



(11)

EP 4 682 068 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.01.2026 Bulletin 2026/04

(51) International Patent Classification (IPC):
B65D 5/30 (2006.01) **B65D 5/36** (2006.01)
B65D 5/66 (2006.01) **B65D 5/42** (2006.01)

(21) Application number: **25190567.5**

(52) Cooperative Patent Classification (CPC):
B65D 5/302; B65D 5/3671; B65D 5/6658;
B65D 5/4204

(22) Date of filing: **18.07.2025**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH LA MA MD TN

(71) Applicant: **MIGUEL MARTINS FERNANDES -**
UNIPESOAAL LDA
4810-006 Guimaraes (PT)

(72) Inventor: **MARTINS FERNANDES, LUÍS MIGUEL**
4810-006 GUIMARÃES (PT)

(74) Representative: **Patentree**
Edifício Net
Rua de Salazares, 842
4149-002 Porto (PT)

(30) Priority: **18.07.2024 PT 2024119603**

(54) **SUSTAINABLE, FOLDABLE AND QUICK-ASSEMBLY BOX**

(57) Quick-assembly foldable box and respective assembly method, wherein said box comprises a board made of foldable material to form a volume for product storage, wherein the board comprises: a base portion (2) to form a base of the box; a front flap (3) and a rear flap (1) arranged opposite relative to the base portion for forming, respectively, a front wall of the box and a rear wall of the box; and two side flaps (5) arranged opposite relative to the base portion for forming the side walls of the box; wherein said board comprises a crease between the base portion and the front flap, a crease between the base portion and the rear flap, a crease between the base portion and each of the side flaps; wherein each of the side flaps comprises two slots (8) each for receiving a protrusion.

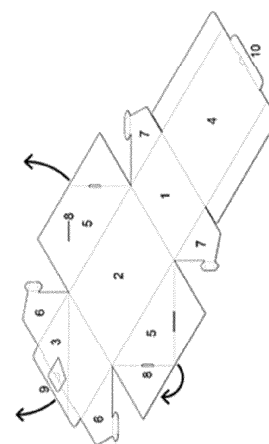
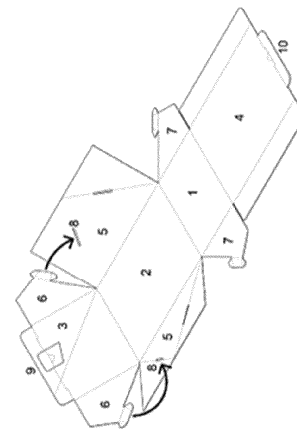


Fig. 6A

EP 4 682 068 A1

Description

TECHNICAL FIELD

[0001] The present disclosure concerns a quick-assembly and more sustainable packaging, transport or export box. Specifically, a foldable and reusable box is described, which allows for a faster assembly, disassembly and closing process, without using adhesive tape.

BACKGROUND

[0002] Cardboard packaging is a world-renowned object, with application in various types of markets and for a wide range of purposes. From its use for the transport of personal belongings to its industrial use, for transporting components and products within and between companies, cardboard boxes can have different configurations and sizes. The safe accommodation of goods, especially for long-distance transport, is only possible with effective closing systems. The traditional method for ensuring the containment of goods inside packaging involves the use of adhesive tape, both at domestic and industrial levels.

[0003] The global paper and cardboard packaging market was valued at USD 210.9 billion in 2022 and is expected to reach USD 251.2 billion by 2032. Given the intensive use of cardboard packaging worldwide, consumption of adhesive tape for closing and securing orders is also expected to be high. Plastic, the main material used to manufacture adhesive tape and even shipping boxes, is one of the seven areas considered crucial by the European Commission for achieving a circular and more sustainable economy in the European Union by 2050, with the most effective way to solve this problem being to prevent its use and to develop more sustainable alternatives.

[0004] The awakening of global environmental awareness in recent years, together with the most recent policies focused on the sustainable development of society, has driven the development of more ecological and sustainable solutions. As a reflection of this global effort, the European Union has approved a regulation to reduce, reuse and recycle packaging, with the aim of making packaging more sustainable and reducing associated waste.

[0005] Specifically in the industrial context, in addition to the associated environmental impact, the closure of packaging is an additional step in the packaging process that increases processing times and associated costs. The assembly of the packaging box itself contributes significantly to increasing packaging and shipping times, which directly impacts companies' responsiveness and costs, both for the company and for consumers. This problem is applicable to any reality and industry in which it is necessary to use boxes for packaging and transporting components or products.

[0006] The most common existing solutions refer to conventional cardboard boxes, of the American type,

which use adhesive tape as a means of closure. There are, however, some solutions that offer more practical assembly and closing methods, without resorting to adhesive tape.

[0007] Document EP0810156 discloses a box with a triangular prism shape, the base and lid of which are sealed by strips with hook and loop type elements, commonly known as "velcro" strips. The proposed box allows for easier storage and transportation of clothing hangers. Due to its specific application and format, there is a need to develop other solutions that allow the packaging and transportation of items with other formats and volumes. Furthermore, it is important to develop more effective closure systems, since Velcro strips lose strength over time and cannot withstand heavy loads.

[0008] Document CN203473584 proposes a shoe packaging consisting of a box with a simple square structure and a lid for mounting on the opening of the box. The great value proposition of this solution is the possibility of the box being folded when not in use. In addition to not being the most appropriate solution for an industrial context, as it is made up of two elements, which complicates the assembly work and does not offer the resistance and safety necessary for transporting loads, closing this box requires the use of adhesive tape.

[0009] Document CN211642916 discloses a mountable box with a security system to prevent it from being opened. This solution consists of the box structure and a locking piece that, once inserted into the box structure, prevents it from opening, without the need to use adhesive tape. The major disadvantage of this solution is that it is single-use. Once this locking piece is inserted, it cannot be removed intact. Its application in industrial contexts is also more difficult as it complicates the packaging process, as it is necessary to assemble two parts.

[0010] All existing solutions are aimed at the end consumer, without considering their industrial application, such as packaging or export boxes, for example, with the capacity to directly and simultaneously impact producers, distributors and the end customer.

[0011] The traditional packaging process is complicated, requiring the use of adhesive tape to close the packages, which requires more time, effort and materials. Furthermore, it is also more difficult to open the packaging, especially without damaging it.

[0012] Therefore, it is necessary to develop a packaging solution that overcomes the limitations of the state of the art, that is, that is easy to implement, especially in industry, quick and intuitive to assemble, resistant, without the use of additional materials or components, reusable and that responds to public sustainability policies.

[0013] These facts are described in order to illustrate the technical problem solved by the embodiments of this document.

GENERAL DESCRIPTION

[0014] This disclosure relates to a packaging, transport

or export box, which is easy to assemble/disassemble and articulate. In particular, it refers to a reusable box, with a quick-assembly mechanism and integrated closure, addressing the industry's challenges with regard to sustainability and product packaging times.

[0015] Due to its origami-inspired structure, the assembly (mounting) and closure of the box do not require the use of adhesive tape. The product features a design based on flaps, creases and fitting areas, which allows the box to be self-sufficient when assembling and closing, meaning there is no need to use adhesive tape. The proposed structure also allows the box to be reusable as it can be easily disassembled and folded flat without damaging its structure.

[0016] The creases are a partial compression of the material that facilitates folding the material. In an embodiment, the creases are made by pressing and have a depth less than that of the material, preferably cardboard.

[0017] The proposed box is composed of a single structure/piece, with the design of all faces, base, flaps, creases, fitting areas and, optionally, lid, which can be supplied to the customer in a flat or pre-assembled format, i.e. flattened/collapsed. In the context of this description, the fitting areas are defined as cuts that perforate the sheet/board of the material that constitutes the structure of the box and that allow the fitting by insertion of the flaps. The creases are considered to be folding lines, that is, the marks left by folding the material that makes up the structure of the box.

[0018] The present disclosure relates to a quick-assembly foldable box comprising a board made of foldable material to form a volume for product storage, wherein the board comprises:

a base portion to form a base of the box;
a front flap (3) and a rear flap arranged opposite relative to the base portion (2) to form, respectively, a front wall of the box and a rear wall of the box; and
two side flaps arranged opposite relative to the base portion to form the side walls of the box;

wherein said board comprises a crease between the base portion and the front flap, a crease between the base portion and the rear flap, a crease between the base portion and each of the side flaps;
wherein each of the side flaps comprises two slots each for receiving a protrusion;
wherein said board comprises two front side flaps arranged opposite relative to the front portion, wherein said board comprises a crease between the front portion and each of the front side flaps;
wherein said board comprises two rear side flaps arranged opposite relative to the rear portion, wherein said board comprises a crease between the rear portion and each of the rear side flaps;
wherein each of the side flaps comprises a protrusion for fitting into one of said slots of the side flaps;
wherein each side flap comprises a crease line in an

intermediate region of the side flap,
wherein said crease line is arranged in an oblique direction relative to the crease between the base portion and each said side flap.

[0019] The box described in this disclosure eliminates the need for adhesive tape, significantly reduces assembly and closing times, and allows for its reuse without compromising structural integrity. The box described in this disclosure allows for quick assembly and disassembly, as well as secure closure without additional accessories. The flaps and protrusion system ensures robustness and stability, even after multiple uses.

[0020] Furthermore, the box can be supplied pre-assembled and flattened, taking up less storage and transportation space than conventional solutions (such as American-style boxes), allowing up to three times more units to be transported per pallet. The structure is customizable in size, resistant, sustainable (it eliminates the need for adhesive tape and replaces plastic packaging), and adaptable to various industrial sectors, with an emphasis on footwear and e-commerce.

[0021] In an embodiment, the crease lines of each side flap are arranged to create a planar deformation of the box when subjected to a force by the user.

[0022] In an embodiment, the front flap comprises a crease line in an intermediate region of the front flap, wherein said crease line is arranged in an oblique direction relative to the crease between the base portion and the front flap.

[0023] In an embodiment, the additional crease line of the front flap is arranged in an oblique direction relative to the crease between the base portion and the front flap at an angle of 15° - 55°, preferably 35° - 50°.

[0024] In an embodiment, one or both of the side flaps comprises an additional crease line in an intermediate region of the side flap, wherein said additional crease line is arranged in an oblique direction relative to the crease between the base portion and each said side flap.

[0025] In an embodiment, each of said crease line or lines is arranged between a point at one end of the base portion and a point at one end of the flap of said crease line.

[0026] In an embodiment, the point at one end of the base portion is an intersection point of two creases between the base portion and two flaps.

[0027] In an embodiment, said board comprises a lid attached to one of said flaps (e.g. 1), wherein the lid comprises two side flaps of the lid arranged opposite relative to the lid, wherein said board comprises a crease between the lid and each of the side flaps of the lid.

[0028] In an embodiment, said lid comprises a closing flap arranged between said side flaps of the lid for closing a storage volume within said box.

[0029] In an embodiment, the flap opposite the flap to which said lid is attached comprises an additional flap with an opening for receiving the closing flap of the lid for closing said storage volume.

[0030] In an embodiment, the lid comprises an additional crease line perpendicular to one or both crease lines between said lid and the side flaps of the lid.

[0031] In an embodiment, the perpendicular additional crease line extends from the limit of one of the side flaps of the lid to the limit of other of the side flaps of the lid.

[0032] In an embodiment, the extension between the base portion and the end of each of the flaps is identical.

[0033] In an embodiment, the protrusion has a round, oval, or elliptical shape.

[0034] In an embodiment, the front flap comprises an opening for viewing an interior of the box.

[0035] In an embodiment, the board is made of a rigid material foldable along preformed creases or of a flexible material foldable along preformed creases, in particular plain cardboard, corrugated cardboard, bamboo, derivatives thereof, or combinations thereof.

[0036] In an embodiment, the side flaps of the box are 10 to 200 cm long, preferably 20 to 160 cm long.

[0037] The present disclosure further relates to a method for producing the quick-assembly foldable box as described, which comprises the following steps:

providing a board comprising:

- a base portion to form a base of the box;
- a front flap and a rear flap arranged opposite relative to the base portion to form, respectively, a front wall of the box and a rear wall of the box; and
- two side flaps arranged opposite relative to the base portion to form the side walls of the box; wherein each of the side flaps comprises two slots each for receiving a protrusion; wherein said board comprises two front side flaps arranged opposite relative to the front portion;
- wherein said board comprises two rear side flaps arranged opposite relative to the rear portion,

wherein each of the side flaps comprises a protrusion for fitting into one of said slots of the side flaps; creasing said board between the base portion and the front flap, creasing said board between the base portion and the rear flap, and creasing said board between the base portion and each of the side flaps; creasing said board between the front portion and each of the front side flaps; creasing said board between the rear portion and each of the rear side flaps; creasing said board along a crease line in an intermediate region of the side flap, wherein said crease line is arranged in an oblique direction relative to the crease between the base portion and each said side flap.

[0038] The side flaps (or side faces) of the box are

connected to the base of the box, on opposite edges. The same happens with the front flaps (or front face) and rear flaps (or rear face). The lid of the package is connected to the rear flap (or rear face) of the box, specifically through its upper edge. The front and rear faces (or flaps) and lid present foldable side flaps on their peripheries that allow for the fitting and closing of the box.

[0039] Once assembled, the proposed structure has the shape of a quadrangular prism.

[0040] The oblique fitting areas on the side flaps or faces of the box allow for the fitting with the front and rear side flaps. The front and rear flaps (or front and rear face) have a protrusion, directed towards the side flaps (or faces) of the box, responsible for the assembly of the box and its safe use, without the use of adhesive tape.

[0041] In an embodiment, these protrusions have a shape similar to an ellipse and two creases that, when folded, allow them to fit into the fitting areas of the side flaps and, after insertion into these fitting areas, they can be unfolded to act as a brake and prevent disengagement. After fitting, the front and rear side flaps are located on the outside of the box. This system provides the necessary security and robustness to the box structure.

[0042] In an embodiment, the side flaps (or faces) also present oblique creases that connect the vertices of the base to its upper edge. The fitting areas of the side faces are located on the line of the oblique creases. The front face of the box also has a crease connecting one of the vertices of the base to its upper edge.

[0043] Surprisingly, the fitting of the flaps and the oblique creases on the front and side faces of the box allow for quick and easy assembly and disassembly of the box. Furthermore, they allow the box to be quickly flattened/unfolded flat, so as to take up less space than conventional packaging boxes, without the need to completely disassemble the box. When flattened, the flaps of the front and rear faces remain engaged with the side faces for quick assembly of the box when necessary.

[0044] The box is closed by fitting the lid onto the vertical faces, i.e. the side, rear and front faces. Particularly, the lid has side flaps that are inserted between the side faces and the flaps of the front and rear faces of the box, which contributes to the safety of closing the box.

[0045] In an embodiment, the lid also has a flap on the front that is inserted into the fitting area existing on the upper edge of the front face of the box. The front face has a folding flap, adjacent to its upper edge, where the fitting area of the lid is located.

[0046] The lid can also have a crease so that the box takes up less space in its pre-assembled format.

[0047] Whenever necessary, the box can be easily dismantled and flattened due to its special diagonal/oblique creases on the front and side faces of the box. The box can thus return to its pre-assembled shape without having to disengage the fitting flaps. The design of the creases and fitting areas therefore allows flexibility when opening and closing the box.

[0048] The size of the described packaging box may

vary, in order to allow the adaptation of its dimensions to the desired application.

[0049] This packaging may be used in a domestic environment, by the end consumer, or in an industrial environment, for the storage, transport and export of goods.

[0050] This box may have applications in various types of retail and industry for the transportation of small and medium-sized products, particularly in the textile industry, footwear industry, agricultural industry, food industry, e-commerce and delivery services.

[0051] Additionally, the proposed box can be used individually or stacked with other boxes for storage, allowing the user to use them in numerous situations, for example, when shopping or for storing products in industrial warehouses.

[0052] In the domestic context, in addition to its function of packaging goods for transport, the box can also be attached to a transport trolley or hand luggage carrier, thus reducing the need to use plastic bags and conventional shopping trolleys.

[0053] Some of the advantages of the present disclosure lie in the speed achieved in the process of packaging and transportation of products, together with the elimination of the use of adhesive tape and the possibility of transporting more flattened boxes in the same space. The average time to apply adhesive tape to currently used packaging boxes is around 27 seconds per box. In contrast, closing the proposed box with the flaps takes about 12 seconds, which means an improvement of over 50%. The assembly of the box itself is faster compared to boxes already in use, which also contributes to a more efficient packaging process. A conventional box, assembled using adhesive tape, can contain on average 30 clothing items. It is expected that within the time required to pack 3000 pieces in conventional boxes (100 boxes), it would be possible to pack 9000 pieces with the present disclosure, i.e. with the proposed box.

[0054] In addition to allowing faster packaging times, this solution further promotes the reduction of the resources used (materials and human) which, ultimately, translates into lower production costs for the customer.

[0055] No less important, the proposed box presents itself as a more sustainable alternative since it is not necessary to use adhesive tape to close it and it can be reused. Furthermore, the proposed box will also make it possible to replace plastic transport boxes, whose consumption is intended to be reduced.

[0056] The implementation of this solution at an industrial level has the advantage of being able to stack more boxes in their pre-assembled/flattened format on transport pallets, compared to common American-type packaging boxes. This is due to the fact that the American-type boxes are supplied to the customer in their disassembled format, which means that they occupy the space equivalent to the length of their front face plus side and the height of their front face plus upper and lower flaps. In contrast, the developed box is supplied to the customer in its pre-

assembled format, taking up only the space equivalent to the length and width of its base.

[0057] Only in the case where the lid does not have a crease, the space occupied by the flattened/folded flat box is equivalent to the length of its base and the width of the base plus the area of the lid after the crease, normally equivalent to the height of the rear face.

[0058] In an embodiment, considering a box with dimensions of 60 x 40 x 40cm assembled, if it is of the American type, it will occupy approximately 100 x 78 cm flattened and the proposed box 60 x 40 cm.

[0059] In general, with the proposed packaging solution it is possible to transport 3 times more boxes in a single pallet. This helps to streamline industrial logistics and reduce transportation costs, which consequently helps to reduce the cost of the box for the end customer.

[0060] When empty, this box can be easily flattened, taking up very little space and, as such, is easy to store. Whenever necessary, the user can reassemble the box quickly, in about 6 seconds, approximately 3 times faster than assembling American-type boxes.

[0061] Another advantage of the present disclosure is the fact that its size is customizable. Having a box with the right size for packaging the product, without wasting space inside, allows to optimize the loading space in transport trucks. This translates into the optimization of the logistics process and, ultimately, into lower production and transportation costs, as well as into a more sustainable process.

[0062] In an embodiment and using the footwear sector as an example, the box may significantly contribute to the agility of the individual packaging process for footwear, in the final stage of the product finishing line. Due to the speed of assembly that it provides and the resistance of the structure, the use of this box will make the process of packing a pair of shoes significantly faster and more efficient. The product can be transported directly in its respective individual box to the stores and it can be reused later by the end customer after purchasing the shoes, once again promoting sustainability and circularity.

[0063] Other particular and preferred aspects are defined in the independent and dependent claims that accompany this process. Features of the dependent claims may be combined with features of the independent claims, as appropriate, and in combinations other than those explicitly set forth in the claims.

[0064] Whenever a feature of a box is described as being operable to provide a function, it is considered that such includes a feature of the box that provides that function or that is adapted or configured to provide that function.

[0065] When elements are described as being connected or connectable, they may be directly connected. When elements are described as being coupled or couplable, they may be connected by one or more intervening or interposed elements.

[0066] When a feature is described as rotatable, it shall

be understood that such includes a feature capable of rotational displacement or that it is adapted or configured to undergo rotational displacement.

BRIEF DESCRIPTION OF THE DRAWINGS

[0067] For easier understanding, figures are herein attached, which represent preferred embodiments which do not intended to limit the object of the present description.

Figure 1 - Representation of the plan view of an embodiment of the box with 3 oblique creases on the side faces or flaps **5** and lid **4**.

Figure 2 - Representation of the plan view of an embodiment of the box with 4 oblique creases on the side faces or flaps **5**, a crease on the lid **4** and a circular-shaped opening **11** on the front face or flap **3**.

Figure 3 - Representation of the plan view of an embodiment of the box with 3 oblique creases on the side faces or flaps **5** and a crease on the lid **4**.

Figure 4 - Representation of the plan view of an embodiment of the box with 3 oblique creases on the side faces or flaps **5**, without lid and without upper flap on the front face **3**.

Figure 5 - Representation of the plan view of an embodiment of the box with 2 oblique creases on the side faces or flaps **5** and a crease on the lid **4**.

Figure 6(A and 6B) - Representation of the assembly process of an embodiment of the box.

Figure 7(7A and 7B) - Representation of the flattening/ folding flat process of an embodiment of the box.

DETAILED DESCRIPTION

[0068] The present description relates to a box for packaging, transport and export, easy to assemble, disassemble and articulate. In particular, it concerns a reusable box, with a quick-assembly mechanism and integrated closure, which responds to the industry's challenges with regard to sustainability and product packaging times.

[0069] This description concerns a quick-assembly and more sustainable box for transporting, packaging, or exporting products. Specifically, it describes a foldable and reusable box that allows for faster assembly, closing, and flattening, without the use of adhesive tape.

[0070] The present disclosure relates to a quick-assembly foldable box and respective assembly method, wherein said box comprises a board made of foldable material to form a volume for product storage, wherein the board comprises: a base portion to form a base of the

box; a front flap and a rear flap arranged opposite relative to the base portion to form, respectively, a front wall of the box and a rear wall of the box; and two side flaps arranged opposite relative to the base portion to form the side walls of the box; wherein said board comprises a crease between the base portion and the front flap, a crease between the base portion and the rear flap, a crease between the base portion and each of the side flaps; wherein each of the side flaps comprises two slots each for receiving a protrusion; wherein said board comprises two front side flaps arranged opposite relative to the front flap, wherein said board comprises a crease between the front flap and each of the front side flaps; wherein said board comprises two rear side flaps arranged opposite relative to the rear flap, wherein said board comprises a crease between the rear flap and each of the rear side flaps; wherein each of the side flaps comprises a protrusion for fitting into one of said slots of the side flaps; wherein each side flap comprises a crease line in an intermediate region of the side flap, wherein said crease line is arranged in an oblique direction relative to the crease between the base portion and each said side flap.

[0071] The proposed box, when assembled, has the shape of a quadrangular prism and has a base **2**, a front face or flap **3** with front side flaps **6** and an additional fitting area or flap **9**, a rear face or flap **1** with rear side flaps **7**, and two side faces or flaps **5** with fitting areas or slots **8**. Optionally, the box may also have a lid **4** whose flaps, preferably closing flaps **10** allow the box to be closed.

[0072] The creases present in the side **5** and front faces or flaps **3** of the disclosed box allow it to be flattened quickly and without the need to disassemble the box.

[0073] Due to its origami-inspired structure, the assembly and closure of the box do not require the use of adhesive tape. The product has a design based on flaps, creases and fitting areas, which allow the box to be self-sufficient during assembly and packaging, meaning there is no need to use adhesive tape. The proposed structure also allows the box to be reusable as it can be easily disassembled without causing damage to its structure, as is the case with adhesive tape.

[0074] The proposed box is composed of a single structure/piece, with the design of all the faces or flaps - front **3**, sides **5** and rear **1** - of the box, base **2**, flaps, creases, fitting areas or slots **8** and **9** and, optionally, lid **4**, which can be supplied to the customer in a flat or pre-assembled format, that is, flattened.

[0075] In an embodiment, the box structure may consist of plain cardboard, corrugated cardboard, bamboo, derivatives thereof or other rigid, semi-rigid and foldable material.

[0076] In an embodiment, the side faces or flaps **5** of the box are connected to the base **2** of the box, on opposite edges. The same happens with the front **3** and rear **1** faces or flaps. The lid **4** of the package is connected to the rear face or flap **1** of the box, specifically through its upper edge. The front **3**, rear **1** faces or flaps and lid **4** have foldable flaps **6**, **7** and **10** on their periph-

eries that allow the box to be fitted and closed, particularly front side flaps **6**, rear side flaps **7** and closing flap **10**.

[0077] Once assembled, the proposed structure has the shape of a quadrangular prism.

[0078] The oblique fitting areas or slots **8** on the side faces of the box allow fitting with the side flaps of the front **6** and rear **7**. The front **6** and rear **7** flaps have a protrusion, directed towards the side flaps (or faces) of the box, responsible for assembling of the box and its safe use, without the use of adhesive tape. These protrusions have a shape similar to an ellipse and two creases that, when folded, allow them to fit into the fitting areas of the side faces **8** and, after insertion, can be unfolded to act as a brake and prevent disengagement. This system provides the necessary security and robustness to the box structure.

[0079] The side flaps (or faces) **5** also have oblique creases that connect the vertices of the base **2** to its upper edge. The front flap (or face) **3** of the box also has a crease connecting one of the vertices of the base **2** to its upper edge. The fittings or slots **8** of the side flaps **6** and **7** and the oblique creases of the front **3** and side **5** flaps (or faces) of the box allow for quick and easy assembly and disassembly of the box. Furthermore, they allow the box to be quickly flattened/folded flat, in order to take up less space than conventional/American style packaging boxes, without the need to completely disassemble the box. When flattened, the additional flaps of the front **6** and rear **7** side flaps remain engaged with the side faces **5** for quick assembly of the box when necessary.

[0080] Each side face or flap **5** of the box has 2 oblique fitting zones or slots **8** and between 1 to 2 oblique creases that go from the vertices of the base **2** to its upper edge. The fitting zones or slots **8** coincide with the position of the oblique creases.

[0081] In an embodiment, the inclination angle of the oblique creases of the side faces or flaps **5** and front face or flap **3** varies from 15° to 55°, relative to the respective lower horizontal edges. Preferably, the angle of inclination of the oblique creases varies from 35° to 50°.

[0082] Depending on the size and desired application for the box, as well as the specifications of the cutting machine used to produce the box, it may be necessary to use 1 or 2 creases on each side face or flap **5** and different inclination angles.

[0083] The rear face or flap **1** has two side flaps **7** and the front face or flap **3** has two side flaps **6** and, optionally, 1 upper flap, all of them being foldable. The front face or flap **3** may also have a fitting area **9** or additional flap, located on its upper horizontal edge.

[0084] The connection of the box can be reinforced by applying glue spots between the flaps of the front and rear faces or flaps **6** and **7**, respectively, and the side faces or flaps **5**, from the edge of the base to the upper edge.

[0085] In a preferred embodiment, the box has a lid **4**. The closing of the box is achieved by fitting the lid **4** onto the side **5**, rear **1** and front **3** faces or flaps. Particularly, the lid **4** has 2 side flaps that are inserted between the

side faces or flaps **5** and the flaps of the front **6** and rear **7** faces of the box, and a flap at the front or closing flap **10** that is inserted into the fitting area or additional flap **9** present on the upper edge of the front face **3** of the box.

The front face **3** has a foldable flap, adjacent to its upper edge, where the fitting area **9** of the lid **4** is located.

[0086] In a preferred embodiment, the side faces or flaps **5** of the box may also present an upper flap, connected to its upper horizontal edge. In this embodiment, a fitting area is provided on the upper edge of the side faces **5**, for the alternative fitting of the side flaps of the lid **4**.

[0087] In an embodiment, the lid **4** of the box may also present a crease parallel to the edge that makes the connection between the lid **4** and the rear face or flap **1** of the box and that extends to the limit of the side flaps of the lid **4**. This crease allows the box to take up less space when flattened, that is, it only takes up the space equivalent to the length and height of the base of the box **2** when the lid can be folded.

[0088] In an embodiment, the crease of the lid **4** of the box is located, relative to its front edge, at a distance equivalent to the height of the rear face or flap **1**.

[0089] The size of the described packaging box may vary, so as to allow its dimensions to be adapted to the desired use.

[0090] In an embodiment, the front **3** and rear **1** face or flap of the box may be between 5 and 150 cm in length. Preferably between 14 and 120 cm.

[0091] In an embodiment, the side faces or flaps **5** of the box may be between 10 and 200 cm in length. Preferably between 20 and 160 cm.

[0092] In an embodiment, the side **5**, front **3** and rear **1** faces or flaps and, consequently, the box, can be between 5 and 100 cm in height. Preferably between 7 and 60 cm.

[0093] The proposed packaging box can be used alone or stacked with other boxes, allowing the user to use them in numerous situations, for example when going shopping or for storing products in industrial warehouses.

[0094] **Figure 1** represents one of the possible embodiments of the box, in its flat perspective. The dotted lines represent the creases in the box. The continuous lines on the inside represent the fitting areas **8** and **9** of the flaps. In this embodiment, the box has 2 oblique creases on one of the side flaps **5** and only 1 oblique crease on the other side face or flap **5**. This embodiment allows the box to be quickly articulated, i.e. it allows it to be assembled and flattened quickly and easily, without the need for adhesive tape to close it.

[0095] **Figure 2** shows the representation of the flat structure of the box embodiment for packaging shoes or other smaller products. This embodiment features 2 oblique creases on each of its side faces or flaps **5** and a crease on the lid **4**, as well as a circular-shaped opening **11** on the front face or flap **3** for easy viewing and handling of the product. Also, in this case, the dotted lines represent the box creases and the continuous lines inside represent the cut and fitting areas of the flaps **8** and **9**.

This embodiment allows the box to be quickly articulated, to be compacted when flattened due to the crease in the lid **4** and the possibility to visualize the product inside the box.

[0096] **Figure 3** represents a flat structure of the box embodiment with 2 oblique creases on one of the side faces or flaps **5**, 1 oblique crease on its other side face or flap **5** and a crease on the lid **4**. As mentioned earlier, the dotted lines represent the creases of the box, the continuous lines inside represent the fitting areas (**8** and **9**) of the flaps. The crease in the lid **4** allows the box to take up less space when flattened. This embodiment of the box allows for rapid articulation of the box and its compaction when flattened due to the crease in the lid **4**.

[0097] **Figure 4** represents the flat structure of the box embodiment without lid. This embodiment has 2 oblique creases on one of the side faces or flaps **5** and 1 oblique crease on its other side face or flap **5**. Also in this case, the dotted lines represent the box creases and the continuous lines inside represent the cut and fitting areas of the flaps or slots **8**. As this embodiment of the box does not have a lid, there is no need for the front face **3** to have an upper flap and a fitting area, whose function is to engage with the lid. This embodiment, which is not intended to limit the scope of protection, allows the box to be quickly articulated, i.e. it allows it to be assembled and flattened quickly and easily, when there is no need to close the box.

[0098] **Figure 5** depicts the representation of the flat structure of another embodiment of the box with only 1 oblique crease on each of the side faces or flaps **5** of the box, represented by the dotted lines, and a crease on the lid **4**.

[0099] **Figure 6** depicts the representation of the assembly process of an embodiment of the box with a lid.

[0100] Finally, **Figure 7** depicts the process steps for flattening/folding flat an embodiment of the box with a lid.

[0101] In an embodiment, the sustainable, foldable, and quick-assembly box is characterized by consisting of a single piece, with the assembled shape of a quadrangular prism, comprising a base **2**, two side faces **5**, a front face **3** with 2 side flaps **6**, and a rear face **1** with 2 side flaps **7**, wherein

the base **2** is connected by its edges to the side faces **5**, on opposite sides, to the front face **3** and to the rear face **1**;

each side face **5** has between 1 and 2 oblique creases and 2 oblique fitting areas **8** that coincide with the line of the creases;

the front face **3** has an oblique crease.

[0102] In an embodiment, the oblique creases of the side **5** and front **3** faces connect the lower vertices to the upper edge of each face.

[0103] In an embodiment, the oblique creases of the side faces **5** and front face **3** have an inclination angle of 15° to 55°, preferably between 35° and 50°.

[0104] In an embodiment, the side flaps of the front **6**

and rear **7** faces have a protrusion, shaped like an ellipse and with two creases that allow the box to fit securely.

[0105] In an embodiment, the side flaps of the front **6** and rear **7** faces fit into the fitting areas of the side faces **8**, from the outside.

[0106] In an embodiment, the front face **3** has an upper flap, connected to its upper edge, where there is also a fitting area **9**.

[0107] In an embodiment, the side faces **5** have an upper flap connected to their upper edge, where there is also a fitting area.

[0108] In an embodiment, the box has a lid **4** with 2 side flaps and 1 front flap **10**, which is connected to the rear face **1** of the box by its upper edge.

[0109] In an embodiment, the side flaps of the lid **4** fit between the side faces **5** and the flaps of the front **6** and rear **7** faces; and the front flap **10** of the lid **4** fits into the fitting area of the front face **9** of the box.

[0110] In an embodiment, the front **3** and rear **1** face of the box have between 5 and 150 cm in length, preferably between 14 and 120 cm.

[0111] In an embodiment, the side flaps **5** of the box have between 10 and 200 cm in length, preferably between 20 and 160 cm.

[0112] In an embodiment, the side **5**, front **3**, and rear **1** faces have between 5 and 100 cm in height, preferably between 7 and 60 cm.

[0113] In an embodiment, the lid **4** has a crease parallel to the edge connecting the lid **4** to the rear face **1**, which extends to the limit of its side flaps.

[0114] In an embodiment, the crease of the lid **4** is located, relative to its front end, at a distance equivalent to the height of the rear face **1**.

[0115] In an embodiment, the box folds along its oblique creases and flattens without the need to disengage the side **5**, front **3**, and rear **1** faces.

[0116] In an embodiment, the box is made of simple cardboard, corrugated cardboard, bamboo, its derivatives, or another rigid and foldable material.

[0117] The term "comprises" or "comprising" whenever used herein is intended to indicate the presence of the features, elements, integers, steps and components mentioned, but does not preclude the presence or addition of one or more other features, elements, integers, steps and components, or groups thereof.

[0118] The present invention is of course in no way restricted to the embodiments described herein and a person with ordinary skills in the art may foresee many possibilities of modifying it and replacing technical features with equivalent ones, depending on the requirements of each situation, as defined in the appended claims.

[0119] The following claims define additional embodiments of the present description.

Claims

1. A quick-assembly foldable box comprising a board made of foldable material to form a volume for product storage, wherein the board comprises:
 - a base portion (2) to form a base of the box;
 - a front flap (3) and a rear flap (1) arranged opposite relative to the base portion (2) to form, respectively, a front wall of the box and a rear wall of the box; and two side flaps (5) arranged opposite relative to the base portion (2) to form the side walls of the box;
 - wherein said board comprises a crease between the base portion and the front flap (3), a crease between the base portion (2) and the rear flap (1), a crease between the base portion and each of the side flaps;
 - wherein each of the side flaps (5) comprises two slots (8) each for receiving a protrusion;
 - wherein said board comprises two front side flaps (6) arranged opposite relative to the front flap (3), wherein said board comprises a crease between the front flap (3) and each of the front side flaps (6);
 - wherein said board comprises two rear side flaps (7) arranged opposite relative to the rear flap (1), wherein said board comprises a crease between the rear flap (1) and each of the rear side flaps (6);
 - wherein each of the side flaps (6, 7) comprises a protrusion for fitting into one of said slots (8) of the side flaps (5);
 - wherein each side flap (5) comprises a crease line in an intermediate region of the side flap (5), wherein said crease line is arranged in an oblique direction relative to the crease between the base portion and each said side flap (5).
2. The box according to the previous claim wherein the front flap (3) comprises a crease line in an intermediate region of the front flap (3), wherein said crease line is arranged in an oblique direction relative to the crease between the base portion and the front flap (3).
3. The box according to the previous claim, wherein the additional crease line of the front flap (3) is arranged in an oblique direction relative to the crease between the base portion and the front flap (3) at an angle of 15° to 55°, preferably 35° to 50°.
4. The box according to any one of the previous claims wherein one or both of the side flaps (5) comprises an additional crease line in an intermediate region of the side flap (5), wherein said additional crease line is arranged in an oblique direction relative to the crease between the base portion and each said side flap (5).
5. The box according to any one of the previous claims wherein each of said crease line or lines is arranged between a point at one end of the base portion (2) and a point at one end of the flap of said crease line, preferably the point at one end of the base portion (2) is an intersection point of two creases between the base portion (2) and two flaps.
6. The box according to any one of the previous claims wherein said board comprises a lid (4) attached to one of said flaps (e.g. 1), wherein the lid (4) comprises two side flaps of the lid arranged opposite relative to the lid (4), wherein said board comprises a crease between the lid (4) and each of the side flaps of the lid.
7. The box according to the previous claim, wherein said lid (4) comprises a closing flap (10) arranged between said side flaps of the lid, for closing a storage volume within said box.
8. The box according to the previous claim, wherein the flap opposite the flap to which said lid (4) is attached, comprises an additional flap (9) with an opening for receiving the closing flap (10) of the lid (4) for closing said storage volume.
9. The box according to any one of claims 4 to 6 wherein the lid (4) comprises an additional crease line perpendicular to one or both crease lines between said lid (4) and the side flaps of the lid.
10. The box according to the previous claim wherein the perpendicular additional crease line extends from the limit of one of the side flaps of the lid to the limit of other of the side flaps of the lid.
11. The box according to the previous claim, wherein the extension between the base portion (2) and the end of each of the flaps (1,3,5) is identical.
12. The box according to any one of the previous claims wherein the protrusion has a round, oval or elliptical shape.
13. The box according to any one of the previous claims wherein the front flap (3) comprises an opening for viewing an interior of the box.
14. The box according to any one of the previous claims, wherein the board is made of a rigid material foldable along preformed creases or of a flexible material foldable along preformed creases, in particular plain cardboard, corrugated cardboard, bamboo, derivatives thereof, or combinations thereof.
15. Method for producing the quick-assembly foldable box according to any one of claims 1 to 14, compris-

ing the following steps:

providing a board comprising:

a base portion (2) to form a base of the box; 5
 a front flap (3) and a rear flap (1) arranged
 opposite relative to the base portion (2) to
 form, respectively, a front wall of the box and
 a rear wall of the box; and two side flaps (5)
 arranged opposite relative to the base por- 10
 tion (2) to form the side walls of the box;
 wherein each of the side flaps (5) comprises
 two slots (8) each for receiving a protrusion;
 wherein said board comprises two front side
 flaps (6) arranged opposite relative to the 15
 front portion (3);
 wherein said board comprises two rear side
 flaps (7) arranged opposite relative to the
 rear portion (1),
 wherein each of the side flaps (6, 7) com- 20
 prises a protrusion for fitting into one of said
 slots (8) of the side flaps (5);

creasing said board between the base portion
 and the front flap (3), creasing said board be- 25
 tween the base portion (2) and the rear flap (1),
 and creasing said board between the base por-
 tion and each of the side flaps;
 creasing said board between the front portion (3)
 and each of the front side flaps (6); 30
 creasing said board between the rear portion (1)
 and each of the rear side flaps (6);
 creasing said board along a crease line in an
 intermediate region of the side flap (5), wherein
 said crease line is arranged in an oblique direc- 35
 tion relative to the crease between the base
 portion and each said side flap (5).

40

45

50

55

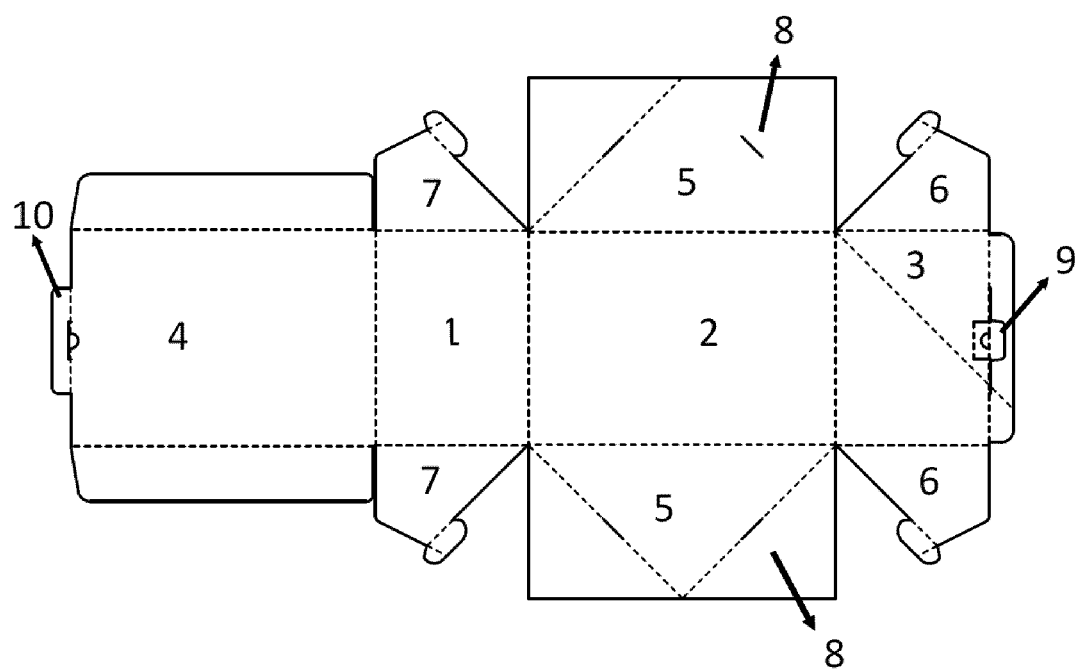


Fig. 1

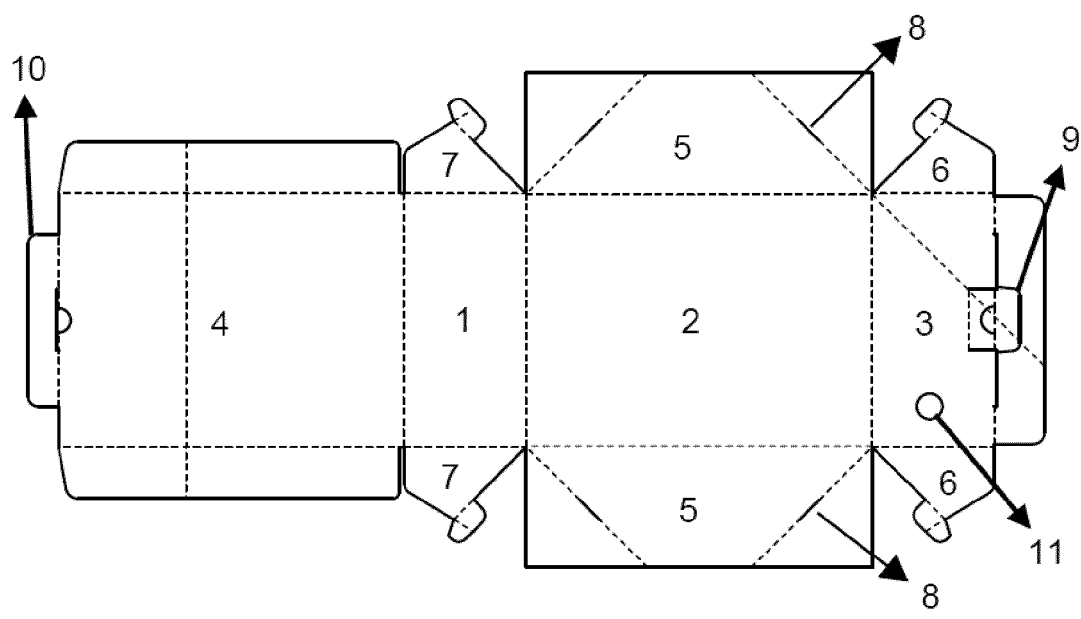


Fig. 2

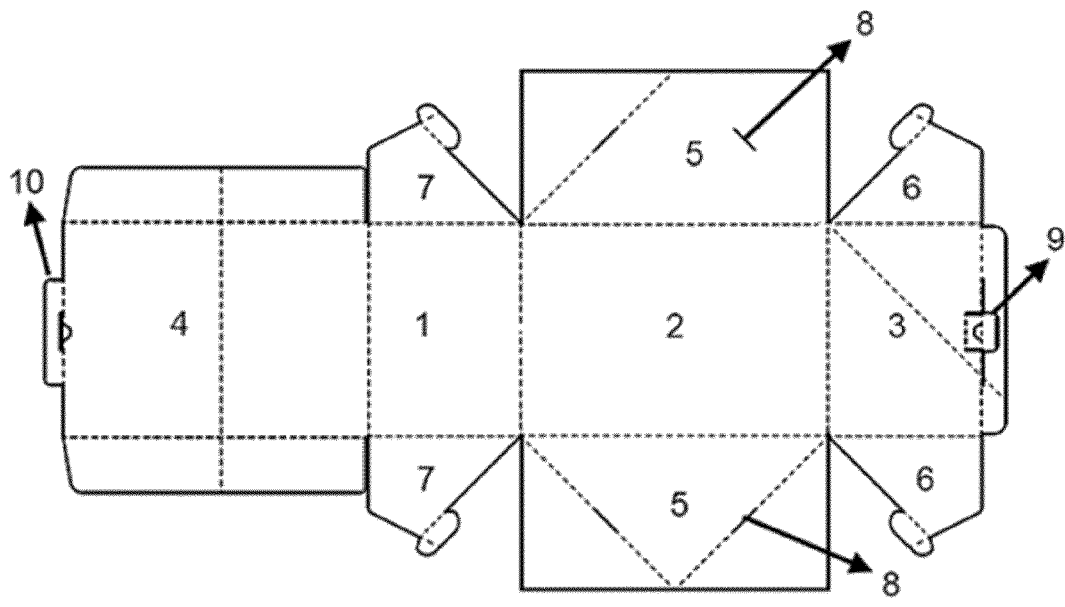


Fig. 3

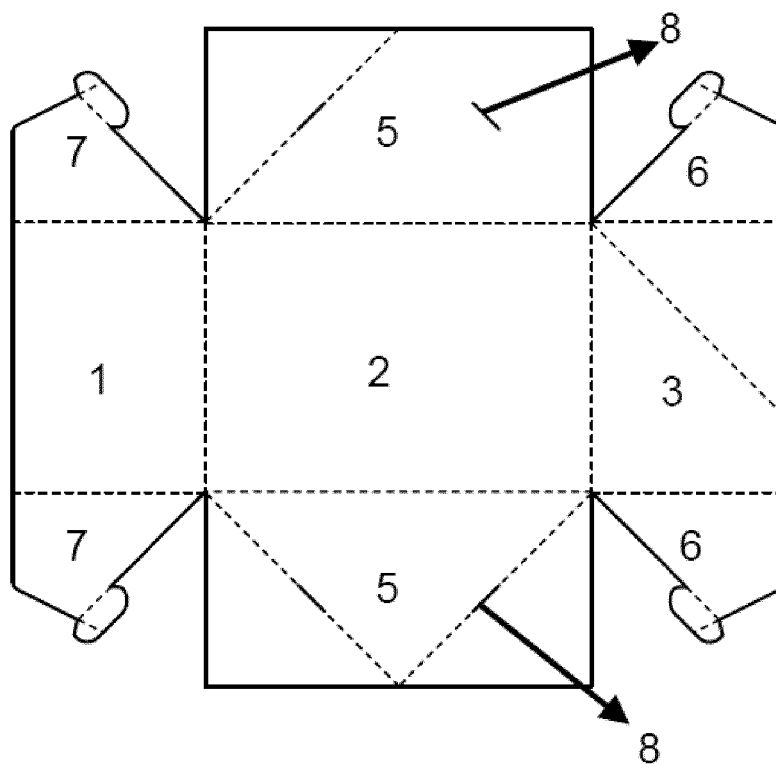


Fig. 4

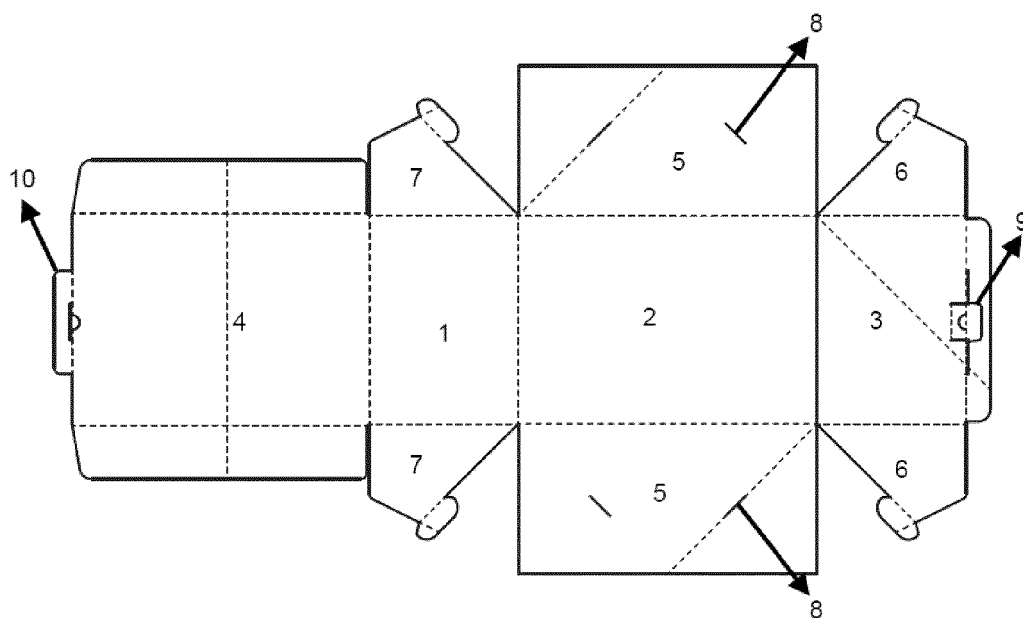


Fig. 5

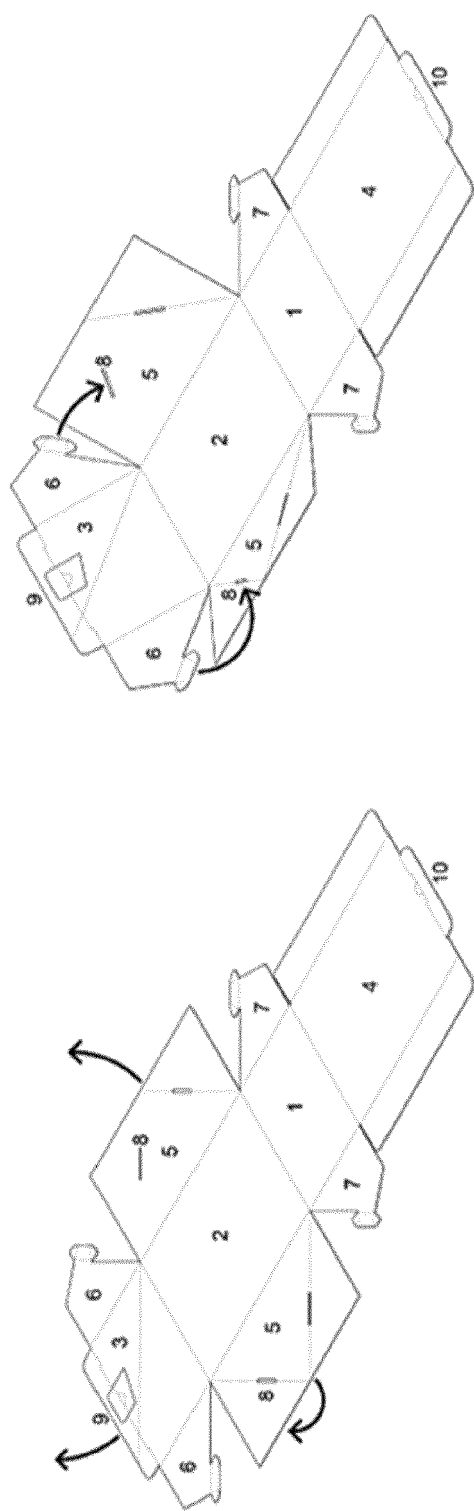


Fig. 6A

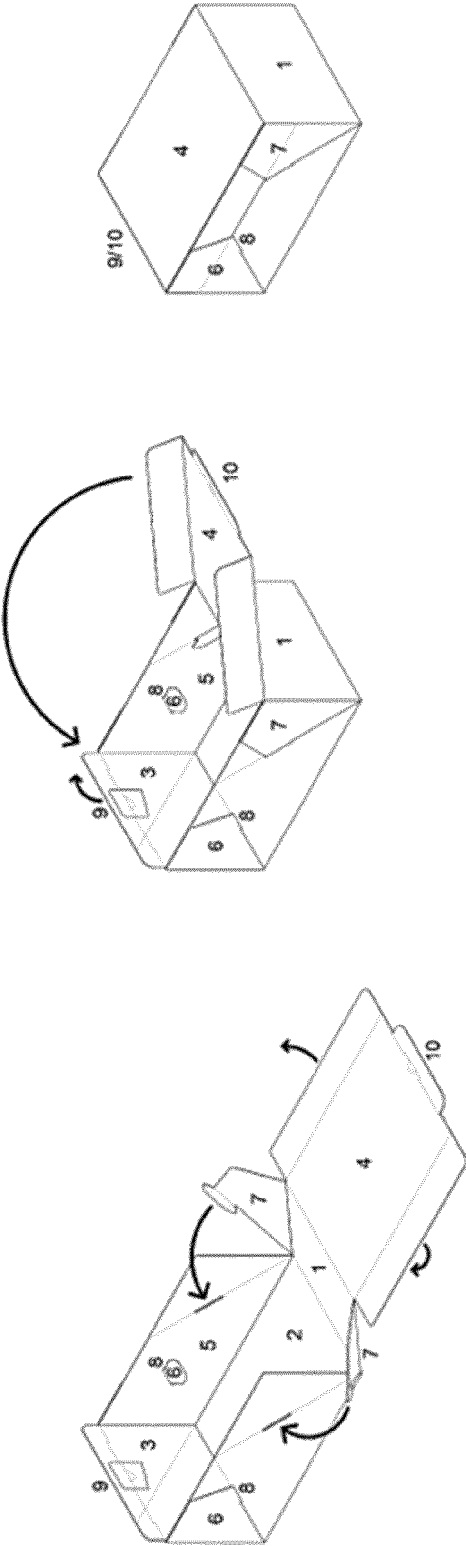


Fig. 6B

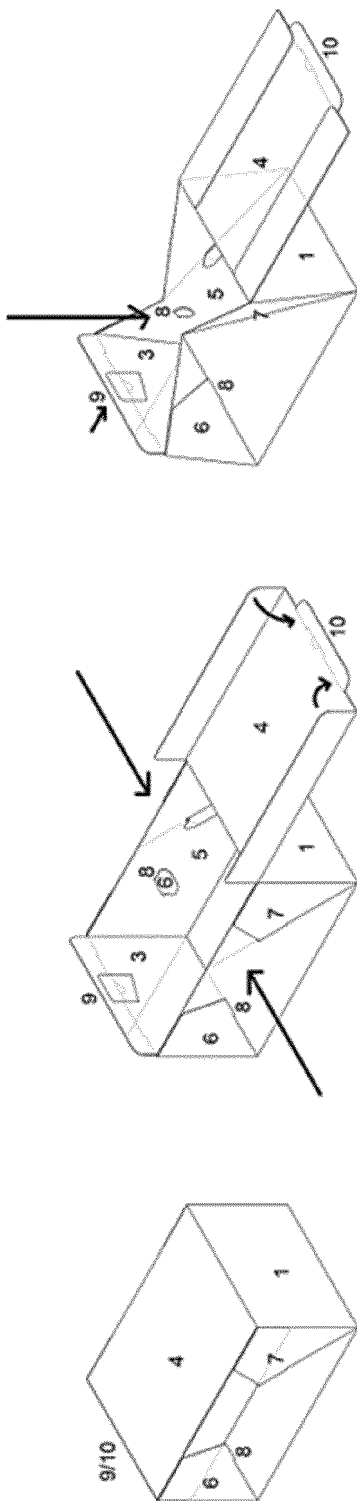


Fig. 7A

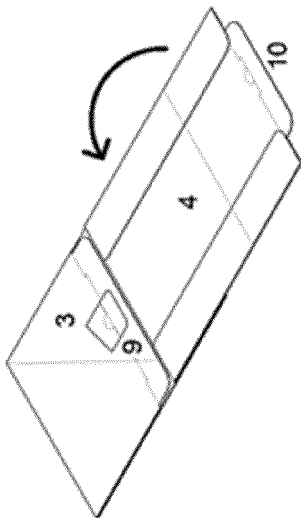
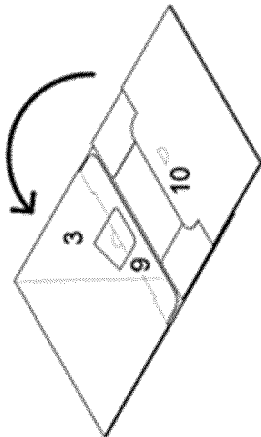
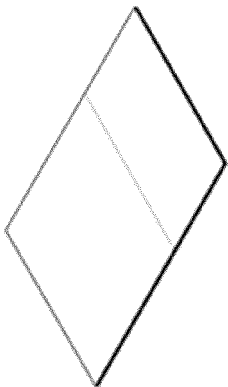


Fig. 7B



EUROPEAN SEARCH REPORT

Application Number

EP 25 19 0567

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 527 840 A (COATES HUNTER LTD; JOHN WILLIAM HUNTER) 17 October 1940 (1940-10-17) * page 1, lines 6-86 * * figures 1-3 *	1-15	INV. B65D5/30 B65D5/36 B65D5/66
X	US 2 319 371 A (STONECYPHER WILLIAM E) 18 May 1943 (1943-05-18) * column 1, line 1 - column 4, line 41 * * figures 1-8 *	1-15	ADD. B65D5/42
X	FR 2 929 596 A1 (SAICA FRANCE SA [FR]) 9 October 2009 (2009-10-09) * pages 1-7 * * figures 1-14 *	1-15	
A	DE 20 2023 106067 U1 (KWIID GMBH [CH]) 8 February 2024 (2024-02-08) * paragraphs [0001] - [0067] * * figures 1-12 *	1-15	
A	GB 468 015 A (PAUL PADWA) 28 June 1937 (1937-06-28) * page 1, line 1 - page 3, line 46 * * figures 1-2 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) B65D
A	IT 2021 0002 7689 A1 (OFFICINE GRAFICHE S R L [IT]) 28 April 2023 (2023-04-28) * figures 13-14 *	1-15	
A	US 2015/076144 A1 (CHALIFOUX PAUL [US]) 19 March 2015 (2015-03-19) * paragraphs [0132] - [0137] * * figures 23-29 *	1-15	
A	US 6 371 366 B1 (EDGERTON KEVIN [US] ET AL) 16 April 2002 (2002-04-16) * figure 2 *	1-15	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 October 2025	Examiner Duc, Emmanuel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P34C01)

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

EP 25 19 0567

10-10-2025

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 527840 A	17-10-1940	NONE	
US 2319371 A	18-05-1943	NONE	
FR 2929596 A1	09-10-2009	NONE	
DE 202023106067 U1	08-02-2024	CH 720746 A2	15-11-2024
		DE 202023106067 U1	08-02-2024
		WO 2024223073 A1	31-10-2024
GB 468015 A	28-06-1937	NONE	
IT 202100027689 A1	28-04-2023		
US 2015076144 A1	19-03-2015	NONE	
US 6371366 B1	16-04-2002	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0810156 A [0007]
- CN 203473584 [0008]
- CN 211642916 [0009]