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(54) **SHIPPING BOX**

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B65D 5/66	(2006.01)
B65D 5/50	(2006.01)

(52) **U.S. Cl.**

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(57) **ABSTRACT**

A shipping box comprises a bottom structural flap and a plurality of sidewall structural flaps, of which at least two are connected to the bottom structural flap, and assembly elements that assemble the box in a stable way. The box is foldable in a flat folded position in which, from its upper part, in the use position, to at least three of the structural sidewall flaps are connected at least three functional flaps independent of each other, making the functional flaps the functions of lid, interior space reducer, fastening and/or handle, and that the assembly elements are located on the internal part of the box.

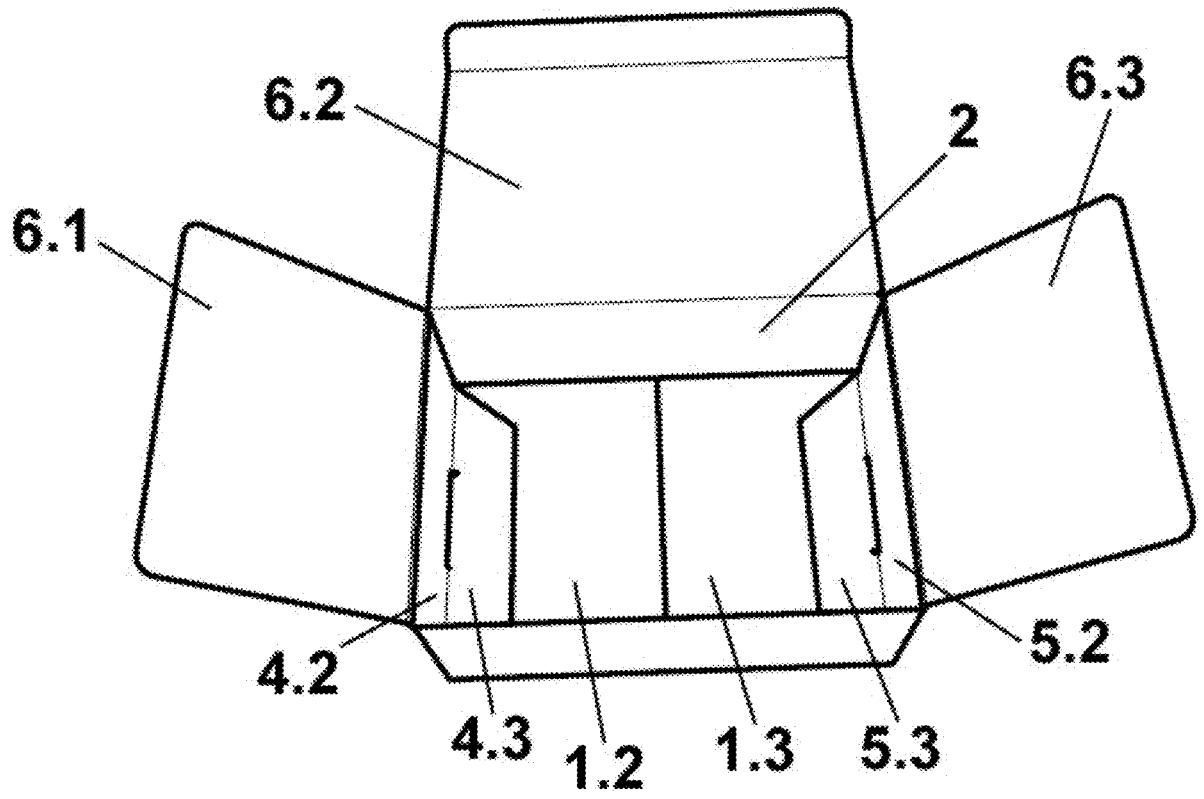

FIG. 1a

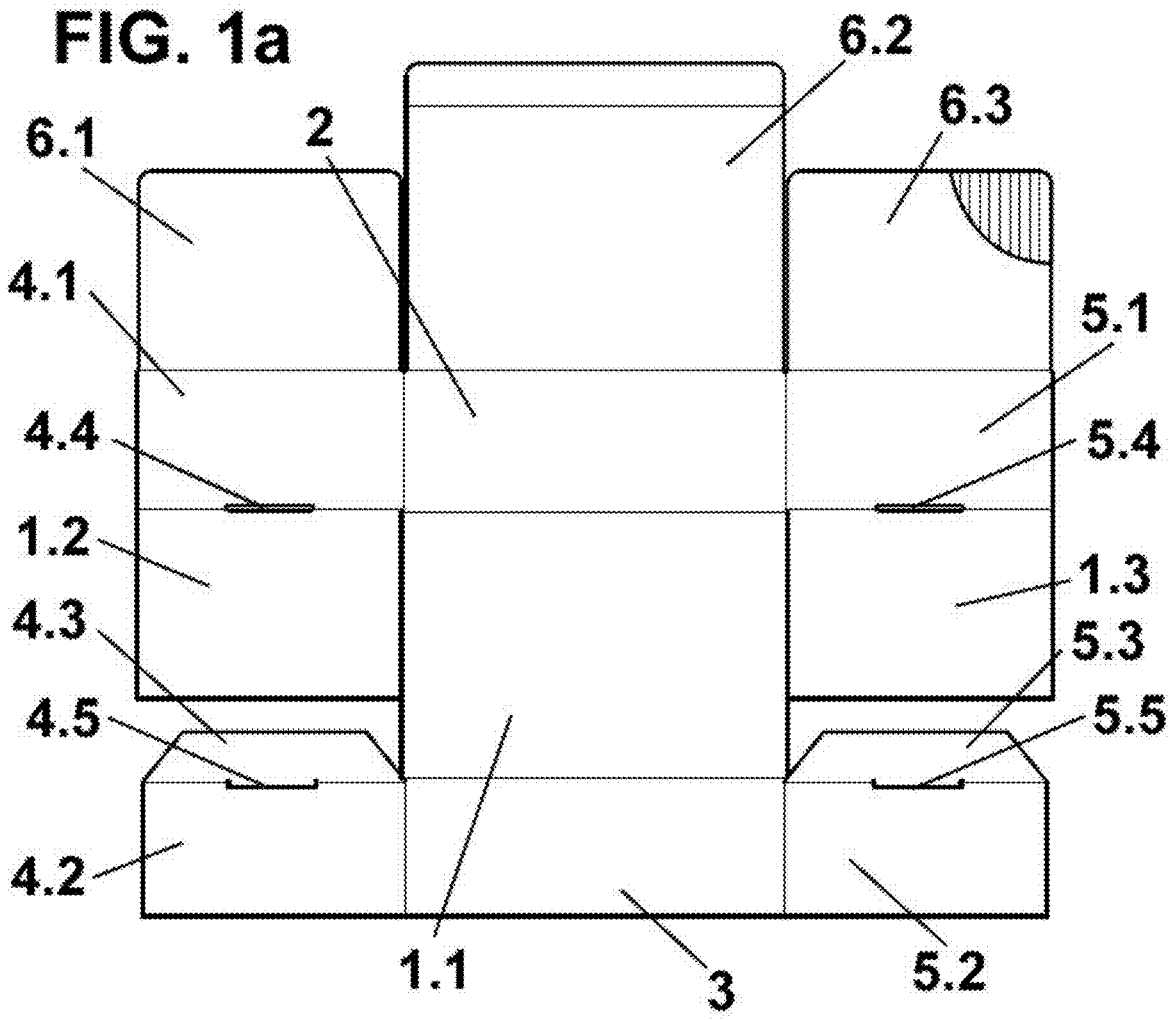

FIG. 1b

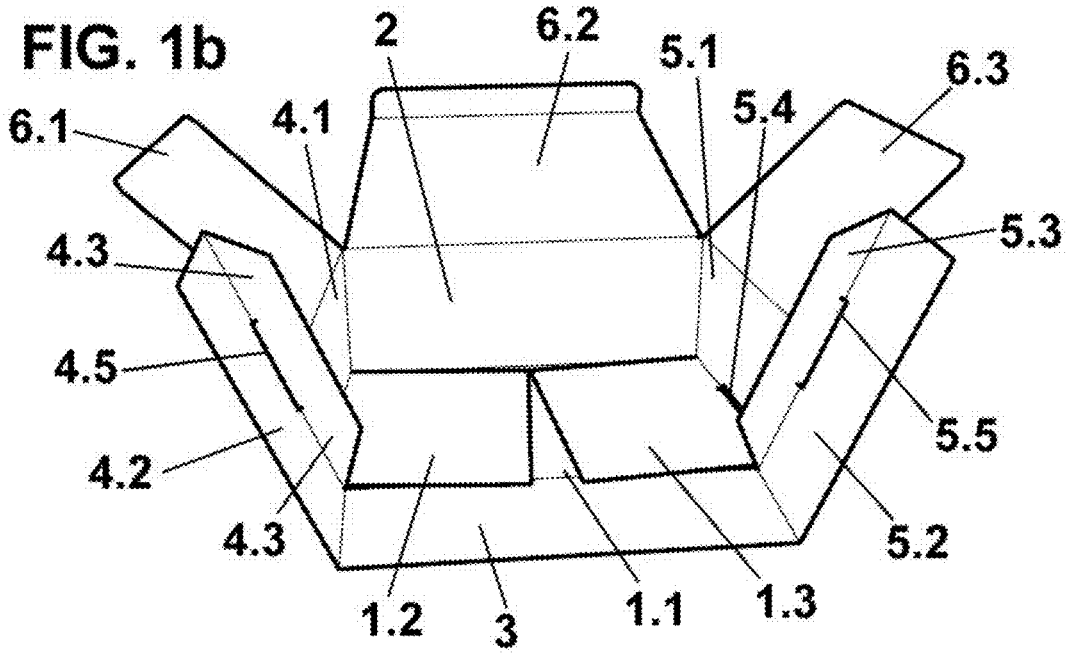
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FIG. 1c

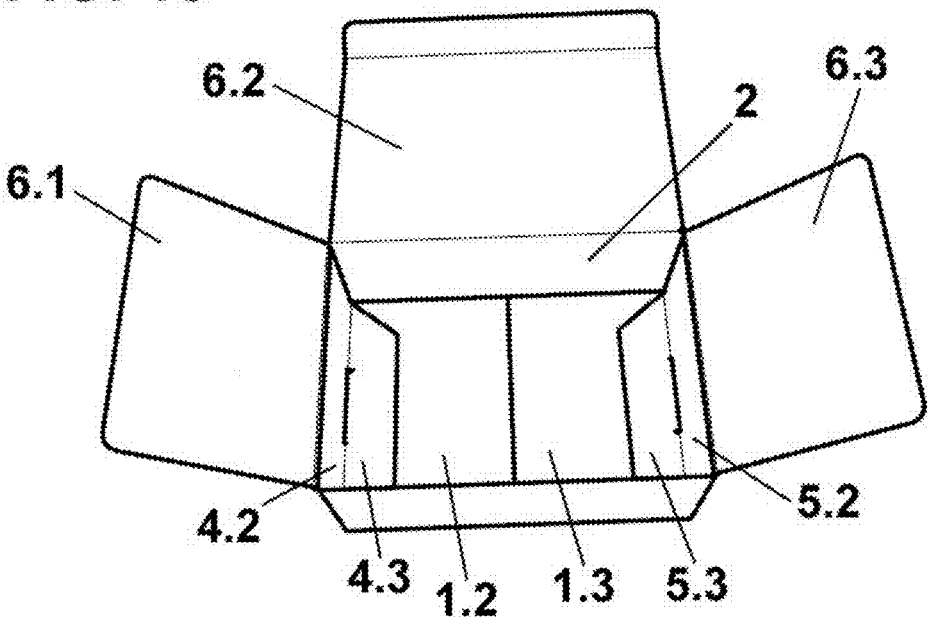
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FIG. 2a

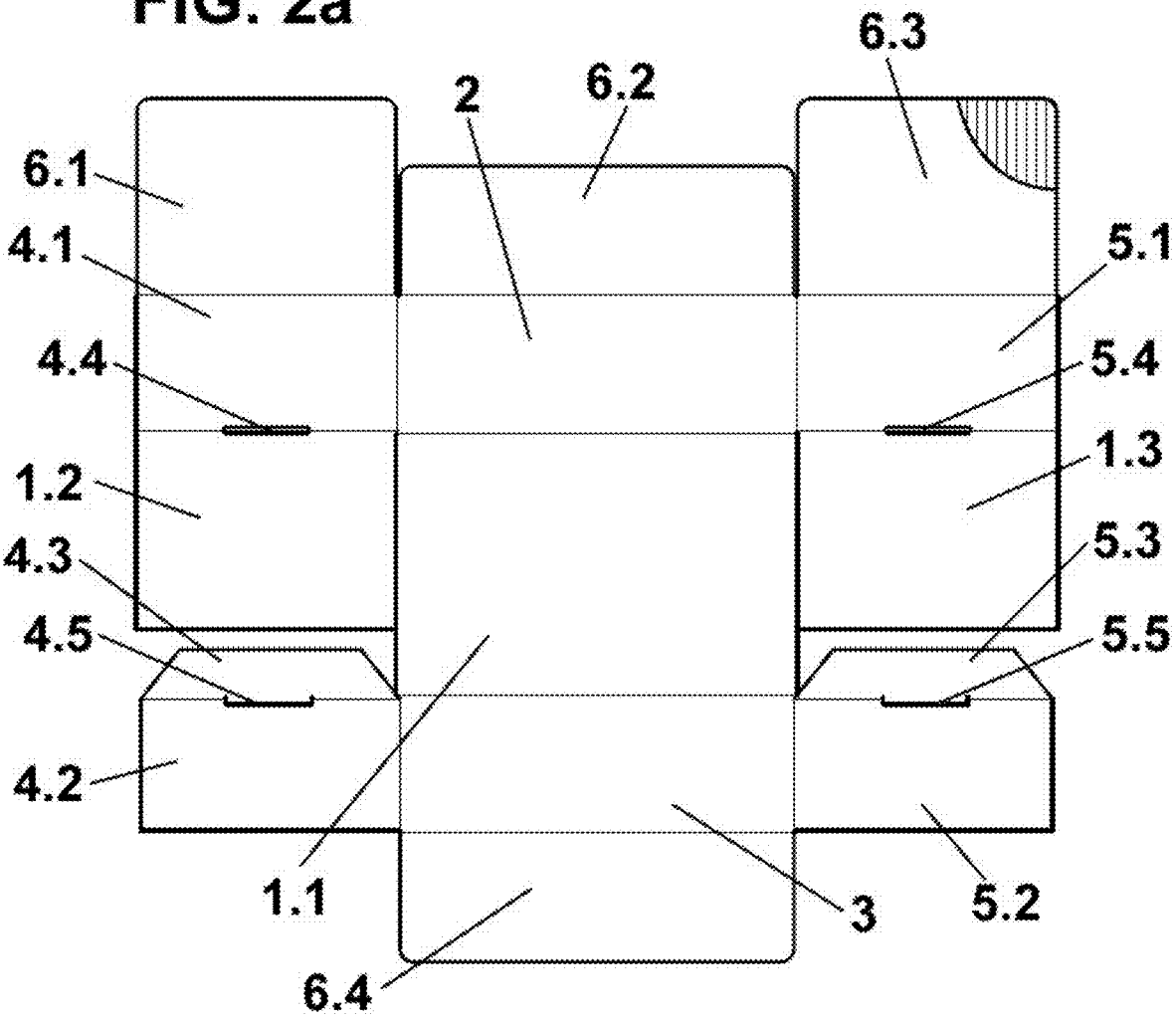

FIG. 2b

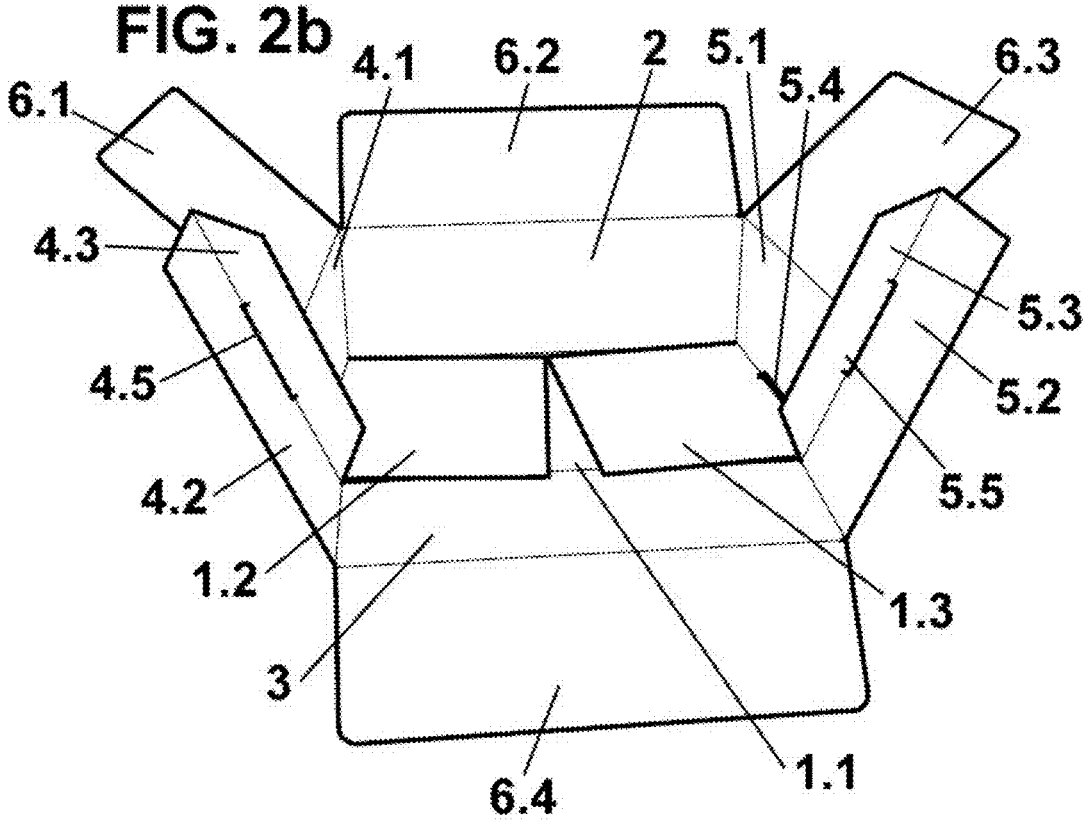
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FIG. 2c

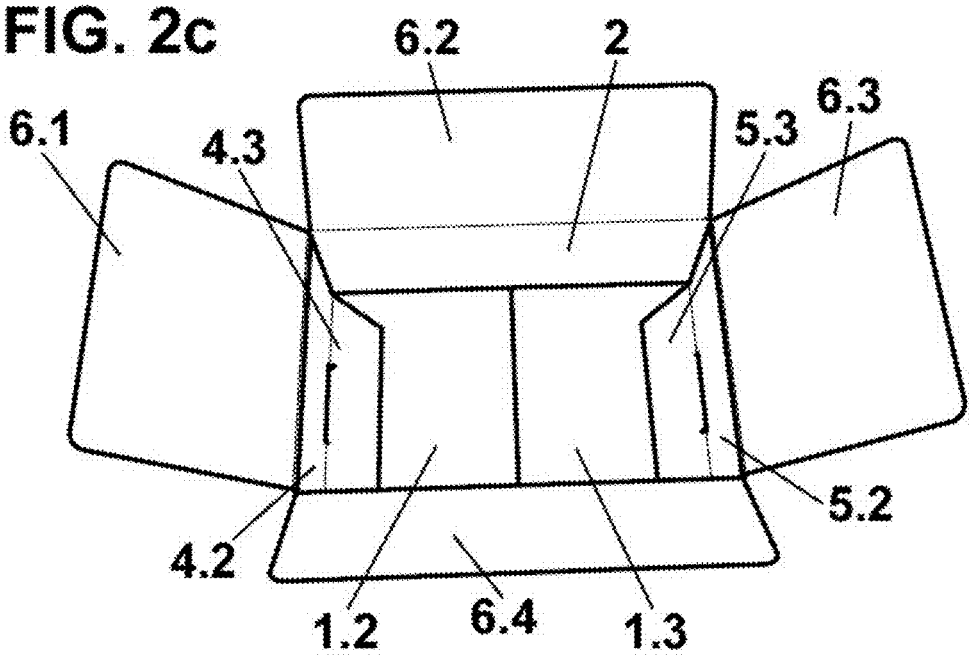
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FIG. 3

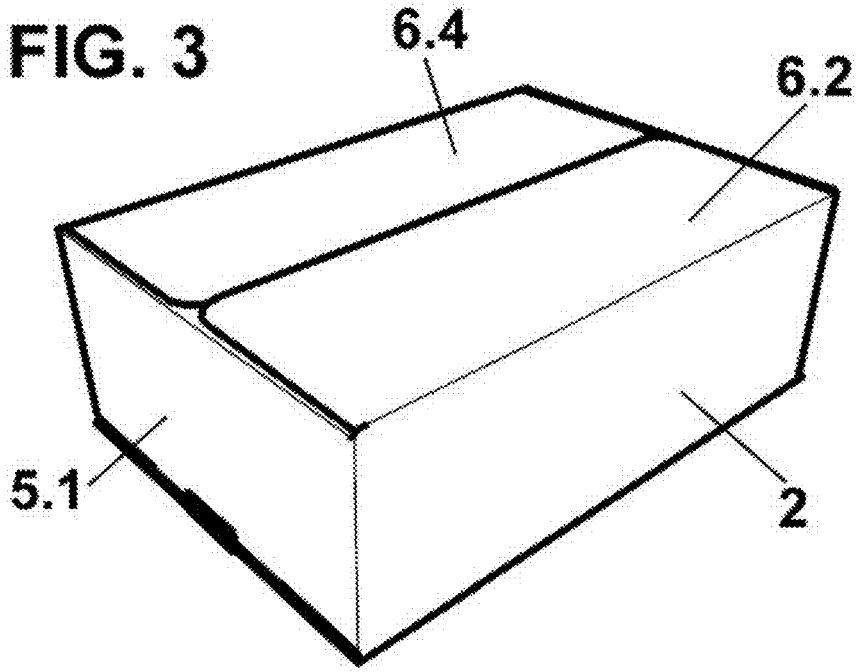

FIG. 4

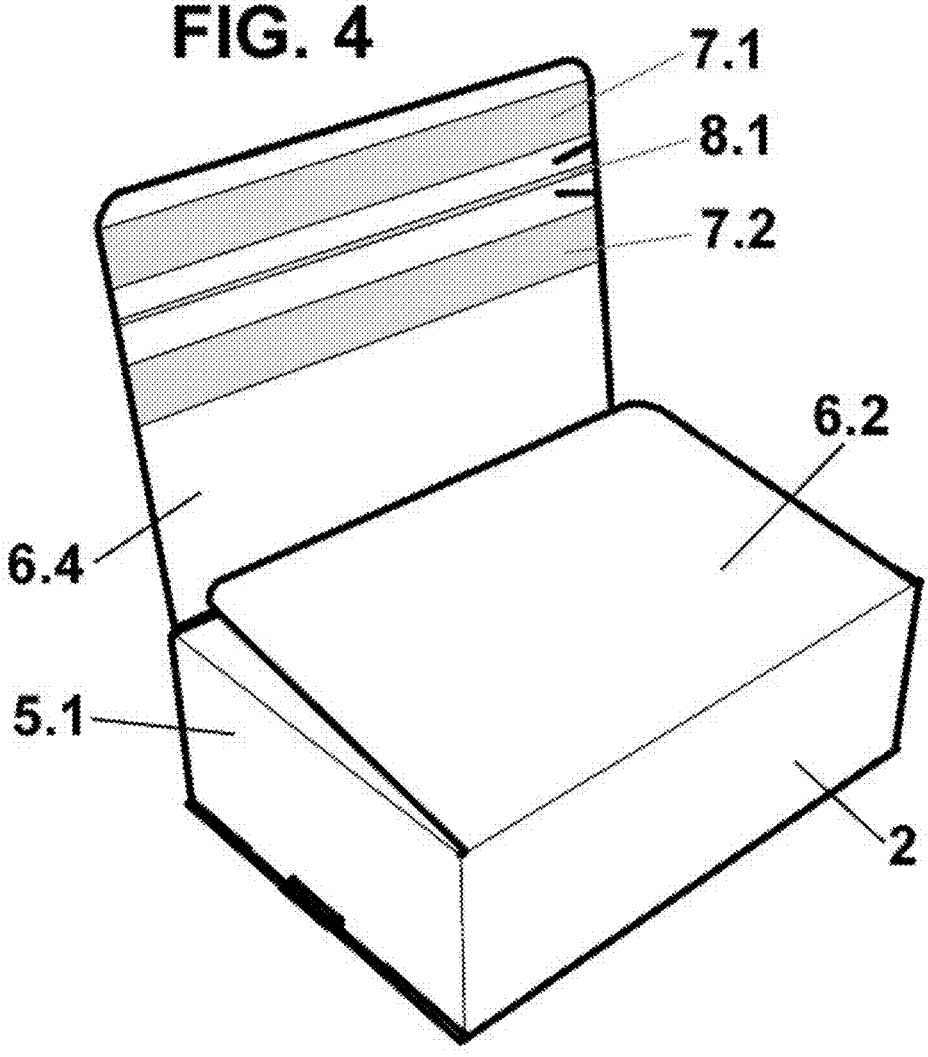

FIG. 5a

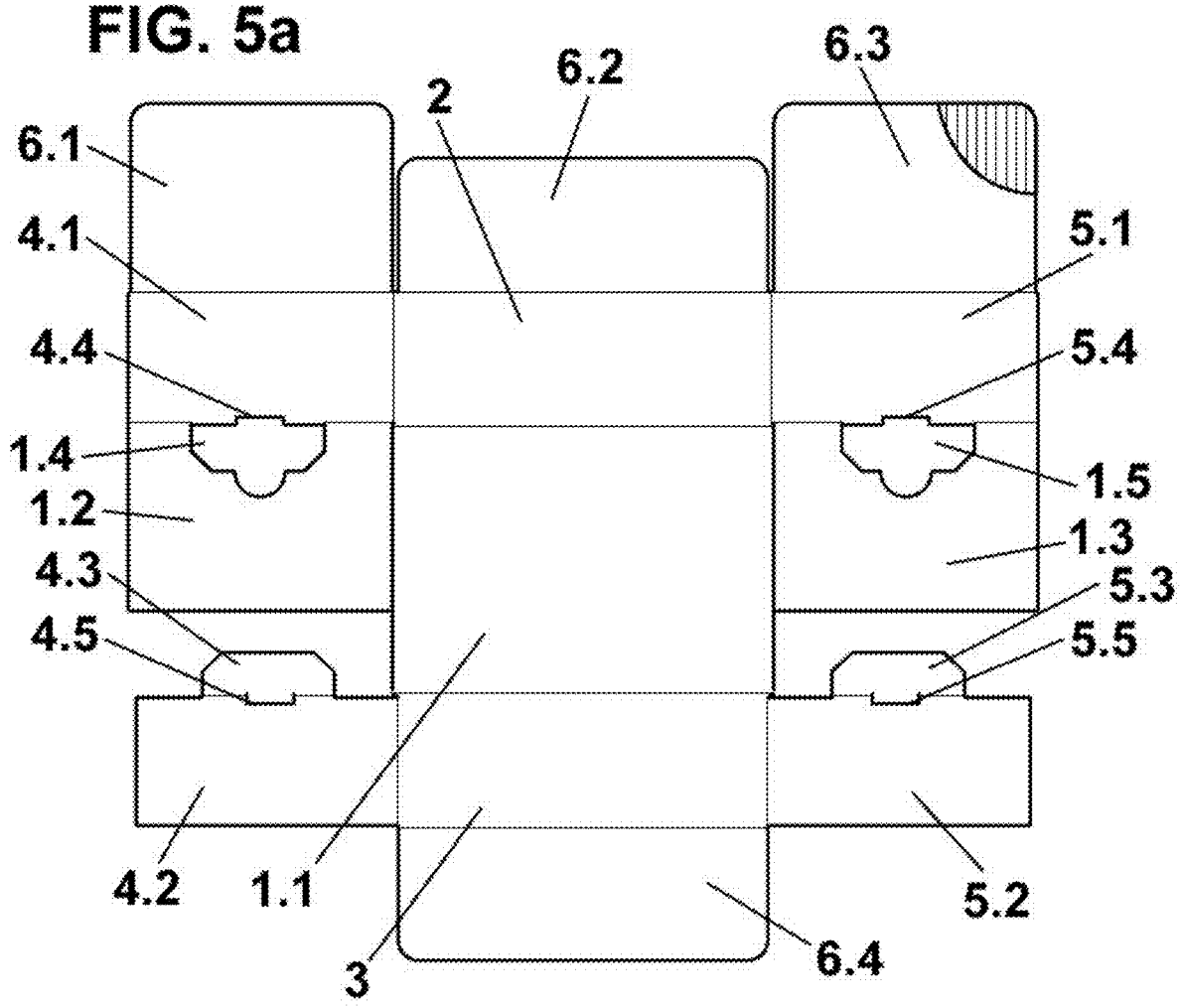

FIG. 5b

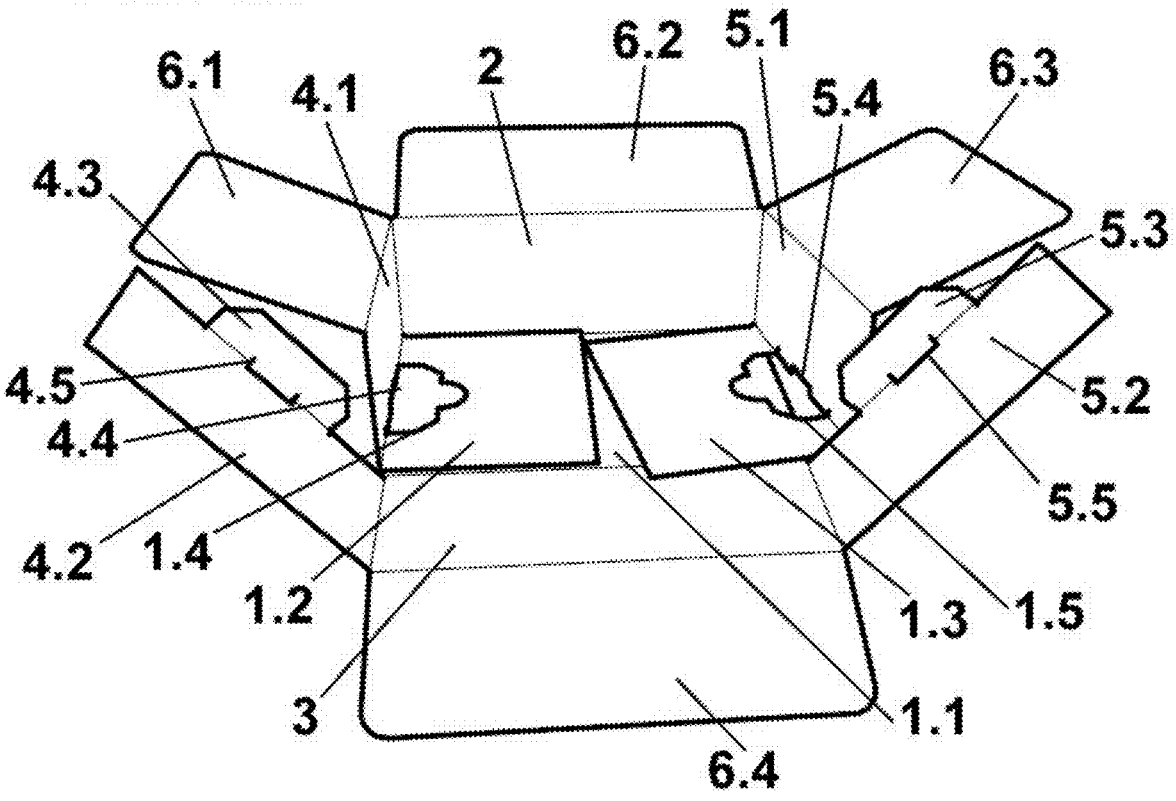
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FIG. 5c

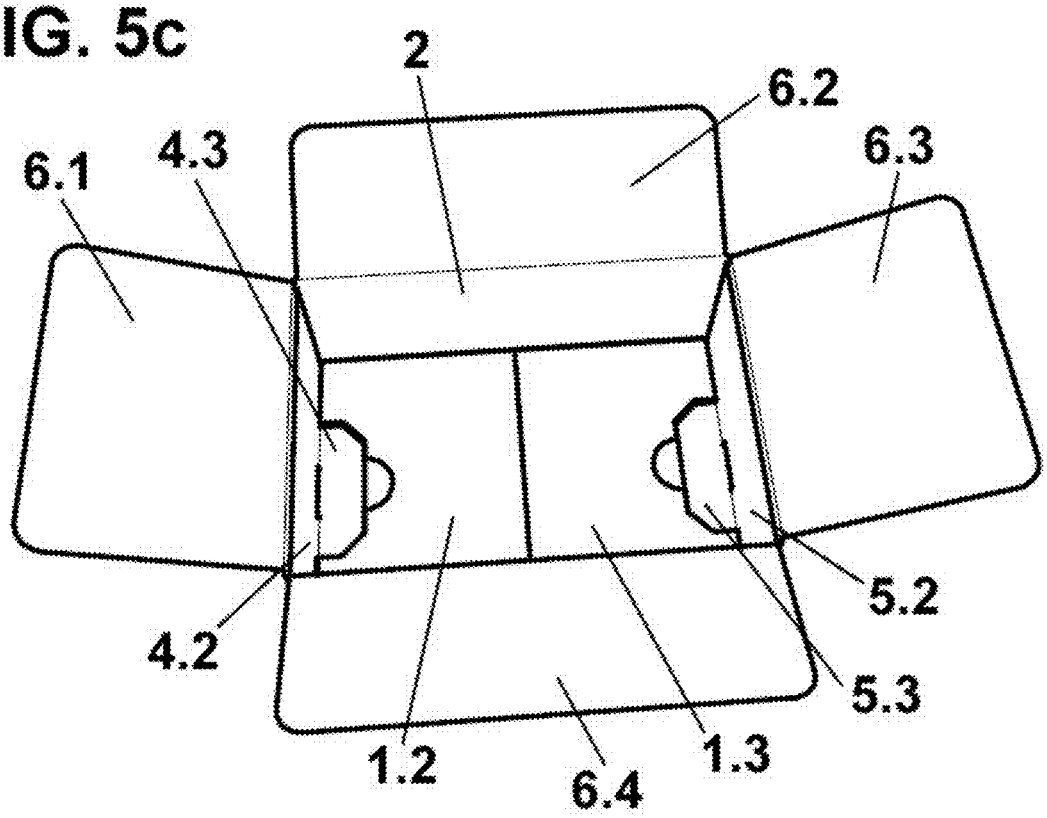
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FIG. 6a

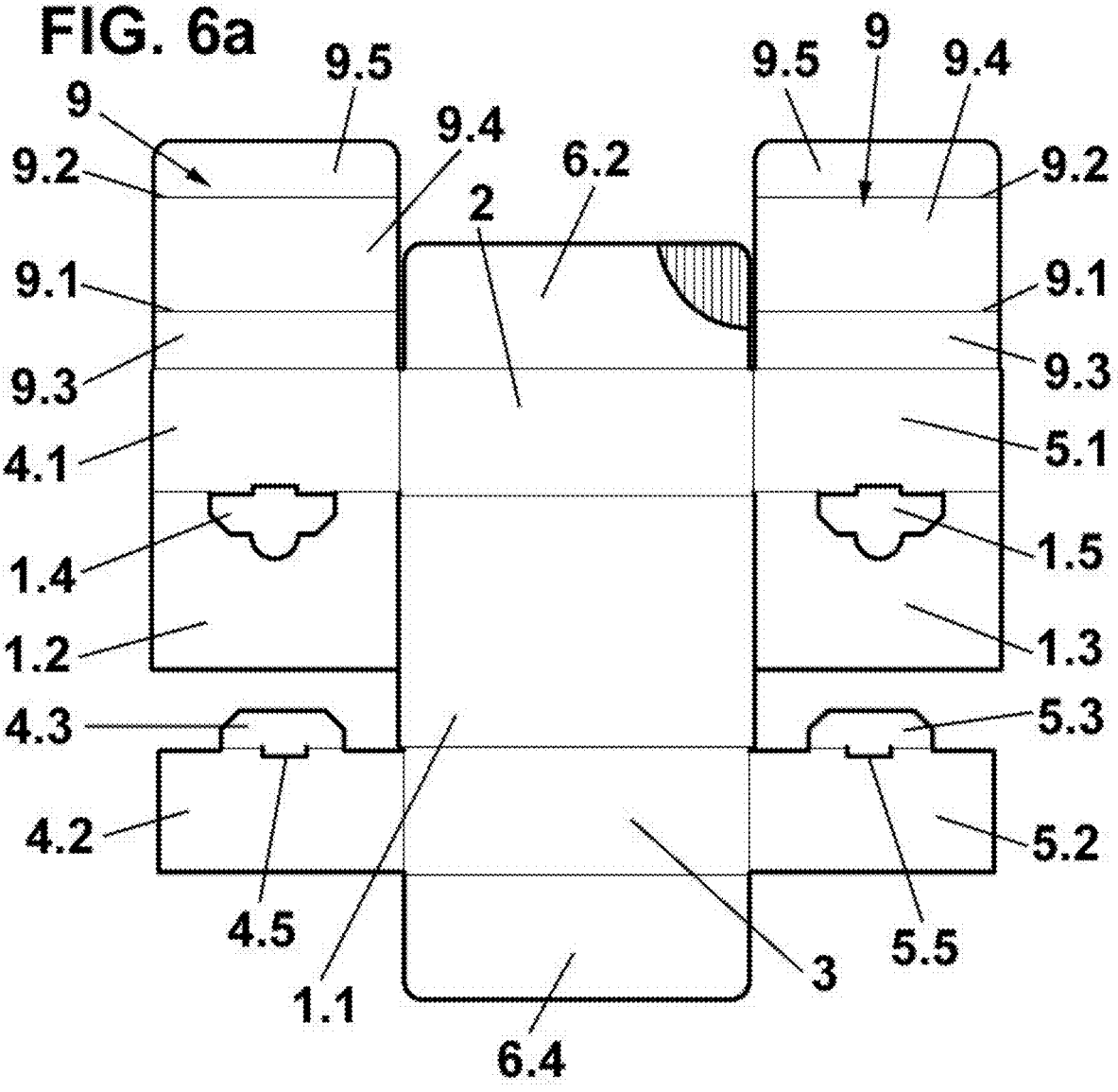
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FIG. 6b

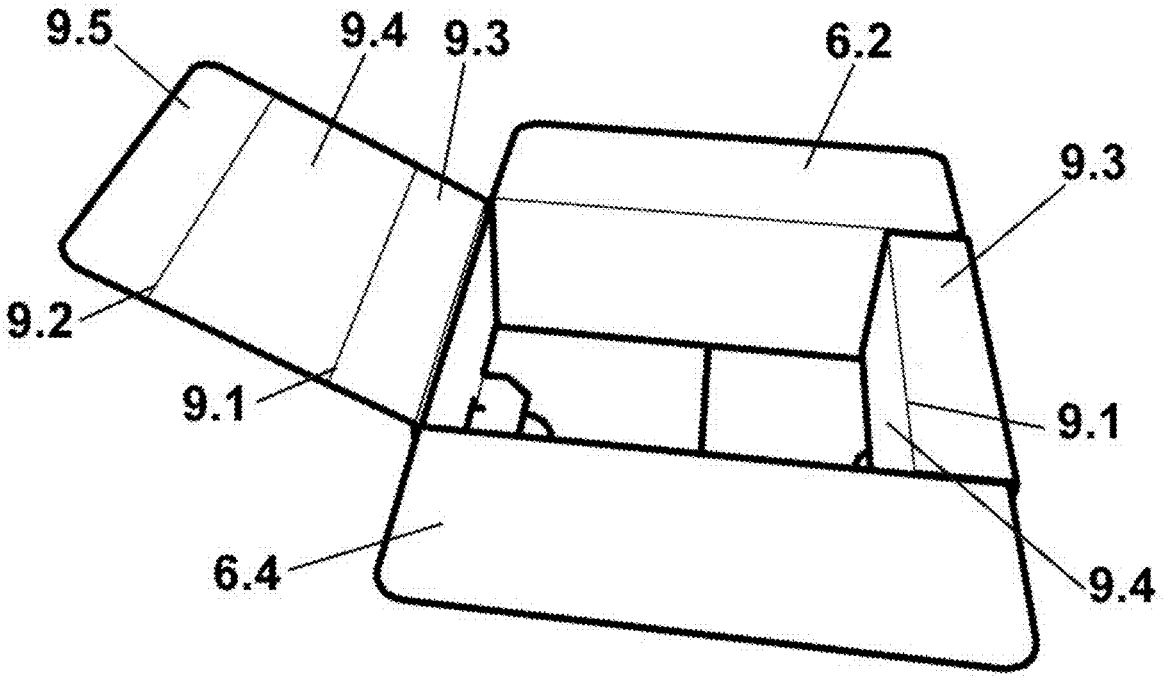


FIG. 6c

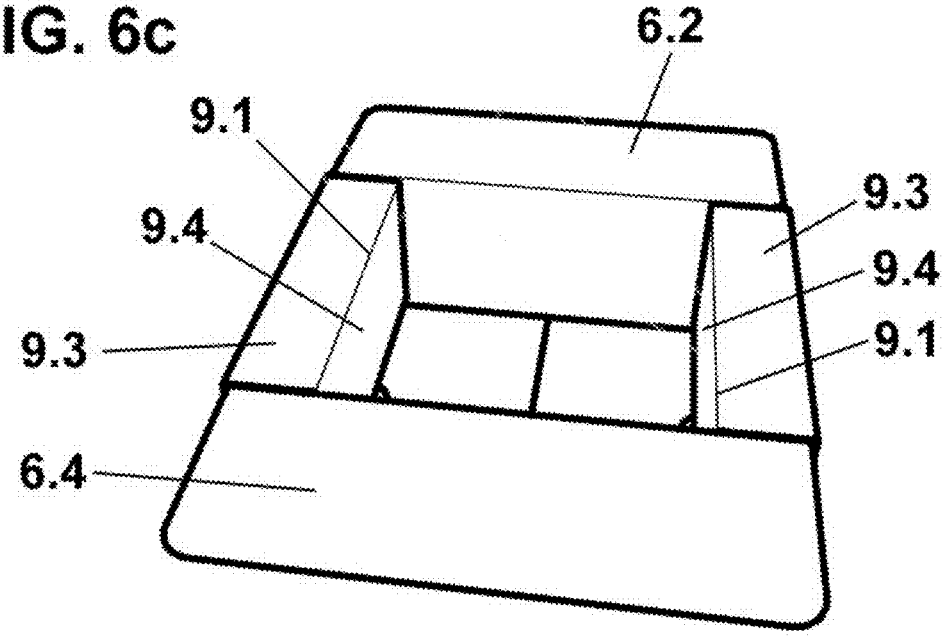


FIG. 7a

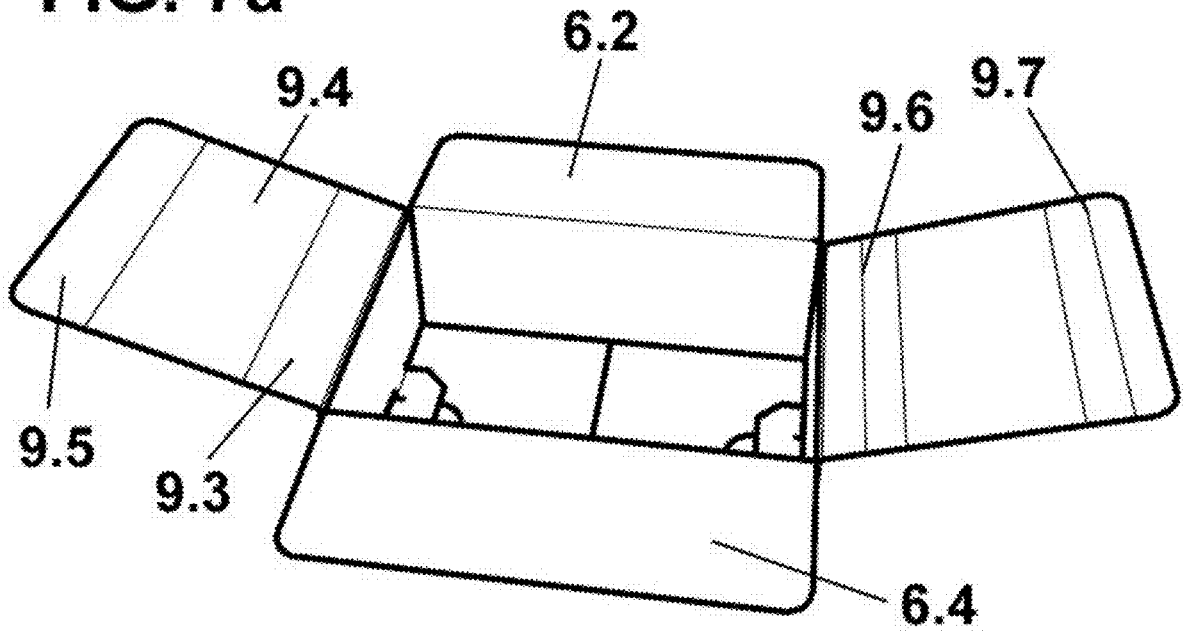


FIG. 7b

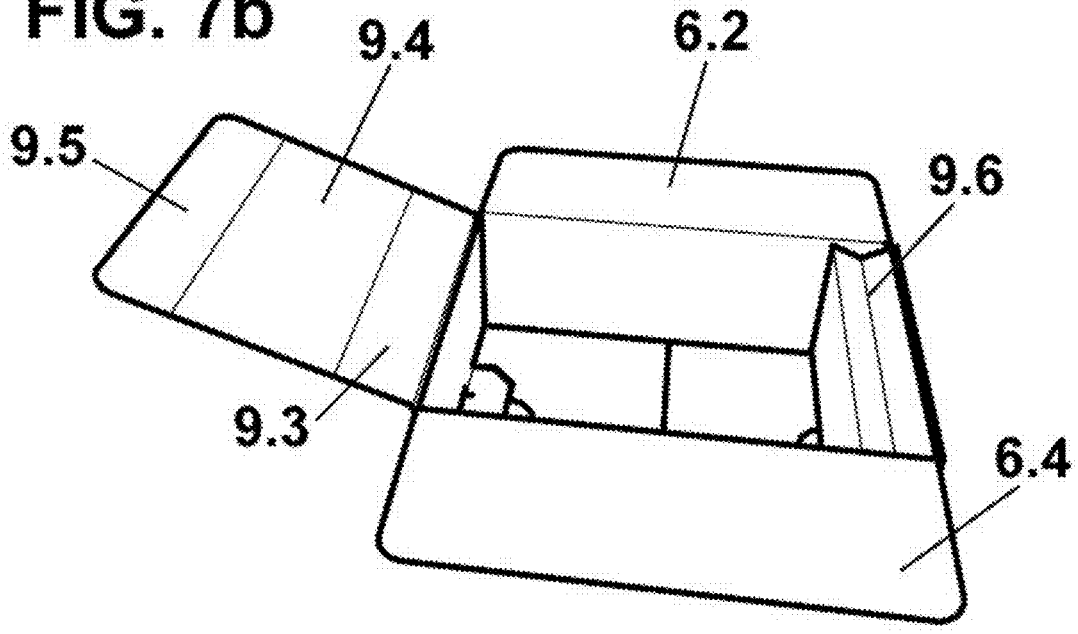


FIG. 8a

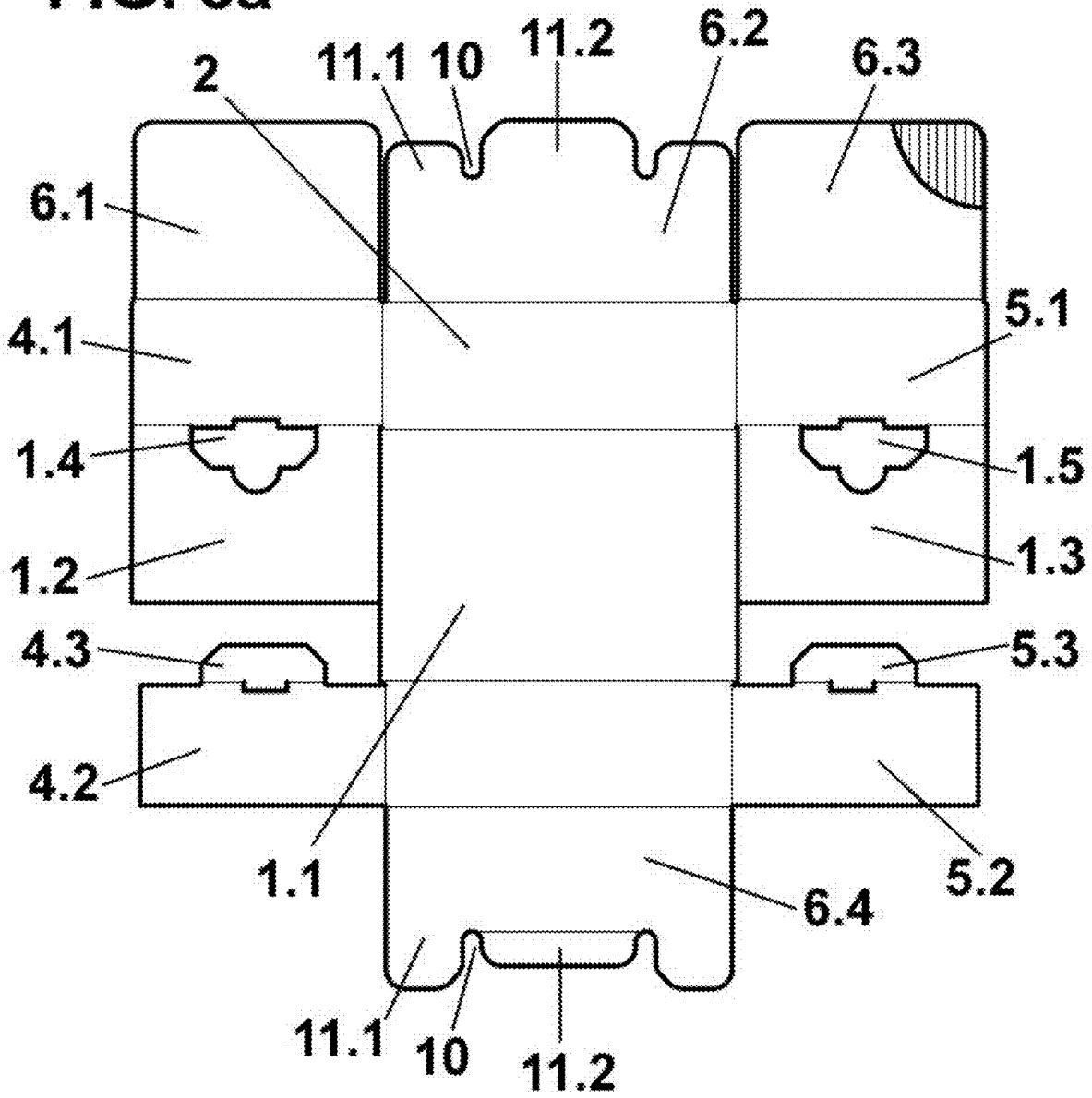


FIG. 8b

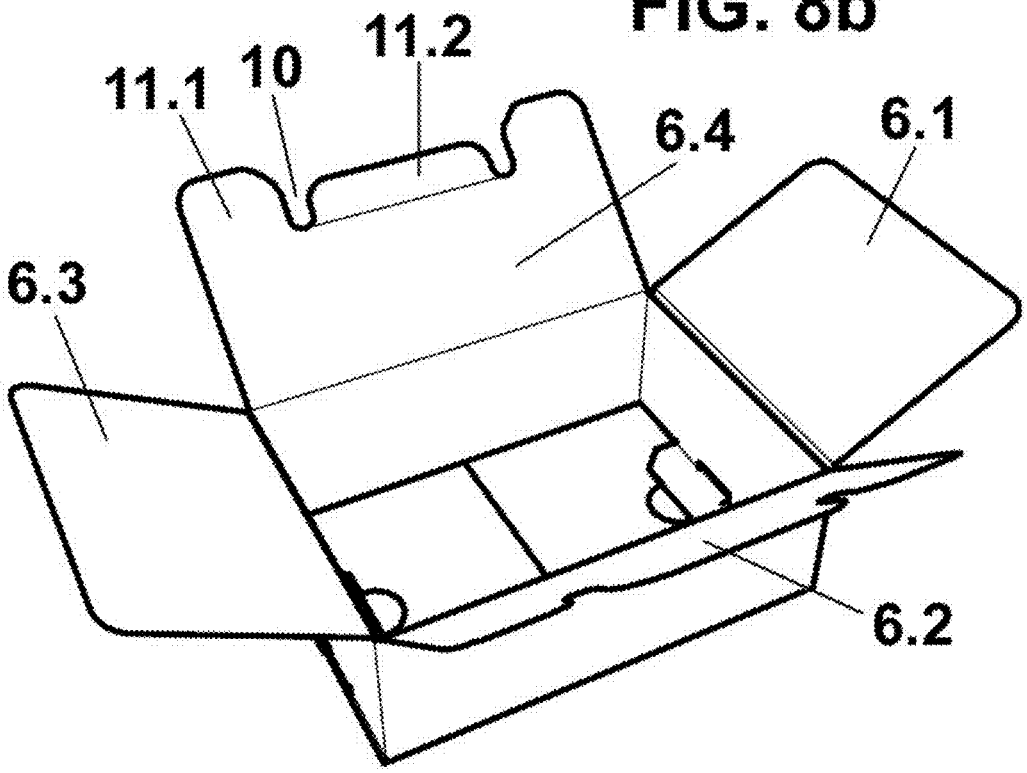


FIG. 8c

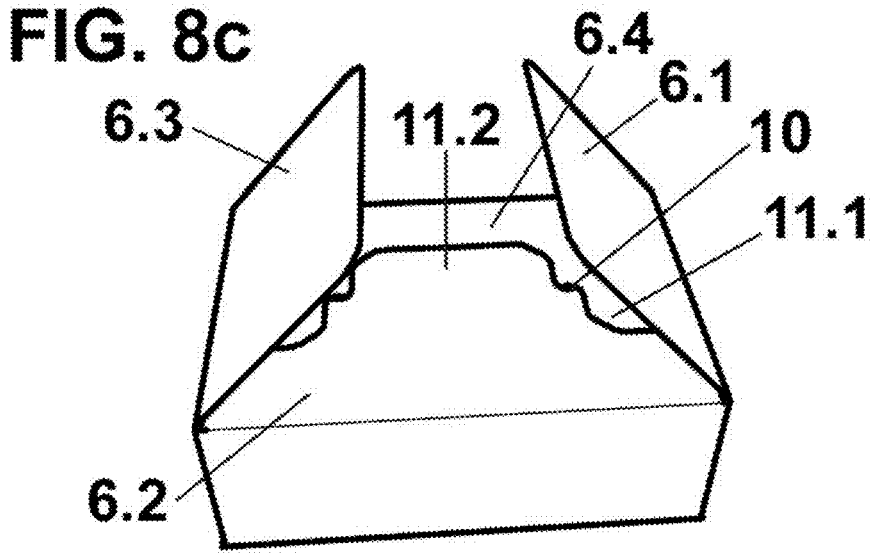


FIG. 9a

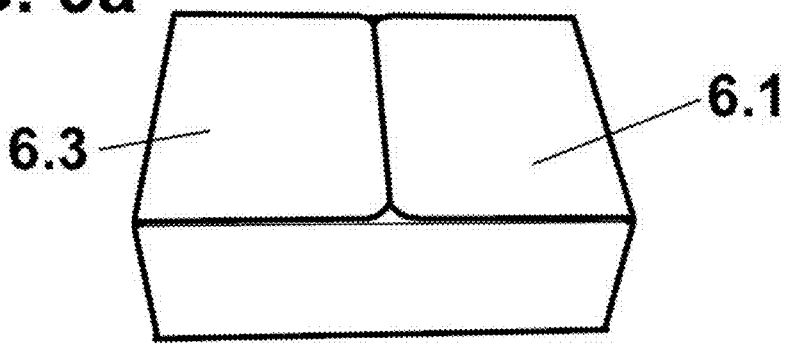


FIG. 9b

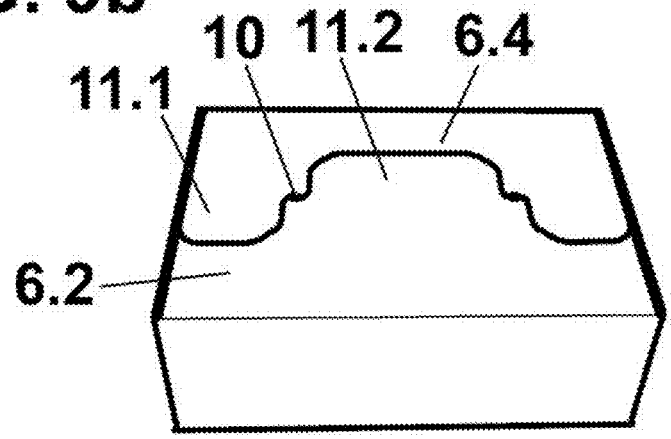


FIG. 10

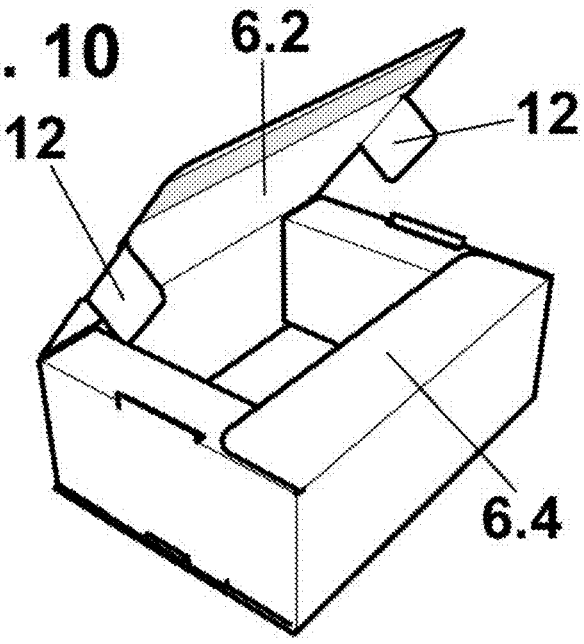


FIG. 11a

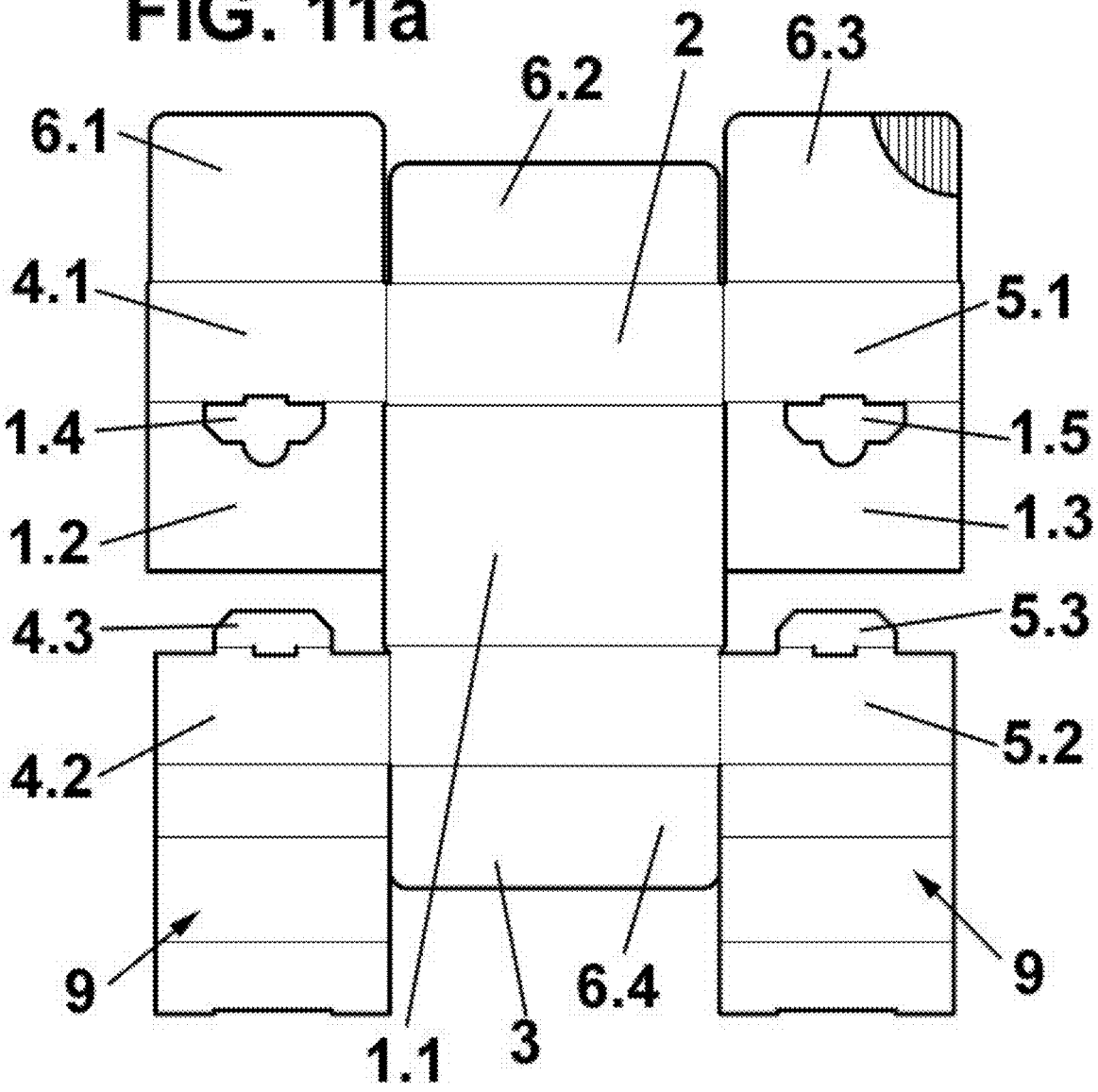


FIG. 11b

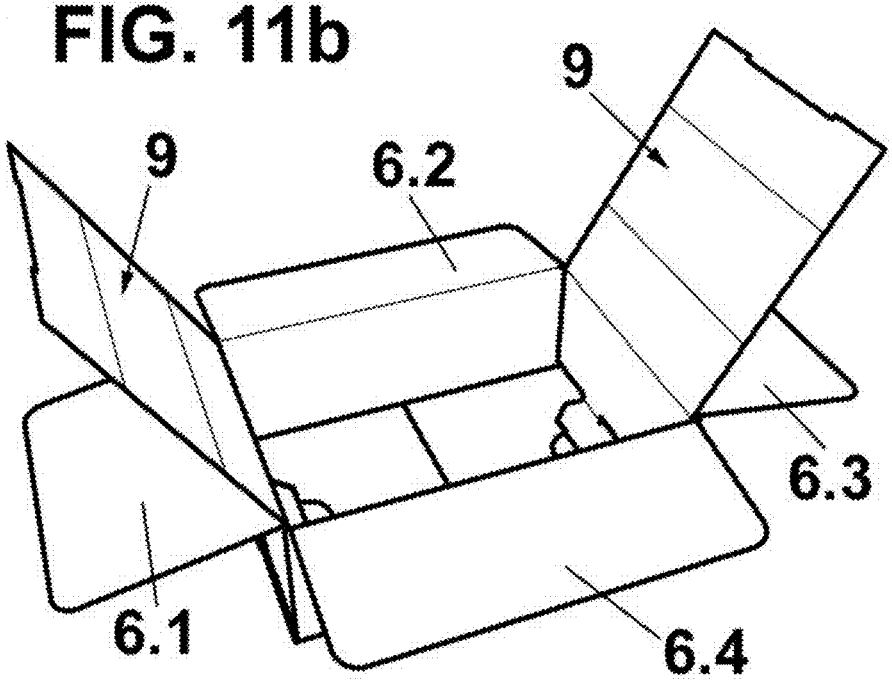


FIG. 11c

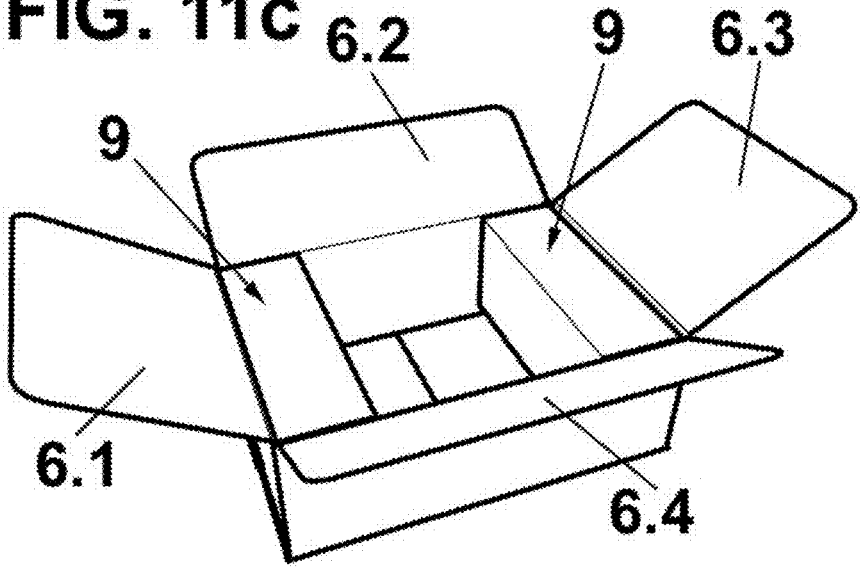


FIG. 12a

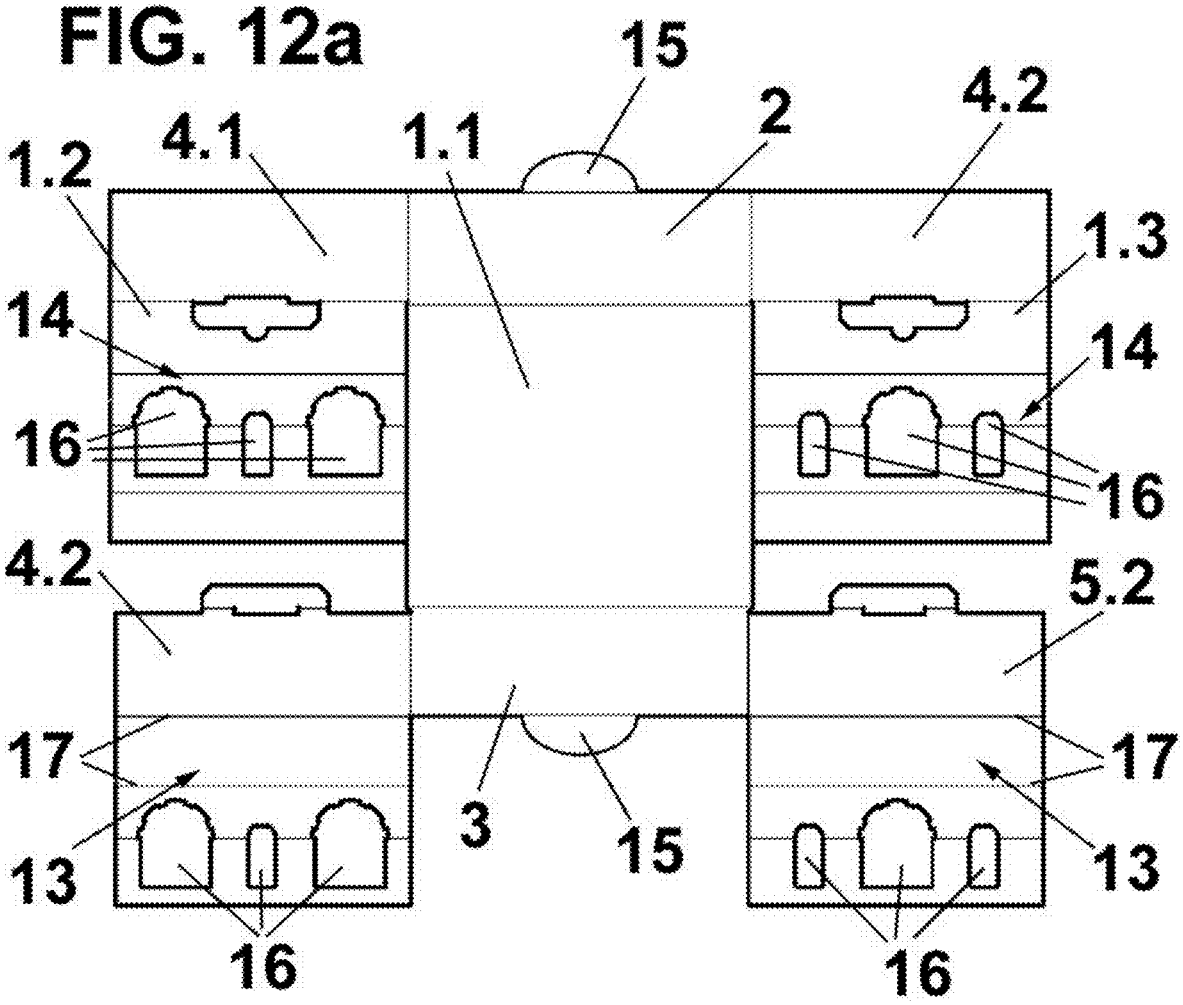
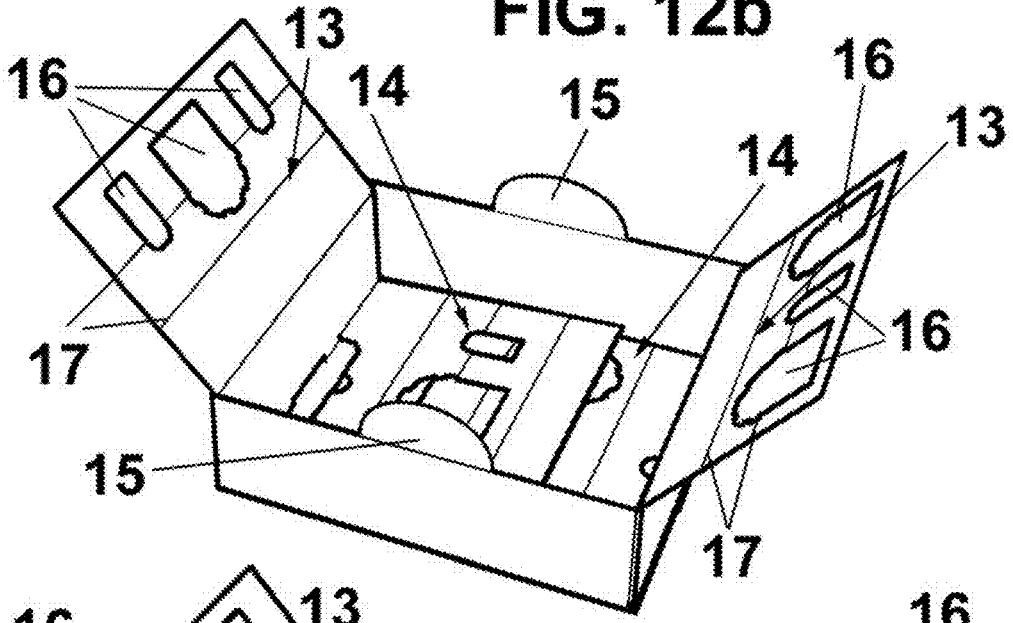


FIG. 12b



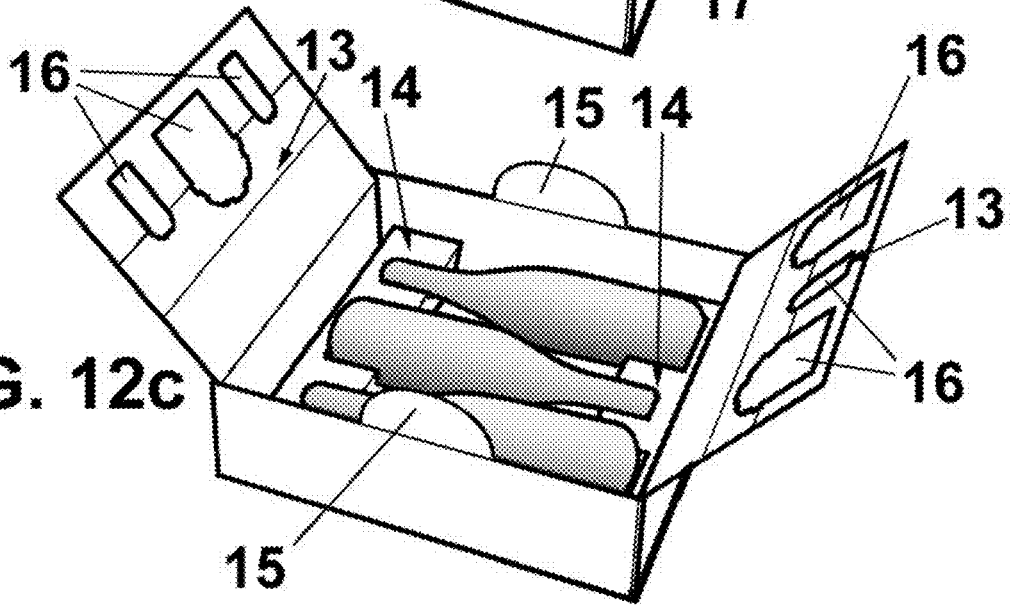


FIG. 12c

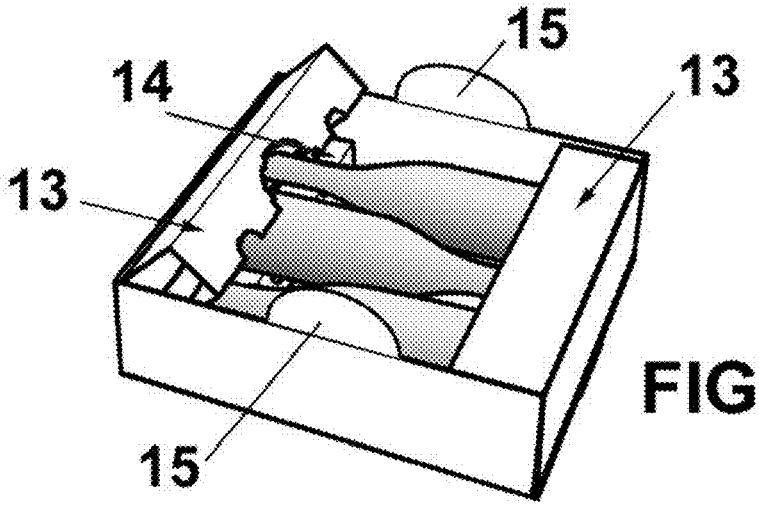


FIG. 12d

FIG. 12e

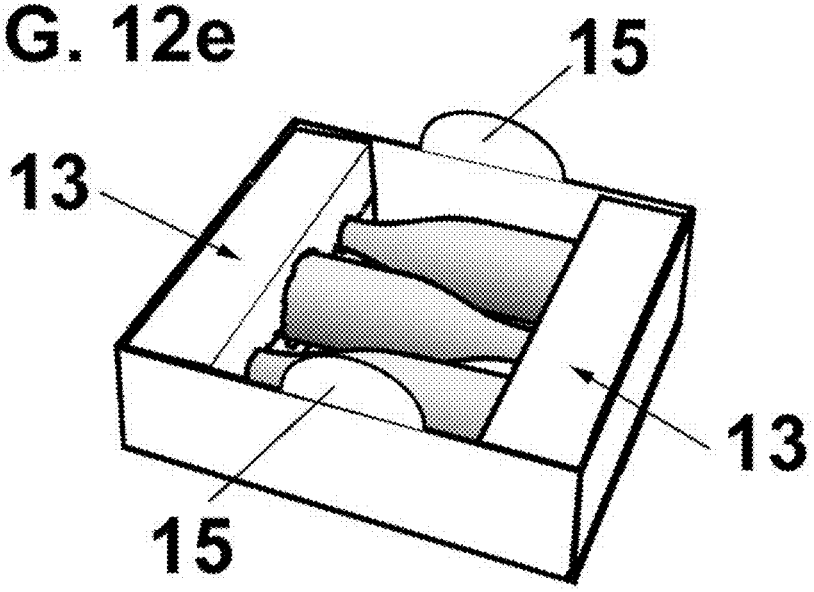


FIG. 12f

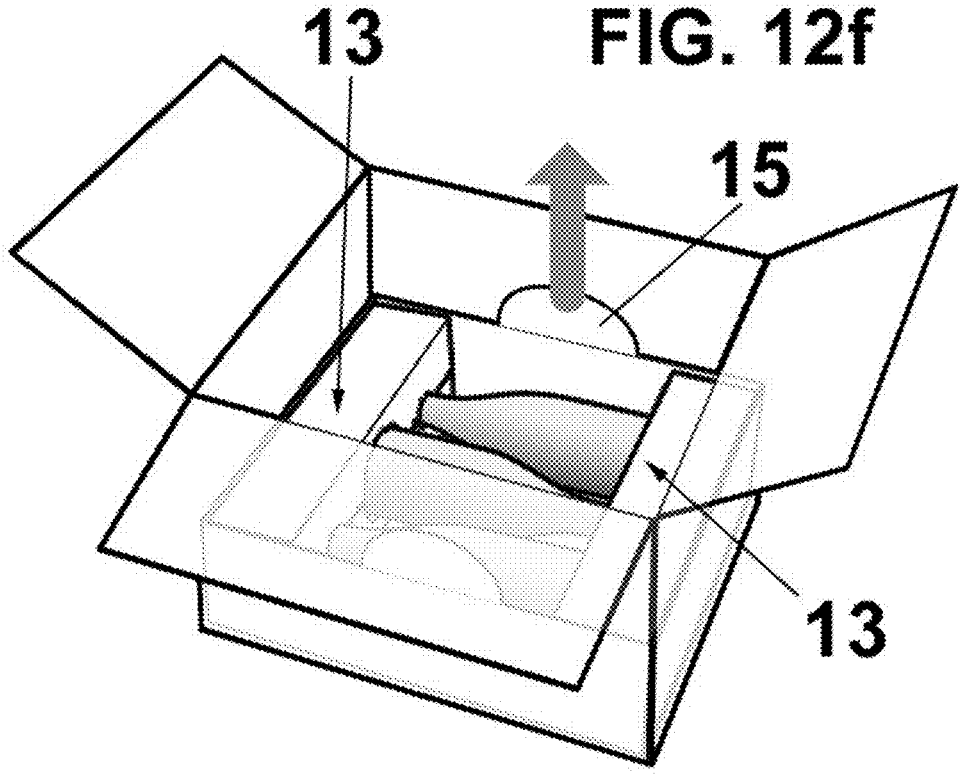


FIG. 13a

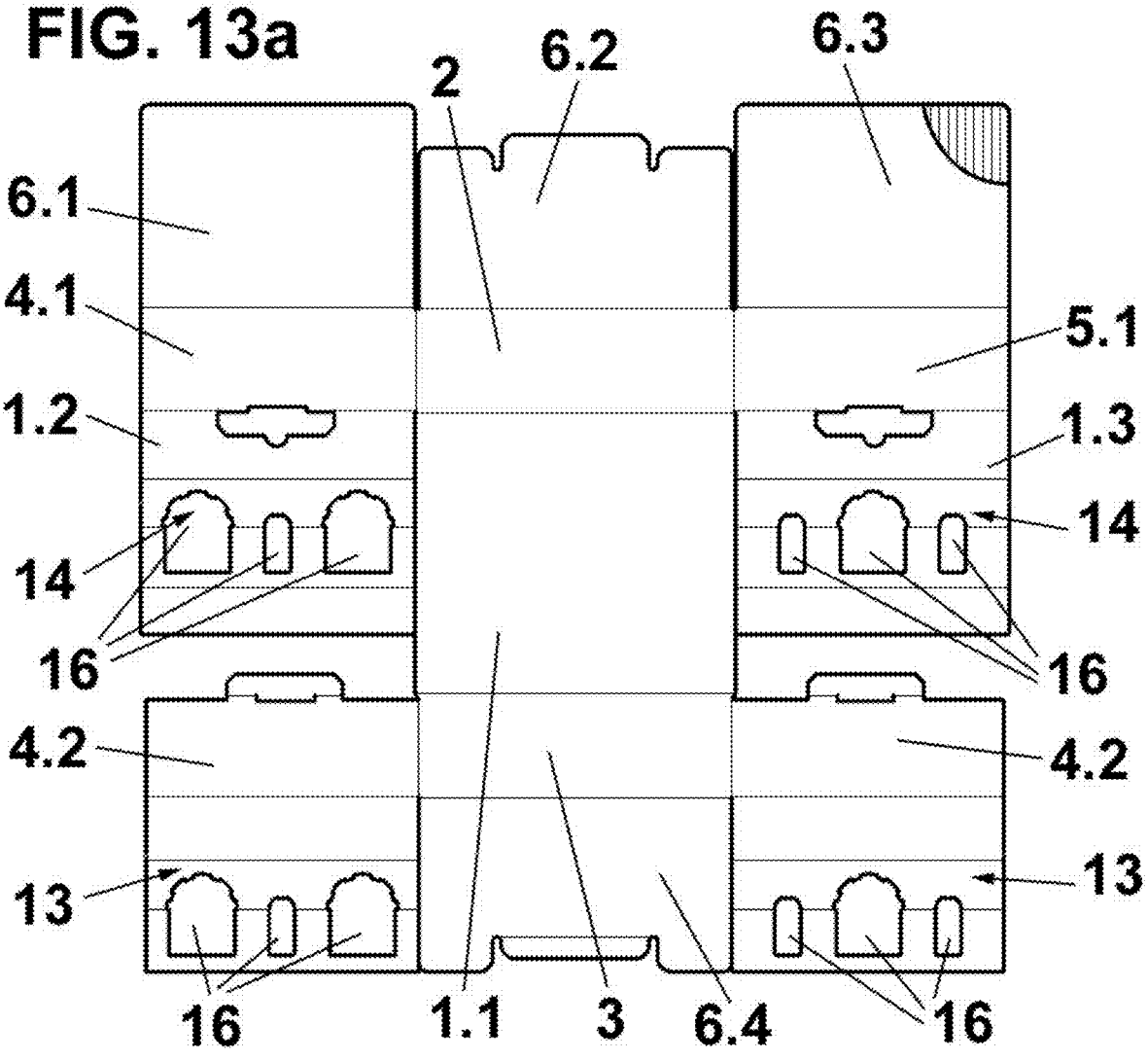


FIG. 13b

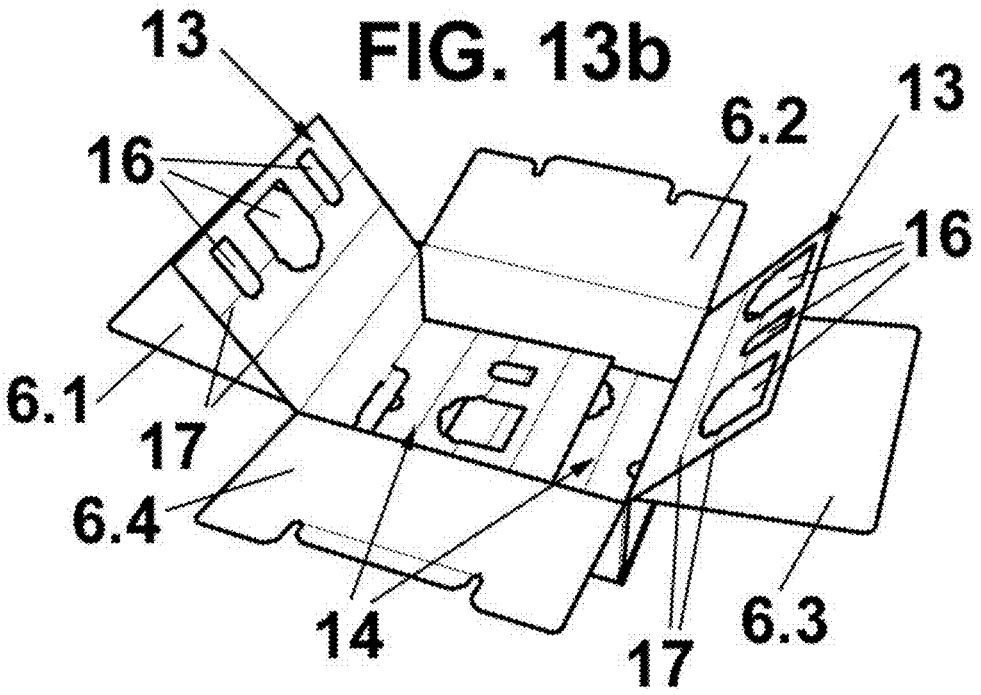


FIG. 13c

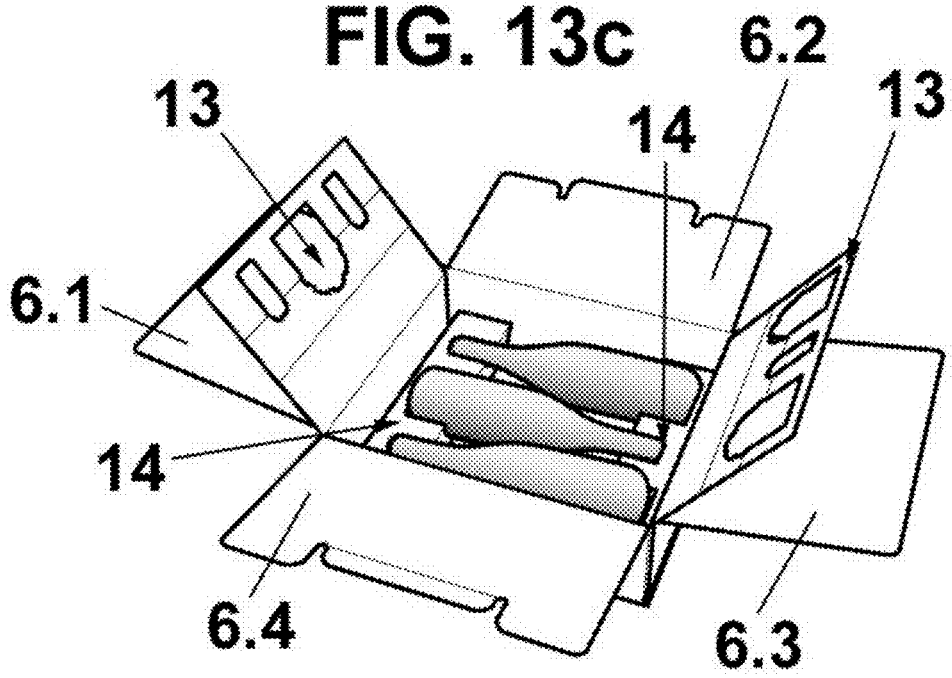


FIG. 13d

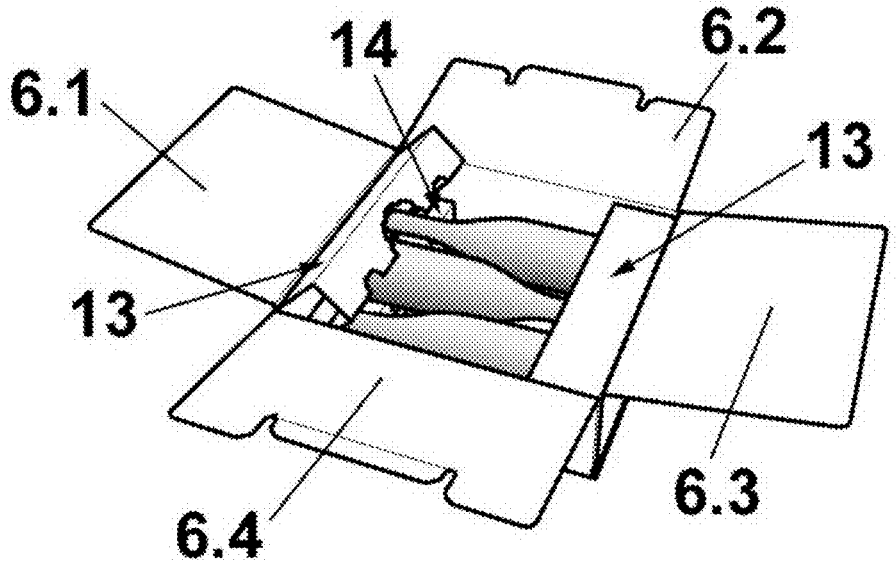
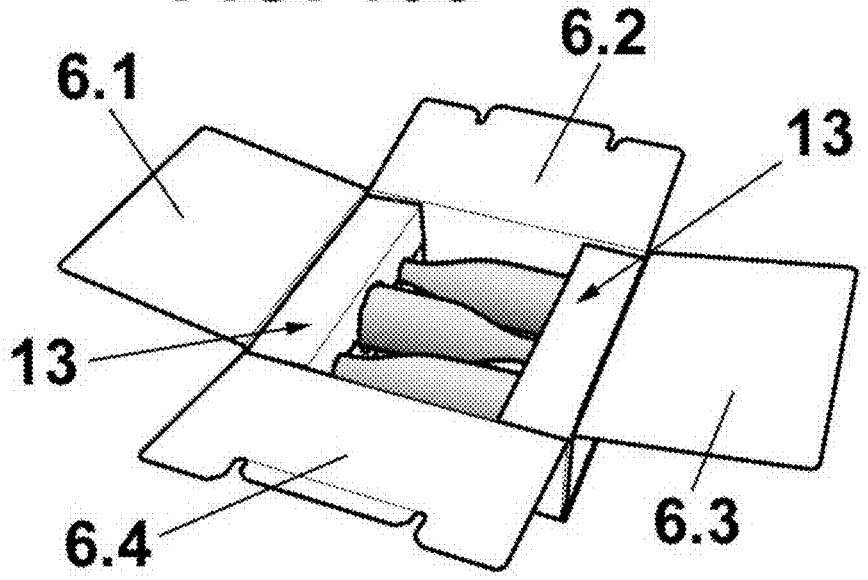


FIG. 13e



SHIPPING BOX

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of International Application No. PCT/EP2021/063875, filed on May 25, 2021, which claims priority under 35 U.S.C. § 119(a)-(d) to Application No. EP 20382474.3 filed on Jun. 2, 2020, the entire contents of which are hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a shipping box, in particular a box for shipping objects by mail.

BACKGROUND

[0003] Postal boxes are known for shipping medium or reduced-sized objects, which are made from a single sheet of cardboard in which the bottom folds to form two or more sidewalls and a lid.

[0004] Usually these boxes are intended to be filled from the top. These boxes belong to or are variants of the boxes included in group 04 of the FEFCO catalog, which is the international code for corrugated cardboard boxes, and they are also known as folding boxes, most of which do not require any type of gluing for their assembly.

[0005] These boxes differ from box models in which the sides are all consecutively joined to each other and require a joint system at the ends.

[0006] In these boxes, the joining mechanism is usually a flange that articulates along one of these ends and that is glued or stapled to the end of the other sidewall.

[0007] For boxes of reduced height that are the most used in postal shipments, the flange is logically shorter, and can be fragile and cause structural problems since, when the box is broken or detached, it loses its integrity. In some cases, this even makes it technically impossible to manufacture.

[0008] Sometimes these designs are used by changing the direction of use of the design, so that, considering the position of the box with respect to its position of use, four flaps are connected to the bottom, from one of them another flap rises that is glued or stapled with the front flap, thus forming a ring.

[0009] The other two flaps that rises from the bottom close the ring on the sides, often forming lids to the end of which a short flap is connected, which is inserted into the ring. These boxes are filled on one or both sides. Therefore, it is not possible for the four sides to remain perpendicular to the bottom during the filling.

[0010] When filled at the sides, they are less comfortable boxes both for filling and for extracting the product later.

[0011] Representative examples of the group 04 boxes of the FEFCO catalog, mentioned above, are box **427** and **470**, as well as their variants. Both one and the other, as well as some of their variants, are characterized in that to remain assembled they require two flaps necessary to maintain the assembled box, which can be called structural flaps, of length basically equal to the height of the box, which rise respectively from the upper ends of the walls that are perpendicular to the wall to which the box lid is connected, and that fold 180° on themselves, embracing one or more flaps that rise in turn from the adjacent walls.

[0012] These structural flaps are anchored by some element, for example, a flange that is inserted into a hole conveniently located at the bottom of the box, thus generating a sidewall with a thickness of three times the thickness of the material.

[0013] This type of model, like many others, has some design restrictions when choosing the size of the box, especially related to the relationship between the different dimensions of length, width and height, which can be characterized as "ratio problems."

[0014] In the case of these designs, specifically, it is not possible to generate boxes whose height is greater than their length, since this would prevent assembly because it is not possible to fold the structural flaps inwardly.

[0015] In most cases, these models incorporate only a functional flap that acts precisely as a lid. Sometimes, on its opposite side, another functional flap is connected, which often forms an internal accessory.

[0016] There are designs that need to be closed so that the box is fully assembled, so the filling is done on a box that is not yet fully conformed with the difficulties or discomfort that this may cause.

[0017] This is the case of model **426** and the like, in which a structural flap similar to that of the previously described models is used but located on the wall parallel to the face to which the lid is connected.

[0018] By correctly folding this flap, a box is obtained in which only three of the walls are kept perpendicular to the bottom, since the wall to which the lid is connected is not fixed when the lid is open to fill, so the box will not be assembled until the lid is closed and with this all vertical walls are fixed.

[0019] Other designs of the enveloping type such as model **401** or similar articulate the walls of the box by slits that are connected to the bottom in a similar way to some previously described models without resorting to any type of structural or anchor flap and therefore resulting in designs that they are not able to maintain the assembled box by themselves before closing it.

[0020] There are other designs that use external elements, such as staples or some type of gluing, so that they can be assembled before filling. In some cases, the result is a completely rigid box that once manufactured is directly assembled and therefore cannot be stored flat, folded, or extended.

[0021] Normally, these boxes are linked to a manufacturing process in which they are glued or stapled when the product is already inside or if it is not, it will then be introduced within the same forming and filling process. In no case are they boxes designed to be manufactured and stored for later use because they take up too much space when assembled.

[0022] In other cases, the boxes have a design that allows them to be glued or stapled when folded, which are known as four- or six-point glue boxes. The manufacturing system of these boxes determines their design, so the sidewalls do not incorporate functional flaps.

[0023] Sometimes they incorporate very short structural flaps that serve to keep the box assembled before filling. This is so because the gluing system for these folded boxes does not allow flaps long enough to be functional, for example, they could not serve as a lid or accessory.

[0024] By folding these structural flaps substantially at right angles, they keep the sidewall to which they are

connected straight, which would otherwise be bent by the diagonal slits that serve precisely to fold the box.

[0025] In addition, these box models have ratio problems, the maximum height that the box may have is limited by its width or length, depending on the variant of the box design.

[0026] There are also other designs that use anchoring systems between the flaps that are connected to the sides. These systems, which tend to be more elaborate, fragile, or not very stable, usually involve flaps arising on one or some of the sides and fit into housings or grooves located on their adjacent side.

[0027] Some versions locate this fit on the outside of the box, making it vulnerable to theft or accidental or unwanted opening. Other versions that locate the fit inside result in a structure incapable of keeping its four outer lateral faces in a rigid position and perpendicular to the bottom of the box.

[0028] Regardless of the assembly system, there are boxes in which three flaps joined together are connected to their upper part to form a lid with a bellows at the junction between the flaps.

[0029] This design is a way to guarantee the inviolability of the contents of the box, in addition to providing it with a certain structural resistance; however, they are boxes that are difficult to fill since the lid cannot be articulated, allowing it to be fully opened.

[0030] The length of these flaps is also conditioned by ratio problems due to the bellows that make up the lid, so they cannot have a different function from that of the lid, so they could not be used as a divider, reducer of the internal space or as any accessory type.

SUMMARY

[0031] Therefore, an objective of the present disclosure is to provide a shipping box comprising a series of flaps that allow performing other functions other than forming the box structure.

[0032] With the disclosed shipping box, the aforementioned disadvantages are solved, presenting other advantages that will be described below.

[0033] The disclosed shipping box is formed from a single sheet comprising:

[0034] a structural bottom flap that forms a bottom and occupies the entire surface of the bottom; and

[0035] a plurality of structural sidewall flaps forming at least four sidewalls of the box, of which at least two are connected to the bottom structural flap, the sidewalls being positioned substantially perpendicular to the bottom in their position of use when the box is open, and

[0036] assembly elements that assemble the box stably, the box being foldable in a flat folded position, wherein:

[0037] from its upper part, in the position of use, from at least three of the sidewall structural flaps, at least three independent functional flaps are connected, the functional flaps performing the functions of lid, interior space reducer, fastening and/or handle, the assembly elements being located on the structural flaps on the internal part of the box.

[0038] Advantageously, the assembly elements are projections that are housed in complementary housings or glued to a structural flap.

[0039] Advantageously, the sheet is of a corrugated material that defines a plurality of channels substantially parallel to each other, and the channels of the corrugated material in the sidewalls are substantially perpendicular to the bottom.

[0040] The channels of the corrugated material are also advantageously perpendicular to the slits separating the structural flaps.

[0041] Furthermore, the box according to the present disclosure preferably comprises two additional bottom structural flaps that form a double thickness bottom, which are connected to two sidewall structural flaps.

[0042] The box according to the present disclosure also preferably comprises two additional sidewall structural flaps forming two double thickness sidewalls, which are connected to a sidewall structural flap.

[0043] According to one implementation, to each of the two opposite additional sidewall structural flaps a bottom structural reinforcement flap is connected, defining a projection between the additional sidewall structural flap and the bottom reinforcing structural flap, the projection being housed in a complementary slot.

[0044] Preferably, each additional bottom structural flap comprises a cavity for housing one of the bottom reinforcing structural flaps.

[0045] According to one implementation, two of the functional flaps are functional lid flaps which, in their closed position, have their ends substantially in contact with each other or are totally or partially overlapped, one of the functional lid flaps comprising at least one sealing element and at least one tear strip when the functional cover flaps are totally or partially overlapped.

[0046] Preferably, two of the functional flaps are functional lid flaps that comprise at least one slot for engagement with each other.

[0047] According to one implementation, at least one of the functional flaps is a functional space reduction flap, each of them comprising one or more slits that define secondary flaps from each functional space reduction flap.

[0048] According to one implementation, at least one of the functional flaps is a functional fastening flap, and each functional fastening flap comprises at least one hole and slits.

[0049] According to one implementation, at least one of the functional flaps is a handle functional flap.

[0050] With the shipping box according to the present disclosure, as from the top, in its position of use, at least three of its structural sidewall flaps give rise to at least three functional flaps independent of each other, which can be as long as desired, these can be used for functions not related with the assembly of the box.

[0051] Therefore, these flaps are functional and can perform the function of lid, reducer of the interior space, reinforcement and/or fastening.

BRIEF DESCRIPTION OF THE DRAWINGS

[0052] For better understanding of what has been disclosed, some drawings in which, schematically and only by way of a non-limiting example, a practical case of implementation is shown.

[0053] FIG. **1***a* is a plan view of an unfolded sheet that forms the shipping box of the present disclosure according to a first implementation.

[0054] FIG. **1**B is a perspective view of a shipping box according to a first disclosed implementation during its assembly process.

[0055] FIG. **1***c* is a perspective view of the shipping box according to the first implementation in its assembled position.

[0056] FIG. **2***a* is a plan view of an unfolded sheet that forms a shipping box according to a second disclosed implementation.

[0057] FIG. **2***b* is a perspective view of the shipping box of the second implementation during its assembly process.

[0058] FIG. **2***c* is a perspective view of the shipping box of the second implementation in its assembled position.

[0059] FIGS. **3** and **4** are perspective views showing two variants of the lid of the shipping box according to the first and second implementations.

[0060] FIG. **5***a* is a plan view of an unfolded sheet that forms a shipping box according to a third disclosed implementation.

[0061] FIG. **5***b* is a perspective view of the shipping box of the third implementation during its assembly process.

[0062] FIG. **5***c* is a perspective view of the shipping box of the third implementation in its assembled position.

[0063] FIG. **6***a* is a plan view of an unfolded sheet that forms a shipping box according to a fourth disclosed implementation.

[0064] FIG. **6***b* is a perspective view of the shipping box of the fourth implementation during its assembly process.

[0065] FIG. **6***c* is a perspective view of the shipping box of the fourth implementation in its assembled position.

[0066] FIGS. **7***a* and **7***b* are perspective views of a variant of the fourth implementation of the box.

[0067] FIG. **8***a* is a plan view of an unfolded sheet that forms a shipping box according to a fifth disclosed implementation.

[0068] FIG. **8***b* is a perspective view of the shipping box of the fifth implementation during its assembly process.

[0069] FIG. **8***c* is a perspective view of the shipping box of the fifth implementation in its assembled position.

[0070] FIGS. **9***a* and **9***b* are perspective views of the fifth implementation of the box, with different closure options.

[0071] FIG. **10** is a perspective view of a variant of the lid of the shipping box, applicable to the above implementations.

[0072] FIG. **11***a* is a plan view of an unfolded sheet that forms a shipping box according to a sixth disclosed implementation.

[0073] FIG. **11***b* is a perspective view of the shipping box of the sixth implementation during its assembly process.

[0074] FIG. **11***c* is a perspective view of the shipping box of the sixth implementation in its assembled position.

[0075] FIG. **12***a* is a plan view of an unfolded sheet that forms a shipping box according to a seventh disclosed implementation.

[0076] FIGS. **12***b* to **12***f* are perspective views of the shipping box of the seventh implementation during its assembly process.

[0077] FIG. **13***a* is a plan view of an unfolded sheet that forms a shipping box according to an eighth disclosed implementation.

[0078] FIGS. **13***b* to **13***e* are perspective views of the shipping box of the eighth implementation during its assembly process.

DETAILED DESCRIPTION

[0079] First, in the present description and in the appended claims, the following terms should be interpreted as follows:

[0080] An "assembled box" is understood to mean that its sidewalls remain rigid and substantially perpendicular to the bottom without the help of external elements.

[0081] "Stiffness" is understood to mean that a wall does not tend to bend due to any slit contained in it or that delimits it.

[0082] "Flap" is understood to be the section of material pertaining to the development of the box that is completely delimited by lines, whether cut or slit.

[0083] "Structural flap" is understood to be those flaps that form the structure of the box, that is, that form the bottom and the sidewalls of the box, or that are necessary to keep the box assembled.

[0084] By "functional flap" is meant those flaps that perform some additional function other than forming the box structure, such as, for example, a lid function, a space reduction function, a fastening function, and/or a handle function.

[0085] By "connected to" with reference to a flap connected to another flap, means that both flaps are connected to each other by a folding line.

[0086] Furthermore, in the implementations described below, identical, or similar elements in the different implementations are described by the same term and indicated by the same reference number for the sake of simplicity.

[0087] The shipping box according to the present disclosure is preferably formed from a single sheet of corrugated material, the corrugated material defining a plurality of channels parallel to each other.

[0088] This box includes the following structural flaps:

- **[0089]** A first structural bottom flap **1.1** that defines the bottom of the box;
- **[0090]** A second and third additional bottom structural flaps **1.2** and **1.3**, which form a double thickness bottom;
- **[0091]** A fourth and fifth structural bottom reinforcement flaps **4.3** and **5.3**;
- **[0092]** A plurality of sidewall structural flaps **2**, **3**, **4.1**, **4.2**, **5.1** and **5.2** that structurally define the four sidewalls.

[0093] In addition, the box also includes functional flaps, i.e., that unlike what are called structural flaps, they are not necessary for the assembly of the box, independent of each other, which are connected to the upper part of at least three of its sidewalls and they can be as long as required without being limited by the development of the unfolded box or by the articulation of the box when it is mounted, thanks to what they can perform as a lid function, the function of reducing the interior space, the clamping function, for example, to assist in clamping an object contained in the box, or the handle function.

[0094] The result will be a box that can be stored flat on already finished. A box is considered finished when a user is able to assemble it for filling without the need to use additional elements such as staples or glue.

[0095] An "assembled box" is understood to have its four sidewalls remain rigid, which means that the walls do not tend to bend due to any slit contained in them or that delimits them, and perpendicular to the bottom even when the lid is ready to be filled. All this without the need for any external element to hold it. In addition, the flaps or any other elements that are involved in the box assembly will be protected inside once it is closed for shipment to avoid accidental or unwanted openings.

[0096] In the implementations shown in FIGS. **1***a* to **1***c* and **2***a* to **2***c*, two of the sidewall structural flaps **2**, **3**, parallel to each other, are connected to the bottom structural flap **1.1**.

[0097] Other structural sidewall flaps **4.1**, **5.1**, **4.2** and **5.2** are connected to the two structural sidewall flaps **2**, **3**. Of these, two sidewall structural flaps **4.1** and **5.1** serve as external sidewalls and the external walls comprise the two additional sidewall structural flaps **4.2** and **5.2** placed therein. This way, these two sidewalls parallel to each other will be formed by a double cardboard layer.

[0098] In addition, the additional sidewall flaps **4.2** and **5.2** are connected to the structural bottom reinforcement flaps **4.3** and **5.3** from their lower part in the position of use.

[0099] These structural bottom reinforcement flaps **4.3** and **5.3** are attached by attaching to two additional structural bottom flaps **1.2** and **1.3** and which in turn are connected to the sidewall structural flaps **4.1** and **5.1**.

[0100] They do this via assembly elements, such as housings, e.g. grooves, **4.4** and **5.4** located in a slit that acts as a hinge between the additional structural bottom flaps **1.2** and **1.3** in which protrusions **4.5** and **5.5** are housed incorporated between the structural bottom reinforcement flaps **4.3** and **5.3**.

[0101] Alternatively, these projections **4.5**, **5.5** and housings or grooves **4.4**, **4.5** can be substituted by a projection glued to a structural flap.

[0102] This assembly system, unlike others, allows to create a box without ratio restrictions, i.e., structurally there are no restrictions regarding the measures with which the box can be created.

[0103] The box lid, in the implementation shown in FIGS. **1***a* to **1***c*, is formed by three separate functional lid flaps **6.1**, **6.2** and **6.3** that are connected to three of the ends of the box sidewall structural flaps.

[0104] In addition, this system allows us to store the self-assembling box fully finished flat. What is meant by self-assembling is that a user can assemble it for filling without having to use external elements such as glue or staples, that is, they do not need any type of gluing or staples for assembly, such as most of the boxes in the group 04 of the FEFCO catalog.

[0105] Also in this implementation, as in successive ones, the channel direction of the corrugated material is preferably perpendicular to the bottom for all the sidewalls, preventing them from being easily crushed in the very probable case that it has to bear weight when stacking other boxes on it.

[0106] The arrangement of the channels of the material is perpendicular to the slits that separate the functional flaps from the structural sidewall flaps, thereby achieving a precise folding of the functional flaps.

[0107] In another implementation, shown in FIGS. **2***a* to **2***c*, the box comprises an additional functional lid flap **6.4**. This way, a functional flap is connected to each of the sidewalls of the box on its upper part, in its position of use.

[0108] The advantage of having these four functional flaps each linked to the structural flaps on the sidewalls of the box is that they provide structural resistance and against possible attempts to steal the contents of the box, since the sidewalls and the lid are thus physically joined, always maintaining the continuity of the material between them without leaving any slits.

[0109] In this described implementation, the box has at least a double thickness of cardboard both on the bottom and on the lid and on two of its sidewalls, giving extra protection to the content.

[0110] As for the lid closure system, in this implementation, as in implementation 1, at least one of the functional lid flaps that are connected to the sidewalls will be the outer one at the time of shipping the box.

[0111] Another variant is shown in FIG. **3**, in which the functional lid flaps **6.1** and **6.3** are internal and the functional lid flaps **6.2** and **6.4** are external. In this case the sealing system could be an external element, such as, for example, an adhesive tape or glue.

[0112] In another variant shown in FIG. **4**, at least one of the outer functional lid flaps **6.4** at the time the box is shipped may incorporate at least one sealing element **7.1** to close the box for shipping and or one or more tear strips **8.1** allowing easy opening of the previously sealed box without the need for any sharp object.

[0113] The external functional lid flap or flaps **6.4** may carry a second sealing element **7.2** that would allow the recipient of the shipped box to make a second shipment, for example, to return the product.

[0114] In another implementation shown in FIGS. **5***a* to **5***c*, from each of the additional sidewall structural flaps **4.2** and **5.2** a structural bottom reinforcing flap **4.3** and **5.3** is connected to its lower part in use position, which does not cover the entire extension of the side of the box, being able to be located, for example, in its central area.

[0115] These reduced length structural bottom reinforcement flaps **4.3** and **5.3** are engaged to the two additional structural bottom flaps **1.2** and **1.3**.

[0116] They do this by housing in cavities **1.4** and **1.5** located in the additional bottom flaps **1.2** and **1.3** and by projections **4.5** and **5.5** of the structural bottom reinforcement flaps **4.3** and **5.3** that are housed in housings, such as grooves **1.4** and **1.5** of similar dimensions located in the hinge slit between the additional structural bottom flaps **1.2** and **1.3** and the structural wall flaps **4.1** and **5.1**.

[0117] This allows, in addition to a firm and stable fixation, to form a smoother bottom for the box than in previous configurations, since all the flaps that are connected to the lower part of the sidewalls remain coplanar. This is an advantage when the content is a set of products, for example, a series of bottles, which benefit from a smooth bottom so that they are more stable and leveled.

[0118] Another implementation is shown in FIGS. **6***a* to **6***c*, which is a box similar to the one previously described. The main difference is that it comprises functional reduction flaps **9**.

[0119] These functional reduction flaps **9** comprise slits **9.1**, **9.2**, preferably parallel to the slit that hinges each functional reduction flap, which in turn is preferably perpendicular to the direction of the corrugated material channel.

[0120] In the implementation shown, a first slit **9.1** from the slit that hinges the functional reduction flap creates a first secondary flap **9.3** of length equal to the width to be reduced, a next slit **9.2** is arranged leaving a second secondary flap **9.4** equal or very close to the interior height of the box and a third secondary flap **9.5** at the end equal to or very close to the space left with the first slit **9.1**.

[0121] This way, folding each slit at 90 degrees forms a closed and fixed compartment inside the box, allowing the space to be adapted to the objects to be packaged.

[0122] Unlike other systems on the market that allow adjusting the dimensions of the box, this system does not alter or break any element of the original development, so the starting structure can always be recovered.

[0123] In addition to reducing the interior of the box, this reducing accessory or a variant thereof can be used to separate the space into two or more parts. Also, in more complex versions of this structure, more slits can be added that, specifically arranged, would allow us to make a variable regulation of the structure.

[0124] In an alternative implementation shown in FIGS. **7***a* and **7***b*, starting from the implementation described above in relation to FIGS. **6***a* to **6***c*, slits **9.6** and **9.7** can be added in the middle of the first and third sections **9.3** and **9.5**, in which a functional reduction flap would be divided.

[0125] If these slits **9.6**, **9.7** are folded outwardly, keeping the first slits folded inwardly, an accordion-shaped structure is achieved that allows creation of a variable and adjustable space-reducing accessory. Through this element, the content can be secured, in addition to reducing the space in a totally flexible way.

[0126] This reducing accessory created from a functional reduction flap can also be created in its opposite reduction functional flap for greater variability in the interior space of the box, since in any case its use is optional.

[0127] Other slots, cuts, gaps, or flanges can be incorporated into one or more functional flaps to contribute to different functionalities of the box.

[0128] In the implementation shown in FIGS. **8***a* to **8***c*, two or more functional lid flaps **6.2** and **6.4**, which are located below the functional lid flaps **6.1** and **6.3** at the time of shipment, may incorporate any coupling element that allows link them together.

[0129] For this purpose, the pair of flaps comprises at least one slot **10** that gives rise to at least two flanges **11.1** and **11.2** that, in use position, are overlapped with each other.

[0130] To facilitate this function, one of the flanges can be longer than the other. The at least one slot **10** is preferably parallel to the corrugated cardboard channel that forms the box.

[0131] The incorporation of these slots **10** and their use at the time of shipment supposes an extra structural reinforcement since it avoids that the opposite sidewalls to which these structural flaps **4.1** and **5.1** are connected can collapse when crushed.

[0132] Furthermore, advantageously, these functional lid flaps **6.2** and **6.4** internal at the time of shipment (FIG. **9***a*) can become external flaps at other times in the life of the box, such as, for example, during previous and subsequent storage, shown in FIG. **9***b*. This way, being engageable, they would allow us to keep the box temporarily closed.

[0133] This can be useful both for the person who receives the box, who can use it to store the product temporarily, and for the person who sends it, who could access the content and provisionally close the box as many times as required during the filling process of the box.

[0134] Other types of flanges could also be incorporated. In the implementation shown in FIG. **10**, in cases where only two or one of the flaps that are connected to the sidewalls serve as a cover, this could negatively affect the security of the box. To fix this, one or more additional flanges **12** could emerge from the at least one outer flap at the time of shipment.

[0135] If necessary, according to the implementation of the box shown in FIGS. **11***a* to **11***c*, this box comprises more than four functional flaps, each of which is connected to a different sidewall structural flap, which protrude from the top of the box, in its position of use. This provides the advantage of being able to use, for example, four of them as a lid **6.1**, **6.2**, **6.3** and **6.4** and the remaining ones **9**, for example, as reducing, separating structures or as preferred.

[0136] In another preferred implementation, optional functional flaps may are connected line to the bottom of the sidewall, specifically from the additional bottom structural flaps **1.2** and **1.3**. These flaps incorporate at least one slit preferably perpendicular with respect to the direction of the flap that allows it to be folded up and used as a divider or, by a series of cuts and slits, to adapt it to specific needs.

[0137] This is the case of the implementation shown in FIGS. **12***a* to **12***f*, in which functional fastening flaps **13** and **14** form an accessory for fastening bottles. The functional fastening flaps **13** are connected to the flaps **4.2** and **5.2** and the functional fastening flaps **14** are connected to the flaps **1.2** and **1.3**.

[0138] These functional fastening flaps **13** and **14** comprise holes **16** to house a part of the bottles and slits **17** to suitably fold them to form the fastening accessory.

[0139] As can be seen in FIG. **12***f*, once the box according to this implementation has been formed, it can be placed inside a larger box, and to facilitate its removal, the box according to the present disclosure may be provided with functional handle flaps **15**.

[0140] A similar implementation shown in FIG. **13** also incorporates up to four functional flaps **6.1**, **6.2**, **6.3** and **6.4**, thus allowing the box to be closed at the top.

[0141] In this last implementation, the box comprises eight functional flaps not necessary for assembling the box, four of which serve as lids and the other four as fasteners.

[0142] Although reference has been made to specific disclosed implementations, it is apparent to a person skilled in the art that the described shipping box is susceptible of numerous variations and modifications, and that all the details mentioned can be replaced by other technically equivalents, without departing from the scope of protection defined by the appended claims.

What is claimed is:

1. A shipping box formed from a single sheet, comprising:

a structural bottom flap that forms a bottom and occupies substantially an entire surface of the bottom;

a plurality of structural sidewall flaps that form at least four sidewalls of the box, at least two of the structural sidewall flaps being connected to the structural bottom flap, all the sidewalls being positioned substantially perpendicular to the bottom in their position of use when the box is open;

assembly elements that assemble the box in a stable manner, the box being foldable in a flat folded position; and

at least three functional flaps that are independent of each other, the functional flaps performing functions of lid, interior space reducer, clamping, separator, and/or handle, wherein:

from their upper part, in their position of use, at least three of the structural sidewall flaps are connected to the at least three functional flaps, and

the assembly elements are located on the structural bottom flap or the structure sidewall flaps on an internal part of the box.

2. The shipping box of claim **1**, wherein the assembly elements are projections that are housed in complementary housings or glued to the structural bottom flap or to a structure sidewall flap.

3. The shipping box of claim **1**, wherein the sheet is of a corrugated material that defines a plurality of channels substantially parallel to each other.

4. The shipping box of claim **3**, wherein the channels of the corrugated material in the sidewalls are substantially perpendicular to the bottom.

5. The shipping box of claim **3**, wherein the channels of the corrugated material are perpendicular to slits that separate the functional flaps.

6. The shipping box of claim **1**, further comprising two additional structural bottom flaps that form a double thickness bottom and that are connected to two of the structural sidewall flaps.

7. The shipping box of claim **6**, wherein each additional structural bottom flap comprises a cavity to house one of the structural bottom reinforcement flaps.

8. The shipping box of claim **1**, further comprising two opposite additional sidewall structural flaps that form two double thickness sidewalls and that are connected to a sidewall structural flap.

9. The shipping box of claim **8**, wherein each of the two opposite additional sidewall structural flaps is connected to a structural bottom reinforcing flap, defining a projection between the additional sidewall structural flap and the bottom reinforcing structural flap, the projection being housed in a complementary groove located at a fold line between the structural sidewall flaps and the additional structural bottom flap, forming the projections and the grooves of the assembly elements.

10. The shipping box of claim **9**, wherein each additional structural bottom flap comprises a cavity to house one of the structural bottom reinforcement flaps.

11. The shipping box of claim **1**, wherein two of the functional flaps are functional lid flaps that, in their closed position, have their ends substantially in contact with each other or are totally or partially overlapped, one of the lid flaps comprising, when the lid flaps are totally or partially overlapped, at least one sealing element.

12. The shipping box of claim **11**, wherein at least one of the functional lid flaps comprises at least one tear strip when the functional lid flaps are totally or partially overlapped.

13. The shipping box of claim **1**, wherein two of the functional flaps are functional lid flaps comprising at least one slot for their engagement to each other.

14. The shipping box of claim **1**, wherein at least one of the functional flaps is a functional space reduction flap, each comprising one or more slits defining secondary flaps from each functional space reduction flap.

15. The shipping box of claim **1**, further comprising at least two functional fastening flaps.

16. The shipping box of claim **15**, wherein each functional fastening flap comprises at least one hole and slits.

17. The shipping box of claim **1**, wherein at least one of the functional flaps is a functional handle flap.

* * * * *