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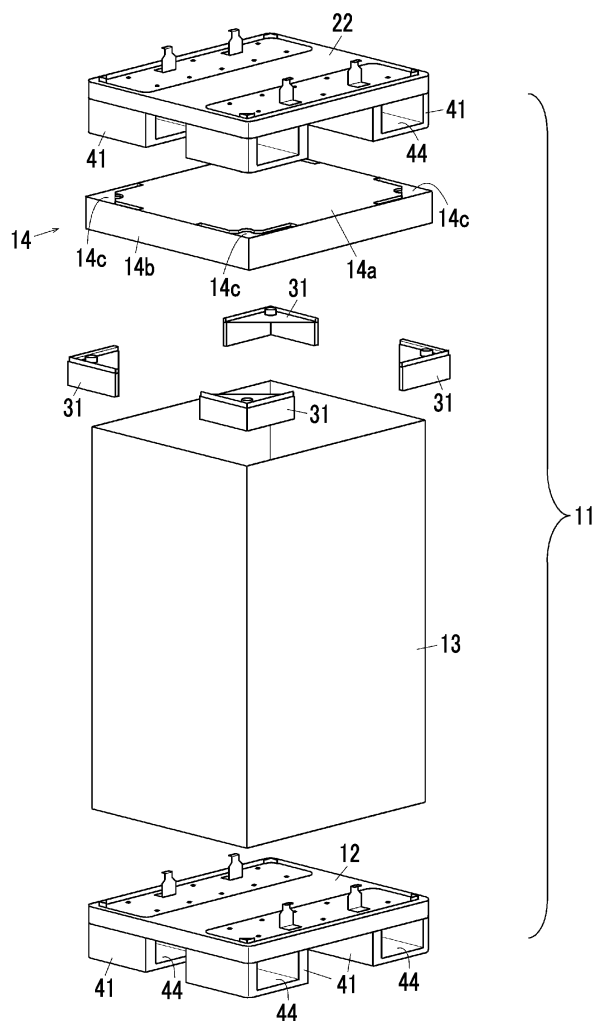
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(54) **AUXILIARY UNIT FOR STACKING PACKAGING MATERIAL**

(57) An auxiliary unit (31, 41), which is disposed between a first packing material including a plurality of side surfaces (13) and a second packing material loaded onto the first packing material in a direction of gravity and assists in loading the second packing material onto the first packing material, includes a load receiving portion that is provided along the side surfaces of the first packing material on an upper side in a direction of gravity and receives a load of the second packing material.

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FIG. 2



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Description

BACKGROUND OF THE INVENTION

(i) Field of the Invention

[0001] The present invention relates to an auxiliary unit.

(ii) Description of Related Art

[0002] With regard to a packing material that is used to pack an object to be packed, techniques disclosed in JP2003-081272A ([0015] to [0022] and Figs. 1 and 2), JP2011-111206A ([0022] to [0025] and Figs. 1, 2, 4, and 6), and JP2006-232297A ([0023] to [0032] and Figs. 1 to 4) are publicly known in the related art.

[0003] JP2003-081272A ([0015] to [0022] and Figs. 1 and 2) discloses a configuration in which four protrusions (5) are installed on an upper surface of a base (1), a plurality of honeycomb structures (20) are placed on upper surfaces of the protrusions (5), a lateral frame body (2) surrounding the honeycomb structures (20) is stacked on the base (1), and a base (1) serving as a lid is stacked on the uppermost frame body (2) with regard to packing boxes that can be stacked in multiple layers.

[0004] JP2011-111206A ([0022] to [0025] and Figs. 1, 2, 4, and 6) discloses a technique in which protruding portions (8) are provided on an upper surface of a lid body (A3) of a packing container and the protruding portions (8) are fitted to recesses (7) formed on a lower surface of a tray (A2) with a pallet provided at the bottom of the packing container to make it difficult for the position of the packing container to be shifted in a case where the packing containers are stacked in layers.

[0005] JP2006-232297A ([0023] to [0032] and Figs. 1 to 4) discloses a technique in which protruding portions (4a to 4c) of a cardboard case are fitted to cut-out holes (102a) of a cardboard pallet (100) to position the cardboard case and to suppress the skidding and collapse of the cardboard case in a case where the cardboard pallet (100) is loaded onto the cardboard case (1) and the cardboard case (1) is stacked on the cardboard pallet (100).

SUMMARY OF THE INVENTION

[0006] A technical object of the present invention is to suppress the deformation of packing materials stacked one above the other as compared to a case where a load is received at a position shifted from an upper portion of a side surface of the packing material.

[0007] According to a first aspect of the present disclosure, there is provided an auxiliary unit that is disposed between a first packing material including a plurality of side surfaces and a second packing material loaded onto the first packing material in a direction of gravity and assists in loading the second packing material onto the first packing material, the auxiliary unit including a load receiving portion that is provided along the side surfaces

of the first packing material on an upper side in a direction of gravity and receives a load of the second packing material.

[0008] According to a second aspect of the present disclosure, in the auxiliary unit according to the first aspect, the load receiving portion may be disposed at upper ends of the side surfaces of the first packing material.

[0009] According to a third aspect of the present disclosure, in the auxiliary unit according to the second aspect, the load receiving portion may be disposed above a groove-shaped connector that is connected in a case where the upper ends of the side surfaces of the first packing material are inserted into the connector.

[0010] According to a fourth aspect of the present disclosure, in the auxiliary unit according to the third aspect, a groove width of the connector may be partially increased to correspond to a portion where thickness directions of the side surfaces of the first packing material overlap with each other.

[0011] According to a fifth aspect of the present disclosure, in the auxiliary unit according to any one of the first to fourth aspects, the second packing material may include a plurality of side surfaces, and the auxiliary unit may include a load portion that is provided along the side surfaces of the second packing material on a lower side in a direction of gravity and is in contact with the load receiving portion.

[0012] According to a sixth aspect of the present disclosure, in the auxiliary unit according to the fifth aspect, in a case where the second packing material is loaded onto the first packing material, only the load portion and the load receiving portion may be in contact with each other and a gap may be formed between an upper portion of the first packing material and a lower portion of the second packing material.

[0013] According to a seventh aspect of the present disclosure, in the auxiliary unit according to the fifth or sixth aspect, the load receiving portion may protrude upward, and the load portion may be recessed upward.

[0014] According to an eighth aspect of the present disclosure, in the auxiliary unit according to the seventh aspect, the load receiving portion may be formed in a shape of a linear projection extending in a horizontal direction, and the load portion may be formed in a shape of a groove to which the load receiving portion is fitted.

[0015] According to a ninth aspect of the present disclosure, in the auxiliary unit according to any one of the fifth to eighth aspects, the load portion may be formed integrally with a support part that supports the second packing material on an upper surface thereof.

[0016] According to the first aspect, the deformation of packing materials stacked one above the other can be suppressed as compared to a case where a load is received at a position shifted from the upper portion of the side surface of the packing material.

[0017] According to the second aspect, since the load of the second packing material can be caused to act on

the upper ends of the side surfaces of the first packing material from above, damaged to the first packing material is suppressed as compared to a case where a load acts from the lateral side of the side surfaces of the first packing material.

[0018] According to the third aspect, since connection between the load receiving portion and the side surfaces is stable as compared to a case where the upper ends of the side surfaces are not inserted, a load acting on the side surfaces can be stabilized.

[0019] According to the fourth aspect, the auxiliary unit can be connected even in a case where the thickness directions of the side surfaces overlap with each other.

[0020] According to the fifth aspect, the load of the second packing material can be caused to act on the load portion from the upper side of the side surfaces of the first packing material.

[0021] According to the sixth aspect, since a load can be caused to act on the side surfaces only from above as compared to a case where not only the load portion and the load receiving portion are in contact with each other, the deformation of the side surfaces can be suppressed.

[0022] According to the seventh aspect, damaged to the load portion can be suppressed as compared to a case where the load portion is formed to be convex downward.

[0023] According to the eighth aspect, since a range in which a load is received can be widened as compared to a case where the load receiving portion is not formed in the shape of a linear projection, the concentration of a load can be suppressed.

[0024] According to the ninth aspect, the load portion can be operated integrally with the support part.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] Exemplary embodiment(s) of the present invention will be described in detail based on the following figures, wherein:

Fig. 1 is an overall view of a packing material including an auxiliary unit of Example 1;

Fig. 2 is an exploded view of the packing material shown in Fig. 1;

Figs. 3A to 3D are diagrams illustrating a load receiving portion of Example 1, Fig. 3A is a perspective view, Fig. 3B is a diagram (top view) viewed in a direction of an arrow IIIB shown in Fig. 3A, Fig. 3C is a diagram (bottom view) viewed in a direction of an arrow IIIC shown in Fig. 3A, and Fig. 3D is a diagram viewed in a direction of an arrow IIID shown in Fig. 3A;

Figs. 4A and 4B are diagrams illustrating a load portion of Example 1, Fig. 4A is a perspective view, and Fig. 4B is a diagram (bottom view) viewed in a direction of an arrow IVB shown in Fig. 4A;

Fig. 5 is an enlarged view of an upper end corner

portion of the packing material of Example 1;

Fig. 6 is an enlarged view of a main portion of a corner portion of side plates of Example 1; and

Fig. 7 is an enlarged cross-sectional view of main portions of the load receiving portion and a part of the load portion of Example 1.

DETAILED DESCRIPTION OF THE INVENTION

[0026] Example as a specific example of an exemplary embodiment of the present invention will be described below with reference to the drawings, but the present invention is not limited to the following example.

[0027] In the following description using the drawings, members other than members required for description will be appropriately omitted for the sake of easy understanding.

[Example 1]

[0028] Fig. 1 is an overall view of a packing material including an auxiliary unit of Example 1.

[0029] Fig. 2 is an exploded view of the packing material shown in Fig. 1.

[0030] Figs. 3A to 3D are diagrams illustrating a load receiving portion of Example 1, Fig. 3A is a perspective view, Fig. 3B is a diagram (top view) viewed in a direction of an arrow IIIB shown in Fig. 3A, Fig. 3C is a diagram (bottom view) viewed in a direction of an arrow IIIC shown in Fig. 3A, and Fig. 3D is a diagram viewed in a direction of an arrow IIID shown in Fig. 3A.

[0031] Figs. 4A and 4B are diagrams illustrating a load portion of Example 1, Fig. 4A is a perspective view, and Fig. 4B is a diagram (bottom view) viewed in a direction of an arrow IVB shown in Fig. 4A.

[0032] In Fig. 1, in a case where packing materials are stored in a warehouse, a second packing material 21 in which an object 1' to be packed is housed may be loaded onto a first packing material 11 in which an object 1 to be packed is housed. Arbitrary objects can be applied as the objects 1 and 1' to be packed. For example, arbitrary objects to be packed, such as industrial products, such as a computer device, a printer, and a copy machine, home appliances, such as a television, a refrigerator, and a microwave oven, food, and processed goods, can be applied.

[0033] In Figs. 1 and 2, the first packing material 11 disposed on the lower side includes a pallet 12 as an example of a support part which the object 1 to be packed is loaded onto an upper surface thereof. The pallet 12 of Example 1 is made of, for example, a resin material. However, the pallet 12 is not limited thereto and can also be made of wood or a metal material.

[0034] Side plates 13 surrounding the outer periphery of sides of the object 1 to be packed are disposed at an outer edge portion of the pallet 12 as an example of side surfaces of the packing material. The side plate 13 of Example 1 is made of, for example, a cardboard as a

paper material, but are not limited thereto. However, the side plate 13 can be made of an arbitrary material, such as a resin material, wood, or a metal material.

[0035] Fig. 5 is an enlarged view of an upper end corner portion of the packing material of Example 1.

[0036] A cap 14 as an example of a lid part is disposed at upper ends of the side plates 13. The cap 14 includes an apical plate 14a that covers an upper surface of the object 1 to be packed, and upper side plates 14b that extend downward from four outer peripheral sides of the apical plate 14a. In Figs. 2 and 5, opening portions 14c corresponding to corner members 31 to be described later are formed at corners of the apical plate 14a. The upper side plates 14b are disposed outside the side plates 13 in a case where the cap 14 is mounted on upper portions of the side plates 13.

[0037] The second packing material 21 loaded on the upper side has a configuration identical to the configuration of the first packing material 11, and includes a pallet 22, side plates 23, and a cap (not shown).

[0038] In Fig. 2, corner members 31 as an example of receiving parts are disposed at corners of upper end portions of the side plates 13. In Figs. 2 and 3, each of the corner members 31 of Example 1 includes a top plate 32 having the shape of a substantially isosceles right triangle. A positioning protrusion 32a as an example of a positioning portion is formed on an upper surface of the top plate 32.

[0039] On the upper surface of the top plate 32, load receiving ribs 33 as an example of a load receiving portion are formed along two sides, between which a right angle is interposed, of the top plate 32 having the shape of an isosceles right triangle. Each of the load receiving ribs 33 is formed in the shape of a linear projection that protrudes upward and extends in a horizontal direction. As shown in Figs. 3A to 3D, the load receiving ribs 33 are formed in a substantially L-shape along the two sides of the top plate 32.

[0040] In Fig. 5, each of the opening portions 14c of the cap 14 is formed such that the positioning protrusion 32a and the load receiving ribs 33 penetrate the apical plate 14a from below to above. The shape of the opening portion 14c is not limited to a shape illustrated in Fig. 5, and can be changed to, for example, the shape of an opening through which the entire corner member 31 can pass, and the like.

[0041] Connecting portions 34 as an example of a connector are formed on a lower surface of the top plate 32 at positions below the load receiving ribs 33. Groove-shaped connecting grooves 35, which are connected in a case where the upper ends of the side plates 13 are inserted into the connecting grooves 35, are formed in the connecting portions 34. In Fig. 3C, the connecting grooves 35 of Example 1 are formed in a substantially L-shape along the load receiving ribs 33. In Fig. 3D, each connecting groove 35 is disposed on a lower extension of each load receiving rib 33, and is adapted such that a load acts in a longitudinal direction of the side plate 13

(vertical direction) in a case where a load acts on the load receiving rib 33 from above. That is, each connecting groove 35 is adapted such that a load does not act in a direction inclined with respect to the longitudinal direction of the side plate 13.

[0042] Fig. 6 is an enlarged view of a main portion of a corner portion of the side plates of Example 1.

[0043] In Fig. 3C, in the connecting groove 35 of Example 1, a wide portion 35b having a groove width about twice the thickness of the side plate 13 is formed near a corner 35a and a narrow portion 35c having a groove width corresponding to the thickness of the side plate 13 is formed at a position away from the corner 35a.

[0044] As shown in Fig. 6, depending on the configuration of the side plates 13, the side plates may doubly overlap with and be fixed to each other at a corner portion 13a with glue, an adhesive, a stapler, or the like. The wide portions 35b are formed at the corner member 31 of Example 1 to correspond to the corner portion 13a.

[0045] In Figs. 1, 2, and 4, feet 41 as an example of mounting portions are supported at a lower portion of the pallet 12. Each foot 41 is fastened to the pallet 12 by screws, bolts, or the like, may be connected to the pallet 12 by a snap-fit structure, can also be fixed to the pallet 12 by an adhesive, or can also be formed integrally with the pallet 12.

[0046] Each foot 41 includes a bottom portion 42 and a pair of side wall portions 43 and 43 that extends upward from both end portions of the bottom portion 42 in a width direction. A space 44 into which a fork (claw) of a forklift or a hand lifter can be inserted is formed between the side wall portions 43 and 43.

[0047] A positioning recess 42a as an example of a portion to be positioned is formed on the bottom side of the bottom portion 42 at a position corresponding to the positioning protrusion 32a. The positioning recess 42a is formed of a recess having a size that allows the positioning protrusion 32a to be housed, and a pulling shape (a guide shape or an R shape) which allows the positioning protrusion 32a to be pulled inward, that is, is inclined inward toward the upper side of the recess, is formed at an inner edge portion of the positioning recess 42a.

[0048] Further, a load groove portion 42b as an example of a load portion is formed on the bottom side of the bottom portion 42 at positions corresponding to the load receiving ribs 33. The load groove portion 42b of Example 1 is formed in the shape of a recessed groove to correspond to the load receiving ribs 33 having the shape of a linear projection. Furthermore, the load groove portion 42b of Example 1 is disposed at positions below the side plates 13 in a direction of gravity, specifically, at positions on lower extensions of the side plates 13 to correspond to the load receiving ribs 33.

[0049] Fig. 7 is an enlarged cross-sectional view of main portions of the load receiving portion and a part of the load portion of Example 1.

[0050] In Fig. 7, in Example 1, a depth L1 of a groove of the load groove portion 42b is smaller than a height

L2 of a protrusion of the load receiving rib 33. Further, in Example 1, a depth L3 of a recess of the positioning recess 42a from a bottom of the groove of the load groove portion 42b is larger than a height L4 of the positioning protrusion 32a from a distal end of the protrusion of the load receiving rib 33.

[0051] Accordingly, in Example 1, in a state where the second packing material 21 is loaded onto the first packing material 11, the load receiving ribs 33 are in contact with the load groove portions 42b, upper ends of the positioning protrusions 32a are not in contact with the bottoms of the recesses of the positioning recesses 42a, and the bottoms of the bottom portions 42 of the feet 41 are also not in contact with the upper surface of the cap 14. Therefore, in Example 1, in a case where the second packing material 21 is loaded onto the first packing material 11, only the load receiving ribs 33 and the load groove portions 42b are in contact with each other and a gap 51 is formed between the upper surface of the cap 14 that is the upper surface of the first packing material 11 and the bottom of each bottom portion 42 that is the lower surface of the second packing material 21.

[0052] The corner members 31 and the feet 41 form a loading auxiliary tool 31+41 of Example 1 that serves as an example of an auxiliary unit for assisting in loading the second packing material 21 onto the first packing material 11.

(Action of Example 1)

[0053] In the loading auxiliary tool 31+41 of Example 1 having the above-mentioned configuration, a load applied from above acts on the load receiving ribs 33 in a case where the second packing material 21 is loaded onto the first packing material 11. Here, since the load receiving ribs 33 are disposed above the side plate 13 in the direction of gravity, a load acting on the load receiving ribs 33 acts on the side plates 13 in the direction of gravity in which the side plates 13 extend. That is, the load of the second packing material 21 acts directly above the side plates 13.

[0054] In a configuration in the related art not including the loading auxiliary tool 31+41, the bottom of the pallet 12 is loaded onto the upper surface of the cap 14. In this case, since the position of the second packing material 21 may be shifted from the position of the first packing material 11 loaded on the lower side due to an error in the operation of the forklift, or the like, a load may be received at a position shifted from the position directly above the side plates 13 of the first packing material 11. In this case, since a position where a load received by the side plates 13 is locally increased in a circumferential direction may be generated, the side plates 13 are buckled and deformed and the second packing material 21 falls and collapses at the worst. For this reason, there is a concern that the object 1' to be packed housed in the second packing material 21 will be damaged.

[0055] Further, in the configurations disclosed in

JP2003-081272A ([0015] to [0022], Figs. 1 and 2), JP2011-111206A ([0022] to [0025], Figs. 1, 2, 4, and 6), and JP2006-232297A ([0023] to [0032], Figs. 1 to 4), an object loaded on the upper side is aligned to reduce a shift but a load is received by a portion corresponding to a lid. Accordingly, in a case where a load acts on the inside of a lid in a plane direction (the inside of a portion corresponding to the side plates 13 provided on the outside), a force pushing the side plate 13 to the outside in the plane direction, that is, a force in a direction in which the side plate 13 expand is likely to act. Therefore, since a force for bending the side plate 13 in a thickness direction acts, there is a problem that the side plate 13 is likely to be deformed, buckled, or damaged as compared to a case where a force in the direction of gravity, which is a length direction of the side plate 13, acts.

[0056] On the other hand, in Example 1, the load of the second packing material 21 is received by the load receiving ribs 33 and the load can be caused to act on the upper side of the side plates 13. Accordingly, in a case where the first packing material 11 and the second packing material 21 are stacked one above the other, the deformation of the packing materials 11 and 21 can be suppressed.

[0057] Further, the corner members 31 of Example 1 are connected to the upper ends of the side plates 13 by the connecting portions 34. Accordingly, since the corner members 31 are not likely to be separated from the upper ends of the side plates 13 as compared to a case where the corner members 31 are not connected to the upper ends of the side plates 13, a load can be caused to stably act on the side plates 13 from above.

[0058] In particular, since the side plates 13 are connected to the connecting portions 34 in the form of being inserted in Example 1, an adhesive or the like and screws or the like are not used. Accordingly, connecting work and detaching work can also be easily performed. Furthermore, reuse or recycling are also easy as compared to a case where the side plate 13 made of a cardboard and the corner member 31 made of a resin are connected to each other by an adhesive.

[0059] Further, in the corner member 31 of Example 1, the wide portions 35b are formed in the connecting grooves 35. In a configuration in which the wide portions 35b are not provided, it is not possible to cope with a configuration in which the side plates 13 doubly overlap with each other at the corner portion 13a and there is a concern that the corner members 31 cannot be connected to the side plates 13, or the corner members 31 are deformed or receives stress and a load applied from the second packing material 21 may not stably act on the side plates 13 in a case where the side plates 13 are forcibly fitted to the corner members 31. In the case of the corner member 31 of Example 1 including the wide portions 35b, it is also possible to cope with a configuration in which the side plates 13 doubly overlap with each other at the corner portion 13a and to stabilize a load acting on the side plates 13. Even though the side plates

13 do not doubly overlap with each other, the corner member 31 can be connected to the upper ends of the side plates 13 by the wide portions 35b and the narrow portions 35c.

[0060] In addition, the load groove portion 42b is formed on each foot 41 in Example 1. Even in a configuration in which the load groove portions 42b are not provided and the lower surfaces of the bottom portions 42 are flat surfaces, a load can be caused to act on the load receiving ribs 33. However, in a case where the lower surfaces of the bottom portions 42 are flat surfaces, the position of the second packing material 21 in the horizontal direction may be shifted from the position of the first packing material 11 due to an error in the operation of the forklift, or the like. For this reason, in a case where packing materials are stacked in three or four layers, there is a possibility that the packing material stacked in the upper layer will be more significantly shifted. In a case where the packing material is significantly shifted, there is also a concern that a load received by the load receiving ribs 33 will be non-uniform or unbalanced between the four corner members 31. Since the load receiving ribs 33 are fitted to the load groove portions 42b in Example 1, the position of the second packing material 21 in the horizontal direction is likely to be stable and the occurrence of the unbalance of a load is also suppressed.

[0061] In particular, since the positioning protrusions 32a and the positioning recesses 42a are also provided in Example 1, the shift of the position of the second packing material 21 from the position of the first packing material 11 is likely to be suppressed. In a configuration in which the positioning protrusions 32a and the positioning recesses 42a are not provided, the delicate operation of the forklift may be required to align the load receiving ribs 33 with the load groove portions 42b. However, in Example 1 in which the positioning protrusions 32a and the positioning recesses 42a are provided, the positions of the load receiving ribs 33 and the positions of the load groove portions 42b are easily aligned in a case where the positions of the positioning protrusions 32a are aligned with the positions of the positioning recesses 42a.

[0062] Further, in Example 1, in a case where the second packing material 21 is loaded onto the first packing material 11, only the load receiving ribs 33 and the load groove portions 42b are in contact with each other and a gap is formed between the upper surface of the cap 14 that is the upper surface of the first packing material 11 and the bottom of each bottom portion 42 that is the lower surface of the second packing material 21. In a case where portions other than the load receiving ribs 33 and the load groove portions 42b are in contact with each other as well, there is a concern that a load obliquely acts on the side plates 13 and the buckling or the like of the side plates 13 is likely to occur. However, since only the load receiving ribs 33 and the load groove portion 42b are in contact with each other in Example 1, a load is likely to act from the upper side of the side plates 13.

[0063] Furthermore, in Example 1, the load receiving

ribs 33 protrude upward and the load groove portion 42b are formed to be recessed upward. The load receiving ribs 33 may be formed in a concave shape and the load groove portion 42b may be formed in a convex shape. However, since the first packing material 11 is in contact with the floor via not the bottoms of the feet 41 but only the convex load groove portions in a case where the convex load groove portions are provided and the first packing material 11 is placed on a flat floor, the convex load groove portions are likely to be damaged. In a case where the concave load groove portions 42b are provided as in Example 1, the bottoms of the bottom portions 42 of the feet 41 are in contact with the floor. Accordingly, damage to the load groove portions 42b is suppressed as compared to a case where the convex load groove portions are provided.

[0064] Further, in Example 1, the load receiving rib 33 is formed in the shape of a linear projection extending in a linear direction, and the load groove portion 42b is also formed in the shape of a groove. The shape of the load receiving rib 33 is not limited to the shape of a linear projection, and may be the shape of a protrusion, such as the positioning protrusion 32a. Since the linear projection as shown in Example 1 has a contact area larger than the contact area of the protrusion, the concentration of a load is reduced. As a result, the concentrated load is also less likely to act on the side plates 13.

(Modification examples)

[0065] The example of the present invention has been described in detail above, but the present invention is not limited to the above-mentioned example and can have various modifications without departing from the scope of the present invention described in claims. Modification examples (H01) to (H08) of the present invention will be exemplified below.

[0066] (H01) In the above-mentioned example, the form of the linear projection has been exemplified as the load receiving rib 33 and the form of the protrusion has also been described as a form that can be employed. However, the load receiving rib 33 is not limited thereto. A form in which the protrusions are arranged along the linear projection or in a specific pattern can also be employed.

[0067] (H02) It is desirable that the positioning protrusions 32a and the positioning recesses 42a are provided in the above-mentioned example, but the positioning protrusions 32a and the positioning recesses 42a may not be provided.

[0068] (H03) A configuration in which four corner members 31 having an identical configuration and four feet 41 having an identical configuration are disposed has been exemplified in the above-mentioned example, but the present invention is not limited thereto. For example, the numbers of the corner members 31 and feet 41 each including the positioning protrusion 32a and the positioning recess 42a can be set to one to three, and corner

members and feet not including the positioning protrusion 32a and the positioning recess 42a can be provided as the other corner members 31 and the other feet 41. Moreover, a configuration in which the corner members 31 are installed at all the four corners has been exemplified in Example 1, but the present invention is not limited thereto and a configuration in which the corner members 31 are provided at two corners facing each other can also be employed.

[0069] (H04) A form in which the wide portions 35b are provided has been exemplified in the above-mentioned example, but the present invention is not limited thereto. In a case where there is no overlapping portion on the side plates 13, a form in which the wide portions 35b are not provided can also be employed. Further, for example, in a case where there is an overlapping portion at only one position on the side plates 13 in a circumferential direction, a modification in which only one corner member 31 including the wide portions 35b is provided and corner members not including the wide portions are used as the other corner members can also be employed.

[0070] (H05) A configuration in which the corner members 31 and the cap 14 are provided separately from each other has been exemplified in the above-mentioned example, but the corner members 31 and the cap 14 can also be integrally formed. Further, a configuration in which the cap 14 is not provided can also be employed. That is, the present invention is not limited to a configuration in which a total of four corner members 31 are disposed at the corners, and the four corner members 31 can also be integrally molded into one member and the integrally molded member can also be formed in a shape that allows the integrally molded member to be inserted into the entire upper portion of each of the packing materials 11 and 21. Moreover, a configuration in which a corner member is formed in a substantially U-shape to cover two corners and one side interposed between the two corners and two corner members are installed to face each other can also be employed.

[0071] (H06) In the above-mentioned example, it has been described above that the feet 41 and the pallet 12 can also be provided separately from each other or can also be integrally molded. Moreover, a form in which a portion corresponding to a quarter of the pallet is integrally formed on an upper surface of one foot and four feet are arranged and assembled to form a configuration identical to the configuration of the feet and the pallet can also be employed.

[0072] (H07) In a case where the packing materials 11 and 21 have identical dimensions in an X-axis direction and a Y-axis direction, that is, upper and lower packing materials have different heights but have an identical horizontal cross-sectional shape in the above-mentioned example, packing materials having different heights can also be stacked since a relationship between the feet 41 and the corner members 31 is identical to the above-mentioned relationship.

[0073] (H08) A case where the packing materials 11

and 21 having a rectangular (quadrangular) horizontal cross-sectional shape are used has been exemplified in the above-mentioned example, but the present invention is not limited thereto. For example, the present invention can also be applied to packing materials 11 and 21 having a polygonal or circular cross-sectional shape other than a quadrangular cross-sectional shape.

Supplementary Note

[0074]

(((1))) An auxiliary unit that is disposed between a first packing material including a plurality of side surfaces and a second packing material loaded onto the first packing material in a direction of gravity and assists in loading the second packing material onto the first packing material, the auxiliary unit comprising:

a load receiving portion that is provided along the side surfaces of the first packing material on an upper side in a direction of gravity and receives a load of the second packing material.

(((2))) The auxiliary unit according to (((1))), wherein the load receiving portion is disposed at upper ends of the side surfaces of the first packing material.

(((3))) The auxiliary unit according to (((2))), wherein the load receiving portion is disposed above a groove-shaped connector that is connected in a case where the upper ends of the side surfaces of the first packing material are inserted into the connector.

(((4))) The auxiliary unit according to (((3))), wherein a groove width of the connector is partially increased to correspond to a portion where thickness directions of the side surfaces of the first packing material overlap with each other.

(((5))) The auxiliary unit according to any one of (((1))) to (((4))),

wherein the second packing material includes a plurality of side surfaces, and the auxiliary unit includes a load portion that is provided along the side surfaces of the second packing material on a lower side in a direction of gravity and is in contact with the load receiving portion.

(((6))) The auxiliary unit according to (((5))), wherein in a case where the second packing material is loaded onto the first packing material, only the load portion and the load receiving portion are in contact with each other and a gap is formed between an upper portion of the first packing material and a lower portion of the second packing material.

(((7))) The auxiliary unit according to (((5))) or (((6))),

wherein the load receiving portion protrudes upward, and
the load portion is recessed upward.

((((8)))) The auxiliary unit according to (((7))),

wherein the load receiving portion is formed in a shape of a linear projection extending in a horizontal direction, and
the load portion is formed in a shape of a groove to which the load receiving portion is fitted.

((((9)))) The auxiliary unit according to any one of (((5))) to (((8))),
wherein the load portion is formed integrally with a support part that supports the second packing material on an upper surface thereof.

[0075] According to the auxiliary unit of (((1))), the deformation of packing materials stacked one above the other can be suppressed as compared to a case where a load is received at a position shifted from the upper portion of the side surface of the packing material.

[0076] According to the auxiliary unit of (((2))), since the load of the second packing material can be caused to act on the upper ends of the side surfaces of the first packing material from above, damaged to the first packing material is suppressed as compared to a case where a load acts from the lateral side of the side surfaces of the first packing material.

[0077] According to the auxiliary unit of (((3))), since connection between the load receiving portion and the side surfaces is stable as compared to a case where the upper ends of the side surfaces are not inserted, a load acting on the side surfaces can be stabilized.

[0078] According to the auxiliary unit of (((4))), the auxiliary unit can be connected even in a case where the thickness directions of the side surfaces overlap with each other.

[0079] According to the auxiliary unit of (((5))), the load of the second packing material can be caused to act on the load portion from the upper side of the side surfaces of the first packing material.

[0080] According to the auxiliary unit of (((6))), since a load can be caused to act on the side surfaces only from above as compared to a case where not only the load portion and the load receiving portion are in contact with each other, the deformation of the side surfaces can be suppressed.

[0081] According to the auxiliary unit of (((7))), damaged to the load portion can be suppressed as compared to a case where the load portion is formed to be convex downward.

[0082] According to the auxiliary unit of (((8))), since a range in which a load is received can be widened as compared to a case where the load receiving portion is not formed in the shape of a linear projection, the concentration of a load can be suppressed.

[0083] According to the auxiliary unit of (((9))), the load portion can be operated integrally with the support part.

[0084] The foregoing description of the exemplary embodiments of the present invention has been provided

for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

Brief Description of the Reference Symbols

[0085]

- 11: first packing material
- 13: side plate of first packing material
- 21: second packing material
- 23: side plate of second packing material
- 31+41: loading auxiliary tool
- 33: load receiving rib
- 34: connecting portion
- 42b: load groove portion

Claims

1. An auxiliary unit that is disposed between a first packing material including a plurality of side surfaces and a second packing material loaded onto the first packing material in a direction of gravity and assists in loading the second packing material onto the first packing material, the auxiliary unit comprising:
a load receiving portion that is provided along the side surfaces of the first packing material on an upper side in a direction of gravity and receives a load of the second packing material.
2. The auxiliary unit according to claim 1,
wherein the load receiving portion is disposed at upper ends of the side surfaces of the first packing material.
3. The auxiliary unit according to claim 2,
wherein the load receiving portion is disposed above a groove-shaped connector that is connected in a case where the upper ends of the side surfaces of the first packing material are inserted into the connector.
4. The auxiliary unit according to claim 3,
wherein a groove width of the connector is partially increased to correspond to a portion where thickness directions of the side surfaces of the first packing material overlap with each other.

5. The auxiliary unit according to any one of claims 1 to 4,
wherein the second packing material includes a plurality of side surfaces, and the auxiliary unit includes a load portion that is provided along the side surfaces of the second packing material on a lower side in a direction of gravity and is in contact with the load receiving portion. 5
6. The auxiliary unit according to claim 5,
wherein in a case where the second packing material is loaded onto the first packing material, only the load portion and the load receiving portion are in contact with each other and a gap is formed between an upper portion of the first packing material and a lower portion of the second packing material. 10 15
7. The auxiliary unit according to claim 5 or 6,
wherein the load receiving portion protrudes upward, and
the load portion is recessed upward. 20
8. The auxiliary unit according to claim 7,

wherein the load receiving portion is formed in a shape of a linear projection extending in a horizontal direction, and 25
the load portion is formed in a shape of a groove to which the load receiving portion is fitted. 30
9. The auxiliary unit according to any one of claims 5 to 8,
wherein the load portion is formed integrally with a support part that supports the second packing material on an upper surface thereof. 35

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FIG. 1

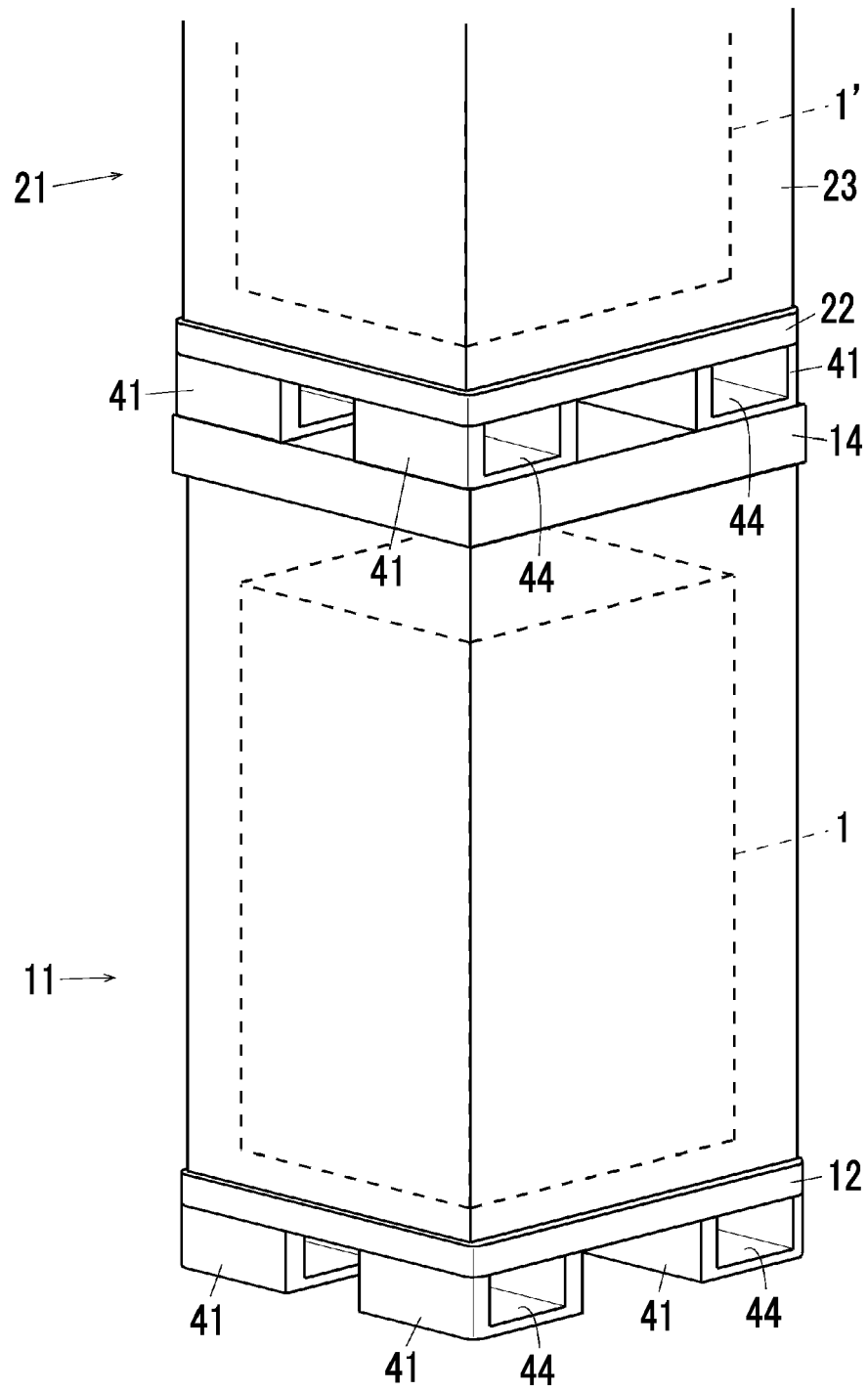


FIG. 2

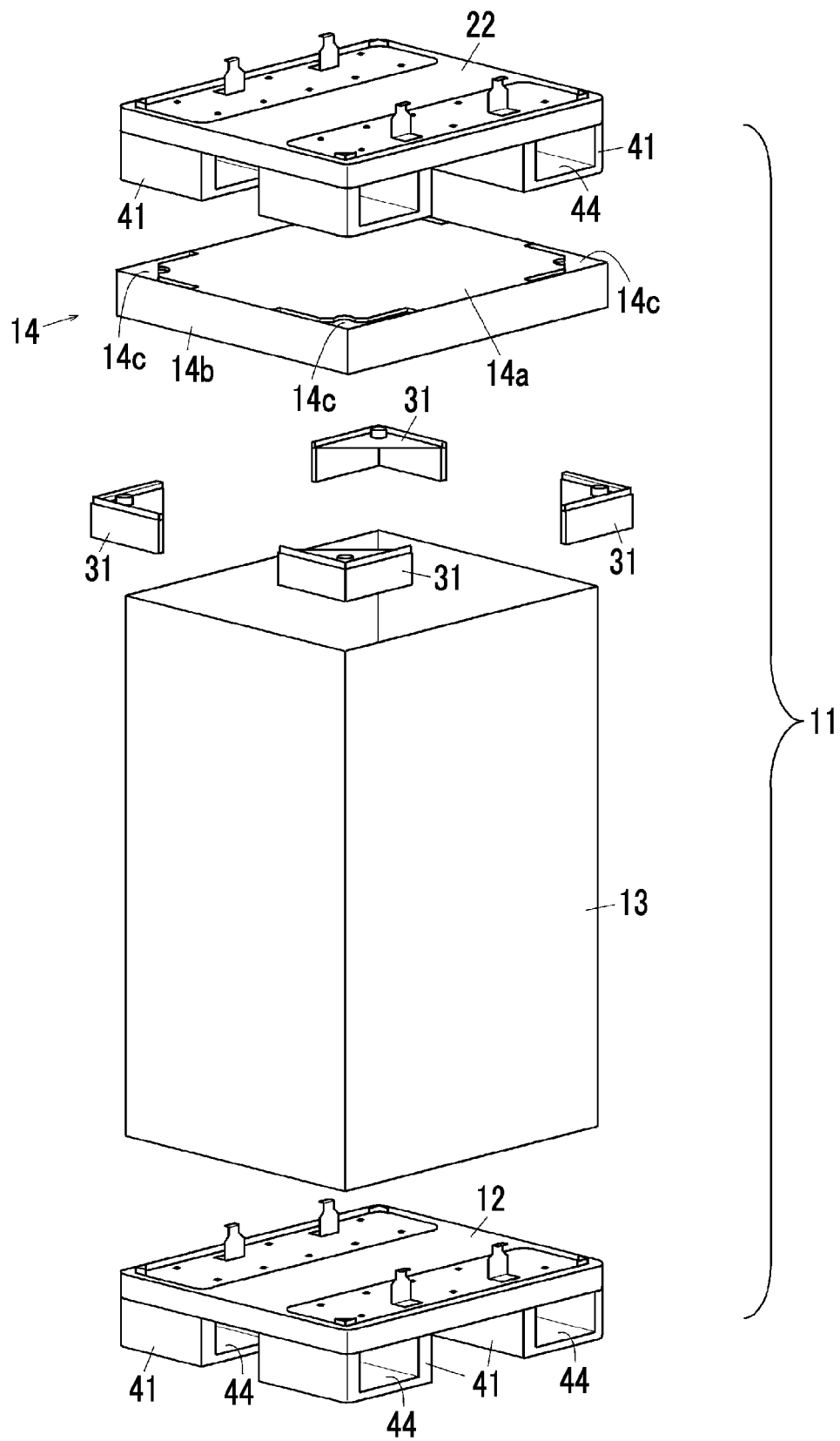


FIG. 3A

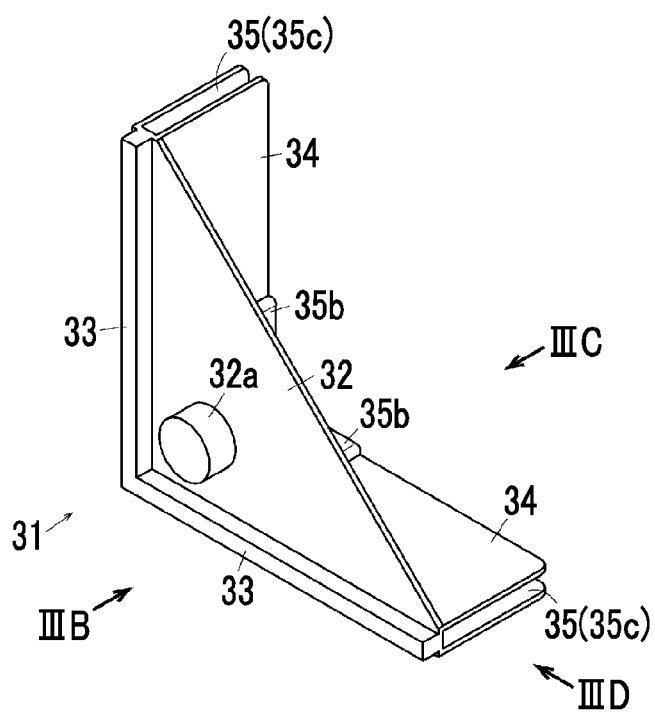


FIG. 3B

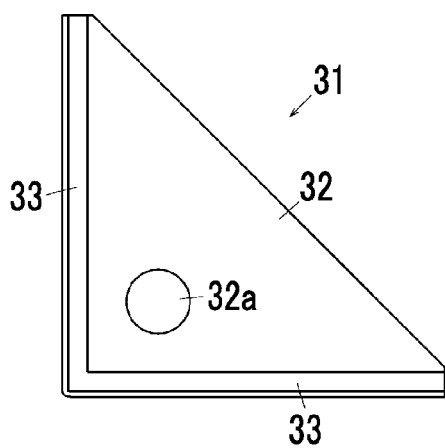


FIG. 3C

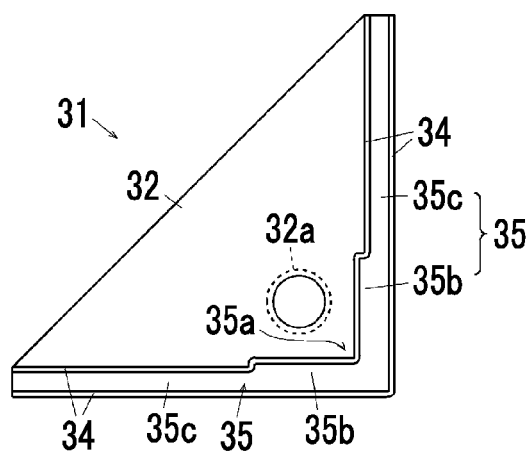


FIG. 3D

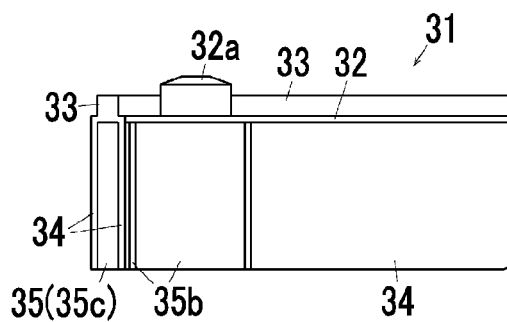


FIG. 4A

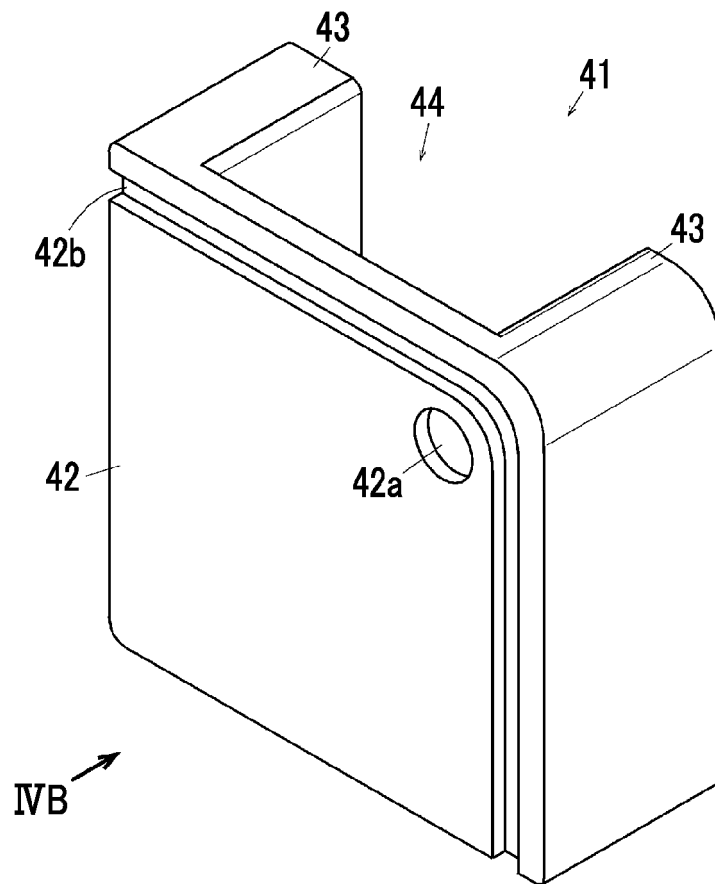


FIG. 4B

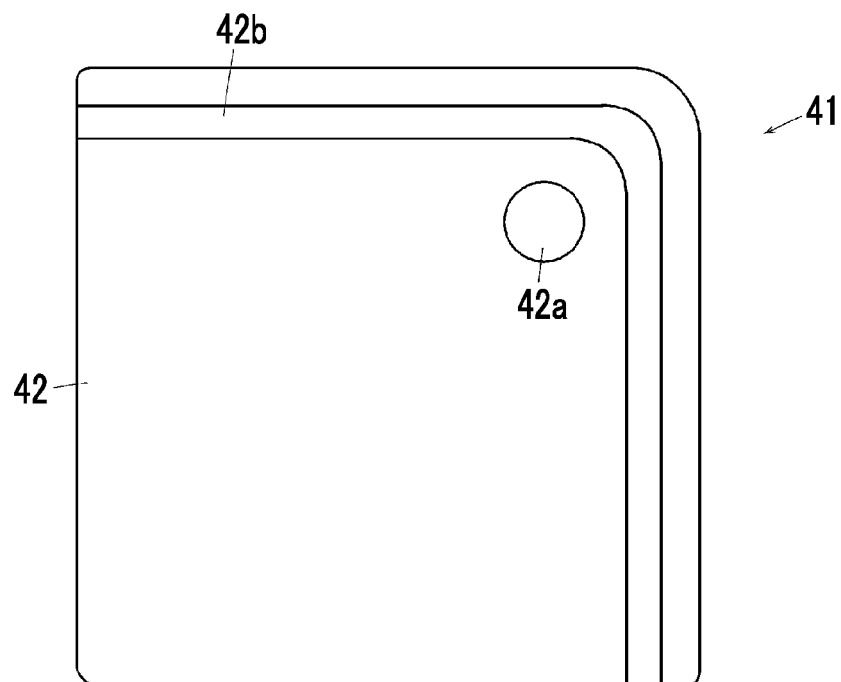


FIG. 5

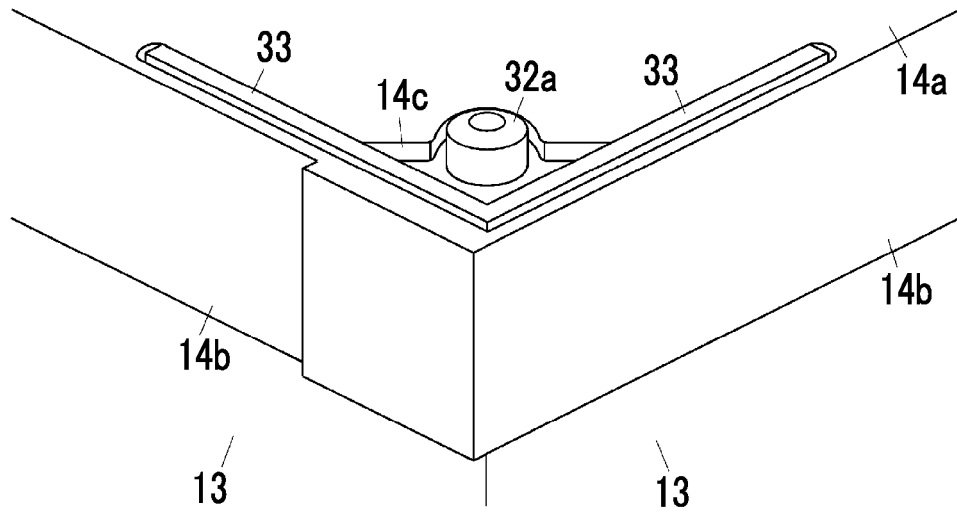


FIG. 6

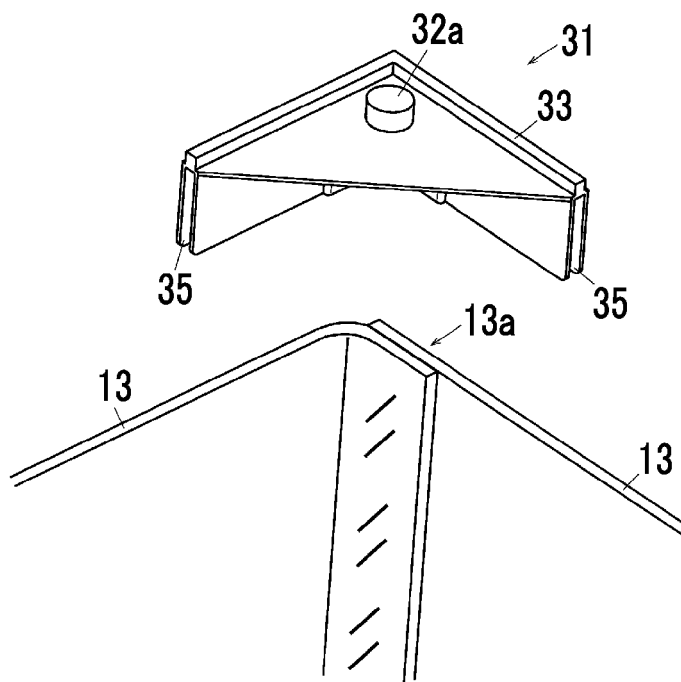
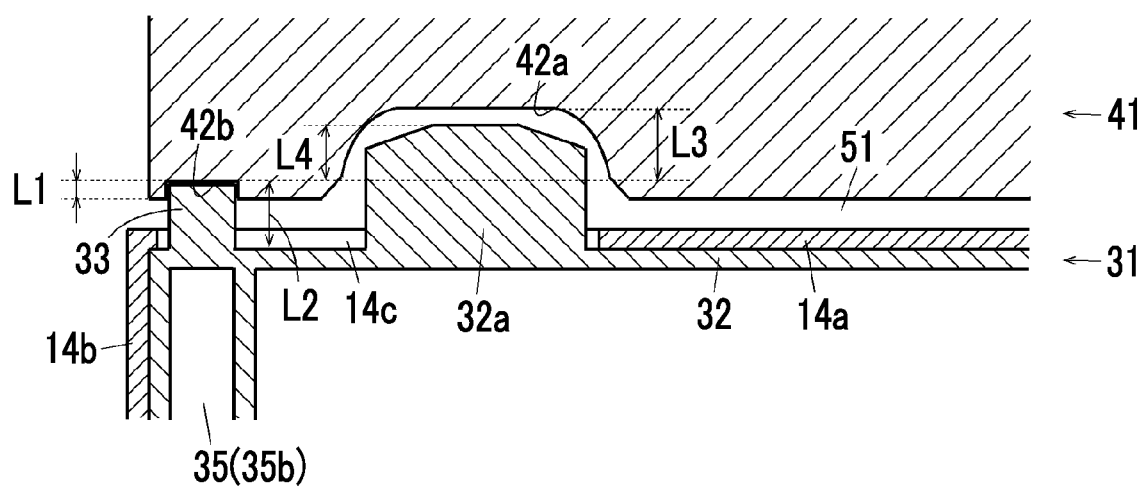


FIG. 7





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