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(54) **System for the transport of an array of a plurality of self-supporting containers for liquids**

(57) A novel system (100) for the transport of an array of a plurality of self-supporting containers (130) for liquids is provided. The system (100) includes a cell tray (110), which is designed for a particular type of containers and has a load carrying surface (111) for receiving bottom portions of said particular containers. The undersurface (112) of the cell tray (110) is on the reverse side to the load carrying surface (111) and is shaped to receive top portions of similar containers of another cell tray beneath the undersurface (112). The cell tray (110) also has a quadrilateral peripheral edge (113), which defines a periphery and surrounds the load carrying surface (111) and the undersurface (112). The system (100) also includes an insert (120, 140, 150), which features a peripheral edge (124, 144, 154), which fits within the periphery of the edge (113) of the cell tray (110). The insert (120, 140, 150) is configured to be removably inserted onto the load carrying surface (111) or to the undersurface (112) of the cell tray (110). A first surface (121, 141, 151) of the insert (120, 140, 150) is defined by the peripheral edge (124, 144, 154) and configured to engage with a plurality of containers (130), which are different to those for which the cell tray (110) is designed. A second surface (122, 142, 152) of the insert (120, 140, 150) is on the reverse side to the first surface (121, 141, 151) and defined by the peripheral edge (124, 144, 154) and configured to engage with the cell tray (110).

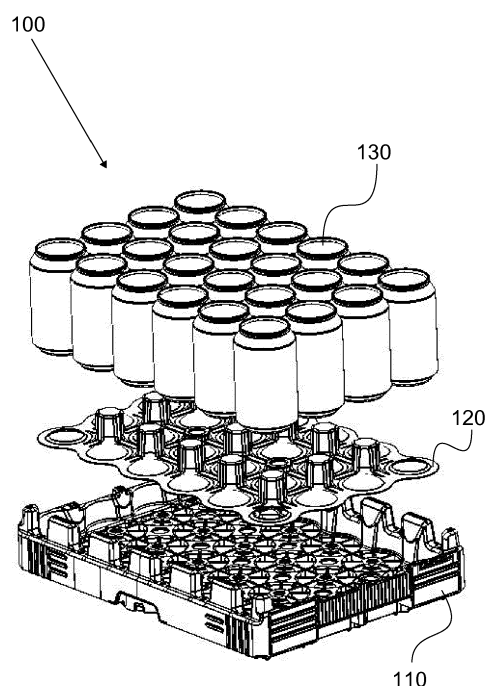


FIG. 2

Description

FIELD OF THE INVENTION

[0001] The present invention relates to logistics equipment. In particular, the invention relates to devices for transportation and exhibition of goods for merchandising purposes. More specifically, the invention relates to a system for the transport of an array of a plurality of self-supporting containers for liquids according to the preamble portion of claim 1.

BACKGROUND ART

[0002] Cans, bottles and similar self-supporting containers for holding liquids are typically transported in cell trays, which are not only used for logistics purposes but for merchandising alike. One such cell tray is known from EP 1593608 A1, which discloses a cell tray with a load carrying surface and a surrounding specially designed edge for providing lateral support for a plurality of containers, namely bottles, having a particular cross-sectional radius. The surrounding upwardly extending edge has outwardly bulging convergences for receiving the outer enveloping surface of the bottle of a particular size. Cell trays are designed such that they may be stacked empty as well as while being loaded with containers. As the containers are self-supporting, the underside of the cell tray is typically provided with recesses for receiving the top rim or portion of the container. This is very advantageous for automated handling of goods as compared to non-self supporting containers such as cups for dairy products, which are typically transported by means of cardboard trays, which are designed to provide the necessary vertical support for stacking purposes and which are therefore different from trays for self-supporting containers.

[0003] As in EP 1593608 A1, it is typical for cell trays to be designed for a particular containers size with a known cross-sectional radius and a known height. It is therefore typical to have one cell tray with low edges for a ⅓ liter can and another with high edges for a ½ liter can despite the fact both have a similar cross-sectional radii but different heights. While the two types of cans share a common footprint size, it is typically not possible to use a cell tray designed for a ⅓ liter can to transport ½ liter can because of lack of lateral support making the ½ liter cans tip over easily. Moreover, a cell tray designed for a large container with a large footprint is not suitable for a smaller container with a smaller footprint due to similar lack of support.

[0004] As known cell trays are only suitable for receiving a container of a particular type, practically no other types of containers can be used. The same applies to a bundle of containers. For example, a cell tray designed to carry four six-packs of two by three cans is typically not suitable to carry a four by six array of cans because such cell trays for multipacks do not provide adequate

lateral support for the array of individual cans.

[0005] It is therefore an aim of the present invention to eliminate the need for different kinds of cell trays.

[0006] It is a particular aim to provide a solution to transporting non-conventional pluralities of containers for liquids, such as special campaign bottles or bundles without the need of tooling and producing specially designed cell trays.

10 SUMMARY

[0007] The aim of the present invention is achieved with aid of a novel system for the transport of an array of a plurality of self-supporting containers for liquids. The system includes a cell tray, which is designed for a particular type of containers and has a load carrying surface for receiving bottom portions of said particular containers. The undersurface of the cell tray is on the reverse side to the load carrying surface and is shaped to receive top portions of similar containers of another cell tray beneath the undersurface. The system also includes an insert, which is configured to be removably inserted onto the load carrying surface or to the undersurface of the cell tray. A first surface of the insert is configured to engage with a plurality of containers, which are different to those for which the cell tray is designed. A second surface of the insert is on the reverse side to the first surface and configured to engage with the cell tray.

[0008] According to one embodiment, the cell tray also has a quadrilateral peripheral edge, which defines a periphery and surrounds the load carrying surface and the undersurface. The insert features a peripheral edge, which fits within the periphery of the edge of the cell tray and defines the first and second surface thereof.

[0009] According to a further embodiment, the first surface of the insert is an upper surface that has a plurality of positions for receiving the bottoms of said containers, whereas the second surface of the insert is a bottom surface, which is intended for engaging with the load carrying surface of the tray. The insert also includes protruding support organs protruding from junctions in between four adjacent positions on the upper surface for providing lateral support.

[0010] According to another embodiment, the first surface of the insert is a bottom surface that has a plurality of positions for receiving the top portions of said containers, whereas the second surface of the insert is an upper surface, which is intended for engaging with the undersurface of the tray. The insert is therefore configured to serve as an adapter between the undersurface of the tray and the plurality of containers, which are different to those for which the cell tray is intended.

[0011] According to yet another embodiment, the system includes one insert for receiving the bottoms of the containers and another insert for receiving the top portions of the containers.

[0012] More specifically, the system according to the present invention is characterized by the characterizing

portion of claim 1.

[0013] Considerable benefits are gained with aid of the present invention. By virtue of a special first insert, a cell tray designed to hold and transport a plurality of containers of one kind may be used to transport a container of another kind. For example, a cell tray designed for $\frac{1}{3}$ liter cans may be used to transport $\frac{1}{2}$ liter cans because the protruding support organs on the upper surface of the first insert provide extra lateral support for the taller $\frac{1}{2}$ liter cans. Alternatively, the cell tray may be modified to receive and transport special campaign bottles or cans, bottles with special nozzles, multipacks, or bottles or cans with a larger or smaller footprint by providing an adapting insert between the cell tray and the plurality of containers. A conventional cell tray may thus be modified without retooling and extra cell tray inventory for transporting special containers or bundles. The insert adaptor may be made of easily discarded material, such as cardboard, or recyclable plastic material, such as PET.

BRIEF DESCRIPTION OF DRAWINGS

[0014] In the following, exemplary embodiments of the invention are described in greater detail with reference to the accompanying drawings in which:

Fig. 1 presents an isometric view of a transportation system according to one embodiment,

Fig. 2 presents an isometric explode view of the system of Fig. 1,

Fig. 3 presents an isometric view of the cell tray of the system of Fig. 1,

Fig. 4 presents an isometric view of the first insert of the system of Fig. 1,

Fig. 5 presents an isometric view of the system of Fig. 1 without containers thus exposing the cooperation between the tray and first insert,

Fig. 6 presents an isometric cross-sectional view of the system of Fig. 1,

Fig. 7 presents an isometric view of a transportation system according to another embodiment,

Fig. 8 presents an isometric view explode view of the system of Fig. 7,

Fig. 9 presents an isometric view explode view of the system of Fig. 7 with a cell tray of another system to be superposed on the system of Fig. 7,

Fig. 10 presents an isometric explode view of the system according to another embodiment, and

Fig. 11 presents an isometric view of the system of Fig. 10 without containers thus exposing the cooperation between the tray and first insert.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0015] Turning first to Figs. 1 and 2, which show a system 100 according to one embodiment, wherein an insert 120 as an adapter between a conventional cell tray 110 and the bottoms of containers 130, which would otherwise be incompatible with the cell tray 110. In the example of Figs. 1 and 2 the incompatibility between the plurality of containers 130 and the cell tray 110 is due to the cell tray 110 being designed to receive an array of short $\frac{1}{3}$ liter cans, whereas the plurality of containers 130 features an array of taller $\frac{1}{2}$ liter cans with a similar footprint. The cell tray 110 would therefore not provide adequate lateral support thus reducing the stability of the load and possible leading to some cans dropping from the cell tray 110. The insert adaptor may be made of plastics by molding preferably of recyclable plastic material, such as PET or otherwise processed of easily discarded material, such as cardboard.

[0016] The system 100 has two major components for transporting an array of a plurality of self-supporting containers 130: a cell tray 110 and a cooperating insert 120. In this context the term *self-supporting* refers to containers, which are configured to bear the load at least another similar full container without collapsing. The cell tray 110 has a load carrying surface 111 and an undersurface 112, which opposes the load carrying surface 111. The load carrying surface 111 is essentially flat, whereas the undersurface 112 is shaped to include recesses for receiving the top portions of containers, namely the rims of cans in Figs. 1 to 6 and bottle top portions in Figs. 7 to 9. Surrounding the load carrying surface 111 there is a quadrilateral peripheral edge 113, which extends upwards from the load carrying surface 111 so as to provide lateral support for the array of containers 130. In the illustrated example, the array is a four by six matrix of beverage cans. Therefore the cell tray 110 itself is a conventional cell tray designed to receive such an array of $\frac{1}{3}$ liter cans (see Fig. 3).

[0017] Turning now more closely to Fig. 4, which shows the second major component of the system 100 in isolation. The first insert 120 has a peripheral edge 124, which is dimensioned to fit within the periphery of the edge 113 of the cell tray 110. More particularly, the peripheral edge 124 of the first insert 120 shares the contour of the edge 113 of the cell tray 110 in a reduced dimension such that the first insert 120 may be easily inserted within the peripheral edge 113 of the cell tray. The first insert 120 is in other words designed to be removably inserted onto the load carrying surface 111 of the cell tray 110.

[0018] The first surface 121 of the insert 120 is an upper surface 121 that has a plurality of positions for receiving the bottoms of a plurality of containers 130, which are

different to those for which the cell tray 110 is designed. The second surface 122 of the insert 120 is a bottom surface 122, which is intended for engaging with the load carrying surface 111 of the tray 110. When inserted, the bottom surface 122 of the first insert 120 engages with the load carrying surface 111 of the cell tray. The upper surface 121 of the first insert 120 has a corresponding four by six array of positions for receiving the bottoms of the corresponding plurality of containers 130. Each position has an opening 126 connecting the upper and bottom surfaces 121, 122. The openings are dimensioned to receive the bottom of a container 130 in a recessed manner for providing further lateral support such that the load carrying surface 111 of the cell tray 110 carries the weight of the container 130 (see Figs. 5 and 6).

[0019] The upper surface 121 of the first insert 120 also has a plurality of support organs 123, 125 protruding from the upper surface 121. The support organs 123, 135 are placed at junctions in between four adjacent positions on the upper surface 121 for providing lateral support for the containers 130 in said positions. According to the illustrated embodiment, there are two kinds of support organs: quills 123 and bosses 125. The quills 123 are dimensioned to provide sufficient lateral support for the containers 130. The quills 123 are provided with concavities corresponding to the cross-sectional radius of the containers 130. In the shown example, there are 13 quills 123 and two bosses 125. The bosses 125 are arranged such that each boss 125 is positioned in a junction in between four adjacent positions such that - without containers 130 - each boss 125 is in a center point of a quadrangle formed by eight quills 123. The bosses 125 are dimensioned to provide further lateral support. The bosses 125 are preferably equipped with through holes for providing access for grippers.

[0020] As a result, the cell tray 110 designed for $\frac{1}{3}$ liter cans may be used for a similar array of $\frac{1}{2}$ liter cans by first introducing the first insert 120 onto the load carrying surface 111 and within the boundaries of the surrounding peripheral edge 113. Once the bottom surface 122 of the first insert 120 has been mated with the load carrying surface 111 of the cell tray 110, the system 100 is formed, where after the array of containers 130 may be loaded onto the system 100. When the containers 130 are loaded onto the system 100, the bottoms of the containers 130 extend through the openings 126 in each position of the tray 120, wherein the load carrying surface 111 of the cell tray 110 bears the weight of the containers 130. Simultaneously, the support organs, namely the bosses 125 and quills 123 provide lateral support from inside the loading pattern, whereas the outwardly recessed edge 113 of the cell tray 110 provides lateral support from the sides. Thus, the array of tall $\frac{1}{2}$ liter cans is more likely to maintain integrity even when handled in a partially loaded configuration.

[0021] Turning now to Figs. 7 to 9, which show a system 100 according to another embodiment, wherein an insert 110 as an adapter between a conventional cell tray

110 and the top portions of containers 130, which would otherwise be incompatible with the cell tray 110.

[0022] According to the second main embodiment, the first surface 141 of the insert 140 is a bottom surface that has a plurality of positions for receiving the top portions of said containers 130. The second surface 142 of the insert 140 is an upper surface, which is intended for engaging with the undersurface 112 of the tray 110. The insert 140 thus serves as an adapter between the undersurface 112 of the tray 110 and the plurality of containers 130, which are different to those for which the cell tray (110) is intended. The top portions of the containers 130 are received into an array of recesses 143, which are accessible from the bottom surface 141. The recesses 143 protrude from the upper surface 142 of the insert 140 so as to fit recesses (not shown) in the undersurface 112 of the tray 110.

[0023] As a result, a cell tray 110, the undersurface 112 of which is designed to receive normal rotary caps may be modified to receive retractable nozzles of sports beverage bottles as shown in Figs. 7 to 9. The recesses 143 on the bottom surface 141 are shaped to fit the special nozzles at the opening side of the recesses 143 and on the reverse side - i.e. on the upper surface 142 - to fit the receiving recesses (not shown) of the undersurface 112 of the tray 110.

[0024] According to another embodiment, the system 100 includes two inserts 120, 140. One insert is an insert 120 for modifying a conventional cell tray 110 to receive the bottoms of otherwise incompatible containers 130, whereas the other insert is an insert 140 for modifying a conventional cell tray 110 to receive the top portions of otherwise incompatible containers 130. In the example shown with reference to Figs. 7 to 9, the system 100 may in addition to the insert 140 include another insert (not shown) to modify the load carrying surface of the cell tray to receive the bottoms of the sports beverage bottles. This bottom adapter insert may be similar in principle to that described with reference to Figs. 1 to 6. By means of such two inserts, both the load carrying surface as well as the undersurface may be modified to receive containers, for which the cell tray was not originally designed.

[0025] Turning now to Figs. 9 and 10, which show yet another embodiment. The insert 150 has a similar function to those described with reference to Figs. 1 to 6 and 7 to 9. The first surface, namely the upper surface 151 has been provided with form fitting adapter recesses 153, which hold a bottom of a bottle, which would otherwise not be compatible with the load carrying surface of the cell tray 110. The recesses 153 are in particular shaped to provide lateral enclosing support for the bottom portion of the containers intended to be inserted. In the shown example, the recesses 153 are shaped for bottles which have a smaller footprint than the bottles for which the cell tray 110 was designed.

[0026] The bottom surface 152 of the insert 150 is on the reverse side to the upper surface 151 and has been shaped to fit the load carrying surface of the receiving

cell tray 110. The upper surface 151 and the bottom surface 152 are delimited by the peripheral edge 154 of the insert 150 such that the peripheral edge 154 of the insert 150 is compatible with that of the cell tray 110. More particularly, the peripheral edge 154 of the insert 150 fits into the periphery of the peripheral edge of the cell tray 110.

TABLE 1: LIST OF REFERENCE NUMBERS.

Number	Part
100	system
110	cell tray
111	load carrying surface
112	underside
113	frame
120	insert
121	upper surface
122	bottom surface
123	quill
124	peripheral edge
125	boss
126	opening
130	container
140	insert
141	bottom surface
142	upper surface
143	recess
150	insert
151	upper surface
152	bottom surface
153	recess
154	peripheral edge

Claims

1. System (100) for the transport of an array of a plurality of self-supporting containers (130) for liquids, which system (100) comprises a cell tray (110) designed for a particular type of containers and including:

- a load carrying surface (111) for receiving bottom portions of said particular containers, and
- an underside (112), which is on the reverse side to the load carrying surface (111) and shaped to receive top portions of similar con-

tainers of another cell tray beneath the underside (112),

characterized by an insert (120, 140, 150), which is configured to be removably inserted onto the load carrying surface (111) or to the underside (112) of the cell tray (110), which insert (120, 140, 150) comprises:

- a first surface (121, 141, 151), which is configured to engage with a plurality of containers (130), which plurality of containers (130) is different in design, packaging or both to those for which the cell tray (110) is designed, and
- a second surface (122, 142, 152), which is on the reverse side to the first surface (121) and configured to engage with the cell tray (110).

2. The system (100) according to claim 1, wherein:

- the cell tray (110) comprises a quadrilateral peripheral edge (113), which defines a periphery and surrounds the load carrying surface (111) and the underside (112), and wherein
- the insert (120, 140, 150) comprises a peripheral edge (124, 144, 154), which defines the first and second surface (121, 141, 152) of the insert (120, 140, 150).

3. The system (100) according to claim 1 or 2, wherein the peripheral edge (124, 144, 154) of the insert (120, 140, 150) is configured to fit within the periphery of the edge (113) of the cell tray (110).

4. The system (100) according to any of the preceding claims, wherein:

- the first surface (121) of the insert (120) is an upper surface (121) having a plurality of positions for receiving the bottoms of said containers (130),
- the second surface (122) of the insert (120) is a bottom surface (122), which is intended for engaging with the load carrying surface (111) of the tray (110), and wherein
- the insert (120) comprises protruding support organs (123, 125) protruding from junctions in between four adjacent positions on the upper surface (121) for providing lateral support.

5. The system (100) according to claim 4, wherein the support organs (123, 125) of the insert (120) are provided with concavities corresponding to the cross-sectional radius of the containers (130).

6. The system (100) according to claim 4 or 5, wherein:

- the peripheral edge (113) of the cell tray (110)

- extends from the load carrying surface (111) to a height, and wherein
 - the protruding support organs (123) extend from the upper surface (121) to a height, which at most equal to that of the peripheral edge (113). 5
7. The system (100) according to any of the preceding claims 4 to 6, wherein the first insert (120) comprises openings (126) provided to each position for receiving a bottom of a container (130), the openings (126) connecting the upper and bottom surface (121, 122) of the first insert (120) and being dimensioned to receive the bottom of the container (130) in a recessed manner for further lateral support such that the load carrying surface (111) of the cell tray (110) carries the weight of the container (130). 10 15
8. The system (100) according to any of the preceding claims 4 to 7, wherein the upper surface (121) is shaped to receive the bottom of the container (130) and to carry the container (130) separated from the load carrying surface (111) of the tray (110). 20
9. The system (100) according to any of the preceding claims 4 to 8, wherein the underside (122) cell tray (110) comprises a plurality of locking recesses for receiving top portions of the corresponding plurality of containers (130). 25 30
10. The system (100) according to any of the preceding claims 1 to 3, wherein:
 - the first surface (141) of the insert (140) is a bottom surface having a plurality of positions for receiving the top portions of said containers (130), 35
 - the second surface (142) of the insert (140) is an upper surface, which is intended for engaging with the undersurface (112) of the tray (110), and wherein 40
 - the insert (140) is configured to serve as an adapter between the undersurface (112) of the tray (110) and said plurality of containers (130), which are different to those for which the cell tray (110) is intended. 45
11. The system (100) according to claim 10, wherein:
 - the insert (140) comprises an array of recesses (143) at said positions for receiving the top portions of said containers (130), which recesses are accessible from the bottom surface (141), and wherein 50
 - the recesses (143) protrude from the upper surface (142) of the insert (140) so as to fit recesses in the undersurface (112) of the tray (110). 55
12. The system (100) according to any of the preceding claims 1 to 3, wherein the insert (120, 140) is:
 - an insert (120) according to any of claims 4 to 9, or
 - an insert (140) according to claim 10 or 11.
13. The system (100) according to any of the preceding claims 1 to 3, wherein the system (100) comprises two inserts (120, 140):
 - one of which inserts (120, 140) is an insert (120) according to any of claims 4 to 9, and
 - the other of which inserts (120, 140) is an insert (140) according claim 10 or 11.

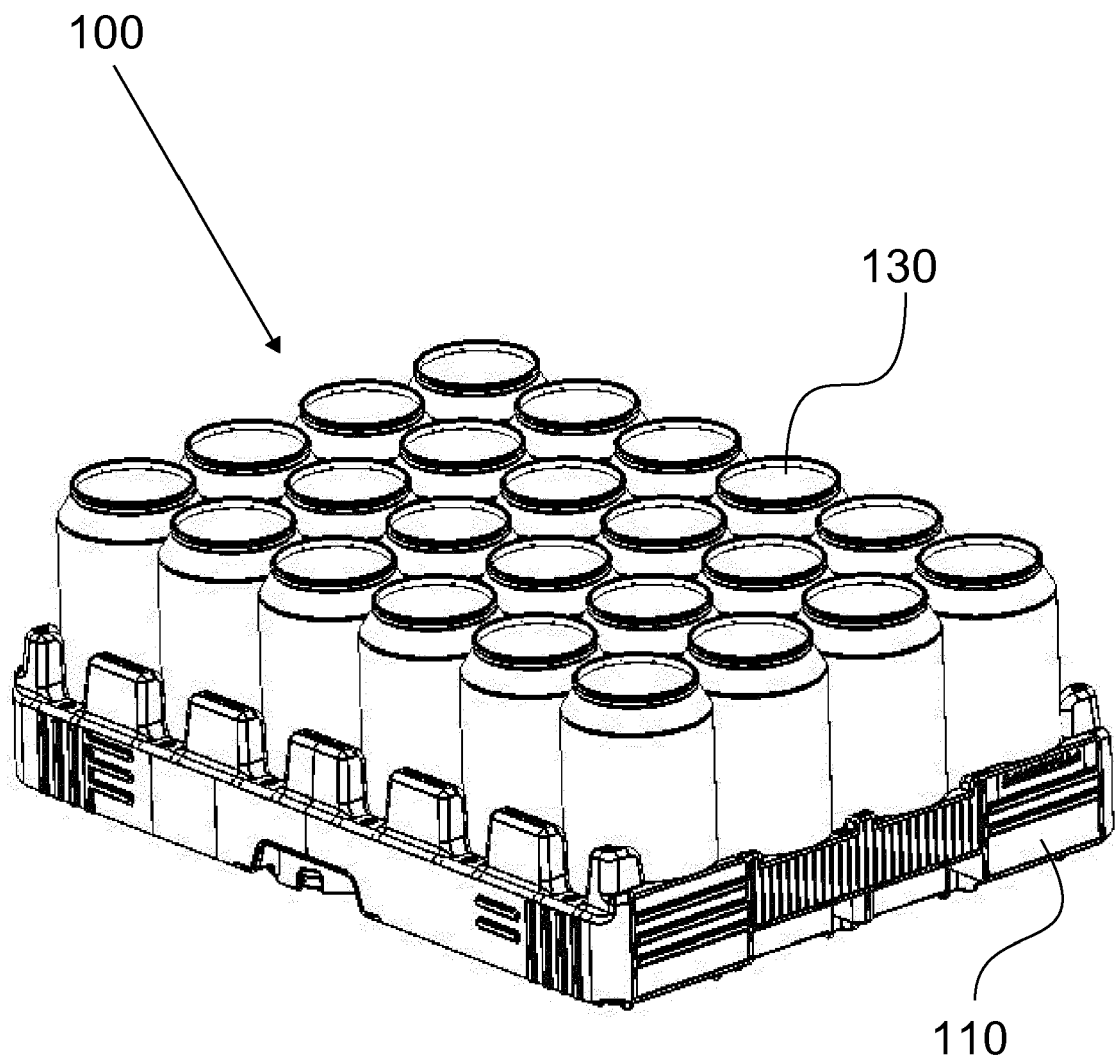


FIG. 1

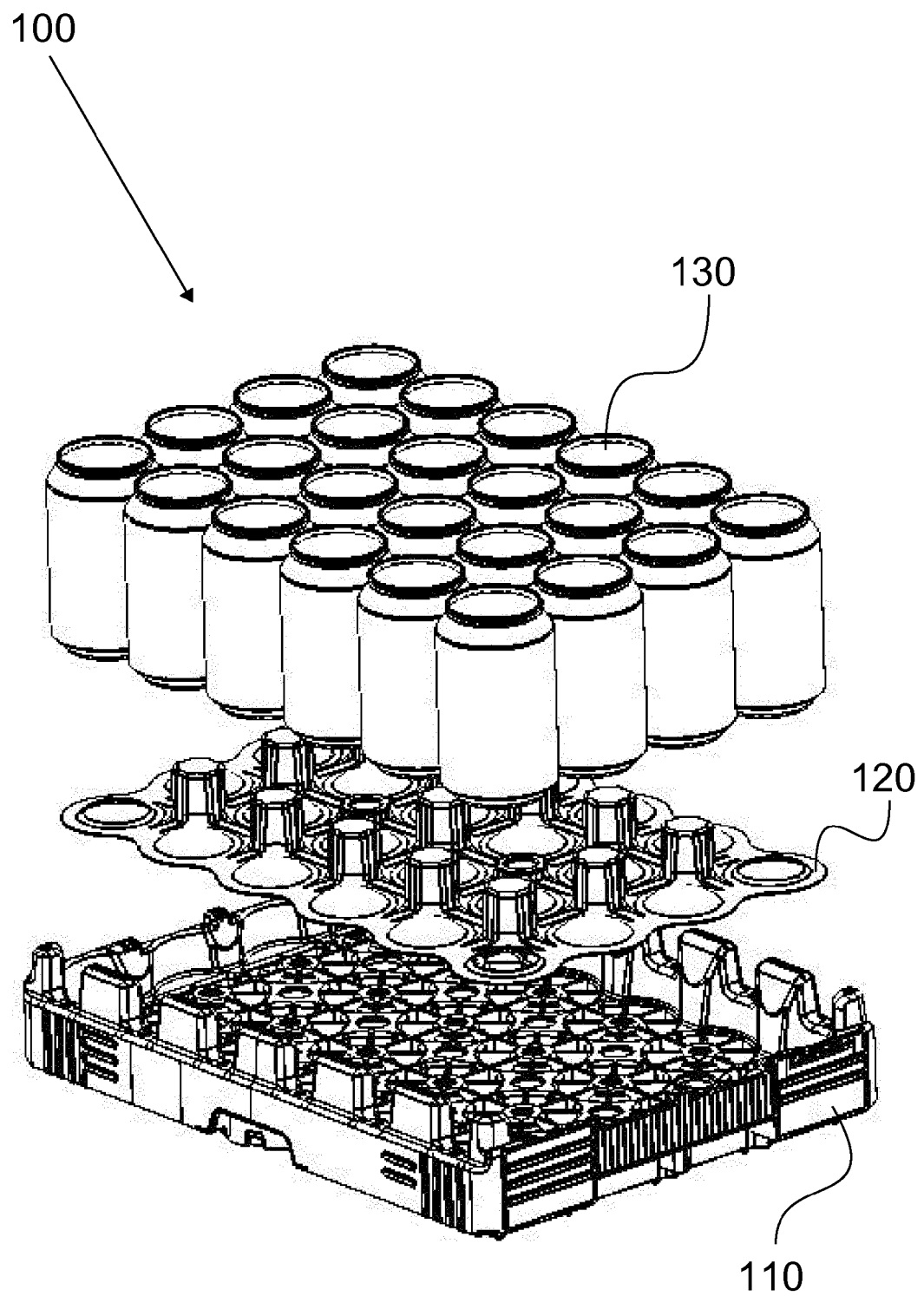


FIG. 2

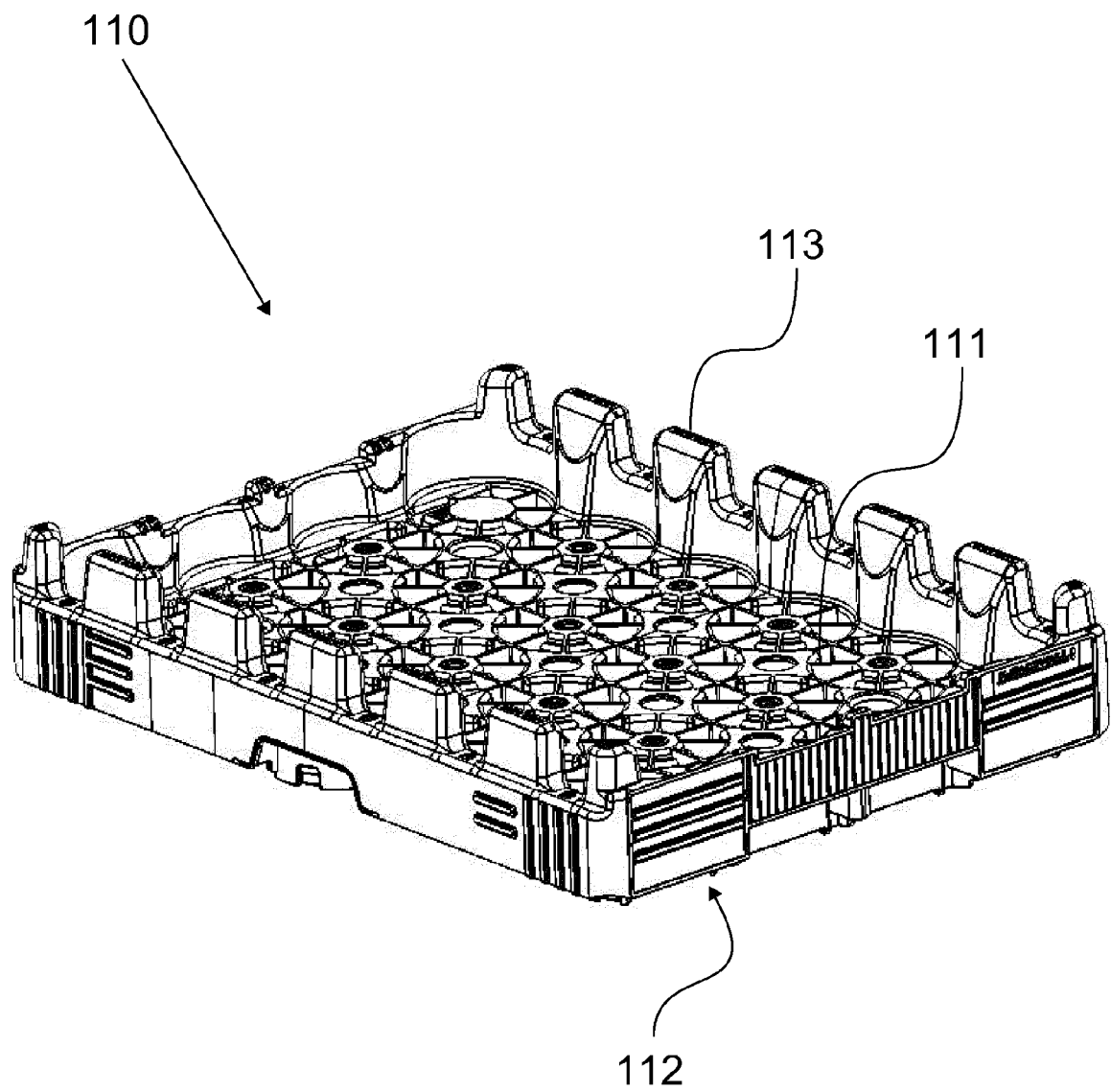


FIG. 3

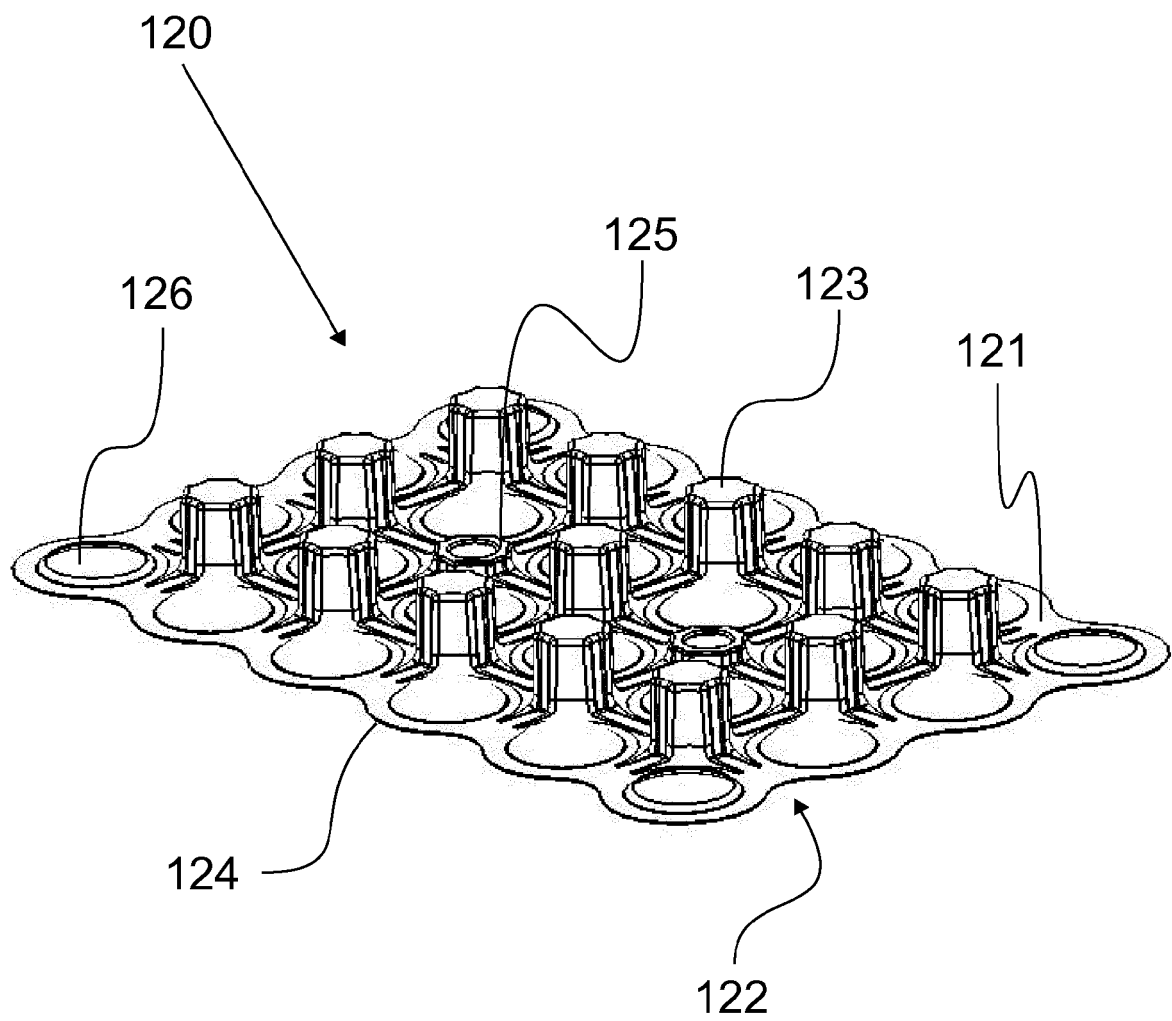


FIG. 4

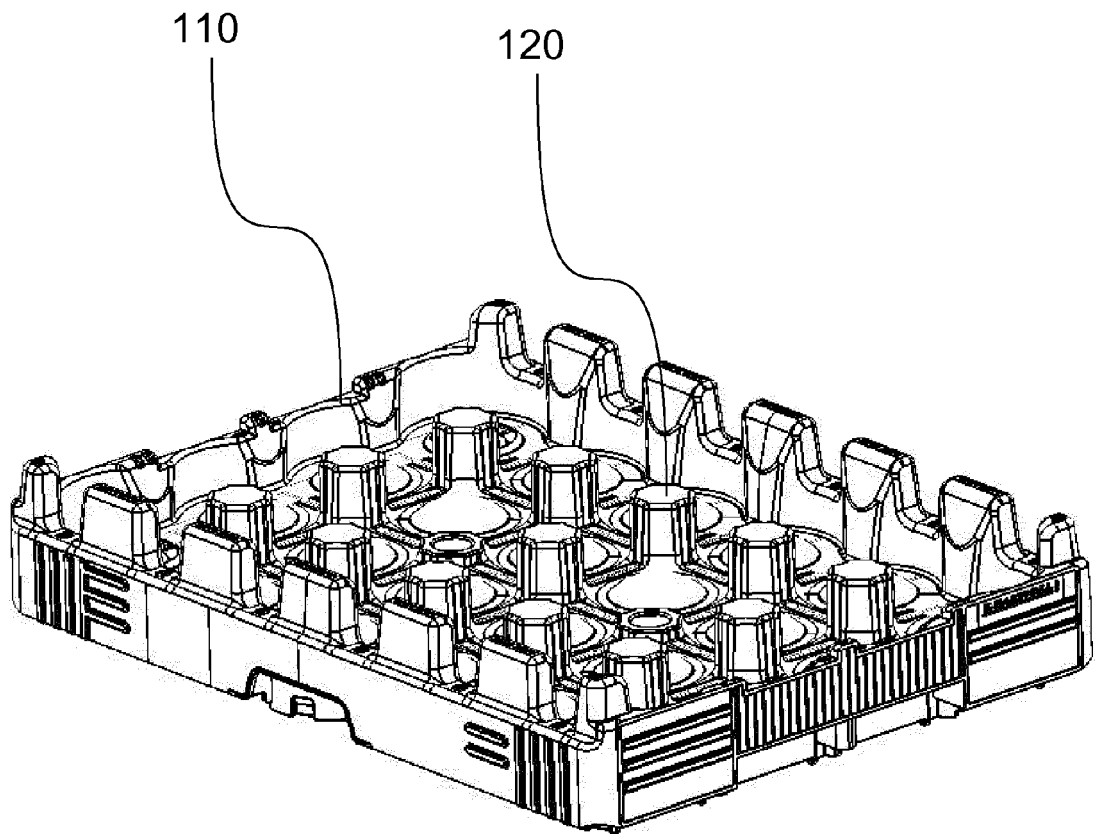


FIG. 5

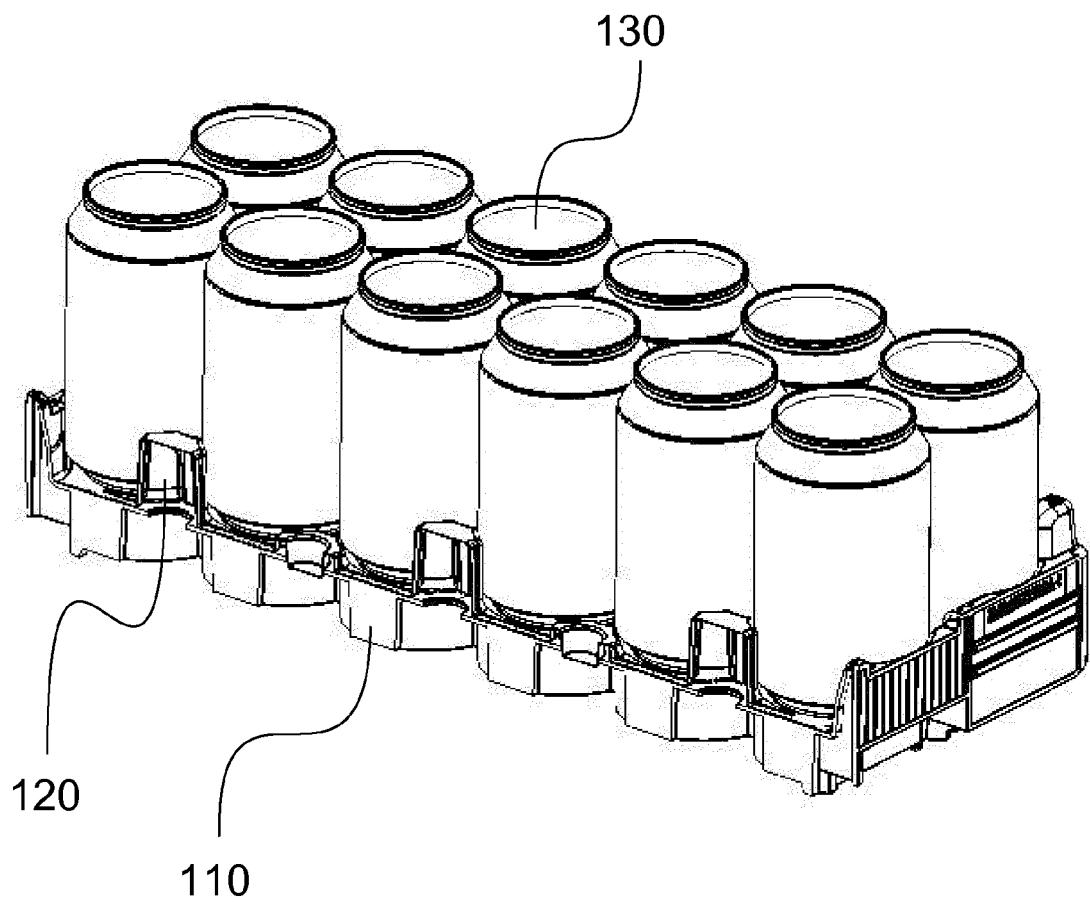


FIG. 6

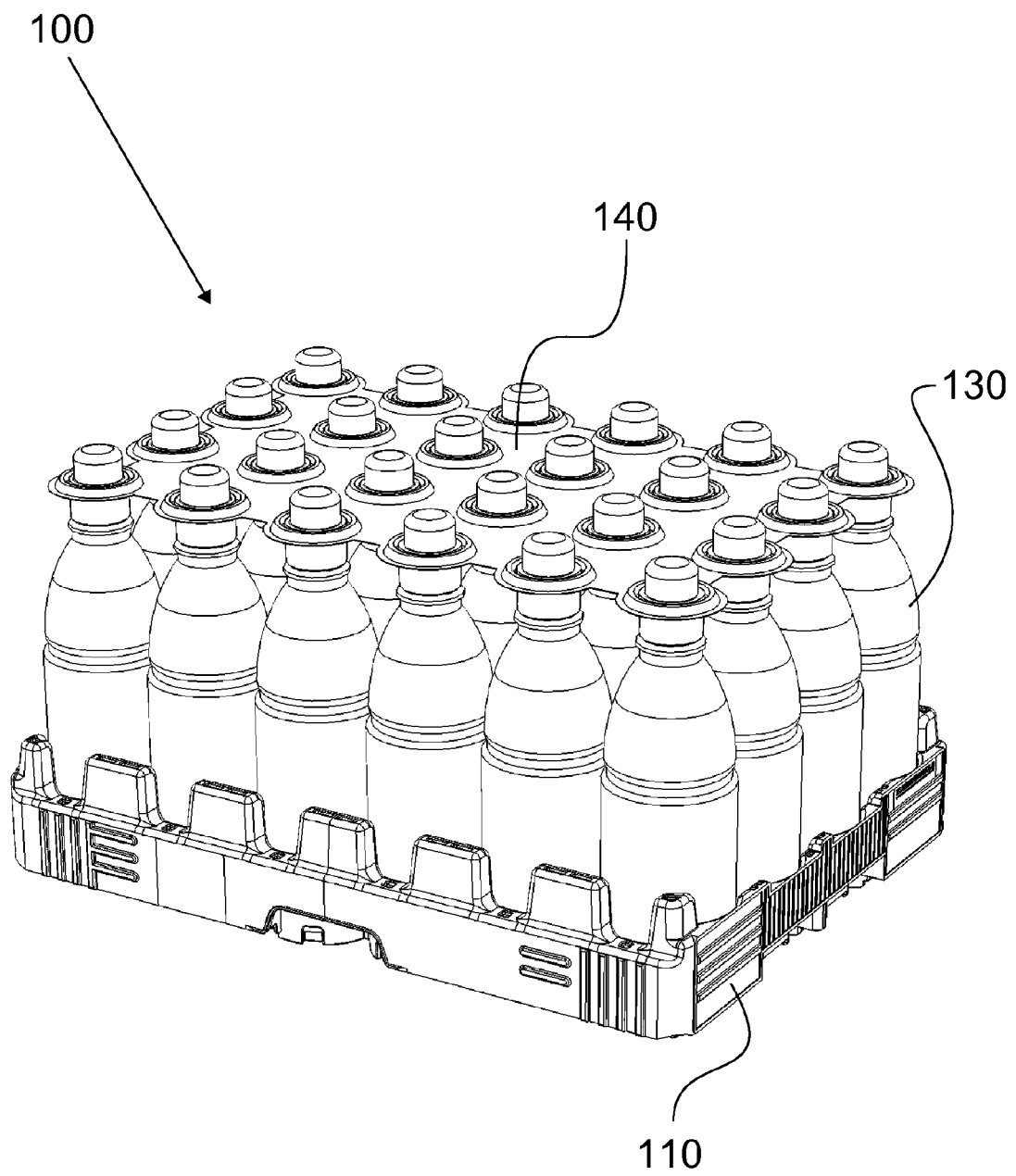


FIG. 7

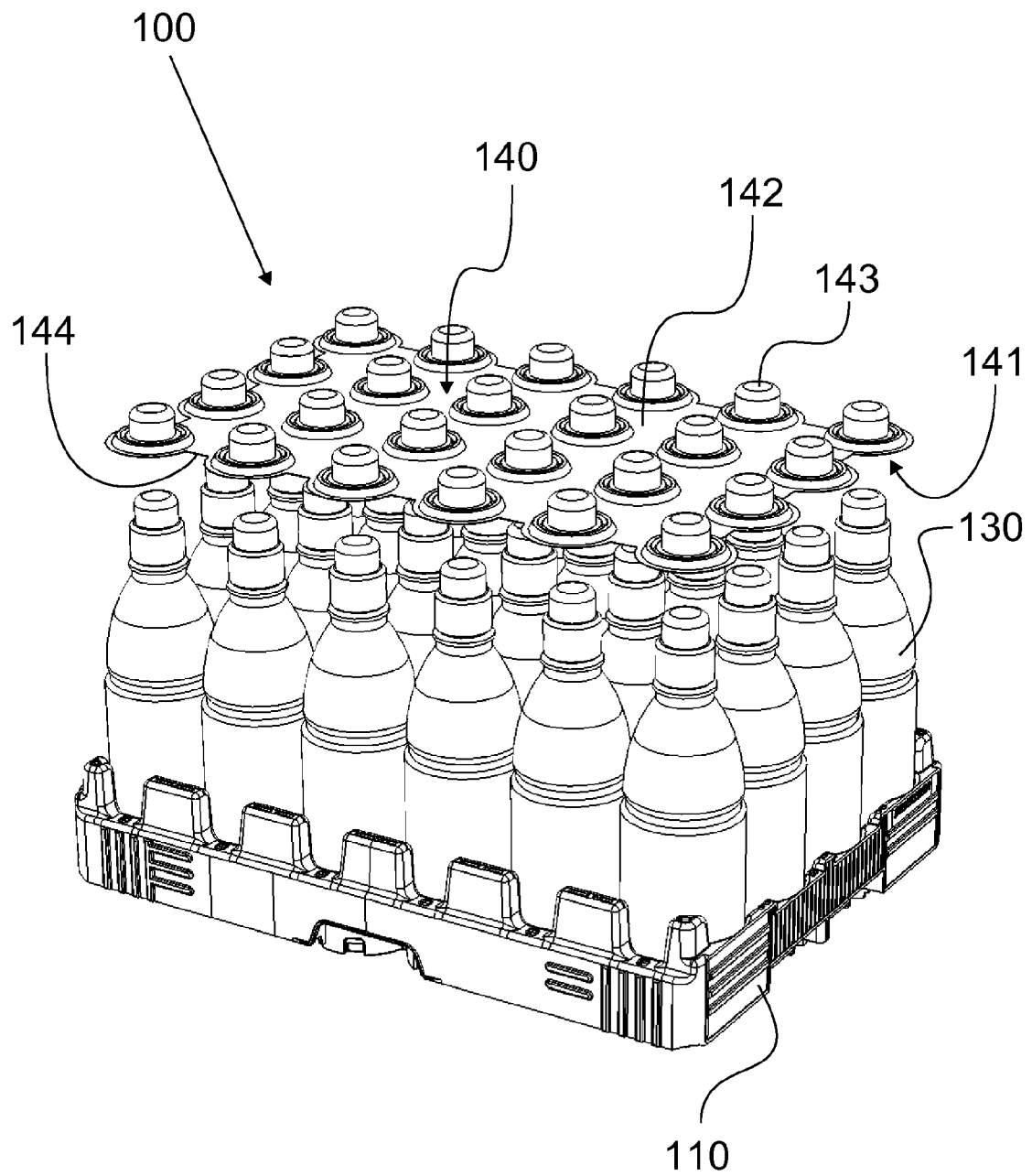


FIG. 8

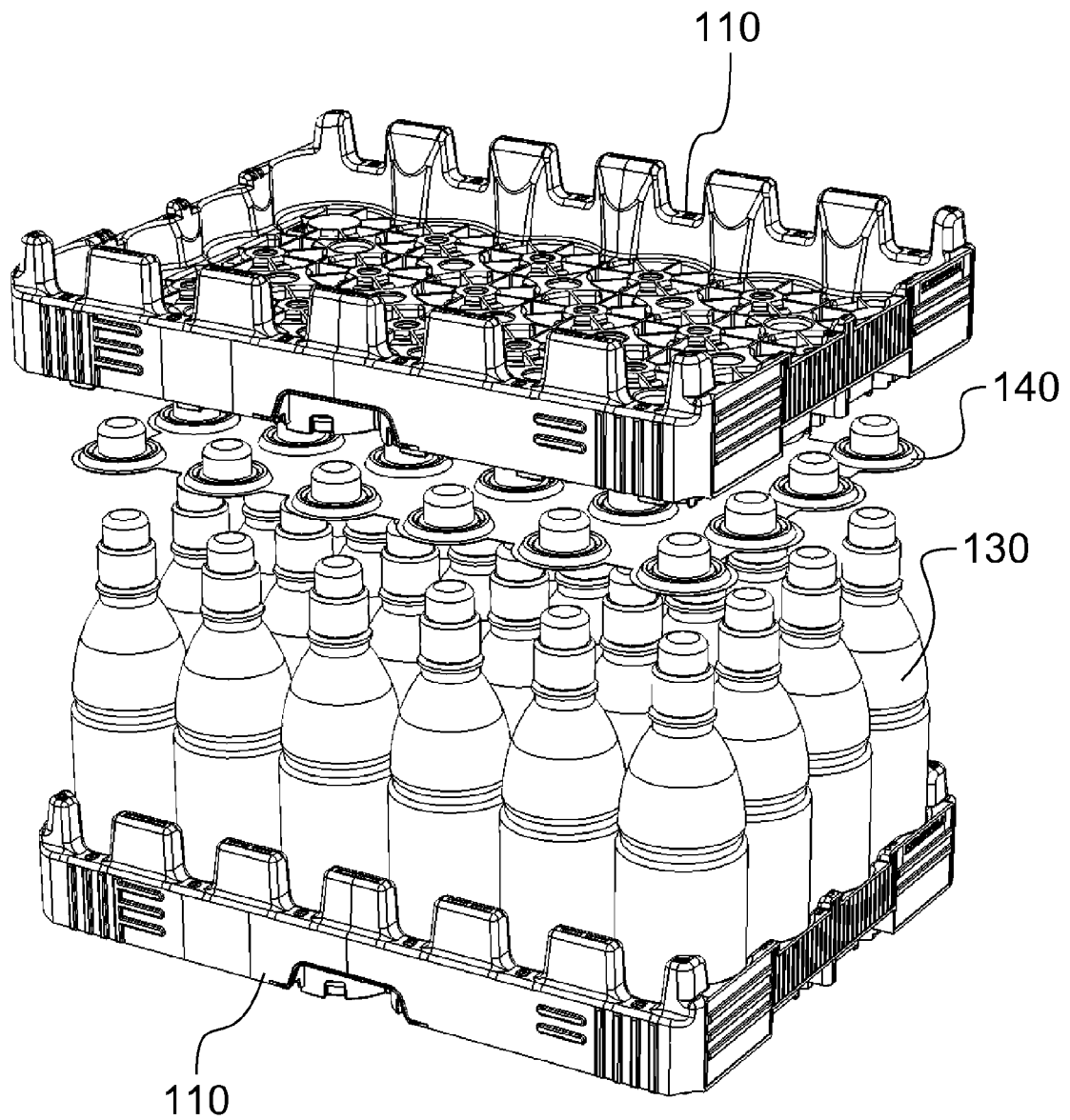


FIG. 9

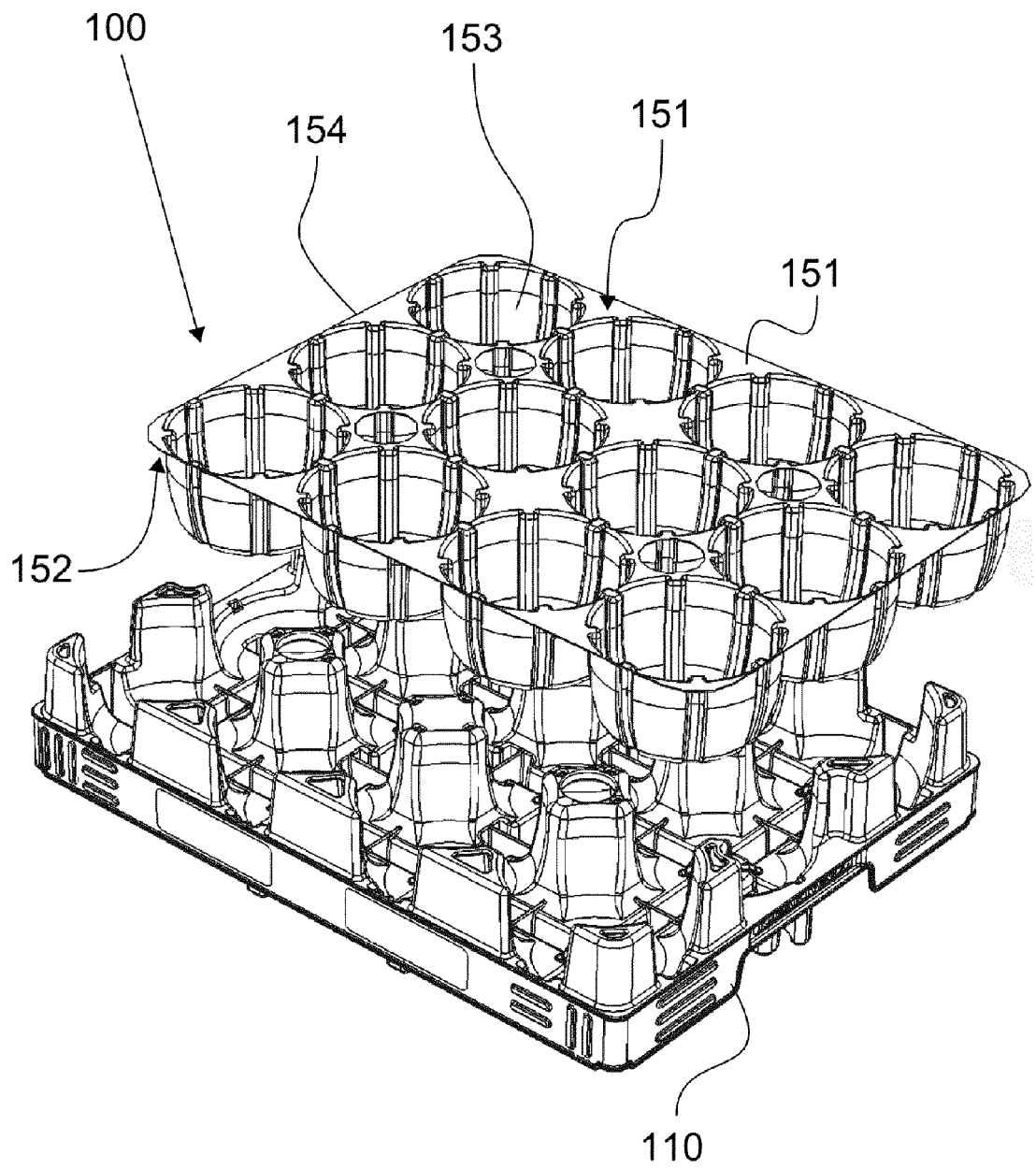


FIG. 10

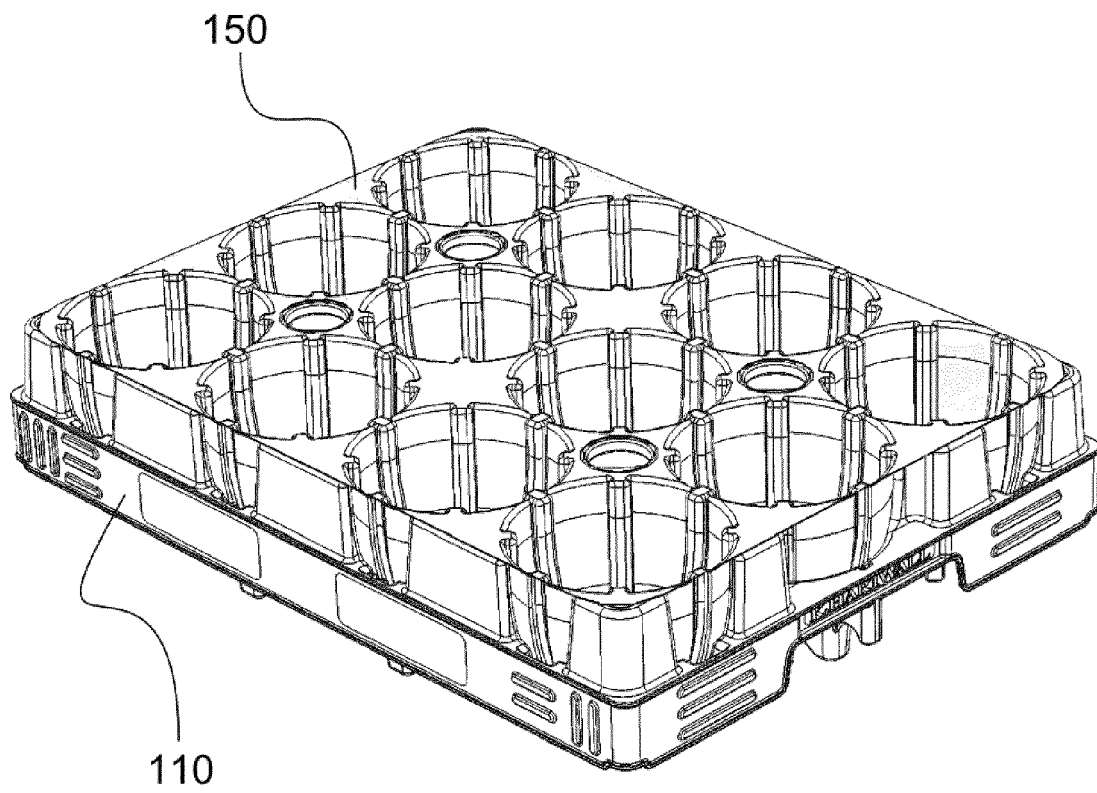


FIG. 11



EUROPEAN SEARCH REPORT

Application Number

EP 14 18 0825

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Place of search		Date of completion of the search	Examiner
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