



(11)

EP 4 818 074 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
07.10.2026 Bulletin 2026/41

(21) Application number: **24897979.1**

(22) Date of filing: **18.11.2024**

(51) International Patent Classification (IPC):
B65D 81/38 ^(2006.01) **B65D 88/74** ^(2006.01)
B65D 88/12 ^(2006.01)

(52) Cooperative Patent Classification (CPC):
B65D 81/38; B65D 88/12; B65D 88/74

(86) International application number:
PCT/KR2024/018150

(87) International publication number:
WO 2025/116383 (05.06.2025 Gazette 2025/23)

(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 MA MD TN

(30) Priority: **29.11.2023 KR 20230169640**

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(54) **PASSIVE CONTAINER FOR STORING AND TRANSPORTING TEMPERATURE-SENSITIVE ARTICLES**

(57) A passive container for storing and transporting temperature-sensitive articles is disclosed. The passive container may comprise an insulation box including an upper surface part, a lower surface part, a rear surface part, and side parts, which provide an inner accommodation space having an open front surface; a door unit which is connected to the insulation box and opens and closes the front surface of the accommodation space; and a first accommodation unit fixed to at least one of the side parts and the door unit to detachably accommodate at least

one case, and having a pair of rails including a first rail and a second rail, which extend in a first direction to allow the case to be slidably fastened in the first direction and are spaced apart from each other in a second direction crossing the first direction to cover one side and the other side of the case, respectively. The first rail and the second rail each may include an uneven portion selectively controlling entry and exit in a third direction different from the first and second directions in response to the movement of the case in the first direction.

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Description

[Technical Field]

[0001] The present disclosure relates to a passive container for storing and transporting temperature-sensitive articles.

[Background Art]

[0002] A cold chain is a system that manages temperature-sensitive articles or the like at an appropriate temperature throughout an entire process from production to consumption, and refers to a logistics system capable of ensuring the stability and reliability of temperature-sensitive articles. In particular, along with increased social interest in vaccine development due to a global pandemic, interest in cold chain systems for safely storing and distributing manufactured vaccines has significantly increased.

[0003] With the growing global interest in the cold chain industry, research and development on containers for implementing such systems have been actively conducted. That is, efforts have been made to develop high-performance containers capable of safely maintaining environmental conditions, such as temperature and humidity, inside refrigerated or frozen containers so as to provide a fresh and safe environment for articles sensitive to environmental factors such as temperature and humidity during logistics and distribution.

[0004] Certain articles, due to their inherent characteristics, require that storage temperatures be strictly maintained within a predetermined range during storage and distribution. For example, chemicals, pharmaceuticals, blood, food ingredients, and the like, whose properties irreversibly change at, above, or below, a predetermined critical temperature, need to have their storage temperature strictly maintained within a predetermined target temperature range.

[0005] Containers used in cold chain systems may be classified into active types and passive types. An active container refers to a container equipped with a mechanically driven system powered by an electrical energy source and operated by an automatic temperature controller to maintain the temperature of products. Such an active container requires battery charging prior to use and essential connection to electrical outlets at major segments of the supply chain.

[0006] However, the active container involves high costs associated with purchase, rental, operation, and maintenance, and since the containers themselves have significant weight, significant air freight costs are incurred. In addition, because there is no effective solution for responding to issues such as sudden power supply interruptions during transportation, it is difficult to ensure product stability. To address this, a method of providing a high-capacity battery for self-power supply has been considered, but this leads to additional problems such

as increased weight and fire risks.

[Disclosure]

[Technical Problem]

[0007] The present disclosure has been made to solve the above-described problems, and an object of the present disclosure is to provide a passive container for storing and transporting temperature-sensitive articles, which improves thermal insulation performance while securing assembly convenience and fastening stability of components such as phase change materials.

[0008] The technical problems to be solved by the present disclosure are not limited to those described above, and other technical problems not explicitly mentioned will be clearly understood by those having ordinary skill in the art to which the present disclosure pertains from the following detailed description.

[Technical Solution]

[0009] A passive container for storing and transporting temperature-sensitive articles according to the present invention may comprise: an insulation box including an upper surface part, a lower surface part, a rear surface part, and side parts, which provide an inner accommodation space having an open front surface; a door unit which is connected to the insulation box and opens and closes the front surface of the accommodation space; and a first accommodation unit fixed to at least one of the side parts and the door unit to detachably accommodate at least one case, and having a pair of rails including a first rail and a second rail, which extend in a first direction to allow the case to be slidably fastened in the first direction and are spaced apart from each other in a second direction crossing the first direction to cover one side and the other side of the case, respectively, wherein the first rail and the second rail each include an uneven portion selectively controlling entry and exit in a third direction different from the first and second directions in response to the movement of the case in the first direction.

[0010] The first rail may include a first-1 body covering one side surface of the case, and a first-2 body extending from the first-1 body to cover at least a portion of a front surface of the case, the first-2 body having a first concave portion and a first convex portion alternately and sequentially arranged along the first direction. The second rail may include a second-1 body covering the other side surface of the case, and a second-2 body extending from the second-1 body to cover at least a portion of the front surface of the case, the second-2 body having a second concave portion and a second convex portion alternately and sequentially arranged along the first direction. And, the case may include a first case convex portion and a first case concave portion arranged on one side so as to respectively correspond to the first concave portion and the first convex portion, and a second case convex por-

tion and a second case concave portion arranged on the other side so as to respectively correspond to the second concave portion and the second convex portion.

[0011] The first accommodation unit further may include a support plate fixed to the door unit and supporting the accommodated case from below. And, the support plate may be disposed to face an upper surface of the lower surface part when the door unit is closed, and may be positioned so as to substantially contact the upper surface of the lower surface part or to be spaced apart from the upper surface by a preset distance.

[0012] The passive container further may comprise a second accommodation unit fixed to the upper surface part and configured to detachably accommodate at least one case in a front-rear direction. The second accommodation unit may include an accommodation plate disposed downward from the upper surface part by a predetermined distance and supporting the case from below, a first auxiliary plate connecting the accommodation plate and the upper surface part and defining accommodation spaces for the cases, and second auxiliary plates fixed to the accommodation plate and the lower surface part or the side part to support the accommodation plate from below.

[0013] At least one of the upper surface part, the lower surface part, the rear surface part, the side part, and the door unit may include a vacuum insulation panel, a transparent member disposed inside the vacuum insulation panel, and an outer reinforcing member disposed outside the vacuum insulation panel. The vacuum insulation panel may include a plurality of divided panels divided along one direction. And, adjacent surfaces of the divided panels may have inclined surfaces.

[0014] Among the divided panels, one adjacent divided panel may have a trapezoidal cross-sectional shape, and another adjacent divided panel may have a parallelogram-shaped cross-sectional shape.

[0015] At least one of the upper surface part, the lower surface part, the rear surface part, the side part, and the door unit may include an inner reinforcing member disposed inside the transparent member and including a through hole exposing at least a portion of the transparent member. And, the through hole may not overlap the inclined surface.

[0016] The passive container further may comprise a first cover member covering open ends of the upper surface part, the lower surface part, and the side part. The first cover member may be bent at least twice along shapes of the upper surface part, the lower surface part, and the side part.

[0017] The passive container further may comprise an inner reinforcing member disposed inside the transparent member; and a second cover member covering an edge of the door unit. The inner reinforcing member of the door unit may cover side surfaces of the transparent member, the vacuum insulation panel, and the outer reinforcing member. And, the second cover member may cover at least a portion of a front surface of the outer

reinforcing member and may cover side surfaces of the outer reinforcing member from outside the inner reinforcing member, and may be fixed to the inner reinforcing member through at least one fixing means.

[0018] The passive container further may comprise a protrusion formed on one of the upper surface part and the lower surface part; and a recess formed on the other one of the upper surface part and the lower surface part and configured to allow entry and exit of the protrusion.

[Advantageous Effects]

[0019] The passive container for storing and transporting temperature-sensitive articles according to the present disclosure has an advantage in that, as thermal insulation performance is improved, stability of accommodated temperature-sensitive articles and product reliability can be ensured throughout the entire cold chain cycle.

[0020] In addition, the passive container for storing and transporting temperature-sensitive articles according to the present disclosure includes the accommodation unit for fixing the case accommodating a phase change material and the like, thereby providing advantages of improved assembly convenience and fastening stability of the case.

[0021] The effects obtainable from the present disclosure are not limited to those described above, and other effects not explicitly described will be clearly understood by those having ordinary skill in the art to which the present disclosure pertains from the following description.

[Description of Drawings]

[0022]

FIG. 1 is a perspective view illustrating a passive container for storing and transporting temperature-sensitive articles according to an embodiment of the present disclosure.

FIG. 2 is a perspective view schematically illustrating an interior of the passive container for storing and transporting temperature-sensitive articles according to the embodiment of the present disclosure.

FIG. 3 is a set of views schematically illustrating shapes of a vacuum insulation panel according to the embodiment of the present disclosure.

FIG. 4 is a set of views for explaining a first accommodation unit and a fastening operation between the first accommodation unit and a case according to the embodiment of the present disclosure.

FIG. 5 is a set of views for explaining a support plate of a door unit according to the embodiment of the present disclosure.

FIG. 6 is a set of views for explaining a first cover member according to the embodiment of the present disclosure.

FIG. 7 is a view for explaining a second cover member according to the embodiment of the present disclosure.

FIG. 8 is a view for explaining a separation prevention means according to the embodiment of the present disclosure.

FIG. 9 is a view for explaining a cushioning member according to the embodiment of the present disclosure.

[Mode for Invention]

[0023] Hereinafter, embodiments disclosed in the present specification will be described in detail with reference to the accompanying drawings. Throughout the drawings, like or similar components are denoted by like reference numerals regardless of the drawing symbols, and redundant descriptions thereof will be omitted. In the following description, the suffixes "module" and "unit" used for constituent elements are assigned or used interchangeably merely for convenience of drafting the specification, and do not by themselves have distinct meanings or roles. In describing embodiments disclosed in the present disclosure, if a detailed description of known techniques associated with the present disclosure would unnecessarily obscure the gist of the present disclosure, detailed description thereof will be omitted. In addition, the attached drawings are provided for easy understanding of embodiments of the disclosure and should not be construed as limiting the technical scope of the present disclosure, and the embodiments should be construed as including all modifications, equivalents, and alternatives falling within the spirit and scope of the embodiments.

[0024] While terms, such as "first", "second", etc., may be used to describe various components, such components must not be limited by the above terms. The above terms are used only to distinguish one component from another.

[0025] When an element is "coupled" or "connected" to another element, it should be understood that a third element may be present between the two elements although the element may be directly coupled or connected to the other element. When an element is "directly coupled" or "directly connected" to another element, it should be understood that no element is present between the two elements.

[0026] The singular forms are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[0027] In addition, in the specification, it will be further understood that the terms "comprise" and "include" specify the presence of stated features, integers, steps, operations, elements, components, and/or combinations thereof, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or combinations.

[0028] FIG. 1 is a perspective view illustrating a pas-

sive container for storing and transporting temperature-sensitive articles according to an embodiment of the present disclosure. FIG. 2 is a perspective view schematically illustrating an interior of the passive container for storing and transporting temperature-sensitive articles according to the embodiment of the present disclosure. FIG. 3 is a set of views schematically illustrating shapes of a vacuum insulation panel according to the embodiment of the present disclosure.

[0029] Referring to FIG. 1, a passive container 1 for storing and transporting temperature-sensitive articles according to an embodiment of the present disclosure (hereinafter referred to as a "passive container") includes an insulation box 10 having a predetermined inner accommodation space and a door unit 70 connected to the insulation box 10 to open and close the accommodation space.

[0030] The insulation box 10 may include an upper surface part 20, a lower surface part 30, a rear surface part 40, and side parts 50 and 60. The upper surface part 20, the lower surface part 30, the rear surface part 40, and the side parts 50 and 60 may define an outer shape of the insulation box 10. The insulation box 10 may include an inner accommodation space opened toward a front side. The inner accommodation space having an open front surface may be formed by a combination of the upper surface part 20, the lower surface part 30, the rear surface part 40, and the side parts 50 and 60. The outer shape of the insulation box 10 may have a hexahedral shape, but is not limited thereto. The upper surface part 20 may be positioned upward, and the lower surface part 30 may be positioned downward. The rear surface part 40 may be positioned rearward and connected to the upper surface part 20 and the lower surface part 30. The side parts 50 and 60 may include a left side part 50 and a right side part 60. The left side part 50 may be positioned on a left side and connected to the upper surface part 20, the lower surface part 30, and the rear surface part 40, and the right side part 60 may be positioned on a right side and connected to the upper surface part 20, the lower surface part 30, and the rear surface part 40. Temperature-sensitive articles such as chemicals and pharmaceuticals may be accommodated in the accommodation space.

[0031] The door unit 70 is connected to the insulation box 10 and opens and closes the inner accommodation space. For example, the door unit 70 may be hinge-connected to one of the left side part 50 and the right side part 60 so as to be rotatable about the hinge, and a user may selectively perform opening and closing operations of the inner accommodation space by controlling the door unit 70.

[0032] Referring further to FIGS. 2 and 3, the upper surface part 20, the lower surface part 30, the rear surface part 40, the side parts 50 and 60, and the door unit 70 may each include a vacuum insulation panel 81 for thermal insulation, an outer reinforcing member 83 disposed outside the vacuum insulation panel 81, and a transparent member 85 disposed inside the vacuum

insulation panel 81. The vacuum insulation panels 81 of the upper surface part 20, the lower surface part 30, the rear surface part 40, and the side parts 50 and 60 may be connected to each other. The outer reinforcing members 83 of the upper surface part 20, the lower surface part 30, the rear surface part 40, and the side parts 50 and 60 may be connected to each other. The transparent members 85 of the upper surface part 20, the lower surface part 30, the rear surface part 40, and the side parts 50 and 60 may be connected to each other.

[0033] The vacuum insulation panel 81 may include a plurality of divided panels 82 divided along one direction. The vacuum insulation panel 81 may be divided into a plurality of sections and then assembled, in consideration of ease of the manufacturing process and material characteristics. The divided panels 82 may be fixed to each other by an adhesive, but are not limited thereto.

[0034] At least one end of each divided panel 82 may include an inclined surface 82a. The inclined surfaces 82a of adjacent divided panels 82 may secure a longer heat transfer path as compared to a vertical surface. Accordingly, thermal insulation performance of the assembled vacuum insulation panel 81 may be improved. For example, the vacuum insulation panel 81 may include a first divided panel 82b and a second divided panel 82c sequentially arranged side by side along one direction and having inclined surfaces 82a. In this case, the first divided panel 82b may have a parallelogram-shaped cross-sectional shape, and the second divided panel 82c may have a trapezoidal cross-sectional shape.

[0035] The outer reinforcing member 83 may be selected from materials having excellent rigidity, cushioning properties, heat resistance, and thermal insulation performance. For example, the outer reinforcing member 83 may include one selected from expanded polypropylene (EPP), glass fiber reinforced plastic (GRP), fiber reinforced polymer (FRP), glass reinforced epoxy (GRE), and stainless steel (SUS), but is not limited thereto. Alternatively, the outer reinforcing member 83 may have a multilayer stacked structure. For example, the outer reinforcing member 83 may have a structure in which one selected from expanded polypropylene (EPP), glass fiber reinforced plastic (GRP), fiber reinforced polymer (FRP), glass reinforced epoxy (GRE), and stainless steel (SUS) having a predetermined rigidity is stacked on one surface and the other surface with one selected from glass wool, mineral wool, and Styrofoam having excellent thermal insulation performance interposed therebetween, but is not limited thereto.

[0036] The transparent member 85 may include a material having predetermined rigidity to protect the vacuum insulation panel 81 from inside and having predetermined transparency so that defects or damage of the vacuum insulation panel 81 can be visually checked from the inside. The transparent member 85 may be made of one selected from polycarbonate (PC), polyethylene terephthalate (PET), and acrylic, but is not limited thereto.

[0037] The upper surface part 20, the lower surface

part 30, the rear surface part 40, the side parts 50 and 60, and the door unit 70 may further include an inner reinforcing member 87 disposed inside the transparent member 85. The inner reinforcing member 87 may protect the vacuum insulation panel 81 and the transparent member 85 from inside. Accommodation units 100 and 150 to be described later may be fixed to the inner reinforcing member 87. The inner reinforcing member 87 may include a material having predetermined rigidity so as to stably maintain a state in which the accommodation units 100 and 150 are fixed. The inner reinforcing member 87 may include one selected from glass fiber reinforced plastic (GRP), fiber reinforced polymer (FRP), glass reinforced epoxy (GRE), acrylic, and aluminum, but is not limited thereto. The inner reinforcing member 87 may be formed of different materials depending on positions. For example, the inner reinforcing members 87 of the upper surface part 20, the lower surface part 30, the rear surface part 40, and the side parts 50 and 60 may include a metallic material such as aluminum (Al), and the inner reinforcing member 87 of the door unit 70 may include glass fiber reinforced plastic (GRP).

[0038] The inner reinforcing member 87 may include at least one through hole 88 penetrating a thickness thereof. The through hole 88 may expose at least a portion of the transparent member 85. The through hole 88 may be a portion through which a user visually checks defects or damage of the vacuum insulation panel 81. The through hole 88 may be positioned so as not to overlap the inclined surface 82a formed on the vacuum insulation panel 81. This means that a longer heat transfer path is secured compared to a structure in which the through hole 88 overlaps the inclined surface 82a, thereby improving thermal insulation performance.

[0039] FIG. 4 is a set of views for explaining a first accommodation unit and a fastening operation between the first accommodation unit and a case according to the embodiment of the present disclosure. FIG. 5 is a set of views for explaining a support plate of a door unit according to the embodiment of the present disclosure.

[0040] Referring further to FIG. 4, the passive container 1 according to the embodiment of the present disclosure may include the accommodation units 100 and 150 for detachably fixing at least one case 200. The accommodation units 100 and 150 may include a first accommodation unit 100 and a second accommodation unit 150. The case 200 may include a temperature-maintaining material. The temperature-maintaining material may include a material for reducing heat transfer. For example, the temperature-maintaining material may be a Phase Change Material (PCM).

[0041] The first accommodation unit 100 may be fixed to an inner side of at least one of the left side part 50, the right side part 60, and the door unit 70. The first accommodation unit 100 may include an accommodation space for detachably accommodating at least one case 200. The case 200 may be slidably coupled to the first accommodation unit 100 along a first direction. A plurality of

cases 200 may be accommodated in the first accommodation unit 100, and the plurality of cases 200 may be sequentially stacked along the first direction within the first accommodation unit 100. For example, the first direction may correspond to an up-down direction (or gravity direction).

[0042] The first accommodation unit 100 may be provided in plurality. That is, a plurality of first accommodation units 100 may be positioned on at least one of the left side part 50, the right side part 60, and the door unit 70, and the plurality of first accommodation units 100 may be arranged spaced apart from each other by a predetermined distance along a second direction (for example, a left-right direction) intersecting the first direction.

[0043] The first accommodation unit 100 may include a pair of rails including a first rail 110 and a second rail 120. The first rail 110 and the second rail 120 may extend in parallel along the first direction and be spaced apart from each other in the second direction. The first rail 110 and the second rail 120 may cover one side and the other side of the case 200, respectively, thereby allowing a sliding movement of the accommodated case 200 in the first direction and restricting or limiting a sliding movement in the second direction within a preset range. The first direction may correspond to a width direction of the case 200, and the second direction may correspond to a length direction of the case 200. One of the ends (or upper ends) of the first rail 110 and the second rail 120 may be open to allow withdrawal of the case 200, but are not limited thereto.

[0044] The first rail 110 and the second rail 120 may include an uneven portion for selectively controlling entry and exit of the case 200 in a third direction in response to movement of the case 200 in the first direction. The third direction may correspond to a thickness direction of the case 200.

[0045] The first rail 110 may include a first-1 body 111 covering one side surface of the case 200, and a first-2 body 113 extending from the first-1 body 111 and covering at least a portion of a front surface of the case 200. The second rail 120 may include a second-1 body 121 covering the other side surface of the case 200, and a second-2 body 123 extending from the second-1 body 121 and covering at least a portion of the front surface of the case 200.

[0046] By the first rail 110 and the second rail 120, a movement path for allowing sliding movement of the accommodated case 200 in the first direction may be provided. The first-1 body 111 and the second-1 body 121 may restrict and limit movement of the case 200 in the second direction. The first-2 body 113 and the second-2 body 123 may structurally control movement of the case 200 in the third direction by shapes thereof. For this purpose, the first-2 body 113, the second-2 body 123, and the case 200 may include uneven portions.

[0047] More specifically, the first-2 body 113 may include first concave portions 114 and first convex portions 115 alternately and sequentially arranged along the first

direction. The second-2 body 123 may include second concave portions 124 and second convex portions 125 alternately and sequentially arranged along the first direction. The numbers of the first concave portions 114, the first convex portions 115, the second concave portions 124, and the second convex portions 125 may be selected in advance as necessary.

[0048] The case 200 may include a first case convex portion 211 and a first case concave portion 213 arranged on one side thereof. The first case convex portion 211 and the first case concave portion 213 may each be provided in one or more numbers, and when a plurality of first case convex portions 211 and first case concave portions 213 are provided, they may be alternately arranged. The first case convex portion 211 and the first case concave portion 213 may correspond to the first concave portion 114 and the first convex portion 115, respectively. The case 200 may include a second case convex portion 221 and a second case concave portion 223 arranged on the other side thereof. The second case convex portion 221 and the second case concave portion 223 may each be provided in one or more numbers, and when a plurality of second case convex portions 221 and second case concave portions 223 are provided, they may be alternately arranged. The second case convex portion 221 and the second case concave portion 223 may correspond to the second concave portion 124 and the second convex portion 125, respectively.

[0049] The case 200 may be allowed to be inserted into the first accommodation unit 100 along the third direction. In this case, the first case convex portion 211, the first case concave portion 213, the second case convex portion 221, and the second case concave portion 223 are respectively in a state of overlapping with the first concave portion 114, the first convex portion 115, the second concave portion 124, and the second convex portion 125 along the third direction.

[0050] The withdrawal of the accommodated case 200 from the first accommodation unit 100 may be restricted along the third direction. In this case, the first case convex portion 211, the first case concave portion 213, the second case convex portion 221, and the second case concave portion 223 may be in a state of overlapping with the first convex portion 115, the first concave portion 114, the second convex portion 125, and the second concave portion 124, respectively, along the third direction.

[0051] By having such a structure, assembly of the case 200 may be easily performed as described below, and disassembly may also be easily performed in a reverse order. The assembly method may be as follows: (1) A plurality of cases 200 are prepared. (2) One case 200 is inserted into the accommodation space of the first accommodation unit 100 along the third direction in a state in which the concave portions and the convex portions of the case 200 are respectively matched with the convex portions and concave portions of the first rail 110 and the second rail 120. (3) The case 200 moves

downward along the first direction and is stacked. Preferably, since the first direction corresponds to a gravity direction, the user can easily assemble the case 200 without applying a large amount of force. (4) Other cases 200 may be inserted into the accommodation space of the first accommodation unit 100 in the same manner as the previously inserted case 200 and may be sequentially stacked on the previously stacked case 200. (5) In a state in which the cases 200 are stacked, the concave portions and convex portions of the cases 200 may respectively maintain a state of overlapping with the concave portions and convex portions of the first rail 110 and the second rail 120 along the third direction, thereby preventing unintended separation of the cases 200.

[0052] The case 200 may further include one or more gripping holes 230 penetrating a thickness thereof. The gripping hole 230 may be a portion gripped by a user when the user carries the case 200 or couples the case 200 to the accommodation units 100 and 150.

[0053] The first accommodation unit 100 may include support plates 130 and 140 supporting the case 200 from below. The support plates 130 and 140 may be fixed to at least one of the left side part 50, the right side part 60, and the door unit 70 to which the first rail 110 and the second rail 120 are fixed. Alternatively, the support plates 130 and 140 may be fixed to the lower surface part 30. The support plates 130 and 140 may be connected to the other ends (or lower ends) of the first rail 110 and the second rail 120, but are not limited thereto.

[0054] Meanwhile, referring further to FIG. 5, the support plate 140 positioned on the door unit 70 may face an upper surface 31 of the lower surface part 30 when the door unit 70 is closed, and may be positioned to be substantially in contact with the upper surface 31 of the lower surface part 30 (including a case in which a predetermined tolerance exists) or to include a preset gap. The preset gap may be set within 0.5 mm to 1 cm, and preferably may be set to 0.5 mm to 1 mm or less. If necessary, a cushioning member (not illustrated) may be further formed on the lower surface part 30 to be in contact with a lower surface of the support plate 140 when the door unit 70 is closed.

[0055] Since the support plate 140 positioned on the door unit 70 is fixed only to the door unit 70, deformation or breakage may occur due to a load applied by the cases 200 provided for a long time when the plurality of cases 200 are stacked, and accordingly, malfunction of opening and closing of the door unit 70 may occur or the case 200 may be separated from a proper position. In the passive container 1 according to the embodiment of the present disclosure, since the support plate 140 may be supported by the lower surface part 30 when the door unit 70 is closed, deformation and breakage may be prevented or minimized, thereby providing an advantage of securing product reliability and stability.

[0056] The second accommodation unit 150 may be fixed to an inner side of the upper surface part 20. The second accommodation unit 150 may include an accom-

modation space capable of detachably accommodating at least one case 200. The case 200 may be slidably coupled to the second accommodation unit 150 along the front-rear direction. The second accommodation unit 150 may include an accommodation plate 160 and an auxiliary plate 170.

[0057] The accommodation plate 160 may be spaced downward from the upper surface part 20 by a predetermined distance to support the case 200 from below. The auxiliary plate 170 may include a first auxiliary plate 171 and a second auxiliary plate 173. The first auxiliary plate 171 may connect the accommodation plate 160 and the upper surface part 20, and a plurality of first auxiliary plates 171 may be provided and spaced apart from each other by a predetermined distance along a lateral direction. The first auxiliary plate 171 may define accommodation spaces for the cases 200. The second auxiliary plate 173 may support the accommodation plate 160 from below. The second auxiliary plate 173 may be fixed to the side parts 50 and 60 and the rear surface part 40 and/or may extend along the side parts 50 and 60 and the rear surface part 40 and be fixed to the lower surface part 30.

[0058] When the plurality of cases 200 are stacked, the accommodation plate 160 may be deformed or broken due to a load applied by the cases 200 provided for a long time, and accordingly, the case 200 may be separated from a proper position. In the passive container 1 according to the embodiment of the present disclosure, since the accommodation plate 160 may be supported by the auxiliary plate 170, deformation and breakage may be prevented or minimized, thereby providing an advantage of securing product reliability and stability.

[0059] FIG. 6 is a set of views for explaining a first cover member according to the embodiment of the present disclosure.

[0060] Referring further to FIG. 6, the insulation box 10 may further include a first cover member 180. The first cover member 180 may cover open ends of the upper surface part 20, the lower surface part 30, and the side parts 50 and 60. The first cover member 180 may have a cross section formed in a U-shape, and may be fitted and coupled to open ends of the upper surface part 20, the lower surface part 30, and the side parts 50 and 60 to maintain a fixed state. If necessary, the first cover member 180 and the open ends of the upper surface part 20, the lower surface part 30, and the side parts 50 and 60 may be fixed to each other through at least one fixing means.

[0061] The first cover member 180 may cover side surfaces of the inner reinforcing member 87, the transparent member 85, the vacuum insulation panel 81, and the outer reinforcing member 83, and one end thereof may be bent to cover at least a portion of an inner surface of the inner reinforcing member 87, and the other end thereof may be bent to cover at least a portion of an outer surface of the outer reinforcing member 83. The first cover member 180 may include any one selected from

glass fiber reinforced plastic (GRP) and fiber reinforced polymer (FRP), but is not limited thereto.

[0062] The first cover member 180 may include at least two or more bent portions to secure a long heat transfer path. Accordingly, an advantage of significantly improving thermal insulation performance of the assembled insulation box 10 may be provided.

[0063] FIG. 7 is a view for explaining a second cover member according to an embodiment of the present disclosure.

[0064] Referring further to FIG. 7, the door unit 70 may further include a second cover member 183 covering an edge of the door unit 70. In the door unit 70, by an assembly structure of the second cover member 183 and the inner reinforcing member 87, the transparent member 85, the vacuum insulation panel 81, and the outer reinforcing member 83 may be stably accommodated and fixed at proper positions.

[0065] More specifically, the inner reinforcing member 87 of the door unit 70 may cover a front surface of the transparent member 85, and one end thereof may be bent to cover side surfaces of the transparent member 85, the vacuum insulation panel 81, and the outer reinforcing member 83. The second cover member 183 may cover at least a portion of an edge of a front surface of the outer reinforcing member 83 and may cover side surfaces of the outer reinforcing member 83 outside the inner reinforcing member 87.

[0066] The inner reinforcing member 87 of the door unit 70 and the second cover member 183 may be fixed to each other through at least one fixing means. The fixing means may penetrate the inner reinforcing member 87 of the door unit 70 and the second cover member 183 so as to face a side surface of the outer reinforcing member 83 in a lateral direction. The fixing means may be provided to penetrate the inner reinforcing member 87 and the second cover member 183 and to penetrate the outer reinforcing member 83 in order to increase fastening strength. The fixing means may be a rivet, but is not limited thereto.

[0067] FIG. 8 is a view for explaining a separation prevention means according to the embodiment of the present disclosure.

[0068] Referring to FIG. 8, the insulation box 10 may further include at least one separation prevention means for guiding a stacking operation of the plurality of passive containers 1 in the up-down direction or for preventing separation from a predetermined position during transportation. The separation prevention means may include a protrusion 190 formed on one of the upper surface part 20 and the lower surface part 30, and a recess (not illustrated) formed on the other one. The separation prevention means may be formed on the upper surface part 20 and the lower surface part 30 and may preferably be formed at edges thereof. The protrusion 190 and the recess may be respectively formed on the upper surface part 20 and the lower surface part 30 corresponding to a virtual line extending side by side in one direction (or

vertical direction). The one direction may correspond to a stacking direction. As an example, a first passive container and a second passive container stacked above the first passive container may be included. During stacking, a carrier may fit the recess of the second passive container onto the protrusion 190 formed on an upper portion of the first passive container.

[0069] When transporting temperature-sensitive articles (maritime transport, air transport, or the like), the plurality of passive containers 1 may be used, and the passive containers 1 may be stacked within a predetermined space. In this case, since a large number of passive containers 1 should be stacked within a limited space, stacking in the up-down direction may be required.

[0070] In the related art, when passive containers are stacked in the up-down direction, there has been no means for guiding a stacking position, and thus stacking had to be performed depending on the intuition of the carrier. In addition, unintended movement of the stacked passive containers may occur due to external forces generated during transportation, and accordingly, damage to the temperature-sensitive articles accommodated inside the passive containers may occur.

[0071] The passive container 1 according to the embodiment of the present disclosure includes the separation prevention means in the insulation box 10, thereby allowing stacking positions of the plurality of passive containers 1 to be easily identified and enabling the passive containers 1 to be stacked at correct positions, and reducing movement caused by external forces during transportation, so that damage to the passive container itself and damage to the temperature-sensitive articles accommodated therein can be minimized.

[0072] Meanwhile, the insulation box 10 may further include a third cover member 185 that covers edges and corners of the adjacent upper surface part 20, lower surface part 30, rear surface part 40, and side parts 50 and 60. The third cover member 185 may reinforce rigidity of the insulation box 10 by mutually fixing the adjacent upper surface part 20, lower surface part 30, rear surface part 40, and side parts 50 and 60. The third cover member 185 may include SUS (stainless steel), but is not limited thereto.

[0073] The separation prevention means may be formed on the third cover member 185. That is, the protrusion 190 may be formed on the third cover member 185 positioned on the upper surface part 20, and the recess may be formed on the third cover member 185 positioned on the lower surface part 30. As the separation prevention means is formed on the third cover member 185, strength against external forces may be significantly improved.

[0074] FIG. 9 is a view for explaining a cushioning member according to the embodiment of the present disclosure.

[0075] Referring further to FIG. 9, the passive container 1 according to the embodiment of the present disclosure

sure may further include a cushioning member 195 for cushioning an impact upon closing between the door unit 70 and the insulation box 10 during opening and closing of the door unit 70 and for maintaining airtightness. The cushioning member 195 may be fixed to the insulation box 10 and may be positioned in a region where the insulation box 10 and the door unit 70 come into contact when the door unit 70 is closed.

[0076] The cushioning member 195 may be formed of a porous material having cushioning properties, such as polyethylene (PE), polypropylene (PP), acrylic, and polyurethane (PU), but is not limited thereto. The cushioning member 195 may include one or more cushioning holes 196 penetrating along a longitudinal direction. The cushioning holes 196 may be pressed and sealed by the door unit 70 and the insulation box 10 when the door unit 70 is closed.

[0077] In the related art, in the cushioning member 195 not provided with the cushioning holes 196, when the door unit 70 is closed, the cushioning member 195 is pressed by the door unit 70 and the insulation box 10 and is deformed to be pushed to one side, thereby causing defective opening and closing of the door unit 70 or failure in maintaining airtightness. The passive container 1 according to the embodiment of the present disclosure includes the cushioning holes 196, thereby preventing defective opening and closing of the door unit 70 due to deformation of the cushioning member 195 and providing an advantage of maintaining airtightness.

[0078] It will be apparent to those skilled in the art that the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. Accordingly, the foregoing detailed description should not be construed as limiting in all respects and should be considered illustrative. The scope of the present invention should be determined by the reasonable interpretation of the appended claims, and all modifications within the equivalent scope of the present invention are included within the scope of the present invention.

Claims

1. A passive container (1) comprising:

an insulation box (10) including an upper surface part (20), a lower surface part (30), a rear surface part (40), and side parts (50, 60), which provide an inner accommodation space having an open front surface;

a door unit (70) which is connected to the insulation box (10) and opens and closes the front surface of the accommodation space; and

a first accommodation unit (100) fixed to at least one of the side parts (50, 60) and the door unit (70) to detachably accommodate at least one case (200), and having a pair of rails including a first rail (110) and a second rail (120), which

extend in a first direction to allow the case (200) to be slidably fastened in the first direction and are spaced apart from each other in a second direction crossing the first direction to cover one side and the other side of the case (200), respectively,

wherein the first rail (110) and the second rail (120) each include an uneven portion selectively controlling entry and exit in a third direction different from the first and second directions in response to the movement of the case (200) in the first direction.

2. The passive container (1) of claim 1, wherein the first rail (110) includes

a first-1 body (111) covering one side surface of the case (200), and

a first-2 body (113) extending from the first-1 body (111) to cover at least a portion of a front surface of the case (200), the first-2 body (113) having a first concave portion (114) and a first convex portion (115) alternately and sequentially arranged along the first direction,

wherein the second rail (120) includes

a second-1 body (121) covering the other side surface of the case (200), and

a second-2 body (123) extending from the second-1 body (121) to cover at least a portion of the front surface of the case (200), the second-2 body (123) having a second concave portion (124) and a second convex portion (125) alternately and sequentially arranged along the first direction, and

wherein the case (200) includes

a first case convex portion (211) and a first case concave portion (213) arranged on one side so as to respectively correspond to the first concave portion (114) and the first convex portion (115), and

a second case convex portion (221) and a second case concave portion (223) arranged on the other side so as to respectively correspond to the second concave portion (124) and the second convex portion (125).

3. The passive container (1) of claim 2, wherein the first accommodation unit (100) further includes a support plate (130), (140) fixed to the door unit (70) and supporting the accommodated case (200) from below, and

wherein the support plate (130), (140) is disposed to face an upper surface of the lower surface part (30) when the door unit (70) is closed, and is positioned so as to substantially contact the upper surface of the lower surface part (30) or to be spaced apart from the upper surface by a preset distance.

4. The passive container (1) of claim 1, further comprising a second accommodation unit (150) fixed to the upper surface part (20) and configured to detachably accommodate at least one case (200) in a front-rear direction,

wherein the second accommodation unit (150) includes

an accommodation plate (160) disposed downward from the upper surface part (20) by a predetermined distance and supporting the case (200) from below,

a first auxiliary plate (171) connecting the accommodation plate (160) and the upper surface part (20) and defining accommodation spaces for the cases (200), and

a second auxiliary plate (173) fixed to the accommodation plate (160) and the lower surface part (30) or the side parts (50) and (60) to support the accommodation plate (160) from below.

5. The passive container (1) of claim 1, wherein at least one of the upper surface part (20), the lower surface part (30), the rear surface part (40), the side parts (50) and (60), and the door unit (70) includes a vacuum insulation panel (81), a transparent member (85) disposed inside the vacuum insulation panel (81), and an outer reinforcing member (83) disposed outside the vacuum insulation panel (81),

wherein the vacuum insulation panel (81) includes a plurality of divided panels (82) divided along one direction, and

wherein adjacent surfaces of the divided panels (82) have inclined surfaces (82a).

6. The passive container (1) of claim 5, wherein, among the divided panels (82), one adjacent divided panel (82b) has a trapezoidal cross-sectional shape, and another adjacent divided panel (82c) has a parallelogram-shaped cross-sectional shape.

7. The passive container (1) of claim 5, wherein at least one of the upper surface part (20), the lower surface part (30), the rear surface part (40), the side parts (50) and (60), and the door unit (70) includes an inner reinforcing member (87) disposed inside the transparent member (85) and including a through hole (88) exposing at least a portion of the transparent member (85), and wherein the through hole (88) does not overlap the inclined surface (82a.)

8. The passive container (1) of claim 5, further comprising a first cover member (180) covering open one of the ends of the upper surface part (20), the lower surface part (30), and the side parts (50) and (60), wherein the first cover member (180) is bent at least

twice along shapes of the upper surface part (20), the lower surface part (30), and the side parts (50) and (60).

9. The passive container (1) of claim 5, further comprising:

an inner reinforcing member (87) disposed inside the transparent member (85); and

a second cover member (183) covering an edge of the door unit (70),

wherein the inner reinforcing member (87) of the door unit (70) covers side surfaces of the transparent member (85), the vacuum insulation panel (81), and the outer reinforcing member (83), and

wherein the second cover member (183) covers at least a portion of a front surface of the outer reinforcing member (83) and covers side surfaces of the outer reinforcing member (83) from outside the inner reinforcing member (87), and is fixed to the inner reinforcing member (87) through at least one fixing means.

10. The passive container (1) of claim 1, further comprising:

a protrusion (190) formed on one of the upper surface part (20) and the lower surface part (30); and

a recess formed on the other one of the upper surface part (20) and the lower surface part (30) and configured to allow entry and exit of the protrusion (190).

Fig. 1

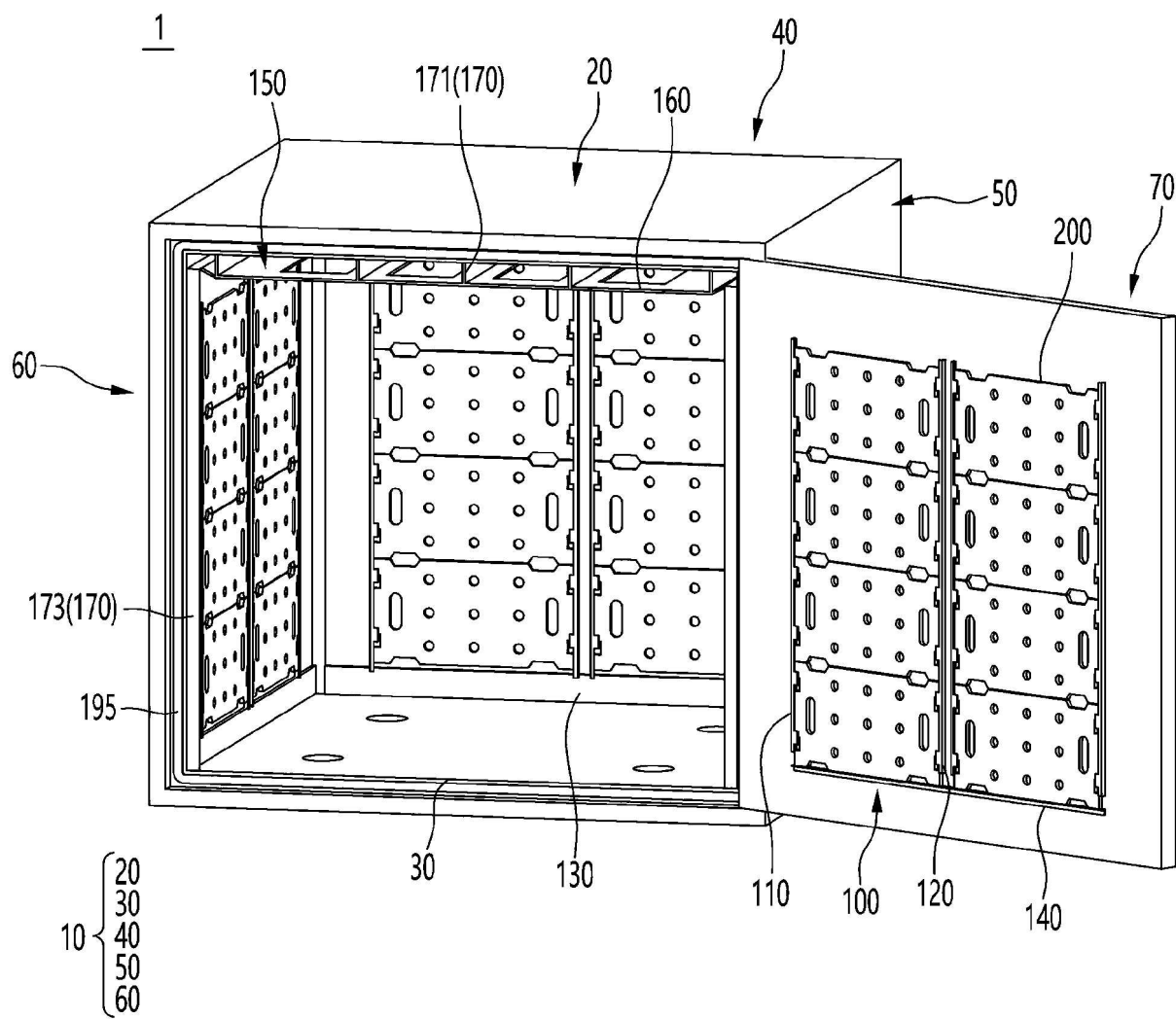


Fig. 2

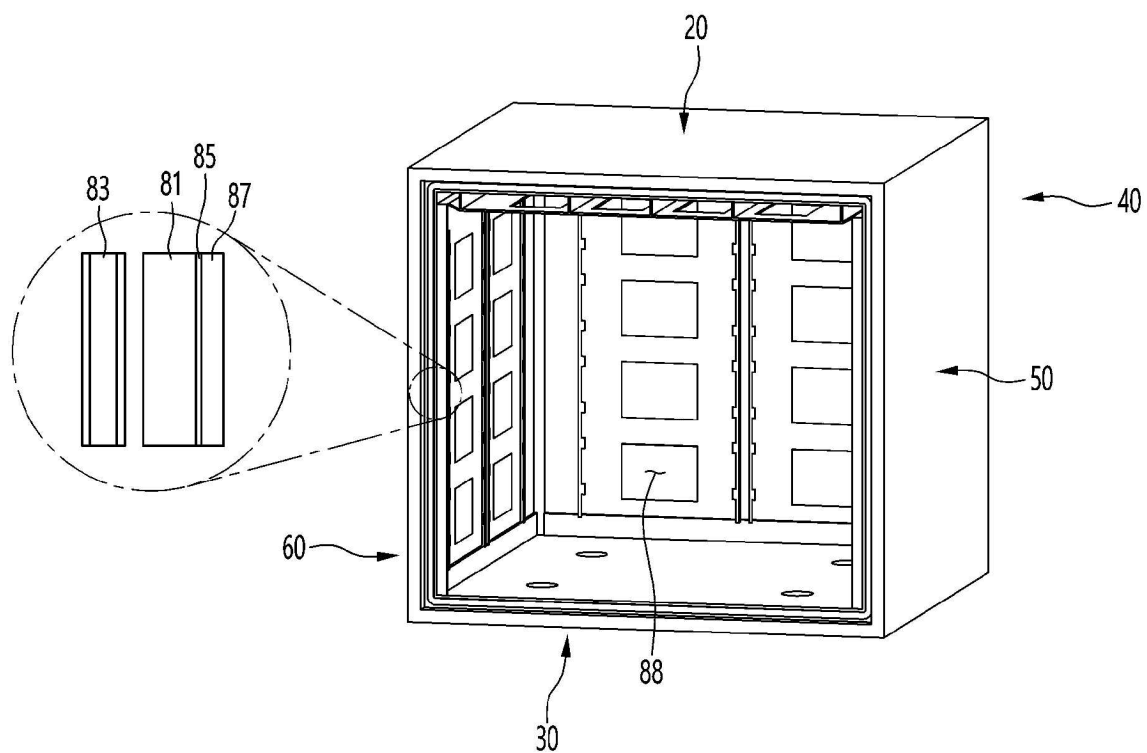


Fig. 3

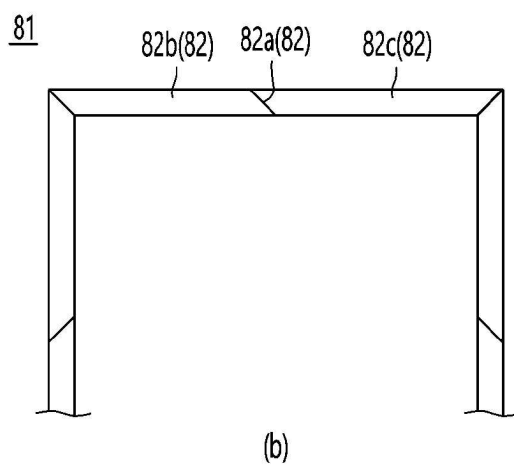
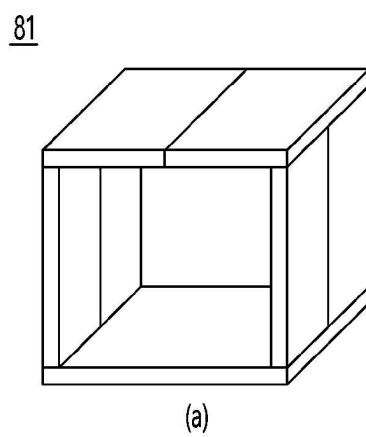


Fig. 4

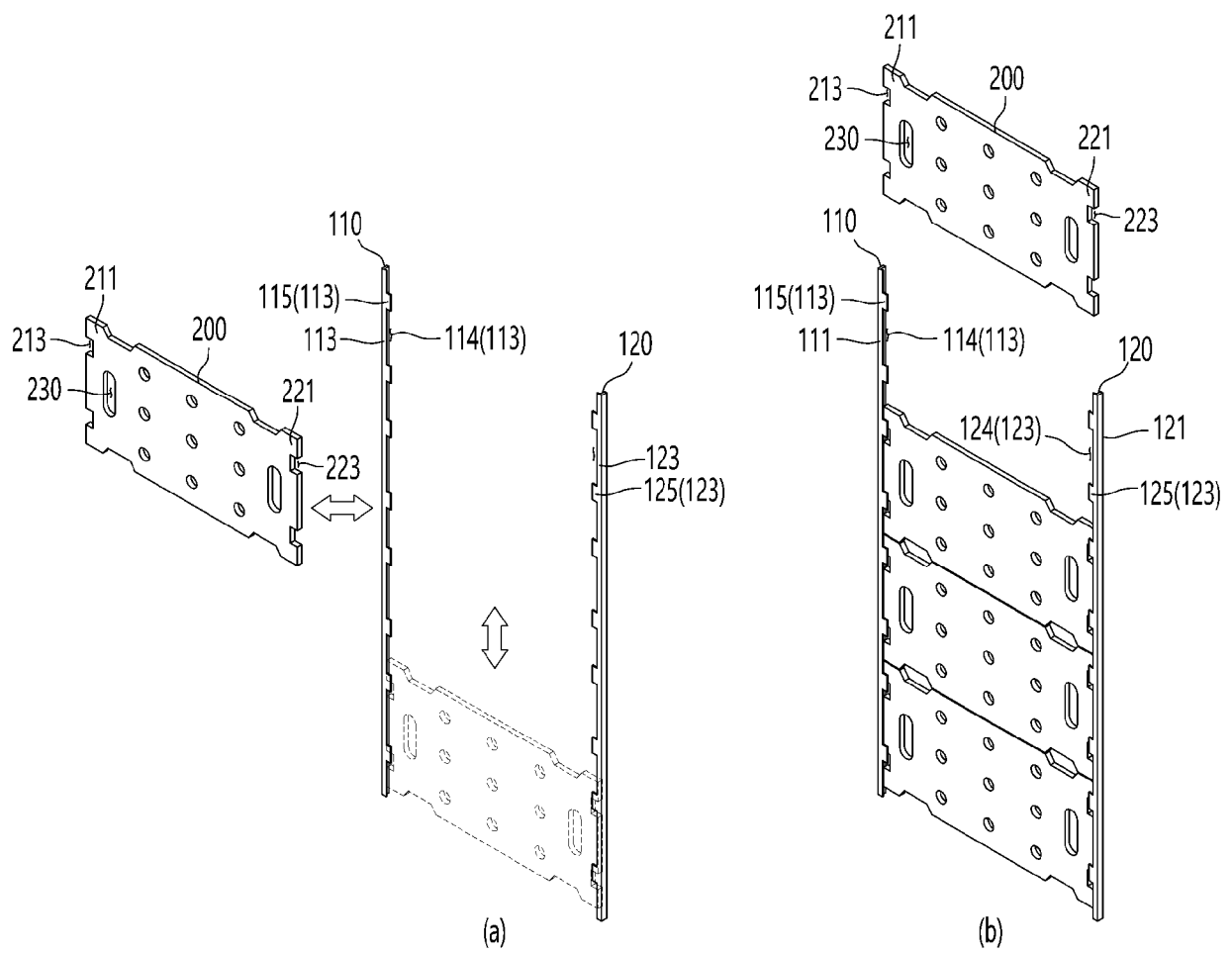


Fig. 5

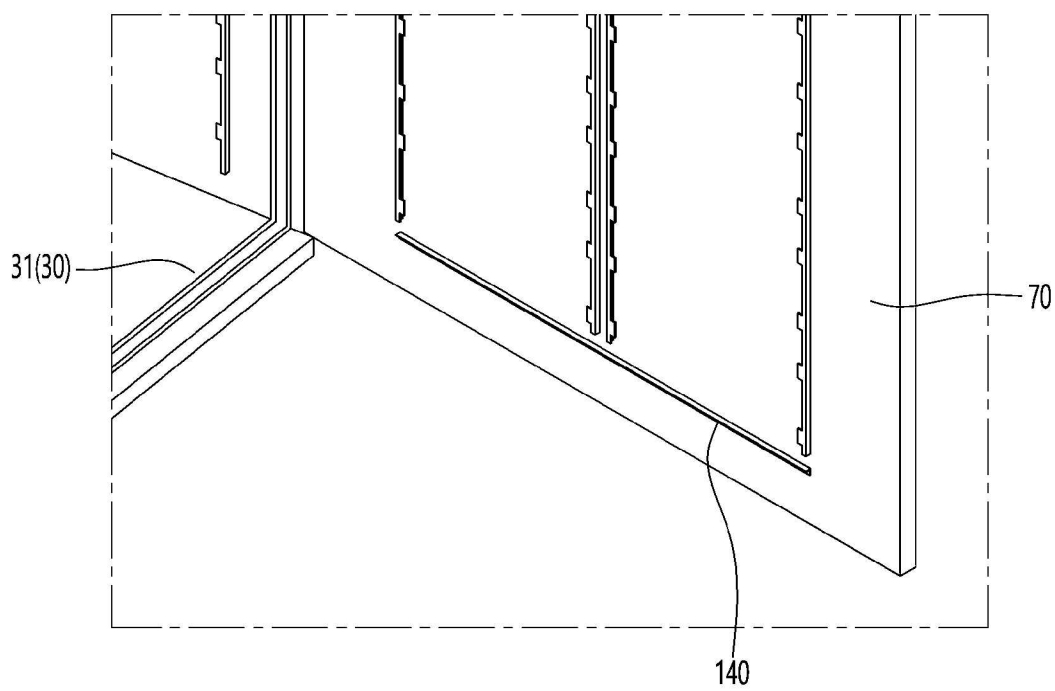


Fig. 6

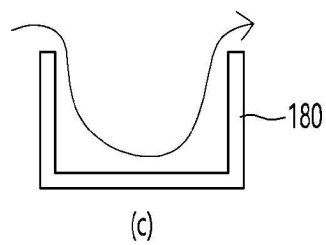
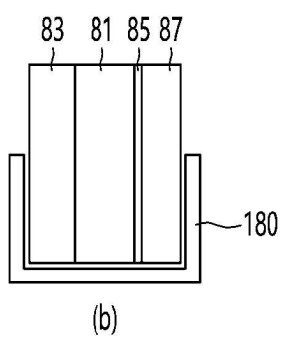
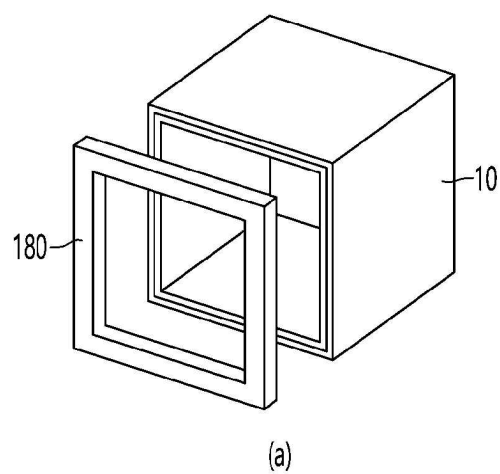


Fig. 7

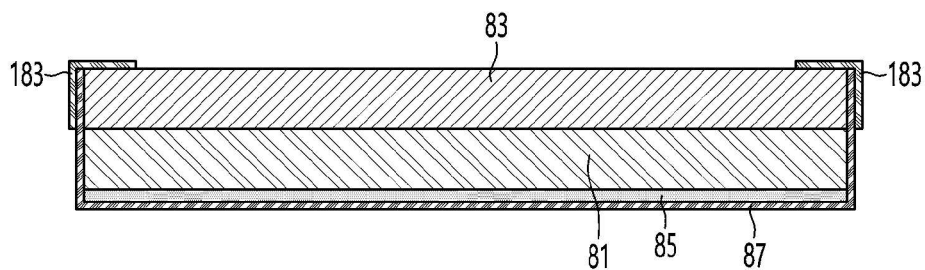


Fig. 8

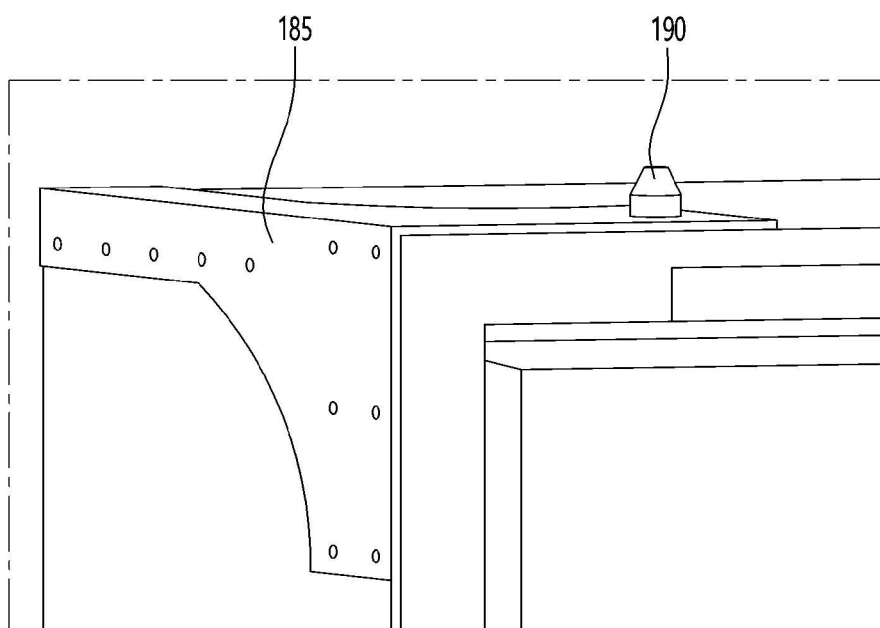
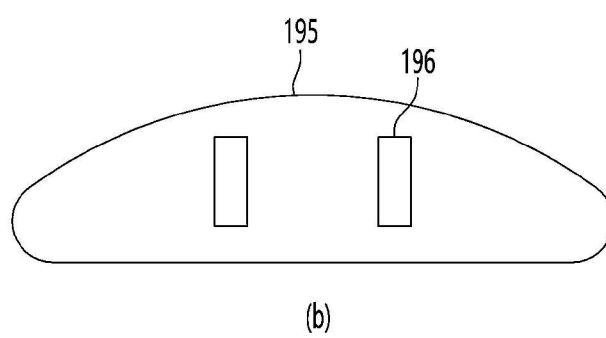
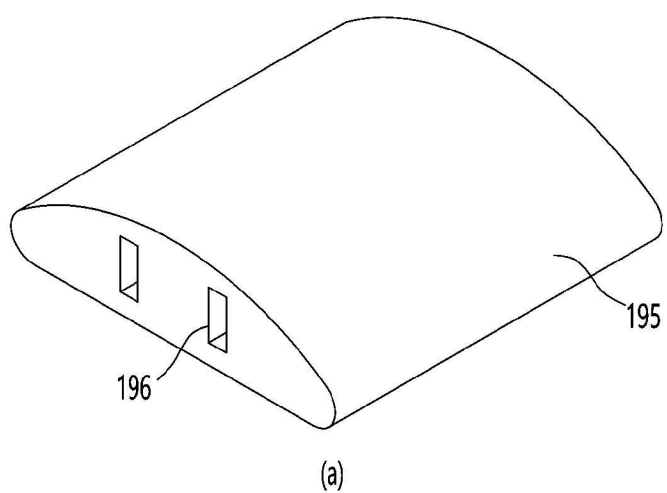


Fig. 9



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/018150

A. CLASSIFICATION OF SUBJECT MATTER**B65D 81/38**(2006.01)i; **B65D 88/74**(2006.01)i; **B65D 88/12**(2006.01)i

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)

B65D 81/38(2006.01); B65D 19/06(2006.01); B65D 19/20(2006.01); B65D 81/18(2006.01); B65D 88/10(2006.01);
B65D 88/12(2006.01); B65D 88/74(2006.01); B65D 90/06(2006.01); F25D 3/06(2006.01); F25D 3/10(2006.01)

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

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 패시브(passive), 컨테이너(container), 단열 박스(insulation box), 도어(door), 레일
(rail), 요철부(uneven part)**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2023-0036215 A (PARK, Woo Suk et al.) 14 March 2023 (2023-03-14) See paragraphs [0042]-[0053] and [0079]-[0083] and figures 1-10.	1,4-6,10
A		2-3,7-9
Y	KR 10-2023-0104419 A (OCI COMPANY LTD.) 10 July 2023 (2023-07-10) See paragraphs [0058] and [0073]-[0074] and figures 3-4.	1,4-6,10
A	WO 2022-180406 A1 (TOWER COLD CHAIN SOLUTIONS LIMITED) 01 September 2022 (2022-09-01) See pages 21-23 and 29-32 and figures 1-20.	1-10
A	JP 2013-249125 A (HITACHI TRANSPORT SYSTEM LTD.) 12 December 2013 (2013-12-12) See paragraphs [0021]-[0029] and figures 2-4.	1-10

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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“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

20 February 2025

Date of mailing of the international search report

20 February 2025

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/018150

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2020-0039687 A1 (VA-Q-TEC AG) 06 February 2020 (2020-02-06) See paragraphs [0035]-[0036] and figures 1-8.	1-10

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2024/018150

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				GB	2604152	B	20 September 2023	
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				EP	3604986	A1	05 February 2020	
				EP	3604986	B1	06 December 2023	
				JP	2020-059553	A	16 April 2020	
				JP	6800291	B2	16 December 2020	
				KR	10-2020-0015422	A	12 February 2020	
				KR	10-2254692	B1	20 May 2021	
				SG	10201907150	A	30 March 2020	
				US	11325746	B2	10 May 2022	