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(54) **ASSEMBLY OF A BOX AND A LID, BLANKS FOR FOLDING THESE, AND METHOD OF HANDLING AT LEAST ONE PRODUCT**

ANORDNUNG EINER SCHACHTEL UND EINES DECKELS, ZUSCHNITTE ZUM FALTEN DIESE
UND HANDHABUNGSVERFAHREN FÜR MINDESTENS EIN PRODUKT

ENSEMBLE D'UNE BOÎTE ET D'UN COUVERCLE, ÉBAUCHES PERMETTANT DE PLIER DE
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Description

[0001] The invention relates to an assembly of a box and a lid manufactured from separate blanks, the box comprising a bottom; and a peripheral side wall connected to the bottom, the peripheral side wall having opposing front and back sections and two opposing side sections, each of which is positioned between the front and back section, wherein at least one of the front section and the back section comprises a recess for displaying the contents of the box, the lid comprising: a top, configured to close the box along a free end of the peripheral side wall; and a front part and opposing back part connected to the top, each extending away from the top at a non-zero angle with respect to a main plane of the top, configured to extend into the box along the front and back sections respectively. The invention further relates to a method of handling at least one product in assembly of a box and a lid.

[0002] Such an assembly is known per se, and is often referred to as a display box. Display boxes may be used in e.g. discount supermarkets. The display box is first used during transport and storage of the contents of the display box. Later, when the products are to be moved to shelves for sale, the lid is at least partly removed, thereby opening the top of the box and the recess, so that the contents of the box, e.g. products, can be seen through the top and/or recess by customers, and can possibly be taken out by customers through the top and/or the recess.

[0003] An example display box is known from EP 2 687 451 A1, which discloses a nestable U-shaped lid and base assembly comprising a separate base and lid, wherein the base has a general parallelepiped shape, having an upper part and front part, which are both open. The lid comprises three consecutively aligned parts or sectors separated by transverse, score lines. Both the base and the lid have cooperative fastening means arranged on the back of the assembly and on the front of the assembly, which could be a foldable flap that is passed through a window, and a number of tabs that emerge through a number of windows, thereby securing the lid over the base and both parts can be separated without causing any tears, breakages or detaching that may damage the base.

[0004] DE 200 08 279 U1 shows another kind of box, which has a lid locked thereto using semi-circular tabs. GB 2 471 378 A also discloses a box and lid, folded from a set of two blanks of stiff but foldable board material for forming a packaging carton. A tray blank has a series of panels for forming vertical panels of a tray joined at crease lines. At least two cut-outs are formed, one on each of the crease lines, to form a projection co-planar with the panel adjacent to that from which the projection is cut out. A lid blank has a series of panels for forming vertical panels of a lid joined at crease lines. Apertures are formed in at least two of said crease lines for fitting over the projections and securing the lid to the tray.

[0005] From US 2007/241172 A1 an adjustable volume storage container is known. The container is formed from two panels. The panels are made from a heavy duty paper board or corrugated cardboard, or the like, and are foldable. The panels are prefabricated, each having a slot array and two tabs. The panels are also cut to form sub-panels. The panels are folded along lines and so that the tabs of one panel can mate with the slot array of the other panel. The particular slot selected determines the length of the container. Once the tabs are mated with the slot arrays, the bottom sub-panels are folded under and fastened to form the container bottom. The container is filled, and then the upper sub-panels are folded over and fastened creating the container top.

[0006] Finally, US 4 657 176 A discloses a simplified and foldable disposable rubbish box characterized in that a square-shaped upper lid having an opening thereon is provided with folding flaps on the edges of the upper lid, a pair of folding flaps opposing to each other are so formed that they contact inner walls near the upper opening of a square-bottomed bag while the other pair of folding flaps opposing to each other are stuck to the inner wall near upper opening of the square-bottomed bag in a manner such that folding lines of the folding flaps are positioned slightly above the open end of the square-bottomed bag. The one opposing flaps have a folding line which crosses in the middle thereof along the line crossing the center of the opening provided on the upper lid, and projections are provided on the both sides of each of the one opposing folding flaps which engages with holes provided on the square-bottomed bag at corresponding positions for receiving the projections.

[0007] While the display box known from for example EP 2 687 451 A1 has been used advantageously particularly on the shelves for allowing easy display, the display box can be handled only with relative difficulty, because in order to prevent the lid from inadvertently detaching from the box during handling, the box must be supported when the box is lifted or moved. In practice this may be achieved by manual labor or relatively complex machinery, both of which increase the cost of handling significantly.

[0008] The object of the invention is therefore, to provide a display box that may be handled more easily.

[0009] The object is achieved by an assembly as described in claim 1, which allows handling at least one product according to the method of claim 10. The object is further achieved by blanks according to claims 8 and 9 for respectively folding a box and a lid as described in claim 1. Preferred features of the claimed assembly and method are described below and in the dependent claims.

[0010] By virtue of the interlocking elements of the lid and the box, the lid and the box may be interlocked. Consequently, the interlocking elements may prevent the lid from detaching from the box inadvertently, for instance during handling. Accordingly, the lid and box may be handled by manipulation of the lid only. This may allow the advantageous use of box handling machines employing

suction surfaces for moving boxes, which can pick up boxes by applying a suction force to the lid of a box.

[0011] In order to open the box, for instance by at least partly removing the lid, the interlocking elements may be unlocked, for instance upon the application of a force exceeding an unlocking threshold force. The unlocking threshold force may be determined by the structural rigidity of the interlocking elements and/or the box and/or the lid. The interlocking elements may therefore be configured to at least withstand a force which is equal to the weight of the box and products to be contained therein. Consequently, the use of a display box of the above-described type, may be particularly advantageous for handling and displaying relatively light-weight products, such as cotton pads, because in that case the interlocking elements need not be exceptionally rigid.

[0012] In particular, the box and the lid can be mutually connected via the interlocking elements. Separating the box and the lid may take place by unlocking the interlocking elements, preferably without tearing and/or breaking them.

[0013] Since the box and lid are manufactured from separate blanks, the box and lid may be completely separable from each other. When closing the box, the lid may be attached to the box only via the interlocking elements. Particularly, no glue, tape, or other joining methods, other than the locking elements, may be used to join or interconnect the lid and the box. As a result, the lid may be attached to and/or removed from the box with relative ease and/or relatively quickly.

[0014] The recess may connect to a free end of its respective front or back section. This may facilitate e.g. a customer taking a product out of the box after the lid has been at least partly removed, especially if the box is placed at a relatively high shelf, because the product may be removed via both the recess and the open top of the box. Accordingly, the recess may not be a through hole, as its circumference connects to the free end of its respective front or back section, i.e. the recess is not delimited by the box over a part of the circumference thereof.

[0015] The recess in the front and/or back section may be a permanent recess, meaning it is already cut out before the box is folded. Alternatively, the recess may be formed by a removable section in the front and/or back section. In order to facilitate removal of the removable section, it may be connected to the front and/or back section via a tearable pre-cut connection. Preferably in the example of the permanent recess, but optionally also in case of the recess being formed by a removable section, the front part and/or back part of the lid may close off the recess and/or the removable section if the lid is arranged on the box. In such a case the front part and/or back part of the lid may extend parallel to a plane of the recess and/or the removable section, practically on an inner side thereof.

[0016] It is noted that the box may have a substantially cuboid or cubic shape, having only one front section, one

back section, and two side sections, but it may alternatively have any other desired shape, and thereby any number of front and/or back and/or side sections adapted thereto.

[0017] According to the invention, the mutually interlocking elements comprise at least one through hole in the peripheral wall of the box; and at least one protrusion protruding from the front and/or back part of the lid, configured to extend at least partly through the at least one through hole when the lid is arranged on the box.

[0018] The through hole and protrusion provide an interlocking element that is relatively easy to make and/or requires little extra material. Therefore, this embodiment may be manufactured at a lower cost.

[0019] It should be noted that the through hole of the interlocking elements is additional to the recess in the front and/or back section of the box.

[0020] It is further noted that the through hole may be delimited by the box over the whole circumference thereof.

[0021] As the assembly may comprise more than one interlocking element, more than one, i.e. multiple, through holes and corresponding protrusions may be provided. However, it is not strictly required the same amount of through holes and protrusions is provided for every interlocking element. For instance, a single interlocking element could comprise one through hole and two protrusions configured to extend into the same single through hole.

[0022] In alternate forms, not according to the invention, the interlocking elements, and therefore the through holes and protrusions may be provided in other locations than the peripheral wall of the box and the front or back parts of the lid respectively. Further, as an example, the box may additionally or alternatively comprise the at least one protrusion, and the lid may in that case comprise at least one through hole.

[0023] According to the invention the at least one through hole is a slot, wherein the at least one protrusion substantially corresponds in shape and size to said slot.

[0024] When the through holes are shaped like a slot, and the protrusions correspond in shape and size thereto, the interlocking elements may form a non-rotating connection, such that the box and lid can not rotate with respect to each other when the protrusion extends into the through hole. The non-rotating connection may contribute to the structural rigidity of the connection between the box and the lid. It is noted that corresponding in shape and/or size may be understood here as that in particular a length and/or thickness of the protrusion may be substantially equal to the length and/or width of the slot.

[0025] According to the invention the slot extends substantially parallel to a direction in which the lid is removed from and/or placed on the box. This direction may be identified as the vertical direction, extending away from the bottom of the box in a direction perpendicular to a main plane of the bottom. In turn, the protrusion corresponding to a slot oriented in this direction, has a rela-

tively large dimension in the vertical direction, or perpendicularly away from the main plain of the top of the lid. As a result the protrusion is relatively strong in this direction. This may be particularly advantageous when the box is picked up by its lid, because the weight of the box will then exert a downward force on the protrusions, parallel to the vertical direction. The downward force thus corresponds in direction to the relatively large dimension of the protrusions. As a result, the protrusion can withstand a relatively strong force.

[0026] The slot may have rounded end zones. Rounded end zones may help to prevent tearing of the material of the box and/or lid around the slot, when a force is applied thereto, for instance by a protrusion of an interlocking element.

[0027] In another embodiment of the assembly according to the invention, the interlocking elements are positioned at or near corner edges of the peripheral wall of the box between the front section and at least one of the side sections and/or between the back section and at least one of the side sections, and at a side edge of the front and/or back part of the lid.

[0028] By positioning the interlocking elements at the corner edges, especially at all or all four corner edges, the lid may be interlocked to the box particularly securely using the interlocking elements. Moreover, the corner edges form a relatively strong part of the box as compared to for instance a flat part of the peripheral wall of the box, so that the interlocking elements may benefit from the enhanced strength of the box at this location. Additionally or alternatively, since the at least one through hole of interlocking elements may decrease the strength of the box at its location, placing the interlocking elements at the corner edges may aid in maintaining strength of the box, due to the box's increased strength at the corner edges.

[0029] The corner edges referred to hereabove may be corner edges in the peripheral side wall, i.e. between sections of the peripheral side wall. When the box is in a normal use orientation, with its bottom facing downwards, the corner edges of the peripheral side wall are disposed vertically. The interlocking elements may be provided in the peripheral side wall, on or along the corner edges. The box may additionally have bottom edges between the peripheral side wall and its bottom.

[0030] In a particular form of this embodiment, the interlocking elements of the box lie tangent to a folding line between the side sections and the front and/or back sections of the peripheral wall, on a side section side of said folding edge.

[0031] Accordingly, the interlocking elements may lie close to the folding lines and achieve the advantages associated therewith, without jeopardizing the integrity of the folding line. Moreover, the interlocking elements lying tangent to the folding line in the side section of the box, places the interlocking elements just towards the inside of the front and back sections of the box. Consequently, the interlocking elements may be placed on the

front and/or back part of the lid, which, when closing the box, lie just inside of the front and back part of the box respectively.

[0032] Even more in particular, the at least one protrusion protrudes from said side edge of the front and/or back part of the lid in a main plane of said respective front and/or back part.

[0033] The protrusion protruding from the side edge in a main plane of the front or back part may be particularly strong, because no folding and/or creasing is required between the protrusion and its respective front or back part of the lid. Moreover, these protrusions may be particularly easy to manufacture from a blank.

[0034] Even more in particular, a local width of the front and/or back part at the at least one protrusion may exceed an internal width of the box.

[0035] As a result, the at least one protrusion may protrude through the at least one through hole in the box, and the at least one protrusion may be prevented from inadvertently exiting the through hole due to the local width of the front and/or back part exceeding the internal width of the box.

[0036] In a particular exemplary embodiment of the assembly the front and/or back part of the lid may comprise at least two protrusions, wherein at least one protrusion protrudes from each side edge of the front and/or back part of the lid in a main plane of said respective front and/or back part, and wherein the at least two protrusions are arranged at a same distance from the top of the lid, such that the local width of the front and/or back part is maximized in the area of the at least two protrusions. This further reduces the chance of the protrusions exiting their respective through holes.

[0037] In order to close the box with the lid, it may be advantageous that the lid is transferred to the top of the box via the open bottom and interior of the box before the box is completely folded. Before completely folding of the box, e.g. prior to folding at least the bottom of the box, the box is somewhat compliant and/or deformable and/or bendable so that the at least one protrusion may be positioned through the at least one through hole without damaging the box or the lid. After the at least one protrusion protrudes through the at least one through hole, the bottom of the box may be folded, thereby giving the box its final structural rigidity. This method is explained further below. For removing the lid from the box, in particular when the local width of the lid exceeds the internal width of the box, it is possible that the box and/or the lid and/or the at least one protrusion have to be bent and/or torn and/or folded. As a result, a combination of a box and lid may be useable only once.

[0038] In yet another embodiment of the assembly according to the invention, the interlocking elements are provided at each corner of the peripheral wall. Moreover, when the box is of cuboid shape, and the bottom therefore of rectangular shape, the interlocking elements may be provided at each of the four corners in the peripheral wall.

[0039] Placing the interlocking elements at the corners

allows a distribution of forces over all corners. Furthermore, in a cuboid configuration of the box, two front interlocking elements and two back interlocking elements may be provided, all positioned at respective corners. By unlocking the two front interlocking elements, whilst leaving the back interlocking elements in place, the lid may be folded backwards and upwards to create a placeholder for advertising products contained in the box.

[0040] The invention also relates to a blank according to claim 8 for folding a box as described in claim 1 out of, the blank comprising: a bottom section, configured to form a bottom of the box when the blank is folded; and a front section, a back section, and two side section, together configured to form a peripheral side wall of the box when the blank is folded, wherein when the blank is folded the front and back sections oppose each other, and the side sections oppose each other, and each of the side sections is positioned between the front and back sections, wherein at least the front or back section comprises a recess for displaying the contents of the box folded from the blank, wherein the blank comprises elements for interlocking with interlocking elements of a lid.

[0041] Any section of the blank, in particular the bottom section, may consist of several distinct pieces of the blank that together, in a folded state of the blank, form the corresponding part of the box, e.g. the bottom.

[0042] It is noted that the blank may comprise any desired further section, for example for attaching a said section to another section.

[0043] The invention also relates to a blank according to claim 9 for folding a lid as described in claim 1 out of, wherein the blank comprises: a top part, configured to close a box when the blank is folded; and a front part and a back part, connected to the top part on opposing sides thereof, configured to extend into the box along front and back sections thereof respectively when the blank is folded, wherein the blank comprises elements for interlocking with interlocking elements of a box.

[0044] The invention also relates to a method as described in claim 10 of handling at least one product in an assembly according to claim 1, the method comprising the steps, to be performed in any suitable order, of:

- a) providing a blank for forming a box out of according to claim 8, and partly folding the front, back and side sections but leaving a bottom of the box open, thereby forming a box which is tubular in cross sectional shape;
- b) providing a blank for forming a lid according to claim 9, and folding front and back parts with respect to the top part so that they extend away from a main plane of the top part towards a same side of the main plane,
- c) placing the at least one product between the front and back parts of the lid,
- d) inserting the lid with the at least one product between the front and back parts of the lid into the partly folded box through the bottom of the box, until the

top part of the lid closes a top side of the box, thereby inserting the product in the box; and

e) completing the folding of the box by folding the bottom with respect to the peripheral side wall, wherein the box and the lid are interlocked during or after step d) using interlocking elements on the lid and the box.

Therefore, in a particular embodiment, the method comprises:

f) picking up and/or moving the box closed with the lid with the at least one product contained therein by applying a force, preferably a suction force, on the lid.

[0045] Moving the box by applying a force on the lid is particularly useful when multiple boxes are closely stacked together, because then the box may be difficult to reach for manipulation via grippers or by hand.

[0046] Step f) may in particular be performed without supporting the box.

[0047] The invention will be further elucidated with reference to the attached schematic figures, in which:

Figure 1A shows a perspective view of an assembly of a box and lid according to the invention;

Figure 1B shows an exploded perspective view of the assembly of figure 1A;

Figure 2 shows a perspective view the assembly of figures 1A and 1B partly opened.

Figure 3 shows a plan view of blank for folding a box out of, according to the invention;

Figure 4 shows a plan view of blank for folding a lid out of, according to the invention; and

Figure 5 shows in a perspective view how a product may be inserted into a box, while closing the box with a lid, according to the invention.

[0048] In the figures, like elements are referred to by like reference numerals.

[0049] Figures 1A and 1B show an assembly of a box 10 and a lid 20. The box 10 comprises a bottom 11, and a peripheral side wall 12 connected thereto. In this specific example the bottom 11 is of rectangular shape, so that the box 10 is of cuboid shape. The peripheral side wall 12 has a front section 13, a back section 14, and two side sections 15, 16. The front section 13 opposes the back sections 14, with side sections 15, 16 disposed on alternate sides in between. The lid 20 comprises a top 21 and a front part 23 and a back part 24. The front section 13 of the box 10 comprises a recess 17 defined by recess edge 17'. The recess 17 connects to a free end of the front section 13 of the peripheral side wall 12. When the lid 20 is removed from the box 10, contents of the box 10 may be displayed through a top of the box 10, but also

through the recess 17. Additionally, the contents, such as products, may be taken out via the recess 17 and/or top of the box 10. Such a box 10 is known as a display box 10, and is particularly popular amongst for example discount supermarkets. Front part 23 and back part 24 of the lid 20 extend away from the top 21 at a non-zero angle with respect to a main plane of the top 21, in this shown example of figures 1A and 1B the front and back parts 23, 24 extend away from the top 21 at approximately a right angle, towards a same side of the top 21. The top 21 of the lid 20 is configured to close the box 10 along a free end of the peripheral side wall 12 of the box, as shown in figure 1A. The front part 23 of the lid 13 extends into the box 10 along the front section 13 of the box 10, while the back part 24 of the lid 24 extends into the box 10 along the back section 14 of the box 10. The recess 17 in the front section 13 is thereby closed by the front part 23 of the lid 20.

[0050] The box 10 and the lid 20 both comprise interlocking elements 30 for interlocking the lid 20 and the box 10 at each of four corners of the box 10. When the lid 20 is interlocked with the box 10, as shown in figure 1A, the box 10 may be moved by applying a force to the lid 20. The interlocking elements 30 of the example shown in the figures each comprises a through hole 31 and a protrusion 32. The through hole 31 is provided in the peripheral side wall 12 of the box 10, and the protrusion 32 protrudes from the front and/or back parts 23, 24 of the lid 20. In order to interlock the box 10 and the lid 20, each protrusions 32 is configured to extend at least partly through its respective through hole 31 as shown in figure 1A. The through holes 31 shown have a longitudinal shape, resembling that of a slot. The protrusions 32 correspond in shape and size thereto, and are therefore also longitudinal in cross sectional shape. The slots 31 have rounded end zones 31'.

[0051] The interlocking elements 30 are positioned at or near corner edges 18 of the peripheral side wall 12 of the box 10. The corner edges 18 of the peripheral side wall 12 connect the front and back sections 13, 14 to side sections 15, 16, and are oriented vertically when the box 10 is in an upright position with its bottom 11 facing downwards. In this case the through holes 31 of slot shape lie tangent to a folding line between the side sections 15, 16 and the front and/or back sections 13, 14 of the peripheral side wall 12. The above-identified corner edges 18 are formed by folding the peripheral side wall 12 along the above-identified folding lines. More specifically, the through holes 31 lie in the side sections 15, 16 of the peripheral side wall 12. Consequently, they can interlock with protrusions 32 protruding in a main plane of the front and back parts 23, 24 from a side edge 28 of the front and back parts 23, 24 of the lid 20. When the box 10 is closed with the lid 20, the side edges 28 of the lid 20 correspond to the corner edges 18 of the box 10.

[0052] As can best be seen in figure 1B, the local width W_P of the front and back parts 23, 24 at the protrusions 32 exceeds an internal width W_B of the box 10. The width

W_L of the front and back parts 23, 24, away from the protrusions, corresponds substantially to the internal width W_B . Consequently, the front and back parts 23, 24 fit into the box 10, extending along the front and back sections 13, 14 thereof, while the protrusions 32 extend through the through holes 31 in the side sections 15, 16 of the box 10.

[0053] As shown in figure 2, the box 10 may be opened by removing the lid 10. The lid 10 may be removed only partly, e.g. by only unlocking interlocking elements 30 near the front section 13 of the box 10. The lid 20 can then be folded up as shown in figure 2. A bottom of the lid then forms a surface 29 on which a product label may be printed. Alternatively, all interlocking elements 30 could be unlocked, so that the lid 20 can be removed completely from the box 10.

[0054] Figure 3 shows a blank 40 for forming a box 10 out of. The blank 40 includes side sections 15, 16 and front and back sections 13, 14, which are together configured to form a peripheral side wall 12 of a box 10. The blank also includes several bottom parts 41, which can be folded with respect to the respective peripheral side wall parts 13, 14, 15, 16 to which the bottom parts 41 are attached, to together form a bottom 11 of the box 10. The blank 40 is provided with through holes 31 to form the interlocking elements 30 introduced above. The blank also includes a connection portion 42 for connecting one side of the back part 13 to another side of the blank 40 after partly folding the blank 40 into a box 10, which results in a peripheral side wall 12 of tubular cross section. The connecting portion 42 is also provided with a through hole 31, which aligns with through hole forming recess 43 in side section 16 when the blank 40 is folded into a box 10.

[0055] Figure 4 shows a blank 50 for forming a lid 20 out of. The blank 40 has the features described above in relation with the lid 20, and is therefore not explained further here.

[0056] Figure 5 shows how a box 10 can be filled with products 60. First, a box 10 is formed only in part by folding a blank 40. The blank is folded along the corner edges 18 so that its peripheral side wall 12 has a tubular shape. The bottom 11 which will ultimately be formed by bottom parts 41 is however left open, by leaving the bottom parts 41 unfolded with respect to the part of the peripheral side wall 12 they are connected to. The partly folded box 10 is shown in the top part of figure 5. Next a lid 20 is folded from a blank 50 by folding front and back parts 23, 24 thereof towards one side of a top 21 thereof. In practice the front and back part 23, 24 thus extend in parallel. Products 60 are then placed between the front and back parts 23, 24 of the lid 20 as shown in the bottom part of figure 5. Subsequently, the lid 20 with the products 60 between its front and back parts 23, 24 is inserted into the box 10 via the open bottom of the box 10 in the direction of arrow A. Because the bottom of the box 10 is at this point still open, the box 10 can be deformed slightly. Consequently the lid 20, which has a local width W_P at

the projections which exceeds then the internal width W_B of the box 10, can be inserted into the box 10 by slightly deforming the box.

[0057] When the lid 20 has moved through the box 10, and arrives with its top 21 near a free end of the peripheral side wall 12 to close a top side of the box 10, the protrusions 32 of the lid 20 align with the through holes 31 of the box 10, so that they may interlock by protruding into the through holes 31. When the protrusions 32 interlock with the through holes 31, the box 10 may be brought back or move back by itself to its undeformed shape. The box 10 may then be completed by folding the bottom parts 41 with respect to their respective parts of the peripheral side wall 12, so as to form a bottom 11 and close the box 10. The box 10 may then be manipulated, e.g. picked up, by the lid 20, for instance by applying a suction force thereon.

[0058] Although the invention has been described hereabove with reference to a number of specific examples and embodiments, the invention is not limited thereto. The scope of protection is defined by the appended claims.

Claims

1. Assembly of a box (10) and a lid (20) manufactured from separate blanks (40), the box (10) comprising:

- a bottom (11); and
 - a peripheral side wall (12) connected to the bottom (11), the peripheral side wall (12) having opposing front and back sections (13, 14) and two opposing side sections (15, 16), each of which is positioned between the front (13) and back section (14), wherein at least one of the front section (13) and the back section (14) comprises a recess (17) for displaying the contents of the box (10),
- the lid (20) comprising:

- a top (21), configured to close the box (10) along a free end of the peripheral side wall (12); and
- a front part (23) and opposing back part (24) connected to the top (21), each extending away from the top (21) at a non-zero angle with respect to a main plane of the top (21), configured to extend into the box (10) along the front and back sections (13, 14) respectively,

wherein the box (10) and the lid (20) comprise mutually interlocking elements (30) for interlocking the lid (20) and the box (10),
wherein the mutually interlocking ele-

ments (30) comprise:

- at least one through hole (31) in the peripheral wall of the box (10); and
- at least one protrusion (32) protruding from the front and/or back part (24) of the lid (20), configured to extend at least partly through the at least one through hole (31) when the lid (20) is arranged on the box (10),

characterized in that

the at least one through hole (31) is a slot extending substantially parallel to a direction in which the lid (20) is removed from and/or placed on the box (10), the at least one protrusion (32) substantially corresponding in shape and size to said slot.

2. Assembly according to claim 1, wherein the slot has rounded end zones.
3. Assembly according to any of the preceding claims, wherein the interlocking elements (30) are positioned at or near corner edges of the peripheral wall of the box (10) between the front section (13) and at least one of the side sections (15, 16) and/or between the back section (14) and at least one of the side sections (15, 16), and at a side edge of the front and/or back part (24) of the lid (20).
4. Assembly according to claim 3, wherein the interlocking elements (30) of the box (10) lie tangent to a folding line between the side sections (15, 16) and the front and/or back sections (13, 14) of the peripheral wall, on a side section (15, 16) side of said folding edge.
5. Assembly according to claim 4, wherein the at least one protrusion (32) protrudes from said side edge of the front and/or back part (24) of the lid (20) in a main plane of said respective front and/or back part (24).
6. Assembly according to claim 5, wherein a local width (W_p) of the front and/or back part (24) at the at least one protrusion (32) exceeds an internal width (W_b) of the box (10).
7. Assembly according to any one of the preceding claims, wherein interlocking elements (30) are provided at each corner of the peripheral wall.
8. Blank (40) for folding a box (10) as described in any of claims 1 - 7 out of, the blank (40) comprising:

- a bottom (11) section, configured to form a bottom (11) of the box (10) when the blank (40) is folded; and
- a front section (13), a back section (14), and

two side sections (15, 16), together configured to form a peripheral side wall (12) of the box (10) when the blank (40) is folded, wherein when the blank (40) is folded the front and back sections (13, 14) oppose each other, and the side sections (15, 16) oppose each other, and each of the side sections (15, 16) is positioned between the front and back sections (13, 14), wherein at least the front or back section (14) comprises a recess (17) for displaying the contents of the box (10) folded from the blank (40),

wherein the blank (40) comprises elements for interlocking with interlocking elements (30) of a lid (20).

9. Blank (50) for folding a lid (20) as described in any of claims 1-8 out of, wherein the blank (50) comprises:

- a top part, configured to close a box (10) when the blank (50) is folded; and
- a front part (23) and a back part (24), connected to the top part on opposing sides thereof, configured to extend into the box (10) along front and back sections (13, 14) thereof respectively when the blank (50) is folded,

wherein the blank (50) comprises elements for interlocking with interlocking elements (30) of a box (10).

10. Method of handling at least one product in an assembly as described in any one of claims 1-7, the method comprising the steps, to be performed in any suitable order, of:

a) providing a blank (40) for forming a box (10) out of according to claim 8, and partly folding the front, back and side sections (15, 16) but leaving a bottom (11) of the box (10) open, thereby forming a box (10) which is tubular in cross sectional shape;
b) providing a blank (50) for forming a lid (20) according to claim 9, and folding front and back parts (23, 24) with respect to the top part so that they extend away from a main plane of the top part towards a same side of the main plane,
c) placing the at least one product between the front and back parts (23, 24) of the lid (20),
d) inserting the lid (20) with the at least one product between the front and back part (23, 24) into the partly folded box (10) through the bottom (11) of the box (10), until the top part of the lid (20) closes a top (21) of the box (10), thereby inserting the product in the box (10); and
e) completing the folding of the box (10) by folding the bottom (11) with respect to the peripheral side wall (12),

characterized by interlocking the box (10) and the lid (20) during or after step d) using interlocking elements (30) on the lid (20) and the box (10).

11. Method according to claim 10, further comprising:
f) picking up and/or moving the box (10) closed with the lid (20) with the at least one product contained therein by applying a force, preferably a suction force, on the lid (20).

Patentansprüche

1. Anordnung einer Schachtel (10) und eines Deckels (20), hergestellt aus getrennten Faltvorlagen (40), wobei die Schachtel (10) aufweist:

- einen Boden (11); und
- eine Umfangsseitenwand (12), die mit dem Boden (11) verbunden ist, wobei die Umfangsseitenwand (12) gegenüberliegende vordere und hintere Abschnitte (13, 14) sowie zwei gegenüberliegende Seitenabschnitte (15, 16) aufweist, von denen jeder zwischen dem vorderen (13) und dem hinteren Abschnitt (14) positioniert ist, wobei der vordere Abschnitt (13) und/oder der hintere Abschnitt (14) eine Aussparung (17) aufweist durch die der Innenraum der Schachtel (10) eingesehen werden kann, und wobei der Deckel (20) aufweist:

- eine Oberseite (21), welche so ausgebildet ist, dass sie die Schachtel (10) entlang eines freien Endes der Umfangsseitenwand (12) verschließt, und
- einen vorderen Teil (23) und einen gegenüberliegenden hinteren Teil (24), die mit der Oberseite (21) verbunden sind und sich jeweils von der Oberseite (21) in einem von Null verschiedenen Winkel in Bezug auf eine Hauptebene der Oberseite (21) weg erstrecken und so gestaltet sind, dass sie sich entlang des vorderen bzw. hinteren Abschnitts (13, 14) in die Schachtel (10) erstrecken,

wobei die Schachtel (10) und der Deckel (20) gegenseitig verriegelnde Elemente (30) aufweisen, zum Verriegeln des Deckels (20) mit der Schachtel (10), wobei die gegenseitig verriegelnden Elemente (30) aufweisen:

- zumindest ein Durchgangsloch (31) in der Umfangswand der Schachtel (10); und
- zumindest einen Vorsprung (32), der von dem vorderen und/oder hinteren Teil (24) des Deckels (20) vorsteht und so ausgebil-

- det ist, dass er sich zumindest teilweise durch das zumindest eine Durchgangsloch (31) erstreckt, wenn der Deckel (20) auf die Schachtel (10) aufgesetzt ist,
- dadurch gekennzeichnet, dass** das zumindest eine Durchgangsloch (31) einen Schlitz darstellt, welcher sich im Wesentlichen parallel zu der Richtung erstreckt, in der der Deckel (20) von der Schachtel (10) abgenommen und/oder auf diese aufgesetzt wird, wobei der zumindest eine Vorsprung (32) in Form und Größe im Wesentlichen dem Schlitz entspricht.
2. Anordnung nach Anspruch 1, wobei die Endbereiche des Schlitzes eine abgerundete Form aufweisen.
 3. Anordnung nach einem der vorherigen Ansprüche, wobei die verriegelnden Elemente (30) an oder in der Nähe von Eckkanten der Umfangswand der Schachtel (10) zwischen dem vorderen Abschnitt (13) und zumindest einem der Seitenabschnitte (15, 16) und/oder zwischen dem hinteren Abschnitt (14) und zumindest einem der Seitenabschnitte (15, 16) sowie an einer Seitenkante des vorderen und/oder hinteren Teils (24) des Deckels (20) angeordnet sind.
 4. Anordnung nach Anspruch 3, wobei die verriegelnden Elemente (30) der Schachtel (10) tangential zu einer Faltlinie zwischen den Seitenabschnitten (15, 16) und den vorderen und/oder hinteren Abschnitten (13, 14) der Umfangswand auf der Seite eines Seitenabschnitts (15, 16) der Faltlinie liegen.
 5. Anordnung nach Anspruch 4, wobei der zumindest eine Vorsprung (32) von der Seitenkante des vorderen und/oder hinteren Teils (24) des Deckels (20) in einer Hauptebene des jeweiligen vorderen und/oder hinteren Teils (24) vorsteht.
 6. Anordnung nach Anspruch 5, wobei eine lokale Breite (W_p) des vorderen und/oder hinteren Teils (24) im Bereich des zumindest einen Vorsprungs (32) eine innere Breite (W_b) der Schachtel (10) überschreitet.
 7. Baugruppe nach einem der vorherigen Ansprüche, wobei an jeder Ecke der Umfangswand verriegelnde Elemente (30) vorgesehen sind.
 8. Faltvorlage (40) zum Falten einer Schachtel (10), wie in einem der Ansprüche 1 bis 7 beschrieben, wobei die Faltvorlage (40) aufweist:
 - einen Boden (11) Abschnitt der so ausgebildet ist, dass er, wenn die Faltvorlage (40) gefaltet wird, einen Boden (11) der Schachtel (10) bildet, und
 - einen vorderen Abschnitt (13), einen hinteren Abschnitt (14) sowie zwei Seitenabschnitte (15, 16), die zusammen so ausgebildet sind, dass sie, wenn die Faltvorlage (40) gefaltet wird, eine Umfangsseitenwand (12) der Schachtel (10) bilden, wobei, wenn die Faltvorlage (40) gefaltet wird, der vordere und der hintere Abschnitt (13, 14) einander gegenüberliegen und die Seitenabschnitte (15, 16) einander gegenüberliegen, und jeder der Seitenabschnitte (15, 16) zwischen dem vorderen und dem hinteren Abschnitt (13, 14) positioniert ist, wobei zumindest der vordere oder der hintere Abschnitt (14) eine Aussparung (17) aufweist, durch die der Innenraum der aus der Faltvorlage (40) gefalteten Schachtel (10) eingesehen werden kann, wobei die Faltvorlage (40) verriegelnde Elemente (30) aufweist, zum Verriegeln eines Deckels (20) mittels den verriegelnden Elementen.
 9. Faltvorlage (50) zum Falten eines Deckels (20), wie in einem der Ansprüche 1 bis 8 beschrieben, wobei die Faltvorlage (50) aufweist:
 - einen oberen Teil, der so ausgebildet ist, dass er, wenn die Faltvorlage (50) gefaltet wird, eine Schachtel (10) verschließt, und
 - einen vorderen Teil (23) und einen hinteren Teil (24), die mit dem oberen Teil auf gegenüberliegenden Seiten desselben verbunden sind, und so ausgebildet sind, dass sie sich, wenn die Faltvorlage (50) gefaltet ist, in der Schachtel (10) entlang des vorderen bzw. hinteren Abschnitts (13, 14) derselben erstrecken,
 wobei die Faltvorlage (50) Elemente aufweist, zum Verriegeln einer Schachtel (10) mit verriegelnden Elementen (30).
 10. Verfahren zur Handhabung zumindest eines Produkts in einer Anordnung nach einem der Ansprüche 1 bis 7, wobei das Verfahren die in beliebiger Reihenfolge durchzuführenden Schritte aufweist:
 - a) Bereitstellen einer Faltvorlage (40) zum Bilden einer Schachtel (10) nach Anspruch 8 sowie teilweises Falten der vorderen, hinteren und seitlichen Abschnitte (15, 16), wobei jedoch ein Boden (11) der Schachtel (10) offen gelassen wird, wodurch eine im Querschnitt röhrenförmige Schachtel (10) gebildet wird;
 - b) Bereitstellen einer Faltvorlage (50) zum Bilden eines Deckels (20) nach Anspruch 9, und Falten von vorderen und hinteren Teilen (23, 24) in Bezug auf das obere Teil, so dass sie sich von einer Hauptebene des oberen Teils zu der gleichen Seite der Hauptebene weg erstrecken,
 - c) Anordnen des zumindest einen Produkts zwi-

schen dem vorderen und dem hinteren Teil (23, 24) des Deckels (20),

d) Einsetzen des Deckels (20) mit dem zumindest einen Produkt zwischen dem vorderen und dem hinteren Teil (23, 24) in die teilweise gefaltete Schachtel (10) über den Boden (11) der Schachtel (10), bis der obere Teil des Deckels (20) eine Oberseite (21) der Schachtel (10) verschließt, wodurch das Produkt in die Schachtel (10) eingesetzt wird; und
e) Abschließen des Faltvorgangs der Schachtel (10) durch Falten des Bodens (11) in Bezug auf die Umfangsseitenwand (12),

dadurch gekennzeichnet, dass die Schachtel (10) und der Deckel (20) während oder nach dem Schritt d) unter Verwendung verriegelnder Elemente (30) des Deckels (20) und der Schachtel (10) verriegelt werden.

11. Verfahren nach Anspruch 10, ferner aufweisend folgenden Schritt:

f) Aufnehmen und/oder Bewegen der mit dem Deckel (20) verschlossenen und das zumindest eine Produkt enthaltenden Schachtel (10) durch Aufbringen einer Kraft, vorzugsweise einer auf den Deckel (20) ausgeübten Saugkraft.

Revendications

1. Assemblage d'une boîte (10) et d'un couvercle (20) fabriqués à partir d'ébauches séparées (40), la boîte (10) comprenant:

- un fond (11); et
- une paroi latérale périphérique (12) reliée au fond (11), la paroi latérale périphérique (12) ayant des sections avant et arrière opposées (13, 14) et deux sections latérales opposées (15, 16), chacune d'elles étant positionnée entre la section avant (13) et la section arrière (14), dans lequel au moins une parmi la section avant (13) et la section arrière (14) comprend un évidement (17) pour présenter le contenu de la boîte (10), le couvercle (20) comprenant:

- un dessus (21), configuré pour fermer la boîte (10) le long d'une extrémité libre de la paroi latérale périphérique (12); et
- une partie avant (23) et une partie arrière opposée (24) reliées au dessus (21), chacune s'étendant à l'opposé du dessus (21) selon un angle différent de zéro par rapport à un plan principal du dessus (21), configurées pour s'étendre dans la boîte (10) le long des sections avant et arrière (13, 14)

respectivement,

dans lequel la boîte (10) et le couvercle (20) comprennent des éléments de verrouillage mutuel (30) pour verrouiller le couvercle (20) et la boîte (10), dans lequel les éléments de verrouillage mutuel (30) comprennent:

- au moins un trou traversant (31) dans la paroi périphérique de la boîte (10); et
- au moins une saillie (32) faisant saillie à partir de la partie avant et/ou arrière (24) du couvercle (20), configurée pour s'étendre au moins partiellement à travers l'au moins un trou traversant (31) lorsque le couvercle (20) est agencé sur la boîte (10),

caractérisé en ce que

l'au moins un trou traversant (31) est une fente s'étendant sensiblement parallèlement à une direction dans laquelle le couvercle (20) est retiré de la boîte (10) et/ou placé sur celle-ci, la forme et la taille de l'au moins une saillie (32) correspondant sensiblement à celles de ladite fente.

2. Assemblage selon la revendication 1, dans lequel la fente a des zones d'extrémité arrondies.

3. Assemblage selon l'une quelconque des revendications précédentes, dans lequel les éléments de verrouillage (30) sont positionnés au niveau ou à proximité de bords angulaires de la paroi périphérique de la boîte (10) entre la section avant (13) et au moins une des sections latérales (15, 16) et/ou entre la section arrière (14) et au moins une des sections latérales (15, 16), et au niveau d'un bord latéral de la partie avant et/ou arrière (24) du couvercle (20).

4. Assemblage selon la revendication 3, dans lequel les éléments de verrouillage (30) de la boîte (10) sont tangents à une ligne de pliage entre les sections latérales (15, 16) et les sections avant et/ou arrière (13, 14) de la paroi périphérique, sur un côté des sections latérales (15, 16) dudit bord de pliage.

5. Assemblage selon la revendication 4, dans lequel l'au moins une saillie (32) fait saillie à partir dudit bord latéral de la partie avant et/ou arrière (24) du couvercle (20) dans un plan principal de ladite partie avant et/ou arrière (24) respective.

6. Assemblage selon la revendication 5, dans lequel une largeur locale (W_p) de la partie avant et/ou arrière (24) au niveau de l'au moins une saillie (32) dépasse une largeur interne (W_b) de la boîte (10).

7. Assemblage selon l'une quelconque des revendica-

tions précédentes, dans lequel les éléments de verrouillage (30) sont disposés à chaque angle de la paroi périphérique.

8. Ébauche (40) pour plier une boîte (10) telle que décrite dans l'une quelconque des revendications 1-7, l'ébauche (40) comprenant:

- une section de fond (11), configurée pour former un fond (11) de la boîte (10) lorsque l'ébauche (40) est pliée; et
- une section avant (13), une section arrière (14), et deux sections latérales (15, 16), configurées ensemble pour former une paroi latérale périphérique (12) de la boîte (10) lorsque l'ébauche (40) est pliée, dans laquelle lorsque l'ébauche (40) est pliée les sections avant et arrière (13, 14) sont opposées l'une à l'autre, et les sections latérales (15, 16) sont opposées l'une à l'autre, et chacune des sections latérales (15, 16) est positionnée entre les sections avant et arrière (13, 14), dans laquelle au moins la section avant ou arrière (14) comprend un évidement (17) pour présenter le contenu de la boîte (10) pliée à partir de l'ébauche (40), dans laquelle l'ébauche (40) comprend des éléments destinés à être verrouillés avec les éléments de verrouillage (30) d'un couvercle (20).

9. Ébauche (50) pour plier un couvercle (20) tel que décrit dans l'une quelconque des revendications 1-8, dans lequel l'ébauche (50) comprend:

- une partie de dessus, configurée pour fermer une boîte (10) lorsque l'ébauche (50) est pliée; et
- une partie avant (23) et une partie arrière (24), reliées à la partie de dessus sur des côtés opposés de celle-ci, configurées pour s'étendre dans la boîte (10) le long de sections avant et arrière (13, 14) de celle-ci respectivement lorsque l'ébauche (50) est pliée,

dans laquelle l'ébauche (50) comprend des éléments destinés à être verrouillés avec des éléments de verrouillage (30) d'une boîte (10).

10. Procédé de manipulation d'au moins un produit dans un assemblage tel que décrit dans l'une quelconque des revendications 1-7, le procédé comprenant les étapes suivantes destinées à être réalisées dans un ordre approprié quelconque:

a) la fourniture d'une ébauche (40) pour former une boîte (10) selon la revendication 8, et le pliage partiel des sections avant, arrière et latérales (15, 16) tout en laissant ouvert un fond (11) de

la boîte (10), ce qui permet ainsi de former une boîte (10) dont la coupe transversale est tubulaire;

b) la fourniture d'une ébauche (50) pour former un couvercle (20) selon la revendication 9, et le pliage des parties avant et arrière (23, 24) par rapport à la partie de dessus de sorte qu'elles s'étendent à l'opposé d'un plan principal de la partie de dessus vers un même côté du plan principal,

c) la mise en place de l'au moins un produit entre les parties avant et arrière (23, 24) du couvercle (20),

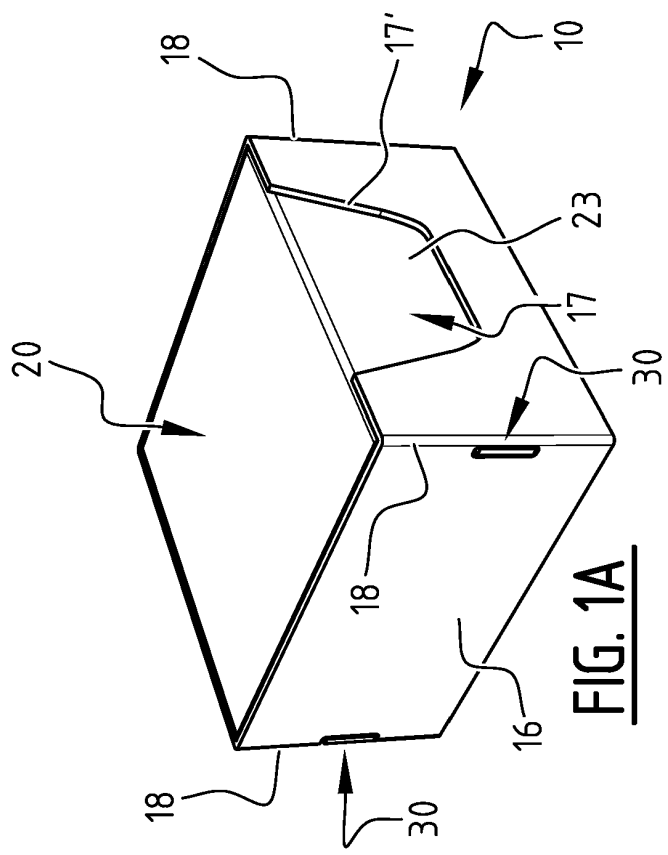
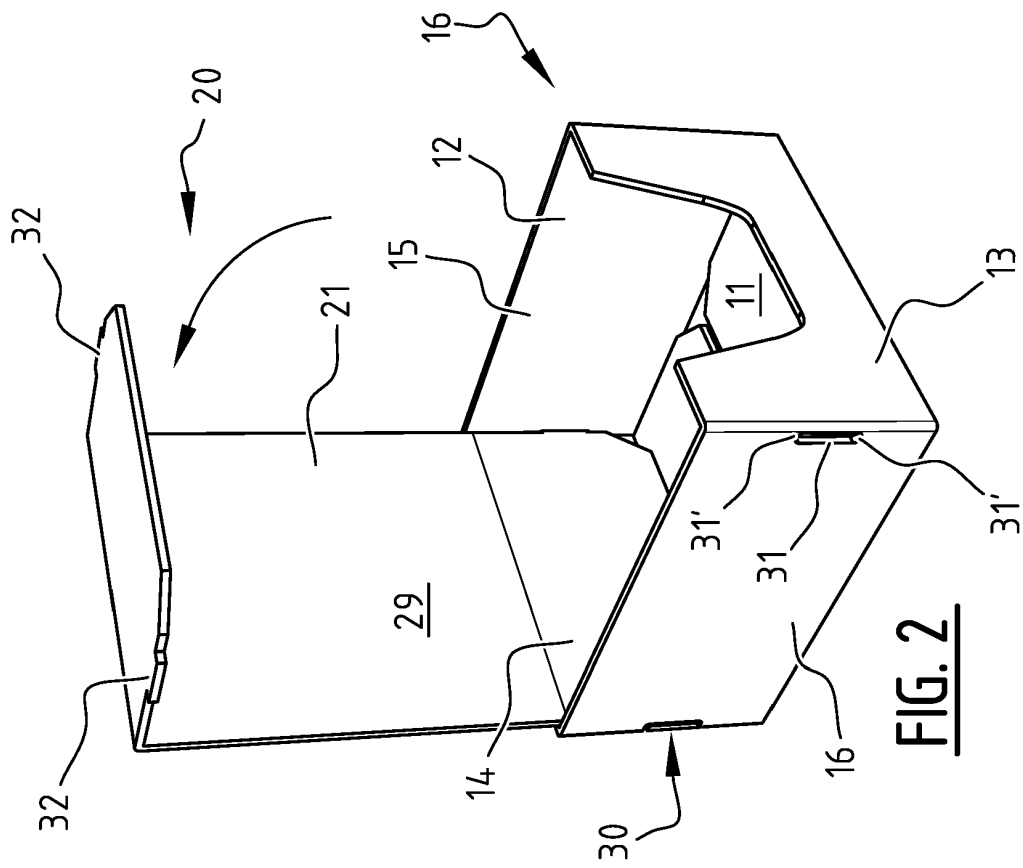
d) l'insertion du couvercle (20) avec l'au moins un produit entre la partie avant et arrière (23, 24) dans la boîte (10) partiellement pliée à travers le fond (11) de la boîte (10), jusqu'à ce que la partie de dessus du couvercle (20) ferme un dessus (21) de la boîte (10), ce qui permet ainsi d'insérer le produit dans la boîte (10); et

e) l'achèvement du pliage de la boîte (10) par pliage du fond (11) par rapport à la paroi latérale périphérique (12),

caractérisé par le verrouillage de la boîte (10) et du couvercle (20) pendant ou après l'étape d) à l'aide des éléments de verrouillage (30) sur le couvercle (20) et la boîte (10).

11. Procédé selon la revendication 10, comprenant en outre:

f) la collecte et/ou le déplacement de la boîte (10) fermée avec le couvercle (20) avec l'au moins un produit contenu dans celle-ci par application d'une force, de préférence une force d'aspiration, sur le couvercle (20).



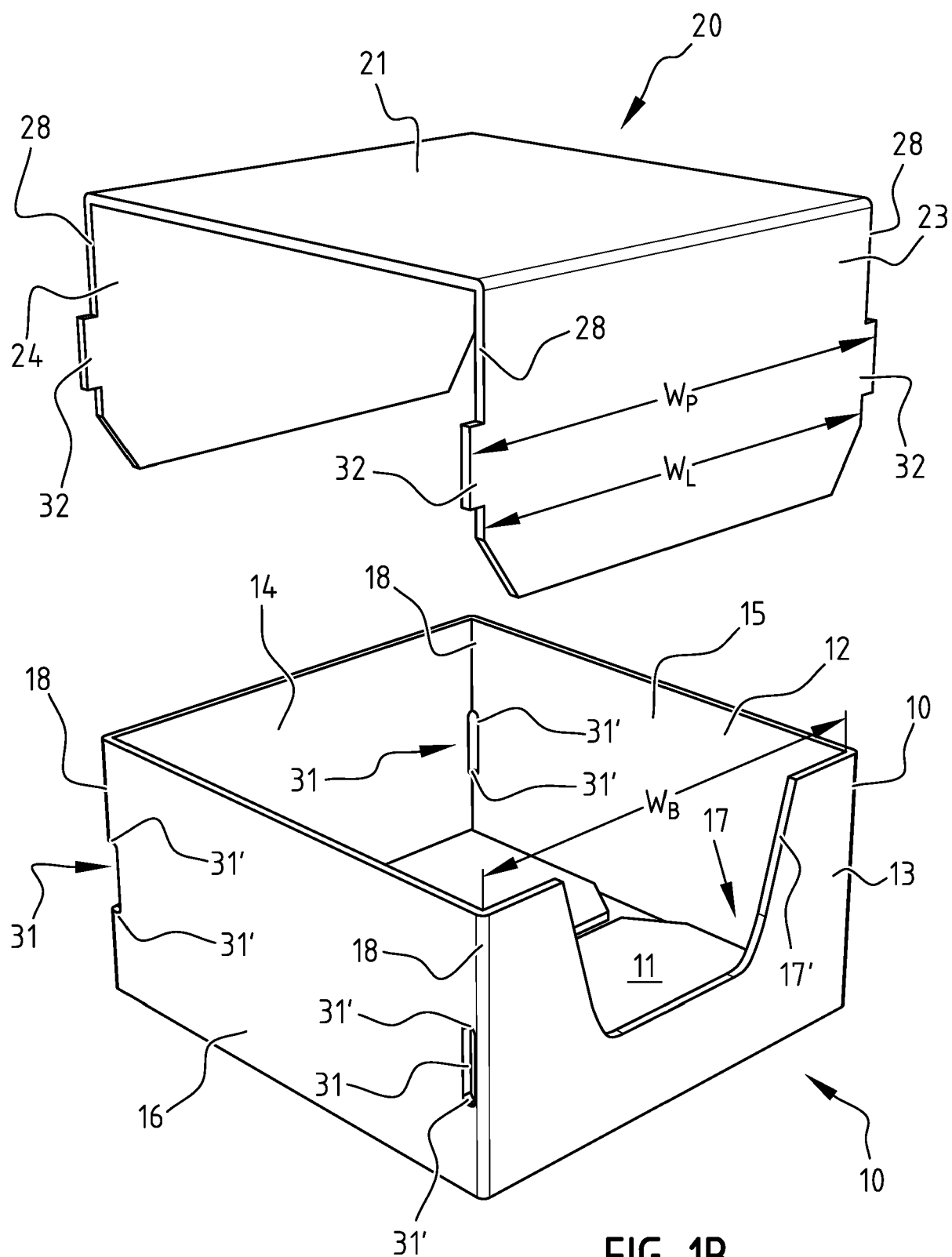
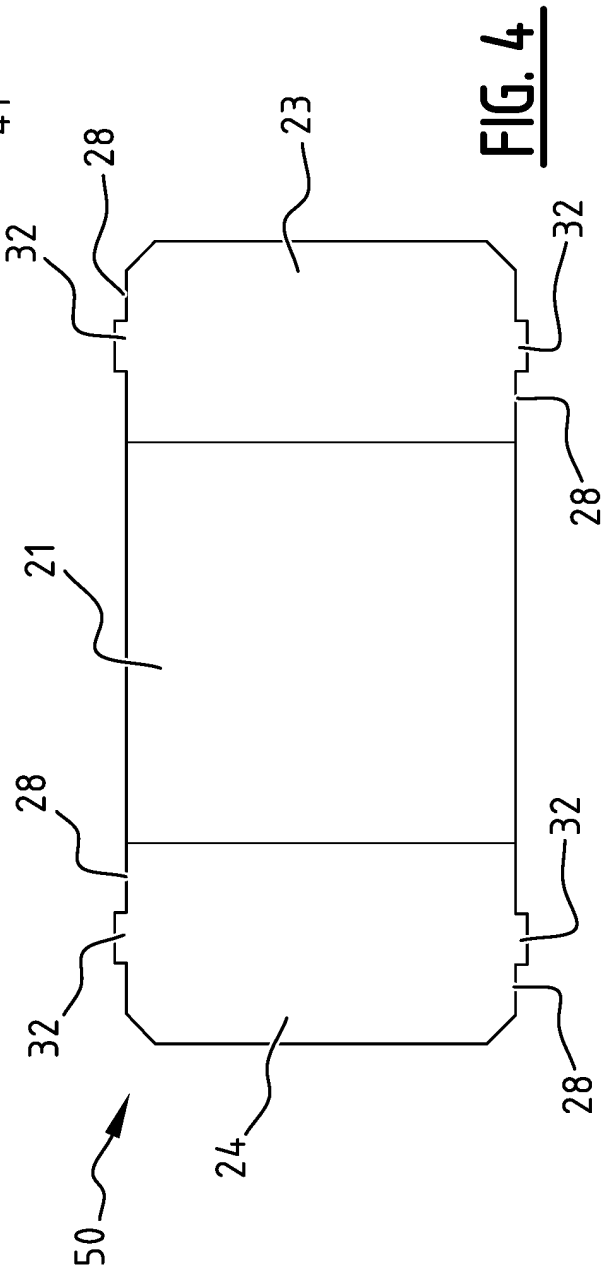
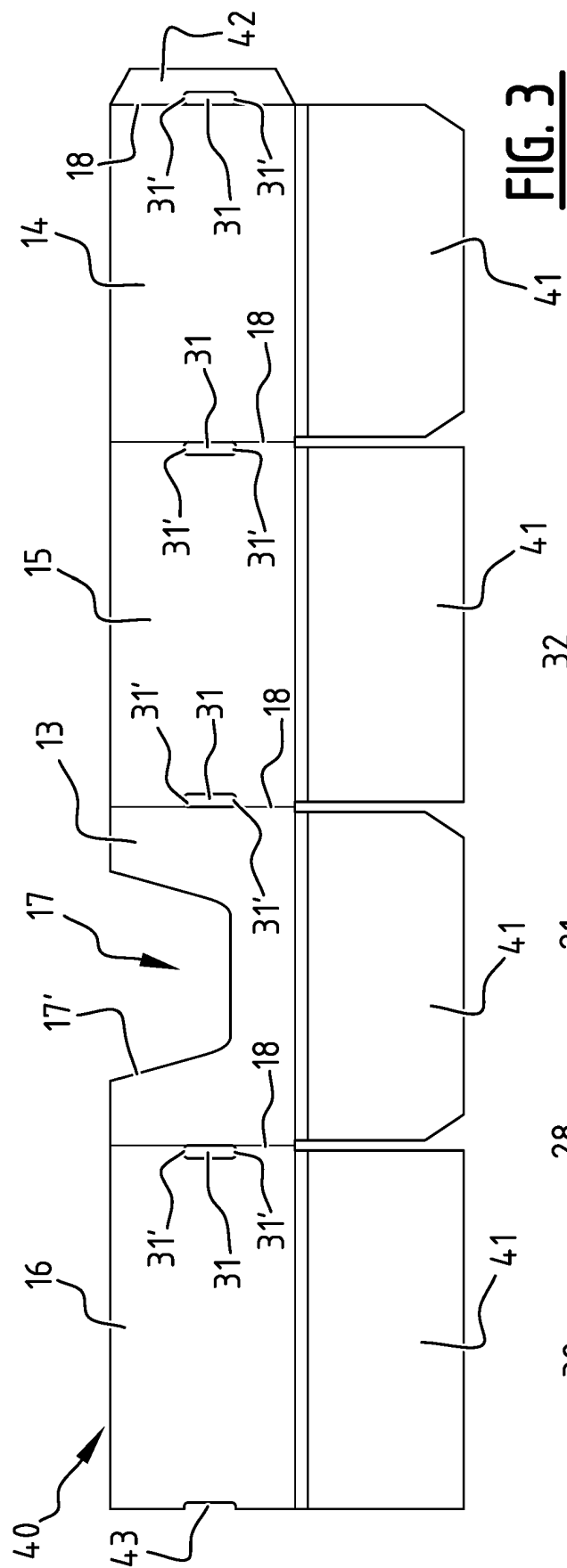


FIG. 1B



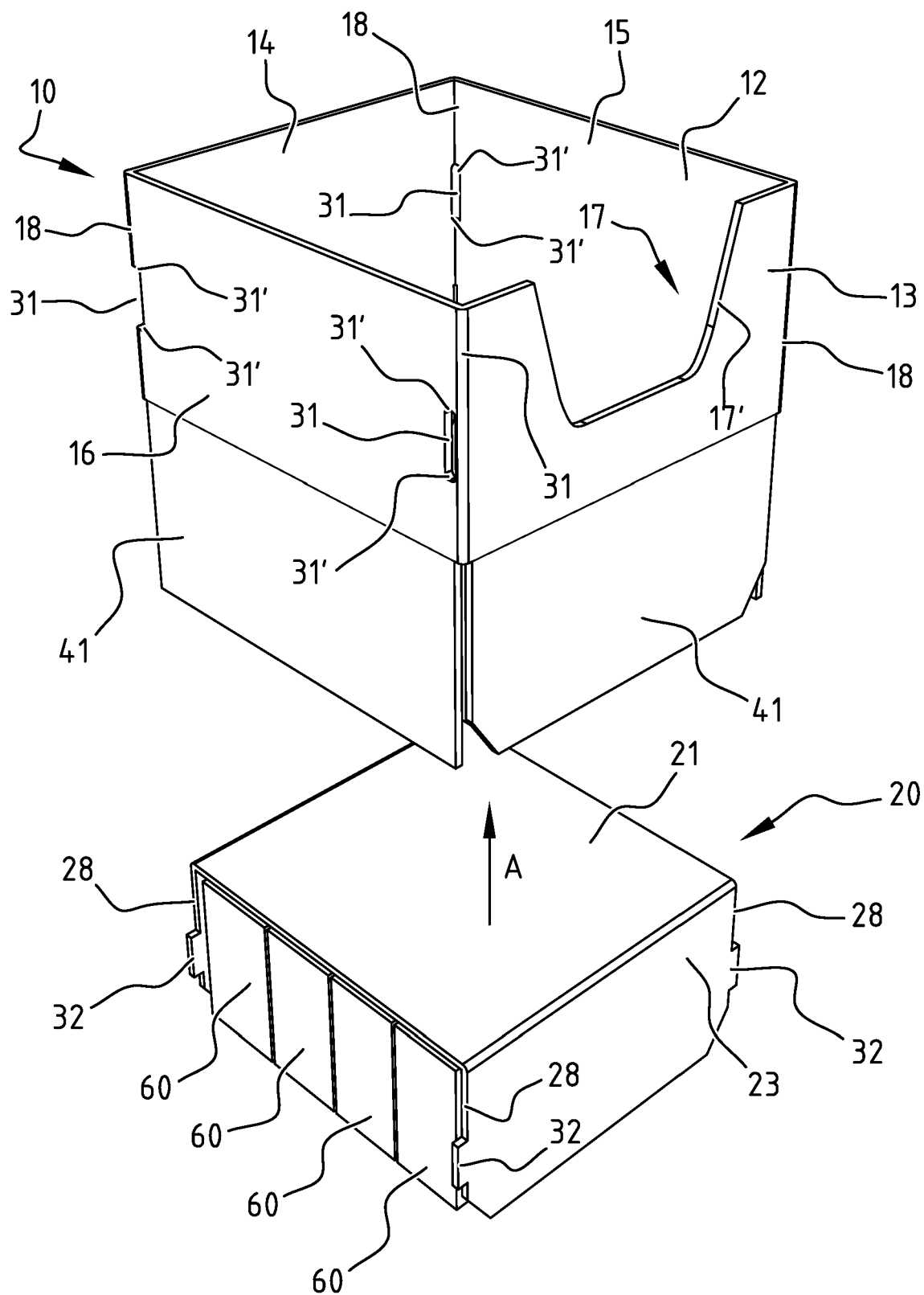


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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