (12) comprising a top wall (18) and a plurality of lid side walls (19). At two non-adjacent containment side walls (13) first portions (23) of a retention device (22) are present and two non-adjacent lid side walls (19) comprise second portions (24) of the retention device (22). When the lid (12) is

closed, each first portion (23) and respective second portion (24) of the retention device (22) are commutable between a stable mutually engaged condition and an unstable mutually disengaged condition, wherein the stable mutual engagement condition is obtained by interference between each first portion (23) and the respective second portion (24) of the retention device (22). A rib (40) is placed inside the containment space (17) and placed between the base wall (14) and the access opening (16).

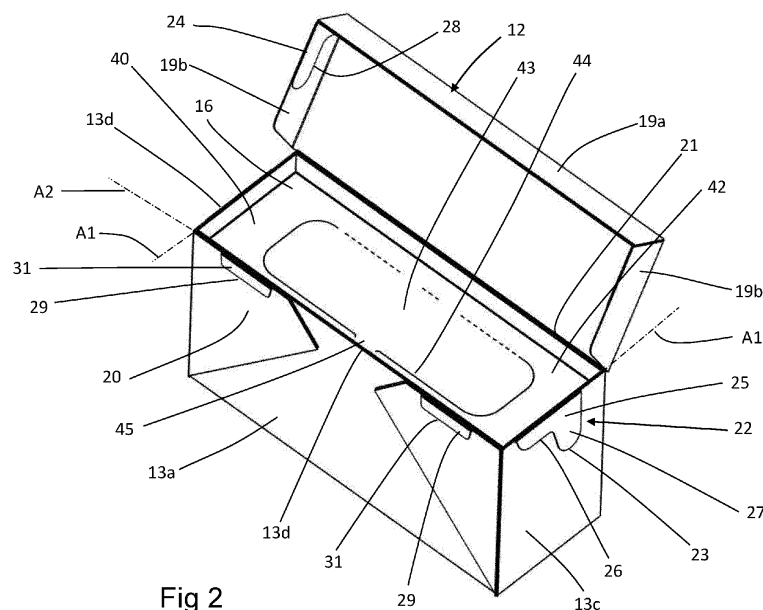


Fig 2

Description

[0001] The present invention relates to a box made of paper material with a lid, and to a blank for making a box made of paper material with a lid, of the openable and reclosable type for accessing loose articles.

[0002] Boxes made of paper material with a lid usually comprise a prismatic-shaped container body defining an open cavity to which a closing lid that allows or inhibits access to the cavity of the container body can be hinged.

[0003] Boxes made of paper material with a lid are highly appreciated and increasingly popular as they have a very low environmental impact compared to boxes made of plastic material with a lid.

[0004] Boxes made of paper material with a lid can be used to contain loose articles that are picked up from time to time by accessing the content of the box by opening and closing the lid.

[0005] The Applicant has felt the need to provide a box made of paper material with a lid, and a relative flat blank, which allows to contain loose articles that should not be accessible to children and infants.

[0006] An example of loose articles that should not be accessible to children and infants concerns ready-to-use washing machine or dishwasher detergent tablets or washing machine or dishwasher detergent capsules (also known as pods).

[0007] In fact, this type of loose articles is usually contained in boxes made of plastic material that are provided with opening and closing systems which are difficult to be operated by children or infants due to the complexity of the operations required to manoeuvre such opening and closing systems and/or due to the force required to operate such opening and closing systems.

[0008] The Applicant has noted that even boxes made of paper material with a lid can be provided with opening and closing systems that make access thereof by children and infants difficult.

[0009] For example, the Applicant has verified that the boxes made of paper material with a lid can be provided with closing systems having tabs placed on the lid that interact with recesses or undercuts placed in the container body in such a way as to make the lid resistant to opening and inhibit access to the content of the box.

[0010] In the Applicant's experience, such tabs and recesses must be structurally sufficiently robust both to ensure their operation even in the event of repeated opening and closing of the lid and to ensure an actual efficacy of the closing system that must not be able to be opened accidentally.

[0011] The Applicant has verified that it is possible to provide these tabs and recesses with the required structural strength by providing the paper material of the box with a lid of sufficient thickness and strength.

[0012] However, the Applicant has noted that this results in a higher weight of the box with a lid and above all a higher amount of paper material for the production of the box with a lid, which has a negative impact on both

the production costs and the environmental sustainability of the box with a lid.

[0013] The Applicant has further noted that these drawbacks are particularly pronounced when the box made of paper material with a lid is obtained starting from a single blank of paper material with constant thickness. In this case, it is in fact necessary to oversize the entire box with a lid to ensure the adequate structural strength of the closing system.

[0014] The present invention therefore relates, in a first aspect thereof, to a box made of paper material with a lid, comprising a containment body having a base wall of polygonal shape and a plurality of containment side walls extending substantially parallel to each other from the base wall up to an access opening for the containment body and defining, in combination with the base wall, a containment space.

[0015] Preferably, it is provided a lid comprising a top wall and a plurality of lid side walls.

[0016] Preferably, first portions of a retention device are provided at two non-adjacent containment side walls.

[0017] Preferably, two non-adjacent lid side walls comprise second portions of the retention device.

[0018] Preferably, when the lid is closed on the containment body, each first portion of the retention device and the respective second portion of the retention device are commutable between a stable mutually engaged condition in which they oppose the opening of the lid and an unstable mutually disengaged condition in which they allow the opening of the lid.

[0019] Preferably, the stable mutual engagement condition is obtained by interference between each first portion of the retention device and the respective second portion of the retention device.

[0020] Preferably, said containment body further comprises a rib placed inside said containment space, connected to said containment side walls and placed between the base wall and the access opening.

[0021] The present invention relates, in a second aspect thereof, to a flat blank for making a box with a lid.

[0022] Preferably, it is provided a first panel, a second panel and a third panel adjacent to the first panel and placed on opposite sides with respect to the first panel.

[0023] Preferably, it is provided a fourth panel adjacent to the third panel on the opposite side with respect to the first panel.

[0024] Preferably, it is provided a fifth panel and a sixth panel adjacent to the first panel and placed on opposite sides with respect to the first panel.

[0025] Preferably, the first panel defines a base wall of a containment body, the second, third, fifth and sixth panel realize containment side walls of the containment body and the fourth panel defines a rib placed inside the containment body.

[0026] Preferably, the fifth and sixth panel comprise respective first appendages defining first portions of a retention device.

[0027] Preferably, the first portions of the retention de-

vice are configured to cooperate with second portions of the retention device placed on a lid to hold said lid closed on the containment body.

[0028] The term "paper material" means, in the present description and in the subsequent claims, a paper or paper pulp based material in the form of single sheets or panels or sheets or panels superimposed on each other or interspersed with one or more corrugated sheets in which the ratio of weight to surface area (grammage) is between about 100 grams per square metre and about 600 grams per square metre.

[0029] The expression "stable condition" means, in the present description and in the subsequent claims, a condition that remains in a state if it is not subjected to actions or forces that alter that state.

[0030] The term "unstable condition" means, in the present description and in the subsequent claims, a condition that remains in a particular state only if subjected to and maintained subject to actions or forces that maintain that state. Once the application of such forces or actions ceases, that particular state changes.

[0031] The first and second portions of the retention device, when in the stable mutual engagement condition, oppose the opening of the lid. Such mutual engagement, being obtained by interference between each first portion of the retention device and the respective second portion of the retention device, holds the lid on the containment body as long as the interference between each first portion and the respective second portion of the retention device is present.

[0032] To remove the interference between the first and second portion of the retention device, it is therefore necessary to exert an action on the first and/or second portion of the retention device to commute these portions into the mutually disengaged condition.

[0033] The Applicant has found that by setting up the mutual disengagement condition as an unstable condition, it is necessary to simultaneously exert, and keep exerting, an action on each first portion and/or on the corresponding second portion of the retention device in order to be able to open the lid.

[0034] The Applicant further found that by arranging the first portions of the retention device on non-adjacent containment side walls, the removal of the interference between each first portion and the respective second portion of the retention device requires at least two coordinated actions that can hardly be easily implemented by a child or an infant, allowing the access to the content of the box by a child or an infant to be inhibited.

[0035] The Applicant further understood that by arranging a rib inside the containment space, connected to the containment side walls and placed between the base wall and the access opening, it is possible to ensure proper operation of the retention device even after numerous opening and closing of the lid and also to prevent a child or infant handling the box from being able to accidentally remove the interference between the first portions and the second portions of the retention device and

therefore to access the content of the box.

[0036] The Applicant has in fact found that said rib stiffens the containment body (which is an open box-shaped element) making it more difficult to deform (based on the type of paper material used and the thickness of the paper material used) compared to a containment body not provided with said rib.

[0037] The Applicant believes that such an increased stiffness prevents small forces or actions, such as those that might be exerted by a child or infant handling the box, from being able to accidentally deform the containment body and the containment side walls thereof to the point of removing the interference between the first portions and the second portions of the retention device.

[0038] The Applicant further believes that such an increased stiffness also makes it possible to better ensure that, when closing the lid, the first portions and the second portions of the retention device reach the correct interference positions by implementing the stable mutual engagement condition.

[0039] The present invention may have, in both aspects discussed above, at least one of the preferred features described below. Such features may thus be present individually or in combination with each other, unless expressly stated otherwise, both in the box of the first aspect of the present invention and in the blank of the second aspect of the present invention.

[0040] Preferably, said lid is hinged to one of said side walls of the containment body interposed between the containment side walls on which the first portions of the retention device are present.

[0041] In this way, the first portions engage with the second portions of the retention device in a guided manner as a result of the rotation of the lid with respect to the containment body while the lid is being closed.

[0042] Preferably, the lid is made as one piece with the containment body, i.e. it is made integral with the containment body.

[0043] In this respect, preferably it is provided a seventh panel of the blank adjacent to the second panel on the opposite side with respect to the first panel, wherein the seventh panel realizes said lid and wherein the seventh panel comprises appendages defining said second portions of the retention device.

[0044] Preferably, said rib is placed closer to the access opening with respect to the base wall.

[0045] The Applicant perceived that by distancing the rib from the base wall and by positioning it close to the access opening, the stiffening effect of the containment body is further increased.

[0046] In fact, the Applicant has verified that the portion of the containment body that is most prone to deformation during the opening and closing operations of the box is placed substantially at the access opening. Positioning the rib closer to the access opening with respect to the base wall also ensures that the containment body is stiffened in the zone on which the lid operates and thus in the zone in which the first portions and the second por-

tions of the retention device operate with each other, further decreasing the possibility of accidentally removing the interference between the first portions and the second portions of the retention device.

[0047] Preferably, said rib comprises a frame connected to said containment side walls and a central door at least partially separable from said frame.

[0048] By separating, at least partially, the central door with respect to the frame, an opening in the rib is defined which allows access to the inside of the containment body. This is particularly useful especially when the rib is placed closer to the access opening with respect to the base wall, as it allows the storage capacity (i.e. the storage volume) of the containment body not to be altered.

[0049] By arranging the frame connected to the containment side walls, the rib continues to perform its stiffening function even when the central door is at least partially removed from the frame.

[0050] The Applicant has also perceived that the central door can also act as a tamper-proof seal. In particular, the Applicant has noted that by arranging the central door not separated from the frame, access to the content of the box can only take place by at least partially separating the central door from the frame. Therefore, the at least partial separation of the central door from the frame is evidence that a first access to the content of the box has taken place.

[0051] Preferably, the central door is connected to said frame through predefined separation lines to achieve a controlled and predefined separation of the door from the frame.

[0052] Preferably, the fourth panel of the blank comprises the central door and the frame connected by a separation line.

[0053] Preferably, the fourth panel comprises at least one edging configured to be joined to the second panel, the fifth panel and the sixth panel to hold said rib in place.

[0054] Preferably, the rib is connected to the containment side walls by edgings arranged parallel to the respective containment side walls and stably connected (e.g. by gluing) to the respective containment side walls.

[0055] These edgings, as well as holding the ribs in place inside the containment body, contribute to further stiffening the containment body at the rib.

[0056] Preferably, said edgings extend from said frame on the opposite side with respect to the central door.

[0057] Preferably, the rib is connected to all containment side walls.

[0058] Preferably, said central door is smaller than said access opening.

[0059] Preferably, the difference between the size of the access opening and the central door is substantially equal to the size of the frame.

[0060] In other words, the frame and the central door preferably occupy the entire access opening.

[0061] Preferably, each first portion of the retention device and the respective second portion of the retention

device interfere with each other to define the stable mutual engagement condition at respective interference zones provided at a first distance from said access opening and interposed between the base wall and the access opening.

[0062] Preferably, said rib is provided at a second distance from said access opening, said second distance being less than three times said first distance, preferably less than twice said first distance, even more preferably less than said first distance.

[0063] The first distance and the second distance are preferably measured along a direction substantially perpendicular to the base wall and are preferably measured from a free edge of one of the containment walls.

[0064] By arranging the rib at said second distance, the rib exerts its stiffening effect in zones near the interference zones between the first portions and the second portions of the retention device.

[0065] By arranging the second distance smaller than said first distance, the interference zones between the first portions and the second portions of the retention device are interposed between the base wall and the rib. In this way, the stiffening of the containment body at the interference zones is maximised, minimising the possibility of accidentally removing the interference between the first portions and the second portions of the retention device and accidentally opening the lid of the box.

[0066] Preferably, said first portions of the retention device extend from containment side walls adjacent to a containment side wall to which said lid is hinged.

[0067] Preferably, said containment side wall to which said lid is hinged is larger than the containment side walls from which said first portions of the retention device extend.

[0068] Each first portion of the retention device is preferably outside the containment space.

[0069] Preferably, each first portion of the retention device comprises an appendage projecting externally from the containment space starting from a respective containment side wall.

[0070] Preferably, each second portion of the retention device comprises a shoulder on a lid side wall on the side facing the containment space.

[0071] Preferably, the interference zones between the first portions and the second portions of the retention device are defined by the mutual engagement between a portion of the appendage of each first portion and the respective shoulder of the second portion of the retention device.

[0072] In this way, the interference zones between the first portions and the second portions of the retention device are provided, when the lid is closed on the containment body, at the lid on the side facing the containment space.

[0073] These interference zones are therefore inaccessible when the lid is closed on the containment body.

[0074] Preferably, each appendage comprises an abutment edge configured to engage said shoulder and

a manoeuvring portion for a user configured to disengage the abutment edge from said shoulder.

[0075] The manoeuvring portion preferably extends away from the abutment edge and preferably emerges from the lid when the lid is closed on the containment body.

[0076] In this way, the manoeuvring portion is accessible by a user when the lid is closed on the containment body so as to operate on the interference zones that are inaccessible when the lid is closed on the containment body.

[0077] Preferably, each appendage extends from a free edge of a respective containment side wall.

[0078] Preferably, each shoulder is obtained from a turned-up portion of a lid side wall.

[0079] Preferably, the interference zones between the first portions and the second portions of the retention device are defined by the mutual engagement between said abutment edge of each appendage and the respective shoulder.

[0080] Preferably, said retention device comprises third portions and fourth portions placed on a containment side wall and a lid side wall, respectively.

[0081] Preferably, said third portions and fourth portions of the retention device are commutable between a mutually engaged condition in which they oppose the opening of the lid and a mutually disengaged condition in which they allow opening the lid.

[0082] The third portions and the fourth portions of the retention device have the function of removably holding the lid to the containment body in the closed position.

[0083] The third portions and the fourth portions of the retention device do not need to be handled directly by a user to open the lid, but are of the "snap-on" type capable of engaging each other to hold the lid on the containment body and of releasing each other once an opening force is applied to the lid.

[0084] The third portions and the fourth portions of the retention device make it possible to avoid accidental movements of the lid with respect to the containment body when the lid is closed, thus assisting the rib in preventing the first portions and the second portions of the retention device from being able to be accidentally commuted into the disengaged condition.

[0085] Preferably, said third retention device portions operate on a different containment side wall than the containment side walls on which the first portions of the retention device operate.

[0086] Preferably, said fourth portions of the retention device are placed on a different lid side wall than the lid side walls on which the second portions of the retention device are obtained.

[0087] This allows maximising the effect of the third and fourth portions of the retention device, as they are essentially insensitive to accidental shocks or forces applied to the containment walls or lid side walls on which the first portions and the second portions of the retention device act.

[0088] Preferably, said third portions of the retention device operate on a containment side wall opposite the containment side wall hinged to the lid.

[0089] Preferably, each third portion of the retention device comprises a flap projecting externally to the containment space from a containment side wall.

[0090] Preferably, each fourth portion of the retention device comprises a shoulder on a lid side wall on the side facing the containment space.

[0091] Preferably, said flap engages a respective shoulder in an inaccessible interference zone when the lid is closed on the containment body.

[0092] In this way, a user cannot directly access said interference zones and release, even accidentally, the flap from the shoulder.

[0093] Preferably, each flap comprises an abutment edge configured to engage said shoulder.

[0094] Preferably, at least the containment body is internally coated with an impermeable or semi-impermeable film preferably made of thermoplastic material.

[0095] In this way, any moisture present in the environment in which the box is stored does not penetrate, or slightly penetrates, inside the containment body preserving the articles contained therein.

[0096] In addition, any accidental spillage of liquids contained in the articles placed inside the containment body will not escape from the box.

[0097] Preferably, said film is applied to the containment walls and to the base wall on the side facing the containment space.

[0098] Preferably, said film is also applied to the rib on the side facing the containment space.

[0099] Preferably, the lid is also internally coated with an impermeable or semi-impermeable film preferably made of plastic material.

[0100] Preferably, said film is applied at least to the top wall of the lid on the side facing the containment space.

[0101] Preferably, said box is entirely made of paper material starting from a flat blank.

[0102] Further characteristics and advantages of the present invention will become clearer from the following detailed description of a preferred embodiment thereof, with reference to the appended drawings and provided by way of indicative and non-limiting example, in which:

- Figure 1 is a perspective view of a box made of paper material with a lid in accordance with the present invention in a closed lid condition;
- Figure 2 is a perspective view of the box of Figure 1 in an open lid condition;
- Figure 2A is a perspective view of the box of Figure 2 with a portion removed;
- Figure 3 is a sectional view according to plane III-III of some details of the box of Figure 1;

- Figure 4 is a sectional view according to plane IV-IV of some details of the box of Figure 1;
- Figure 5 is a sectional view according to plane V-V of some details of the box of Figure 1; and
- Figure 5A is a sectional view according to plane V-V of the box of Figure 1;
- Figure 6 depicts a blank for making a box made of paper material with a lid in accordance with the present invention.

[0103] A box made of paper material with a lid in accordance with the present invention has been indicated as a whole with the reference number 10.

[0104] The box 10 comprises a containment body 11 and a lid 12 both made of paper material and preferably obtained from a single flat blank.

[0105] The containment wall 11 is a box-shaped element comprising, in the illustrated embodiment, four containment side walls 13 and a base wall 14.

[0106] The containment side walls 13 extend from the base wall 14 up to an access opening 16 (illustrated in Figure 2) to define a containment space 17 of the containment body 11 (illustrated in Figure 2A). The access opening 16 is delimited by free edges 13d of the containment side walls 13.

[0107] The containment space 17 is accessible through the access opening 16 and is configured to contain preferably loose articles such as pods (detergent capsules).

[0108] Among the four containment side walls 13 it is possible to identify a front containment side wall 13a, a rear containment side wall 13b, opposite the front containment side wall 13a, and two transverse containment side walls 13c, which extend between the front 13a and the rear 13b containment side wall.

[0109] All containment side walls 13 have the same height, i.e. they extend equally from the base wall 14 to the access opening 16.

[0110] The front containment side wall 13a and the rear containment side wall 13b have, in the embodiment illustrated in the accompanying figures, the same width, i.e. they extend equally between the transverse containment side walls 13c.

[0111] The transverse containment side walls 13c have, in the embodiment illustrated in the accompanying figures, the same width, i.e. they extend equally between the front containment side wall 13a and the rear containment side wall 13b.

[0112] The width of the front containment side wall 13a is greater than the width of the transverse containment side walls 13c.

[0113] In other embodiments not illustrated, the number of containment side walls 11 may be greater than four, for example eight.

[0114] The lid 12 comprises a top wall 18 and three lid

side walls 19.

[0115] Among the three lid side walls 19 it is possible to identify a front lid side wall 19a and two transverse lid side walls 19b, which extend transversely to the front lid side wall 19a.

[0116] All lid side walls 19 have the same height, i.e. they extend equally away from the top wall 18.

[0117] The transverse lid side wall 19b have, in the embodiment illustrated in the accompanying figures, the same width, i.e. they extend equally from the front lid side wall 19a.

[0118] The width of the front lid side wall 19a is greater than the width of the transverse lid side wall 19b.

[0119] In other embodiments not illustrated, the number of containment side walls 11 may be greater than three, for example seven.

[0120] In any embodiment of the present invention, the number of containment side walls 13 is equal to the number of lid side walls 19 increased by one.

[0121] The corners that are realized between the base wall 14 and the containment side walls 13 are obtained from respective folding lines of a single sheet or blank, and the corners that are realized between the containment side walls 13 are surmounted by strips 20 which extend from two opposite containment side walls 13.

[0122] This configuration allows the elimination of junction lines between the containment side walls 13 and between the containment side walls 13 and the base wall 14.

[0123] In other words, the corners of the containment body 11 that are realized between the containment side walls 13 and between the containment side walls 13 and the base wall 14 are all realized by folds in the paper material that realizes the containment body or are surmounted by said strips 20.

[0124] In the embodiment illustrated in the accompanying figures, the front containment side wall 13a and the rear containment side wall 13b are surmounted, on the opposite side with respect to the containment space 17, by said strips 20 that extend from the transverse containment side walls 13c. Such flaps 20 are joined, for example by gluing, to the front containment side wall 13a and to the rear containment side wall 13b by surmounting the corners between the transverse containment side walls 13c, the rear containment side wall 13b and the front containment side wall 13a.

[0125] The lid 12 is hinged to the containment body 11 so that it can be opened and closed by folding over the access opening 16.

[0126] The lid 12 is hinged to a containment side wall 13 of the containment body 11.

[0127] Preferably, the top wall 18 of the lid 12 is hinged to a containment side wall 13 of the containment body 11. In the illustrated example, the top wall 18 of the lid 12 is hinged to the rear containment side wall 13b.

[0128] When the lid 12 is closed, the lid side walls 19 surmount respective containment side walls 13 of the containment body 11.

[0129] A hinge line 21 between the lid 12 and the containment body 11 extends over the entire width of the containment side wall 13 to which the lid 12 is hinged 11.

[0130] Said hinge line 21 is a folding line of a same sheet or panel that realizes both the containment side wall 13 to which the lid 12 is hinged and the top wall 18 of the lid 12.

[0131] The box 10 comprises a retention device 22 configured to hold the lid 12 in the closed position on the containment body 11.

[0132] The retention device 22 comprises first portions 23 and second portions 24 which are commutable between a stable mutually engaged condition in which they oppose the opening of the lid 12 and an unstable mutually disengaged condition in which they allow the opening of the lid 12.

[0133] In the preferred embodiment of the invention, the first portions 23 are two in number as two in number are the second portions 24. Each first portion 23 corresponds to a second portion 24.

[0134] Each first portion 23 comprises an appendage 25 placed outside the containment space 17 in the vicinity of the access opening 16. Each appendage 25 comprises an abutment edge 26 and a manoeuvring portion 27.

[0135] As illustrated in Figure 2, the manoeuvring portion 27 is closer to the base wall 14 with respect to the abutment edge 26. In particular, when the lid 12 is closed on the containment body 11, the manoeuvring portion 27 is not covered by the lid 12 while the abutment edge 26 is surmounted by the lid 12, preferably it is surmounted by a lid side wall 19.

[0136] The two appendages 25 are hinged to the containment body 11 at two respective opposite containment side walls 13, in the illustrated example a first appendage 25 is hinged at a first transverse containment side wall 13c and a second appendage 25 is hinged at a second transverse containment side wall 13c.

[0137] In particular, the two appendages 25 are hinged to the containment body 11 at the free edges 13d of the respective containment side walls 13 opposite the base wall 14. Each appendage 25 is free to rotate about a hinge axis A1 (Figure 2) perpendicular to the hinge line 21 between lid 12 and containment body 11. The hinge axes A1 are parallel to each other and coplanar and preferably coplanar with the hinge line 21.

[0138] Each second portion 24 comprises a shoulder 28 placed inside the lid 12 and facing the containment body 11 when the lid is closed.

[0139] The two shoulders 28 are placed on opposite lid side walls 19, in the illustrated example a first shoulder 28 is placed on a first transverse lid side wall 19b and a second shoulder 28 is placed on a second transverse lid side wall 19b.

[0140] The shoulders 28 are obtained from flaps or panels that are folded and preferably glued to the lid side wall 19.

[0141] When the lid 12 is closed on the containment body 11, the abutment edges 26 of the appendages 25

abut on the shoulders 28 in respective interference zones Z1, as illustrated in Figure 4. In this condition, which realizes the stable mutual engagement condition of the first 23 and second portions 25 of the retention device 22, the interference between the shoulders 28 and the abutment edges 26 prevents a free rotation of the lid 12 holding it on the containment body 11.

[0142] In order to achieve this condition, when the lid 12 is rotated closed on the containment body 11, the appendages 25 are forced to rotate about the hinge axes A1 arranging themselves parallel to the respective containment side walls 13. The rotation of the appendages 25 is actuated by the lid side wall 19 which intercept the appendages 25 causing them to rotate.

[0143] While continuing to rotate the lid 12 into the closed position, the appendages 25 remain interposed between the respective containment side walls 13 and the lid side walls 19, until the shoulders 28 go beyond the abutment edges 26 of the appendages 25 thus coming into abutment thereon (as shown in Figure 2A).

[0144] When the lid 12 is closed, by exerting a manoeuvring force on each manoeuvring portion 27 of the appendages 25 directed towards the containment space 17, the yieldability of the paper material with which the box 10 is made allows a further (albeit minimal) rotation of the appendages 25 towards the containment space 17. This rotation of the appendages 25 releases the abutment edges 26 from the respective shoulders 28.

[0145] It should be noted that this further rotation of the appendages 25 can only be actuated when the aforementioned manoeuvring force is applied to each manoeuvring portion 27, since upon cessation of the manoeuvring force the elastic return of the appendages 25 results in a rotation of the appendages in the opposite direction, bringing the abutment edges 26 back into abutment with the respective shoulders 28. This results in an instability of the release action between the abutment edges 26 and the relative shoulders 28 that realizes the aforementioned unstable condition of mutual disengagement of the first portions 23 and the second portions 24 of the retention device 22.

[0146] Therefore, in order to be able to open the lid 12, it is necessary to exert a manoeuvring force simultaneously on the manoeuvring portions 27 of both appendages 25 and to continue to exert such a manoeuvring force while the lid 12 is being rotated with respect to the containment body 11. This allows making the opening of the lid 12 difficult for a child or an infant.

[0147] The retention device 22 further comprises third portions 29 and fourth portions 30 placed on a containment side wall 13 and on a lid side wall 19, respectively.

[0148] The third portions 29 and the fourth portions 30 have the function of preventing movements of the lid 12 with respect to the containment body 11 when the lid 12 is closed, so as to prevent the first portions 23 and the second portions 24 from being able to accidentally disengage from each other. The third portions 29 and the fourth portions 30 are commutable between a mutually

engaged condition in which they oppose the opening of the lid 12 and a mutually disengaged condition in which they allow opening the lid 12.

[0149] In the preferred embodiment of the invention, the third portions 29 are two in number as two in number are the fourth portions 30. Each third portion 29 corresponds to a fourth portion 30.

[0150] The third portions 29 comprise respective flaps 31 projecting externally to the containment space 17. Each flap 31 comprises an abutment edge 33.

[0151] The two flaps 31 are hinged to the containment body 11 at a same containment side wall 13 not affected by the first portions 23 of the retention device 22. The two flaps 31 are spaced apart from each other. In the illustrated example, the two flaps are hinged at the front containment side wall 13a.

[0152] In particular, the two flaps 31 are hinged to the containment body 11 at a free edge 13d of the containment side wall 13 opposite the base wall 14. Each flap 13 is free to rotate about an axis of rotation A2 (Figure 2) parallel to the hinge line 21 between lid 12 and containment body 11. The axes of rotation A2 are parallel to each other and coincident and preferably coplanar with the hinge line 21.

[0153] Each fourth portion 30 comprises a shoulder 32 placed inside the lid 12 and facing the containment body 11 when the lid is closed.

[0154] The two shoulders 32 are placed on a same lid side wall 19 not affected by the second portions 24 of the retention device 22. In the illustrated example, the two shoulders 32 are placed on the frontal lid side wall 19a.

[0155] The shoulders 32 are obtained from flaps or panels that are folded and preferably glued to the lid side wall 19.

[0156] When the lid 12 is closed on the containment body 11, the abutment edges 33 of the flaps 31 abut on the shoulders 32 in respective interference zones Z2, as illustrated in Figure 5. In this condition, which realizes the mutual engagement condition of the third 29 and fourth portions 30 of the retention device 22, the interference between the shoulders 32 and the abutment edges 33 prevents a free rotation of the lid 12 holding it on the containment body 11.

[0157] In order to achieve this condition, when the lid 12 is rotated closed on the containment body 11, the flaps 31 are forced to rotate about the hinge axes A2 arranging themselves parallel to the respective containment side walls 13. The rotation of the flaps 31 is actuated by the side lid wall 19 (in the figures by the frontal lid side wall 19a) which intercepts the flaps 31 causing them to rotate.

[0158] While continuing to rotate the lid 12 into the closed position, the flaps 31 remain interposed between the containment side wall 13 and the lid side wall 19, until the shoulders 32 go beyond the abutment edges 33 of the flaps 31 thus coming into abutment thereon (as shown in Figure 5).

[0159] When the lid 12 is closed, by exerting an opening force on the lid 12, the yieldability of the paper material

with which the box 10 is made allows the flaps 31 to deform, releasing the abutment edges 33 from the respective shoulders 28.

[0160] For this purpose, the size of the flaps 31 measured in the direction perpendicular to the axes of rotation A2 is smaller than the size of the appendages 25 measured in the same direction.

[0161] The distance between the abutment edge 33 of a flap 31 and the respective axis of rotation A2 is less than the distance between the abutment edge 26 of an appendage and the respective hinge axis A1.

[0162] Preferably, the distance between the abutment edge 33 of a flap 31 and the respective axis of rotation A2 is about half the distance between the abutment edge 26 of an appendage and the respective hinge axis A1.

[0163] The box 10 further comprises a rib 40 placed inside the containment space 11 and stably connected to the side containment walls 13.

[0164] The rib 40 has two much larger development dimensions than the third direction of development. In other words, the rib 40 is shaped like a panel, a plate or a foil.

[0165] The rib 40 is parallel to the base wall 14 and is interposed between the base wall 14 and the free edges 13d of the containment side walls 13.

[0166] As shown in Figure 5A, the interference zones Z1 of the first portions 23 and the second portions 24 of the retention device 22 are provided at a first distance D1 from the free edges 13d of the containment walls 13.

[0167] The rib 40 is provided at a second distance D2 from the free edges 13d of the containment walls 13.

[0168] The base wall 14 is provided at a third distance D3 from the free edges 13d of the containment walls 13.

[0169] The first distance D1, the second distance D2 and the third distance D3 are measured in a direction perpendicular to the base wall 14.

[0170] The first distance D1 and the second distance D2 are smaller than the third distance D3. The second distance D2 is smaller than the first distance D1. In other words, the rib 40 is placed closer to the free edges 13d of the containment walls 13 with respect to the base wall 14. The rib 40 is closer to the free edges 13d of the containment walls 13 with respect to the interference zones Z1.

[0171] The second distance D2 is between zero and one half of the third distance D3, preferably between zero and one third of the third distance D3, more preferably between zero and one fifth of the third distance D3.

[0172] The first distance D1 is between one twentieth of the third distance D3 and one half of the third distance D3, preferably between one twentieth of the third distance D3 and one third of the third distance D3, more preferably between one fifteenth and one fifth of the third distance D3.

[0173] The function of the rib 40 is to stiffen the containment body 11 at the interference zones Z1 of the first portions 23 and the second portions 24 of the retention device 22, so as to prevent the first portions 23 and the

second portions 24 from being able to accidentally disengage due to an impact or a manipulation of the box 10.

[0174] The rib 40 is connected, e.g. by gluing, to the containment side walls 13. For this purpose, there are provided edgings 41 (Figure 3), preferably integral with the rib 40, folded substantially at right angles with respect to the rib 40 and arranged parallel to the containment side walls 13. These edgings are glued to the containment side walls 13 in such a way as to stably constrain the rib inside the containment space 16.

[0175] The rib 40 comprises a frame 42 connected to all the containment side walls 13, preferably through edgings 41, which is immovable with respect to the containment side walls 13.

[0176] The rib 40 further comprises a central door 43 (Figure 2) which can be removed either totally (as illustrated in Figure 2A) or only partially to create a passage opening and allow access to the containment space 17.

[0177] The central door 43 is placed centrally in the rib 40 and is completely surrounded by the frame 42. The central door 43 is connected to the frame by continuous separation lines 44 which facilitate the removal thereof from the frame 42. The central door 43 is provided with a tab 45 to facilitate its gripping during the separation from the frame 42.

[0178] The size of the central door 43 is smaller than the size of the access opening 17 as it is completely surrounded by the frame 42.

[0179] The box 10 is obtained starting from a single flat blank 100 made of paper material.

[0180] The blank 100 (illustrated in Figure 6) comprises a plurality of panels separated from each other by folding lines.

[0181] A first panel 101 defines the base wall 14 of the containment body 11. A second panel 102 defines a containment side wall 13 which, in the illustrated example, is the rear containment side wall 13b. A third panel 103 defines a containment side wall 13 which, in the illustrated example, is the front containment side wall 13a. The first panel 101 is interposed between the second panel 102 and the third panel 103.

[0182] A fourth panel 104 defines the rib 40. The fourth panel 104 is placed side by side to the third panel 103 on the opposite side with respect to the first panel 101. The fourth panel 104 comprises the central door 43 and the frame 42 connected to each other by the separation line 44. The fourth panel 104 further comprises four flaps 104a defining the edgings 41 that constrain the rib 40 to the containment side walls 13. The four flaps 104a are placed on the outer periphery of the fourth panel 104 with internally the frame 42 which in turn surrounds the central door 43.

[0183] The blank 100 further comprises a fifth panel 105 that realizes a containment side wall 13 which, in the illustrated example, is a transverse containment side wall 13c. A sixth panel 106 realizes a containment side wall 13 which, in the illustrated example, is a transverse containment side wall 13c.

[0184] The fifth panel 105 comprises two side portions 105a that are opposed to one another between which a central portion 105b is arranged. The two side portions 105a realize two respective strips 20 that surmount the front containment side wall 13a and the rear containment side wall 13b. The central portion 105b defines a transverse containment side wall 13c.

[0185] The sixth panel 106 comprises two side portions 106a that are opposed to one another between which a central portion 106b is arranged. The two side portions 106a realize two respective strips 20 that surmount the front containment side wall 13a and the rear containment side wall 13b. The central portion 106b defines a transverse containment side wall 13c.

[0186] The fifth panel 105 is adjacent to the first panel 101, second panel 102 and third panel 103. The sixth panel 106 is adjacent to the first panel 101, second panel 102 and third panel 103 on the opposite side with respect to the fifth panel 105.

[0187] The fifth panel 105 comprises a first appendage 105c that defines one of the two first portions 23 of the retention device 22. The first appendage 105c is placed at the central portion 105b of the fifth panel 105.

[0188] The sixth panel 106 comprises a first appendage 106c that defines the other first portion 23 of the retention device 22. The first appendage 106c is placed at the central portion 106b of the sixth panel 106.

[0189] The fifth panel 105 further comprises a second appendage 105d that defines one of the two third portions 29 of the retention device 22. The second appendage 105d is placed at one of the side portions 105a of the fifth panel 105.

[0190] The sixth panel 106 further comprises a second appendage 106d that defines the other of the two third portions 29 of the retention device 22. The second appendage 106d is placed at one of the side portions 106a of the sixth panel 106.

[0191] The blank 100 further comprises a seventh panel 107 which realizes the lid 12. The seventh panel 107 is adjacent to the second panel 102 on the opposite side with respect to the first panel 101.

[0192] The seventh panel 107 comprises a main portion 107a which realizes the top wall 18 of the lid 12 and two side portions 107b that are opposed to one another and realize two lid containment walls 19, in the illustrated example the transverse lid containment walls 19b. The main portion 107a is placed between the two side portions 107b. An outer portion 107c of the seventh panel 107 realizes a lid containment wall 19, in the illustrated example the frontal lid containment wall 19a.

[0193] The seventh panel further comprises two appendages 107d that realizes the second portions 24 of the retention device 22. The two appendages 107c are configured to be folded and glued to the two side portions 107b. A turned-up portion 107e which realizes the fourth portions 30 of the retention device 22 is interposed between the two appendages 107c. The turned-up portion 107e is configured to be folded and glued to the outer

portion 107c.

[0194] The blank 100 is made entirely of paper material and is in one piece, i.e. it consists of a single sheet. The blank 100 may be coated, on one face only or on both faces, with an impermeable or semi-impermeable film, so as to make the box 12 and the lid 12 impermeable or semi-impermeable.

[0195] Preferably, the film is made of a thermo-adhesive plastic material in order to be stably applied on the blank 100.

[0196] Obviously, a person skilled in the art, in order to satisfy specific and contingent needs, can make numerous modifications and variations to the invention described above while remaining within the scope of protection defined by the following claims.

Claims

1. A box (10) made of paper material with a lid comprising:

a containment body (11) having a base wall (14) of polygonal shape and a plurality of containment side walls (13) extending substantially parallel to each other from the base wall (14) up to an access opening (16) for the containment body (11) and defining, in combination with the base wall (14), a containment space (17);

a lid (12) comprising a top wall (18) and a plurality of lid side walls (19); wherein first portions (23) of a retention device (22) are provided at two non-adjacent containment side walls (13) and wherein two non-adjacent lid side walls (19) comprise second portions (24) of said retention device (22);

wherein when the lid (12) is closed on the containment body (11), each first portion (23) of the retention device (22) and the respective second portion (24) of the retention device (22) are commutable between a stable mutually engaged condition in which they oppose the opening of the lid (12) and an unstable mutually disengaged condition in which they allow the opening of the lid (12);

wherein the stable mutual engagement condition is obtained by interference between each first portion (23) of the retention device (22) and the respective second portion (24) of the retention device (22);

said containment body (11) further comprising a rib (40) placed inside said containment space (17), connected to said containment side walls (13) and placed between the base wall (14) and the access opening (16).

2. A box (10) according to claim 1, wherein said lid (12) is hinged to one of said containment side walls (13)

interposed between the containment side walls (13) on which the first portions (23) of the retention device (22) are active.

3. A box (10) according to claim 1 or 2, wherein said rib (40) is placed closer to the access opening (16) with respect to the base wall (14).

4. A box (10) according to any one of the preceding claims, wherein said rib (40) comprises a frame (42) connected to said containment side walls (13) and a central door (43) at least partially separable from said frame (42).

5. A box (10) according to claim 4, wherein said central door (43) is connected to said frame (42) through predefined separation lines (44) to achieve a controlled and predefined separation of the central door (43) from the frame (42).

6. A box (10) according to any one of the preceding claims, wherein said central door (43) is smaller than said access opening (16).

7. A box (10) according to any one of the preceding claims, wherein each first portion (23) of the retention device (22) and the respective second portion (24) of the retention device (22) interfere with each other to define the stable mutual engagement condition at respective interference zones (Z1) provided at a first distance (D1) from said access opening (16) and interposed between the base wall (14) and the access opening (17); said rib (40) being provided at a second distance (D2) from said access opening (16), wherein said second distance (D2) is less than three times said first distance (D1), preferably less than twice said first distance (D1), even more preferably less than said first distance (D1).

8. A box (10) according to any one of the preceding claims, wherein each first portion (23) of the retention device (22) comprises an appendage (25) projecting externally from the containment space (17) at a containment side wall (13) and wherein each second portion (24) of the retention device (22) comprises a shoulder (28) on a lid side wall (19) on the side facing the containment space (17).

9. A box (10) according to claim 8, wherein each appendage (25) extends from a free edge (13d) of a respective containment side wall (13) and wherein each shoulder (28) is obtained from a turned-up portion of a lid side wall (19).

10. A box (10) according to claim 8 or 9, wherein each appendage (25) comprises an abutment edge (26) configured to engage said shoulder (28) and a manoeuvring portion (27) for a user configured to dis-

engage the abutment edge (26) from said shoulder (28).

11. A box (10) according to any one of the preceding claims, wherein said retention device (22) comprises third portions (29) and fourth portions (30) operating on a containment side wall (13) and a lid side wall (19), respectively; said third portions (29) and said fourth portions (30) of the retention device (22) being commutable between a mutually engaged condition in which they oppose the opening of the lid (12) and a mutually disengaged condition in which they allow opening the lid (12). 5 10
12. A box (10) according to claim 11, wherein each third portion (29) of the retention device (22) comprises a flap (31) projecting externally to the containment space (17) from a containment side wall (13) and wherein each fourth portion (30) of the retention device (22) comprises a shoulder (32) on a lid side wall (19) on the side facing the containment space (17). 15 20
13. A box (10) according to any one of the preceding claims, wherein said box is made entirely of paper material starting from a flat blank (100). 25
14. A flat blank (100) for making a box with lid comprising:
 - a first panel (101), a second panel (102) and a third panel (103) adjacent to the first panel (101) and placed on opposite sides with respect to the first panel (101); a fourth panel (104) adjacent to the third panel (103) on the opposite side with respect to the first panel (101); 30 35
 - a fifth panel (105) and a sixth panel (106) adjacent to the first panel (101) and placed on opposite sides with respect to the first panel (101); wherein the first panel (101) realizes a base wall (14) of a containment body (11), the second panel (102), the third panel (103), the fifth panel (105) and the sixth panel (106) realize containment side walls (13) of the containment body (11) and wherein the fourth panel (104) defines a rib (40) placed inside the containment body (11); 40 45
 - wherein the fifth panel (105) and the sixth panel (106) comprise respective first appendages (105a, 106a) defining first portions (23) of a retention device (22) configured to cooperate with second portions (24) of the retention device (22) placed on a lid (12) to hold said lid (12) closed on the containment body (11). 50
15. A blank (100) according to claim 14, comprising a seventh panel (107) adjacent to the second panel (102) on the opposite side with respect to the first panel (101), wherein the seventh panel (107) realiz-

es said lid (12) and wherein the seventh panel (107) comprises appendages (107d) defining said second portions (24) of the retention device (22).

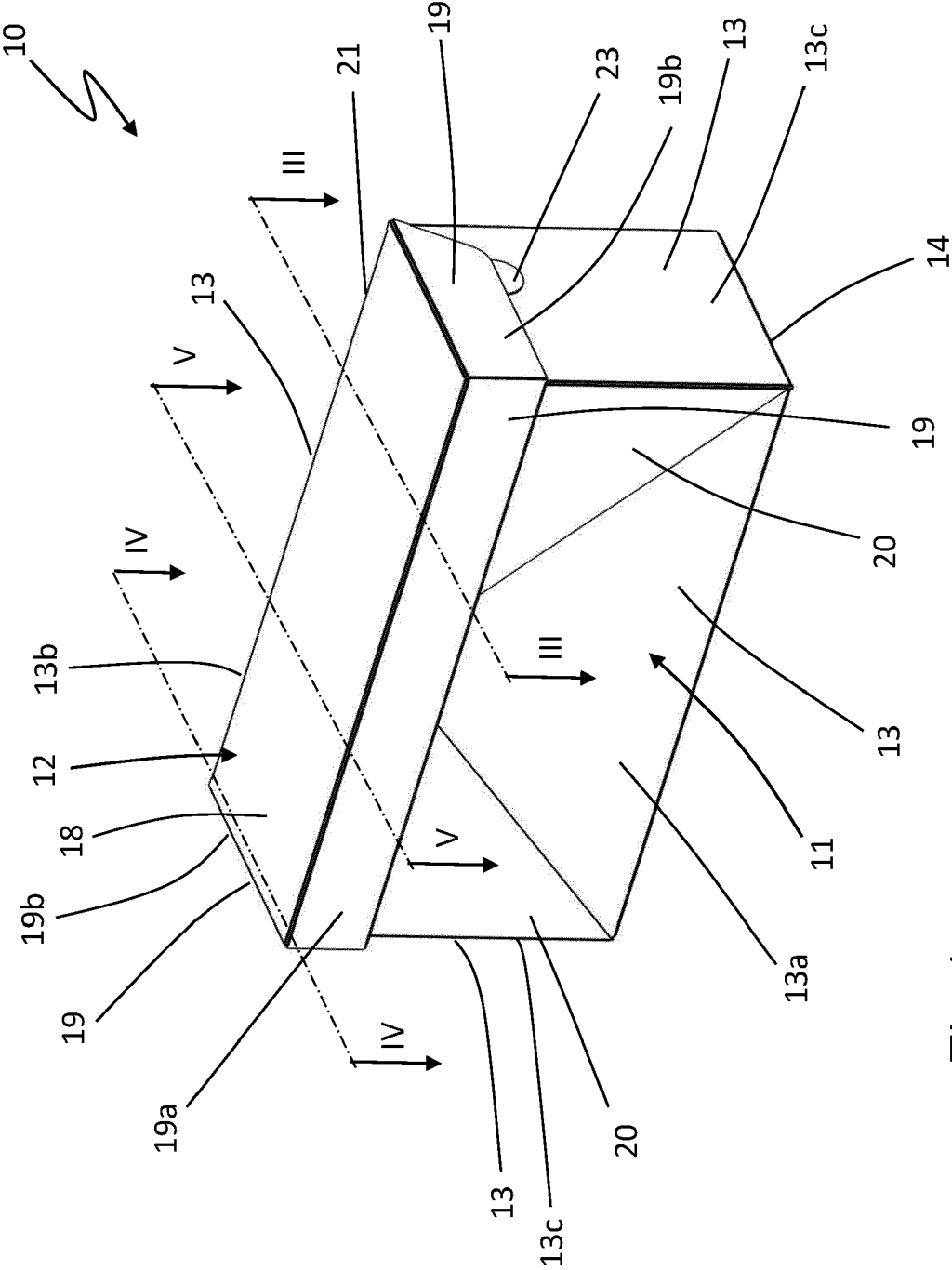


Fig 1

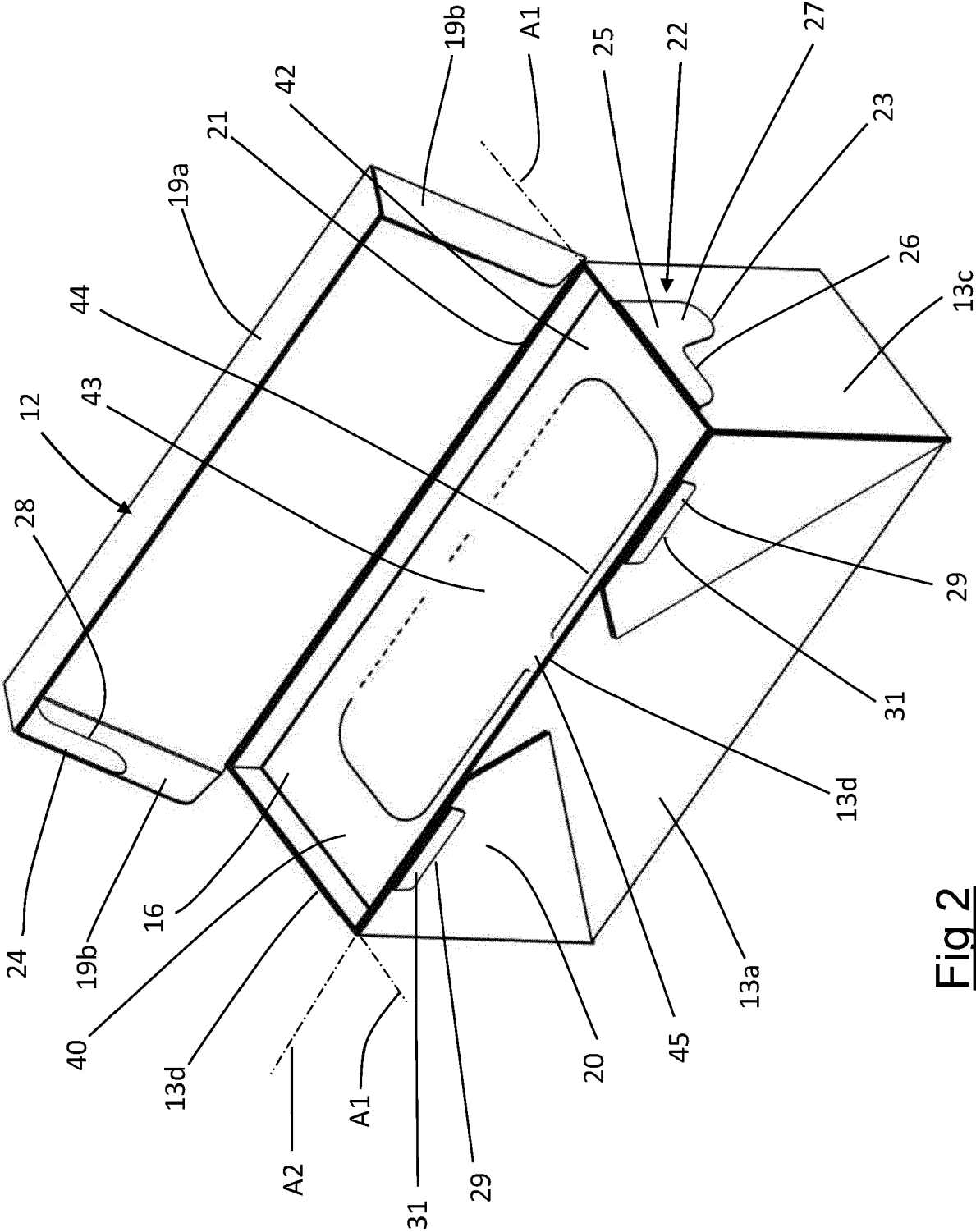


Fig 2

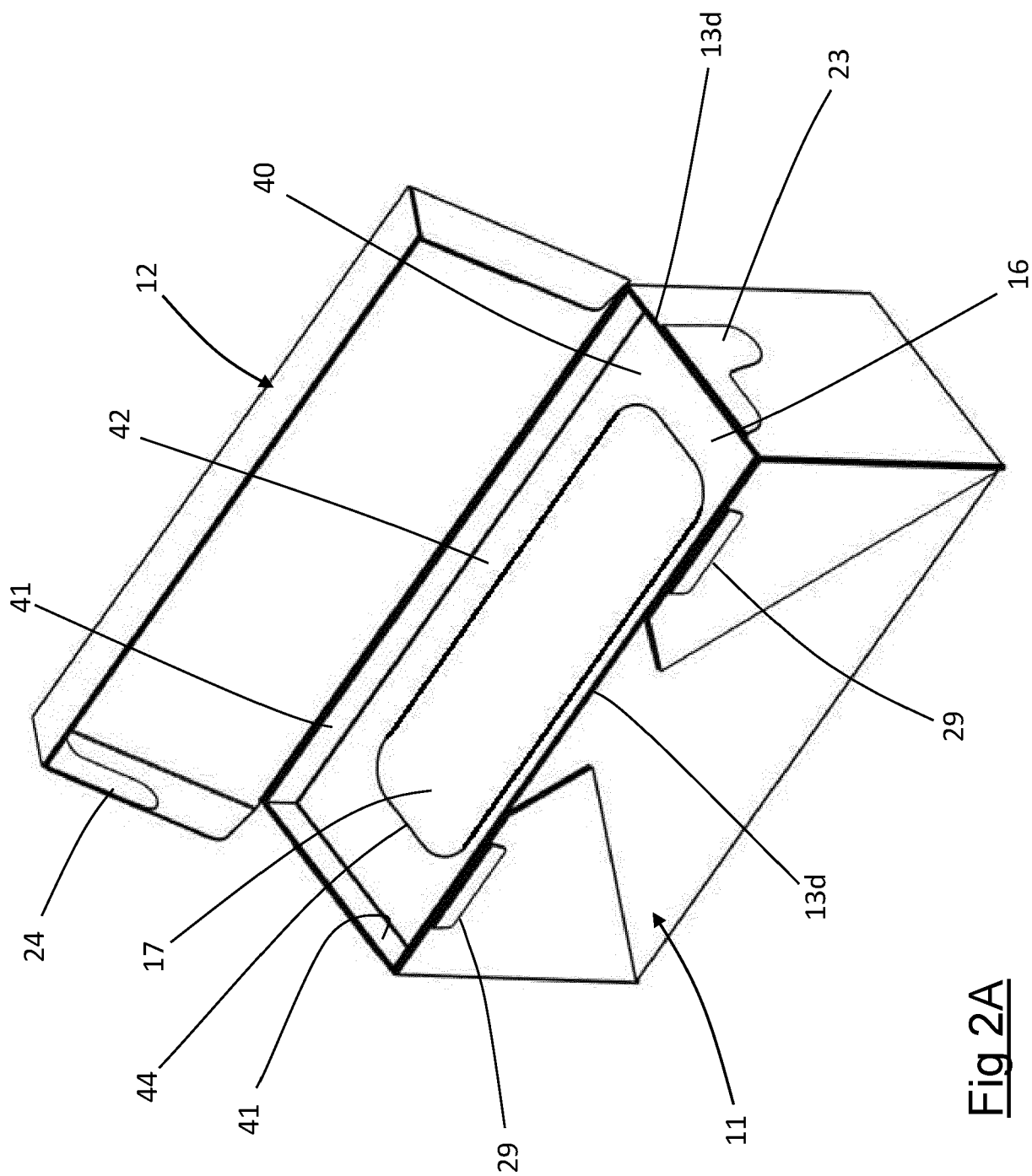


Fig 2A

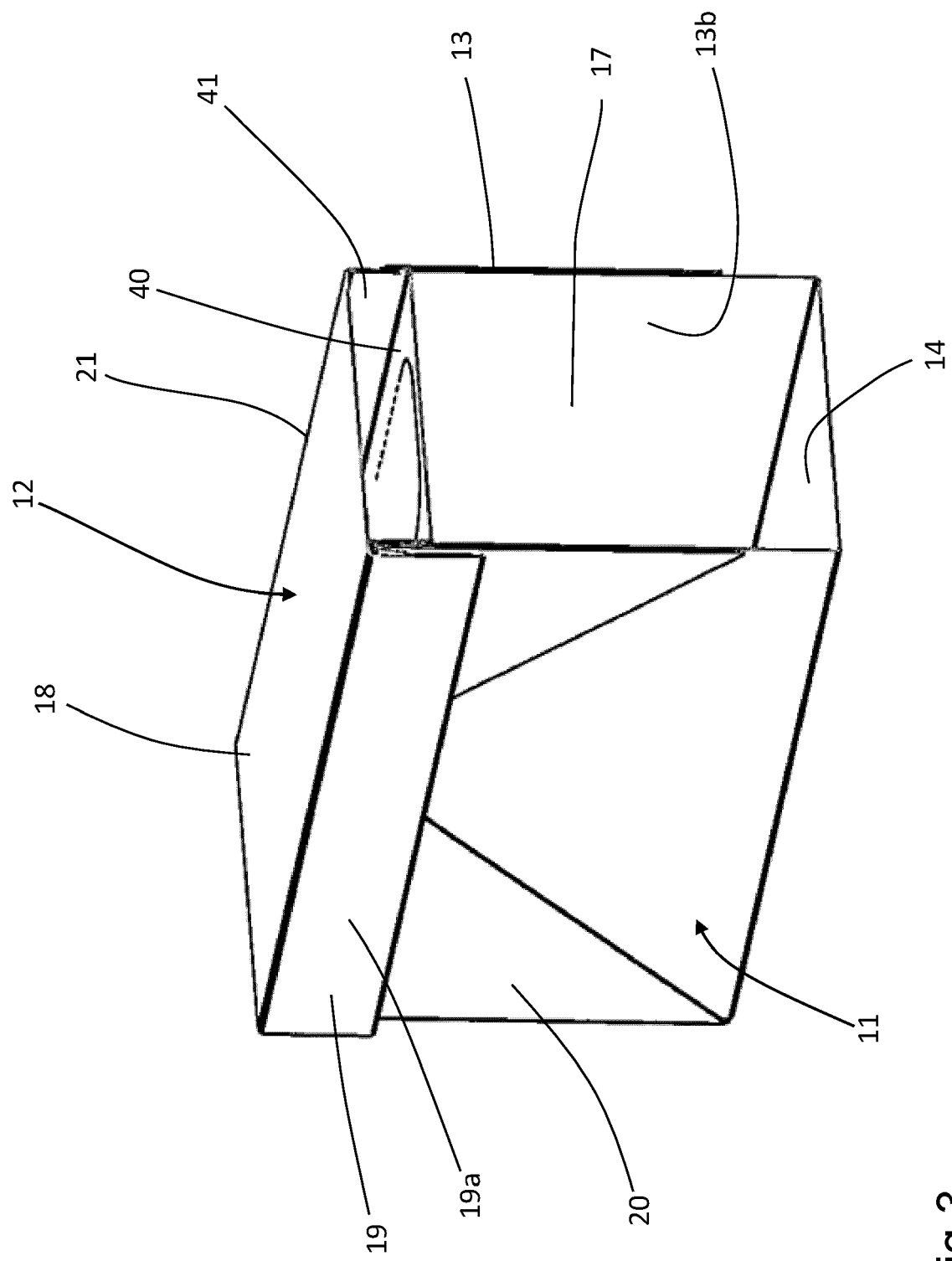
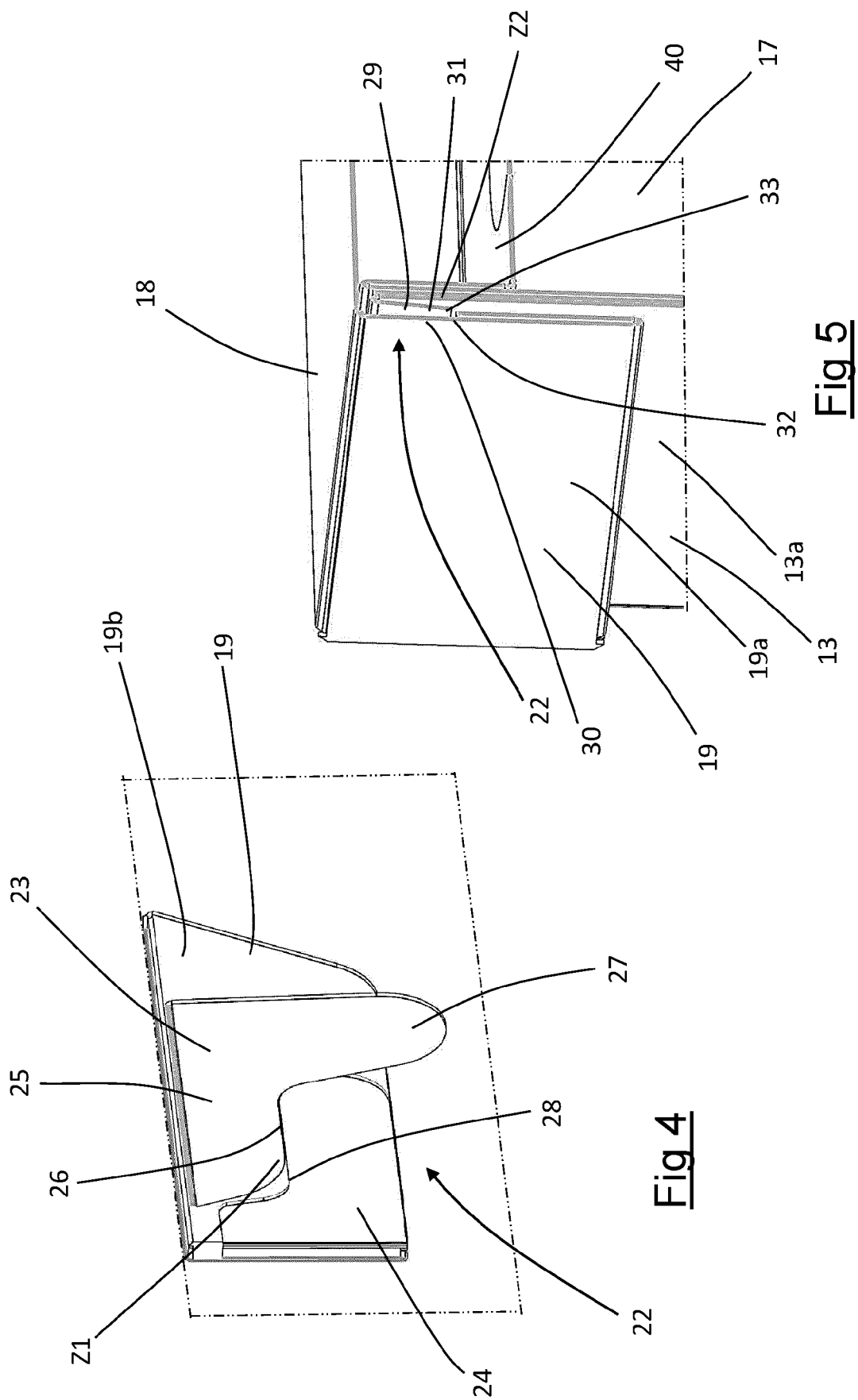
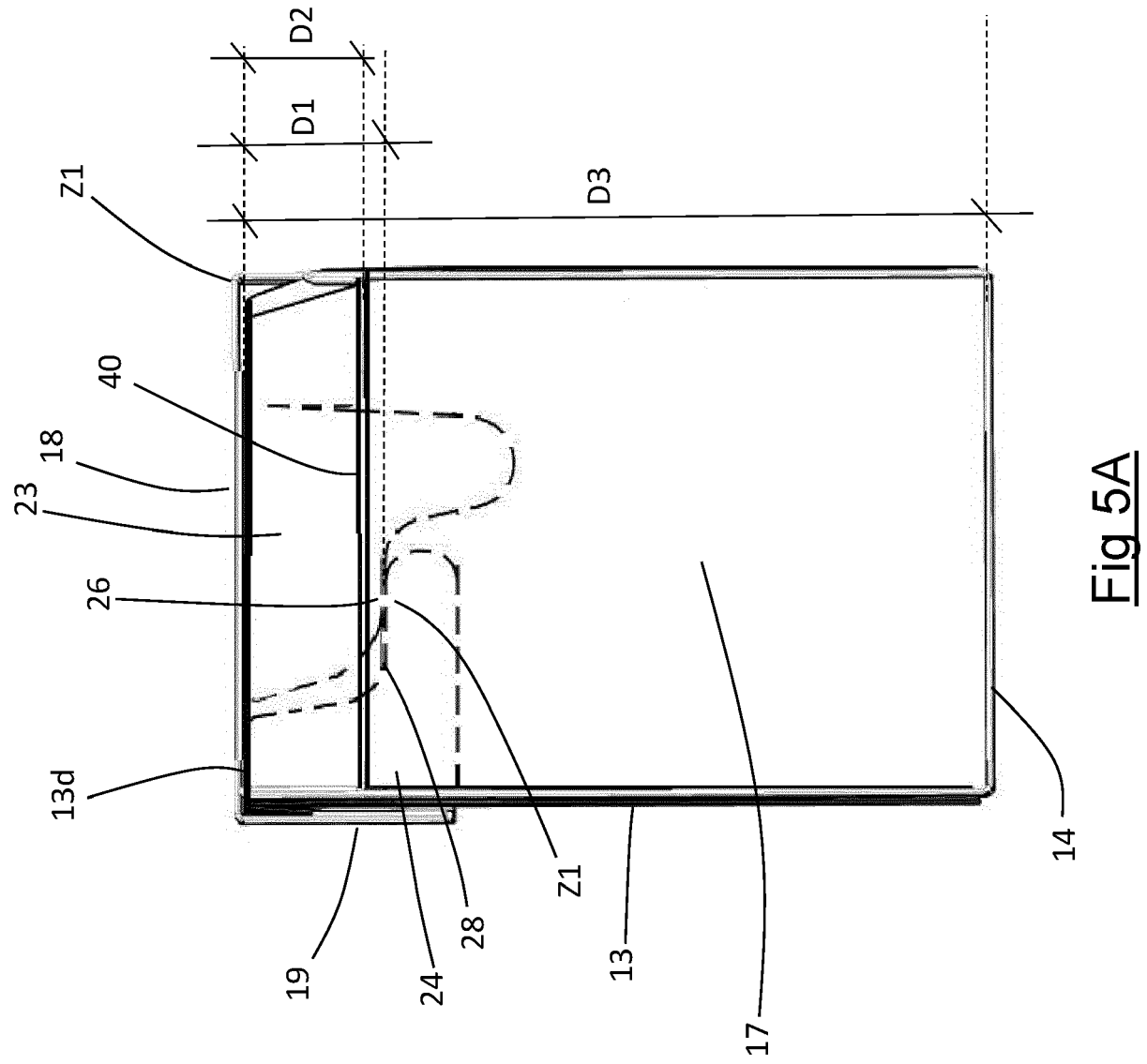


Fig 3





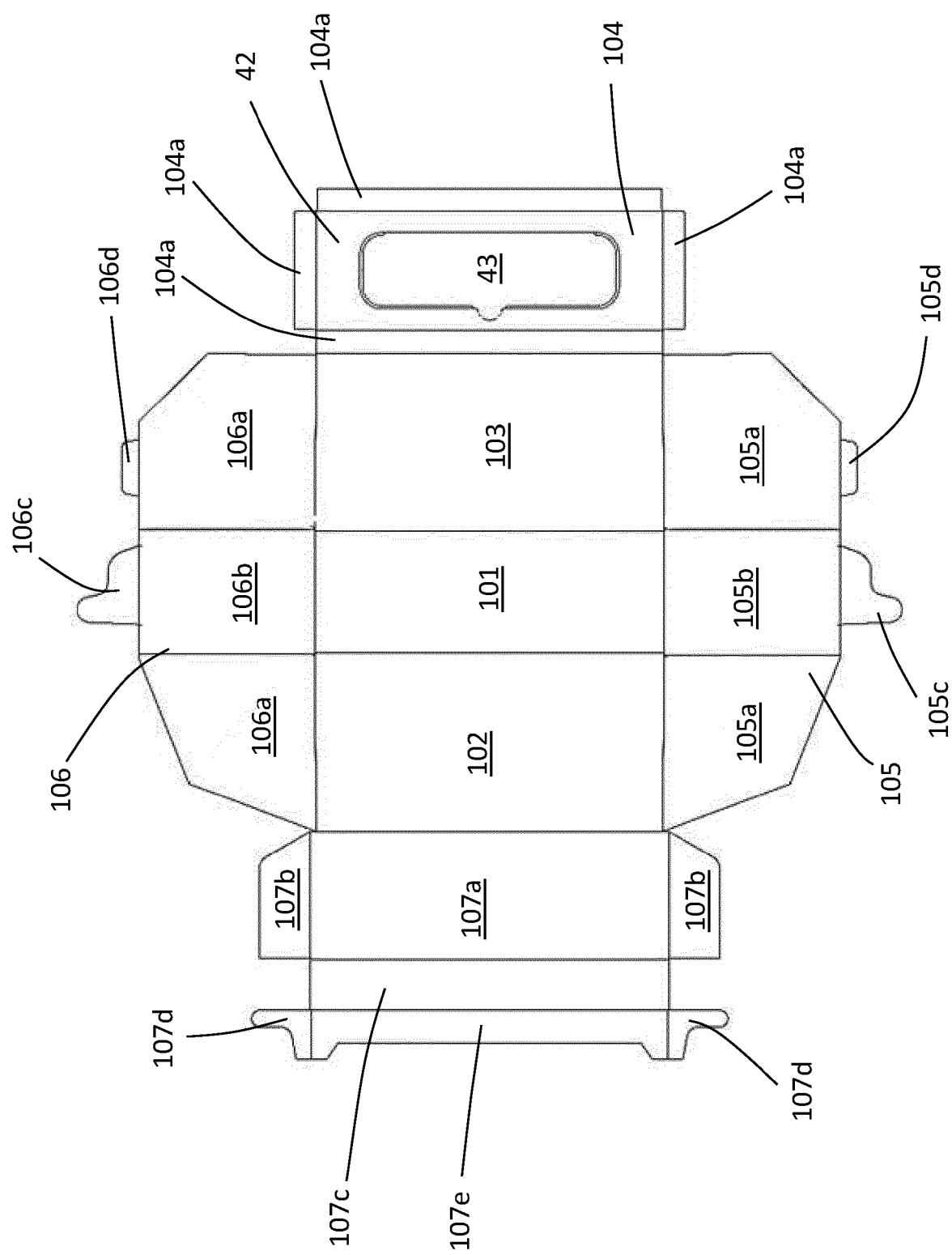


Fig 6



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Application Number

EP 22 17 3865

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 October 2022	Examiner Balz, Oliver
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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