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(54) Title: A CONTAINER

(57) Abstract: A container comprises: a) a rectangular base made of thermoplastic material; b) a plurality of vertical support columns integrally formed with said base; and c) a plurality of side walls located between two vertical support columns, which are integrally formed with said base, at least two of said side walls being provided with handling elements from which the container can be suspended.

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A CONTAINER

Field of the Invention

The present invention relates to the field of material handling. More particularly, the invention relates to a container.

Background of the Invention

Containers are widely used for package, storage and transportation of commerce items. Bulk containers are a well-known type of such containers, generally rectangular shaped and made of thermoplastic material, such as high density polyethylene (HDPE) or polypropylene (PP), allowing low manufacturing costs, reduced weight, sturdiness and the ability to be easily cleaned. Many bulk containers are provided with lids that allow closure of the container, in addition to stacking of two or more container on one another.

A particularly important sturdiness consideration is the stacking of containers on one another that requires increased support of the contact points between the top and bottom containers. Some commercially available containers comprise vertical support columns, the bottom sides of which are suitable to fit on the top sides of support columns of another container.

A filled bulk container is required to be liftable mechanically with the aid of material handling equipment. Accordingly, the base of many bulk containers comprises skids allowing the containers to be lift by a forklift. Such lifting requires the forklift to have access to one of the sides of the container, which is not always possible.

Other bulk containers comprise handling elements (e.g. handles), either in the form of recesses or protrusions, which allow the containers to be lifted from above by attaching chains or straps to the handling elements and lifting the chains or straps, for instance, by a crane. In order to provide high support during lifting, these handling elements are located at one of the sturdiest components of the container, i.e. at the vertical support columns of the containers.

Unfortunately the location of handling elements at the support columns decreases the efficiency of the containers. Recess handling elements located in support columns presents

overall decreased sturdiness of a container relative to a container with no recesses in its support columns. Protrusion handling elements and, in some cases, recess handling elements increase the net size of a container.

It would be profitable to have a bulk container with vertical support columns and handling elements that overcome the drawbacks of the prior art containers.

It is therefore an object of the present invention to provide a bulk container with vertical columns and with handling elements that do not decrease the sturdiness of the container.

It is another object of the present invention to provide a bulk container with handles that do not increase the net size of the container.

Other objects and advantages of the invention will become apparent as the description proceeds.

Summary of the Invention

In one aspect, the present invention relates to a container comprising a rectangular base made of thermoplastic material, a plurality of vertical support columns integrally formed with said base and a plurality of side walls located between two vertical support columns, which are integrally formed with said base. At least two of said side walls are provided with handling elements from which the container can be suspended.

According to an embodiment of the invention, the handling elements are provided adjacent to the support columns. According to another embodiment of the invention, the handling elements are provided at two parallel side walls. According to yet another embodiment of the invention, each handling element is provided adjacent to a vertical support column.

The handling elements typically (but not limitatively) comprise a top side opening, an internal wall, an external wall, a passage between said walls, and a bottom side opening.

In some embodiments of the invention, the side walls comprise an internal side facing the base and an external side facing away from the base, and the handling elements are provided on the external side of said side walls.

According to one embodiment of the invention, the container further comprises aligning members suitable for reversibly stacking two or more containers. According to another embodiment, the container further comprises skids suitable for lifting and tilting the container with a forklift.

In another aspect, the present invention relates to a rectangular shaped lid for the container, which comprises openings and aligning members suitable to bring the openings into operational positioned relationship with the handling elements of the container. The container may be coupled with a lid, such that the opening in the lid allows access to the handling elements of the container from above the lid when the lid is placed on the container. In some embodiment of the invention, the lid further comprises aligning members suitable for stacking lidded containers.

In yet another aspect, the present invention relates to a container-lid combination, comprising a container formed by a rectangular base made of thermoplastic material, a plurality of vertical support columns integrally formed with said base, a plurality of side walls located between two vertical support columns, which are integrally formed with said base, handling elements from which the container can be suspended, and a rectangular shaped lid comprising openings and aligning members suitable to bring said openings into operational positioned relationship with the handling elements of said container.

Brief Description of the Drawings

In the drawings:

- Figs. 1A and 1B show perspective views from the top and bottom sides, respectively, of a container, according to an embodiment of the present invention;
- Figs. 2A and 2B show enlarged perspective views of a handling element, according to an embodiment of the present invention;
- Fig. 3 shows a perspective exploded view of the container of Fig. 1A and a container lid, according to an embodiment of the present invention.
- Fig. 4A shows a lifting element with a holding member in an expanded position;
- Fig. 4B shows the lifting element of Fig. 4A with the holding member in a closed position;

- Fig. 5A schematically illustrates the lifting element of Fig. 4A inserted to an opening in the container of Fig. 1A; and
- Fig. 5B schematically illustrates the lifting element of Fig. 4A after exiting an opening in the container of Fig. 1A.

Detailed Description of the Invention

Reference will now be made to an embodiment of the present invention, examples of which are provided in the accompanying figures for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods exemplified herein may be employed, *mutatis mutandis*, without departing from the principles of the invention.

Figs. 1A and 1B show perspective views from the top and bottom sides, respectively, of a generally rectangular container 101, according to an embodiment of the present invention, comprising a base 102, four corner vertical support columns (e.g. 103), intermediate vertical support columns (e.g. 104), two wide side walls 105 (a-b) and two narrow side walls 106 (a-b). The bottom edges of the wide and narrow side walls adjoin base 102, while the top sides of the side walls adjoin a rim 110.

Base 102 comprises skids 107, allowing container 101 to be lift by a forklift, and female aligning members (e.g. 108) located at the corners of base 102. The outermost skids (as opposed to the middle skid) comprise a narrow portion 107a, where the width of the skid 107 is decreased. The corner support columns (e.g. 103) comprise male aligning members (e.g. 109) the position and shape of which correspond to the female aligning members in base 102. When a first container 101 is stacked upon another container 101 the male aligning members are inserted into the female aligning members, preventing movement of the second container relative to the first.

It is noted that although the female aligning members are presented in base 102 and the male aligning members in the corner support columns, male aligning member may be provided in base 102 and female aligning members may be provided in the corner support columns. Furthermore, the present invention is not limited to aligning members of a specific shape or relation, and may include any other aligning apparatus suitable for determining the contact points between two stacked containers and arranging them in a unified structure.

Container 101 further comprises handle elements 111 provided along wide side walls 105a and 105b. Fig. 2A shows an enlarged view of a handling element 111 from container 101's interior, and Fig. 2B shows an enlarged of a handling element 111 from container 101's exterior. Openings 112 in rim 110 allow insertion of a lifting element through and past handling 111. Handling element 111 comprises an internal wall 201 and an external wall 202. A passage 203 is formed between opening 112, walls 201 and 202, and an opening 204 on the bottom side of handling element 111. A lifting element passed through opening 112 and passage 203 may be further passed through opening 204 to the bottom side of handling element 111.

A container according to the present invention may by lifted by a lifting element comprising a holding member that is configured to be brought from a closed position to an expanded position. In the closed position the lifting element is able to pass through handling element 111, while in the expanded position the lifting element is prevented from passing through handling element 111. This configuration is suitable for passing the lifting element in its resting position through opening 112, passage 203 and opening 204, and, in its expanded position, lifting container 101 from the handling element. Accordingly, in order to allow lifting of a heavily loaded container 101 from handling elements 111, they contain a sufficient amount of material to withstand such heavy weight. Fig. 4A shows a lifting element 401 with a holding member 402 in an expanded position, sufficient to lift container 101. Fig. 4B shows lifting element 401 with holding member 402 in its closed position. Fig. 5A schematically illustrates lifting element 401 attached to a chain 501 engaging rim 110 at the top side of opening 112, and therefore holding member 402 obtaining a closed position. Fig. 5B shows lifting element 401 after exiting opening 204, wherein holding member 402 engages the bottom side of external wall 202 and is in position to lift container 101.

When a heavily loaded container is suspended from above by lifting the container from four points, as commonly practiced in the art, forces are exerted on the container walls urging them to collapse under the weight of the container and its contents. As mentioned above, because the support columns of containers are required to withstand this weight when the container is set down and therefore contain a large amount of material, the collapsing forces are overcome by the lifting points being provided in typical containers at the support

columns. This practice, causing degradation of the columns' sturdiness, is replaced in the present invention by positioning the handling elements at the side walls.

Still addressing the abovementioned collapsing forces, the handling elements 111 are provided along the walls of container 101 generally adjacent to support columns 103, thereby enhancing sturdiness of the handling elements while not compromising the sturdiness of the support columns.

Lifting container 101 from handling elements on the walls thereof causes collapsing forces between the handling elements (i.e. along the walls from which the container is not lifted). Points that are far from a handling element is applied with increased collapsing forces than points that are close to a handling element. Recognizing that the collapsing forces are lower on wide side walls 105 than on side walls 106, handling elements 111 are provided along wide side walls 105 (rather than narrow side walls 106) and are merged therewith, causing handling elements 111 to reinforce side walls 105 and side walls 105 to support handling elements 111. The reinforcement is enhanced by external wall 202 being arranged around the top rib 113 of container 101 (as shown in Fig. 2B), which in particular contributes to support of the side wall while lifting the container.

As shown in Figs. 1A and 1B, rim 110 defines the boundaries of container 101. Due to the fact that handling elements 111 do not project beyond the external side of rim 110, the net size of container 101 is not influenced thereby.

When a plurality of containers 101s is stacked the peripheral skids of a high container are laid on the rims 110 of the bottom container and the aligning members cooperatively arrange the stack in a unified structure. Despite the skids being laid on the rims 110, narrow portions 107a in the peripheral skids 107 allow access to handling elements 111 of the bottom container, and a lifting element may be passed through the handling elements of top containers to the handling elements of the bottom container so as to allow the unified structure of stacked containers to be lifted unitedly.

According to an embodiment of the present invention, container 101 further comprises one or more drainage openings (not shown in the Figs.) provided in one or more of the side walls 105 and/or 106, for draining fluids outwards from the container.

According to another embodiment of the invention, the exterior of side walls 105 and/or 106 comprises areas that may be utilized for various indications, such as information regarding the contents of the container.

Fig. 3 shows a perspective exploded view of container 101 and a container lid 301, according to an embodiment of the present invention. Lid 301 comprises aligning members (e.g. 302), the position and shape of which correspond to aligning elements 108 and 109 such that when lid 301 is placed upon a first container 101 and a second container 101 is placed upon lid 301, the male aligning member 109 of the first container is inserted into bottom female side of aligning member 302 and the top male side of aligning member 302 is inserted into the female aligning member 108 of the second container. Lid 301 further comprises sunken areas (e.g. 303) and risen areas (e.g. 304) such that skids 107 of a container 101 that is placed on top of lid 301 fit in sunken areas 303 and are prevented from moving to the sides.

Lid 301 further comprises openings (e.g. 305) the shape, size and location of which correspond to openings 112 in the container's rim 110 such that when the lid is placed upon a container 101 openings 305 grant access from above the lidded container to handling elements 111. Due to the shape of the bottom side of container 101, and as can be seen in Fig. 1B, openings 305 are not blocked when a container is placed upon the lid due to narrow portions 107a in skids 107. Accordingly the handling elements 111 of a lidded container 101 remain accessible when another container is placed thereupon.

According to an embodiment of the invention, container 101 and lid 301 are made of thermoplastic material such as, but not limited to, high density polyethylene (HDPE) or polypropylene (PP).

Although embodiments of the invention have been described by way of illustration, it will be understood that the invention may be carried out with many variations, modifications, and adaptations, without exceeding the scope of the claims.

Claims

1. A container comprising:
   a. a rectangular base made of thermoplastic material;
   b. a plurality of vertical support columns integrally formed with said base; and
   c. a plurality of side walls located between two vertical support columns, which are integrally formed with said base,

   wherein at least two of said side walls are provided with handling elements from which the container can be suspended.

2. A container according to claim 1, wherein the handling elements are provided adjacent to the support columns.

3. A container according to claim 1, wherein the handling elements are provided at two parallel side walls.

4. A container according to claim 1, wherein each handling element is adjacent to a vertical support column.

5. A container according to claim 1, wherein the handling elements comprise a top side opening; an internal wall; an external wall; a passage between said walls; and a bottom side opening.

6. A container according to claim 1, wherein the side walls comprise an internal side facing the base and an external side facing away from the base, and wherein the handling elements are provided on the external side of said side walls.

7. A container according to claim 1, further comprising aligning members suitable for reversibly stacking two or more containers.

8. A container according to claim 1, further comprising skids suitable for lifting and tilting the container with a forklift;

9. A rectangular shaped lid for a container as claimed in claim 1, comprising openings and aligning members suitable to bring said openings into operational positioned relationship with the handling elements of said container.

10. A container according to claim 1, coupled with a lid according to claim 9, wherein the opening in said lid allows access to the handling elements of said container from above the lid when the lid is placed on the container.

11. A container according to claim 10 wherein the lid further comprises aligning members suitable for stacking lidded containers.

12. A container-lid combination, comprising container formed by:
    a. a rectangular base made of thermoplastic material;
    b. a plurality of vertical support columns integrally formed with said base;
    c. a plurality of side walls located between two vertical support columns, which are integrally formed with said base;
    d. handling elements from which the container can be suspended; and
    e. a rectangular shaped lid comprising openings and aligning members suitable to bring said openings into operational positioned relationship with the handling elements of said container.

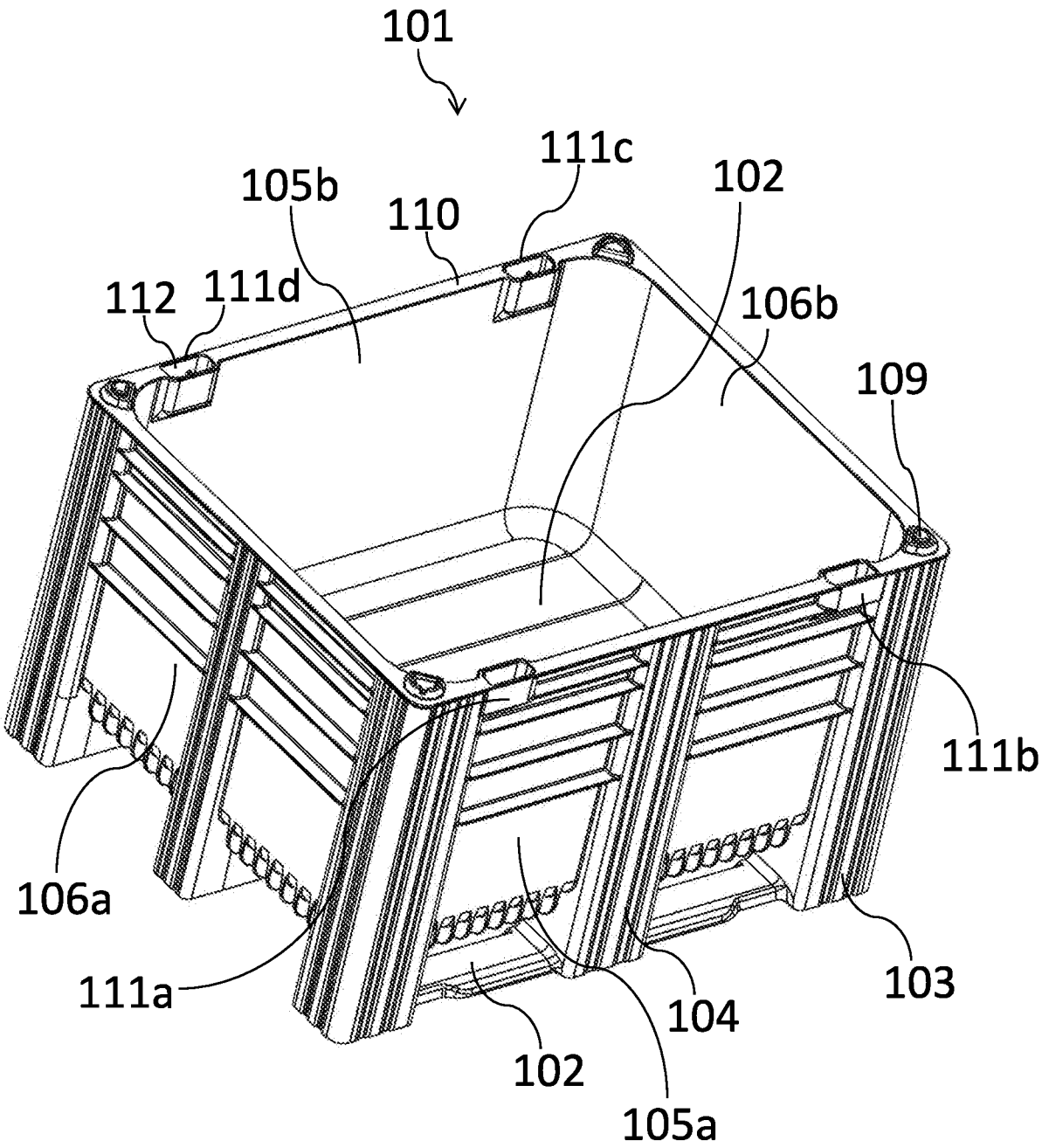
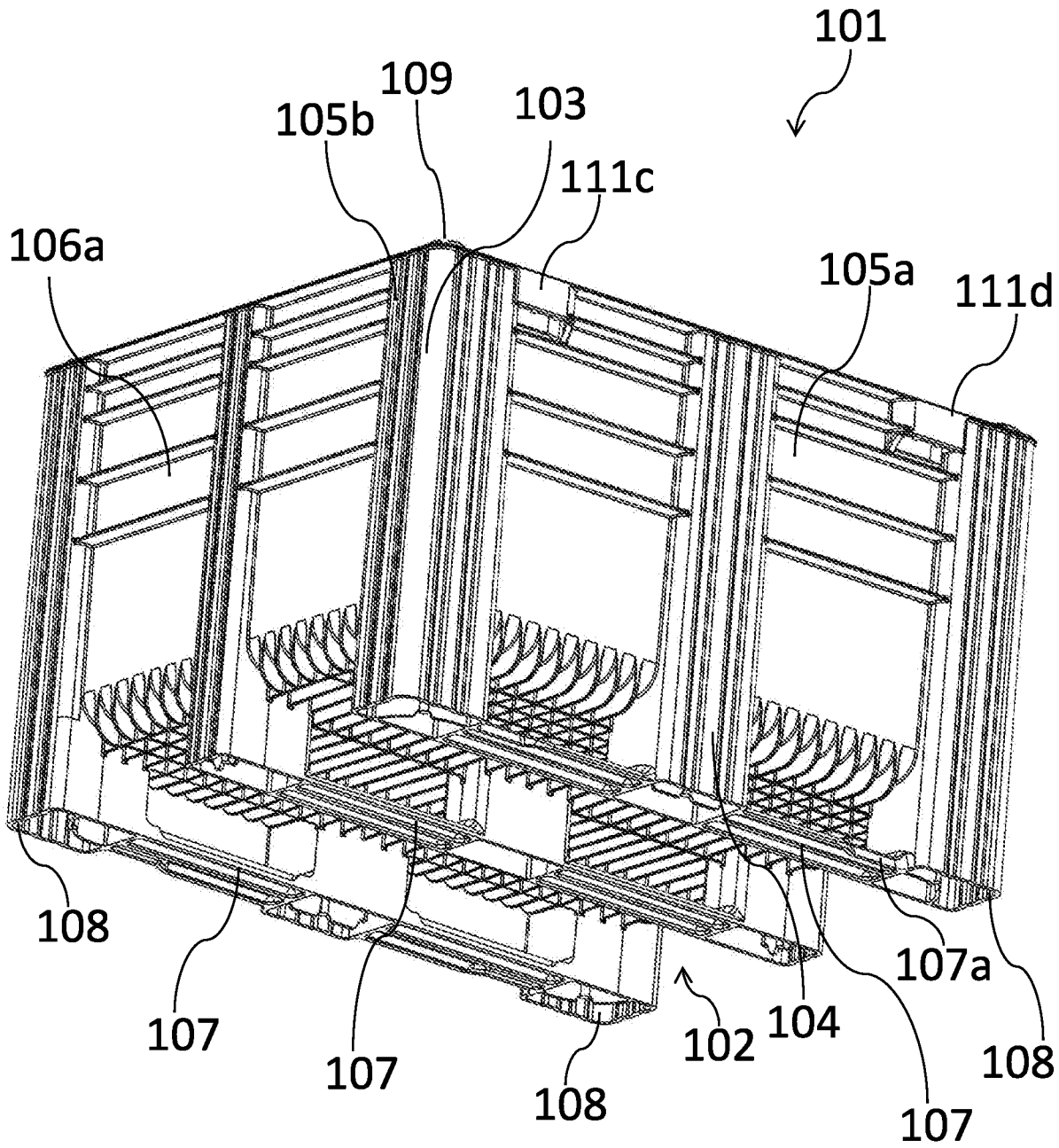

101
111c
105b
110
102
112
111d
106b
109
111b
106a
111a
104
103
102
105a

FIG. 1A


101
109
105b
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111c
106a
105a
111d
108
107
107
108
102
104
107a
108
107

FIG. 1B

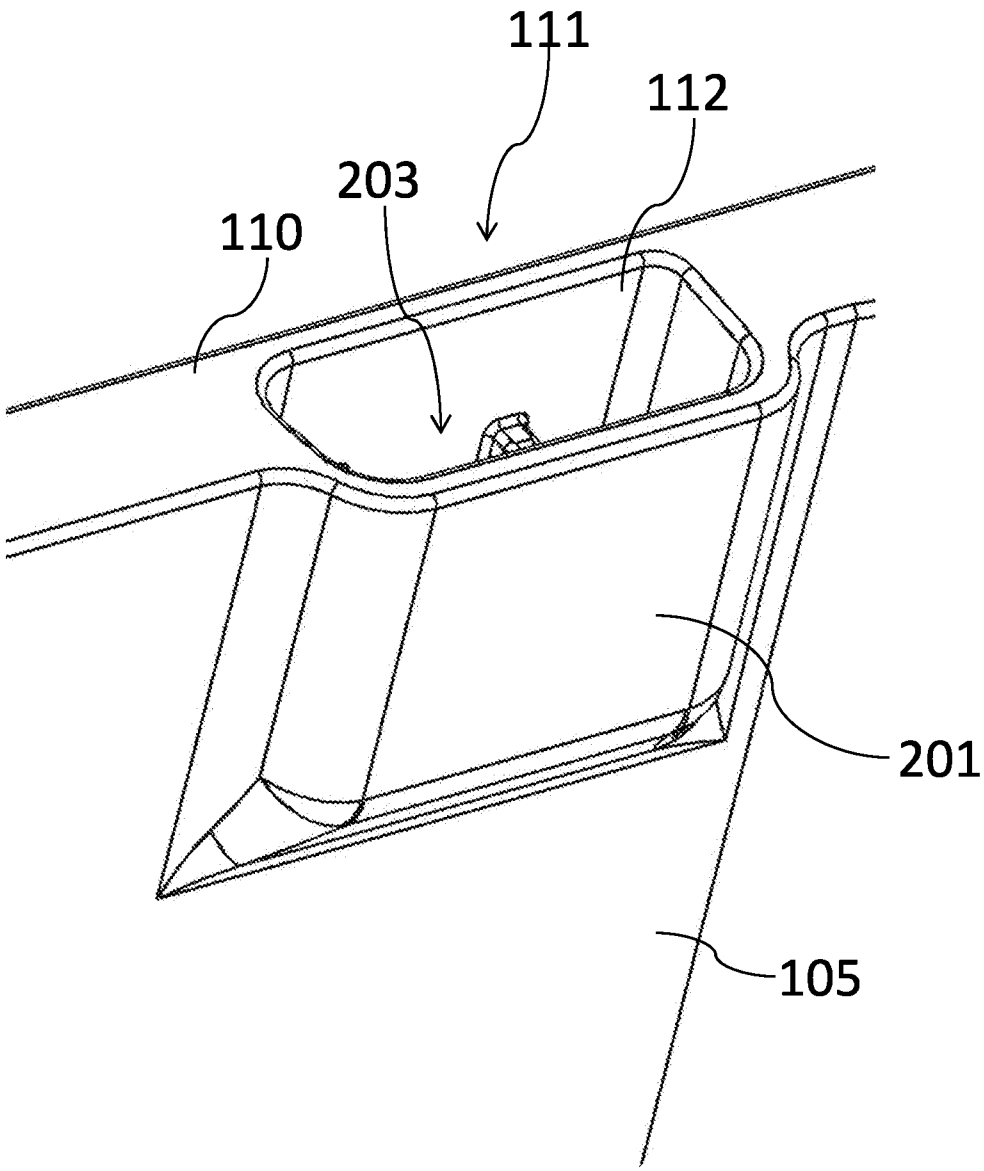

FIG. 2A

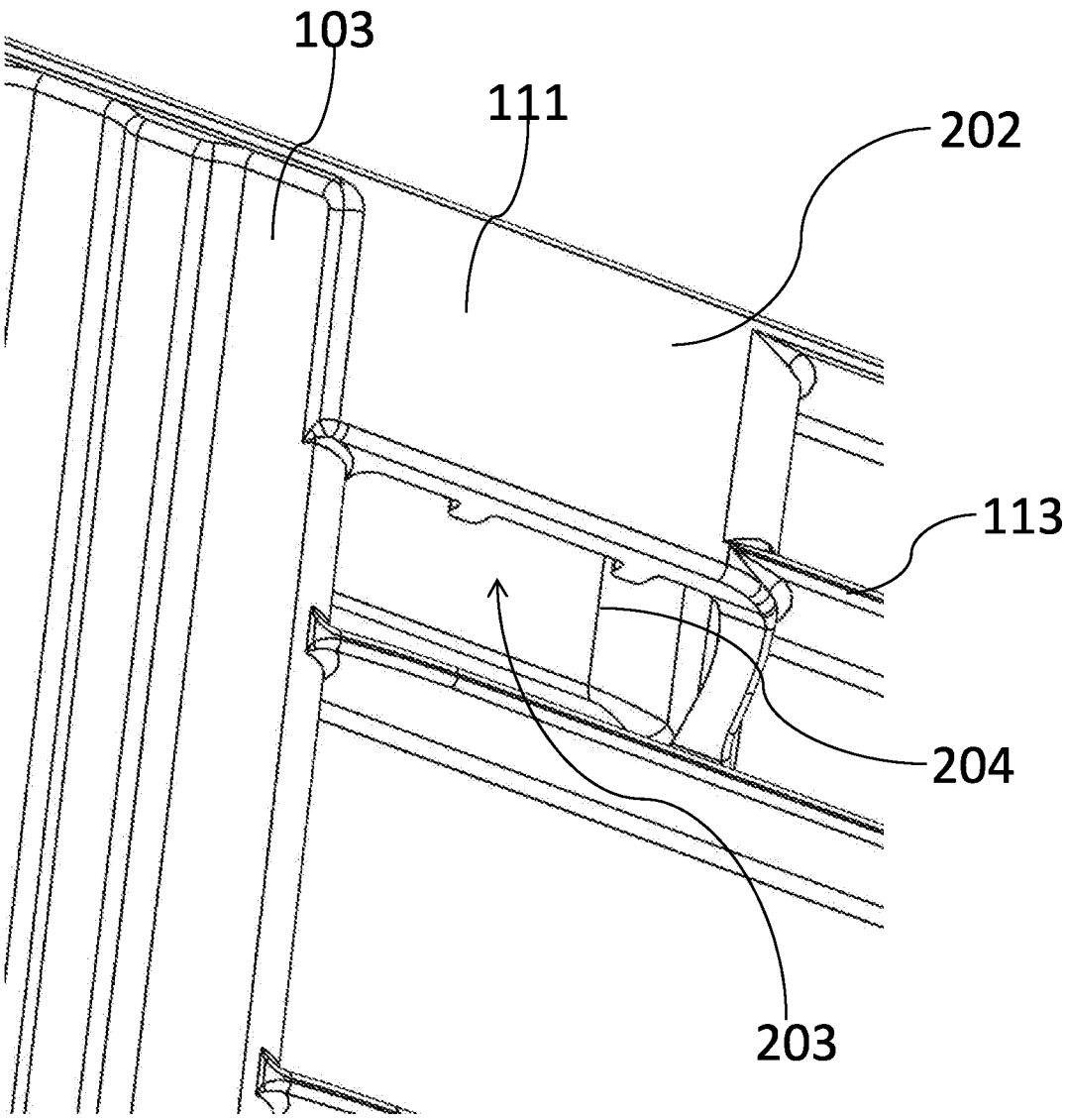

FIG. 2B

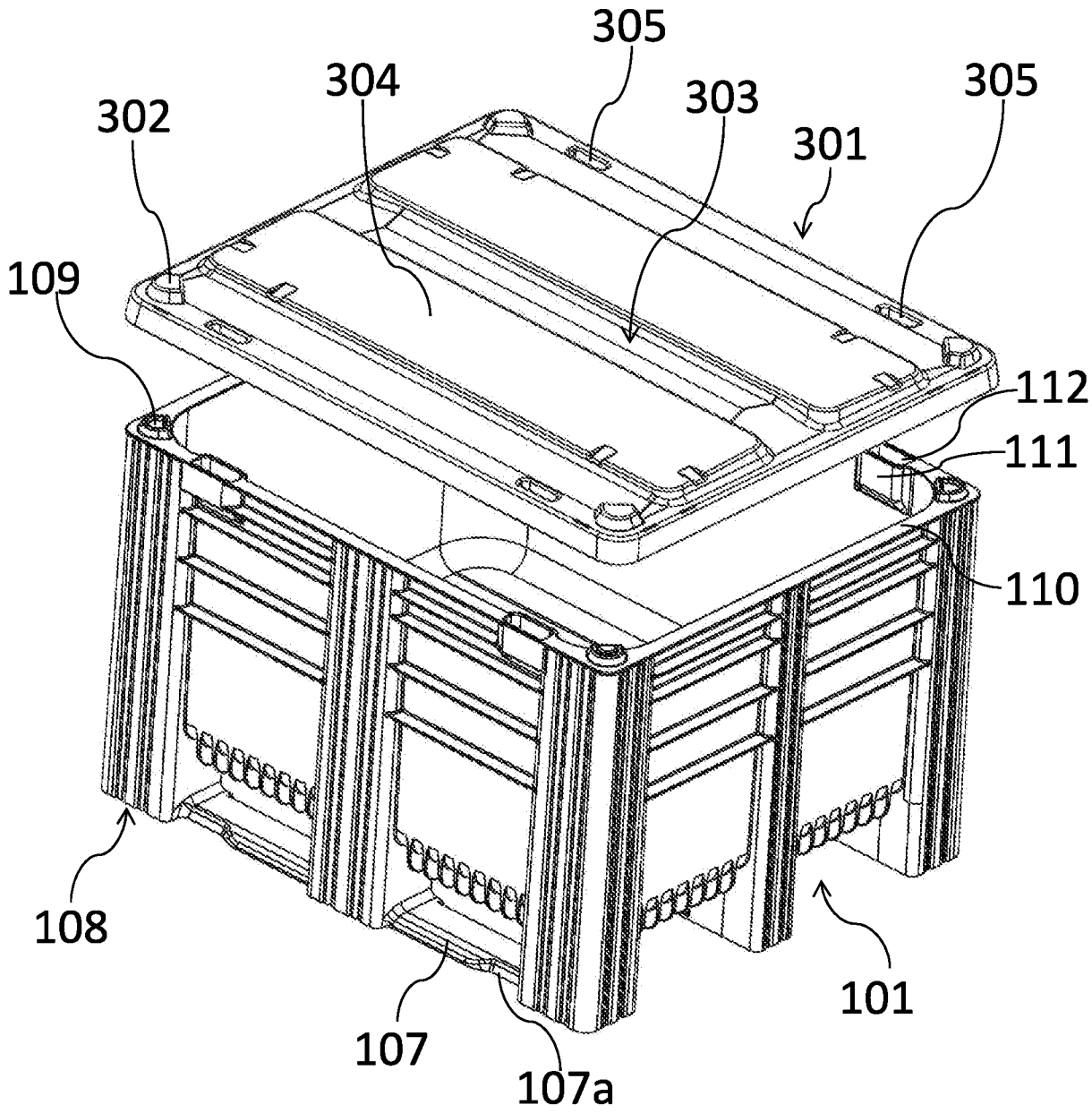

FIG. 3

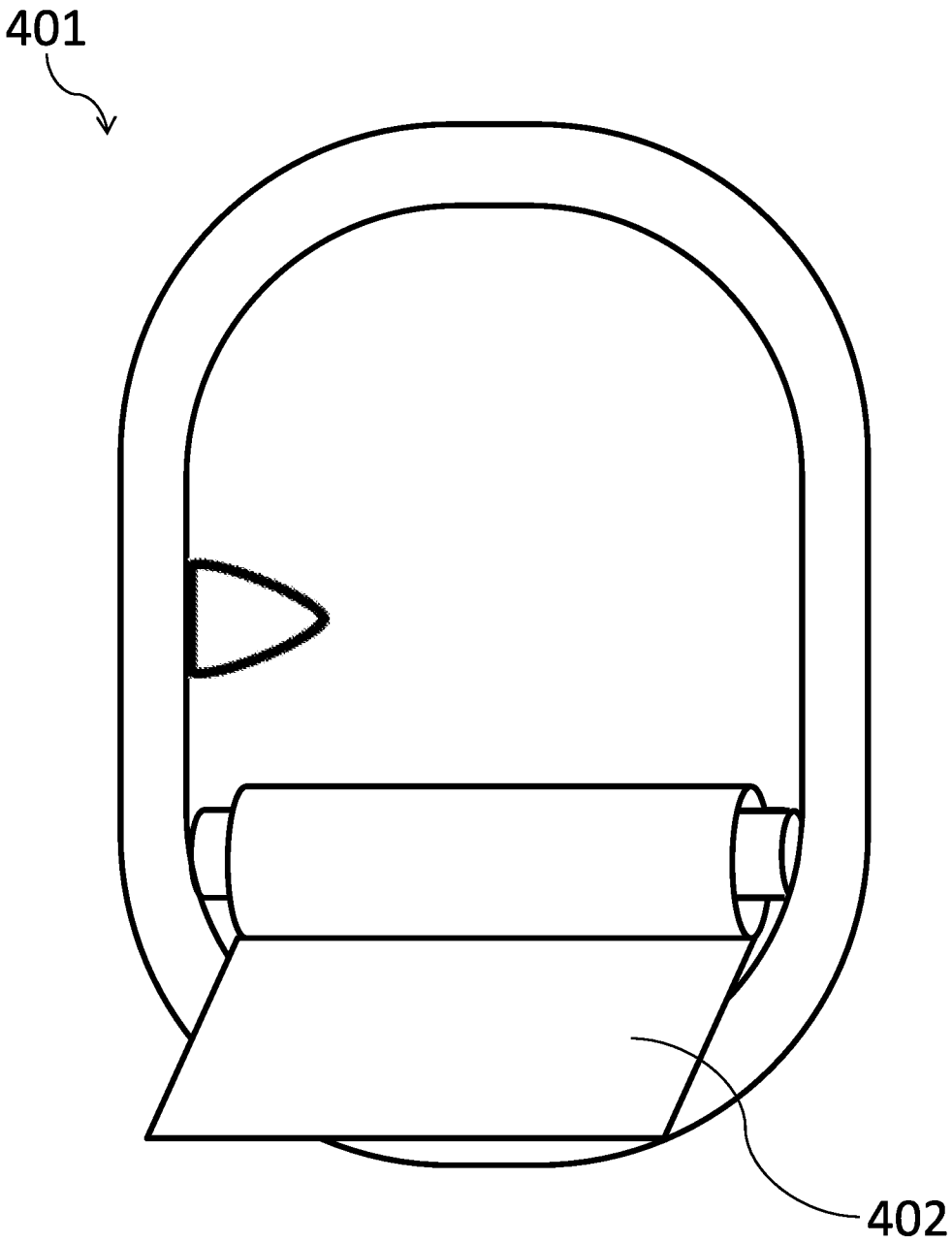

FIG. 4A

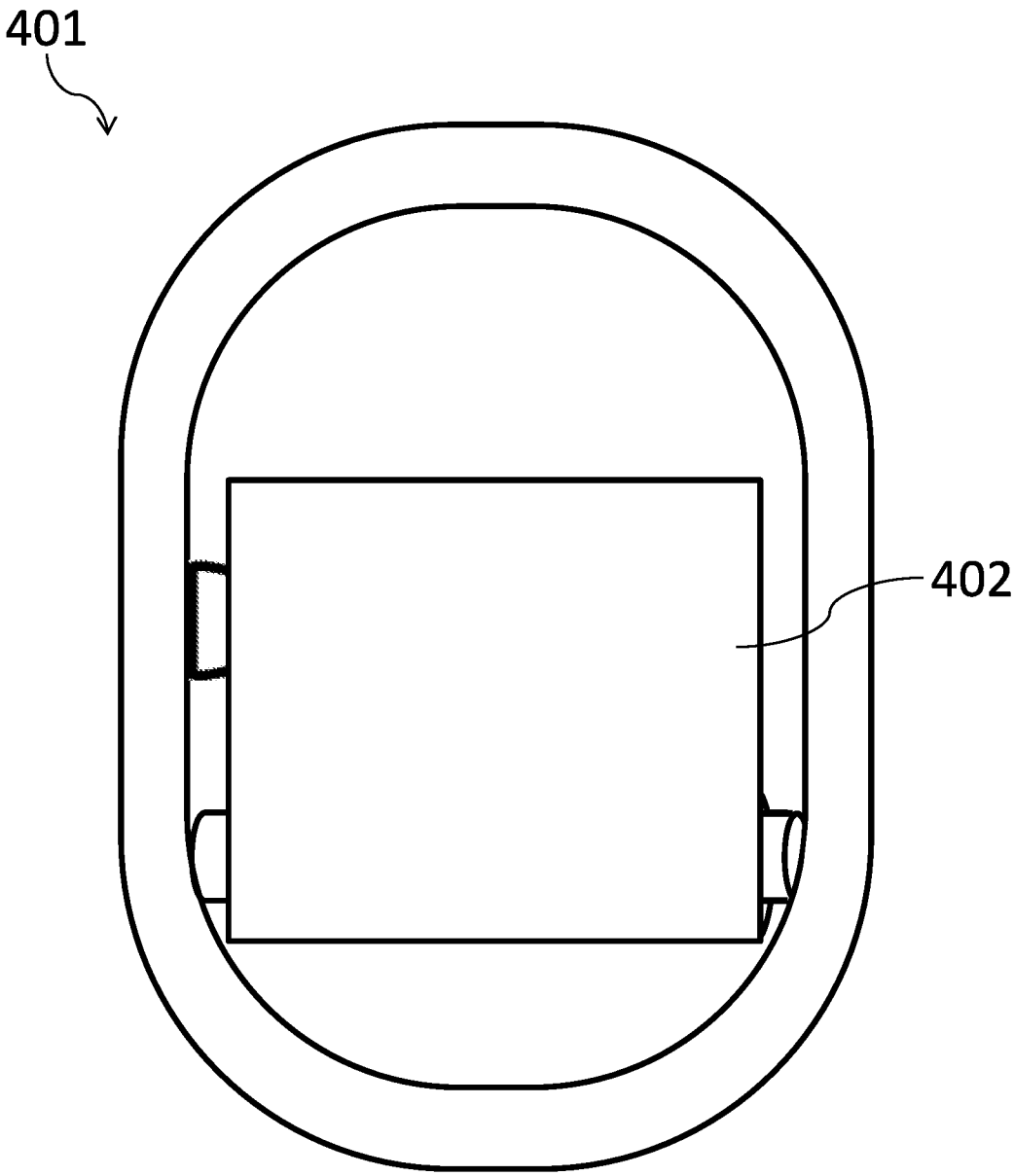

FIG. 4B

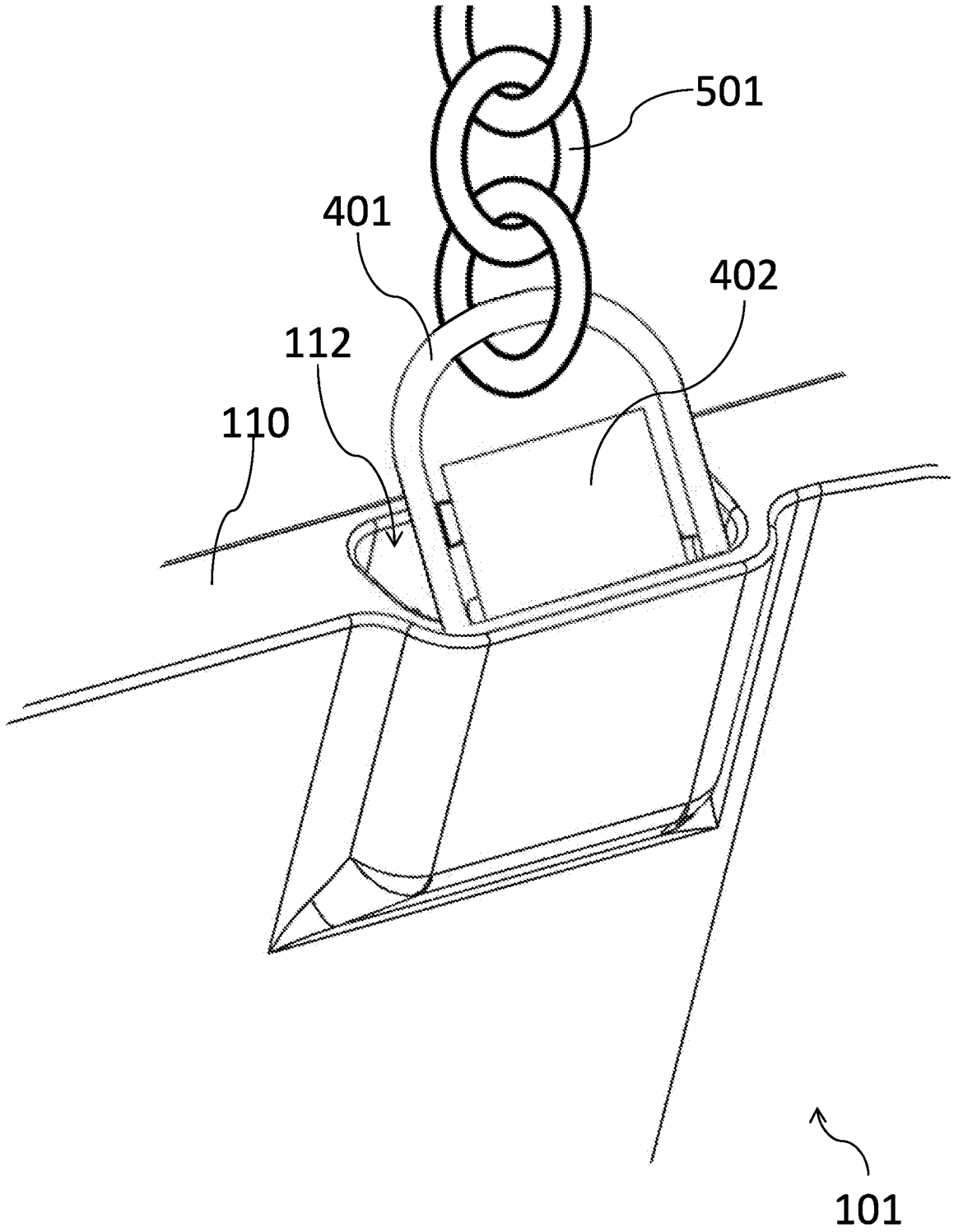

FIG. 5A

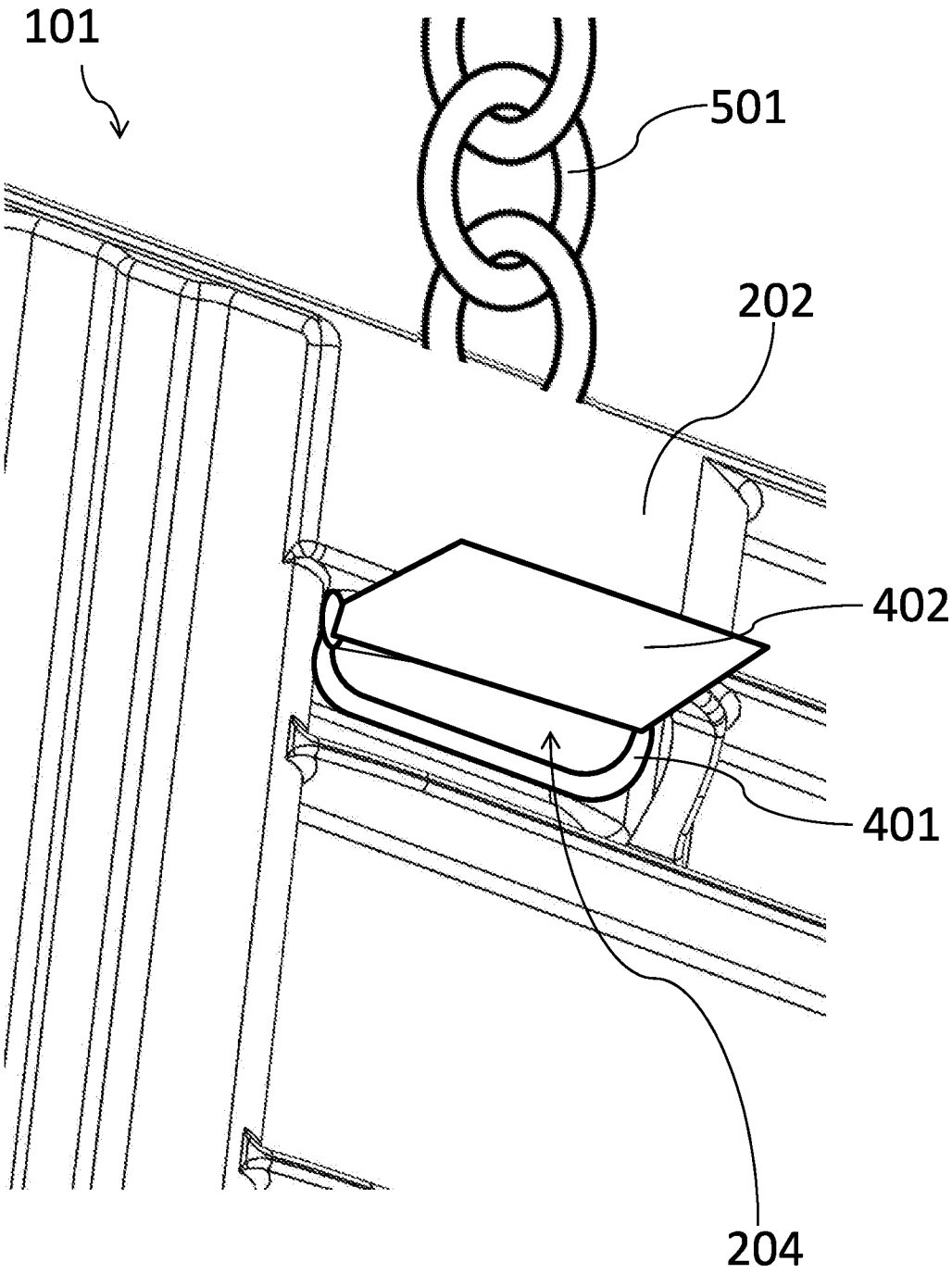

FIG. 5B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL2019/050375

A. CLASSIFICATION OF SUBJECT MATTER
IPC (20190101) B65D 1/22, B65D 21/00, B65D 5/42
CPC B65D 1/225, B65D 21/00, B65D 5/4208
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC (20190101) B65D 1/22, B65D 21/00, B65D 5/42
CPC B65D 1/225, B65D 21/00, B65D 5/4208

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Databases consulted: Esp@cenet, Google Patents, Orbit
Search terms used: (lift* or suspend*) (hole* or slot* or recess* or loop*) (hook* or clasp or fastener*)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5439113 A MACROPLASTICS INC 08 Aug 1995 (1995/08/08) the whole document	1-4,7,8
X	GB 2076366 A UTZ AG GEORG 02 Dec 1981 (1981/12/02) the whole document	1-4,7,8
X	US 6237758 B1 REHRIG PACIFIC CO 29 May 2001 (2001/05/29) the whole document	1-4,7

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 Jul 2019	14 Jul 2019
Name and mailing address of the ISA: Israel Patent Office Technology Park, Bldg.5, Malcha, Jerusalem, 9695101, Israel Facsimile No. 972-2-5651616	Authorized officer MOR Yosef Telephone No. 972-73-3927229

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IL2019/050375

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