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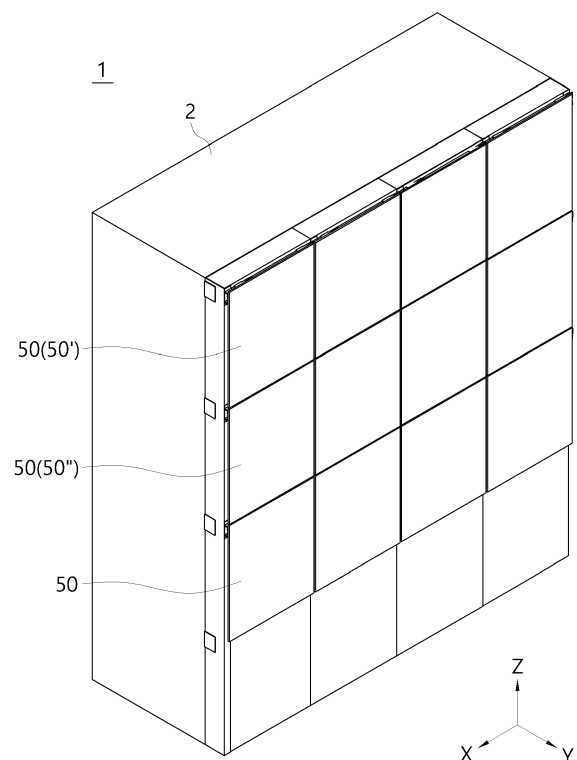
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PANEL STRUCTURE

(57) A panel structure is provided. The panel structure according to an aspect of the present invention includes a plurality of first frames extending in a first direction and spaced apart at predetermined intervals along a second direction perpendicular to the first direction; a plurality of first panel connection members coupled to the first frame; a second panel connection member coupled to the first panel connection member; a panel in which the first panel connection member coupled to one of the two adjacent first frames is fixed to one side, and the second panel connection member coupled to the other of the two adjacent first frames is fixed to the other side; a second frame disposed between the first frame and a wall and extending in the second direction; a first frame bracket coupling the first frame to the second frame; and a second frame bracket that couples the second frame to a surface of the wall in a third direction and whose cross-section perpendicular to the second direction is open toward the third direction so that the second frame can be inserted, wherein the second frame has a thermal insulating material extending in the second direction disposed therein, and the thermal insulating material is disposed between the plurality of second frames.

【FIG. 1】



Description**CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This application claims priority to and the benefit of Korean Patent Application Nos. 10-2022-0180990, filed on December 21, 2022, and 10-2023-0073147, filed on June 07, 2023, the disclosures of which are incorporated herein by reference in its entirety.

[Technical Field]

[0002] The present invention relates to a panel structure, and more particularly, to a panel structure that can be replaceably coupled to a wall of a building.

[Background Art]

[0003] Panels installed on the walls of buildings not only directly protect the walls from the external environment, but also provide thermal insulating and soundproofing effects. Additionally, panels allow the exterior of a building to be improved by replacing the panels even if the wall itself is not repaired.

[0004] In this case, various materials such as stone, metal, and solar panels are used for the panel. Accordingly, a separate structure is installed on the wall to install each panel.

[0005] In the past, there was a problem that welding was performed to install panels on a structure, which could cause a fire accident at a construction site. Accordingly, there is a growing demand for a structure that can install panels on a wall without welding.

[Disclosure]

[Technical Problem]

[0006] The present invention is to solve the above problems and is directed to providing a panel structure that can prevent fire by installing the panel without welding.

[0007] The present invention is directed to providing a panel structure that can easily install a panel and increase the thermal insulating effect.

[0008] The problems of the present invention are not limited to those mentioned above, and other problems not mentioned will be clearly understood by those of ordinary skill in the art from the following description.

[Technical Solution]

[0009] In order to solve such problems, the panel structure according to an aspect of the present invention may include a plurality of first frames extending in a first direction and spaced apart at predetermined intervals along a second direction perpendicular to the first direction; a plurality of first panel connection members coupled to the first frame; a second panel connection member coupled to the first panel connection member; a panel in which the first panel connection member coupled to one of the two adjacent first frames is fixed to one side, and the second panel connection member coupled to the other of the two adjacent first frames is fixed to the other side; a second frame disposed between the first frame and a wall and extending in the second direction; a first frame bracket coupling the first frame to the second frame; and a second frame bracket that couples the second frame to a surface of the wall in a third direction and whose cross-section perpendicular to the second direction is open toward the third direction so that the second frame can be inserted, wherein the second frame has a thermal insulating material extending in the second direction disposed therein, and the thermal insulating material is disposed between the plurality of second frames.

[0010] In this case, the first panel connection member may include a first horizontal plate in contact with a surface of the first frame in the second direction, and a first vertical plate that protrudes from one side of the first horizontal plate and contacts a surface of the first frame in a third direction perpendicular to the first direction and the second direction, and one side of the panel may be fixed to the outer surface of the first vertical plate.

[0011] In this case, the first frame may be formed in a 'C' shape with a cross-section perpendicular to the first direction open toward the third direction and have a protrusion protruding in the second direction, and the first panel connection member may further include a first support part extending from the first vertical plate and contacting a portion or all of a surface of the protrusion in the third direction, and a second support part extending from the first vertical plate and contacting a part or all of a surface of the protrusion in an opposite direction to the third direction.

[0012] In this case, the second support part may be formed as a pair, and the pair of second support parts may be

formed on both sides of the first support part, respectively.

[0013] In this case, the first panel connection member may further include a locking part protruding from the other side of the first horizontal plate and contacting a surface of the first frame in a direction opposite to the third direction, and the locking part may be formed such that its fore end is located closer to the second direction than the second support part.

[0014] In this case, the first panel connection member may further include a connection part extending from the first horizontal plate in a direction opposite to the second direction, and the second panel connection member may include a second vertical plate with one side thereof in contact with a surface of the first frame in the third direction and the panel fixed to the other side thereof, a third support part extending from the second vertical plate and contacting a part or all of the connection part in the third direction, and a fourth support part extending from the second vertical plate and contacting a part or all of a surface of the connection part in an opposite direction to the third direction.

[0015] In this case, the fourth support part may be formed as a pair, and the pair of fourth support parts may be formed on both sides of the third support part, respectively.

[0016] In this case, the connection part may have a surface in the third direction located on a side opposite to the third direction than a surface of the second vertical plate in the third direction.

[0017] In this case, the connection part may be formed on a side of the first vertical plate in the first direction or in a direction opposite to the first direction.

[0018] In this case, the first frame bracket may include a first wing protruding in the second direction of the first frame bracket, a hole may be formed in the first wing, and a screw may be inserted into the hole to fix the first wing to the second frame.

[0019] In this case, the first frame bracket may further include a second wing protruding in a direction opposite to the second direction of the first frame bracket, a hole may be formed in the second wing, and a screw may be inserted into the hole to fix the second wing to the second frame.

[0020] In this case, the second frame may be such that the thermal insulating material is open in the first direction or in a direction opposite to the first direction.

[0021] In this case, the panel may be provided in plural pieces, and a pair of second panel connection members among the plurality of second panel connection members may be respectively fixed to opposing sides of an end in a direction opposite to the second direction of one panel of the plurality of panels, and a pair of one first panel connection members among the plurality of first panel connection members may be respectively fixed to opposing sides of an end in the second direction.

[0022] In this case, a pair of other first panel connection members among the plurality of first panel connection members may be respectively fixed to opposing sides of an end in a direction opposite to the second direction of the other panel of the plurality of panels, and a pair of the other first panel connection members may be respectively coupled to a pair of the one second panel connection members of the one panel.

[0023] In this case, one second vertical plate of the one second panel connection member may be disposed on a side in a direction opposite to the second direction of a connection part of the one first panel connection member.

[Advantageous Effects]

[0024] The panel structure according to an embodiment of the present invention includes a first panel connection member and a second panel connection member to which a panel installed on a wall of a building can be connected, so that the panel can be installed without welding, thereby preventing fire.

[0025] The panel structure according to an embodiment of the present invention includes a second frame and a first frame between a panel and a wall of a building, so that the panel can be easily installed and the thermal insulating effect can be improved.

[0026] Advantageous effects of the present invention are not limited to the above-described effects, and should be understood to include all effects that can be inferred from the configuration of the invention described in the description or claims of the present invention.

[Description of Drawings]

[0027]

FIG. 1 is a perspective view of a panel structure according to an exemplary embodiment of the present invention.

FIG. 2 is a perspective view illustrating a state in which panels of a panel structure according to an exemplary embodiment of the present invention are separated.

FIG. 3 is an enlarged view of part A of FIG. 2.

FIG. 4 is a view illustrating a state in which a first panel connection member and a second panel connection member are combined according to an exemplary embodiment of the present invention.

FIG. 5 is a perspective view of a second frame and a second frame bracket of a panel structure according to an exemplary embodiment of the present invention.

FIG. 6 is a perspective view of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention.

FIG. 7 is a side view of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention.

FIG. 8 is a perspective view of a modified example of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention.

FIG. 9 is a side view of a modified example of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention.

FIG. 10 is a perspective view of a first panel connection member according to an exemplary embodiment of the present invention.

FIG. 11 is a perspective view of a second panel connection member according to an exemplary embodiment of the present invention.

FIG. 12 is a side view illustrating a state in which a first panel connection member and a second panel connection member are coupled to a first frame according to an exemplary embodiment of the present invention.

FIG. 13 is a view illustrating a state in which a first panel connection member and a second panel connection member are fixed to a panel according to an exemplary embodiment of the present invention.

[Modes of the Invention]

[0028] Hereinafter, exemplary embodiments of the present invention will be described in detail so that those of ordinary skill in the art can readily implement the present invention with reference to the accompanying drawings. The present invention may be embodied in many different forms and is not limited to the embodiments set forth herein. In the drawings, parts unrelated to the description are omitted for clarity of description of the present invention, and throughout the specification, same or similar reference numerals denote same elements.

[0029] Terms and words used in the present specification and claims should not be construed as limited to their usual or dictionary definition. They should be interpreted as meaning and concepts consistent with the technical idea of the present invention, based on the principle that inventors may appropriately define the terms and concepts to describe their invention in the best way.

[0030] Accordingly, the embodiments described in the present specification and the configurations shown in the drawings correspond to preferred embodiments of the present invention, and do not represent all the technical idea of the present invention, so the configurations may have various examples of equivalent and modification that can replace them at the time of filing the present invention.

[0031] It should be understood that the terms "comprise" or "have" or the like when used in this specification, are intended to describe the presence of stated features, integers, steps, operations, elements, components and/or a combination thereof but not preclude the possibility of the presence or addition of one or more other features, integers, steps, operations, elements, components, or a combination thereof.

[0032] The presence of an element in/on "front", "rear", "upper or above or top" or "lower or below or bottom" of another element includes not only being disposed in/on "front", "rear", "upper or above or top" or "lower or below or bottom" directly in contact with other elements, but also cases in which another element being disposed in the middle, unless otherwise specified. In addition, unless otherwise specified, that an element is "connected" to another element includes not only direct connection to each other but also indirect connection to each other.

[0033] Hereinafter, a panel structure according to an exemplary embodiment of the present invention will be described with reference to the accompanying drawings. FIG. 1 is a perspective view of a panel structure according to an exemplary embodiment of the present invention. FIG. 2 is a perspective view illustrating a state in which panels of a panel structure according to an exemplary embodiment of the present invention are separated. FIG. 3 is an enlarged view of part A of FIG. 2. FIG. 4 is a view illustrating a state in which a first panel connection member and a second panel connection member are combined according to an exemplary embodiment of the present invention. FIG. 5 is a perspective view of a second frame and a second frame bracket of a panel structure according to an exemplary embodiment of the present invention.

[0034] In this case, in FIG. 1, it will be described by defining the X-axis as a first direction and a right direction, the Y-axis as a third direction and a front direction, and the Z-axis as a second direction and an upward direction.

[0035] As shown in FIG. 1, a panel structure 1 according to an embodiment of the present invention provides a structure for coupling a panel 50 to an outer surface of a wall 2 of a building (not shown). To this end, the panel structure 1 according to an embodiment of the present invention includes a first frame 10, a first frame bracket 20, a second frame 30, a second frame bracket 40, a panel 50, a first panel connection member 60, and a second panel connection member 70.

[0036] As shown in FIG. 2, a plurality of first frames 10 may be provided. In this case, the first frames 10 extends in

the first direction (X), that is, to the right, and is arranged spaced apart at a predetermined interval toward the second direction (Z) perpendicular to the first direction (X), that is, upward.

[0037] As shown in FIG. 3, the plurality of first frames 10 are coupled to the outer surface of the wall 2. In this case, the first frame 10 may be directly coupled to the wall 2, or may be coupled to the wall 2 by the second frame 30. A description of the second frame 30 will be provided later.

[0038] As shown in FIG. 4, the first frame 10 is formed in a 'C' shape with a cross-section perpendicular to the first direction (X) open toward the third direction (Y). To explain this in more detail, the first frame 10 is a section shape steel with a space formed therein, and is formed in a shape that is partly or entirely open along the first direction (X) in the third direction (Y), that is, forward.

[0039] Accordingly, the inner space of the first frame 10 is formed to enable communication with the outside through the third direction (Y). In this case, a protrusion 11 is formed at the fore end of the first frame 10 in the third direction (Y). More specifically, the protrusion 11 protrudes upward from a lower end of the first frame 10 in the third direction (Y).

[0040] In this case, as shown in FIG. 4, the protrusion 11 may further include an additional protrusion 12 protruding downward from an upper end of the first frame 10 in the third direction (Y). By providing such an additional protrusion 12, the first frame 10 can be installed on the wall regardless of the up-down direction of the first frame 10, and the rigidity of the first frame 10 can be further increased.

[0041] The first frame 10 may be directly coupled to the wall 2, but a second frame 30 is disposed between the first frame 10 and the wall 2 to provide a space for insulating between the first frame 10 and the wall 2 and to easily couple the first frame 10 to the wall 2.

[0042] As shown in FIG. 5, the second frame 30 is formed to extend in the second direction (Z). There are no restrictions on the shape of the second frame 30. That is, as long as a surface capable of coupling the first frame 10 is formed in the third direction (Y), there is no limit to the shape and a section shape steel of a known shape can be used.

[0043] In this case, a thermal insulating material 31 may be disposed inside the second frame 30. The thermal insulating material 31 may be made of a material with known thermal insulating properties. The thermal insulating material 31 extends in the second direction (Z), like the second frame 30. In this case, the thermal insulating material 31 can be deformed and inserted into the interior of the second frame 30, so there is no limit to its shape. The fact that the thermal insulating material 31 can be disposed inside the second frame 30 does not mean that the thermal insulating material must be disposed only inside the second frame 30, and although not shown in the drawing, a thermal insulating material may be additionally disposed between the plurality of second frames 30.

[0044] As shown in FIG. 5, the second frame 30 may be formed in a 'C' shape that is open in the first direction (X) or in a direction opposite to the first direction (X). Accordingly, the second frame 30 allows the thermal insulating material 31 to be easily inserted into the interior of the second frame 30 through the open side.

[0045] The second frame 30 may be directly fixed to the wall 2. However, a second frame bracket 40 may be provided to fix the second frame 30 so that the second frame 30 may be easily fixed to the wall 2 with the thermal insulating material 31 inserted into the second frame 30, and thus it may be able to adjust the verticality of the panel 50 even if the wall 2 is not formed flat, and as well as to adjust the construction error of the second frame 30 in the third direction (Y).

[0046] The second frame bracket 40 couples the second frame 30 to the outer surface of the wall 2 facing the outside of the building as the surface of the third direction (Y) side. There is no limitation to the method by which the second frame bracket 40 fixes the second frame 30 to the outer surface of the wall 2.

[0047] In the present embodiment, as shown in FIG. 5, the second frame bracket 40 is formed in a 'C' shape with a cross-section perpendicular to the second direction (Z) open toward the third direction (Y) so that the second frame 30 can be inserted.

[0048] To explain this in more detail, as shown in FIG. 5, the second frame bracket 40 is installed on the outer surface of the wall 2 using known components. If the wall 2 is made of concrete, the second frame bracket 40 may be installed on the wall 2 using an anchor.

[0049] It is preferable that the rear side of the second frame bracket 40, in the direction opposite to the third direction Y, is formed in a shape corresponding to the outer surface of the wall 2.

[0050] Both sides of the second frame bracket 40 are formed in shapes corresponding to the left and right surfaces of the second frame 30. Accordingly, the left and right surfaces of the second frame 30 can be easily coupled to the second frame bracket 40 while being in contact with the inner surface of the second frame bracket 40.

[0051] In addition, when inserting the second frame 30 backward toward the second frame bracket 40, the left and right surfaces of the second frame bracket 40 serve to guide the second frame 30, allowing the operator to easily insert the second frame 30 into the second frame bracket 40.

[0052] Meanwhile, as shown in FIG. 5, when the first direction (X) side of the second frame 30 is open, the non-open side surface of the second frame 30 is fixed to one of the inner left and right surfaces of the second frame bracket 40.

[0053] There is no limitation to the method of coupling the second frame 30 to the second frame bracket 40, and known fixing components can be used. In the present embodiment, with the second frame 30 inserted into the second frame bracket 40, the second frame 30 is fixed to the second frame bracket 40 through a piece.

[0054] FIG. 6 is a perspective view of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention. FIG. 7 is a side view of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention. FIG. 8 is a perspective view of a modified example of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention. FIG. 9 is a side view of a modified example of a first frame bracket of a panel structure according to an exemplary embodiment of the present invention.

[0055] Meanwhile, as shown in FIG. 3, while the second frame 30 is fixed to the wall 2 by the second frame bracket 40, the first frame 10 is coupled to the second frame 30. In this case, the first frame 10 may be directly coupled to the second frame 30, or may be coupled to the second frame 30 through the first frame bracket 20. In the present embodiment, it is described that the first frame 10 is coupled to the second frame 30 by the first frame bracket 20. As in the present embodiment, by providing the first frame bracket 20, the first frame 10 can be stably supported by compensating for rotation or sagging of the first frame 20.

[0056] As shown in FIG. 3, while the second frame 30 is fixed to the wall 2 by the second frame bracket 40, the first frame bracket 20 may couple the first frame 10 to the second frame 30. However, this is a case where the second frame 30 is installed between the wall 2 and the first frame 10, and if the second frame 30 is not placed as necessary, the first frame bracket 20 may directly fix the first frame 10 to the outer surface of the wall 2.

[0057] As shown in FIG. 6, the first frame bracket 20 is formed to cover the top surface, front surface, and bottom surface of the first frame 10. When the first frame 10 is formed of a 'C' shaped section shape steel that is open to the front as described above, the first frame bracket 20 has a 'C' shaped structure that is open to the rear.

[0058] In this case, the first frame bracket 20 includes a first wing 21 protruding upward from the first frame bracket 20. The first wing 21 provides an area where the first frame bracket 20 and the second frame 30 can be fixed, while the first frame bracket 20 covers the top surface, the front surface and the bottom surface of the first frame 10.

[0059] As shown in FIG. 6, a first wing hole 21h is formed in the first wing 21, and a first wing hole screw 21t is inserted into the first wing hole 21h so that the first wing 21 is fixed to the second frame 30. Through this, the first frame 10 can be fixed to the second frame 30 without welding the first frame bracket 20 to the second frame 30.

[0060] In this case, as shown in FIG. 7, the first frame bracket 20 may further include a second wing 22 protruding downward from the first frame bracket 20. The second wing 22 is preferably formed symmetrically with the first wing 21, but is not limited thereto. In this case, a second wing hole screw 22t is inserted into a second wing hole 22h formed in the second wing 22 so that the second wing 22 is also fixed to the second frame 30.

[0061] By using the first wing 21 and the second wing 22, the first frame 10 can be stably fixed to the second frame 30 through the first frame bracket 20, and the shape of the first frame bracket 20 is simple, making it easy to manufacture.

[0062] However, as shown in FIG. 8, in the case of the first frame bracket 20 for fixing the first frame 10 disposed at the bottom of the second frame 30 to the second frame 30, the second wing 22 may not be provided. This is because when the first frame 10 disposed at the bottom of the second frame 30 is provided with the second wing 22, the second wing 22 may be exposed to the outside by protruding lower than the bottom of the second frame 30.

[0063] In this case, in FIG. 8, the description was made on the assumption that the first frame 10 is placed at the lower end of the second frame 30 as an example, but even in the case where the first frame 10 is placed at the upper end of the second frame 30, the same application may be applied except that the direction in which the first frame bracket 20 is placed is different.

[0064] When the first frame 10 disposed at the lower end of the second frame 30 can be installed at a predetermined height from the ground, that is, when the first frame 10 disposed at the lower end of the second frame 30 is not disposed at the bottom of the second frame 30, there is no need to use the first frame bracket 20 without the second wing 22.

[0065] As shown in FIG. 8, in the case of the first frame bracket 20 without the second wing 22, in order to firmly fix the first frame 10, the first frame 10 is fixed to the second frame 30 through the first wing hole 21h formed in the first wing 21 and a first frame bracket hole 20h formed in the body of the first frame bracket 20.

[0066] As shown in FIG. 9, a first frame bracket hole screw 20t inserted into the first frame bracket hole 20h formed in the body of the first frame bracket 20 disposed at the bottom of the second frame 30 penetrates and is fixed to the protrusion 11 of the first frame 10. Through this, the protrusion 11 provides a structure that can be combined with a first panel connection member 60, which will be described later, and at the same time provides a structure in which the first frame bracket hole screw 20t inserted through the first frame bracket hole 20h formed in the body of the first frame bracket 20 can fix the first frame bracket 20 and the first frame 10.

[0067] In this case, in FIG. 9, it was described that the first frame 10 disposed at the end of the second frame 30 is placed at the lower end of the second frame 30 as an example, but even in the case where the first frame 10 is placed at the upper end of the second frame 30, the same application may be applied except that the direction in which the first frame bracket 20 is placed is different.

[0068] FIG. 10 is a perspective view of a first panel connection member according to an exemplary embodiment of the present invention. FIG. 11 is a perspective view of a second panel connection member according to an exemplary embodiment of the present invention. FIG. 12 is a side view illustrating a state in which a first panel connection member and a second panel connection member are coupled to a first frame according to an exemplary embodiment of the

present invention. FIG. 13 is a view illustrating a state in which a first panel connection member and a second panel connection member are fixed to a panel according to an exemplary embodiment of the present invention.

[0069] Meanwhile, as shown in FIG. 2, the first panel connection member 60 is coupled to the first frame 10. In this case, a plurality of first panel connection member 60 are provided. The plurality of first panel connection members 60

are coupled to the plurality of first frames 10 by the necessary number.

[0070] As shown in FIG. 10, the first panel connection member 60 includes a first horizontal plate 62. As shown in FIG. 12, the first horizontal plate 62 is in contact with the surface of the second direction (Z) side, that is, the top surface, of the first frame 10.

[0071] The shape of the first horizontal plate 62 is not limited, as long as it can cover the top surface of the first frame 10. The first horizontal plate 62 is fixed to the first frame 10. To this end, as shown in FIG. 10, a first horizontal plate hole 62h is formed in the first horizontal plate 62, and the first panel connection member 60 may be fixed to the first frame 10 by inserting a first horizontal plate hole screw 62t into the first horizontal plate hole 62h.

[0072] The first horizontal plate 62 may extend in the first direction (X). In this case, a plurality of first horizontal plate holes 62h may be formed in the first horizontal plate 62. In the present embodiment, it is described that one is formed on the left and right, respectively.

[0073] A first vertical plate 61 protruding downward is provided on the front side of the first horizontal plate 62. The first vertical plate 61 covers the front surface of the first frame 10. To this end, as shown in FIG. 12, it extends downwards at least up to the protrusion 11.

[0074] The first vertical plate 61 is disposed to contact the front surface of the first frame 10. In this case, as shown in FIG. 10, a first vertical plate hole 61h is formed in the first vertical plate 61, and the first vertical plate 61 may be coupled to the panel 50, which will be described later, by inserting a first vertical plate hole screw 61t into the first vertical plate hole 61h.

[0075] As shown in FIG. 10, the first panel connection member 60 includes a first support part 65 and a second support part 66 extending downward from the first vertical plate 61.

[0076] The first support part 65 is formed integrally with the first vertical plate 61 and extends lower than the first vertical plate 61. Accordingly, as shown in FIG. 12, the first support part 65 comes into contact with the front surface of the protrusion 11.

[0077] As shown in FIG. 10, the second support part 66 is also formed integrally with the first vertical plate 61. It extends lower than the first vertical plate 61, but unlike the first support part 65, the second support part 66 is bent toward the inside of the first frame 10.

[0078] In this case, as long as the second support part 66 is bent toward the inside of the first frame 10 and the second support part 66 can support a part or all of the inner surface of the protrusion 11 of the first frame 10, there is no limit to the shape in which the second support part 66 is bent. For example, the second support part 66 may be bent once and the second support part 66 may be formed to support the upper end of the protrusion 11.

[0079] However, in the present embodiment, as shown in FIG. 12, it is described that the second support part 66 is bent twice. To explain this in more detail, the second support part 66 may be formed by being bent backward from the first vertical plate 61 and then bent forward again. Accordingly, the front surface of the second support part 66 may come into contact with the rear surface of the protrusion 11.

[0080] As shown in FIG. 12, the protrusion 11 may remain positioned between the second support part 66 and the first support part 65 of the first panel connection member 60 by the load of the panel 50 described later and the shape of the first panel connection member 60.

[0081] In addition, the second support part 66 and the first support part 65 also serve to guide in a process of structurally coupling the first panel connection member 60 to the first frame 10 before fixing the first panel connection member 60 using screws.

[0082] In this case, as shown in FIG. 10, the second support part 66 may be formed as a pair. It is preferable that the pair of second support parts 66 are formed on both sides of the first support part 65.

[0083] Through this, the pair of second support parts 66 are formed symmetrically on both sides of the first support part 65, thereby preventing the first panel connection member 60 from rotating in one direction during the coupling process.

[0084] The second support part 66 and the first support part 65 may be formed by cutting a plate integrally with the first vertical plate 61. Through this, not only may the structures of the second support part 66 and the first support part 65 be easily manufactured, but also the first panel connection member 60 may be manufactured with a minimum amount of material.

[0085] Meanwhile, as shown in FIG. 10, the first panel connection member 60 includes a locking part 64 protruding downward from the rear side of the first horizontal plate. As shown in FIG. 12, the locking part 64 is disposed opposite to the first vertical plate 61 with the first frame 10 in the center.

[0086] The locking part 64 comes into contact with the rear surface of the first frame 10. Accordingly, the top surface of the first frame 10 is in contact with the first horizontal plate 62, the front surface of the first frame 10 is in contact with the first vertical plate 61, and the rear surface of the first frame 10 is in contact with the locking part 64, whereby the first

panel connection member 60 may be locked and coupled with the first frame 10. That is, by providing the locking part 64, it is possible to prevent the first panel connection member 60 from being separated forward due to the load of the panel 50, which will be described later.

[0087] As shown in FIG. 12, the locking part 64 protrudes downward so that its lower end is located above the second support part 66. Through this, it is possible to prevent from being disturbed by the locking part 64 in the process of inserting the second support part 66 into the first frame 10.

[0088] Meanwhile, as shown in FIG. 10, the first panel connection member 60 includes a connection part 63 extending upward from the first horizontal plate 62. The connection part 63 may be integrally formed with the first horizontal plate 62.

[0089] When the connection part 63 is formed by extending the first horizontal plate 62 in the first direction (X) or in a direction opposite to the first direction (X), it may be formed to protrude upward from the extended portion of the first horizontal plate 62.

[0090] That is, the connection part 63 is located in parallel with the first vertical plate 61 in the first direction (X). Accordingly, the connection part 63 can be formed by bending a portion of the front of the first vertical plate 61. Through this, not only can the connection part 63 be easily manufactured, but it is also possible to manufacture the first panel connection member 60 by minimizing the material.

[0091] As shown in FIG. 12, as for the connection part 63, the front surface of the connection part 63 is located rearward than the front surface of the second vertical plate 71. More specifically, the front surface of the connection part 63 is located rearward than the front surface of the second vertical plate 71 of the second panel connection member 70, which will be described later, by the front-rear direction thickness d of the second vertical plate 71.

[0092] Accordingly, the third direction (Y) surface of the second vertical plate 71 and the third direction (Y) surface of the first vertical plate 61 are located on the same plane. That is, the panel 50 coupled to the second panel connection member 70 and the first panel connection member 60 can be arranged parallel to the front surfaces of the second frame 30 and the first frame 10. In addition, the outer surface of the panel 50 coupled to the first frame 10 in the up-down direction can be arranged on the same plane.

[0093] As shown in FIG. 12, the second panel connection member 70 is coupled to the first frame 10 by being coupled to the first panel connection member 60. To this end, the second panel connection member 70 includes a second vertical plate 71.

[0094] The panel 50 is fixed to the front surface of the second vertical plate 71. There is no limit to the shape of the second vertical plate 71 as long as it is formed in the shape of a plate having a predetermined thickness.

[0095] As shown in FIG. 11, a second vertical plate hole 71h is formed in the second vertical plate 71, and a second vertical plate hole screw 71t is inserted into the second vertical plate hole 71h so that the second vertical plate 71 is fixed to the panel 50. There is no limit to the number of second vertical plate holes 71h formed in the second vertical plate 71. In the present embodiment, in order to prevent the second vertical plate 71 fixed to the panel 50 from rotating, a pair of second vertical plate holes 71h are formed in the left-right direction.

[0096] As shown in FIG. 11, the second panel connection member 70 includes a third support part 72 and a fourth support part 73 to be coupled to the first panel connection member 60.

[0097] As shown in FIG. 12, the third support part 72 extends downward from the second vertical plate 71 and contacts the front surface of the connection part 63 of the first panel connection member 60 in the third direction (Y). The third support part 72 may be integrally formed with the second vertical plate 71.

[0098] As shown in FIG. 11, the fourth support part 73 is also formed integrally with the second vertical plate 71. The fourth support part 73 also extends lower than the second vertical plate 71, but unlike the third support part 72, the fourth support part 73 is bent toward the rear of the connection part 63.

[0099] In this case, as long as the fourth support part 73 is bent toward the rear of the connection part 63 and the second support part 66 can support a part or all of the rear surface of the connection part 63 of the first panel connection member 60, there is no limit to the shape in which the fourth support part 73 is bent. For example, the fourth support part 73 may be bent once and the fourth support part 73 may be formed to support the rear upper end of connection part 63. Through this, in the process of coupling the second vertical plate 71 by moving the second vertical plate 71 from the upper side to the lower side of the connection part 63, the operator may easily allow the connection part 63 to be positioned between the fourth support part 73 and the third support part 72.

[0100] However, in the present embodiment, as shown in FIG. 12, it is described that the fourth support part 73 is bent twice. The fourth support part 73 may be formed by being bent backward from the second vertical plate 71 and then bent forward again. Accordingly, the front surface of the fourth support part 73 may come into contact with the rear surface of the connection part 63.

[0101] As shown in FIG. 12, the connection part 63 may remain positioned between the fourth support part 73 and the third support part 72 of the second panel connection member 70 by the load of the panel 50 described later and the shape of the second panel connection member 70.

[0102] In this case, as shown in FIG. 11, the fourth support part 73 may be formed as a pair. It is preferable that the pair of fourth support parts 73 are formed on both sides of the third support part 72.

[0103] Through this, the pair of fourth support parts 73 are formed symmetrically on both sides of the third support part 72, thereby preventing the second panel connection member 70 from rotating in one direction during the coupling process.

[0104] The fourth support part 73 and the third support part 72 may be formed by cutting a plate integrally with the second vertical plate 71. Through this, not only may the structures of the fourth support part 73 and the third support part 72 be easily manufactured, but also the second panel connection member 70 may be manufactured with a minimum amount of material.

[0105] Meanwhile, as shown in FIG. 13, in order to couple the panel 50 to the first frame 10, the first panel connection member 60 and the second panel connection member 70 are coupled to the panel 50.

[0106] In this case, the position or number of the first panel connection member 60 and the second panel connection member 70 fixed on the panel 50 may vary depending on the shape of the panel 50. In addition, depending on the type of the panel 50, the panel 50 may be coupled in a variety of ways known to the front surface of the first vertical plate 61 of the first panel connection member 60 and the front surface of the second vertical plate 71 of the second panel connection member 70. For example, it may be fastened using an adhesive or using a screw, as described above.

[0107] In the present embodiment, the panel 50 is formed in a rectangular plate shape, as shown in FIG. 13, and a pair of first panel connection members 60 are fixed to the upper part of the panel 50 and a pair of second panel connection members 70 are fixed to the lower part of the panel 50 in order to couple the upper and lower parts of the panel 50 to the first frame 10.

[0108] In this case, in order to stably support the panel 50, the pair of first panel connection members 60 are placed on opposing sides of the upper part of the panel 50, and the pair of second panel connection members 70 are placed on opposing sides of the lower part of the panel 50.

[0109] Meanwhile, the positional and coupling relationship between the first panel connection member 60 and the second panel connection member 70 fixed to the panel 50 will be described as follows.

[0110] As shown in FIGS. 2 and 3, the first panel connection member 60 fixed to the upper part of the panel 50 is defined as one first panel connection member 60'. It will be described that the first frame 10 to which the one first panel connection member 60' is coupled is defined as one first frame 10', and the first frame 10 disposed on a lower side adjacent to one first frame 10' is defined as the other first frame 10".

[0111] As shown in FIGS. 1 and 2, it will be described that the panel 50 to which one first panel connection member 60' is fixed is defined as one panel 50', and the panel 50 disposed on a lower side adjacent to one panel 50' is defined as the other panel 50". In this case, the first panel connection member 60 fixed to the upper part of the other panel 50" is defined as the other first panel connection member 60", and the other first panel connection member 60" is coupled to the other first frame 10".

[0112] A pair of second panel connection members 70 of the one panel 50' are coupled to a pair of the other first panel connection members 60" of the other panel 50", respectively. That is, the connection part 63 of the other first panel connection member 60" is inserted between the fourth support part 73 and the third support part 72 of the second panel connection member 70.

[0113] To this end, as shown in FIG. 13, the second vertical plate 71 of the second panel connection member 70 fixed to one panel 50' is disposed in the opposite direction of the second direction (Z), that is, lower side, of one connection part 63 of one first panel connection member 60'.

[0114] As described above, preferred embodiments according to the present invention have been examined, and it is obvious to those skilled in the art that the present invention can be embodied in other specific forms without departing from the spirit or scope of the present invention in addition to the above-described embodiments. Therefore, the above-described embodiments are to be construed as illustrative rather than restrictive, and accordingly, the present invention is not limited to the above description and may be modified within the scope of the appended claims and their equivalents.

[Description of Symbols]

[0115]

1	panel structure	60	first panel connection member
2	wall	61	first vertical plate
10	first frame	61h	first vertical plate hole
11	protrusion	61t	first vertical plate hole screw
12	additional protrusion	62	first horizontal plate
20	first frame bracket	62h	first horizontal plate hole
20h	first frame bracket hole	62t	first horizontal plate hole screw
20t	first frame bracket hole screw	63	connection part

(continued)

	21	first wing	64	locking part
	21h	first wing hole	65	first support part
5	21t	first wing hole screw	66	second support part
	22	second wing	70	second panel connection member
	22h	second wing hole	71	second vertical plate
	22t	second wing hole screw	71h	second vertical plate hole
10	30	second frame	71t	second vertical plate hole screw
	31	thermal insulating material	72	third support part
	40	second frame bracket	73	fourth support part
	50	panel		

Claims

1. A panel structure, comprising:

a plurality of first frames extending in a first direction and spaced apart at predetermined intervals along a second direction perpendicular to the first direction;
a plurality of first panel connection members coupled to the first frame;
a second panel connection member coupled to the first panel connection member;
a panel in which the first panel connection member coupled to one of the two adjacent first frames is fixed to one side, and the second panel connection member coupled to the other of the two adjacent first frames is fixed to the other side;
a second frame disposed between the first frame and a wall and extending in the second direction;
a first frame bracket coupling the first frame to the second frame; and
a second frame bracket that couples the second frame to a surface of the wall in a third direction and whose cross-section perpendicular to the second direction is open toward the third direction so that the second frame can be inserted,
wherein the second frame has a thermal insulating material extending in the second direction disposed therein, and the thermal insulating material is disposed between the plurality of second frames.

2. The panel structure of claim 1,

wherein the first panel connection member comprises a first horizontal plate in contact with a surface of the first frame in the second direction, and a first vertical plate that protrudes from one side of the first horizontal plate and contacts a surface of the first frame in a third direction perpendicular to the first direction and the second direction, and
one side of the panel is fixed to the outer surface of the first vertical plate.

3. The panel structure of claim 2,

wherein the first frame is formed in a 'C' shape with a cross-section perpendicular to the first direction open toward the third direction and has a protrusion protruding in the second direction, and
the first panel connection member further comprises a first support part extending from the first vertical plate and contacting a portion or all of a surface of the protrusion in the third direction, and a second support part extending from the first vertical plate and contacting a part or all of a surface of the protrusion in an opposite direction to the third direction.

4. The panel structure of claim 3,

wherein the second support part is formed as a pair, and
the pair of second support parts are formed on both sides of the first support part, respectively.

5. The panel structure of claim 3,

wherein the first panel connection member further comprises a locking part protruding from the other side of the first horizontal plate and contacting a surface of the first frame in a direction opposite to the third direction, and the locking part is formed such that its fore end is located closer to the second direction than the second support part.

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6. The panel structure of claim 2,

wherein the first panel connection member further comprises a connection part extending from the first horizontal plate in a direction opposite to the second direction, and
10 the second panel connection member comprises a second vertical plate with one side thereof in contact with a surface of the first frame in the third direction and the panel fixed to the other side thereof, a third support part extending from the second vertical plate and contacting a part or all of the connection part in the third direction, and a fourth support part extending from the second vertical plate and contacting a part or all of a surface of the connection part in an opposite direction to the third direction.

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7. The panel structure of claim 6,

wherein the fourth support part is formed as a pair, and
20 the pair of fourth support parts are formed on both sides of the third support part, respectively.

8. The panel structure of claim 6, wherein the connection part has a surface in the third direction located on a side opposite to the third direction than a surface of the second vertical plate in the third direction.

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9. The panel structure of claim 6, wherein the connection part is formed on a side of the first vertical plate in the first direction or in a direction opposite to the first direction.

10. The panel structure of claim 1,

wherein the first frame bracket comprises a first wing protruding in the second direction of the first frame bracket,
30 a hole is formed in the first wing, and
a screw is inserted into the hole to fix the first wing to the second frame.

11. The panel structure of claim 10,

wherein the first frame bracket further comprises a second wing protruding in a direction opposite to the second direction of the first frame bracket,
35 a hole is formed in the second wing, and
a screw is inserted into the hole to fix the second wing to the second frame.

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12. The panel structure of claim 1, wherein the second frame is such that the thermal insulating material is open in the first direction or in a direction opposite to the first direction.

13. The panel structure of claim 1,

wherein the panel is provided in plural pieces, and
45 a pair of second panel connection members among the plurality of second panel connection members are respectively fixed to opposing sides of an end in a direction opposite to the second direction of one panel of the plurality of panels, and a pair of one first panel connection members among the plurality of first panel connection members are respectively fixed to opposing sides of an end in the second direction.

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14. The panel structure of claim 13,

wherein a pair of other first panel connection members among the plurality of first panel connection members are respectively fixed to opposing sides of an end in a direction opposite to the second direction of the other panel of the plurality of panels, and
55 a pair of the other first panel connection members are respectively coupled to a pair of the one second panel connection members of the one panel.

- 15.** The panel structure of claim 13, wherein one second vertical plate of the one second panel connection member is disposed on a side in a direction opposite to the second direction of a connection part of the one first panel connection member.

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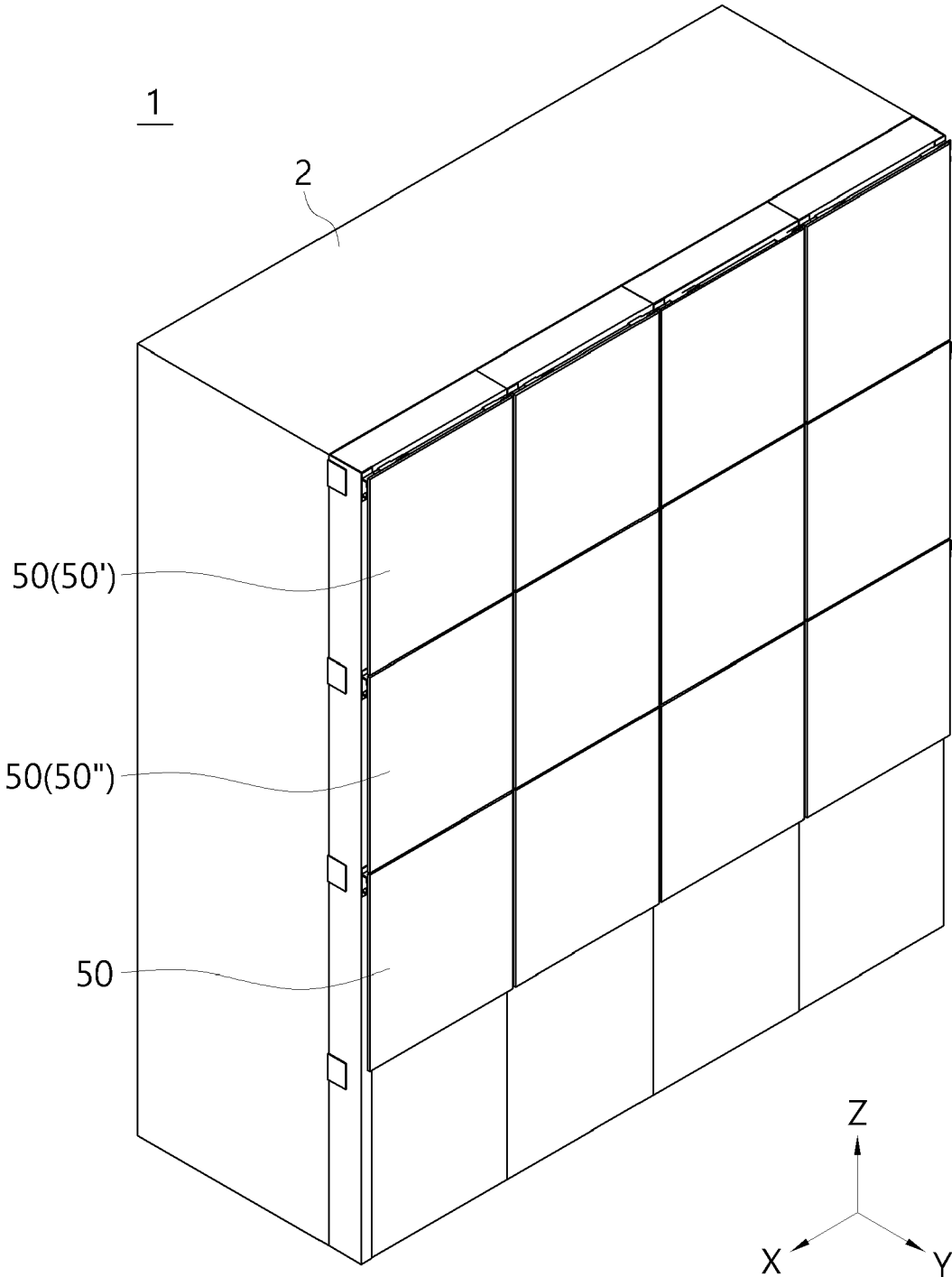
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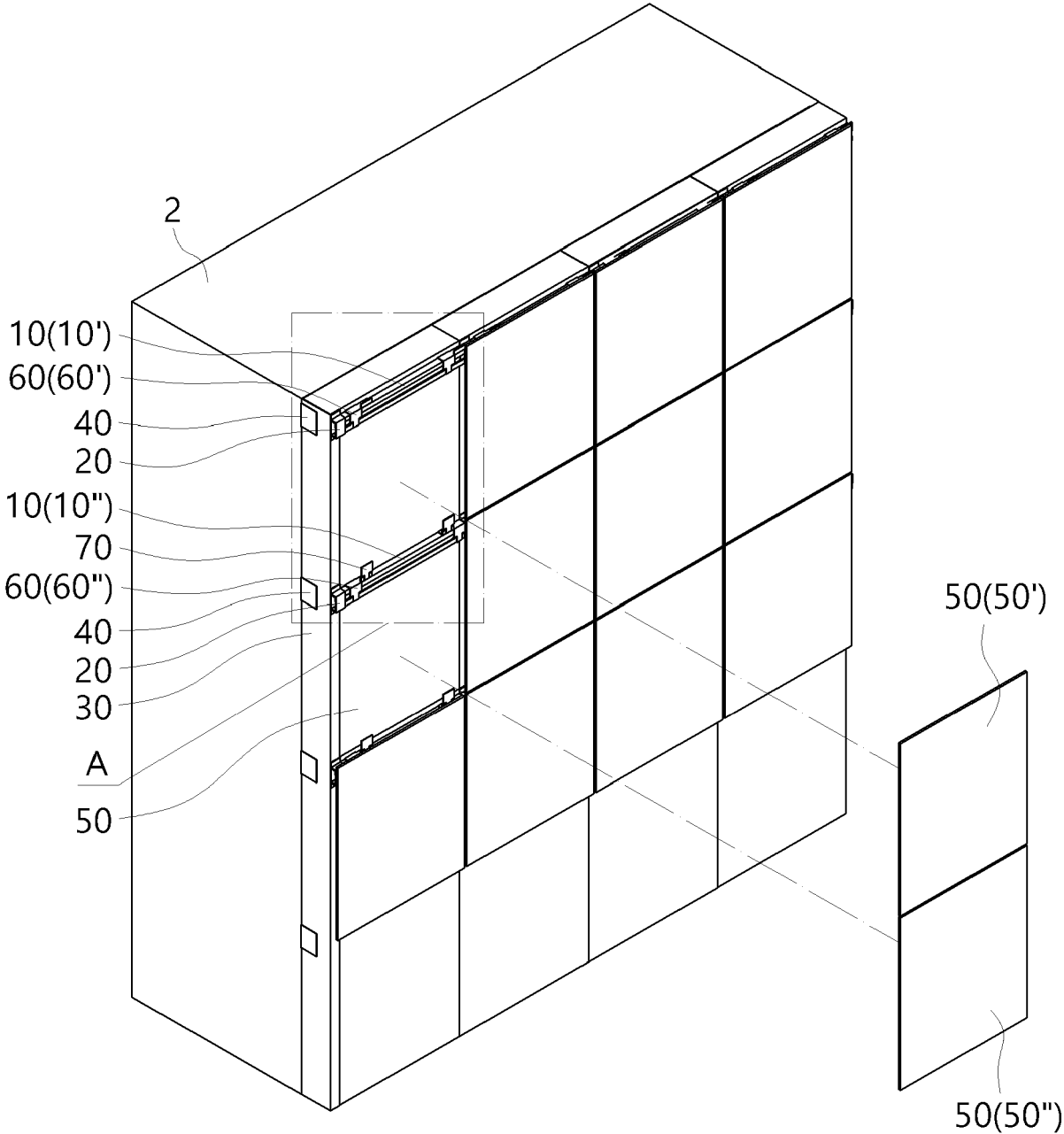
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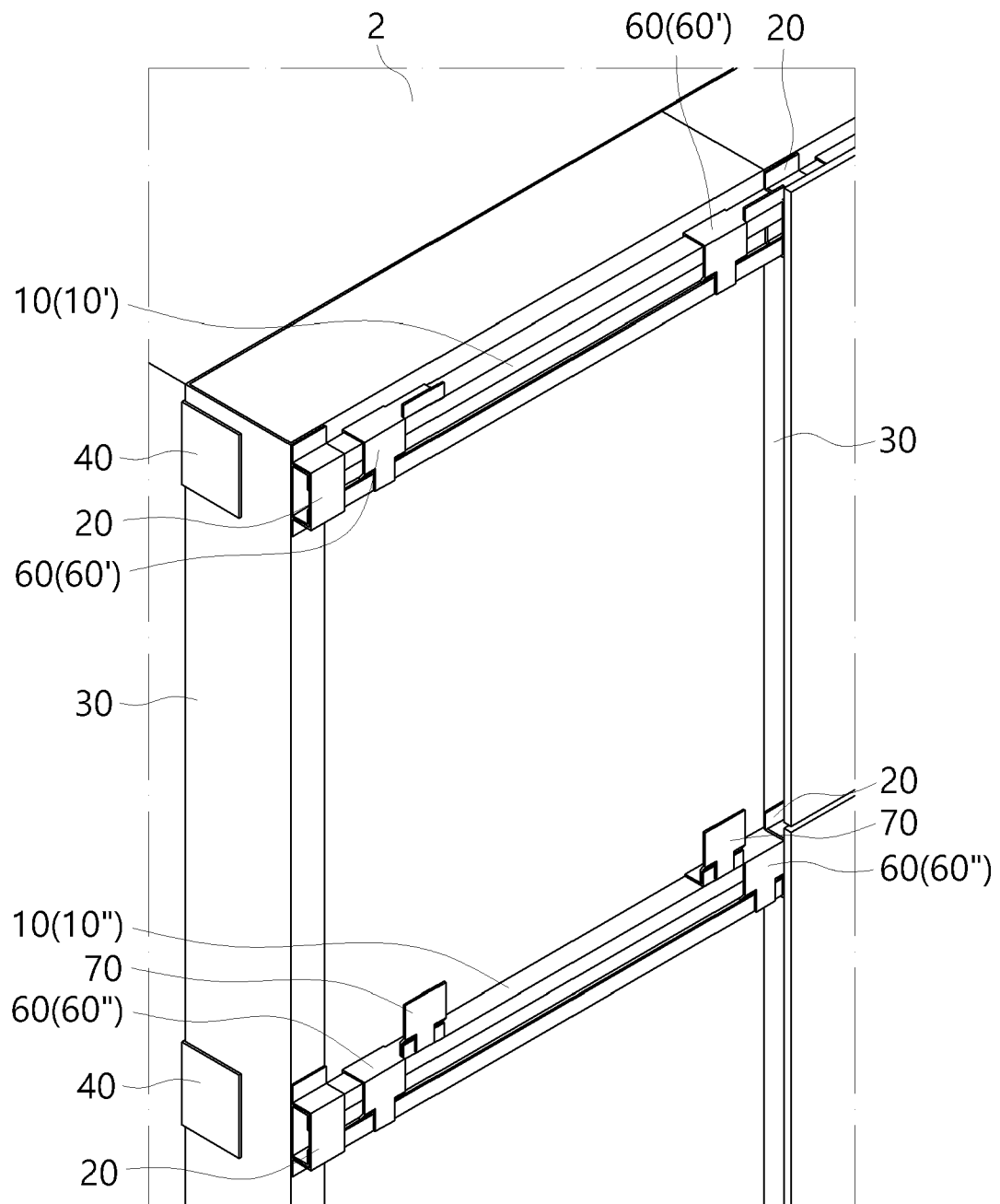
【FIG. 1】



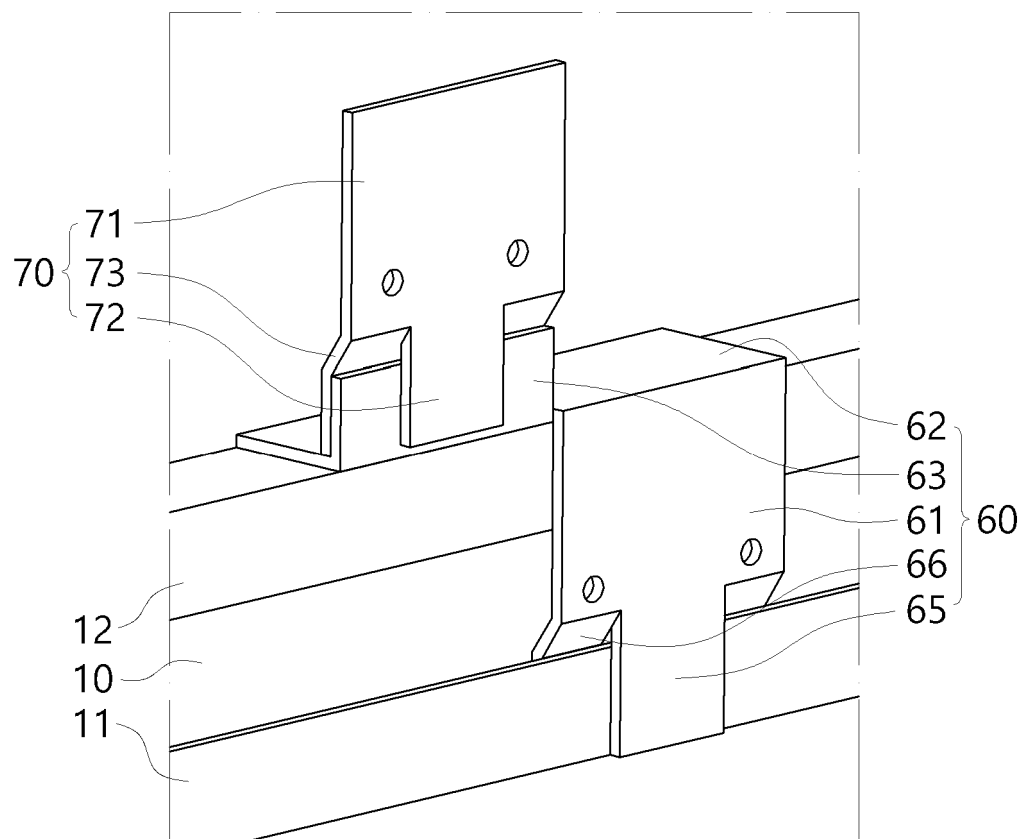
【FIG. 2】



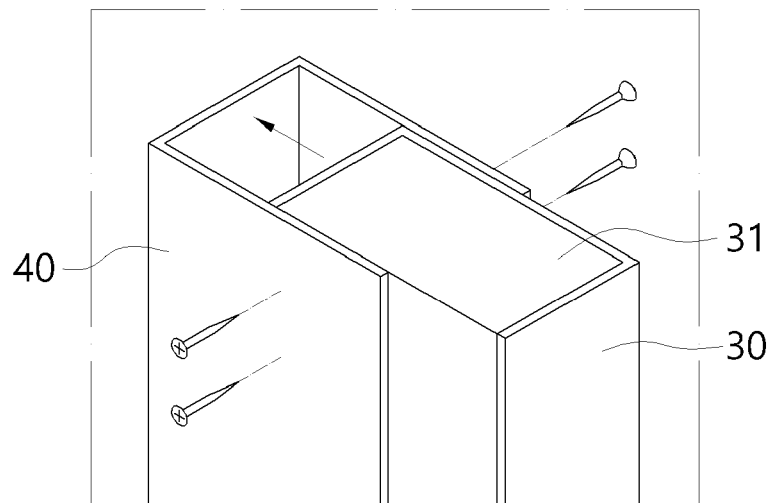
【FIG. 3】



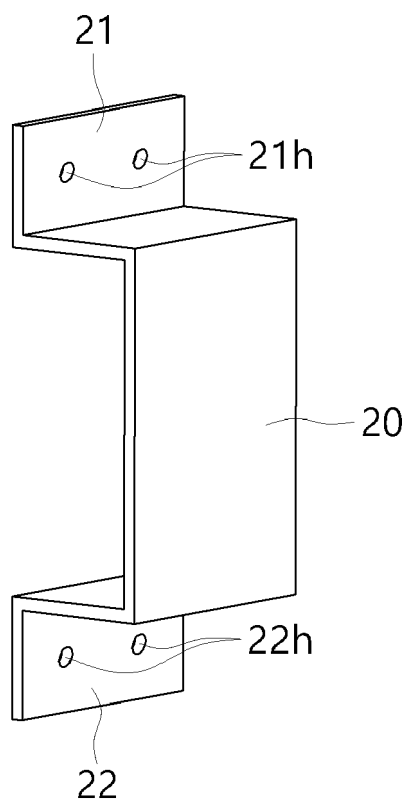
【FIG. 4】



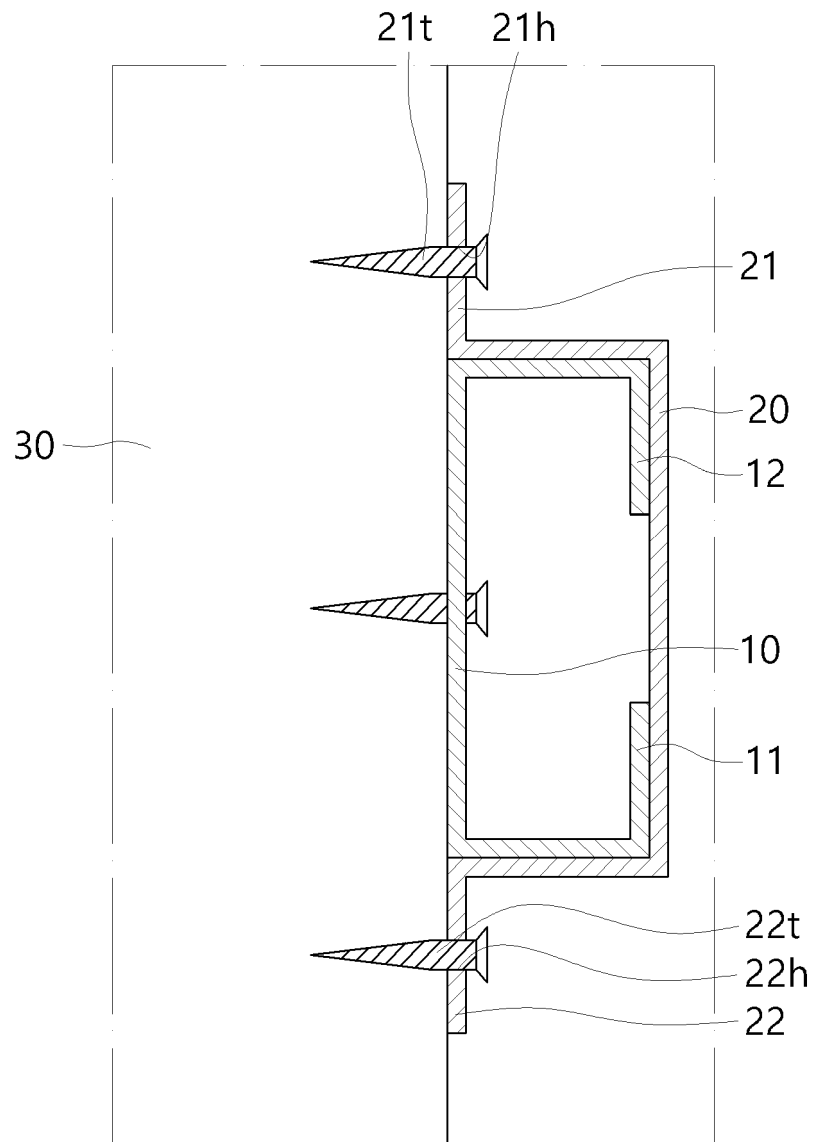
【FIG. 5】



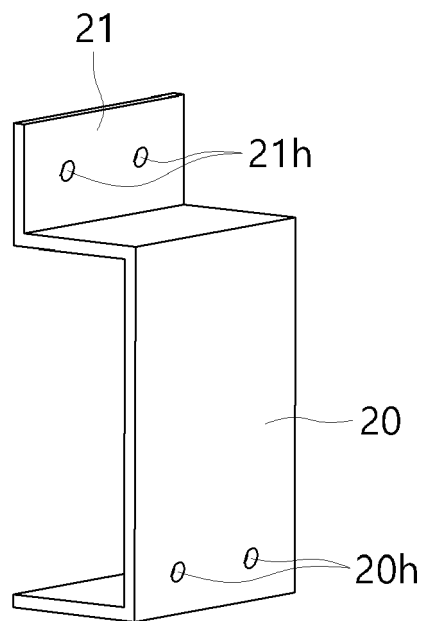
【FIG. 6】



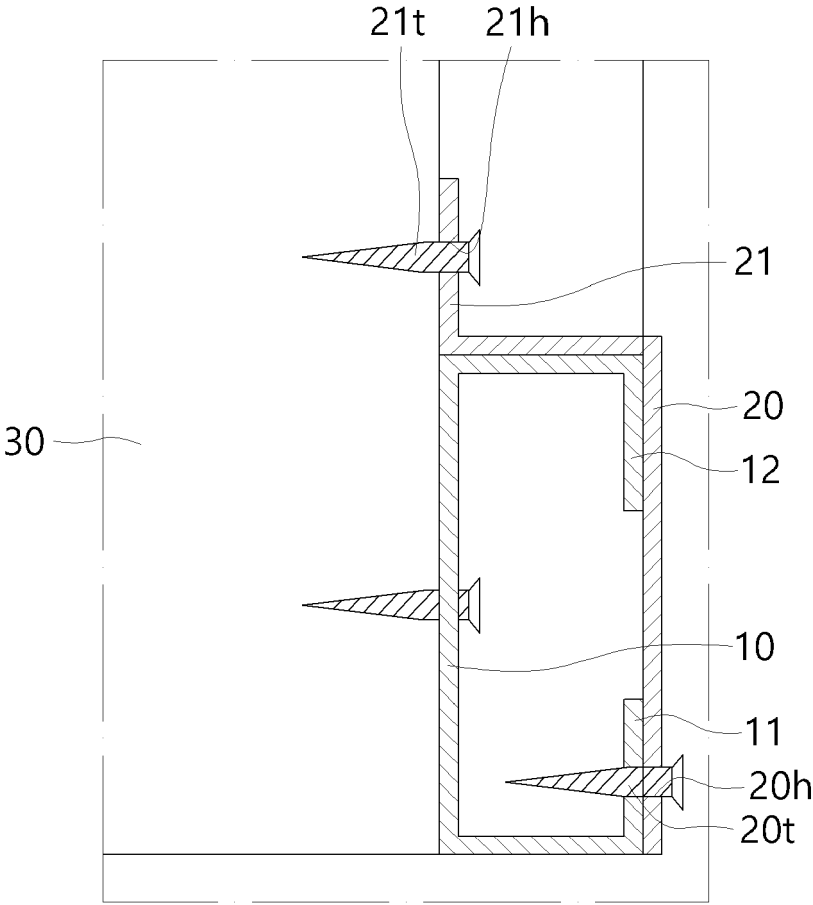
【FIG. 7】



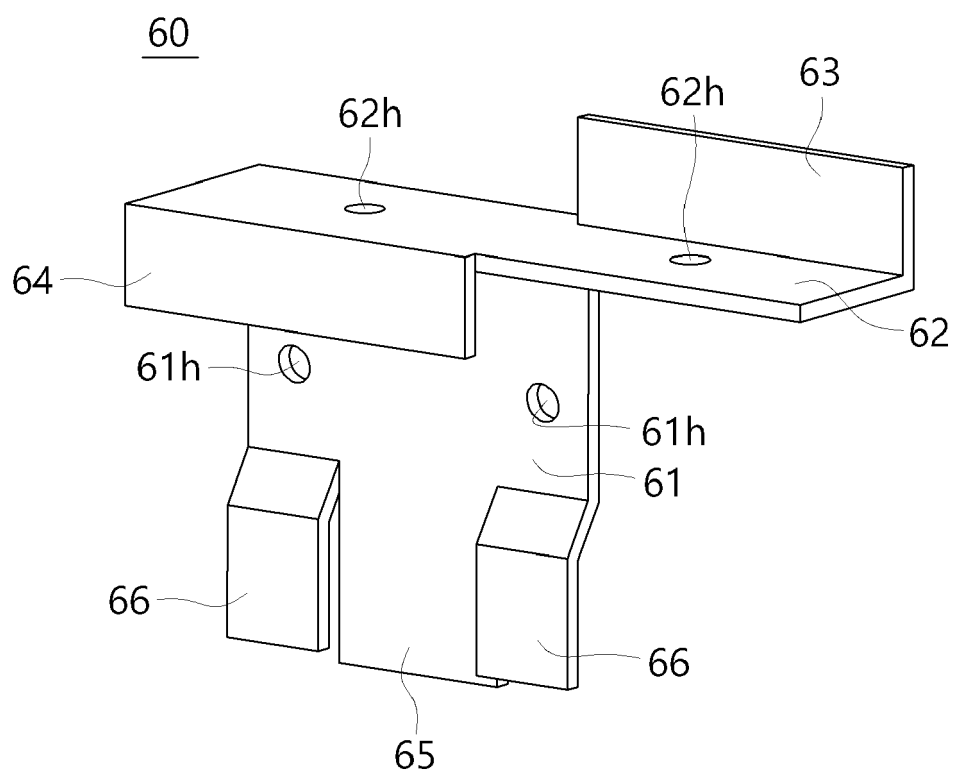
【FIG. 8】



【FIG. 9】

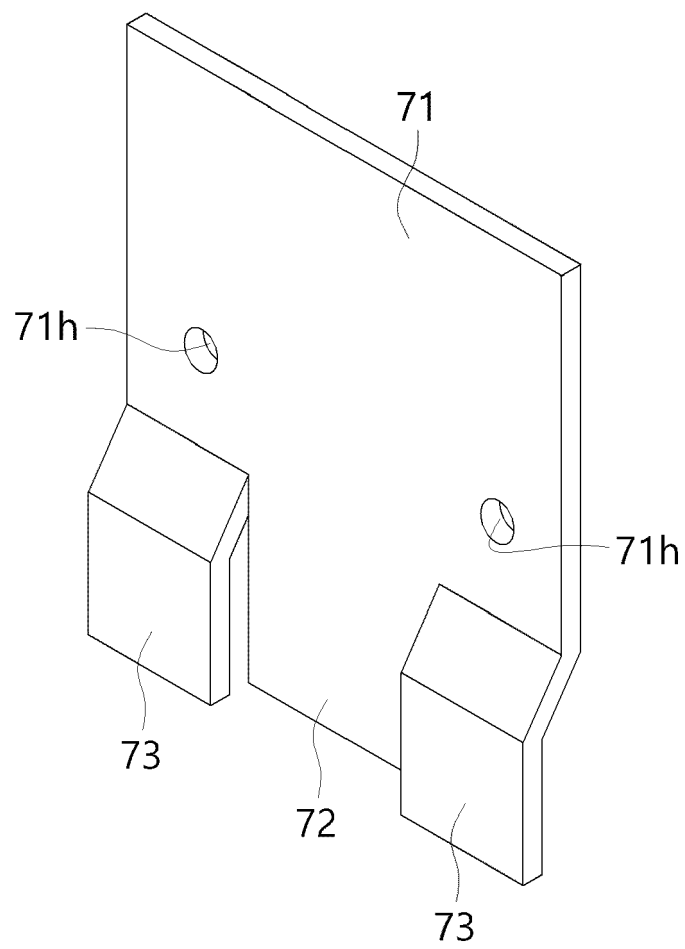


【FIG. 10】

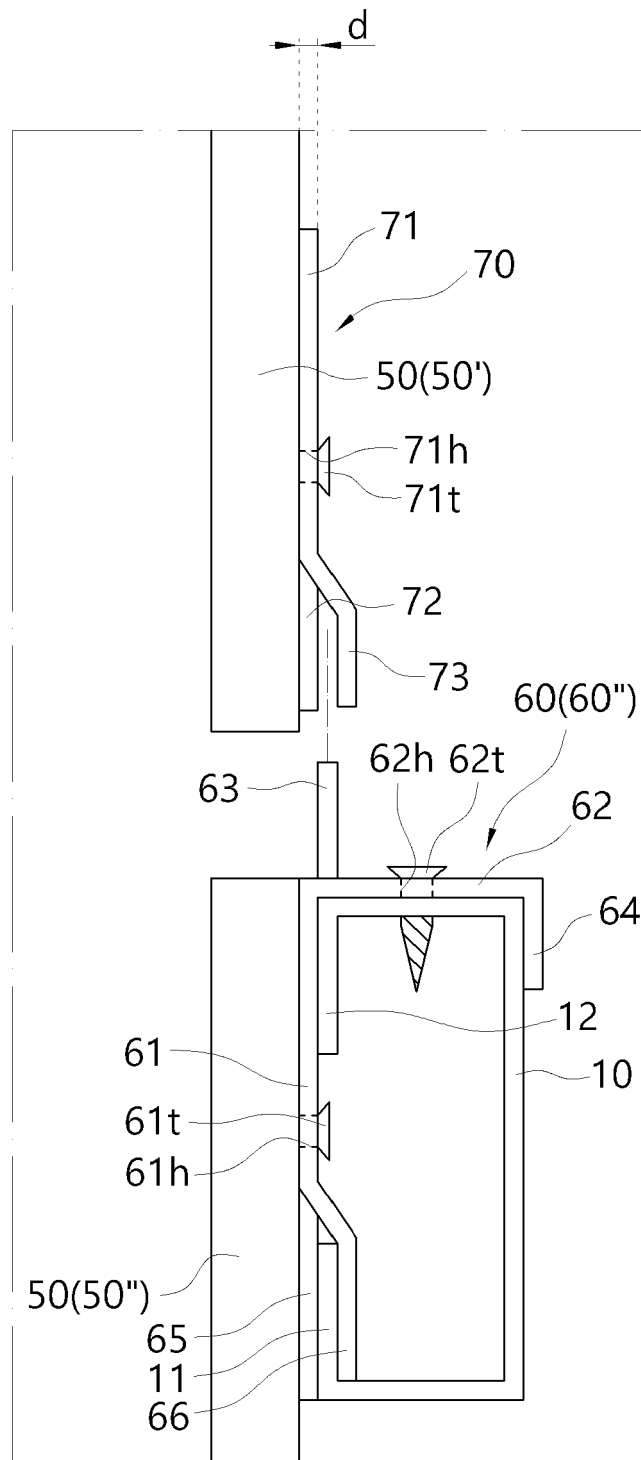


【FIG. 11】

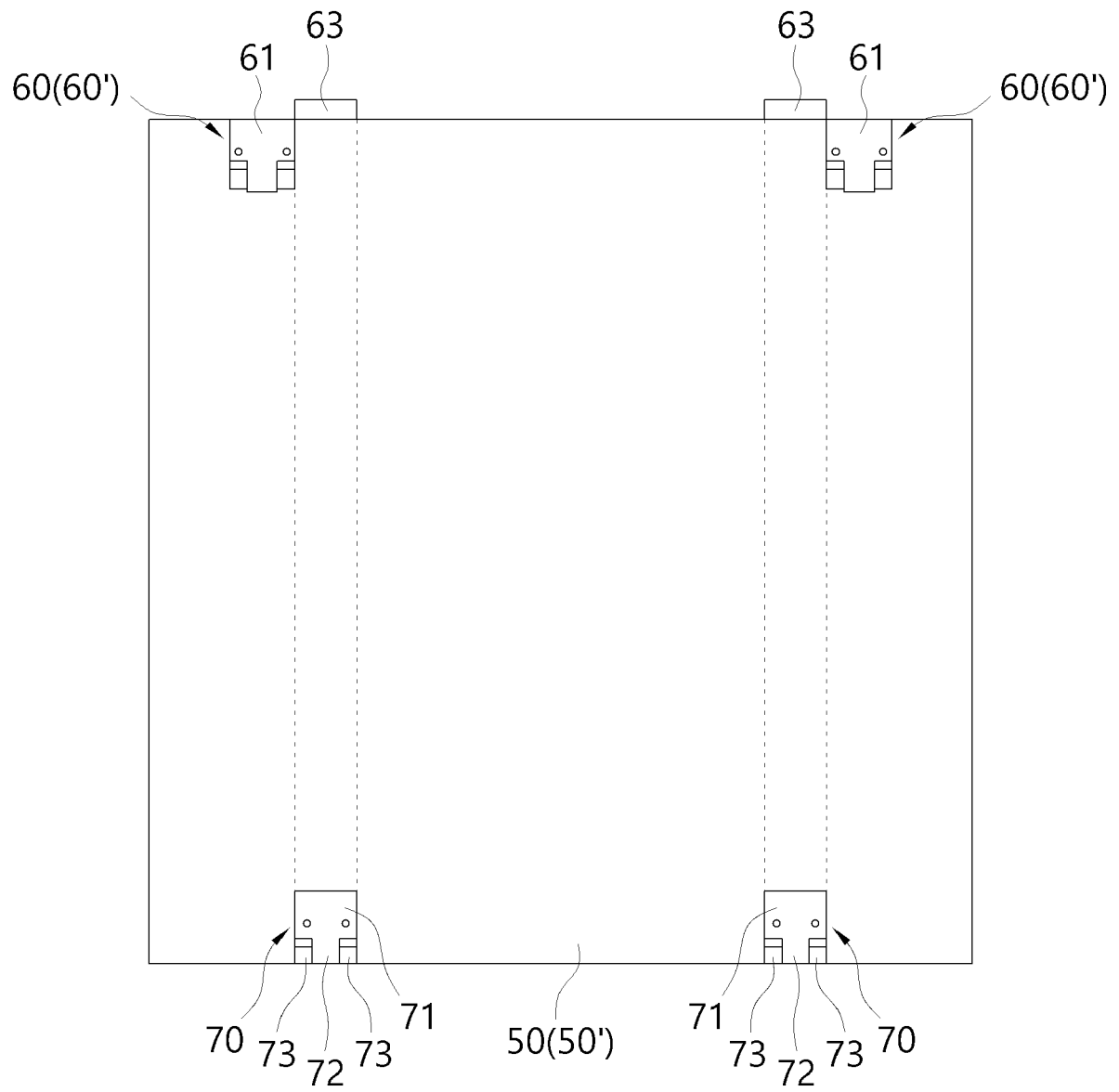
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【FIG. 12】



【FIG. 13】





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Application Number

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Y	KR 2022 0053111 A (UNIV AJOU IND ACADEMIC COOP FOUND [KR]) 29 April 2022 (2022-04-29) * paragraphs [0028] - [0054]; figures * -----	1-5, 10-15	
A	DE 37 18 044 A1 (MAISCH F PROTEKTORWERK [DE]) 15 December 1988 (1988-12-15) * the whole document * -----	1-15	
A	WO 2010/012061 A1 (LYSYUK DMYTRO ROMANOVICH [UA]) 4 February 2010 (2010-02-04) * abstract; claims; figures * -----	1-15	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 May 2024	Examiner Movadat, Robin
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