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(54) **FRAME MODULE AND SPACE UNIT MADE OF THE MODULES**

(57) A module for building a space unit, comprising a rectangular frame (1) made of frame elements (2, 3) and forming the edges of the module and defining two opposite planar planes. A glass pane (4) is mounted in the frame (19) at a distance from at least one of the planar planes and extending over an opening formed by the

frame (1). Further, there is a panel (9) mounted on the frame (1) at a distance from the glass pane (4) so that an air gap (10) is formed between the glass pane (4) and the panel (9) and extending over the opening formed by the frame (1).

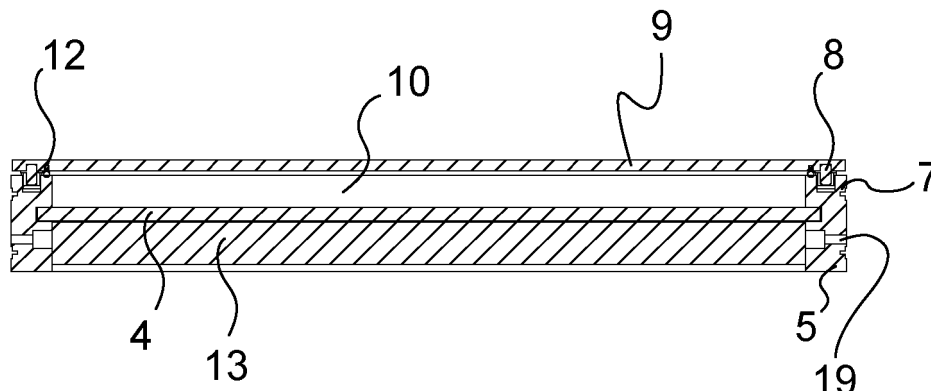


FIG. 6

(52) Cooperative Patent Classification (CPC): (Cont.)
E04C 2/54

Description

FIELD

[0001] The invention relates to providing space units for working areas in buildings, for example in open offices or working areas or public spaces where a space separate from the general environment is required. In particular, the invention relates to providing sound proofed space for working or meetings.

BACKGROUND

[0002] Public spaces and offices are nowadays usually open space. However, such open spaces are noisy and restless, making the working environment uncomfortable. Light movable walls to a working space may divide a working area for one or more employees. This way a modifiable lay-out with low cost is obtained. Correspondingly, public spaces for example at airports, train stations and such are also restless by nature. Same applies to workshops and even retail shops and restaurants. There is a need for providing spaces separated from such larger space for working and meeting in quiet relaxed environment. Such separated spaces may be customer service pods, office pods, meeting units or simply a closed space for relaxation isolated from disturbing environment.

[0003] The separated space can be built as fixed rooms within a building. This provides a solid structure, but is expensive and the layout is tedious to alternate. A more flexible solution is to use modular movable space units or pods that can be built basically anywhere on an available floor area. These are easy to set up and easy to dismantle, whereby changing layout, adding more units and removing units is relatively easy and cost effective. However, when demands for good noise insulation, electric and data connections as well as air conditioning increase, the structural demands of the modular unit increase making constructing and setting up of the unit more complicated and demanding. Simultaneously, costs of a unit and setup should be kept affordable and the construction simple.

[0004] Even though there are several types of modular working units and pods, there is demand of improved designs.

SUMMARY OF THE INVENTION

[0005] The invention is defined by the features of the independent claims. Some specific embodiments are defined in the dependent claims.

[0006] According to a first aspect of the present invention, there is provided a module for building a space unit, comprising a rectangular frame made of frame elements having thickness and forming the edges of the module and defining two opposite planar planes, a glass pane of laminated glass mounted in the frame at a distance from at least one of the planar planes and extending over an

opening formed by the frame and a panel mounted on the frame at a distance from the glass pane so that an air gap is formed between the glass pane and the panel and extending over the opening formed by the frame.

[0007] According to a second aspect of the present invention, there is provided an insulating panel on the opposite side of the glass pane and extending over the opening formed by the frame.

[0008] According to a third aspect of the invention, the insulation panel is mounted on the frame by power locked fitting.

[0009] According to a fourth aspect of the invention, the insulation panel is flexible foam.

[0010] According to a fifth aspect of the invention, the panel is attached on one of the surfaces of the frame defining a planar plane.

[0011] According to one of the aspects of the invention, the panel is mounted on the frame by hidden fasteners.

[0012] According to one aspect of the invention, the glass pane is mounted on the frame air tight.

[0013] According to one aspect of the invention, a seal is fitted between the frame and the panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

FIGURE 1 illustrates a part that can be used for realizing the invention;

FIGURE 2 is a cross section of the part in FIGURE 1;

FIGURE 3 illustrates a setup for realizing a module in accordance with at least some embodiments of the present invention;

FIGURE 4 is a cross section of the setup in FIGURE 3;

FIGURE 5 illustrates an example module capable of supporting at least some embodiments of the present invention;

FIGURE 6 is a cross section of the module in FIGURE 5; and

FIGURE 7 illustrates a space unit made using modules described herein.

EMBODIMENTS

[0015] The purpose of the invention is to provide a new module for realizing space units like working pods with simple element modules. The modules use a body structure on which parts providing various functionalities are attached. This allows that only one frame of body is needed for many modules having different functions and appearance. The insulation capacity and soundproofing

can be easily adjusted without providing many frame elements and only parts providing the functionalities have to be changed. The sound insulation is very high and can be adjusted. As the system is highly modular, the wall structure, layout and size of space units can be easily changed. Mounting a space unit, for example a working pod, is fast and easy as well as dismantling of it. This makes it very simple to build different types of spaces quickly, change them and transfer the pods or units in modules to other location or layout

[0016] FIGURE 1 illustrates a window module that can be utilized for realizing modules in accordance with at least some embodiments of the present invention. The window module comprises a frame 1 made of two long frame elements 2 and two short frame elements 3 joined together as a square. The frame elements are made of wood material such as massive wood, MDF or like, as they combine sufficient structural strength and soundproofing. However, use of metals or plastics of composite can be contemplated. In an assembled structure, for example in a working pod, one of the short frame elements 3 forms a base of the frame 1 and the other a top of the frame 1. The long frame elements 2 set in vertical position and form sides of the frame 1. The frame 1 delimits an open area wherein the frame 1 forms the edges. On the side surface of each frame element 2, 3 is a groove 6 opening to the open area. A glass pane 4 is set in the groove 6. The groove 6 is at a distance from the surfaces 5 of the frame elements 2, 3 so that a glass pane 4 mounted in the groove 6 is set at a distance from the surface 5 of the frame elements 2, 3. The glass pane 4 is mounted in the groove 6 by a seal or a sealing agent or similar known mounting method so that the seal between the glass pane 4 and the frame 1 is airtight. This provides good soundproofing and insulation. The glass pane 6 is preferably laminated glass to provide structural strength. In this way the frame 1 and the glass pane 6 form the load bearing structure of the module. The glass pane may be clear or tinted and/or have decorations to provide desired appearance. Instead of using laminated glass, using hardened glass, insulating glass or other type of glass may be contemplated. The choice of glass type depends on structural strength needed, but it has to be at least partially transparent to provide a light permeable window.

[0017] The surfaces 5 of the frame elements 2, 3 facing in the same direction define two opposing planar planes (faces). When the module is assembled in a space unit, the opposing planar surface form the inside wall and the outside wall of the space unit. On one surface 5 of the frame element 2, 3 are female fasteners 7.

[0018] FIGURE 3 illustrates a module having a top plate attached to one of the short frame elements 3 and adjacent long frame elements 2. The purpose of the top plate 11 is to cover the edge of a roof or roof element placed on top of the module.

[0019] FIGURE 5 illustrates an example module capable of supporting at least some embodiments of the

present invention. The basic structure is the one described above. In addition to that there is a panel 9 attached to one surface 5 of the frame elements 2, 3. The panel 9 forms an air gap 10 with the glass panel 4. A seal 12 is placed between the surface 4 of the frame 1 and the panel 9. The seal 12 can be placed on a groove in the frame or panel or both or simply attached on the surface of either one. In this way, the air gap 10 is closed space. This increases remarkably the soundproofing capability of the structure. The panel 9 is fastened to the frame 1 by hidden fasteners comprising a female fastener embedded in the surface 5 of the frame 1 and male fasteners extending from the surface of the panel 9. By using hidden fasteners the surface of the panel 9 is unbroken and neat. However, other types of fasteners may be used, for example to give decorative appeal around the perimeter of the module. The number of applicable fasteners is high and the module may utilize any desired type.

[0020] The panel may extend over one of the short frame elements to form a top plate as in FIGURE 3. The material of the panel may be varied to alternate appearance of the module. However, lightweight structures are preferred for easy handling and minimum stress on frame. On the other hand, thicker and heavier materials increase sound insulation.

[0021] One further feature improving the sound insulation is to place an insulation panel 13 over the glass panel 4. For this, the glass pane 4 is mounted on a distance from the surface 5 of the frame elements 2, 3. This forms a box-like trough within the inside edges of the frame 1 and the glass pane 4. A soft flexible piece of tightly fitting insulation panel can now be pushed on said trough and is set on place by power locked fitting by friction. Of course, other attaching methods may be used but this is superiorly simple. There are number of choices for the insulation material but soft flexible materials have the benefit of comfortable feel and texture. They also dampen echoes within a space effectively.

[0022] FIGURE 7 shows an example of a space unit constructed using the modules according to the invention. The space unit is a cubicle comprising a floor 14, a roof 15 and walls made of modules. On one edge there are two window modules 17 according to the FIGURES 3 and 4. There is also a door module comprising a sliding door 18. Other modules are closed modules 16 with surface panels in connection with FIGURES 5 and 6. In this example, the window modules 17 have an open window over the whole module. The window space may be limited by using panels and/or insulating panels extending only partially over the opening in the frame 1. For example, the lower part of the module may be thus covered. The window elements can be easily changed to closed elements and vice versa by removing or adding panels and insulating panels. When panels 9 are not in use, the female fasteners 7 are covered with caps.

[0023] There are several alternatives to join the modules together. One is schematically shown in FIGURE 6 as a hole 19 through which the modules can be attached

to a unit. The joint between the modules is accomplished with methods known in the art of producing working pods or space units. The soundproofing may require using sealing elements or structures prohibiting the transfer of sound. Such structures are readily available and familiar to persons skilled in the art of designing these units.

[0024] It is to be understood that the embodiments of the invention disclosed are not limited to the particular structures, process steps, or materials disclosed herein, but are extended to equivalents thereof as would be recognized by those ordinarily skilled in the relevant arts. It should also be understood that terminology employed herein is used for the purpose of describing particular embodiments only and is not intended to be limiting.

[0025] Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment.

[0026] As used herein, a plurality of items, structural elements, compositional elements, and/or materials may be presented in a common list for convenience. However, these lists should be construed as though each member of the list is individually identified as a separate and unique member. Thus, no individual member of such list should be construed as a de facto equivalent of any other member of the same list solely based on their presentation in a common group without indications to the contrary. In addition, various embodiments and example of the present invention may be referred to herein along with alternatives for the various components thereof. It is understood that such embodiments, examples, and alternatives are not to be construed as de facto equivalents of one another, but are to be considered as separate and autonomous representations of the present invention.

[0027] Furthermore, the described features, structures, or characteristics may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided, such as examples of lengths, widths, shapes, etc., to provide a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that the invention can be practiced without one or more of the specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

[0028] While the forgoing examples are illustrative of the principles of the present invention in one or more particular applications, it will be apparent to those of ordinary skill in the art that numerous modifications in form, usage and details of implementation can be made without the exercise of inventive faculty, and without departing

from the principles and concepts of the invention. Accordingly, it is not intended that the invention be limited, except as by the claims set forth below.

[0029] The verbs "to comprise" and "to include" are used in this document as open limitations that neither exclude nor require the existence of also un-recited features. The features recited in depending claims are mutually freely combinable unless otherwise explicitly stated. Furthermore, it is to be understood that the use of "a" or "an", i.e. a singular form, throughout this document does not exclude a plurality.

INDUSTRIAL APPLICABILITY

[0030] The invention provides variable working pods and other space units for many purposes.

REFERENCE SIGNS LIST

[0031]

- | | |
|----|------------------------------|
| 1 | frame |
| 2 | long frame element |
| 3 | short frame element |
| 4 | glass pane |
| 5 | surface (of a frame element) |
| 6 | groove |
| 7 | female fastener |
| 8 | male fastener |
| 9 | panel |
| 10 | air gap |
| 11 | top plate |
| 12 | seal |
| 13 | insulation panel |
| 14 | floor |
| 15 | roof |
| 16 | closed module |
| 17 | window module |
| 18 | door module |
| 19 | hole |

Claims

1. A module for building a space unit, comprising:
- a rectangular frame (1) made of frame elements (2, 3) and forming the edges of the module and defining two opposite planar planes, and
 - a glass pane (4) mounted in the frame (19) at a distance from at least one of the planar planes and extending over an opening formed by the frame (1),
- characterized by**
- a panel (9) mounted on the frame (1) at a distance from the glass pane (4) so that an air gap (10) is formed between the glass pane (4) and the panel (9) and extending over the opening

formed by the frame (1).

2. A module according to the claim 1, comprising an insulating panel (13) on the opposite side of the glass pane (4) and extending over the opening formed by the frame (1). 5
3. A module according to one of the claims 1-2, wherein the insulation panel (13) is mounted on the frame (1) by power locked fitting. 10
4. A module according to one of the claims 1-3, wherein the panel (9) is attached on one of the surfaces (5) of the frame (1) defining a planar plane. 15
5. A module according to one of the claims 1-4, wherein the panel (9) is mounted on the frame by hidden fasteners (7, 8).
6. A module according to one of the claims 1 - 6, wherein the glass pane (4) is mounted on the frame (1) air tight. 20
7. A module according to one of the claims 1-6, comprising a seal (12) fitted between the frame (1) and the panel (9) to provide an airtight air gap. 25
8. A module according to one of the claims 1-7, wherein the frame elements have a thickness enabling establishment of the air gap. 30
9. A module according to one of the 1 - 8 comprising a plurality of holes in the frame elements for joining the modules together. 35

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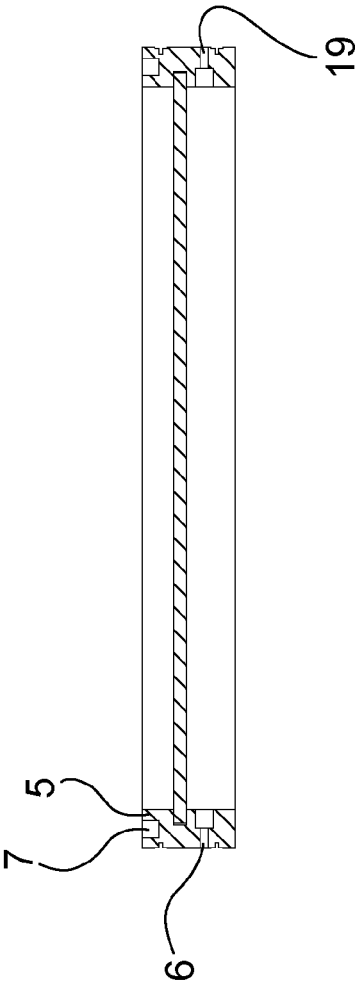
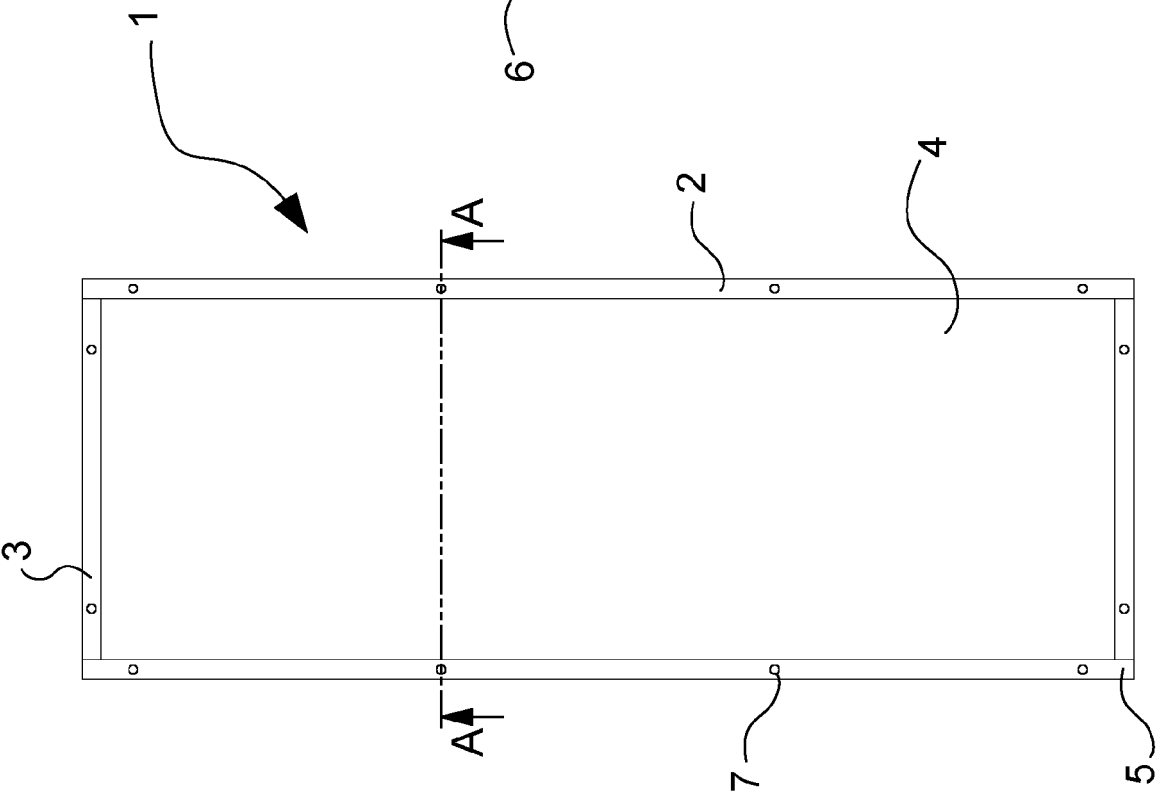
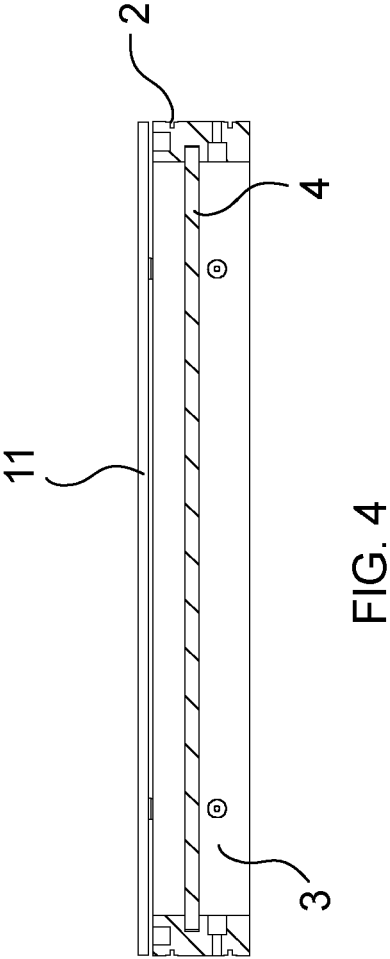
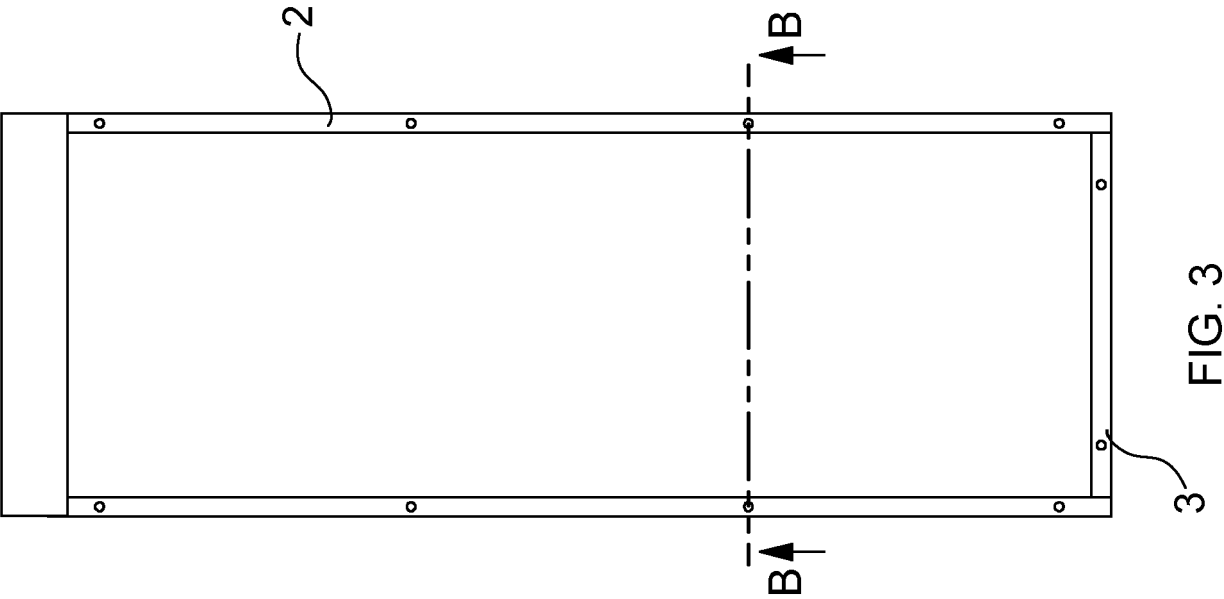


FIG. 2

FIG. 1



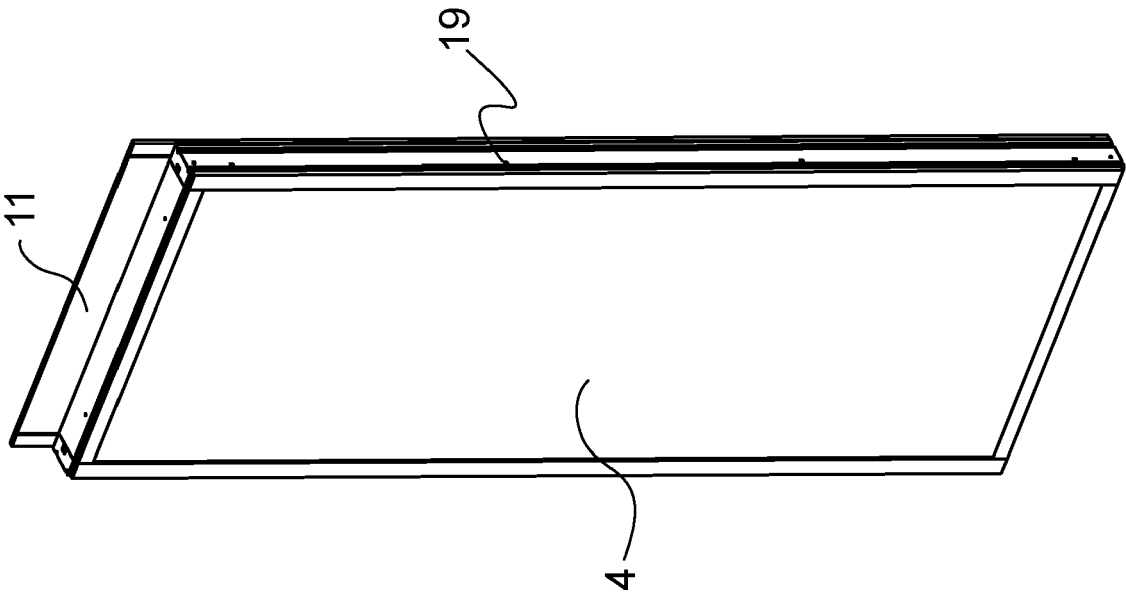


FIG. 5

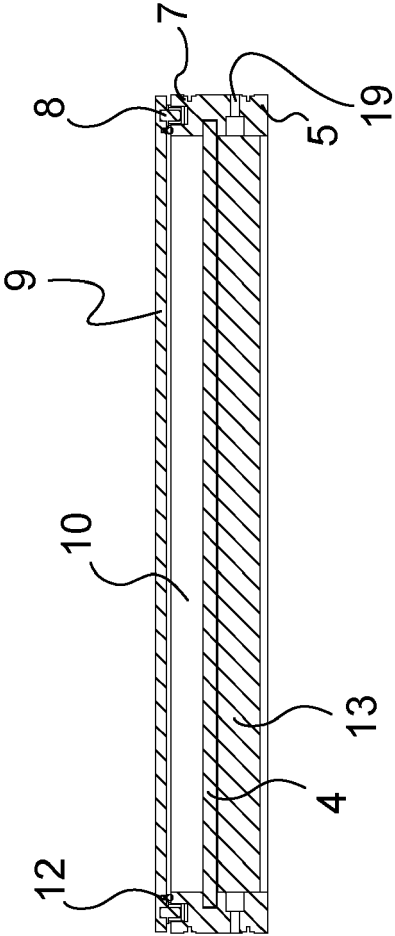


FIG. 6

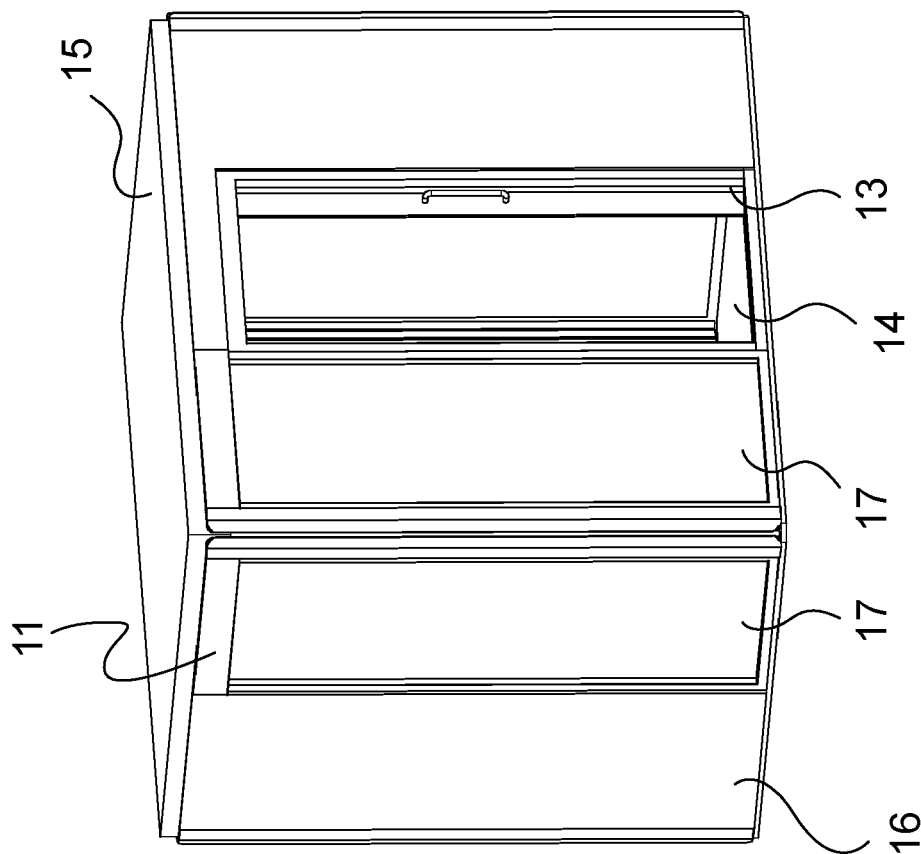


FIG. 7



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Application Number

EP 23 15 9910

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Place of search Munich		Date of completion of the search 29 June 2023	Examiner Giannakou, Evangelia
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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