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(54) **MULTIPLE OCCUPANCY ACCOMMODATION**

UNTERKUNFT FÜR UNTERSCHIEDLICHE BEWOHNER

LOGEMENT POUR OCCUPANTS MULTIPLES

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(56) References cited:
WO-A-82/03418 **WO-A-94/16160**
FR-A- 2 628 462 **GB-A- 1 226 107**
GB-A- 2 039 561 **GB-A- 2 266 907**
US-A- 3 683 571

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Description

[0001] The invention relates to multiple occupancy accommodation. More particularly the invention relates to such accommodation intended for temporary occupation as in an hotel or motel or the like.

[0002] Hotels and motels are expensive to erect and maintain. They are usually located on expensive land (or if they are on remote cheaper land the hotel guest or the hotel itself has to pay transport costs from a central location to the hotel). It is one object of this invention to provide relatively cheap temporary accommodation which can readily be moved from site to site when appropriate.

[0003] It is known to provide a module for accommodation by building a frame and locating panel members within the frame. It is necessary to reinforce the frame at appropriate locations to ensure that loads are transferred or isolated as required. Typically the frame members are of large volume and weight. While such technology is suitable for its purpose it is not suitable for structures which are to be assembled at one site, dismantled, transported to another site and then reassembled. Such technology is exemplified by WO-A-82/03418, GB-A-2266907, GB-A-2039561 and WO-A-94/16160.

[0004] WO 82/03418 discloses a multiple occupancy building built up of layers of modules, each having a floor, sidewalls and a roof, end walls having a window. The modules are sufficiently large to provide an accommodation area at each side with a transverse passageway or corridor in between. The walls are planar sheets of metal and are welded to beam framing.

[0005] The invention is based on the realisation that by using walls of a monocoque structure the disadvantages of the prior art can be reduced or eliminated.

[0006] According to the invention in one aspect there is provided an accommodation module comprising an elongate floor, two sidewalls, end walls each having a window and a roof, the module being sufficiently large to provide an accommodation area at each end with a transverse passageway in between **characterised in that** the walls defining the accommodation areas comprise lengths of generally planar sheet metal joined together in monocoque manner whereby to provide a stressed skin, the sheets of each wall being joined to those of adjacent walls by an angle member and **in that** the passageway is provided by a box section made up of frame members.

[0007] According to the invention in another aspect there is provided an accommodation module comprising an elongate floor, two sidewalls, end walls each having a window and a roof, the module being sufficiently large to provide an accommodation area at each end with a transverse passageway in between **characterised in that** the walls defining the accommodation areas comprise lengths of generally planar sheet metal joined together in monocoque manner whereby to provide a

stressed skin and **in that** the walls defining the floor and the roof extend from end to end of the module and **in that** the sheets of each wall being joined to those of adjacent walls by an angle member and **in that** the passageway is provided by picture frame members.

[0008] Preferably each side wall and end wall is made up of two parallel lengths of planar sheet metal typically galvanised alloy steel, held by rivets fixed to ribs which are spaced apart along the lengths. The walls may be of plastics coated steel aluminium, fibreglass or the like.

[0009] Most preferably internal members and/or external members are present to reduce the risk that the planar walls will move and so to provide stiffness. Such members may take the form of vertical ribs or bars and/or horizontal ribs or bars. As a practical matter it is necessary to secure two elongate sheets together to form each side wall. This is done by rivets secured to vertical ribs whose purpose is not to act as a bracing frame but to stiffen the sheets against deflection. The sheets can be made of relatively thin sheet from say less than about 1.7 mm thick. When the side walls are subjected to wind forces the riveted joints ensure that the load is applied across the full area of the stressed skin and there is no separating of the sheets one from another. Adhesives or other securing means may be used instead or in addition to rivets.

[0010] Preferably the corner members are made of hot rolled angle steel. In a preferred feature the frame member bounding a passage is made up of four sides each side element being of L section and arranged so that one leg of the L faces inward behind the other element. The frame member preferably has built up sides made of hot rolled steel and the corners are full penetration butt weld joints.

[0011] Preferably the roof comprises generally parallel longitudinal roof lengths each comprising two overlapping sheets with reinforcing ribs, one roof length overlapping the other and sealing mastic being present to seal the joint.

[0012] Preferably one or each end portion incorporates a connector whereby one module may be mounted on another such module in vertical alignment.

[0013] Preferably a module of the invention has a length of 7 to 16 metres, typically about 9 metres, a height of about 2.4 to about 3 metres and width of about 2.6 to 3.6 metres.

[0014] It will be noted that the invention in its preferred embodiment provides a system of connecting modules or boxes constructed primarily from cold rolled sheet steel of preferably approximately 1.5 mm thickness, such modules being inherently very rigid thus requiring no bracing when being lifted and transported. The modules are monocoque structure i.e. with no structural frames with only four vertical corner angle members taking vertical loads and two picture frame members transferring differential loads. In use the primary vertical loads are transferred through the vertical angle members at each corner connected e.g. riveted, to the sheet

skin whereby working in concert with the sheet steel skin such angle members are restrained and prevented from buckling and can therefore be designed with minimal cross sectional area. For this reason they can be of angle section and no thicker save in exceptional circumstances. As a result of the monocoque structure the whole of the centre of the two long sides can be removed (for a corridor space connecting the modules) and differential loads can be transferred uniformly by the picture frame member (made up of angle section) riveted to and working in concert with the sheet steel skin. The modules span between their extreme corners transferring bending loads through the sheet steel sidewalls which acts as a stressed external skin. Because in a building the modules are connected only at the external corners, one module can be moved without dislocation or collapse and without transferring loads of magnitude detrimental to adjacent modules. Noise and vibration transfer between modules is minimised because the modules are connected at the corners only.

[0015] Neighbouring modules may be joined at their corners using different connectors in a variety of ways, for example by a simple push in connecting device made up of either of a 'pad' of dense rubber approximately 160 min x 80 m x 12 mm thick with two steel locating pins passing through the rubber and projecting either side of the rubber for reception in sockets in the corners of the modules, or a steel plate of similar size having pins set in dense rubber grommets.

[0016] In another aspect the invention provides a method of mounting one module of the invention on top of another, the method comprising connecting the modules at their corners whereby the primary vertical loads are transferred through the vertical angle members and the bending loads are transferred into the stressed sidewalls.

[0017] Preferably one module is mounted on another by lifting means, e.g. a crane with lifting chains passed within and connected to the intermediate portion, e.g. by lifting eyes or the like.

[0018] In another aspect the invention provides a multiple occupancy accommodation building comprising at least one column of modules, each according to the invention.

[0019] Preferably the column is made up of four modules, and adjacent columns are linked together. Up to seven levels of module can be stacked in a column.

[0020] For economy and ease of assembly and disassembly it is preferred that the base module is located approximately 1 metre above the ground. This leaves a gap beneath the lowest module and the ground where all vertical services are collected to run laterally. Preferably outer continuous elongate members such as skirts are present to hide the gap and to give the building a unitary appearance.

[0021] It is a much preferred feature of this invention that the module be made of as few components as possible. To that end the module comprises one elongate

floor element extending the full length of the module; two sidewalls of equal length and having therein a cavity for the passage or corridor; at least one roof portion extending the length of the module; and two end portions.

5 In one method of the invention of assembling a module the parts are laid out on a base and then the sidewalls and end walls are presented to the respective sides of the module floor raised and then secured together by the corner members. The central frame members are inserted into the corridor openings to provide the necessary strength and lifting capability, following which the roof element, which is preferably in two halves is added.

[0022] In order that the invention may be well understood it will now be described by way of example only with reference to the accompanying diagrammatic drawings in which:

15 Figure 1 is a partial exploded perspective view of one accommodation module;

20 Figure 2 is an elevation of one outer corner of the module of Figure 1 showing a connector for joining the module to one above;

25 Figure 3 is a side elevation of a building made up of modules of Figure 1;

30 Figure 4 is a plan view of two parallel modules showing four bedrooms;

35 Figure 5 is a partial exploded perspective view of another accommodation module of the invention;

40 Figure 6 is a side elevation of the module of Figure 5;

45 Figure 7 is a partial side elevation as Figure 6 drawn to enlarged scale; and

50 Figure 8 shows schematically a method of making the module of Figure 5.

[0023] The module M of Figure 1 is made of two identical end portions 1, and a central box frame member 2. Each end portion is a square section structure having identical side walls 3. The portion also has a floor 4 and roof 5 only part of which is shown. Each side wall is made up of two parallel lengths 6, 7 one above the other of planar sheet metal, typically galvanised alloy steel.

55 The lengths measure 3.75 metres long x 1.2 metres high and 1.6 mm thick. Ribs 8 made up of hollow struts of channel section steel are spaced apart along the lengths, and held thereto by riveting. These ribs hold the two lengths together. The ribs 8 measure 2.4 mm long and 70 mm deep. The ribs 8 are spaced 450 mm apart. (These dimensions are given by way of illustration and are not crucial to the invention.) The side walls and the end walls defined are a monocoque structure, i.e. a sin-

gle layer having internal reinforcement which is self-supporting, the outer skin of which is rigid and will resist stresses and be deformation resistant even in the absence of any external frame.

[0024] An end wall 9 is present at the outer end of each portion and comprises a steel sheet structure the same as the side walls but a round window 10 is present. The end wall 9 is joined to the adjacent ends of the side walls 3 by riveting of an outer L-shaped vertical length or angle bracket 11 on the outside and by riveting together of ribs 8 in the corner on the inside.

[0025] The floor 4 of each end portion is made of edge lengths 12 and an upper skin 13 and lower skin (not shown) containing a length of corrugated length of steel 14. The roof 5 has the same structure as the walls.

[0026] The frame member 2 is a box made up of lengths 20 of steel square section riveted or otherwise joined together at their junctions. The inner end of the lengths 1 are joined to the opposite sides of the frame. The ribs 8 at each end of the walls 3 are shorter to define a gap to receive the bridging lengths 20 and the cross beams 21. Connectors 16 are present as required. In this way a substantially unitary structure is formed.

[0027] As shown in Figure 2, a socket 22 is present in the corner of the module and a multi part pin 23 is long enough to be received in the underlying corner socket 22 and that in the module above (not shown). These are dimensioned so that when one module is stacked on another the modules are vertically aligned by reception of the pin in the sockets. One module is lifted on to the other by connecting a chain to the frame and lifting it using a crane. Side bolts 24 may be received in the pin assembly to lock parts in place. As also shown in Figure 2, two such pins may be mounted in a plate 25 so that adjacent modules may be engaged side-by-side.

[0028] The module M is mounted above the ground to leave a gap for service pipes etc. When modules M are arranged in rows and columns the windows 10 are aligned to give the assembly the unitary appearance of a building. To enhance this a skirt 26 are present along the top and bottom (see Figure 3). This also serves to hide the gap. One end of the building has a stairway and reception area 27, with the usual communal facilities, not shown.

[0029] The modules of Figures 1 to 4 are fitted out in a way appropriate to the intended use of the building, typically overnight ensuite accommodation. It is a preferred feature of the invention that each end portion defines sleeping accommodation and the frame 2 a corridor or passageway. An internal skin is connected to the ribs 8. As shown in Figure 4, each room has a bed 28 under the window 10, and a front door 29 adjacent which is shower/lavatory area 30. The services may be passed through the floor or ceiling. The wall 31 between the room and the corridor is curved, giving a distinctive appearance. Each door 29 is lockable, so that individual rooms may be rented out by the hour, day or the like.

[0030] A building of Figures 1 to 4 may be erected

quickly and cheaply on a convenient site, including in a low cost area. A 20 module building giving a 40 bed complex may be assembled in 48 hours, as little or no site preparation is required. The building may function as an hotel, motel, barracks, sports or festival accommodation, an annexe to a hospital or public house, refugee centre or the like. The building may be dismantled and relocated, the modules being transported in pairs on a trailer by road.

[0031] The module M1 shown in Figures 5 to 8 comprises two rooms 101 sufficiently large to provide sleeping accommodation and separated by a passage or corridor 102. Each room 101 has an end wall 103 with a window 104. A floor 105 extends the full length of the module which is some 9 metres. The module has two elongate side walls 106 each made up of two sections which extend that length and are spaced apart to have an opening 107 which is a precursor for the corridor. The roof 108 comprises two elongate longitudinal half portions 108A, 108B.

[0032] Each wall section is made up of two parallel lengths of planar sheet metal, typically galvanised alloy steel. The lengths are held together by rivets fixed to ribs made up of hollow struts of general section steel which are spaced apart along the lengths. (This is best shown in Figures 5 and 6). The walls define a mono-coque or stressed skin structure, i.e. a single layer having internal stiffeners which resist stress and being resistant to deformation even in the absence of an external frame. The end walls 103 comprise a steel sheet structure the same as the side walls. The end wall is joined to the adjacent end of the side walls by riveting of an outer L shaped corner length 109 outside and by riveting together all ribs on the inside.

[0033] The frame member 110 is made up of four sides each being of L section and arranged so that one leg of the L 110A faces inward behind the outer element 110B. The frame is built up of hot rolled steel and the corners are full penetration but weld joints. The L frame wall measures 75mm x 113m x 13mm and the interior opening of the frame is 1950mm wide and 2250 mm high.

[0034] Each of the two roof length comprises two overlapping sheets with reinforcing ribs (in the same manner as the side walls) and having dependant side walls along three sides leaving the facing inner side open. One roof length overlaps the other and sealing mastic may be present to seal the joints.

[0035] The module is made by a sequence of operations shown in Figure 8. The floor assembly 105 and the longer side walls and end walls are formed and then laid alongside the floor in the proper arrangement. The walls are then lifted and connected together by the L-shaped corner members 109. The frame members 110 are then applied following which the roof sections are applied. In this simple way a module having the required strength and made of low weight materials has been formed. Such a module may be connected to others in the meth-

od described in relation to Figures 1 to 4.

[0036] The invention is not limited to the embodiments shown but is as defined in the appended claims. For example, plasterboard and like materials may be added.

Claims

1. An accommodation module (M), comprising an elongate floor (4), two sidewalls (3), end walls (9) each having a window (10); and a roof (5); the module being sufficiently large to provide an accommodation area (1) at each end with a transverse passageway (2) in between **characterised in that** the walls defining the accommodation areas comprise lengths of generally planar sheet metal (6,7) joined together in monocoque manner whereby to provide a stressed skin, the sheets (6,7) of each wall being joined to those of adjacent walls by an angle member (11) and **in that** the passageway (2) is provided by a box section made up of frame members (20).
2. An accommodation module (M1), comprising an elongate floor (105), two sidewalls (106), end walls (103) each having a window (104); and a roof (108), the module being sufficiently large to provide an accommodation area (101) at each end with a transverse passageway (102) in between **characterised in that** the walls defining the accommodation areas comprise lengths of generally planar sheet metal (106) joined together in monocoque manner whereby to provide a stressed skin **and in that** the walls defining the floor (105) and the roof (108) extend from end to end of the module (M1) **and in that** the sheets (106) of each wall are joined to those of adjacent walls by an angle member (109) **and in that** the passageway (102) is provided by picture frame members (110).
3. A module according to Claim 1 or 2, wherein each side wall (3) and end wall (9) is made up of two parallel lengths of planer sheet metal held by rivets fixed to ribs (8) which are spaced apart along the lengths.
4. A module according to Claim 1, 2 or 3 wherein the angle members (11) are made of hot rolled angle steel.
5. A module according to Claim 2,3 or 4, wherein the picture frame member (110) is made up of four sides (110A, 110B) each side element being of L section and arranged so that one leg (110A) of the L faces inward behind the other element.
6. A module according to any proceeding Claim, having a length of about 9 meters, a height of about 2.4 meters and a width of about 2.6 metres.

7. A module of mounting one module according to any preceding Claim, wherein one or each end portion (1:101) incorporates a connector (23) whereby one module (M;M1) may be mounted on another module in vertical alignment.
8. A method of mounting one module according to any preceding Claim on top of another, the method comprising connecting the modules at their corners whereby the primary vertical loads are transferred through the vertical angle members (11;109) and the bending loads are transferred into the stressed sidewalls (3:106).
9. A multiple occupancy accommodation building comprising at least one column of rows of modules, each according to any of Claims 1 to 7.
10. A building according to Claim 9, whereby the column is made up of four modules.
11. A building according to Claim 9 or 10, including outer continuous elongate members (26) extending along the base of the building to give the building a unitary appearance.

Patentansprüche

1. Unterkunftsbauereinheit (M), mit einem länglichen Boden (4), zwei Seitenwänden (3), Endwänden (9), von denen jede ein Fenster (10) aufweist, und einem Dach (5), wobei die Baueinheit ausreichend groß ist, um an jedem Ende einen Unterkunftsraum und dazwischen einen Querdurchgang (2) bereitzustellen, dadurch gekennzeichnet, daß die Wände, welche die Unterkunftsräume festlegen, Längsabschnitte aus einem im allgemeinen planaren plattenförmigen Metall (6, 7) aufweisen, die in Schalenbauweise miteinander verbunden sind, wodurch eine tragende Außenhaut gebildet wird, und die Platten (6, 7) jeder Wand mit jenen der benachbarten Wand mittels eines Winkelelements (11) verbunden sind, und daß der Durchgang (2) durch einen Kastenabschnitt gebildet wird, der aus Rahmenelementen (20) besteht.
2. Unterkunftsbauereinheit (M1), mit einem länglichen Boden (105), zwei Seitenwänden (106), Endwänden (103), von denen jede ein Fenster (104) aufweist, und einem Dach (108), wobei das Modul genügend groß ist, um einen Unterkunftsraum (101) an jedem Ende mit einem Querdurchgang (102) dazwischen bereitzustellen, dadurch gekennzeichnet, daß die Wände, welche die Unterkunftsräume festlegen, Längsabschnitte aus einem im allgemeinen planaren plattenförmigen Metall (106) aufweisen, die in Schalenbauweise miteinander verbunden

sind, wodurch eine tragende Außenhaut gebildet wird, und daß sich die den Boden (105) festlegenden Wände und das Dach (108) von Ende zu Ende der Baueinheit (M1) erstrecken sowie die Platten (106) jeder Wand mit jenen der benachbarten Wände mittels eines Winkelelements (109) verbunden sind und der Durchgang (102) durch Bildrahmenelemente (110) gebildet wird.

3. Baueinheit nach Anspruch 1 oder 2, worin jede Seitenwand (3) und Endwand (9) aus zwei parallelen Längsabschnitten aus einem planaren plattenförmigen Metall besteht, die durch Niete an Rippen (8) fixiert sind, die entlang der Längsabschnitte im Abstand voneinander angeordnet sind. 10
4. Baueinheit nach Anspruch 1, 2 oder 3, worin die Winkelelemente (11) aus warmgewalztem Winkelstahl hergestellt sind. 15
5. Baueinheit nach Anspruch 2, 3 oder 4, worin das Bilderrahmenelement (110) aus vier Seitenteilen (110A, 110B) besteht, wobei jedes Seitenelement einen L-Querschnitt aufweist und derart angeordnet ist, daß ein Schenkel (110A) des L nach innen hinter das andere Element weist. 20
6. Baueinheit nach einem der vorstehenden Ansprüche mit einer Länge von etwa 9 Metern, einer Höhe von etwa 2,4 Metern und einer Breite von etwa 2,6 Metern. 25
7. Baueinheit zum Errichten einer Baueinheit nach einem der vorstehenden Ansprüche, worin einer oder jeder Endabschnitt (1; 101) ein Verbindungsglied (23) aufweist, wodurch eine Baueinheit (M; M1) mit vertikaler Ausrichtung an einer anderen Baueinheit befestigt werden kann. 30
8. Verfahren zum Errichten einer Baueinheit nach einem der vorstehenden Ansprüche übereinander, wobei das Verfahren das Verbinden der Baueinheiten an ihren Ecken beinhaltet, wobei die primären vertikalen Belastungen über die vertikalen Winkelelemente (11; 109) und die Biegebelastungen in die tragenden Außenhüllen (3; 106) übertragen werden. 35
9. Unterkunftsgebäude für eine mehrfache Belegung, mit mindestens einer Säule aus Reihen von Baueinheiten, von denen jede nach einem der Ansprüche 1 bis 7 ausgebildet ist. 40
10. Gebäude nach Anspruch 9, wobei die Säule aus vier Baueinheiten besteht. 45
11. Gebäude nach Anspruch 9 oder 10, mit äußeren kontinuierlichen Längselementen (26), die sich ent-

lang dem Boden des Bodens des Gebäudes erstrecken, um dem Gebäude ein einheitliches Aussehen zu geben.

Revendications

1. Module de logement (M), comprenant un sol allongé (4), deux parois latérales (3), des parois d'extrémité (9) ayant chacune une fenêtre (10) ; et un toit (5) ; le module étant suffisamment grand pour doter une surface de logement (1), à chaque extrémité, d'un passage transversal (2) entre les deux, caractérisé en ce que les parois définissant les surfaces de logement comprennent des longueurs de tôle globalement planes (6, 7) réunies les unes aux autres de manière monocoque, pour ainsi fournir un revêtement porteur, les tôles (6, 7) de chaque paroi étant réunies à celles des parois adjacentes par un élément angulaire (11) et en ce que le passage (2) est réalisé par une section en caisson constituée d'éléments formant cadre (20).
2. Module de logement (M1), comprenant un sol allongé (105), deux parois latérales (106), des parois d'extrémité (103) ayant chacune une fenêtre (104) ; et un toit (108), le module étant suffisamment grand pour doter une surface de logement (101), à chaque extrémité, d'un passage transversal (102) entre les deux, caractérisé en ce que les parois définissant les surfaces de logement comprennent des longueurs de tôle (106) globalement planes réunies les unes aux autres de manière monocoque, pour ainsi fournir un revêtement porteur et en ce que les parois définissant le sol (105) et le toit (108) s'étendent d'une extrémité à l'autre du module (M1) et en ce que les feuilles (106) de chaque paroi sont réunies à celles des parois adjacentes par un élément angulaire (109) et en ce que le passage (102) est muni d'éléments formant encadrement (110).
3. Module selon la revendication 1 ou 2, dans lequel chaque paroi latérale (3) et chaque paroi d'extrémité (9) est constituée de deux longueurs parallèles de tôle plus plane maintenues par des rivets fixés à des nervures (8) qui sont écartées sur toutes les longueurs.
4. Module selon la revendication 1, 2 ou 3, dans lequel les éléments angulaires (11) sont fabriqués sous forme de cornières d'acier laminé à chaud.
5. Module selon la revendication 2, 3 ou 4, dans lequel l'élément formant encadrement (110) se compose de quatre côtés (110A, 110B), chaque élément latéral ayant une section en L et étant agencé de telle sorte qu'une barre (110A) du L soit tournée vers l'intérieur derrière l'autre élément.

6. Module selon l'une quelconque des revendications précédentes, ayant une longueur de 9 mètres environ, une hauteur de 2,4 mètres environ et une largeur de 2,6 mètres environ. 5
7. Module pour monter un module selon l'une quelconque des revendications précédentes, dans lequel une ou chaque partie d'extrémité (1 ; 101) incorpore un raccord (23), moyennant quoi un module (M ; M1) peut être monté sur un autre module en alignement vertical. 10
8. Procédé de montage d'un module selon l'une quelconque des revendications précédentes les uns au-dessus des autres, le procédé comprenant le raccordement des modules au niveau de leurs angles, moyennant quoi les charges verticales principales sont transférées au moyen des éléments angulaires verticaux (11 ; 109) et les charges de flexion sont transférées dans les parois latérales soumises à des contraintes (3 ; 106). 15 20
9. Bâtiment de logement pour occupants multiples comprenant au moins une colonne de rangées de modules, chacun selon l'une quelconque des revendications 1 à 7. 25
10. Bâtiment selon la revendication 9, moyennant quoi la colonne se compose de quatre modules. 30
11. Bâtiment selon la revendication 9 ou la revendication 10, comprenant des éléments allongés continus extérieurs (26) s'étendant le long de la base du bâtiment pour conférer au bâtiment un aspect unitaire. 35

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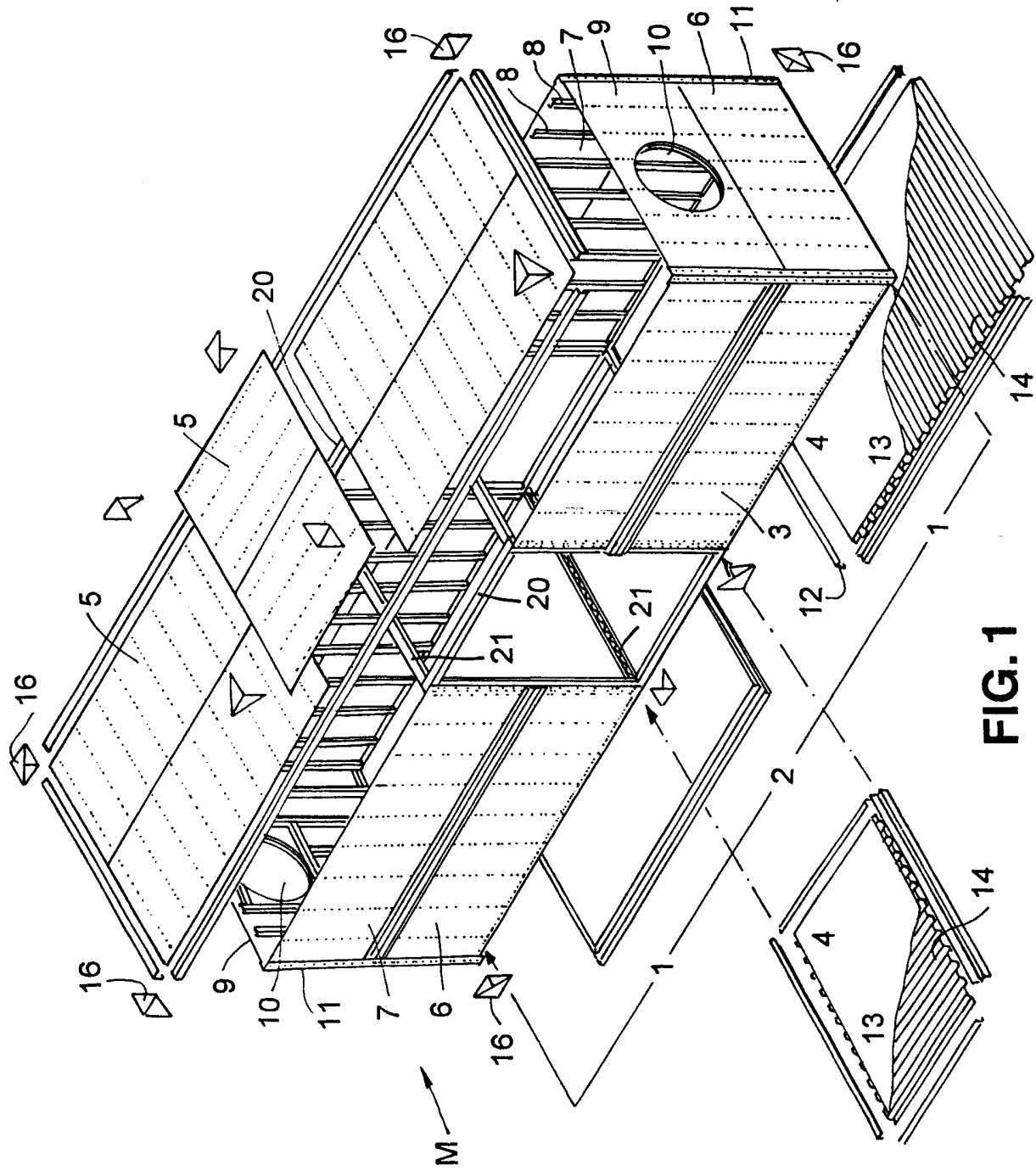


FIG. 1

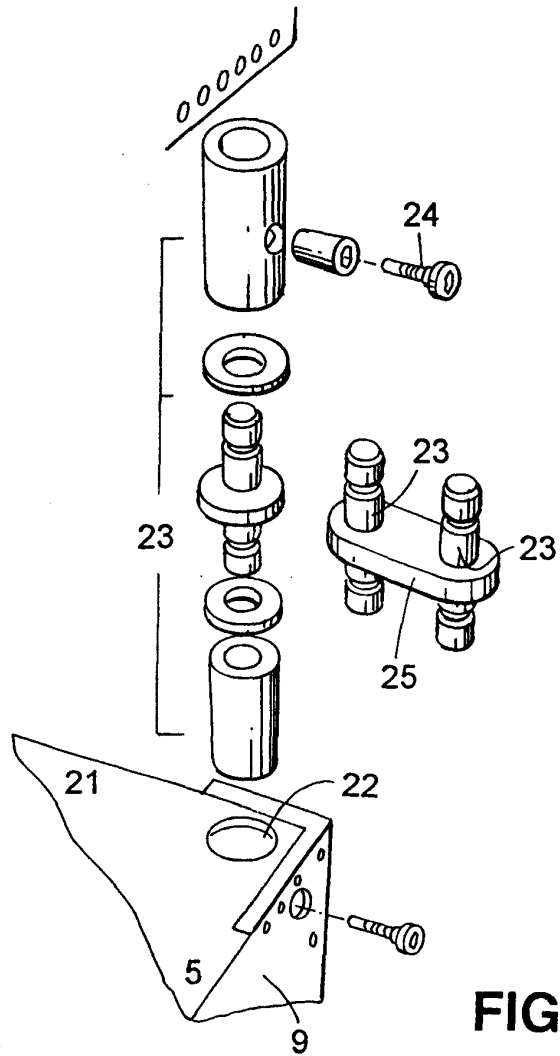


FIG. 2

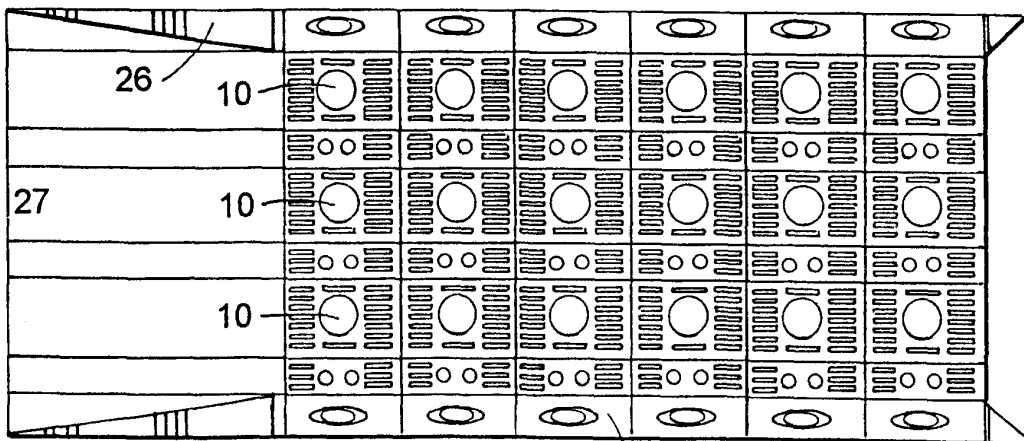


FIG. 3

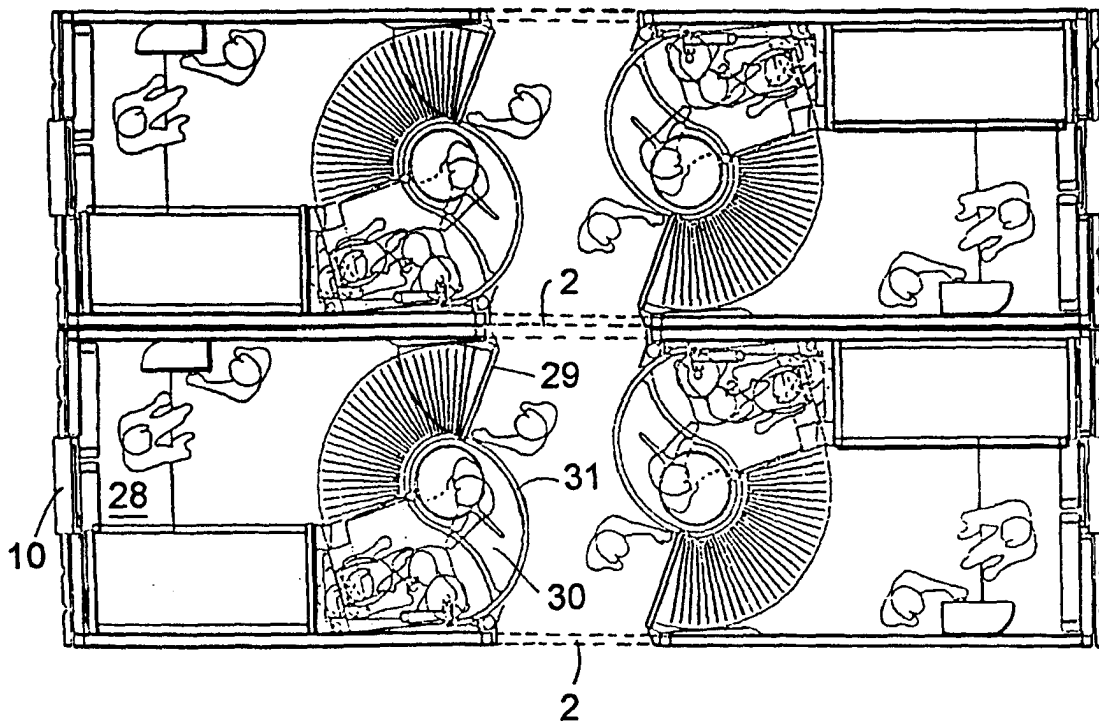


FIG. 4

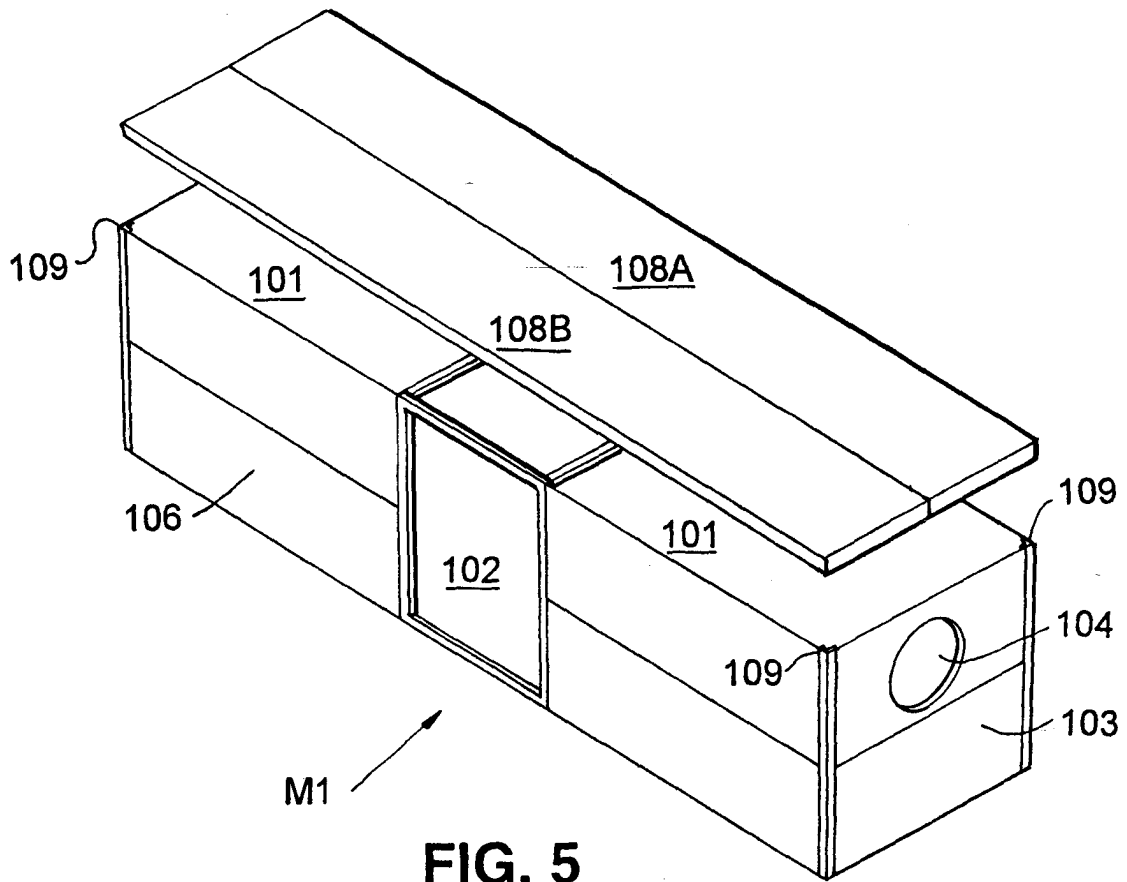


FIG. 5

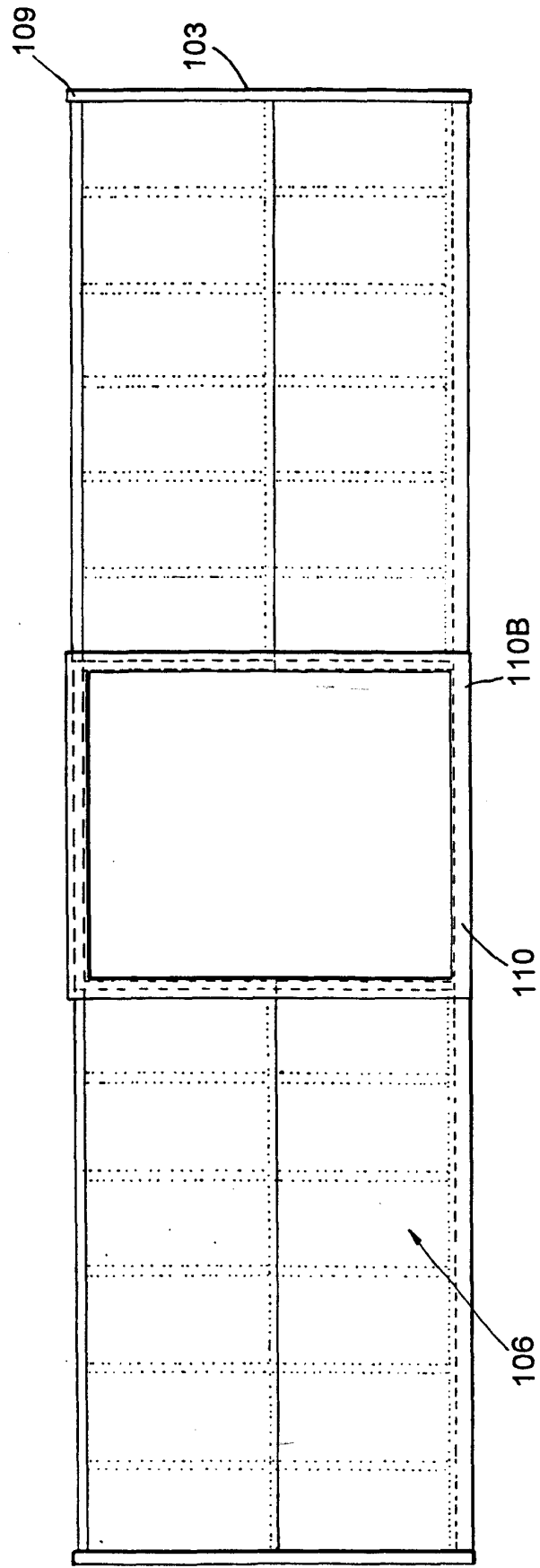


FIG. 6

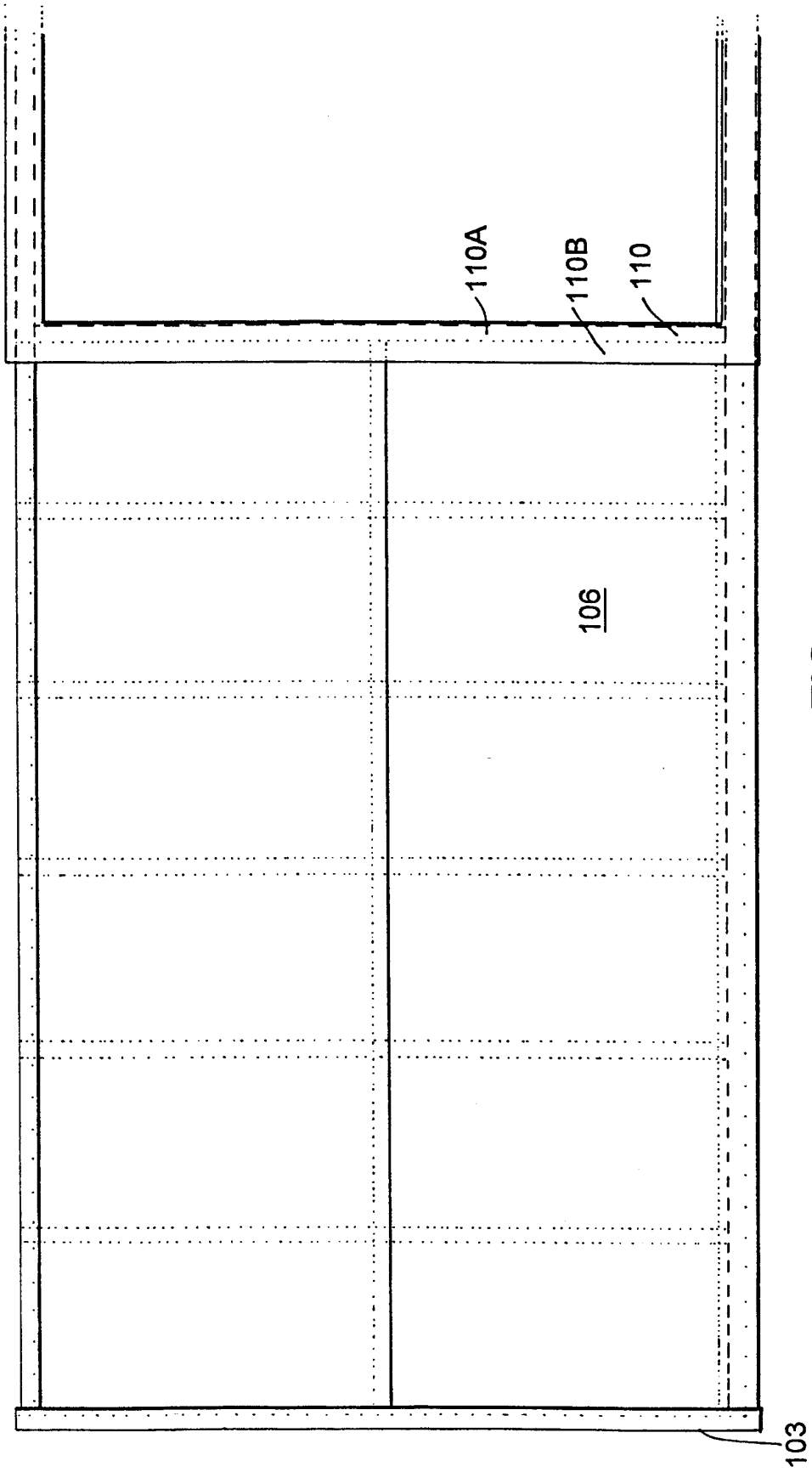


FIG. 7

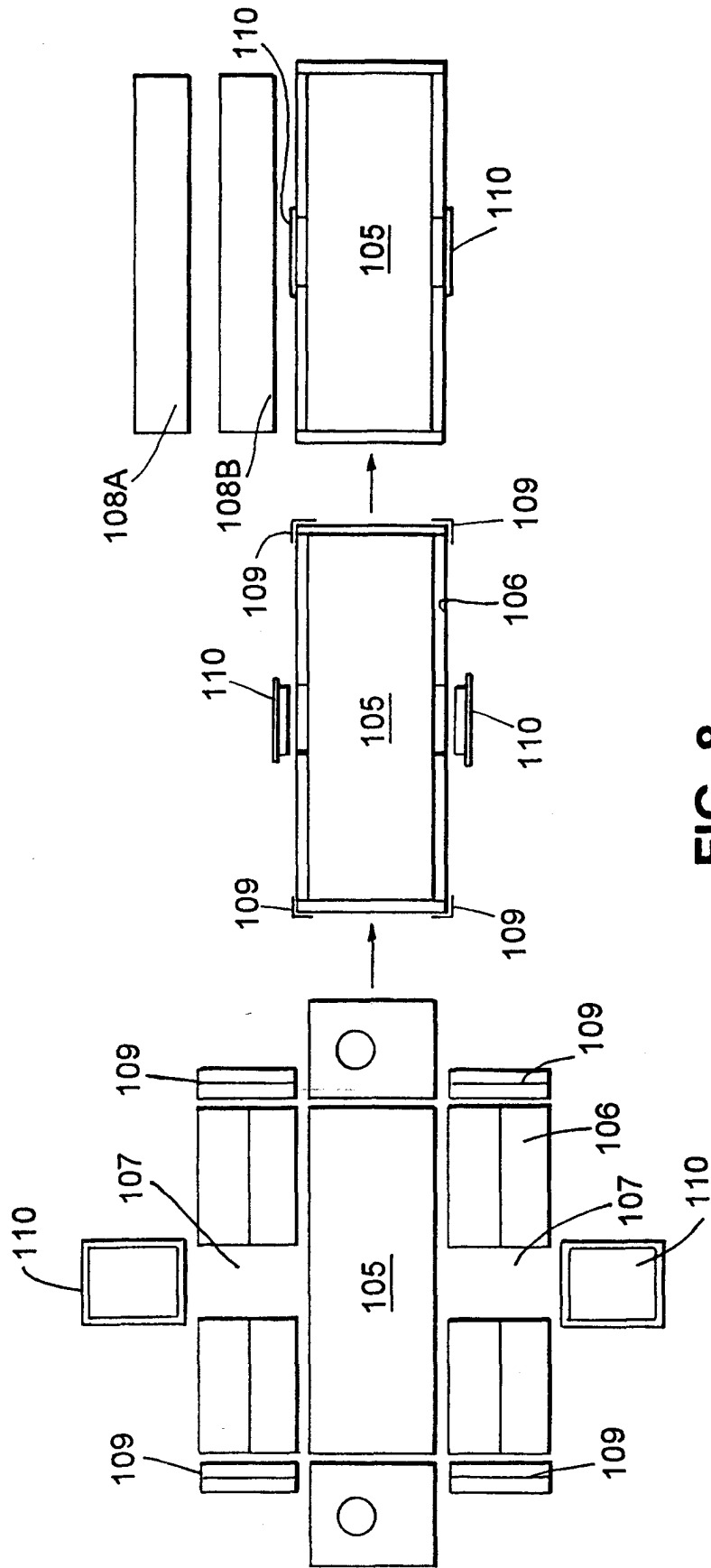


FIG. 8