(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 553 255 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.10.2019 Bulletin 2019/42

(21) Application number: **19169114.6**

(22) Date of filing: **12.04.2019**

(51) Int Cl.:
E04H 1/12 *(2006.01)* ***E04H 1/14*** *(2006.01)*
A61M 21/00 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA D TN

(30) Priority: **12.04.2018 GB 201806068**
13.04.2018 GB 201806121
20.07.2018 GB 201811932

(71) Applicants:
- **Glass, Christopher**
  London EC1Y 8QE (GB)
- **Hathorn, Charles**
  London EC1Y 8QE (GB)

(72) Inventors:
- **Glass, Christopher**
  London EC1Y 8QE (GB)
- **Hathorn, Charles**
  London EC1Y 8QE (GB)

(74) Representative: **Fry, David John**
Agile IP LLP
Airport House
Purley Way
Croydon, Surrey CR0 0XZ (GB)

(54) ACOUSTICALLY ISOLATED BOOTH

(57) A booth structure (1) comprising a roof (25), a floor (26) and a plurality of slat elements (10) that when stacked together form at least one wall of an enclosure (2), wherein the slat elements are pre-shaped and stackable in a predefined order to form a door frame (3) for the enclosure, wherein each slat element comprises at least one aperture (12) which when aligned with an aperture of a slat above and/or below form a duct within the wall or walls of the structure.

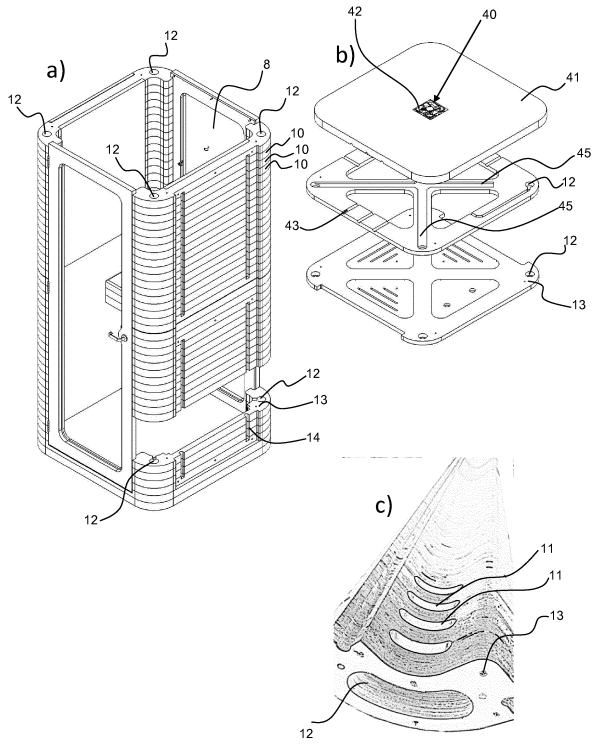


Fig. 5

EP 3 553 255 A1

Description

Field of the Invention

[0001] The present disclosure relates to a booth for personal use, such as for reading, telephoning etc., and/or as a group meeting booth that is acoustically quiet and private from its surrounding. More specifically, it relates to a quiet booth comprising a slatted structure.

Background to the invention

[0002] A vast majority of office based work environments employ an open-plan office layout or a cubical partitioned work desk layout. These work environments have high levels of background noise, which in many cases may still permit a person to perform their duties. However, these high noise levels may be distracting or in some cases even prohibit people to perform a required task, for example when concentration is required.

[0003] High noise levels in the background may also affect a telephone conversation in two ways; one, the other party may not be heard properly; and two, the microphone of the telephone handset may transmit the background noise to the other party and make the conversing unpleasant and undistinguishable.

[0004] Another important issue arising from open office environments is that there is no conversation privacy. This may be a problem for personal one to one or over the telephone conversations, as well as when for example dealing with privacy issues concerning a client.

[0005] Similar acoustic pollution and privacy related deficiency may be identified in factories, industrial plants, construction sites, and work sites with heavy machinery.

[0006] Evasion from acoustic pollution and need for private conversation has also been identified e.g. in expos, trade shows, job fairs, conferences, etc.

[0007] Public places, coffee houses, etc. may be great places to meet and convers. However, noise levels and privacy issues may prohibit a full meaningful discussion or e.g. a business meeting or an interview to take part.

[0008] The inventors have identified as a solution a booth for personal use, such as for reading, telephoning and, depending on its size, also for use as a group meeting booth that is acoustically quiet and private from its location's surrounding. The booth comprises a slatted structure. In some of its embodiments the booth may be a temporary structure, which is assembled on site and then disassembled and taken away.

Statement of the Invention

[0009] According to a first aspect of the invention there is provided a booth structure comprising:

a roof;
a floor; and
a plurality of slat elements that when stacked together form at least one wall of an enclosure;
wherein the slat elements are pre-shaped and stackable in a predefined order to form a door frame for the enclosure;
wherein each slat element comprises at least one aperture which when aligned with an aperture of a slat above and/or below form a duct within the wall or walls of the structure.

[0010] Preferably the slat elements may comprise widened corner sections forming stackable surfaces.

[0011] Preferably the corner sections of each slat provide structural columns for the enclosure.

[0012] Preferably the apertures are provided in the corner sections to provide a duct within at least one of the columns.

[0013] Preferably the booth has an air inlet aperture which provides a passage of outside air into the duct.

[0014] Preferably the booth has an air outlet aperture inside the enclosure which provides a passage of air from the duct into the enclosure.

[0015] Preferably the booth further comprises preshaped slat elements that when stacked form a table with the enclosure.

[0016] 8 Preferably the booth further comprises preshaped slat elements that when stacked form a seat with the enclosure.

[0017] Preferably the booth further comprises preshaped slat elements that when stacked form a window frame for the enclosure.

[0018] Preferably the booth may be disassembleable into at least two parts.

[0019] In a further embodiment there is provided a kit of parts comprising a plurality of pre-shaped slat elements which when assembled form the said booth.

[0020] Preferably the booth is disassembleable into the kit of parts.

[0021] Preferably the enclosure once assembled is generally rectangular, oval, pentagonal, triangular, hexagonal, or clover shaped.

[0022] Preferably the enclosure may have staged seating arrangements.

[0023] In a further embodiment there is provided a plurality of booths which are arrangeable to attach to adjacently attach to each other to form multiple booth formations.

Brief Description of the Drawings

[0024] The invention will now be described by way of example only with reference to the accompanying diagrammatic drawings in which:

Figure 1 illustrates a perspective view of a first embodiment of a booth in accordance with the invention;

Figure 2 illustrates a front view of the booth, showing a door and entrance into the booth;

Figure 3 illustrates a side view of the booth;

Figure 4 illustrates various construction slat elements of the booth, specifically (a) a general wall slat, (b) a combined table and wall slat, and (c) a combined seat and wall slat.

Figure 5 illustrates (a) a partially disassembled booth, showing (b) the top cover elements and the top ventilation system, and (c)side column extract showing a ventilation channel and air outlet holes.

Figure 6a illustrates a top view of the booth; and Figure 6b illustrates a bottom view of the booth;

Figure 7 illustrates alternative top view design embodiments of the booth, specifically: a)rectangular, b)oval, c)pentagonal, d)triangular, e)hexagonal, and f)clover shaped;

Figure 8 illustrates a top view of the triangular embodiment of the booth, showing an enhanced top ventilation system;

Figure 9 illustrates a perspective front view of the triangular booth, showing a door, a window, and the interior of the booth, wherein table and seating areas are visible;

Figure 10 illustrates a perspective view of the back of the triangular booth;

Figure 11 illustrates a bird's-eye view of the triangular embodiment of the booth, wherein for illustration purposes, the roof has been removed and four people can be seen having a meeting in the booth;

Figure 12a and Figure 12b illustrate sketches of two of the various possible cluster arrangements of triangular booths, wherein doors and tables of the booths are also depicted.

Detailed Description of the Invention

[0025] A booth 1 in accordance with a first embodiment of the invention is shown in Figure 1. The booth 1 comprises an enclosure 2. The enclosure 2 has an opening 3 formed as a door frame in at least one side of the enclosure 2, leading to the inside of the enclosure 2.

[0026] As can be also seen in Figure 2, a door 4 is arranged to be in an opened position allowing access to the enclosure 2 through the opening 3, and in a closed position, which fully closes the opening and acoustically separates the enclosure from the surrounding environment. The door 4 has a door handle 5, or may have any other grab and/or access locking means. In some embodiments the access means may be mechanical, such as keys, locks etc.

[0027] Alternatively or additionally the access means may be electronic based, such as magnetic cards, locks with alpha numerical keys and pins, radio frequency activated, fingerprint, smartphone, or connected to and controlled by software installed in a controller of the booth and/or connected and controlled via wireless protocols, and/or connected and controlled via the internet.

[0028] The door 4 has a peripheral frame made 6 of rigid material. The peripheral frame 6 may be made of real wood or reconstructed wood-based material, such as plywood, compressed cardboard etc.; it may be plastic, or polymer based; or metal based, e.g. aluminium or light weight alloy. The peripheral frame may be acoustically insulated, with further side panelling to it or with internal insulating methods, such as foam etc.

[0029] The peripheral frame 6 supports a door panel 7. The door panel may be transparent or translucent to allow natural light into the booth's enclosure. In other embodiments the door may be a combination of both, e.g. in sections and/or in patterns. A transparent door panel allows more light in, and allows people inside and outside to see each other. A translucent door panel would provide more visual privacy.

[0030] In this embodiment, the door panel 7 is transparent and in Figures 1 and 2 the interior of the booth 1 can be seen. Also, in this embodiment a first side of the booth opposite the door has an incorporated window 8 with a transparent window panel. The window 8 has similar dimensions and design as the door. This allows for more natural light to enter the interior of the booth.

[0031] Both the door 4 and window 8 may have high acoustic insulating properties.

[0032] In this embodiment, the door is made of a single peripheral frame and panel. In other embodiments, the door may comprise two or more frame sections supporting two or more window panel sections respectively. As such the door may come e.g. in two parts for ease of transportations, and the two parts may be assembled together on site. The window 8 may have similar assembly features and parts as the door 4.

[0033] Figure 3 shows a side view of the booth showing a second side of the booth 1. As can be seen in Figure 3, the booth is a structure comprising a number of slat elements 10 or referred to as horizontal slats stacked vertically on top of each other. In this embodiment a decorative panel 13 is attached to the second side of the booth.

[0034] The slats 10 may be made of real wood or reconstructed wood-based material, such as plywood, compressed cardboard etc.; they may be plastic, or polymer based; or metal based, e.g. aluminium or light weight alloy.

[0035] Additional acoustic insulation panelling may be attached the slats 10. However, slats with integrated acoustic insulation properties in their structure may also be used and may create a better acoustically insulated booth. The insulation of each slat element may be internal, such as injected with acoustic foam, or encompass-

ing acoustic foam; may be structural, e.g. compressed paper or wood-based composite with high acoustic dampening properties; or may be a slat that comprises a layered sandwich of materials with acoustics dampening properties.

[0036] Referring to Figure 4, three types of slats can be seen. The top one is a general wall slat 10,15, the middle one is a combined wall-table forming slat 16 and the bottom one is a combined seat-wall forming slat 17.

[0037] Referring now to Figure 5, it can be seen that the booth may be constructed entirely by stacking the slats 10 on top of each other. This method may be used to create a booth with a uniformly empty enclosure.

[0038] Inserting one or more seat-wall slats 16 on one side of the booth at approximately seating height, creates a seat 21 , which is structurally integrated to the booth.

[0039] Similarly, inserting one or more table-wall slats 17 on the side of the booth other than the seat side, at a height higher that the seating height, creates a table 22, which is structurally integrated to the booth. As the slats are modular, the height of the table may be at a table height suitable when sat down in a chair stool or the booth integrated seat, or the table height may be suitable for a standing up table.

[0040] Referring to Figure 6a, the booth has a roof 25, which may be a singular unit or composite top panelling.

[0041] Referring to Figure 7b the booth has a base or floor 26, which may be a singular unit or composite top panelling.

[0042] In this embodiment the shape of the roof 25 and the floor 26, which also define the overall shape of the booth, are square shaped with rounded corners.

[0043] In other embodiments, the roof and the floor of the booth may be other shapes, e.g. rectangular, pentagonal, triangular, hexagonal, oval, clover shaped, etc. as illustrated in Figure 7.

[0044] The roof 25 and the floor 26 may also be different shapes to each other, as long as the enclosure has suitable internal space and the door is arranged to be functional.

[0045] The size of the interior of the booth may be suitable to accommodate one person or alternatively bigger booths may be suitable for accommodating two or more people.

[0046] Referring back to Figures 1, 2 and 4, in this embodiment can be seen that the seat and the table are integrated on two opposite side panels of the booth. In an embodiment wherein the roof and the floor are rectangular as seen in Figure 7a, two seats may be integrated on two opposite sides of the booth and the table may be integrated on the back side of the booth, i.e. opposite the booth side comprising the door.

[0047] Alternative combinations and arrangements of seats and table may be made depending on the shape of the booth.

[0048] In further embodiments, the table may be integrated to the floor, and all side walls, apart from door sides, may incorporate seats.

[0049] Referring now to Figures 6a and 6b, which show the roof panelling and the underside of the floor panel, respectively, and to Figure 6, which shows the wall slats in the assembly of the booth, the invention will be described in more detail.

[0050] In this embodiment, the floor panel has one or more air and/or cable holes at the corners, one or more dowel holes close to the corner limits and one or more rod holes along the middle of the floor frame. One of the air-cable holes is opened through the floor to allow external cabling such as power and internet to be wired through the booth, or allow a socket for a socket connection.

[0051] The air-cable holes, the dowel holes and the rod holes correspond to similar holes of the wall slats, seat-wall slats and the table-wall slats.

[0052] In this embodiment in the slats, the rod holes may be used only in a limited number of slats. As such rods, e.g. the length of four slat height may be used to bolt together to halves of a booth. Reverting back to the floor panel, dowels are used to join the floor panel to the first wall slats. A second wall slat is positioned on top of the first walls slat. The two wall slats attach to each other via dowels inserted into respective and corresponding dowel holes of the two slat panels. A third wall slat is positioned and attached on top of the second slat with dowels in a similar manner. The rest of the wall slats are also attached in a similar manner on top of each other.

[0053] Referring to Figure 8, can be seen that the first two wall slats have rod holes, whereas the wall slats attached further up have channel grooves at the location of the rod holes.

[0054] In this embodiment the rod is threaded, and nuts with corresponding mating thread are used to fasten the two wall slats to the floor panels.

[0055] Similarly, the roof panel is fastened with rods and nuts to the top two wall slats.

[0056] Referring to Figure 4, grooved wall slats continue to be stacked up to approximately the middle of the booth. In this embodiment, the four wall slats corresponding approximately to the middle of the booth have again holes and not grooves. These four wall slats are fastened together with rods and nuts, and thus increasing the structural integrity of the booth.

[0057] In other embodiments, alternative combinations and locations of rod and nut fastening may be used.

[0058] Furthermore, the booth may be assembled in e.g. in two parts at the manufacturer's shop, then transported to the installation location, where the two booth parts can be assembled together in a very short amount of time by fastening the rod and bolts in the middle section. Then the door, window and any decorative panels may be attached without much time required.

[0059] Referring further to Figure 4, a disassembled roof panelling is shown. In addition to providing structural support and enclosing the booth, the roof panelling also incorporated a ventilation system 40.

[0060] The roof panelling comprises a top panel, which

in turn comprises one or more electric fans. The top panel comprises side ventilation channel openings 43.

[0061] The top roof panel mates with a middle roof panel 44. The middle panel also has corresponding side ventilation channel openings 43. The ventilation channels in the top and middle roof panels form ventilation openings when the two panels are mated together.

[0062] The middle panel comprises through holes 45 that correspond with the size and location of the air-cable holes of the wall slats. Furthermore, the middle roof panel comprises large channels running across the panel and creating air passages that join the fan, i.e. fresh air inlet with the through holes that correspond with the air-cable holes of the wall slats. Air from the fan is pushed through the large channels into the air-cable holes all the way down to air exit holes located at the lower part of the wall slats. This can be seen e.g. in Figure 6, that the lowest stacked wall slats have openings into the air-cable holes, which allow the air into the booth.

[0063] This arrangement ensures that the booth is ventilated and adequate air temperature levels, while at the same time minimising the acoustic exchange between the outside and the inside of the booth.

[0064] The complete ventilation system is an integral part of the structure of the layered slats structure i.e. of the booth. The openings, holes, channels and duct forming extrusions that are aligned and arranged to create the ventilation system are formed and machined into the slats design during the machining process.

[0065] Furthermore, the ventilation system of the booth draws fresh air from the top, i.e. the roof's air entry points, ducts it down through the structure and pushes this fresh air into the enclosure of the booth at a low level air inject outlets. Whereas air exhaust outlets are located at the top of the booth in the roof but at different location from the fresh air inlets to avoid fresh air contamination and recirculation of 'used air'. The thus system uses convection air circulation by injecting fresh cold air in the lower part of the enclosure and allows the natural process of warm air to rise and exit at the top part of the enclosure.

[0066] A booth in accordance with a second embodiment of the invention is shown in Figures 8 to 12. The base, i.e. the floor, and roof of the booth are triangular in shape and the booth comprises three side walls. The booth comprises an enclosure. The enclosure has an opening in at least one side of the enclosure, leading to the inside of the enclosure.

[0067] Figure 8 illustrates a top view of the triangular embodiment of the booth, showing an enhanced top ventilation system. The ventilation system may be enhanced for meeting booths that may accommodate two or more people. The enhanced ventilation provides greater quantities of air circulation, with minimal amount of fan noise.

[0068] As can be also seen e.g. in Figure 9, a door is arranged to be in an opened position allowing access to the enclosure through the opening, and in a closed position, which fully closes the opening and acoustically separates the enclosure from the surrounding environment. Furthermore, Figure 9 illustrates a perspective front view of the triangular booth, showing the door, a window, and the interior of the booth, wherein table and seating areas are visible.

[0069] Figure 10 illustrates a perspective view of the back of the triangular booth, showing two back walls. In some embodiments, none, or one, or both of the back walls may be glazed to allow light in, or to increase privacy, depending on the purpose of the booth.

[0070] Figure 11 illustrates a bird eye view of the triangular embodiment of the booth, wherein for illustration purposes, the roof has been removed and four people can be seen having a meeting in the booth. Seating areas and a table can also be seen in Figure 11. In some embodiments, the seating area may be at multiple levels, i.e. staged or in steps, thus allowing a greater number of people to be comfortable in the same surface area. Staged seating can be seen in the top corner of Figure 11, which can comfortably accommodate up to six people.

[0071] Due to their geometry, triangular booths may be arranged in various clusters and formations. This may be to maximise the use of space where these booths are located, i.e. increased number of booths, or to adapt to the geometry of the room, or for purely aesthetic purposes, or combination of all of the above.

[0072] Figure 12a and Figure 12b for example illustrate sketches of two of the many possible cluster arrangements the triangular booths may have. Doors and tables of the booths are also depicted to demonstrate the workings of the booths.

[0073] The booths may have connection means to connect to each other in the cluster in order to increase the structural integrity of the booths and of the cluster.

[0074] In this embodiment, the triangles are equilateral. This allows the booths to be arranged in different arrangements. For example, Figure 12a shows that a chain of booths may be created in a continuous line. The doors of the booths are all accessible. Further booths may be added to the right of the cluster, or in this arrangement, downwards as seen in Figure 12a. it will be appreciated that linear or angular cluster geometries are possible.

[0075] Figure 12b on the other hand shows a central cluster arrangement, which maximises the use of space where these booths are located. In addition to the functions aspect, a central cluster arrangement also provides aesthetic qualities, especially in a fair or open office environment. The doors of the booths are all accessible.

[0076] In some embodiments a booth may have more than one opening and doors, i.e. a main door and a secondary door. In some cluster arrangements, i.e., when two booths are abut, respective secondary doors or a main door and a secondary door may align and when in the opened position, provide a double booth space.

[0077] In some cluster embodiments, where for example the main door is not accessible directly, a through route may be used from an adjacent booth.

[0078] Thus the invention discloses a booth structure

comprising a roof, a floor, and a plurality of slat elements that when stacked together form at least one wall of an enclosure, wherein the slat elements are pre-shaped and stackable in a predefined order to form a door frame for the enclosure, wherein each slat element comprises at least one aperture which when aligned with an aperture of a slat above and/or below form a duct within the wall or walls of the structure.

[0079] The slat elements comprise widened corner sections forming stackable surfaces. The corner sections of each slat provide structural columns for the enclosure. The apertures are provided in the corner sections to provide a duct within at least one of the columns. The booth has an air inlet aperture 42 which provides a passage of outside air into the duct 45.

[0080] The booth has an air outlet aperture 11 inside the enclosure which provides a passage of air from the duct 12, 45 into the enclosure.

[0081] Pre-shaped slat elements when stacked form a table with the enclosure. Pre-shaped slat elements that when stacked form a seat with the enclosure. Pre-shaped slat elements that when stacked form a window frame for the enclosure.

[0082] Other variations and modifications such as e.g. stacking the slats horizontally will be apparent to the skilled person. Such variations and modifications may involve equivalent and other features which are already known and which may be used instead of, or in addition to, features described herein.

[0083] Features that are described in the context of separate embodiments may be provided in combination in a single embodiment. Conversely, features which are described in the context of a single embodiment may also be provided separately or in any suitable sub-combination.

[0084] It should be noted that the term "comprising" does not exclude other elements, the term "a" or "an" does not exclude a plurality, a single feature may fulfil the functions of several features recited in the claims and reference signs in the claims shall not be construed as limiting the scope of the claims. It should also be noted that the Figures are not necessarily to scale; emphasis instead generally being placed upon illustrating the principles of the present disclosure.

Claims

1. A booth structure comprising:

a roof;
a floor; and
a plurality of slat elements that when stacked together form at least one wall of an enclosure;
wherein the slat elements are pre-shaped and stackable in a predefined order to form a door frame for the enclosure;
wherein each slat element comprises at least one aperture which when aligned with an aperture of a slat above and/or below form a duct within the wall or walls of the structure.

2. A booth in accordance with claim 1, wherein the slat elements comprise widened corner sections forming stackable surfaces.

3. A booth in accordance with claim 2, wherein the corner sections of each slat provide structural columns for the enclosure.

4. A booth in accordance with claim 3, wherein the apertures are provided in the corner sections to provide a duct within at least one of the columns.

5. A booth in accordance with claim 4, wherein the booth has an air inlet aperture which provides a passage of outside air into the duct.

6. A booth in accordance with claim 5, wherein the booth has an air outlet aperture inside the enclosure which provides a passage of air from the duct into the enclosure.

7. A booth in accordance with any one of the previous claims, further comprising pre-shaped slat elements that when stacked form a table with the enclosure.

8. A booth in accordance with any one of the previous claims, further comprising pre-shaped slat elements that when stacked form a seat with the enclosure.

9. A booth in accordance with any one of the previous claims, further comprising pre-shaped slat elements that when stacked form a window frame for the enclosure.

10. A booth in accordance with any one of the previous claims, wherein the booth is disassembleable into at least two parts.

11. A kit of parts comprising a plurality of pre-shaped slat elements which when assembled form the booth of any one of claims 1 to 9.

12. A booth in accordance with claim 11 wherein the assembled booth is disassembleable into the kit of parts.

13. A booth in accordance with any one of the previous claims, wherein the enclosure once assembled is generally rectangular, oval, pentagonal, triangular, hexagonal, or clover shaped.

14. A booth in accordance with any one of the previous claims, wherein the enclosure has staged seating arrangements.

15. A plurality of booths in accordance with any one of the previous claims, wherein the booths are arrangeable to attach to adjacently attach to each other to form multiple booth formations.

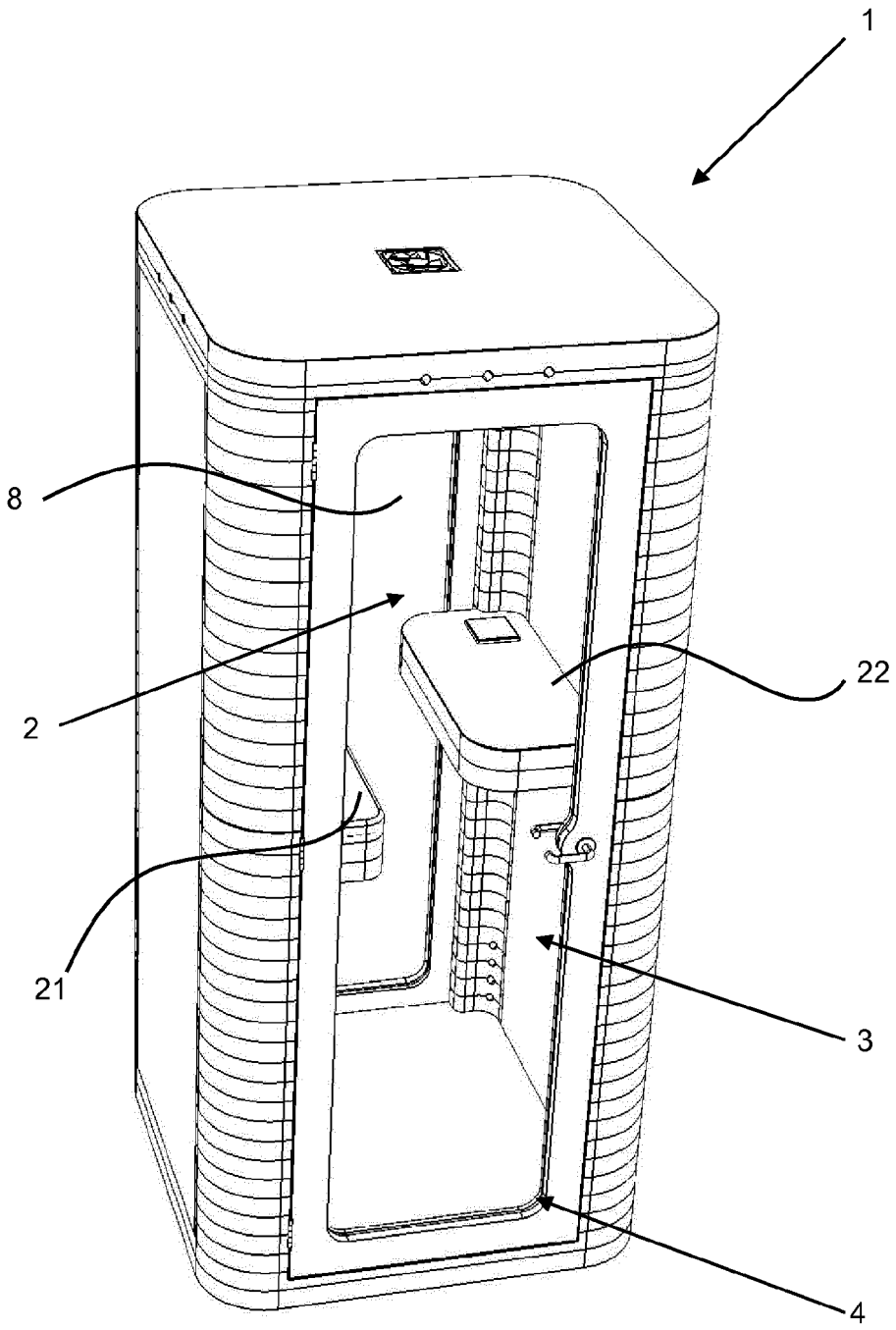


Fig. 1

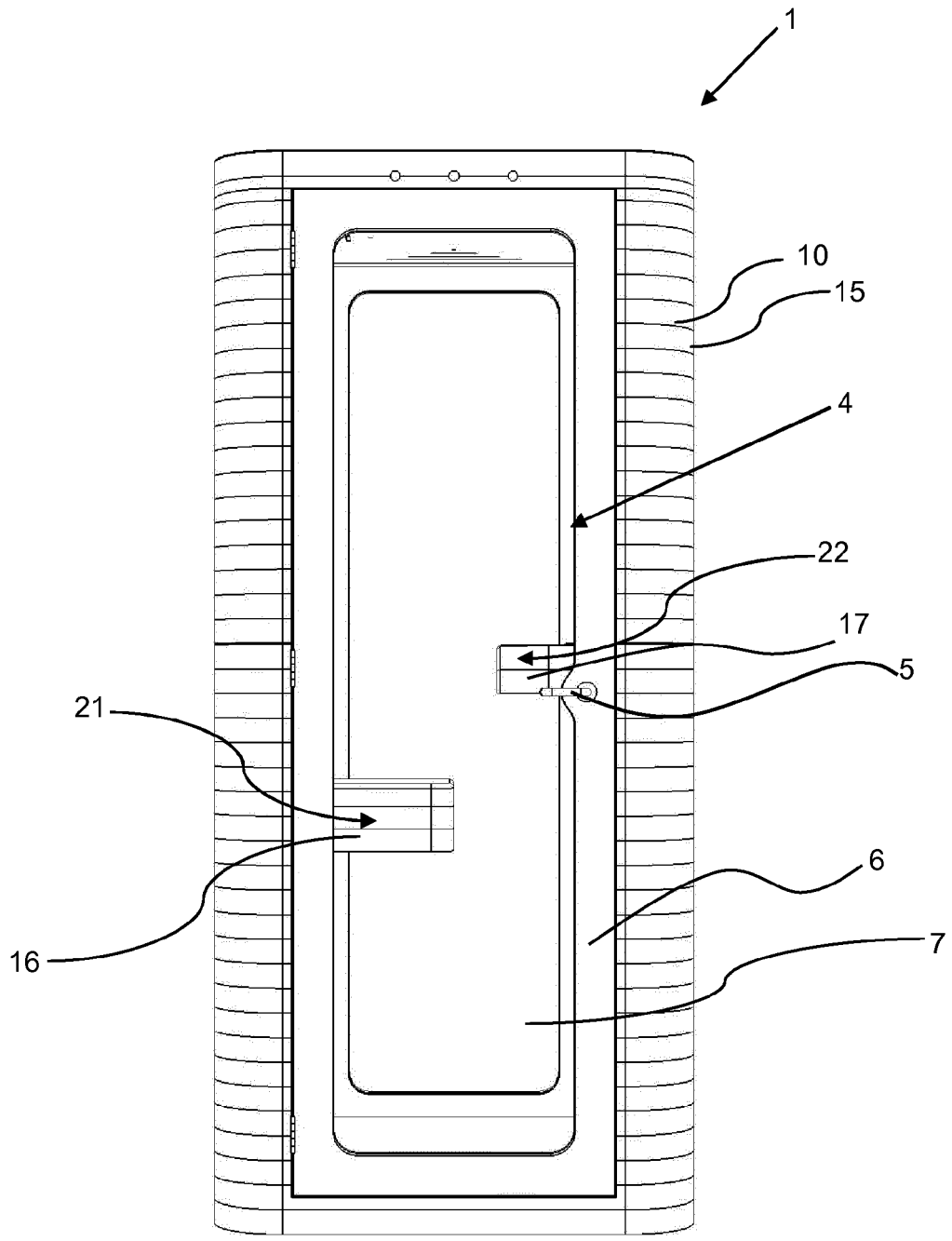


Fig. 2

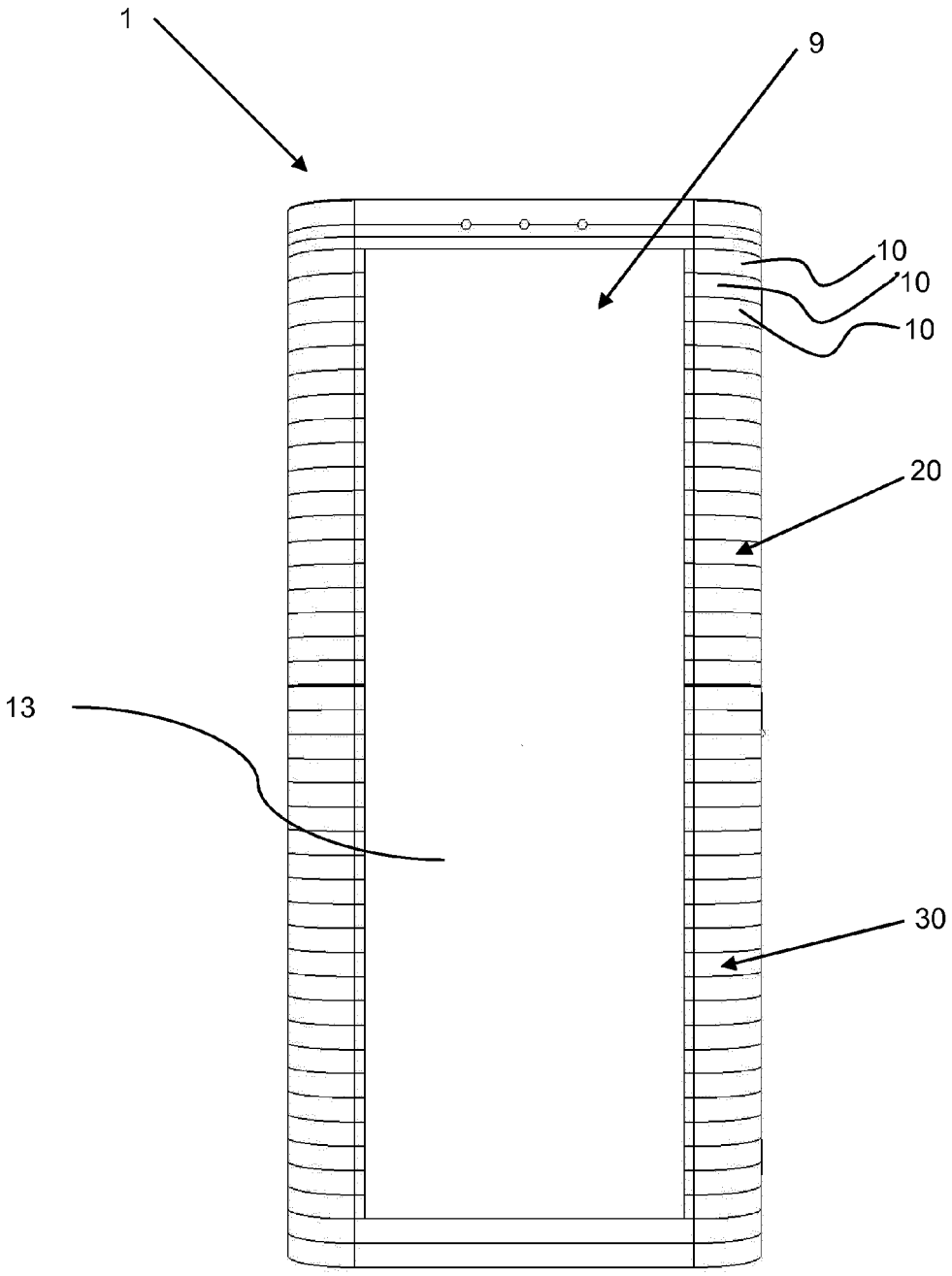


Fig. 3

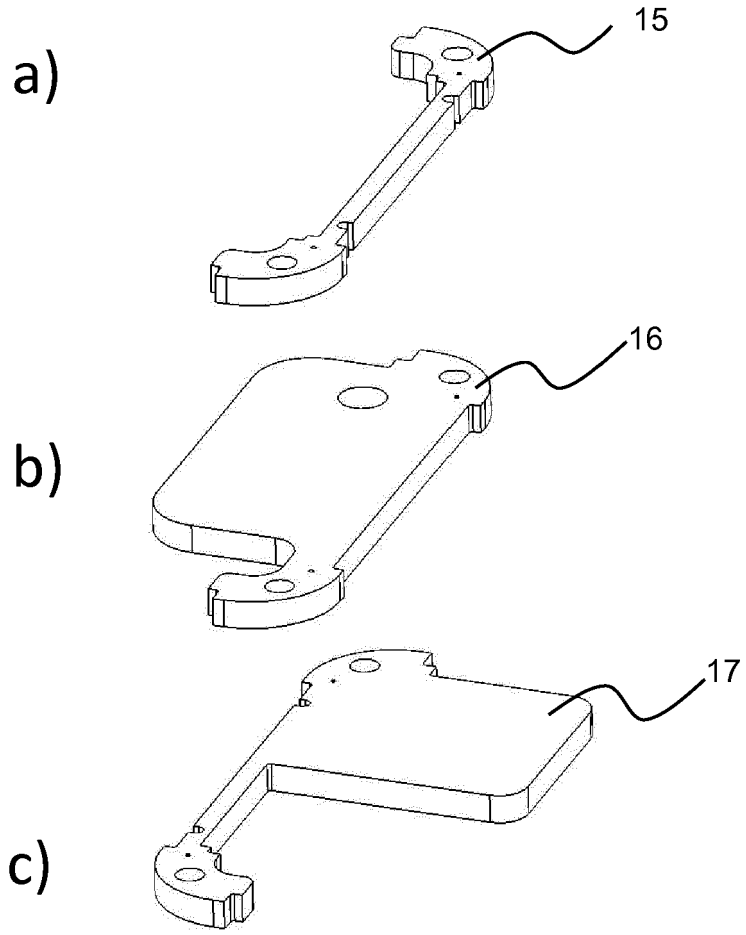


Fig. 4

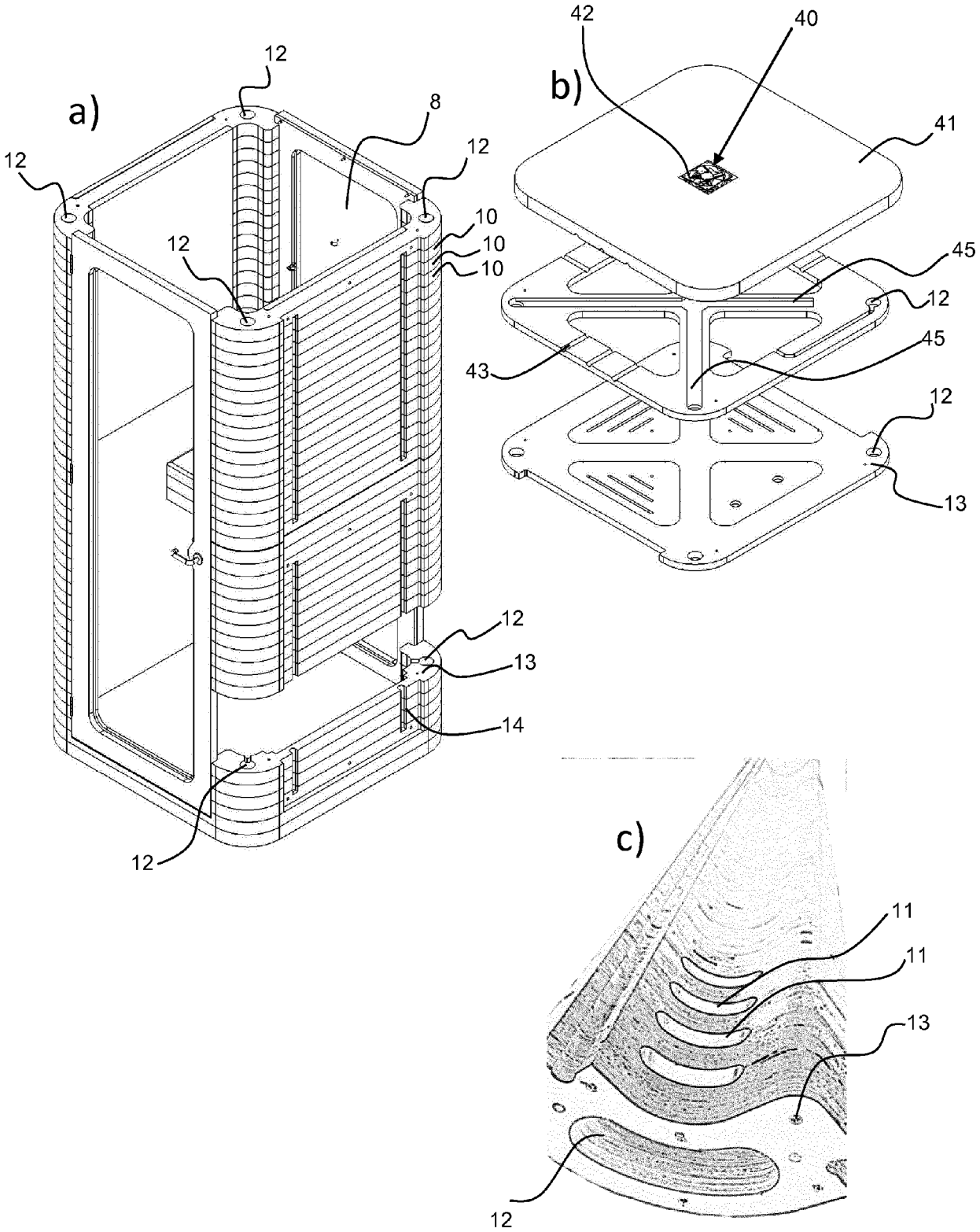

a)
12
8
12
12
12
10
10
10
12
12
13
14
12
b)
42
40
41
45
12
45
43
12
13
c)
11
11
13
12

Fig. 5

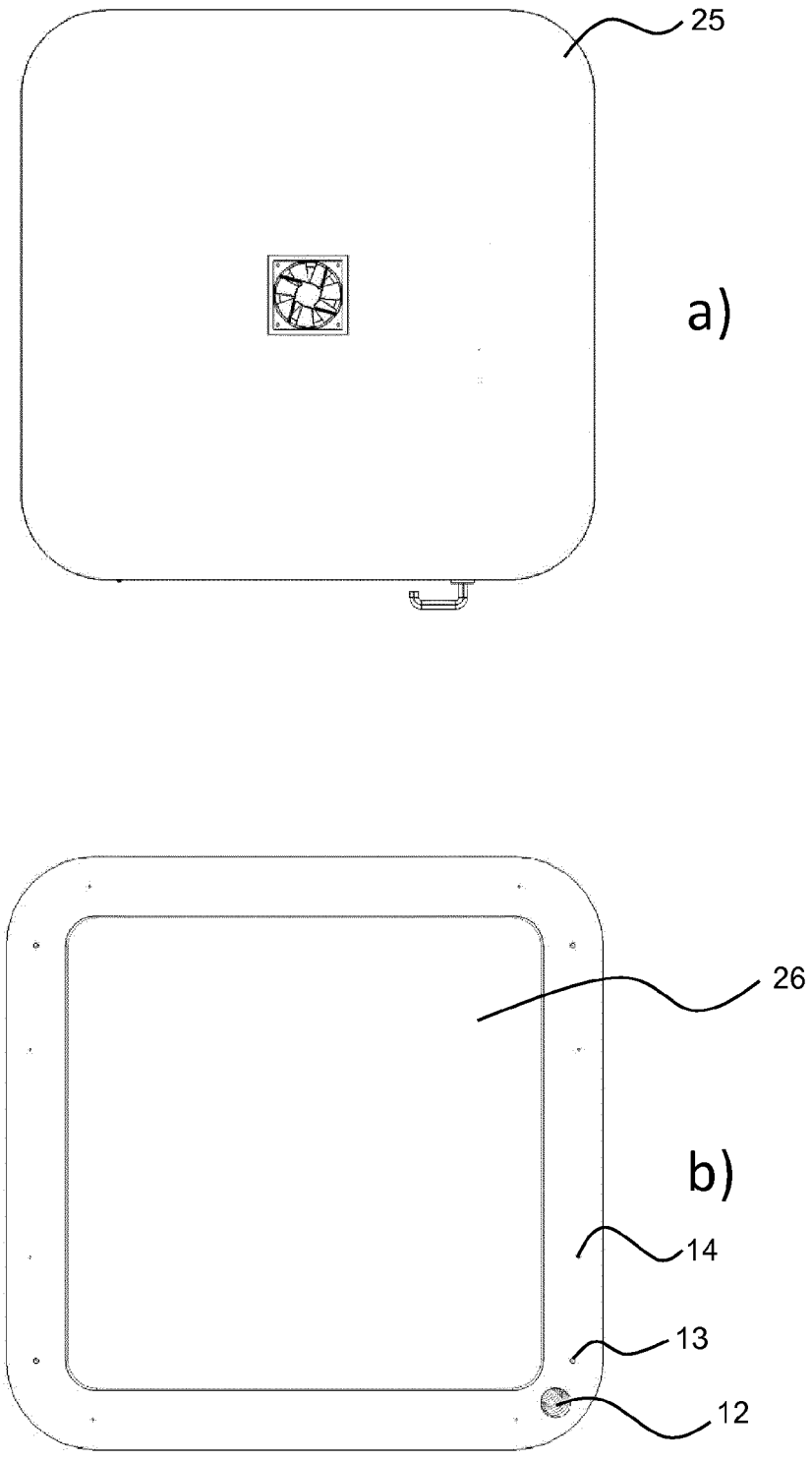


Fig. 6

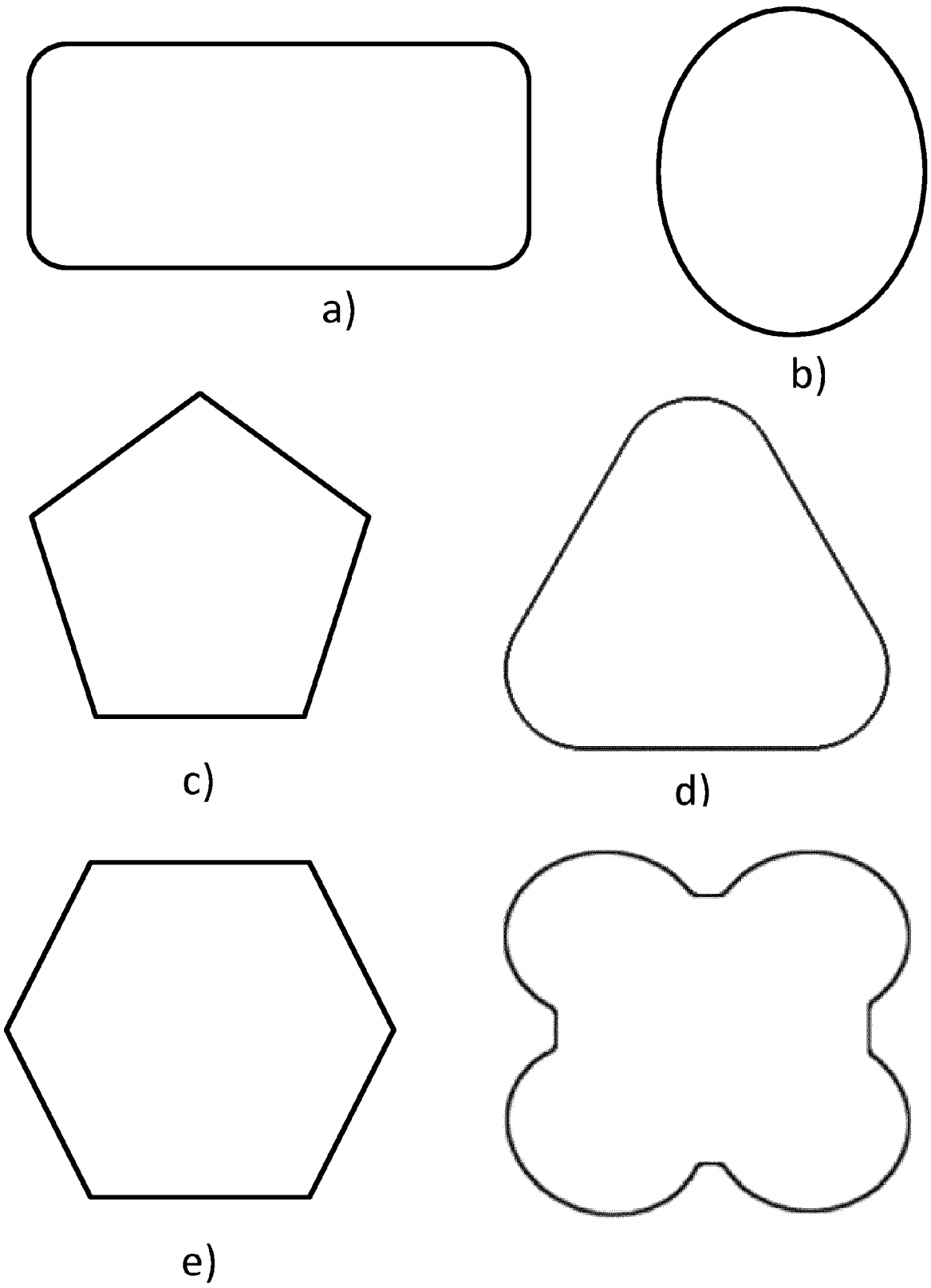


Fig. 7

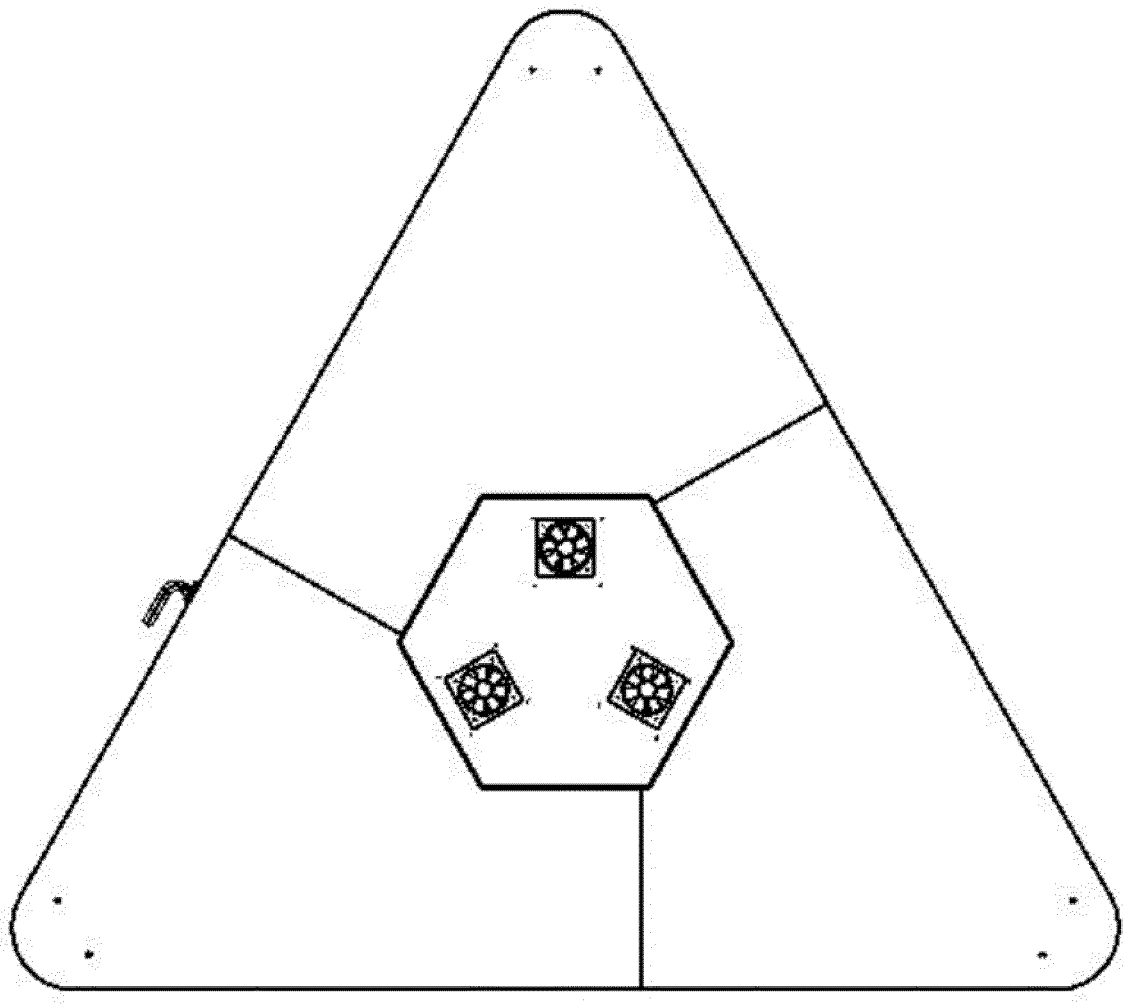


Fig. 8

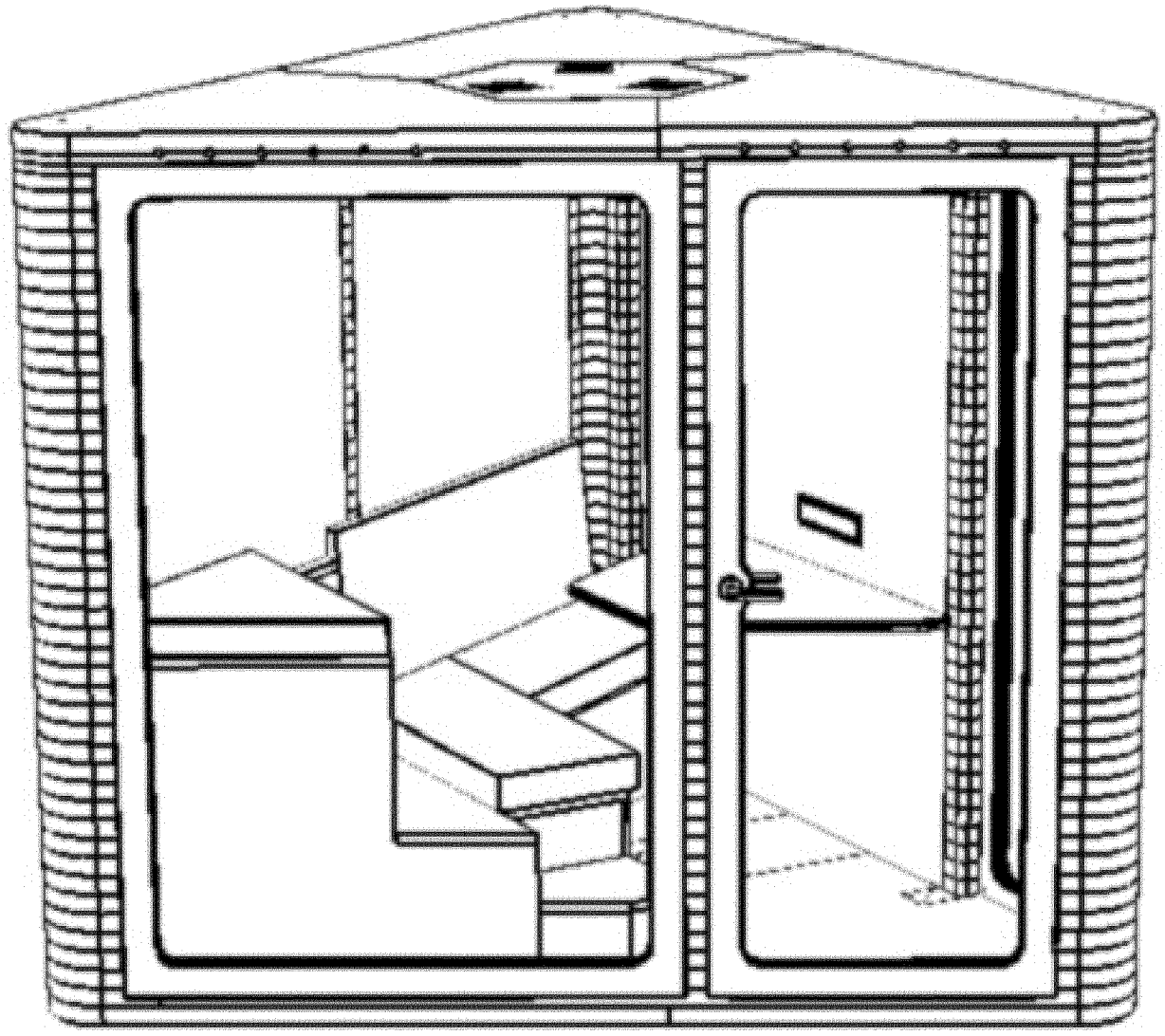


Fig. 9

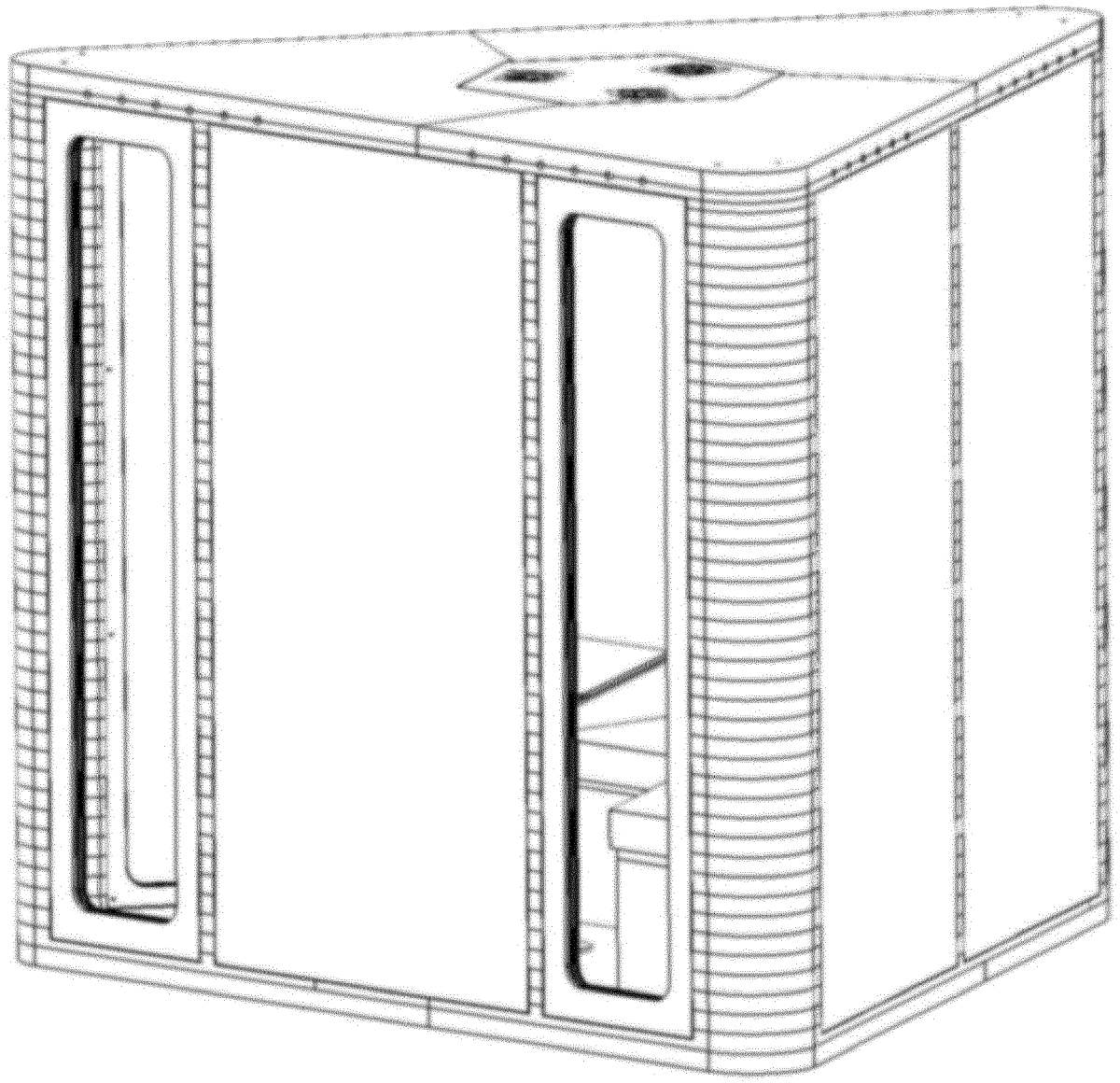


Fig. 10

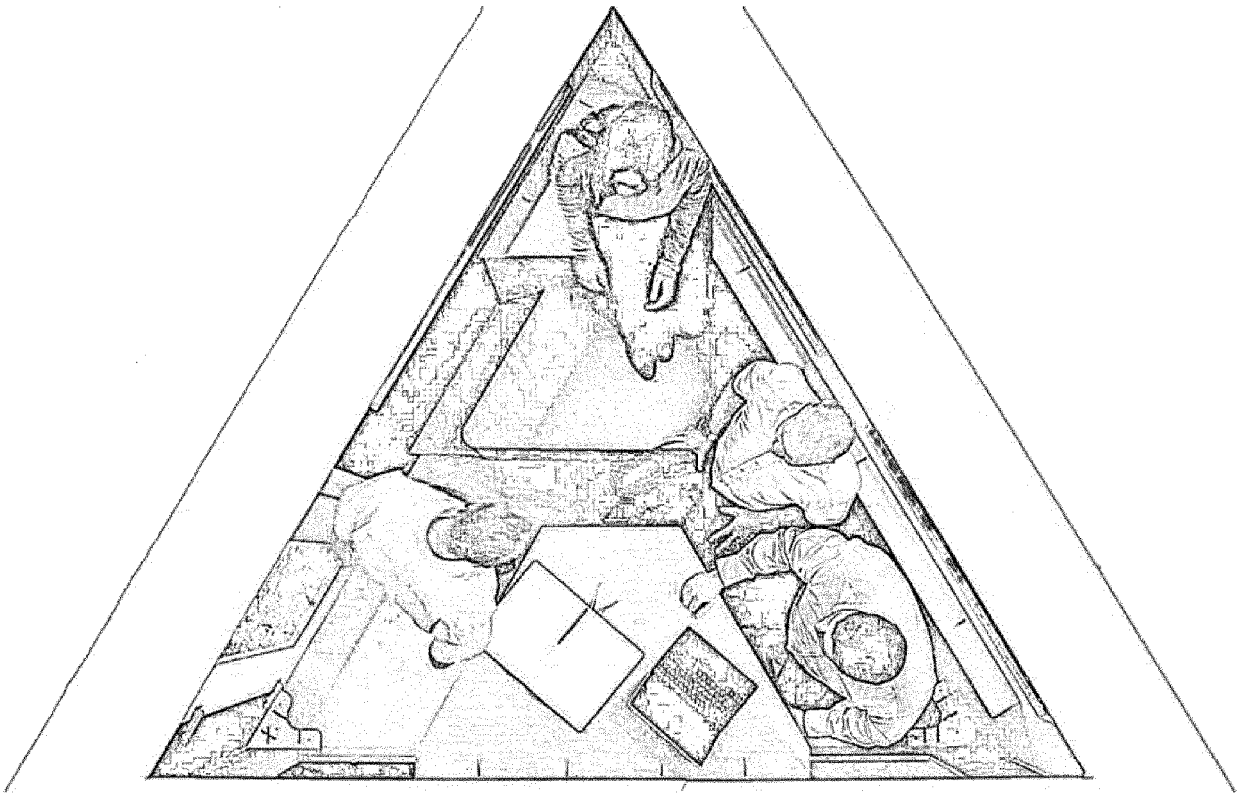
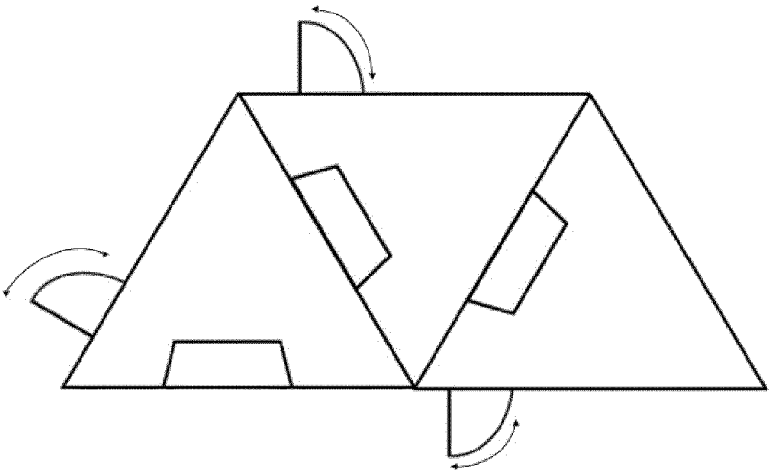
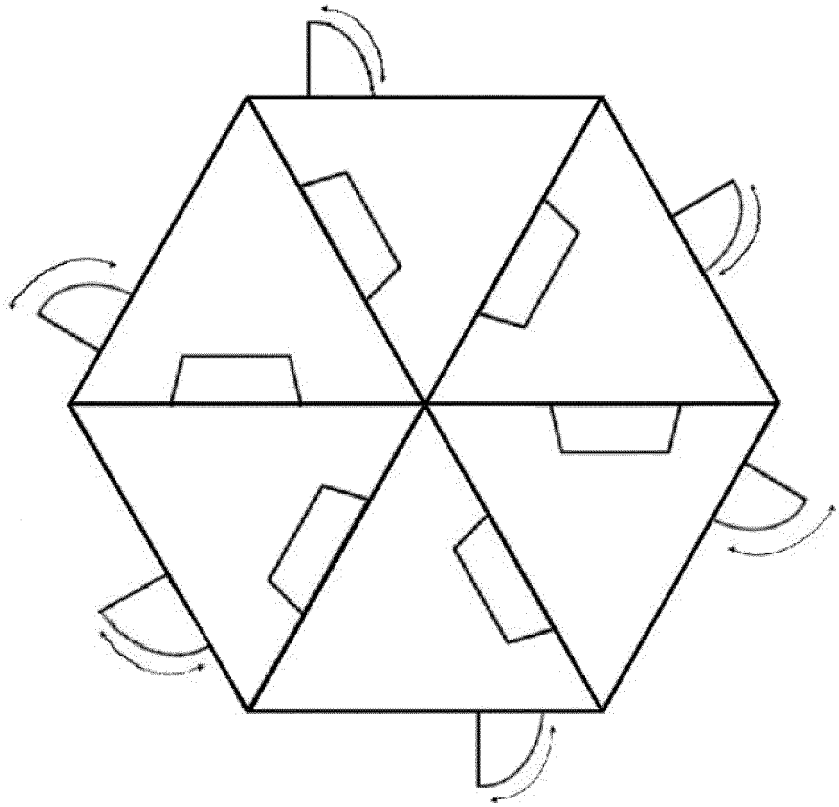


Fig. 11



a)



b)

Fig. 12

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 19 16 9114

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 201 02 418 U1 (GERKE KAELTE KLIMA KAELTEANLAG [DE]) 23 May 2001 (2001-05-23) * claim 1; figures 1-4 *	1-15	INV. E04H1/12 E04H1/14 A61M21/00
A	EP 2 453 076 A1 (STARPOOL S R L [IT]) 16 May 2012 (2012-05-16) * claim 1; figures 1,3,4, 7-10 *	1-15	
A	WO 2012/022973 A1 (CHARLIE GREIG BESPOKE HOMES LTD [GB]; GREIG CHARLIE [GB]) 23 February 2012 (2012-02-23) * claims 1,7,8,9,25, 28,29, 31, 32; figures 1-12 *	1-15	
A	WO 2016/118953 A1 (KRAMER RICHARD [US]) 28 July 2016 (2016-07-28) * claim 1; figures 1,9,18-24 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

E04H
A61M
G21F
E04B
B41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 August 2019	Decker, Robert

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 16 9114

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-08-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 20102418 U1	23-05-2001	NONE	
EP 2453076 A1	16-05-2012	EP 2453076 A1	16-05-2012
		IT 1403487 B1	17-10-2013
WO 2012022973 A1	23-02-2012	GB 2482970 A	22-02-2012
		WO 2012022973 A1	23-02-2012
WO 2016118953 A1	28-07-2016	US 2018023292 A1	25-01-2018
		WO 2016118953 A1	28-07-2016
		ZA 201705743 B	24-04-2019

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82