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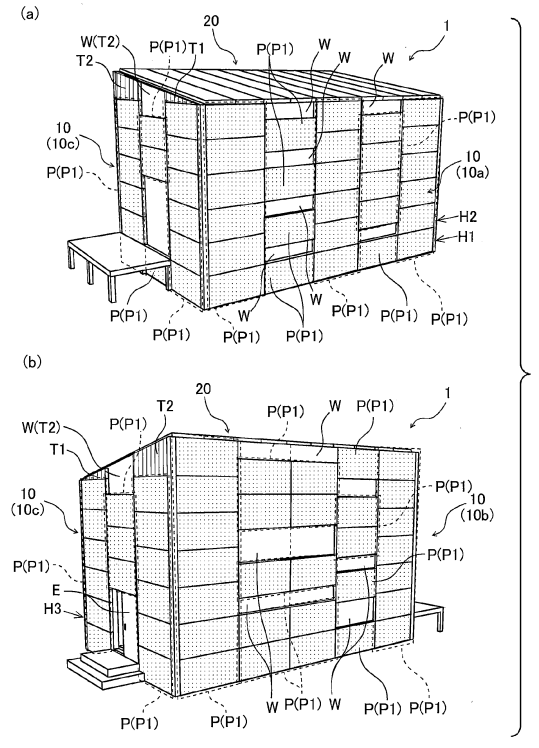
(54) **BUILDING**

(57) A building (1) comprises a wall part (10) formed by connecting in a planar direction a plurality of panel members (P) configured with a standard size having a predetermined height and a predetermined width. At least one surface of the wall part (10) is configured by, when the width thereof is N times (N is an integer of 2 or more) the predetermined width: the (N - α (α is an integer not less than 0 and less than N)) panel members (P) aligned in the width direction; and a window part (W) corresponding to the area of α panel members (P). At least one surface of the wall part (10) is configured by, when the width thereof has a remainder with respect to M times (M is an integer of 2 or more) the predetermined width: the (M - β (β is an integer not less than 0 and less than M)) panel members (P) aligned in the width direction; and the window part (W) corresponding to the area of β panel members (P) + the remainder.

FIG.1



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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a building.

BACKGROUND ART

[0002] In the related art, vacuum insulation panels are often used on the outer walls of a building to keep the interior of the building comfortable. Furthermore, in recent years, air conditioning panels have also been suggested, in which the panels themselves provide the air conditioning function, such as heat pipe panels that allow heat transmission from one surface to the other surface while blocking the heat transmission from the other surface to the one surface, and cooling panels in which an absorption or adsorption refrigerator is formed into a panel shape (for example, see PTLs 1 and 2).

CITATION LIST

PATENT LITERATURE

[0003]

[PTL 1] JPS60-042529A
[PTL 2] JP2008-134043A

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] Generally, since the vacuum insulation panels and the air conditioning panels have a vacuum portion inside the panels, the panels cannot be cut when used as the outer walls of a building. In addition, it is difficult to manufacture the vacuum insulation panels and air conditioning panels in various sizes according to buildings, and it is preferable to mass-produce standard sizes such as 182 cm in width and 91 cm in height, for example.

[0005] When the vacuum insulation panels and air conditioning panels are used as the walls of a building, the walls are often not in a size that is an integer multiple of the standard size, resulting in odd portions that cannot be filled with panels of the standard size. Furthermore, when the positions of the toilet window, the bathroom window, and the kitchen window are determined, many odd portions are generated around the windows. As a result, the area occupied by standard-sized panels on a wall of a building is reduced, resulting in a decrease in the comfort of the building.

[0006] The present disclosure has been made to solve the problems described above, and accordingly, an object is to provide a building that can provide improved comfort.

SOLUTION TO PROBLEM

[0007] A building according to the present disclosure includes a wall part including at least one of a first wall and a second wall, in which

the first wall is configured as a plurality of panel members having a standard size having a predetermined height and a predetermined width being connected in a plane direction,
in which a width of the first wall is N times the predetermined width (N is an integer of 2 or more), and (N-α (α is an integer of 0 or more and less than N)) panel members are arranged side by side in a width direction, and
includes a window portion corresponding to an area of the α panel members,
the second wall is configured as a plurality of panel members being connected in the plane direction,
in which, when a width of the second wall has a remainder of less than a predetermined width with respect to M times the predetermined width (M is an integer of 2 or more), the (M-β) panel members are arranged side by side in the width direction (β is an integer of 0 or more and a number less than M), and
includes a window portion corresponding to a sum of an area of β panel members and an area corresponding to the remainder, and
the panel member is at least one kind of a vacuum insulation panel having a vacuum layer therein, a heat pipe panel that allows heat transmission from one surface side to the other surface side and prevents heat transmission from the other surface side to the one surface side, and a cooling panel that exhibits a refrigerating function by adsorption or adsorption.

ADVANTAGEOUS EFFECTS OF INVENTION

[0008] According to the present disclosure, a building that can provide further improved comfort can be provided.

BRIEF DESCRIPTION OF DRAWINGS

[0009]

[FIG. 1] FIG. 1 are perspective views of an example of a building according to an embodiment of the present disclosure, in which (a) shows a perspective view of one surface side, and (b) shows a perspective view of the other surface side.
[FIG. 2] FIG. 2 is a plan view of another example of a wall part.
[FIG. 3] FIG. 3 is a front view of an example of a window portion according to the present embodiment.
[FIG. 4] FIG. 4 is a perspective view of a structure

when a wall part is removed from the building according to the present embodiment.

[FIG. 5] FIG. 5 is a plan view of a first floor of the building shown in FIG. 4.

[FIG. 6] FIG. 6 is a plan view of a second floor of the building shown in FIG. 4.

[FIG. 7] FIG. 7 is a partially enlarged perspective view of the first floor shown in FIG. 4.

[FIG. 8] FIG. 8 is another enlarged perspective view of the first floor shown in FIG. 4.

DESCRIPTION OF EMBODIMENTS

[0010] Hereinafter, the present disclosure will be described according to preferred embodiments. The present invention is not limited to the embodiments described below, and can be appropriately modified within a scope that does not depart from the spirit of the present disclosure. Moreover, in the embodiments shown below, the illustrations and explanations of certain configurations may be omitted, but it is apparent that publicly known or well-known techniques are appropriately applied to the details of the omitted techniques as long as no contradiction occurs with the contents described below.

[0011] FIG. 1 are perspective views of an example of a building according to an embodiment of the present disclosure, in which (a) shows a perspective view of one surface side, and (b) shows a perspective view of the other surface side. A building 1 according to the example shown in FIG. 1 includes a wall part 10 and a ceiling part 20. The wall part 10 is configured to include a panel member P and a window portion W. In addition, the window portion W may be of a slide opening/closing type, a depth opening/closing type, or a fixed type that is fixed and cannot be opened or closed.

[0012] The panel member P according to the present embodiment includes a single plate member that serves as both an outer wall and an interior material, and has a uniform standard size with a predetermined width and a predetermined height. For example, the predetermined width is a width of 90 cm or more and less than 5 m, and more preferably, a width of 182 cm. In addition, for example, the predetermined height is a height of 45 cm or more and less than 2 m, and more preferably, a height of 91 cm. This panel member P includes at least one kind of a vacuum insulation panel, a heat pipe panel, and a cooling panel.

[0013] The vacuum insulation panel is a panel having an evacuated vacuum layer therein. The heat pipe panel is a panel that allows heat transmission from one surface side to the other surface side and prevents the heat transmission from the other surface side to the one surface side. This heat pipe is a panel that has a working fluid therein and allows heat transmission from one surface side to the other surface side as the working fluid evaporates on one surface side and takes heat, and the vapor generated by the evaporation reaches the other surface side and dissipates the heat of condensation from the other surface side. This heat pipe panel has an inclined structure therein and has a structure in which the working fluid condensed on the other surface side returns to the one surface side by its own weight. In addition, the heat pipe panel has a vacuum or the like therein and prevents the heat transmission from the other surface side to the one surface side. The cooling panel is a panel that exhibits a refrigerating function by absorption or adsorption, and includes, in a plate shape, a regenerator, a condenser, an evaporator, and an absorber which form an absorption refrigeration cycle, or an adsorber, a condenser, and an evaporator which form an adsorption refrigeration cycle.

[0014] Here, the vacuum insulation panel has the vacuum layer therein, the heat pipe panel has the vacuum layer and the working fluid therein, and the cooling panel has the vacuum portion, adsorption liquid, and refrigerant in the evaporator, such that the panels cannot be cut. Therefore, in the building 1 according to the present embodiment, without cutting, a large number of panel members P of the standard size are used.

[0015] In order to use a large number of panel members P, the wall part 10 according to the present embodiment is formed by connecting a plurality of standard-sized panel members P in the plane direction, that is, by connecting the long sides or the short sides to form an upright surface, for example. In addition, the wall part 10 includes a non-connecting portion formed on a part of the upright surface where the panel member P is not arranged, and the non-connecting portion serves as the window portion W. That is, in a general building, the layouts of a living room, a toilet, a bathroom, and the like are first determined, and then windows corresponding to each room such as the living room are determined, and the non-window portions are filled with walls. On the other hand, in the building 1 according to the present embodiment, a plurality of panel members P are connected to form a wall, while there is provided a portion to be used as a window at a part where the panel members P are not connected, so as to utilize a large number of panel members P, that is, to increase the utilization rate of the panel members P.

[0016] Specifically, when each side of the wall part 10 is N times the predetermined width, the wall part 10 includes (N-α) panel members P arranged side by side and a window portion W corresponding to the area of the α panel members P. Each surface of the wall part 10 is an example of the first wall. Here, N is an integer of 2 or more, and is 3 or 5 in the example shown in FIG. 1. In addition, α is an integer equal to or greater than 0 and less than N, and is 1 or 2 in the example shown in FIG. 1(a) and 1 in the example shown in FIG. 1(b). Specifically, α is "0" at a certain height position H1, and α is "2" at another height position H2.

[0017] It is to be noted that, since the entrance is also a necessary element for the building 1, the entrance E is formed in the same manner as the window portion W

in the example shown in FIG. 1(b). That is, at a height position H3 where the entrance E is formed, the wall part 10 includes (N-α) panel members P arranged side by side and the entrance E corresponding to an area of α panel members. It is to be noted that, while there is only the entrance E formed at the height position H3, the window portion W may also be formed.

[0018] FIG. 2 is a plan view of another example of the wall part 10. The wall part 10 is not necessarily be N times the predetermined width and may have a remainder that is smaller than the predetermined width. Therefore, when there is the remainder, the wall part 10 as an example of a second wall is formed as follows.

[0019] When there is a remainder in the width of the wall part 10 with respect to M times the predetermined width, the wall part 10 includes (M-β) panel members P arranged side by side in the width direction and a window portion W corresponding to the sum of an area of β sheets of panel members P and an area corresponding to the remainder. Here, M is an integer of 2 or more, and is 3 in the example shown in FIG. 2. In addition, β is an integer of 0 or more and a number less than M. Specifically, at a certain height position H4, β is "0" and the window portion W corresponding to the remaining area is formed. At another height position H5, β is " 1", and the window portion W corresponding to an area of one sheet plus the remainder is formed.

[0020] By forming the panel members P and the window portion W as described above, the utilization rate of the panel members P in the width direction is increased.

[0021] Reference is made to Fig. 1 again. As shown in FIG. 1(a), a specific wall 10a of the wall part 10 has a height that is an integer multiple of the predetermined height of the standard size, and 6 times in the example shown in FIG. 1(a), and has a stacked portion, that is, a portion in which the corresponding integer number of panel members P are stacked.

[0022] Here, as shown in FIGS. 1(a) and (b), the height of a specific wall 10a is different from the height of an opposing wall 10b facing the specific wall 10a. In this case, a connection wall 10c connecting the specific wall 10a and the opposing wall 10b includes a plurality of panel members P, or particularly, the number of panel members P equal to or less than the integer multiple, and a triangular portion T1 or trapezoidal portions T2 used at an upper end portion. In the present embodiment, the triangular portion T1 and one of the trapezoidal portions T2 is a plate material for building, and the remaining one of the trapezoidal portions T2 is the window portion W. In the example shown in FIG. 1, the trapezoidal portion T2 is the window portion W, but embodiments are not limited thereto, and the triangular portion T1 may be the window portion W.

[0023] In this way, by using at least a part of the upper end that is an odd portion as the window portion W, it is possible to utilize the odd portion as a light-receiving portion, which contributes to reducing the number of window portions W lower than the upper end. As a result, the utilization rate of the panel members P is increased.

[0024] FIG. 3 is a front view of an example of the window portion W according to the present embodiment. In this embodiment, the window portion W is not entirely configured as a window glass installation part WGP for installing a window glass WG, and preferably includes a through plate installation part THP for installing a plate material B (hatched portion in FIG. 3) having a through hole TH penetrating indoors and outdoors.

[0025] Here, the panel member P cannot be cut and also cannot have the through hole TH formed therein. Meanwhile, the building 1 requires outer wall penetrating elements such as ventilation port, exhaust port, introduction of power lines and telephone lines, and antenna wiring. Therefore, these outer wall penetrating elements are formed in the window portion W, and it is not necessary to form the through hole TH in the panel member P.

[0026] FIG. 4 is a perspective view of the structure when the wall part 10 is removed from the building 1 according to the present embodiment. FIG. 5 is a plan view of the first floor of the building 1 shown in FIG. 4, and FIG. 6 is a plan view of the second floor of the building 1 shown in FIG. 4. FIG. 7 is a partially enlarged perspective view of the first floor shown in FIG. 4, and FIG. 8 is another enlarged perspective view of the first floor shown in FIG. 4.

[0027] In the present embodiment, when the panel member P (see FIGS. 1 and 2) is the air conditioning panel P1 (see FIGS. 1 and 2) that is at least one kind of the heat pipe panel and the cooling panel, for the indoor side, the building 1 is preferably configured as described in 1) to 8) below.

1) First, as shown in FIG. 5, in the building 1, it is preferable that the toilet TO, the kitchen K, and the bathroom BA are installed in the central portion apart from the wall part 10. In general, the toilet TO, the kitchen K, and the bathroom BA often include relatively small rooms. These small rooms may trap the air conditioned air when the inside of the rooms is air conditioned by the air conditioning panel P1. Therefore, by installing these in the central portion apart from the wall part 10, it is possible to contribute to the improvement of comfort without confining the air-conditioned air in the small room.

In the example shown in FIG. 5, although there are toilet TO, kitchen K, and bathroom BA installed in the central portion apart from the wall part 10, it is preferable to install a storage room in the central portion as well. In addition, not all of them may be installed in the central portion, and one of them may be installed in the central portion. Furthermore, at least two or more of the storage room, the toilet TO, the kitchen K, and the bathroom BA are preferably manufactured as an integral unit in advance at the factory.

2) As shown in FIGS. 4 and 6, the building 1 (see FIG. 1) preferably has a first atrium A1 and a second

atrium A2. The first atrium A1 faces one wall W1, that is, the opposing wall 10b in the present embodiment, and vertically extends across a plurality of floors, for example, across the first and second floors in the example shown in FIG. 4. The second atrium A2 faces the other wall W2 facing the one wall W1, that is, the specific wall 10a in the example shown in FIGS. 4 and 6, and vertically extends across a plurality of floors, for example, across an underfloor and the first and second floors in the example shown in FIG. 4.

In the example shown in FIG. 4, both of the first atrium A1 and the second atrium A2 vertically extend from the same uppermost floor, that is, the second floor, but embodiments are not limited thereto. For example, the building 1 may include four floors, and the atria may extend from different uppermost floors from each other, with the first atrium A1 vertically extending across the second to fourth floors, the second atrium A2 vertically extending across the first to third floors, and so on.

3) In addition, the building 1 preferably has an upper communication path LTL1 for communication between lower uppermost floors of the first atrium A1 on the one wall W1 side and the second atrium A2 on the other wall W2 side. In the present embodiment, since the first atrium A1 and the second atrium A2 vertically extend from the same uppermost floor, that is, the second floor, the upper communication path UL1 is in communication with the second floors. Here, the upper communication path UL1 shown in FIG. 6 may always be communicated, but embodiments are not limited thereto, and an openable sliding door, a louver that operates to allow the other side to be seen, or the like may be provided so that the path may be communicated by the residents.

4) In addition, as shown in FIG. 5, the building 1 preferably has a lower communication path UL2. The lower communication path UL2 is provided for communication between floors lower than the floor on which the upper communication path UL1 is communicated, between the first atrium A1 on the one wall W1 side and the second atrium A2 on the other wall W2 side. In the building 1 according to the present embodiment, as shown in FIGS. 5 and 7, the foundation L arranged under the floor is partially exposed, and the underfloor floor is visible from the first floor.

Further, as shown in FIG. 8, the first floor has ventilation holes VH formed in the floor surface on the one wall W1 side. A base L visible from the first floor and the ventilation holes VH are connected in the underfloor. That is, in the building 1 according to the present embodiment, the underfloor floor is configured to serve as the lower communication path UL2. In addition, in the building 1 according to the present embodiment, the underfloor floor serves as the lower communication path UL2, but embodiments are not limited thereto, and the lower communication path UL2 may be formed in another floor such as the first floor. In order to reduce the impact on the living space, it is preferable that the upper communication path UL1 horizontally ventilates the loft (attic) and the lower communication path UL2 horizontally ventilates under the first floor (underfloor floor). Furthermore, like the upper communication path UL1, the lower communication path UL2 is not limited to being always communicated, and may be communicated by the resident. Hereinafter, the lower communication path UL2 is also referred to as an underfloor communication path UL2.

5) Further, in the building 1, it is preferable that at least one of the first atrium A1, the second atrium A2, and the upper communication path UL1 is air conditioned by the air conditioning panel P1.

By adopting the configurations 2) to 5) above, it is possible to provide a circulation structure for the air cooled or heated by the air conditioning panel P1. For example, the cooled or heated air by the air conditioning panel P1 rises through the first atrium A1, reaches the second atrium A2 through the upper communication path UL1, descends through the second atrium A2, reaches the underfloor communication path UL2, and returns from the underfloor communication path UL2 to the first atrium A1 through the ventilation holes VH. Therefore, the cooled or heated air can be easily distributed inside the building 1, improving the comfort.

6) Additionally, the building 1 preferably includes a fan F (see FIG. 5). When the air conditioning panel P1 for air conditioning the atria A1 and A2 performs the cooling function, the fan F generates a downward flow in the atria A1 and A2 to assist the cooling function. When the air conditioning panel P1 for air conditioning the atria A1 and A2 performs the heating function, the fan F generates an upward flow in the atria A1 and A2 to assist the heating function. As a result, air can be circulated more suitably.

In the example shown in FIG. 5, the fan F is provided in the underfloor (underfloor communication path UL2), but embodiments are not limited thereto, and it may be provided in the atria A1 and A2 or the upper communication path UL1. In particular, the fan F is preferably provided close to the air conditioning panel P1 through which the atria A1 and A2 are air conditioned, so that the air immediately after air conditioning can be quickly circulated.

7) Furthermore, the building 1 preferably includes an air conditioner AR having an outdoor unit such as an air conditioner in the underfloor communication path UL2. In general, when the air conditioner AR having an outdoor unit is installed in the upper floor, pipes connecting the upper layer air conditioner AR to the outdoor unit run along the wall surface, or the outdoor unit is provided on the upper layer wall surface. However, by providing the air conditioner AR on the un-

derfloor, the problem mentioned above does not occur and the appearance is improved.

8) In addition, as shown in FIGS. 4 and 6, the building 1 preferably has a structure in which floor surfaces of a plurality of heights are provided in one floor, that is, a so-called skip floor. More specifically, preferably, the building 1 has a one-step lower floor surface LF on the second floor or another floor, and a space S is formed between the one step lower floor surface LF and the normal-height floor surface NF. This is to allow the air to be be further circulated by the space (S).

[0028] Next, an overview of a method for constructing the building 1 according to the present embodiment will be described. First, a unit including at least two or more of the storage room, the toilet TO, the kitchen K, and the bathroom BA integrated therein is manufactured in advance in a factory. Next, like other buildings, the foundation L is formed and then the frame, floor surface, and ceiling 20 are formed, and the unit is arranged at a predetermined position in the indoor space.

[0029] Next, a large number of panel members P are connected and stacked. Then, non-connected gaps are formed in certain areas. After that, a window glass WG, a door, and the like are installed in the gaps to form the window portion Wand the entrance E. It is to be noted that the order of operations is not limited to that described above, and the panel members P may be installed after the window glass WG, doors, and the like are installed as usual.

[0030] Next, the operation of the building 1 according to the present embodiment will be described. First, as shown in FIG. 1, in the present embodiment, the wall part 10 is formed so as to be filled with the standard size panel members P without requiring the standard size panel members P to be cut, and parts of the wall part 10 are formed as the window portion W or the like. In particular, when the width of the wall part 10 is N times the predetermined width (standard size), the wall part 10 includes (N-α) panel members P arranged side by side at specific height positions H1 and H2, and window portions W corresponding to the area of α panels.

[0031] Furthermore, as shown in FIG. 2, when the width of the wall part 10 has a remainder with respect to M times the predetermined width, the wall part 10 includes (M - β) panel members P arranged side by side in the width direction, and window portions W corresponding to the area of (β + remainder) at specific height positions H4 and H5.

[0032] It is to be noted that the entrance E is also made in the same manner as the window portion W described above.

[0033] Therefore, the wall part 10 in the width direction, except for the necessary parts of the window portion Wand the entrance E, are filled with the panel members P of the standard size, and the utilization rate of the panel members P is increased.

[0034] Further, for the connection wall 10c shown in FIG. 1, a plurality of panel members P are used, and the upper end includes the triangular portion T1 or the trapezoidal portion T2, and the triangular portion T1 or the trapezoidal portion T2 is a window portion W. Therefore, by using the odd portion of the upper end as a light-receiving portion, it is possible to contribute to reducing the window portion W below the upper end, and the utilization rate of the panel member P is increased.

[0035] Further, as shown in FIG. 3, the window portion W includes the through plate installation part THP for installing the plate material B having the through hole TH. Therefore, it is not necessary to form the through hole TH in the panel member P in order to provide the outer wall penetrating elements, such as a ventilation port, an exhaust port, an intake of power line, telephone line, and the like, the antenna wiring, and the like, and a situation in which the panel member P loses its function is prevented.

[0036] Furthermore, as shown in FIG. 5, the panel member P is the air conditioning panel P1, and the storage room, the toilet TO, and the bathroom BA are installed in the central portion away from the wall part 10. Therefore, the cooled or heated air by the air conditioning panel P1 is prevented from being confined in relatively small rooms such as the storage room, the toilet TO, the kitchen K, and the bathroom BA, thereby contributing to the improvement of comfort.

[0037] In addition, in the building 1, at least one of the first atrium A1, the second atrium A2, and the upper communication path UL1 is air conditioned by the air conditioning panel P1, and the circulation structure of the air is formed by the first atrium A1, the second atrium A2, the upper communication path UL1, and the underfloor communication path UL2. With this structure, the cooled or heated air circulates inside the building 1. Therefore, it contributes to the improvement of comfort.

[0038] Further, the air conditioning panel P1 is provided with the fan F that assists the cooling and heating function so that the downward flow is generated when cooling the atria A1 and A2, and the upward flow is generated when heating the same. Therefore, it is possible to further facilitate spreading the cooled or heated air throughout the building 1, contributing to an improvement in comfort.

[0039] Furthermore, when the air conditioner AR is provided in the underfloor communication path UL2, not only the comfort improved by the air conditioner AR, but also the deterioration of the appearance due to the installation of the outdoor unit and the piping is prevented.

[0040] Further, since the building 1 has the skip floor and the space S is defined between the one step lower floor surface LF and the normal-height floor surface NF, the circulation of the air can be further facilitated.

[0041] As described above, according to the building 1 according to the present embodiment, when the wall part 10 is N times the predetermined width of the standard size, (N-α) panel members P are arranged side by side

in the width direction to form the window portion W corresponding to the area of α sheets. In addition, when the wall part 10 has a remainder with respect to M times the predetermined width of the standard size, (M-β) panel members P are arranged side by side in the width direction to form the window portion W corresponding to the area of β sheets plus the remainder. By the configuration described above, the odd portion that cannot be filled with the panel member P of the standard size is minimized, and the utilization rate of the panel members P in the wall part 10 is increased. Therefore, it is possible to provide the building 1 that can provide further improved comfort.

[0042] In addition, since the specific wall 10a has the integer number of panel members P stacked, it is possible to increase the utilization rate of the panel members for the specific wall 10a. In addition, since the connection wall 10c has a plurality of panel members P and the window portion W having a triangular or trapezoidal shape at the upper end, by using the odd portion of the upper end as a light-receiving portion, it is possible to contribute to reducing the window portion W below the upper end, and the utilization rate of the panel members P is increased.

[0043] Further, the window portion W has the window glass installation part WGP and the through plate installation part THP for installing the plate material B having the through hole TH penetrating indoors and outdoors. Therefore, it is not necessary to form the through hole TH in the panel member P for the outer wall penetrating element such as a ventilation port, an exhaust port, a power line, a telephone line, and the like, or an antenna wiring, and it is possible to prevent the panel member P from losing its function due to the formation of the through holes and deteriorating comfort.

[0044] Moreover, in the building 1, the panel members P are provided on the wall part 10, and at least one of the storage room, the toilet TO, the bathroom BA, and the kitchen K are installed in the central portion away from the wall part 10. Therefore, the air that is conditioned by the building 1 is less likely to be confined in the narrow spaces such as the storage room, the toilet TO, the bathroom BA, and the kitchen K, and it is possible to contribute to the improvement of comfort.

[0045] In addition, the building 1 includes a plurality of atria A1 and A2 facing the one wall W1 and the other wall W2, respectively, the upper communication path UL1 communicating between the uppermost floors of the atria A1 and A2, and the lower communication path UL2 communicating between the lower floors of the atria A1 and A2. Furthermore, in the building 1, at least one of the atria A1 and A2 and the upper communication path UL1 is air conditioned by the air conditioning panel P 1. Therefore, the cooled or heated air by the air conditioning panel P1 circulates through the atria A1 and A2, the upper communication path UL1, and the lower communication path UL2. As a result, it is easier for the cooled or heated air to spread throughout the building 1, thereby improving comfort.

[0046] Further, the building 1 includes the fan F that assists the cooling and heating function. The fan F generates a downward flow in the atria A1 and A2 when the air conditioning panel P1 for air conditioning the atria A1 and A2 provides the cooling function, and generates an upward flow in the atria A1 and A2 when the air conditioning panel P1 for air conditioning the atria A1 and A2 provides the heating function. Therefore, the indoor air is appropriately circulated according to the cooling and heating, so that the cooled or heated air is more easily distributed inside the building 1, and the comfort can be further improved.

[0047] In addition, the building 1 further includes the air conditioner AR installed in the underfloor communication path UL2, in which the lower communication path UL2 is the underfloor communication path UL2 that communicates between lower floors through the underfloor. Therefore, unlike the air conditioner AR installed on the upper floor, the piping for connecting the air conditioner AR on the upper floor to the outdoor unit does not necessarily run along the wall surface, and it is also possible to connect the underfloor air conditioner AR to the outdoor unit with a short pipe, thus contributing to improving the appearance of the building 1.

[0048] As described above, while the disclosure has been described based on certain embodiments, the present disclosure is not limited to the embodiments described above, and modifications may be performed without departing from the spirit of the present disclosure, and well-known or publicly known techniques may be combined.

[0049] For example, in the embodiment described above, many panel members P are used in the wall parts 10a to 10c on all surfaces of the building 1. When the width of the wall part is N times the predetermined width, the wall parts 10a to 10c include (N-α) panel members P arranged side by side in the width direction, and window portions W corresponding to the area of α pieces. Alternatively, when the wall parts 10a to 10c have a remainder of less than the predetermined width with respect to M times the predetermined width thereof, the wall parts 10a to 10c have (M-β) panel members arranged side by side in the width direction, and a window portion W corresponding to the area of β sheets plus the remainder. However, the wall parts 10a to 10c are not limited to being configured as described above on all surfaces, and may be configured as described above on at least one surface, for example. This is to increase the utilization rate of the panel members P for the corresponding surface.

[0050] Here, the features of the embodiment of the building according to the present disclosure described above are summarized briefly as Items [1] to [15] below.

[1] The building (1) includes the wall part (10) including at least one of a first wall (each surface of the wall part 10 in FIG. 1) and a second wall (the wall part 10 in FIG. 2), in which

the first wall is configured as a plurality of panel members (P) having a standard size having a predetermined height and a predetermined width being connected in the plane direction,
in which the width of the first wall is N times the predetermined width (N is an integer of 2 or more), and (N-α (α is an integer of 0 or more and less than N)) panel members are arranged side by side in the width direction, and
includes the window portion (W) corresponding to the area of the α panel members,
the second wall is configured as the plurality of panel members being connected in the plane direction,
in which, when a width of the second wall has a remainder of less than a predetermined width with respect to M times the predetermined width (M is an integer of 2 or more), the (M - β) panel members are arranged side by side in the width direction (β is an integer of 0 or more and a number less than M), and
includes the window portion W corresponding to the sum of the area of the β panel members and the area corresponding to the remainder, and
the panel member is at least one kind of a vacuum insulation panel having a vacuum layer therein, a heat pipe panel that allows heat transmission from one surface side to the other surface side and prevents heat transmission from the other surface side to the one surface side, and a cooling panel that exhibits a refrigerating function by adsorption or adsorption.

[2] The building according to [1] described above, in which the wall part includes the specific wall (10a), the opposing wall (10b) facing the specific wall, and the connection wall (10c) connecting the specific wall and the opposing wall,

the height of the specific wall is an integer multiple of the predetermined height, and the corresponding integer number of panel members are stacked, and
when the specific wall is different in height from the opposing wall, the connection wall connecting the specific wall and the opposing wall between the wall parts includes a plurality of the panel members and a triangular or trapezoidal window portion used at an upper end.

[3] The building according to the [1] or [2] described above, in which the window portion includes the window glass installation part (WGP) for installing the window glass (WG), and the through plate installation part (THP) for installing a plate material having the through hole (TH) penetrating indoors and outdoors.

[4] The building according to the above [1] or [2] described above, in which the panel member is an air conditioning panel (P 1) that is at least one kind of the heat pipe panel and the cooling panel, and
at least one of a toilet, a bathroom, and a kitchen are installed in a central portion away from the wall part.
[5] The building according to [4] described above, further including a plurality of atria (the first atrium A1, the second atrium A2) that face each of the one wall (W1) and the other wall (W2) facing each other among the wall parts and extend across a plurality of floors,

the upper communication path (UL1) communicating the lower uppermost floors of the atrium on the one wall side and the atrium on the other wall side, and
the lower communication path (UL2) communicating the floors below the floor on which the upper communication path is communicated, between the atrium on the one wall side and the atrium on the other wall side, in which
at least one of the plurality of atria and the upper communication path is air conditioned by the air conditioning panel.

[6] The building according to [5] described above, further including the fan (F) that generates the downward flow in the atrium when the air conditioning panel for air conditioning the atrium provides the cooling function, and generates the upward flow in the atrium when the air conditioning panel for air conditioning the atrium provides the heating function.
[7] The building according to [5] described above, further including the air conditioner (AR) installed in an underfloor communication path, in which the lower communication path is the underfloor communication path that communicates between lower floors through the underfloor.
[8] The building according to [6] described above, further including the air conditioner (AR) installed in an underfloor communication path, in which the lower communication path is the underfloor communication path that communicates between lower floors through the underfloor.

[0051] This application is based upon Japanese Patent Application (Application No. 2021-092743), filed on June 2, 2021, the entire contents of which are incorporated herein by reference.

INDUSTRIAL APPLICABILITY

[0052] According to the present disclosure, a building that can provide further improved comfort can be provided. The present disclosure with the effect described above is useful for buildings.

REFERENCE SIGNS LIST

[0053]

1 building
10 wall part
10a specific wall
10b opposing wall
10c connection wall
A1 first atrium
A2 second atrium
AR air conditioner
B plate material
BA bathroom
F fan
K kitchen
P panel member
P1 air conditioning panel
TH through hole
THP through plate installation part
TO toilet
UL1 upper communication path
UL2 lower communication path (underfloor communication path)
VH ventilation hole
W window portion
W1 one wall
W2 the other wall
WG window glass
WGP window glass installation part

Claims

1. A building comprising:

a wall part including at least one of a first wall and a second wall,
wherein the first wall is configured as a plurality of panel members having a standard size having a predetermined height and a predetermined width being connected in a plane direction,
wherein a width of the first wall is N times the predetermined width (N is an integer of 2 or more), and (N-α (α is an integer of 0 or more and less than N)) panel members are arranged side by side in a width direction, and
includes a window portion corresponding to an area of the α panel members,
the second wall is configured as the plurality of panel members being connected in the plane direction,
wherein, when a width of the second wall has a remainder of less than a predetermined width with respect to M times the predetermined width (M is an integer of 2 or more), the (M - β) panel members are arranged side by side in the width direction (β is an integer of 0 or more and a number less than M), and
includes a window portion corresponding to a sum of an area of β panel members and an area corresponding to the remainder, and
the panel member is at least one kind of a vacuum insulation panel having a vacuum layer therein, a heat pipe panel that allows heat transmission from one surface side to the other surface side and prevents heat transmission from the other surface side to the one surface side, and a cooling panel that exhibits a refrigerating function by adsorption or adsorption.

2. The building according to claim 1, wherein the wall part includes a specific wall, an opposing wall facing the specific wall, and a connection wall connecting the specific wall and the opposing wall,

a height of the specific wall is an integer multiple of the predetermined height, and the corresponding integer number of panel members are stacked, and
when the specific wall is different in height from the opposing wall, the connection wall connecting the specific wall and the opposing wall between the wall parts includes a plurality of the panel members and a triangular or trapezoidal window portion used at an upper end.

3. The building according to claim 1 or claim 2, wherein the window portion includes a window glass installation part for installing a window glass, and a through plate installation part for installing a plate material having a through hole penetrating indoors and outdoors.

4. The building according to claim 1 or claim 2, wherein the panel member is an air conditioning panel that is at least one kind of the heat pipe panel and the cooling panel, and
at least one of a toilet, a bathroom, and a kitchen is installed in a central portion away from the wall part.

5. The building according to claim 4, further comprising:

a plurality of atria that face each of the one wall and the other wall facing each other among the wall parts and vertically extend across a plurality of floors;
an upper communication path communicating lower uppermost floors of an atrium on the one wall side and an atrium on the other wall side; and
a lower communication path communicating floors below the floor on which the upper communication path is communicated, between the atrium on the one wall side and the atrium on the other wall side,

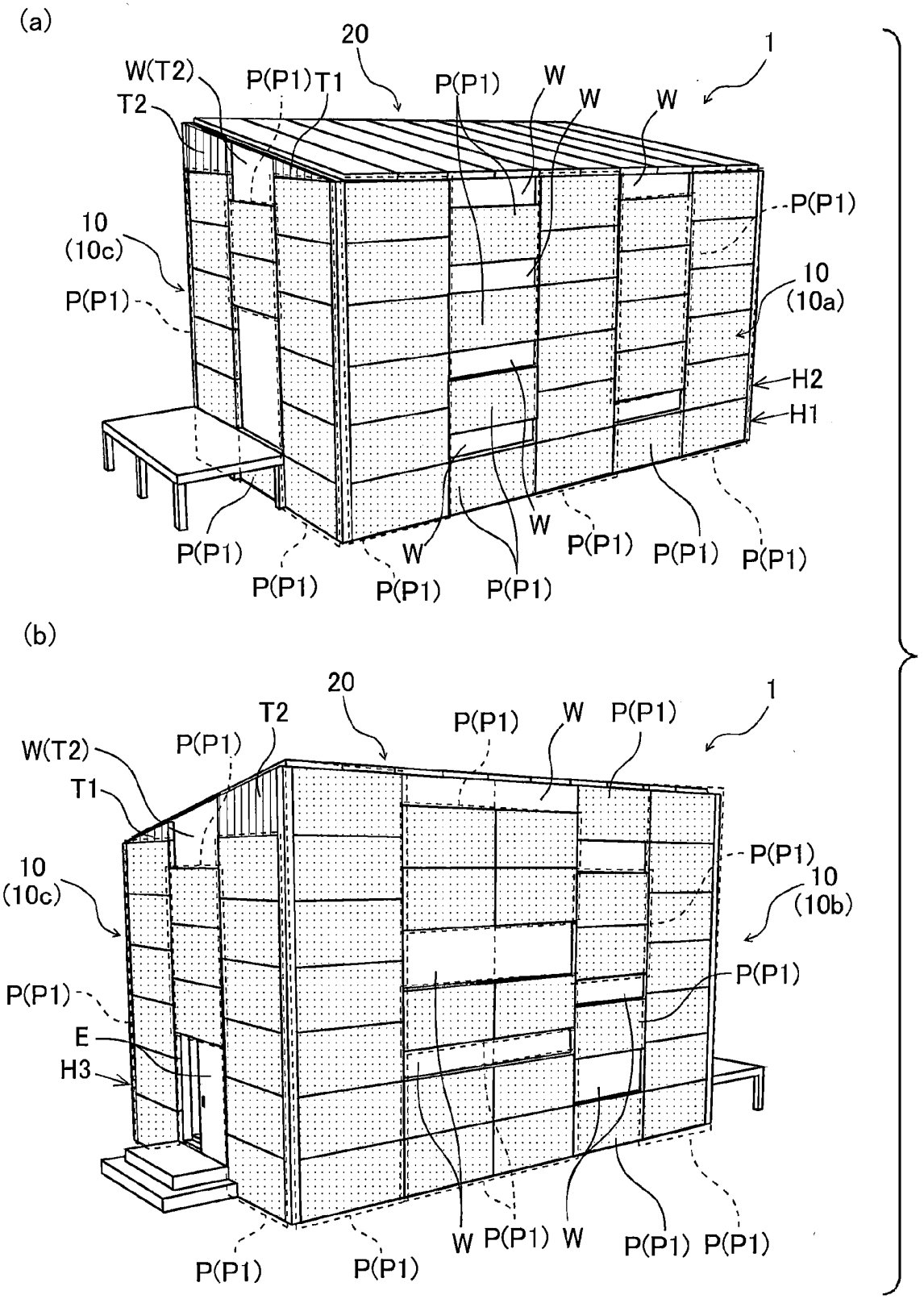
wherein at least one of the plurality of atria and the upper communication path is air conditioned by the air conditioning panel.

6. The building according to claim 5, further comprising a fan that generates a downward flow in the atrium when the air conditioning panel for air conditioning the atrium provides a cooling function, and generates an upward flow in the atrium when the air conditioning panel for air conditioning the atrium provides a heating function.

7. The building according to claim 5, further comprising an air conditioner installed in an underfloor communication path, wherein the lower communication path is the underfloor communication path that communicates between lower floors through an underfloor.

8. The building according to claim 6, further comprising an air conditioner installed in an underfloor communication path, wherein the lower communication path is the underfloor communication path that communicates between lower floors through an underfloor.

FIG.1


(a)
20
1
W(T2)
P(P1)
T1
T2
P(P1)
W
W
W
P(P1)
10
(10c)
P(P1)
10
(10a)
H2
H1
P(P1)
P(P1)
W
P(P1)
P(P1)
P(P1)
P(P1)
W
P(P1)
P(P1)
(b)
20
1
T2
P(P1)
W
P(P1)
W(T2)
P(P1)
T1
P(P1)
10
(10c)
10
(10b)
P(P1)
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P(P1)

FIG. 2

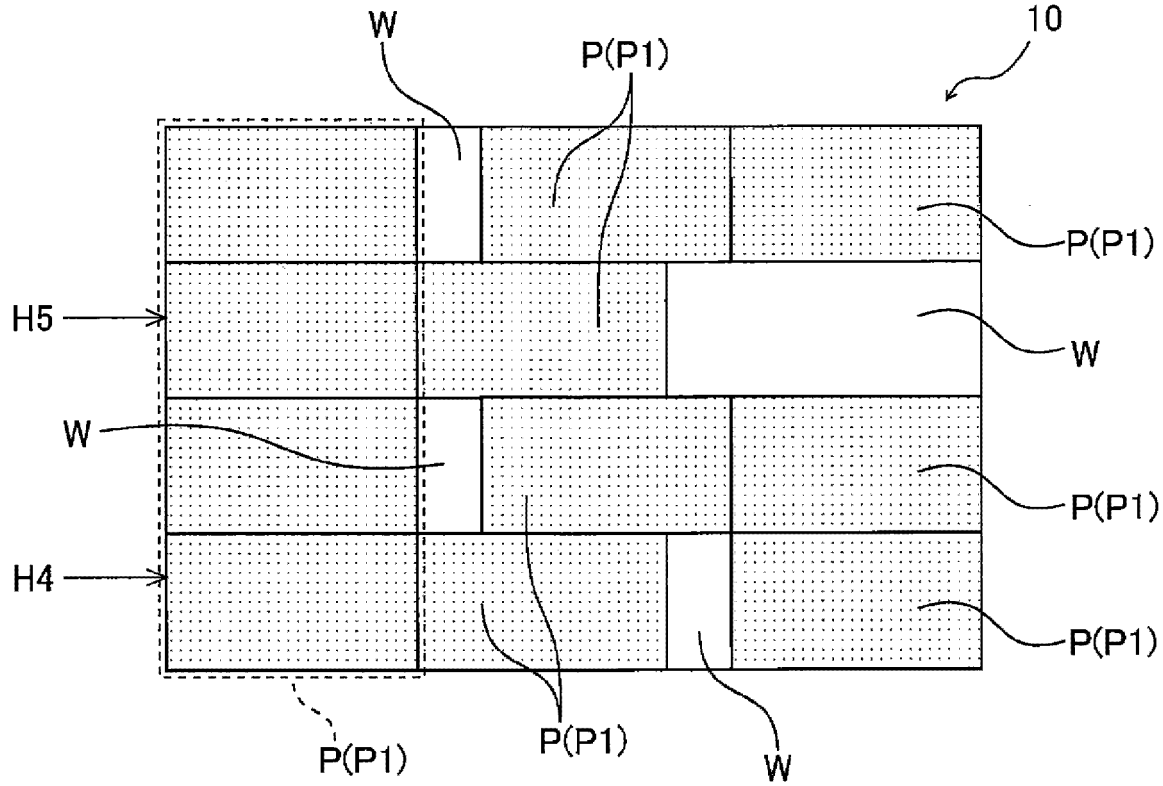


FIG. 3

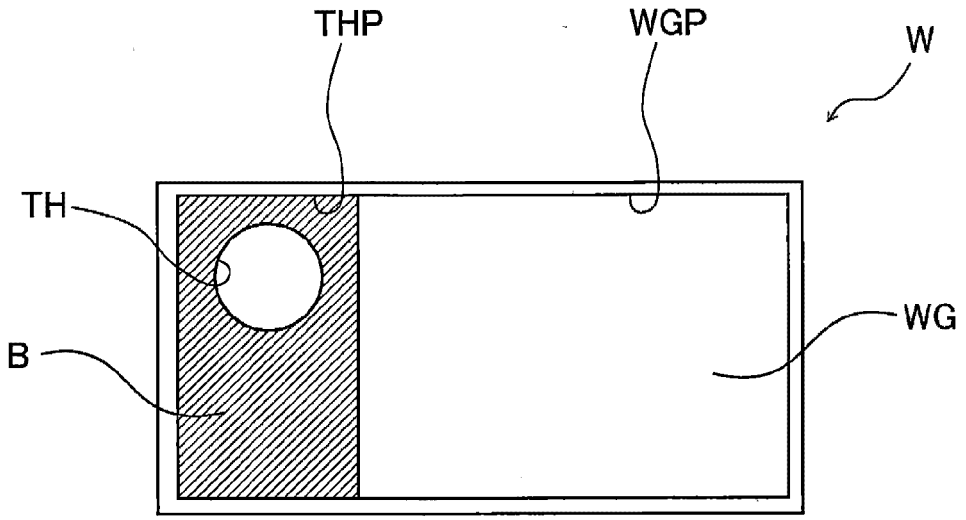


FIG. 4

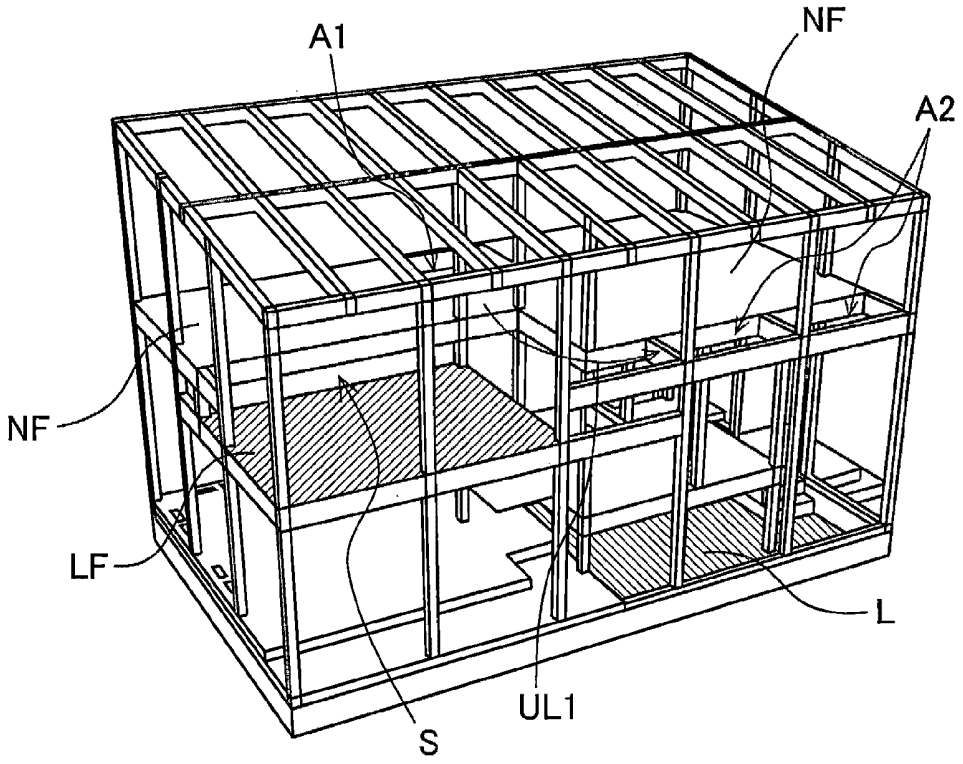


FIG. 5

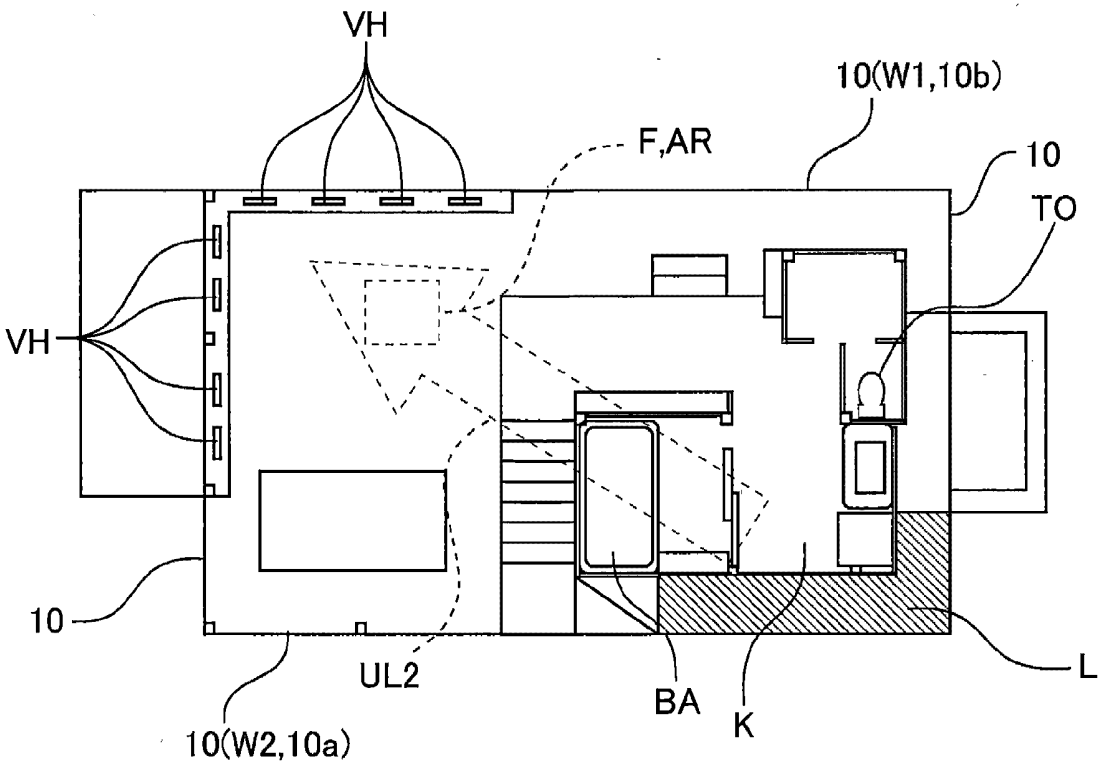


FIG. 6

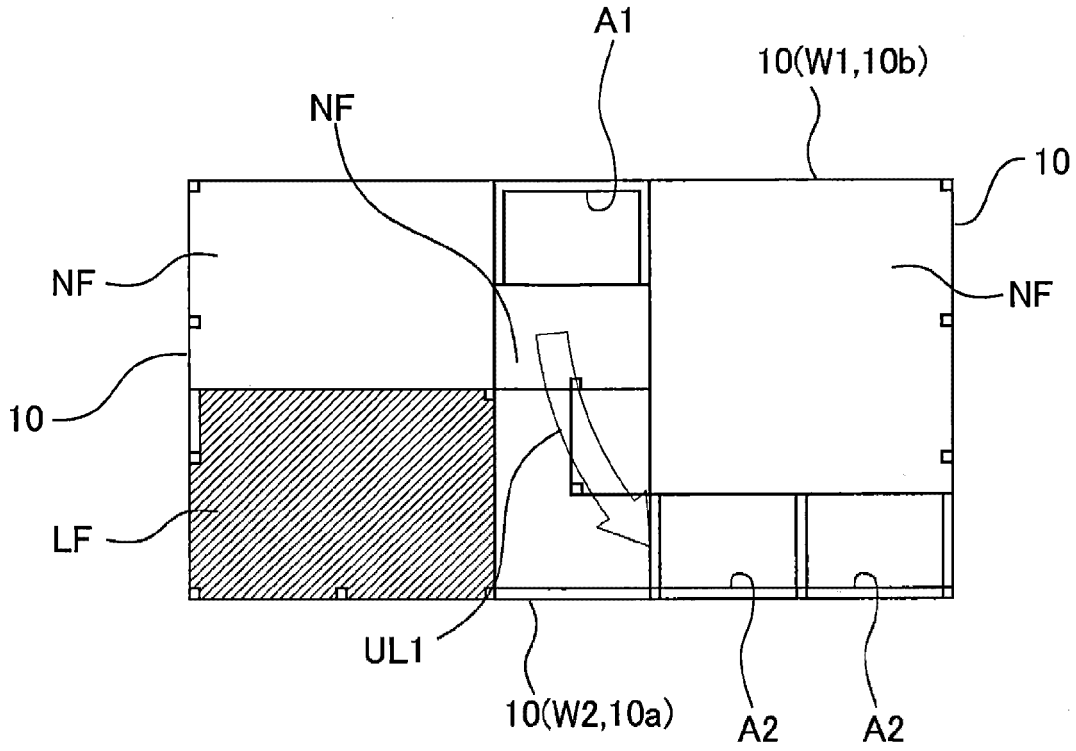

A1
10(W1,10b)
NF
10
NF
NF
10
LF
UL1
10(W2,10a)
A2
A2

FIG. 7

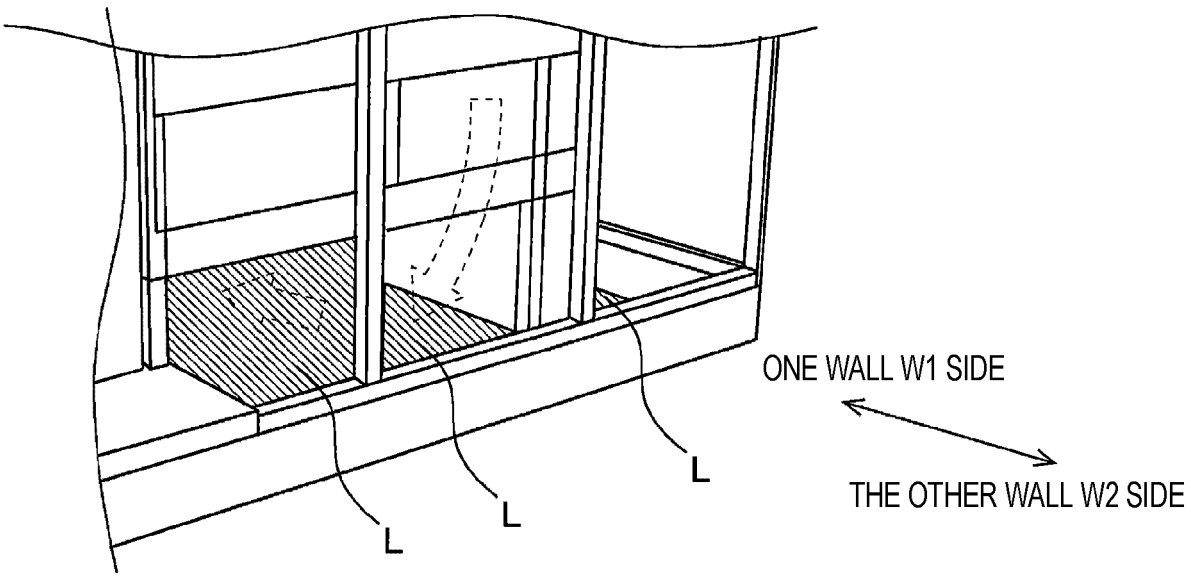
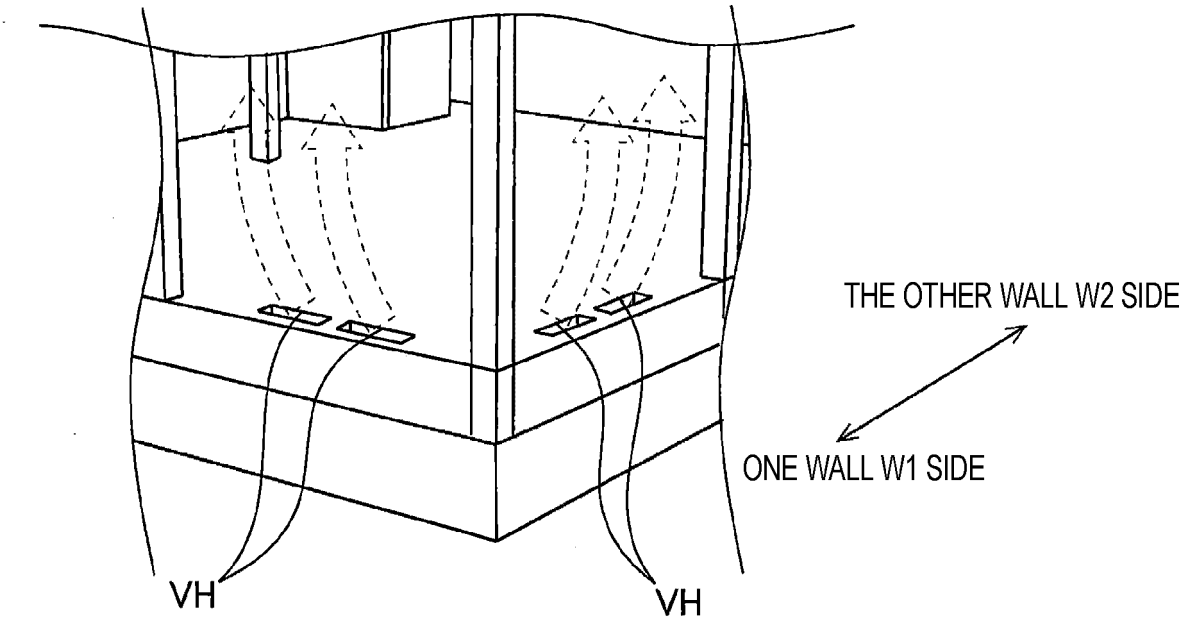

ONE WALL W1 SIDE
THE OTHER WALL W2 SIDE
L
L
L

FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2022/019186

A. CLASSIFICATION OF SUBJECT MATTER

E04B 2/56(2006.01)i; ***E04B 1/76***(2006.01)i
FI: E04B2/56 645B; E04B2/56 605Z; E04B1/76 200Z

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E04B2/56-2/70; E04B1/62-1/99

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

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2022
Registered utility model specifications of Japan 1996-2022
Published registered utility model applications of Japan 1994-2022

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2005-98079 A (SATOKOU KK) 14 April 2005 (2005-04-14) paragraph [0020], fig. 4(B)	1-8
Y	JP 2007-218055 A (MIYAZAKI, Masayasu) 30 August 2007 (2007-08-30) paragraph [0001]	1-8
Y	JP 62-7975 Y2 (TAKASAGO THERMAL ENGINEERING) 24 February 1987 (1987-02-24) column 1, line 21 to column 2, line 4	1-8
Y	JP 6552425 B2 (PORTA PARK CO LTD) 31 July 2019 (2019-07-31) paragraphs [0021]-[0058], fig. 1-15	1-8
Y	JP 2011-169096 A (JOYFUL HONDA KK) 01 September 2011 (2011-09-01) fig. 8	2-8
Y	JP 2016-69891 A (TOYOTA HOME KK) 09 May 2016 (2016-05-09) fig. 1	2-8
Y	JP 2007-247176 A (TOYO EXTERIOR CO LTD) 27 September 2007 (2007-09-27) paragraph [0018], fig. 1	2-8

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 May 2022	**07 June 2022**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2022/019186

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2007-239189 A (MATSUSHITA ELECTRIC IND CO LTD) 20 September 2007 (2007-09-20) paragraph [0043], fig. 6	3
Y	JP 10-132301 A (FURUHATA, Kakuji) 22 May 1998 (1998-05-22) paragraphs [0017]-[0021], [0028]-[0031], fig. 1, 4	5-8
A	JP 2009-270400 A (PANASONIC CORP) 19 November 2009 (2009-11-19) paragraphs [0038]-[0044], fig. 1	1-8

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2022/019186

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 2005-98079 A	14 April 2005	(Family: none)	
JP 2007-218055 A	30 August 2007	(Family: none)	
JP 62-7975 Y2	24 February 1987	(Family: none)	
JP 6552425 B2	31 July 2019	(Family: none)	
JP 2011-169096 A	01 September 2011	(Family: none)	
JP 2016-69891 A	09 May 2016	(Family: none)	
JP 2007-247176 A	27 September 2007	(Family: none)	
JP 2007-239189 A	20 September 2007	(Family: none)	
JP 10-132301 A	22 May 1998	(Family: none)	
JP 2009-270400 A	19 November 2009	(Family: none)	

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP S60042529 A **[0003]**
- JP 2008134043 A **[0003]**
- JP 2021092743 A **[0051]**