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(54) **BOTTLE CRATE WITH REMOVABLE DIVIDER ELEMENT**

(57) The invention relates to bottle crate, comprising an injection-moulded plastic box (2) formed by a pair of longitudinal side walls (4), a pair of transverse side walls (5) and a bottom wall (6), the side and bottom walls being connected to each other at right angles, at least one of the pairs of side walls being provided with handles (7), the injection-moulded plastic box comprising reinforcement structures (15) at the inside of the side walls such

that the box is capable of supporting a predetermined weight; and a divider element (3), provided for defining storage spaces in the box for storing bottles of a predetermined type and preventing that adjacent bottles of this type that are stored in the box can contact each other. The divider element is removably mounted in the box and the bottom wall of the box is entirely closed.

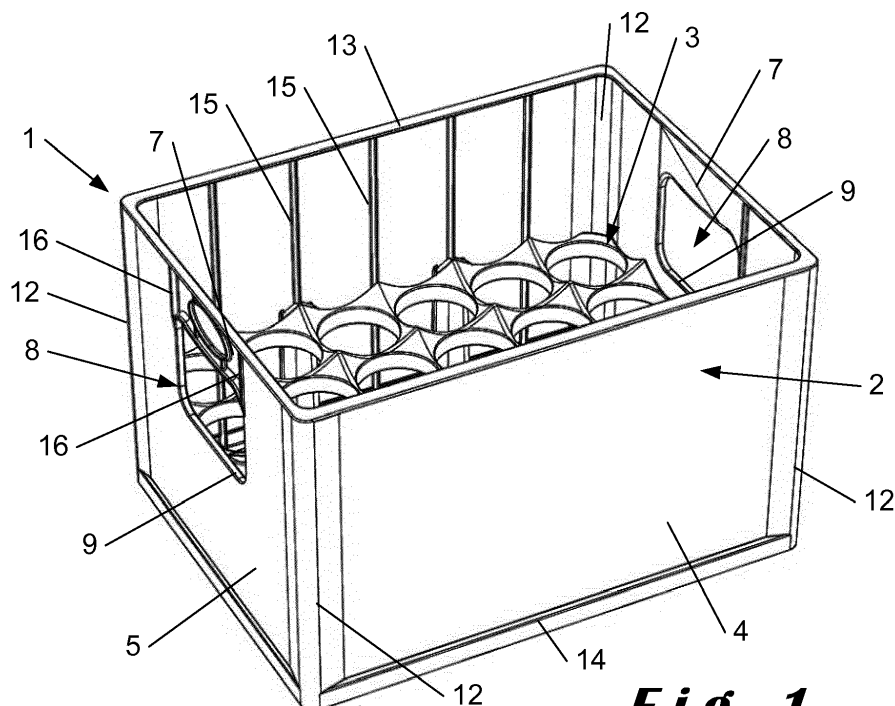


Fig. 1

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Description

Technical field

[0001] The present invention relates to a reinforced bottle crate suitable for being kept by the end user and having a second life as a general purpose storage box. More in particular, the present invention relates to a plastic crate which comprises a bottom part, side walls and a divider element wherein the divider element is removably mounted in the box and in that the bottom wall of the box is entirely closed.

Background art

[0002] Rectangular bottle crates such as beer crates, provided with a surrounding wall with recesses as carrying handles, are widely known. Said bottle crates are usually provided for being returned with the empty bottles.

[0003] Moreover, known bottle crates usually have a plurality of holes through their bottom wall for purposes of air circulation, removal of humidity, yeast process, etc.

[0004] Such bottle crates are for example described in particular in EP 0 322 152.

[0005] EP 0 322 152 discloses a crate having a body with a cavity for receiving a plurality of containers and a base with floor surfaces containing openings on which the containers can be supported. A crate insert is located in the cavity to provide a spacer arrangement above the base of the body for separating containers in the crate from one another. The crate body is a relatively thin-walled body of plastics material and the crate insert has reinforcements for providing the body with support against flexing. The crate body and insert have complementary formations for securing the insert to the body, locating the insert and further strengthening the crate. The base of the crate body is designed to rest on the tops or necks of containers in a subjacent crate for nesting a plurality of crates.

[0006] There is room for improvement in these crates which, in themselves have already been known for some time, or for crates suitable for being kept by the end user and having a second life as a general purpose storage box.

Disclosure of the invention

[0007] It is an aim of this invention to provide an alternative bottle crate which is optimized for a dual purpose, namely for storing and transporting bottles as well as for being kept by the end user and having a second life as a general purpose storage box.

[0008] According to the present invention, the aforementioned aim is achieved with the bottle crate showing the technical characteristics of the first claim. In particular, the bottle crate is optimized for its first use in that the plastic box is an injection-moulded plastic box, formed

by a pair of longitudinal side walls, a pair of transverse side walls and a bottom wall, the side and bottom walls being connected to each other at right angles, at least one of the pairs of side walls being provided with handles, the injection-moulded plastic box comprising reinforcement structures at the inside of the side walls such that the box is capable of supporting a predetermined weight, in particular the weight of like (or other) bottle crates and full bottles stored therein which are stacked on top of the box, and furthermore in that the bottle crate comprises a divider element which is provided defining storage spaces in the box for storing bottles of a predetermined type and preventing that adjacent bottles of this type that are stored in the box can contact each other. The "bottle crate" of the invention is optimized for its second use as a general purpose storage box in that the divider element can be removed and in that the bottom wall is entirely closed, i.e. no holes are provided at the bottom of the box. **[0009]** Further embodiments of the invention can be found in the depending claims and in the description of the drawings.

[0010] In order to optimize the box for its second use, the reinforcement structures, which are provided for reinforcing the walls of the box and help to provide the capability of supporting the predetermined weight, are preferably purposely designed so that they form minimal obstructions during the second use of the box. For example, the reinforcement structures preferably comprise a plurality of first upright ribs provided at the inside of the longitudinal side walls and spaced at substantially equal distances from each other, so that the reinforcing function is well spread over the side walls and that their dimensions can be minimized. As another example, the handles are preferably provided on the transverse sides and the reinforcement structures comprise a plurality of second upright ribs provided at the inside or outside of the transverse side walls on opposite sides of the handles. As another example, the box preferably comprises a support flange at the top side for supporting other crates stacked on top of the box, with the reinforcement structures preferably not projecting more than this support flange or in other words, considering the volume defined by this support flange by orthogonal projection onto a virtual plane drawn on the bottom wall of the box, the reinforcement structures are preferably fully provided in this volume.

[0011] Incidentally, an in-mould label may be provided on at least one of the side walls and different in-mould labels may be provided on different side walls. Alternatively, other types of labels or decorations may be provided on the side walls, such as for example stickers, inserts, relief structures, other labels, screen printing, etc.

[0012] In an embodiment, the box is made of plastic material and preferably made of high density polyethylene (HDPE) and/or polypropylene (PP) and/or polyethylene (PE). The wall thickness of the side and bottom walls is preferably not more than 2.3 mm, and more preferably not more than 2.0 mm. Preferably the wall thick-

ness of the side and bottom walls is as low as possible and determined as a function of the load which has to be carried by the box.

[0013] In an embodiment, the box comprises integrated support structures on the inside of side walls, provided for supporting the divider element at a predetermined height.

[0014] In an embodiment, said integrated support structures and the divider element are together provided with resilient connection members, so that the divider element can be releasably locked into place on the support structures. In this embodiment, the divider element also functions as an additional reinforcement of the plastic box.

[0015] In an embodiment, the divider element is made of plastic material and preferably made of high density polyethylene (HDPE) and/or polypropylene (PP) and/or polyethylene (PE).

Brief description of the drawings

[0016] The invention will be further elucidated by means of the following description and the appended drawings.

Figure 1 shows a perspective view of a bottle crate according to the present invention;

Figure 2 shows a perspective view of a bottle crate according to the present invention without the removable divider element;

Figure 3 shows a perspective view of a up-side-down bottle crate according to the present invention;

Figure 4 shows a perspective view of a longitudinal section of a bottle crate according to the invention;

Figure 5 shows a side elevation of a longitudinal section of a bottle crate according to the invention;

Figure 6 shows a perspective view of a cross section of a bottle crate according to the invention.

Modes for carrying out the invention

[0017] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the invention.

[0018] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

[0019] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

[0020] The term "comprising", used in the claims, should not be interpreted as being restricted to the means listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

[0021] The bottle crate 1 shown merely by way of non-limiting example in Figures 1 to 6 comprises a one part injection-moulded plastic box 2 and a one part injection-moulded plastic crate divider element 3.

[0022] The box 2 is formed by a pair of longitudinal side walls 4, a pair of transverse side walls 5 and a bottom wall 6, the side 4,5 and bottom 6 walls being connected to each other at right angles. The transverse side walls 5 are provided with handles 7 formed by handle openings 8. Said handle openings 8 have rectangular shape and are suitably reinforced by a peripheral rim 9 protruding inwardly. Hence, the crate can be lifted easily. It is obvious that handle openings 8 can have any appropriate shape such as ovoid shape, for instance, since the handle openings have dimensions such that a hand can be inserted therein.

[0023] The bottom wall 6 is entirely closed in such way that the bottle crate according to the invention is suitable for being kept by the end user and having a second life as a general purpose storage box, said storage box being suitable for storing any material, even capable of receiving solids and/or powdery and/or liquids. The inner side of the bottom wall 6 is flat and the outer side, i.e. the lower side, of the bottom wall 6 comprises nesting elements 10, which function for positioning like bottle crates on top of each other and on which the bottle crate can stand when it is not nested on another bottle crate. Said nesting elements 10 are formed by rectangular or squared ribs 11 aligned longitudinally and transversely and spaced at substantially equal distances from each other, so that the wall or top flange of another crate, onto which the crate is stacked, can fit in between the ribs 11. In this embodiment, the lower side of the bottom wall 6 comprises three longitudinal rows of four squared ribs 11. It should be noted that the nesting elements 10 can have any appropriate shape without departing from the scope of the invention.

[0024] The pair of longitudinal side walls 4 and the pair

of transverse side walls 5 are connected to each other at right angles through rounded corners 12 of the bottle crate 1. As shown, the surfaces of the side walls 4 and 5 are recessed with respect to these corners 12, a top flange 13 and a bottom part 14. This is to protect labels or decorations (not shown) that may be provided on the side walls.

[0025] Furthermore, the top end of the longitudinal side walls 4 and of the transverse side walls 5 comprises a peripheral flange 13 extending perpendicularly to the longitudinal side walls 4 and to the transverse side walls 5 of both sides of said walls 4 and 5. Said peripheral flange 13 forms a support flange at the top side of the box 2 as a support surface for other bottle crates stacked on the top of the box 2. A first portion of the peripheral flange 13 extends inwardly and a second portion of the flange 13 extends outwardly. The width of the peripheral flange 13 preferably lies within the range going from 8 to 14 mm. The peripheral flange 13 may have a different width on different sides of the box 2.

[0026] In this embodiment, for example, the peripheral flange 13 does not have the same width around the box 2. The flange 13 has a width of 12 mm on the long sides, i.e. on the top of the longitudinal side walls 4, and a width of 8 mm on the short sides, i.e. on the top of the transverse side walls 5. In this embodiment, the first portion of the flange 13 extending inwardly has a width of about 8 mm along the top of the longitudinal side walls 4. As mentioned above, the box 2 comprises also the nesting structures 10 at the bottom side, which cooperate with this top flange 13 for positioning the crates on top of each other.

[0027] Hence, the side walls 4 and 5 are recessed on the outside for decoration purpose. Said decorations, not shown on the figures, are preferably in-mould labels but these can also be stickers, laser printed decorations, relief structures on the side walls, screen printing or any known type of decorations.

[0028] Moreover, the inner face of the longitudinal side walls 4 comprises reinforcement structures such that the box 2 is capable of supporting a predetermined weight, usually at least 100 kg. Said reinforcement structures comprise a plurality of first upright ribs 15 provided at the inside of the longitudinal side walls 4 and extending from the bottom wall 6 up the peripheral flange 13. Preferably, the first upright ribs 15 have a thickness which is smaller than, preferably substantially equal to, and more preferably equal to the width of the first portion of the peripheral flange 13 extending inwardly, such that the first upright ribs 15 do not protrude from the peripheral flange 13 inside the box 2.

[0029] In this embodiment, for example, said first upright ribs 15 are spaced at substantially equal distance from each other. Said first upright ribs 15 have a thickness of about 8 mm which is equal to the width of the first portion of the peripheral flange 13 extending inwardly. Thus, said first upright ribs 15 do not protrude from the peripheral flange 13 inside the box 2.

[0030] In the same manner, the outer face of the trans-

verse side walls 5 comprises reinforcement structures. Said reinforcement structures comprise two second upright ribs 16 provided at the outside of the transverse side walls 5 and extending from the handle openings 8 to the peripheral flange 13. Said second upright ribs 16 have a thickness equal to the width of the second portion of the peripheral flange 13 extending outwardly. Thus, said second upright ribs 16 do not protrude from the peripheral flange 13 outside the box 2.

[0031] Referring to figures 1 and 3 to 6, the box 2 comprises integrated support structures 17 on the inside of the longitudinal side walls 4, provided for supporting the divider element 3 at a predetermined height. In this embodiment, said integrated structures 17 are pillars 18 extending from the bottom wall 6 up to about the mid-height of the box 2. The divider element 3, provided for defining storage spaces in the box 2 for storing bottles of a predetermined type and preventing that adjacent bottles of this type that are stored in the box 2 can contact each other, is designed to be located in the cavity of the box 2 at "shoulder height" of the bottles and has complementary formations 19 for engaging formations 20 on the top end of the pillars 18 to locate and releasably secure the divider element 3 with respect to the box 2. The complementary formations 19 are hollow downright formations extending downwardly from the divider element 3 and are designed to fit around top edges of pillars 18. Thus, complementary formations 19 and formations 20 form resilient connection members so that the divider element 3 can be releasably locked into place on the support structures. It should be noted that the box 2 without the divider element 3 can also be used for selling bottle packs, i.e. bottles packaged together in cardboard, without departing from the scope of the invention.

[0032] Hence, the bottle crate according to the invention can be firstly used for selling bottles, with or without the removable divider element, and then be kept by the end user for a second life as a general purpose storage box, said storage box being capable of receiving solids and/or powdery and/or liquids since the bottom wall of the box is entirely closed.

[0033] The bottle crate according to the invention is preferably integrally formed and may be made of suitable plastic material, such as polypropylene (PP), polyethylene (PE) or high density polyethylene (HDPE) for instance. In the same manner, the divider element 3 is preferably integrally formed and may be made of suitable plastic material, such as polypropylene (PP) and/or polyethylene (PE) and/ or high density polyethylene (HDPE).

[0034] Moreover, the bottle crate is preferably a standard crate of size 300x400 mm but the principle of the invention can also be applied on non-standard crates, such as for example half-size crates of 200x300 mm.

[0035] Furthermore, the bottle crate according to the invention is preferably a so-called "light-weight" crate wherein the side walls 4,5 and the bottom wall 6 have a thickness less than 2.3 mm, preferably less than 2.0 mm.

The term "light-weight" means that the weight of the box and the divider element together is not more than 1.5 kg, preferably not more than 1.3 kg, more preferably not more than 1.1 kg, for a regular crate of size 300x400 mm.

[0036] It will be understood by those skilled in the art that the present invention is not limited to the embodiments illustrated above and that many modifications and additions may be made without departing from the scope of the invention as defined in the appending claims.

Claims

1. A bottle crate, comprising:

an injection-moulded plastic box (2) formed by a pair of longitudinal side walls (4), a pair of transverse side walls (5) and a bottom wall (6), the side (4,5) and bottom (6) walls being connected to each other at right angles, at least one of the pairs of side walls (4,5) being provided with handles (7), the injection-moulded plastic box (2) comprising reinforcement structures (15) at the inside of the side walls (4,5) such that the box (2) is capable of supporting a predetermined weight; and

a divider element (3), provided for defining storage spaces in the box (2) for storing bottles of a predetermined type and preventing that adjacent bottles of this type that are stored in the box (2) can contact each other;

characterised in that the divider element (3) is removably mounted in the box (2) and **in that** the bottom wall (6) of the box (2) is entirely closed.

2. The bottle crate of claim 1, wherein the reinforcement structures comprise a plurality of first upright ribs (15) provided at the inside of the longitudinal side walls (4) and spaced at substantially equal distances from each other.

3. The bottle crate of claim 1 or 2, wherein the handles (7) are provided on the transverse side walls (5) and wherein the reinforcement structures comprise a plurality of second upright ribs (16) provided on the transverse side walls (5) on opposite sides of the handles (7).

4. The bottle crate of any one of the preceding claims, wherein the wall thickness of the longitudinal (4) and transverse (5) side walls and the bottom wall (6) is at most 2.3 mm.

5. The bottle crate of any one of the preceding claims, wherein the box (2) comprises a support flange (13) at the top side as a support surface for other bottle crates stacked on top of the box (2), the support

flange (13) projecting at least inwards and the reinforcement structures (15) extending from the bottom wall (6) up to the support flange (13).

6. The bottle crate of claim 5, wherein the first (15) and/or second ribs (16) project not more than the support flange (13).

7. The bottle crate of any one of claims 5 and/or 6, wherein the box (2) comprises nesting structures (14) at the bottom side.

8. The bottle crate of any one of the preceding claims, wherein an in-mould label is provided on at least one of the side walls (4,5).

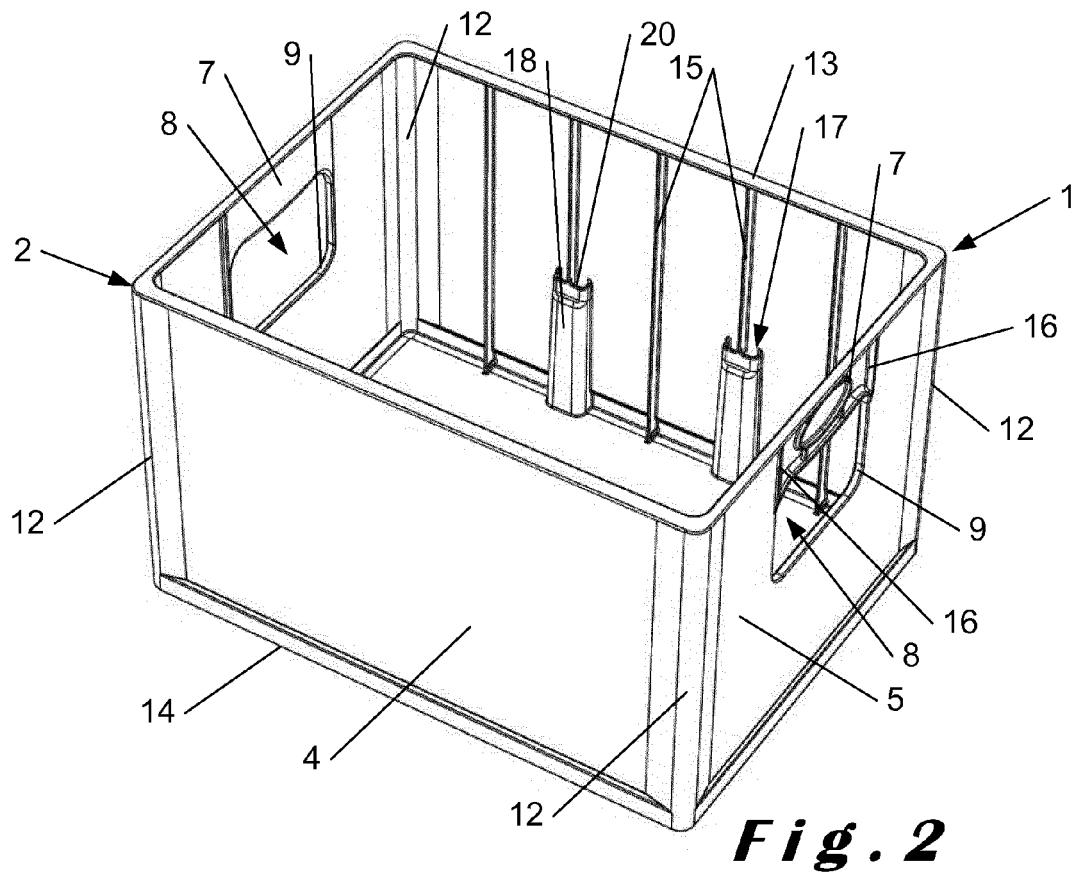
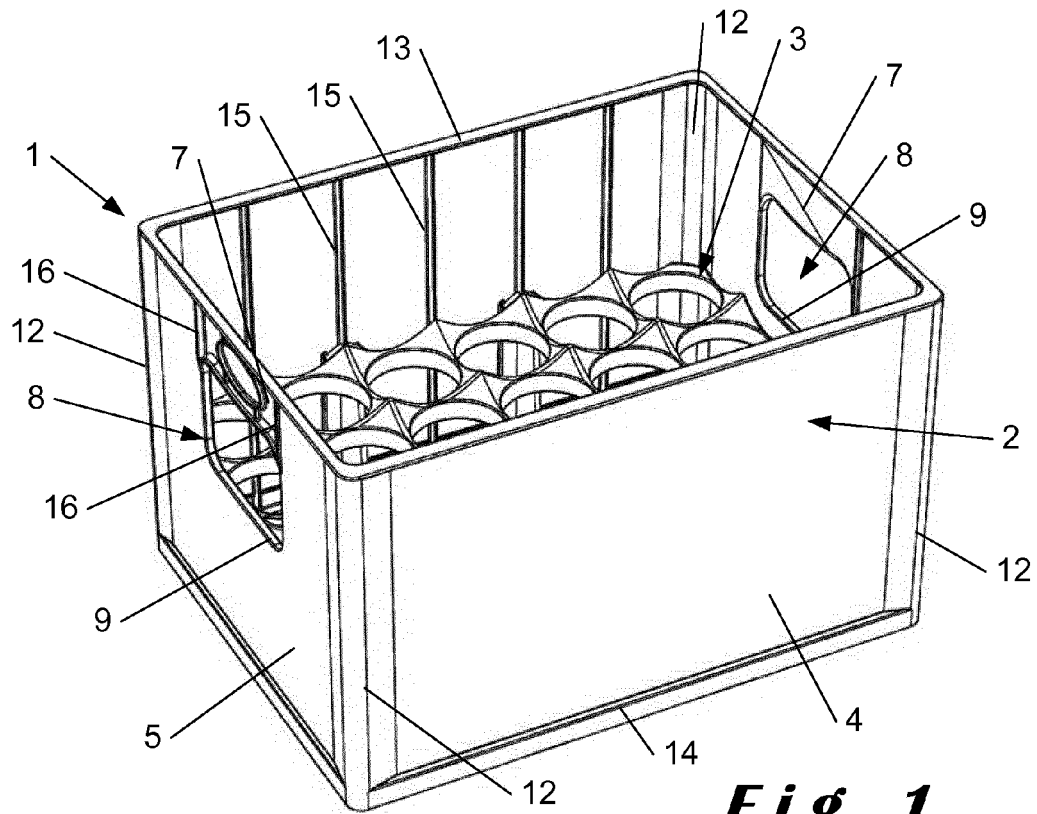
9. The bottle crate of any one of the preceding claims, wherein the box (2) is made of high density polyethylene (HDPE) and/or polypropylene (PP) and/or polyethylene (PE).

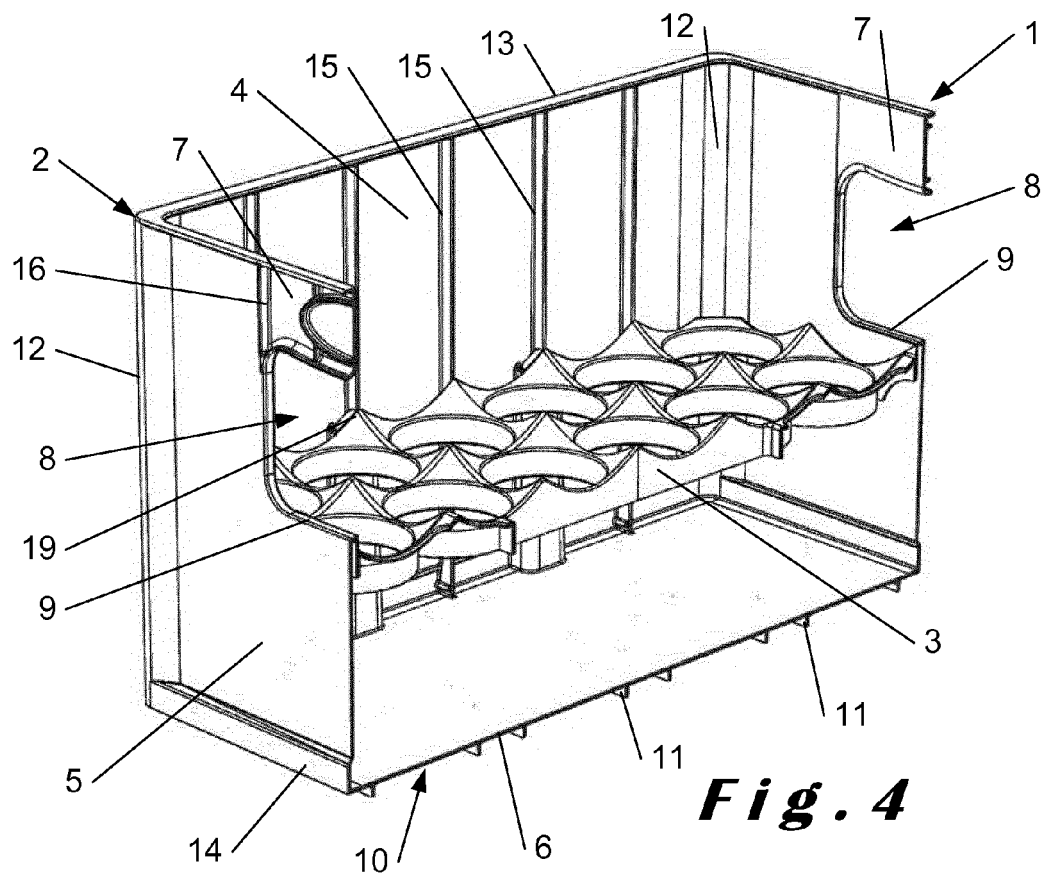
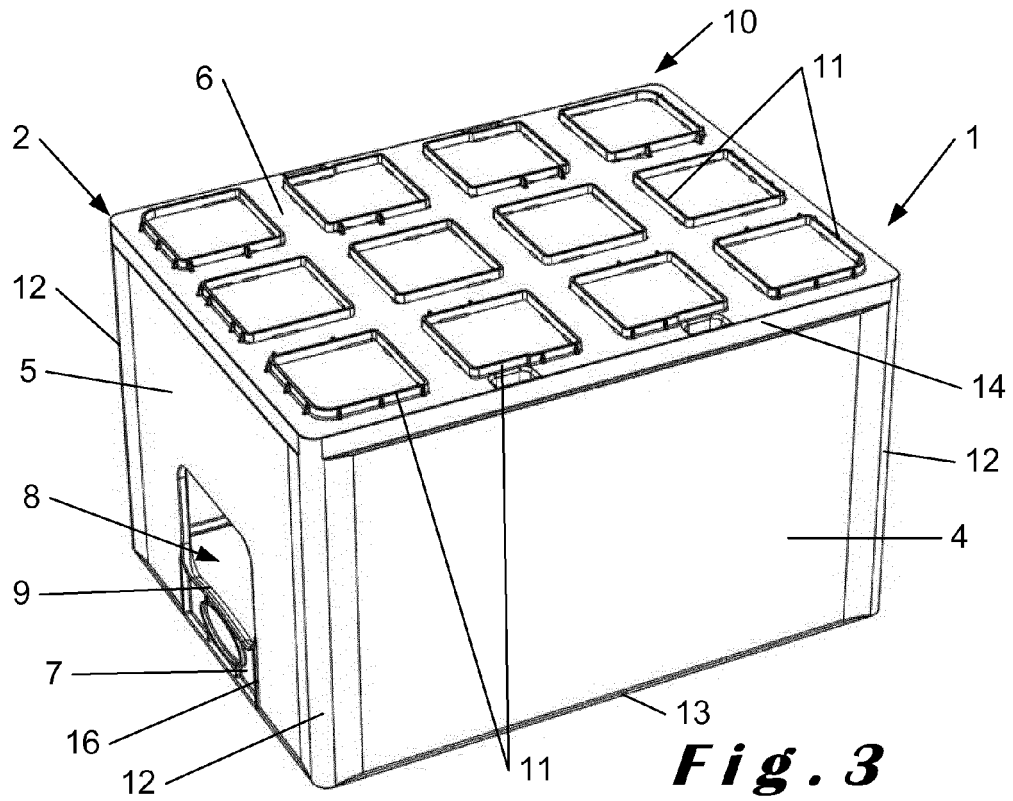
10. The bottle crate of any one of the preceding claims, wherein the box comprises integrated support structures (18) on the inside of side walls (4), provided for supporting the divider element (3) at a predetermined height.

11. The bottle crate of claim 10, wherein the integrated support structures (18) and the divider element (3) are together provided with resilient connection members, so that the divider element (3) can be releasably locked into place on the support structures (18).

12. The bottle crate of any one of the preceding claims, wherein the divider element (3) is provided for forming an additional reinforcement of the plastic box.

13. The bottle crate of any one of the preceding claims, wherein the divider element (3) is made of high density polyethylene (HDPE) and/or polypropylene (PP) and/or polyethylene (PE).





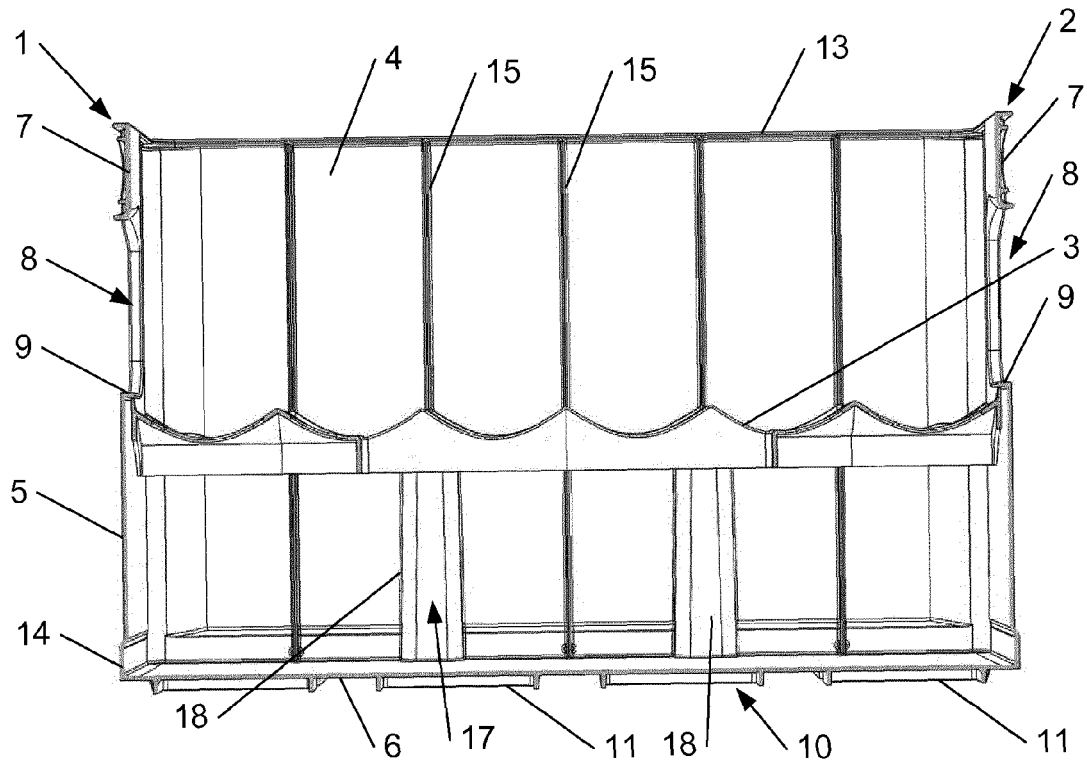


Fig. 5

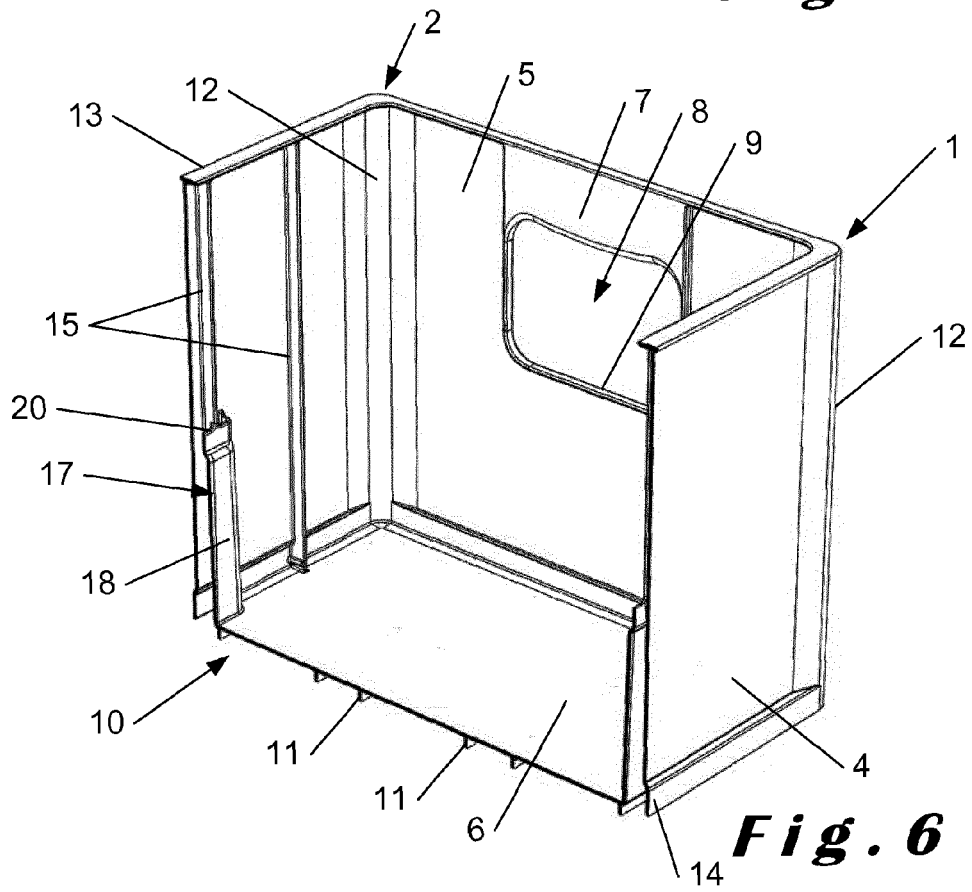


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 15 17 9385

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 2 829 485 A1 (SCHOELLER ALLIBERT GMBH [DE]) 28 January 2015 (2015-01-28) * abstract; figures * * paragraphs [0034] - [0037] *	1-13	INV. B65D1/24 B65D85/30
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A	US 3 129 838 A (WORMER III CLARK C) 21 April 1964 (1964-04-21) * column 4, lines 1-16; figures * * column 5, lines 31-43 *	1-13	
A	BE 547 980 A (VAN DEN ASSEM) 6 November 1959 (1959-11-06) * the whole document *	1-13	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) B65D
Place of search The Hague		Date of completion of the search 11 September 2015	Examiner Serrano Galarraga, J
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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