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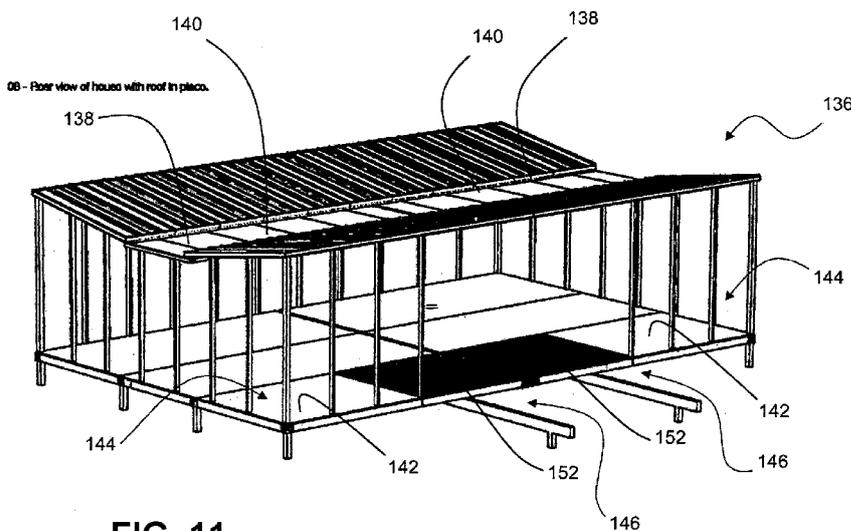


FIG. 11

(57) Abstract: In one preferred form there is provided a building construction 136. The building construction comprises a body portion 140 having a floor extension 142 adapted to extend from the body portion 140 and provide a floor area 144 wherein the floor extension 142 includes a facility 146 for receiving a building module.



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BUILDING CONSTRUCTION

FIELD OF THE INVENTION

The present invention relates to a building construction. In one form of the present invention there is provided a prefabricated building unit for transport as an ISO standard shipping container.

BACKGROUND TO THE INVENTION

There is a need for affordable and sustainable mass produced buildings, and dwellings. The current techniques of building houses, for example, are typically very manual and expensive. Most of a typical house is constructed on site. Skilled labour is required to build the house and connect the required services. Furthermore, it takes a considerable amount of time, typically many months, to build a house.

It is against this background and the problems and difficulties associated therewith that the present invention has been developed.

SUMMARY OF THE INVENTION

According to a first aspect of preferred embodiments herein described there is provided a building construction comprising a body portion having a floor extension adapted to extend from the body portion and provide a floor area wherein the floor extension includes a fitting facility for receiving a building module.

According to a second aspect of preferred embodiments herein described there is provided a building construction having a body portion of a box configuration suitable for transportation as a transport container wherein the body portion has an upper structure having at least two elongate upper external edge portions with a gutter arrangement disposed inwardly of and along at least one of the two elongate upper edge portions.

According to a third aspect of preferred embodiments herein described there is provided a building construction comprising: a body portion and a gutter arrangement wherein the gutter arrangement includes a moveable hinge portion and a gutter portion, the moveable hinge portion being adapted to mount a roof extension to the body portion, the moveable hinge portion being movable to allow the roof extension to be inclined at angle relative to

the body portion in a position adjacent the gutter portion such that when water falls onto the roof extension the water will flow downwardly along the roof extension into the gutter portion.

5 According to a fourth aspect of preferred embodiments herein described there is provided a building construction comprising: a body portion having an upper structure and a lower structure, the lower structure being adapted to provide at least one water compartment, the at least one water compartment being adapted to be emptied and provide the lower structure with sufficient buoyancy to lift the body portion in flood conditions.

10 According to a fifth aspect of preferred embodiments herein described there is provided a building construction comprising: at least one module, the or each module being adapted to be provided as ISO shipping container, when in a transport condition; the at least one module being adapted to provide a building body which has a floor area at least 2.5 times the combined horizontal area of the modules, when in the transport condition; and a panel system comprising a plurality of interchangeable panels allowing the building to be
15 provided with different facade layouts suited to different site orientations and other conditions.

According to a sixth aspect of preferred embodiments herein described there is provided a building construction comprising: a body portion; and panel system; wherein the panel system comprises a number of interchangeable panels that can be arranged to provide the
20 body portion with different facade layouts so as to adapt building to different site orientations and conditions.

According to a seventh aspect of preferred embodiments herein described there is provided a building construction for providing a building, the building construction comprising a body portion, a floor extension and a moveable hinge portion, the hinge
25 portion mounting the floor extension to the lower end of the body portion such that the floor extension is moveable between collapsed and extended conditions; wherein in the collapsed condition the floor extension provides side walls of the building construction at least in part providing the building construction with ISO shipping certification; further wherein the building construction comprises a roof extension that is put onto the building
30 after the floor extension has been moved to the extended condition, the floor extension being of a heavy weight in comparison to the roof extension.

According to an eighth aspect of preferred embodiments herein described there is provided a method of construction comprising: providing a building construction; swinging out floor extensions provided as side walls that at least in part provide the building constructions as an ISO shipping container wherein the floor extensions are of a substantial weight; and then attaching roof extensions to the building construction where
5 the roof extension are of a relatively light weight.

According to a ninth aspect of preferred embodiments herein described there is provided a method of construction comprising: providing a building construction, positioning roof and flooring extensions relative to a body of the building construction; and providing a
10 flotation arrangement beneath the floor extensions to assist with lifting the building construction during flood conditions.

According to a tenth aspect of preferred embodiments herein described there is provided a method of construction comprising: providing a building construction; extending floor extensions to provide an extended floor area; using a facility of the floor extensions to
15 receive a building module; positioning the building module such that the building module provides a portion of the floor area of the building construction.

According to an eleventh aspect of preferred embodiments herein described there is provided a method of construction comprising: providing a building construction; positioning roof and flooring extensions relative to a body of the building construction;
20 using a hinge of a gutter arrangement to dispose the roof extension in an inclined condition relative to the body of the building construction such that when water falls onto the roof extension the water flows flow downwardly along the roof extension into the a gutter portion of the gutter arrangement.

According to a twelfth aspect of preferred embodiments herein described there is provided a unit for a building, the unit comprising: a base; and a roof supported above the
25 base.

According to a thirteenth aspect of preferred embodiments herein described there is provided a building construction providing a transportable module, the transportable module providing kitchen or bathroom facilities for installation within a larger building
30 construction.

As will be discussed there are considered to be a number of preferred arrangements of the present invention that advantageously:

- 5 (i) Provide room areas having an improved feeling of spaciousness and comfort in a building constructed using prefabricated ISO standard container modules, where the building is still relatively readily manufactured and installed.
- (ii) Provide buildings, constructed using prefabricated ISO standard container modules, having advantageous rain capture and waterproofing capabilities while still being relatively readily manufactured and installed.
- 10 (iii) Provide ISO standard container modules having prefabricated fold out floor extensions, where during construction, the containers are placed side by side to provide a building of advantageous size and the building is able to receive a building module.
- (iv) Provide systems having one or more containers each with a floor portion
15 where the floor portion can be folded to triple the floor space.
- (v) Provide a building constructed using prefabricated ISO standard container modules with advantageous flood protection capabilities.
- (vi) Provide systems formed from at least one ISO shipping container module
20 having a plurality of panels that allow the final building to be provided with different facade layouts suited to different site orientations and other conditions.
- (vii) Provide systems and methods having an advantageous kitchen and bathroom fitting facility and module.

Further aspects, advantages and preferred features will be apparent from the drawings,
25 claims and a reading of the specification as a whole.

It is to be appreciated that each of the embodiments is specifically described and that the present invention is not to be construed as being limited to any specific feature or element of any one of the embodiments. Neither is the present invention to be construed as being limited to any feature of a number of the embodiments or variations described in relation

to the embodiments. The term building construction is to be understood as embracing transportable modules and building assemblies.

BRIEF DESCRIPTION OF DRAWINGS

In order to facilitate a better understanding of the present invention, several preferred
5 embodiments will now be described with reference to the accompanying drawings, in which:

Figures 1 to 9 provide several views illustrating a method of construction according to a first preferred embodiment of the present invention;

Figure 10 provides several views of a building construction according to another
10 preferred embodiment of the present invention;

Figures 11 to 17 illustrate a completed building construction according to a further embodiment, the building construction being provided according to the method illustrated in Figures 1 to 9;

Figures 18 and 19 illustrate another building construction according to a further
15 preferred embodiment of the present invention;

Figures 20a to 20f illustrate a further system and method according to a further embodiment;

Figures 21 to 23 illustrate a kitchen bathroom module according to yet another embodiment of the present invention;

Figure 24 illustrates a building construction according to yet another embodiment
20 of the present invention;

Figures 25 to 27 illustrate a building construction according to a further embodiment of the present invention; and

Figures 28 to 45 illustrate yet further preferred embodiments of the present
25 invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Referring to Figures 1 to 9 there is shown a method of construction 10 according to a first preferred embodiment of the present invention. Referring to Figure 3, in particular, the method of construction 10 employs two building constructions 12 that form preferred
30 embodiments of the present invention in their own right. Advantageously the method 10

is considered to provide for the ready construction of a building with several advantageous features that are discussed below.

As shown in Figure 1, the method of construction 10 provides a footing arrangement 14. More particularly, in the footing arrangement 14, the method 10 provides a plurality of first side footings 16, a plurality of intermediate footings 18 and a plurality of opposite side footings 20. A slide structure 22 in the form of a pair of bearers 24 is also provided.

The first side footings 16 and the opposite side footings 20 form a plurality of rows 26 comprising a first row 28, a second row 30, a third row 32, and a fourth row 34. Advantageously the slide structure 22 provides a first intermediate footing 36 and a second intermediate footing 38 that form part of the first row 28.

Of the intermediate footings 18, an intermediate footing 40 forms part of the second row 30, an intermediate footing 42 forms part of the third row 32 and an intermediate footing 44 forms part of the fourth row 34.

As shown in Figure 2, a first one of the building constructions 12 is placed on: (i) the first side footings 16 of the first row 28 and the second row 30; as well as on (ii) the intermediate footing 36 and the intermediate footing 40. This is performed using a crane.

The second building construction 12 is placed on: (i) the opposite side footings 20 of the first row 28 and the second row 30; as well as on (ii) the intermediate footing 36 and the intermediate footing 40. The intermediate footing 36 and intermediate footing 40 are provided as "T" footings to advantageously support both of the building constructions 12. In the method 10 the building constructions 12 are secured to the footings.

The two building constructions 12 are each provided as a standard container module 46 certified to meet ISO shipping standards. Each of the standard modules 46 comprises a body portion 48 having an advantageous gutter arrangement 50.

As shown in Figure 4, the gutter arrangement 50 of each standard module 46 includes a moveable hinge portion 52 and a gutter portion 54. When in a collapsed condition for transport, as shown in Figure 3, each gutter arrangement 50 is advantageously protected by a number of floor extensions 56 that are connected to the lower portion 58 of each module 46. In the embodiment the floor extensions 56 are connected to the lower portion 58 by a number of butt hinges 60.

The floor extensions 56 are provided in the form of outer panels and, in the method 10, are unfolded to form a floor area 62 as shown in Figure 5. In order to provide the floor area 62, the top of each of the floor extensions 56 is swung away from the upper portion 64 of each respective module 46. The floor extensions 56 are brought to rest on and are
5 secured to the footings 14.

Figures 6 to 8 illustrate the process of attaching a roof extension 66 to the body portion 48 of each module 46. The moveable hinge portions 52 of the modules 46 are adapted to mount a plurality of roof components 68 in the form of roof panels to form the roof extension 66 which is mounted to the body portions 48. The moveable hinge portions 52
10 are able to move from a first position 70, shown in Figure 4, to an intermediate position 72 shown in Figure 6. In the method 10, a number of roof components 68 are attached in series along the hinges 52 such that the roof components 68 extend from one side of the overall structure to the other, to form the roof extension 66.

Advantageously in the embodiment, the floor extensions 56 are of a relatively heavy
15 weight in comparison to the roof extension 66 so as to provide weight to base of the final building. Advantageously, the floor extensions 56 provide a floor area that feels similar to a house having a concrete floor in terms of the stability provided. By folding down the floor extensions 56 first the heaviest part is folded down. The roof extension 66 can then be advantageously provided by lighter roof components that are subsequently connected
20 in the intermediate position 72 shown. Assembly in this vertical-type position allows the person assembling the building to advantageously assess the quality of the water proofing of the completed roof extension 66. Six roof components 68 are provided within each of the constructions 12 during transport to provide the overall roof extensions on either side.

Returning to Figure 7, the gutter arrangement 50 provides an elongate channel 74 having
25 a first lateral side portion 76 and a second lateral side portion 78. The first lateral side portion 76 is configured for extending along the length of the body portion 48 and the second lateral side portion is configured for extending along an along an edge portion 80 of the roof extension 66.

In the method 10, as shown in Figure 8, the roof extension 66 is moved by an outward
30 swinging movement with the hinges 52 moving from the intermediate position 72 shown in Figure 6 to an inclined position 82 shown in Figure 8. When the roof extension 66 has

been raised to a sufficient height a plurality of supporting members 84 are installed and secured in position using conventional attachment means. The process is repeated on the opposite side of the each module 46 which has an identical advantageous mirror image gutter arrangement to provide a full extended building structure 86 shown in Figure 9.

5 After this has been performed a number of supporting brackets 88 are removed.

The form and arrangement of the building structure 86 is considered to be advantageous given that the hinge portions 52 are moveable from a vertical position shown in Figure 3 to the intermediate position 72 with the roof extension finally being fixed in the inclined position 82 shown in Figure 8.

10 The provision of the gutter arrangement 50 as described and shown in the drawing is considered to serve to advantageously protect the body portions 48 for water seepage and to provide advantageous water capture in a prefabricated two module container system.

Referring to Figure 10 there is shown an advantageous building construction 90 according to a further preferred embodiment. The building construction 90 comprises a body
15 portion 92 and a gutter arrangement 94. The gutter arrangement 94 includes a moveable hinge portion 96 and a gutter portion 98. The moveable hinge portion 96 is adapted to mount a roof extension 100 to the body portion 92. The moveable hinge portion 96 is movable to allow the roof extension 100 to be inclined at an upward angle relative to the body portion 92 in a position adjacent the gutter portion 98. As such when water falls
20 onto the roof extension 100, the water is caused by the action of gravity to flow downwardly along the roof extension 100 into the gutter portion 98.

The gutter arrangement 94 is provided as an elongate channel 102 having a first lateral side portion 104 and a second lateral side portion 106. The first lateral side portion 104 is configured for extending along the length of the body portion 92 and the second lateral
25 side portion 106 is configured for extending along an edge portion 108 of the roof extension 100.

In the embodiment the gutter arrangement 94 is provided on a first side 110 of the building construction 90 and a 'mirror image' gutter arrangement 112 is provided on an

opposite side 114. The gutter arrangement 94 and the gutter arrangement 112 form an overall gutter arrangement 116.

When in a condition for transport, both the gutter arrangement 94 and the gutter arrangement 112 are advantageously protected by lateral elongate side panels of the body portion 92 in the form of two floor extensions 118. The two floor extensions 118, in the transport condition, extend upwardly to protect the gutter arrangement 94 and the gutter arrangement 112 from sideways damage which could be caused by say a forklift.

As shown in Figure 10, the gutter portion 98 is provided as a u-shaped channel portion 120 located between the roof extension 100 and remainder of the body portion 92. By virtue of the channel portion 120 being of a conventional size for a gutter, the channel portion 120 is advantageously able to be readily cleaned using a ladder and conventional extendable gutter cleaners.

In the gutter arrangement 94, the hinge portion 96 comprises an elongate butt hinge 122 having a first leaf 124 for connection to the gutter portion 98 and a second leaf 126 for connection to the roof extension 100 as shown. Various hinge and connection arrangements are of course possible.

The body portion 92 has a slightly inclined upper portion 128 for causing water falling on the included upper portion 128 to flow into the gutter arrangement 94. In the embodiment the upper portion 128 is inclined by being slightly convexly shaped.

As discussed each lateral side of the building construction 90 is provided by an elongate floor extension 118 adapted to extend from the lower portion of the body portion 92 and provide a floor area. The floor extensions 130 are latched in position for transport purposes. The floor extensions extend slightly beyond the central main portion 132 of the body portion 92 to provide strength during transport. The width of each elongate floor extension 130 (vertical height) is only slightly greater than the height of the main portion 132 of the body portion 92.

Advantageously, the hinge portion 96 of the gutter arrangement 94 allows for the roof extension 100 to be substantially wider than the height of the body portion 92 such that when the building is assembled there is provided a desirable feeling of spaciousness and comfort.

- 5 The embodiment is considered to provide a building construction 90 having a body portion 92 of a box configuration suitable for transportation as a transport container. The floor extension 130 provides an upper structure having at least two elongate upper external edge portions 134 provided by the floor extensions 118 with the gutter arrangement 94 and the gutter arrangement 112 being disposed inwardly thereof. The gutter arrangements extend along the external edge portions 134 and provide a channel 120 on the upper portion for the flow of water. The building construction 90 is considered to be advantageous for reasons discussed above.

Turning to Figure 11, there is shown an overall building construction 136 provided according to the method 10. The building construction 136 comprises two modular building constructions 138 adapted to be transported as ISO certified shipping containers.

Each of the modular building constructions 138 includes a body portion 140 having a floor extension 142 pivotally attached to a lower portion of the respective body portion 140. In other embodiments a pivotal attachment may not be provided, and the floor extensions 142 may be positioned manually with say straps and chains that are used to constrain the lower edge of each floor extension 142 during lowering. Notably, with a manual positioning system, without an integral pivot, it is also preferred that the floor extensions are mounted vertically on the sides of the main chassis of the building construction 138 during transport. This may be advantageously achieved with a bolting system as is discussed in further detail below with reference to Figures 18 and 19.

- 25 Returning to the embodiment of Figure 11, each floor extension 142 is adapted to extend from the body portion 140 and provide a floor area 144. As shown the floor area 144 provided by both extensions 142, in combination, is about 2/3 of the total floor area.

Moreover, each floor extension 142 includes a fitting facility 146 for receiving a building module 148 in the form of a kitchen or bathroom module 150 (See Figure 13). The building constructions 138 are provided as mirror images with the fitting facility 146 being provided at a corner of each corresponding building construction 138. By being provided as mirror images this means that the fitting facilities 146 provide a central fitting facility in the overall building construction 136.

Referring to Figures 11 to 13, each fitting facility 146 comprises a removable portion 152 that is removable from the respective floor extension 142 to provide a floor recess 154 (See Figure 12) for receiving a corresponding half of the building module 148, (See Figure 13).

As shown in the Figures, the recesses 154 are together positioned on a lateral outer edge of the building construction 136, and are centrally positioned. Whilst each of the building constructions 138 provides a recess that receives only half of the horizontal cross-section of the building module 148, the recess 156 of the overall building construction 136 receives the full cross-section of the building module (in the horizontal plane). This is illustrated in Figure 12. The recess 156 is provided by removing centre panels that each form about half of the respective floor extension 142.

Before the building module 148 is installed, a number of water tanks 158 are provided in the centre of the building construction 136. This is illustrated in Figure 14.

As shown in Figure 15, there is provided a sliding system 160 that is adapted to allow ready positioning of the building module 148. The sliding system 160 comprises two spaced apart bearers that allow the building module 148 to be placed thereon and slid into the recess 156 of the full building construction 136. As shown the bearers extend perpendicularly from the building construction 136. The bearers if relatively accurately positioned can also be used as a guide. In the embodiment, the removable portions 152 are advantageously used to provide further flooring in the form of a verandah.

As shown in Figures 15 to 17, the building module 148 is placed outside the house on the bearers. Module end caps are removed and the module is slid along the bearers into the installed position. Internal and exterior wall panels can then be installed.

In the embodiment the building module comprises a kitchen / bathroom module. Each floor extension is adapted to be mounted vertically when in a transport condition and then to be position horizontally to provide the floor area. The removable portions are provided adjacent a top corner of the floor extensions so that when removed a recess is relatively centrally provided to accommodate the floor of a rectangularly configured recess/fitting facility. Whilst the removable portions are preferred other mounting arrangements allowing the incorporation of a kitchen/bathroom module are of course possible. The overall recess provided receives the full floor area of the building module.

Referring to Figure 18 there is shown a further embodiment of the present invention. The embodiment comprises a single 40ft building unit 139 that is advantageously provided as a unitary 40ft ISO standard shipping container. A number of floor extensions 141 are bolted to a main chassis 143. The bolting occurs along top edges 147 and bottom edges 149. Advantageously in the embodiment the complete side of the building unit 139, including its top and bottom corner fittings comprises a single welded frame of a floor extension 141. This is illustrated in Figure 18 and provides for advantageous strength.

Additionally Figure 19 illustrates the use of bolts 151 and mounting portions 153 that are used to fix the floor extensions 141 to the main chassis 143 during transport. The mounting portions are openly configured to allow ready access to the nuts that are used to secure the opposite end of the bolts 151. Several configurations are of course possible.

After unbolting, the floor extensions are moved from a vertically mounted position and are then positioned horizontally to form an extended floor area. This can be achieved by several methods including say manually with straps, chains or brackets that constrain the lower edge during assembly. The floor extensions 141 span the full height to the main chassis 143. This is considered to be advantageous.

The building unit 139, in this embodiment, comprises a single/unitary 40'ft reinforced container rather than two 20' containers placed end to end. This is considered to significantly reduce the number of components required and therefore cost, as well as to simplify transportation and installation in several cases. The fixing arrangement

comprises the floor extensions 141 being bolted by extending the bolts 151 through the main peripheral frame 155 of each floor extension 141. This is also considered to be advantageous for the reason that the bolts are able to advantageously transfer impact loads and maintain the floor extensions 141 in a desirable position during transportation.

- 5 Referring to the Figures it is also shown that the floor extensions 141 each advantageously form a complete side of the container vertically and horizontally with respect to the chassis 143. The floor extensions 141 provide ISO standard corners 157 as part of their outer frame 155. The ISO standard corner castings 157 are separate, as shown, from the centre chassis 143 to which the floor extensions 141 are bolted. By
10 bolting in this manner, the floor extensions 141 are advantageously secured in a steadfast manner.

The floor extensions 141 each provide a structural frame of a similar structural reinforcement to the chassis 143 to which they are bolted.

- During installation the floor extensions 141 are detached from the centre chassis 143 of
15 the container, are lowered in to position using a pivoting motion (but without an integral pivot) and then are re-attached by bolting.

- In addition, one of the floor extensions 141 of the unitary 40'ft building unit 139
advantageously provides a fitting facility. The fitting facility is advantageously adapted to receive a separate building construction in the form of a kitchen or bathroom module.
20 It is considered that allowing a separate building unit to be inserted into the container, enables the advantageous provision of relatively full sized rooms. In comparison to other container building units the kitchen and bathroom is not positioned in the relatively narrow central spine of the 40' container. In the embodiment, a kitchen and bathroom module is received within/on one of a floor extensions 141 extending from the base of the
25 chassis 143.

Referring to Figures 20a to 20f there is shown a method of construction 159 according to a further embodiment providing a unitary 40ft building unit. As shown the floor extensions provide the ISO standard corners 161. The kitchen/bathroom module is

transported as a container having a floor 163. The kitchen/bathroom unit also provides ISO end mounts 165 and a protecting roof 167. During installation the floor 163 of the module, which is transported separately, is then guided into position and forms part of the final floor area. The protecting roof is reusable and advantageously includes flooring as part of the protecting layering for use as part of the verandah of the building.

Figures 21 to 23 illustrate a modular unit 169 according to a further preferred embodiment of the present invention. The modular unit 169 is advantageously provided as a 20 foot container 171. The container 171 advantageously comprises a chassis 173 having a box shaped frame 175 with an internal reinforcement 177. The frame 173 is elongate and includes a first end 179 and a second end 183.

A first carrier element 185 is mounted to the first end 179 and a second carrier element 187 (not shown) is mounted to the second end 183. The carrier elements 185 and 187 are removably attached to the chassis 172 and have a relatively flat planar configuration. The removable attachment is provided a number of bolting elements as shown. The carrier elements 185 and 187 are of a shape protecting the periphery of the chassis 173 and substantially span the full width and height of the ends 179, 183.

The carrier elements 185, 187 each include ISO corner elements 189. The modular unit 169 is provided to ISO shopping container standards. Furthermore, the modular unit 169 is designed to provide both kitchen facilities and bathroom facilities for a larger modular unit of the type described above. By providing the majority of the plumbing and kitchen facilities in the modular unit 169, other material such as roofing can be advantageously transported in the larger modular unit (40ft). The smaller modular unit 169 containing the kitchen and bathroom facilities is separately transported to the assembly site. The applicant considers that this is advantageous.

The modular unit 169 may include low friction material on its lower surface to assist with being moved on a plurality of bearers mounted to the large modular unit during assembly. This could for example comprise a strip of nylon material. It is preferred that a winch is connected to the inner edge of a recess provided within a floor extension of the larger

modular unit, and that the smaller unit 169 is pulled on the bearers using the winch. By bolting to the larger unit the bearers can be advantageously used to provide a guide. The system is preferably able to be installed by two or three relatively unskilled persons.

5 Another advantage of the approach is considered to be that it allows one to relatively maximise the floor area of the house. The applicant considers that such a design in combination with a modular roof system could possibly give a substantial additional effective floor space in some embodiments. . This is considered to allow for the design of more generous spaces which contribute to the overarching goal of creating a home that looks and feels like a site built house. Kitchen and bathroom facilities are centrally
10 located on a floor extension rather than in the main chassis. During transportation, the relatively empty chassis of the larger unit can be advantageously used to transport other material such as roofing panels. This provides several advantageous assembly aspects on site.

Referring to Figure 24, there is shown a building construction 162 according to a further
15 preferred embodiment of the present invention. The building construction 162 comprises a body portion 164 having an upper structure 166 and a lower structure 168. The lower structure 168 is advantageously adapted provide a water compartment 170 that is adapted to be emptied to provide the lower structure 168 with sufficient buoyancy to lift the body portion 164 in flood conditions.

20 The water compartment 170 comprises a symmetrical arrangement adapted to accommodate a plurality of footings 172 extending therethrough and to allow the building to be formed using two ISO certified containers. The water compartment 170 is fitted within the lower structure 168 so as to form part of the lower structure 168 and extend around along the boundary thereof.

25 The building construction 162 includes a vertical guiding system 174 that is adapted to guide the body portion 164 up and down during flood conditions. The vertical guiding system 174 comprises four guiding members 176 that are adapted to guide the body portion 164 up and down.

The building construction 162 is considered to be particularly advantageous for use in floodplain areas that are subject to flooding. Generally where houses are formed from ISO compliant shipping containers they would otherwise be washed away.

5 In the embodiment the building construction 162 is provided by positioning the roof and flooring extensions relative to two prefabricated units and providing a flotation arrangement beneath the floor extensions.

Referring to Figure 25 there is shown a building construction 178 according to a further preferred embodiment of the present invention. The building construction comprises a body 180 provided by two transportable modules 182 (as previously discussed) where
10 each module 182 is adapted to be provided as an ISO shipping container, when in a transport condition. Advantageously the modules 182 can be assembled from the transport condition to provide a building 184, in an extended condition. As shown in Figure 25, the building 184 has a floor area 185 about three times the combined horizontal area of the bases of modules 182, when assembled in the transport condition.
15 Advantageously the building construction 178 further includes a panel system 186 comprising a plurality of interchangeable panels 188 allowing the building 184 to be provided with different facade layouts suited to different site orientations and other conditions.

The building system is considered to be particularly advantageous as it allows the
20 provision of a building formed from ISO certified shipping containers where the building is able to be desirably adapted by builders to suite the site orientations. Owners can also advantageously decide where to position windows, doors as well as internal walls.

Similarly to the previous embodiments described, the building body 180 as assembled includes a floor portion 190 that forms part of the sides of the modules 182 when the
25 modules 182 are provided in the transport condition. The floor portion 188 forms at least part of the floor area 184 in the building body. Advantageously the interchangeable panels 188 are arrangeable around the boundary of the floor area 185 to provide the different facade layouts.

As shown in Figure 25, the panel system 186 includes a wall panel 194, a high window
30 panel 196, a medium window panel 198, a full window panel 200, a door panel 202 and a

sliding window double panel 204. Each of the panels of the panel system 186 is advantageously of the same width apart from the sliding window double panel 204 which is twice the standard width.

Advantageously by providing a modularised construction with the panel system, mass manufactured container type houses are considered to be able to be readily manufactured. Different positions of facade and internal layouts can be readily provided.

As shown in Figure 26, the floor area 185 is substantially square comprising a width 206 of approximately 6 standard panel widths and height 208 of approximately 6 standard panel widths 206. This is considered to be advantageous.

Figure 27 shows the wall panel 194 in cross section. Advantageously the wall panel 194 is provided with an extension 210 and an abutment 212. The abutment 212 is provided as a lower surface for bearing against the floor portion 190. The extension 210 extends from the front of the abutment 212 downwardly past the front face 214 of the floor portion 190 as shown in Figure 27. This serves to advantageously assist with weatherproofing the join between the wall panel 194 and the floor portion 190. The extension is preferably longer than 10cm. In the embodiment the extension is about 30cm long which also serves to advantageously hide water tanks provided beneath the floor portion 190.

The wall panels of the panel system 186 are hung at the top and then attached with screws along the sides and the bottom for the pressure seals to be sufficiently watertight.

In addition in the completed unit there are no cables in the exterior wall panels, all the power and plumbing runs through the main floor structures and the centre chassis. Floor boxes are used rather than standard wall mounted outlets) to provide power outlets to each room.

As detailed above, several preferred embodiments are considered to provide a number of systems and methods that advantageously:

- (i) Provide room areas having an improved feeling of spaciousness and comfort in a building constructed using prefabricated ISO standard container modules, where the building is still relatively readily manufactured and installed.

- (ii) Provide buildings, constructed using prefabricated ISO standard container modules, having advantageous rain capture and waterproofing capabilities while still being relatively readily manufactured and installed.
- (iii) Provide ISO standard container modules having prefabricated fold out floor extensions, where during construction, the containers are placed side by side to provide a building of advantageous size and the building is able to receive a building module.
- (iv) Provide systems having one or more containers each with a floor portion where the floor portion can be folded to triple the floor space.
- (v) Provide a building constructed using prefabricated ISO standard container modules with advantageous flood protection capabilities.
- (vi) Provide systems formed from at least one ISO shipping container module having a plurality of panels that allow the final building to be provided with different facade layouts suited to different site orientations and other conditions.

In terms of the Figures 28 to 45: Figure 28 shows an exploded perspective view of one embodiment of a building; Figure 29 shows steps of one embodiment of a method of erecting the building of Figure 28 in accordance with an aspect of the invention; Figure 30 shows a site with screw piles installed; Figure 31 is a perspective view of one embodiment of two units for a building, in accordance with another aspect of the present invention, in collapsed mode and received by the screw piles; Figure 32 shows one of the units with roof extensions swung up; Figure 33 and Figure 34 show base extensions swung down into respective extended positions; Figure 35 shows the units with a sub unit disposed therein and columns installed over the base extensions; Figures 36 and 37 show the roof extensions in respective extended positions; Figure 38 shows the unit with outer panels installed; Figure 39 shows the building in a final or near final form; Figure 40 shows an example of a cap which may form part of the unit of Figure 31; Figure 41 shows an example of a hinge that has more than one degree of freedom which is a part of the units of Figure 31; Figure 41 shows an example of a vessel in the building of Figure 28; Figure 43 shows various embodiments of exterior panels in front of a building they may

be fitted to; and Figures 44 and 45 show one embodiment of a collapsible wall in a collapsed and an extended mode respectively.

As shown in Figure 28 an exploded perspective view of one embodiment of a building is generally indicated by the numeral 312. In the embodiment, a considerable fraction of the building 312 is manufactured within a controlled factory environment, that is it is
5 prefabricated. This reduces the amount of skilled labour and time required onsite.

The building 312 is delivered as one or more units in a collapsed state. In the collapsed state the building 312 has an external form commensurate with a shipping container, such as an ISO shipping container. Another label for a shipping container, in the context of
10 this document, is an intermodal container. For example, the base may have the same footprint as the base of an ISO shipping container, the roof may also have the same width and length as the roof of an ISO shipping container, and the side walls may also have the same width and length as corresponding side walls of an ISO shipping container. The external form of the collapsed unit may, in some alternative embodiments, be
15 commensurate with a non ISO container standard. The United States often uses longer units at 48 ft (14.63 m) and 53 ft (16.15 m). Some European containers are about 2 inches wider at 2.5 m (8 ft 2.4 in) to accommodate Euro-pallets. Australian RACE containers are also slightly wider to accommodate Australia Standard Pallets.

The unit, in this particular embodiment, is not a shipping container but has been
20 constructed to take certain features of a shipping container so that it can be transported over an intermodal freight transport system which may comprise, for example, a container ship, a container train, a truck, and specialized container handling equipment such as a portainer. In another embodiment, however, the unit is a shipping container that has been suitably modified.

25 In a particular embodiment, the outer form of the unit is commensurate with a high cube shipping container. High cube containers have a width of around 2.44m (8 feet), and a height of 2.89 m (9.5 feet). High cube containers are available in lengths of, for example, 10, 20, 30 or 40 feet. The length of the unit in this, but not necessarily all embodiments, is 20 feet.

The building 312 is assembled by extending the unit onsite, typically in a few weeks by an owner/builder, or by an experienced construction crew in a matter of days.

Figure 29 shows the steps of one embodiment of a method of erecting the building 312 from one or more units and a sub unit. In a first step, one or more units (in this example 2 units) such as units 310, 311 for the building 312, and a sub unit 374 are delivered to a site on which the units 310,311 and thus the resulting building 312 is to be located. The units 310,311 are substantially identical, but do not need to be, and have dimensions which are commensurate with a shipping container, such as an ISO shipping container. In this embodiment, the units 310,311 have external dimensions commensurate with a high cube shipping container which is higher than "standard" shipping containers. The corresponding building thus has a relatively high roof and relatively more internal volume than that which can be achieved using lower shipping containers. The units 310,311, because they have dimensions commensurate with a shipping container, may be handled and transported using the existing infrastructure for handling and transporting shipping containers. In the embodiment of the method shown in Figure 29, the units 310,311 are delivered on a B-triple truck which is configured to carry ISO shipping containers. The B-triple truck also carries and delivers the sub unit 374 which is to be located in the units 310,311. Typically, the sub unit 374 has external dimensions which are also commensurate with a shipping container, but a shipping container smaller than that corresponding to the unit 10 (typically lower but having the same footprint). The sub-unit external dimensions may be commensurate with an ISO shipping container.

In step 2, caps such as 374 are removed from the ends of the units, and then the units 310,311 are positioned end to end upon the site by, for example, a crane that is a part of the truck. In this case, the units 310,311 are located on a plurality of columns 360 (as shown in Figure 29) each having the form of a screw pile, for example. The screw piles are typically installed on the site before the units 310,311 and sub unit 374 are delivered.

In the following, the method will be explained further with reference to unit 310, although it is to be understood that similar steps may be performed with unit 311.

As shown in step 2, the unit 310 has a rectangular roof extension 18 folded down to form a sidewall but which may be extended to form an extension of the rectangular roof 316 of

the unit 310. During transport, the roof extension 318 is fastened down in a collapsed position by clamps, cables, or ties for example. Before the roof is swung up it is released.

When the roof extension 318 is swung up into an elevated mode, as shown in step 3, a rectangular base extension 320, which may form an extension of a rectangular base 314 of the unit 310 when folded down, is revealed. The base extension 20 is fastened during transport. When it is to be swung down, the base extension 20 is first released.

As shown in step 4, the base extension 320 is swung down to form a larger floor area than that provided by the base 314 alone.

In step 5, the sub unit 374, which in this example has a form commensurate with a 20 foot ISO container, is disposed within the one or more units. In this example, the sub-unit is not a high cube container. The sub unit 374, in this embodiment, may be a bath and/or a kitchen and may have all of the plumbing and other services in place. The sub-unit may have one or more doors, for example opening into the kitchen and/or bathroom.

In step 6, the roof extension 18 has been swung down from the elevated mode into an extended mode.

In step 7, panels are placed around the periphery of the extended unit 310, the panels being, for example, wall panels, doors and exterior windows. The panels may be all of the same width, typically but not necessarily 1.2 m, and so the panels are interchangeable. Generally, the use of panels is greatly simplified when the roof extension is extended before the floor extension is extended.

The various stages of the erection of another embodiment of a building 312 are shown in more detail in the Figures. Similar parts to those shown in Figures 28 and 29 have been similarly numbered.

As shown in Figure 30, a plurality of columns in the form of screw piles such as 360 and 362 are first installed on the site. Figure 31 shows two units for a building abutted end to end, the foremost unit indicated by the numeral 310 and the rearmost unit indicated by a numeral 311. When the units are used as shown in Figure 32, the resulting building may be described as a modular building. A vertical line indicates the boundary of the units 310,311. A capping member is disposed over the boundary of the respective roofs and/or roof extensions. The capping member, in this embodiment in the form of a seal capping,

is attached using adhesives and/or fasteners. The units are shown in a collapsed mode located on the piles 360. The unit 310 has opposing ends 348, 350 that are open, as does the unit 311. During transport, however, the open ends 348, 350 may be capped, the additional cap structure stiffening the unit for transport. With the caps installed, a unit
5 may have dimensions equal to an ISO shipping container, for example a 20 foot long high cube. With the cap removed, the unit may be slightly shorter than an ISO shipping container. The caps may be removed on site, for example, and used as a component of the building 132. Figure 40 shows a front perspective view of an example of a cap 374. The rear end of the cap is open and presents a cavity into which an end of a unit may be
10 received. The caps may be configured to engage an intermodal container transport, such as a container ship, by a pair of cooperating elements, each of the pair of elements being located on one of the cap and the transport respectively. When the elements are engaged, the unit can be secured in handling and in transit. The element may, for example, be a standard ISO mounting point 376 in the form a corner casting, an element compatible
15 with a twistlock (a fastening device used in the container shipping industry). Any suitable fastening system may be employed. The elements 376 may be located at one or more corners of the cap 374 as for an ISO shipping container.

The unit 310 has a roof extension 318 which can adopt a collapsed, an extended, or an elevated mode. In Figure 31, the roof extension 318 is shown in the collapsed mode
20 (folded down). In this embodiment, the roof extension 318 extends essentially the entire span between the base and the roof to form an external wall of the unit 310. In other embodiments, the roof extension does not extend the entire span. The roof extension, in this embodiment, is slightly smaller than an outer wall of a high cube container, and in particular its width in this, but not necessarily all embodiments, is around 2.8m.

25 When the unit is in a collapsed mode, located behind the roof extension 318 is a base extension 320. The base extension 320 can adopt either a collapsed mode or an extended mode. In Figure 31, the base extension 320 is shown in the collapsed mode. The base extension has a width of 2.4m. The base extension 320, in this but not all embodiments, is of a lesser width than the roof extension and thus does not extend the entire span
30 between the base 314 and the roof 316. This may provide space for, for example, a mechanism such as a hinge connecting the roof extension to the unit. In the extended

mode the base extension 320 is an extension of the base 314; the top surfaces of the base and the base extension lie in the same plane.

Because the roof extension is of greater width than the roof extension the house is provided with an awning. The awning advantageously improves passive thermal management making the house more sustainable.

The roof extension 318 has a proximal edge 322 adjacent the roof 316 and also a distal edge 324. When the roof extension 318 adopts the collapsed mode, the distal edge 324 is located adjacent the base 314. In the extended mode, however, the distal edge 324 of the roof extension 318 is elevated above the proximal edge 322 of the roof extension 318, as shown in Figure 28. The internal space is generally higher than that provided by a container because the distal edge is elevated. More height is provided on an outer edge 324 of the house than the interior under the roof 316. This enhances the sense of space within the house, especially when looking outwards beyond the distal edges of the roof extension. Also, the inward slope of the roof extension causes rain that falls on the house 312 to flow inwards where it can be centrally collected and transported via a conduit to a water reservoir, such as a tank located under the house.

As shown in Figure 32, the roof extension 318 can, at least in this embodiment, be swung up by greater than 180 degrees revealing the base extension 320. The roof extension 18 is attached to the roof by a hinge 342 shown in Figure 28. The use of a hinge is convenient as it supports half the weight of the roof extension as it is swung around. A hinge also pre-aligns the roof extension with respect to the roof and walls. Similarly, the base extension 320 is attached to the base 314 by another hinge 344 shown in Figure 32.

The roof extension in the elevated mode, as shown in Figure 32, typically makes an angle of between 180 – 270 degrees with the roof extension in the collapsed mode. The roof extension is actually one of two roof extensions and in the elevated mode respective distal edges of the roof extensions are brought together. This is a relatively stable position, especially if the extensions are fastened together, and expensive and cumbersome equipment is not required to bring the extensions into the elevated mode or hold them in this mode. In this mode, the roof extensions are self supporting and conveniently out of the way during the preliminary stages of erection.

As shown in Figure 33 the base extension 320 may be swung down into the extended position after the roof extension 318 has been swung up.

The hinge 342 is configured so that the roof extension 318 can be swung either above or below the roof 316 and so adopt various positions used during transport, construction and final use of the building. This may be impossible using prior art arrangements. A hinge that provides movement along a path rather than around an axis may be used. That is, it may be advantageous to use a hinge that has two or more degrees of freedom, such as for example the double hinge shown in Figure 42. The double hinge has a first 380 and a second 382 pivot, the pivots being each connected to a connecting member 383 common to the pivots. The first pivot 380 is attached to a first leaf 384 and the second pivot is attached to a second leaf 386. Because the angle between each leaf and the connecting member can be changed this double hinge has 2 degrees of freedom, unlike a standard hinge which has only one degree of freedom. In use, the first leaf may be fastened to an internal surface of the roof 16 adjacent an edge, and the second leaf is attached to an internal surface of the roof extension 318. When extending the roof extension, rotation around the first pivot 380 causes the second pivot 382 to swing out of the interior of the unit and free of the roof. The roof extension can then be rotated around the second pivot without interference from the roof. A hinge with more than 2 degrees of freedom may be employed. A hinge having one or more translational degrees of freedom may be employed. In the present embodiment, the hinge is attached to external surfaces of the unit, however it may be attached to internal surfaces of the unit as described. This protects the hinge during transport etc, and in this case the hinge does not extend beyond the dimensions of the standard container the unit is modelled on.

The unit 312 has a water proofing material over at least a portion of a boundary between the roof and the roof extension. In this embodiment, the material takes the form of a strip of water proof membrane, such as a strip of PVC plastic sheet or a bituminous sheet. In other embodiments, the water proofing material may be a membrane applied as a fluid and allowed to set, such as silicone.

Typically, the roof extension 318 is swung between the collapsed and extended modes around the hinge 344 however it will be appreciated that the roof extension need not be

hinged. In alternative embodiments, the roof 316 (or even the base 314) can be detached from the unit and then reattached in the required position or mode.

As can be seen in Figure 33, the roof 316 is supported above the base 314 by a plurality of posts 346 extending between the base 314 and the roof 316. The posts 346 may be, for example, steel tube of a square cross sectional profile or in some embodiments, timber. Generally any suitable material may be used for the posts 346. The posts are offset from corners of the unit. This allows the extensions to span the entire length of a unit in the collapsed mode.

As shown in Figure 33, the base extension 320, when in the extended mode, sits on a plurality of columns such as 362. The column 362 may take the form of, for example, a screw pile, or alternatively a brick pile with a concrete foundation. Generally any form of suitable column may be employed. Screw piles, however, may be rapidly deployed. The base extension (and indeed the base) may have, for example, integral strengthening plates that engage the columns.

As shown in Figure 35, with the roof extension 318 swung up and the base extension 320 swung down, the unit 310 may receive the sub unit 374, which is in this embodiment has a length commensurate with a 20 foot long ISO shipping container. In some embodiments, more than one sub unit is disposed within the unit 310. The unit, in this embodiment, comprises a kitchen and bathroom. The further units may be, for example, bedrooms or studies or some other specialised room.

The embodiments of the unit 310 and sub unit 374 shown are each configured to receive one or more services such as a water service, a gas service, an electrical service, a communication service such as telephone or internet and a sewerage service. For example, the unit 310 may come with one or more of an electrical distribution board and electrical outlets, apertures for receiving pipes and cables therethrough and ducts for pipes and cables, as appropriate. The apertures may be capped for transport and handling of the unit. An exterior service of the unit can comprise an electrical connector for connection to the grid. The connector may be recesses. Electrical wiring may be located within a floor cavity, for example. Generally, no additional electrical work needs to be done inside the house on site besides connecting the house to an electrical supply such as an

electrical grid. In this embodiment the sub-unit 374 has a toilet, shower, stove, and oven all connected to service conduits such as wires and pipes, for example, within the unit.

The sub-unit of this embodiment has a base that is removed prior to being disposed within the one or more units. In this case, there is no step into the interior of the sub-unit from
5 the unit.

The sub-unit 374 has a vessel 388, shown in Figure 41, adapted to hold a thermal mass such as water, sand, or any suitable material capable of storing heat. The vessel is typically adjacent a side wall of the sub-unit and fixed to a wall of the sub-unit. When the sub-unit is installed the vessel is ideally located near or at the centre of the building. The
10 unit is delivered with the vessel empty. The empty vessel reduces the mass of the sub-unit during transport and installation. In one form, the vessel is a water tank of around 1,000 litres. Once the sub-unit is installed, the tank may be filled with, for example, water delivered via a hose connected to the water mains. Alternatively, sand, soil etc. may be used, possibly sourced from the site. The thermal mass may help stabilise the
15 temperature within the building providing a better interior climate without unnecessary transport of the mass.

As can be seen in Figure 35, a plurality of columns, in this embodiment in the form of steel posts 376, are erected above the base extension 320. The posts such as 376 are located over respective screw piles. The roof extension 318 is then swung down into the
20 extended mode to rest upon the columns 376 as shown in Figure 36. The extensions may have integral strengthening plates that engage the columns. The roof extension in the extended mode makes an angle of 50 – 135 degrees with the roof in the collapsed mode.

As shown in Figure 36 walls are disposed within the unit. At least one of the walls 412 is a collapsible wall that is transported in a collapsed mode (Figure 44) and after being
25 installed adopts an extended mode (Figure 45). The wall has first 414 and second sheets 416 of material. A structure 418 is attached to the first and second sheets. The structure, at least in this embodiment, has a hinge although any suitable equivalent structure such as a joint may be used. In this embodiment, the structure actually has two double hinges 418. The double hinge has first and second leaves, the first leaf being attached to the first sheet
30 and the second leaf being attached to the second sheet. The double hinge is located between the sheets. The sheets are relatively closer (say, 100mm rather than 300mm

spacing) when the structure is in the collapsed mode than the extended mode. Once expanded, material such as an insulating material may be disposed in the space between the sheets.

Figure 38 shows the building with outer wall panels installed. The panels are interchangeable to adapt to site specifications and orientation. Because the outer walls are panels, cladding materials can be exchanged as required. For example, the cladding material may be fibre cement, timber, metal sheet, plastic or the like. Because, in this embodiment, the outer walls are hung, they have improved water proofing compared to outer walls attached via hinges to the roof and/or base and which can be swung out on the hinges. The load bearing features of the building 312 are columns 376. The outer walls are self supporting, making the final structure relatively easy to build and significantly lighter.

The base extension may have a proximal edge adjacent the base and a distal edge. The distal edge is, in this but not necessarily all embodiments, configured to receive a respective edge of a panel. In this particular embodiment, the distal edge is configured to engage the panel by a pair of cooperating elements, each of the pair of elements being located on one of the distal edge and panel respectively. The cooperating elements may comprise a pin configured to be located in a corresponding recess. In another embodiment, however, the cooperating elements may comprise a protruding rib configured to be located in a corresponding slot. Generally, any suitable engaging elements may be employed. It may be preferable, in some embodiments, to have the male element, such as a pin or rib, located on the panel. This is because a male element located on the distal edge of the base extension would be vulnerable to snagging and/or damage as the building is erected. A male element on the panel is afforded some protection by virtue of the adjacent structures, most notable a downward projecting flange 408 shown in Figure 43. The panel may comprise, for example, at least one of a window, a wall panel and a door.

Figure 43 shows various embodiments of the exterior panels indicated by the numerals 390 to 400. Panel 390, for example, has a first end 402 and a second end 404 that is spaced apart from the first end 402. A surface 406 is disposed between the ends. The surface may be, for example, the outer face of cladding, a surface of a door, a window, a

double sliding window, sliding doors etc. As best seen in panel 400, the panels each have a flange 408 parallel to the surface and extending away from one of the ends that it is attached to. The flange has a surface which is adapted to be an exterior surface. For example, the exterior surface may be painted or treated metal or timber, plastic etc, and can withstand the weather and/or sun. The flange 408 is substantially in the same plane as the surface 406. The flange may comprise an insulating material which covers the edges of the base and/or base extensions. Alternatively or additionally, an insulating material, such as a glass fibre mat, may be disposed between the flange and the base. This is advantageous when the base and/or base extension is fabricated of a thermally conductive material such as steel which would normally act as a thermal conduit between the edges of the base/base extension and the interior of the unit. The flanges may also aid in waterproofing the structure because they may terminate at or below the bottom of the base extension. Located behind the flanges are the one or more elements that cooperate with corresponding elements on the distal edge of the base extension.

Figure 38 shows the building in a final or near final form. A vergeboard (or Bargeboard) 368 has been installed at an end of the unit above the end panels 372. The verge board comprises material of high thermal resistance, such as glass fibre matting, air blown plastic such as Styrofoam, an analogue of these or any other suitable material. Preferably a biodegradable insulating material is used. One or more glass elements 370 are installed above the side wall panels 336,338. Typically, the glass elements each comprise glass panels of high thermal resistance, such as double glazing, low emissivity glass, or even vacuum glazing.

The final building 312, such as that shown in Figure 38, may not have any reminiscence to a shipping container.

Typically, embodiments of the unit 310 are configured to receive at least one solar collector such as a photovoltaic panel or solar hot water heater. The roof or roof extensions may have mounts 374 attached or formed therein ready to engage a solar collector or a solar collector supporting member. In the present embodiment, mounting plates 374 (Figure 28) are fixed to an exterior top surface by an adhesive such as a 2-part epoxy or cyanoacrylate adhesive. The use of an adhesive is preferable to the use of mechanical fasteners, such as screws, which may penetrate one or more apertures formed

in the roof. The apertures may provide a conduit through which water or another substance may enter the interior of the unit, which is generally undesirable. The apparatus may be starting points for corrosion. The mounting plates may be fabricated of aluminium, for example, but any suitable material may be used. Alternatively or
5 additionally, one or more exterior wall panels such as 390 may one or have mounts such as 374 to engage a solar collector or a collar collecting supporting member. In another embodiment, a wall panel may have an integrated solar collector. The solar collector may be installed when the building is in a final or near final condition.

Thus in one aspect of the invention there is provided a unit for a building, the unit
10 comprising: a base; and a roof supported above the base.

The unit may be prefabricated in a factory and form at least part of a prefabricated or modular building. Mass production techniques may be employed to reduce costs and construction time. Because units from the factory may be similar or identical economies of scale may be realised reducing costs. A quality, for example one or more of energy
15 rating, sustainability of the materials used, or build quality, of the unit may be greater and more certain when produced in a controlled environment typical of a factory.

In embodiments, the unit comprises a roof extension having a collapsed mode and an extended mode, in the collapsed mode a surface of the roof extension is also an external side surface of the unit, and in the extended mode the roof extension is an extension of the
20 roof. The roof extension in the extended mode may make an angle of 50 – 135 degrees with the roof extension in the collapsed mode. The roof extension has a proximal edge adjacent the roof and a distal edge that is, in the extended mode, elevated above the proximal edge.

The collapsible unit may be easily transported in the collapsed mode and still provide
25 significant building space in the extended mode. The distal edge being elevated above the proximal edge is desirable for architectural reasons, including giving more internal space and a greater sense of openness when looking outward from within the building. Without the elevated distal edge the building may feel unacceptably confined to a person, who may even experience claustrophobia.

The roof extension also may have an elevated mode wherein the distal edge of the roof extension is located over the roof. The roof extension in the elevated mode may make an angle of 180 – 270 degrees with the roof extension in the collapsed mode. The roof extension may be one of two roof extensions. In the elevated mode respective distal edges
5 of the two roof extensions may be brought together.

When the roof extensions are in the elevated mode they are conveniently out of the way during work performed at the level of the base. The roof extensions are less likely to be damaged while in the elevated mode during the work. The extensions may be substantially self supporting when the respective distal edges are brought together,
10 reducing the need of building tools/equipment.

In one embodiment, in the collapsed mode the roof extension extends at least in part between the base and the roof. The roof extension when in the collapsed mode may extend between the base and the roof.

A roof extension that extends between the base and the roof may form a superior barrier
15 to external interference such as from bumps, moisture etc. during transport.

In preferred forms, the roof extension is pivotally attached to the roof. The roof extension may be attached to the roof via a hinge such that the roof extension can be swung above and below the roof.

Preferably, the roof extension is swung between the collapsed, extended and elevated
20 modes around the hinge. The hinge has more than one degree of freedom. The hinge may be a double hinge.

Preferably, the roof extension is configured to receive at least one solar collector. Retrofitting buildings with fittings to engage a solar collector may be more expensive than including the fitting during fabrication of the unit. Ad hoc installation may cause
25 inadvertent damage to the building, for example if apertures for fasteners need to be made.

Preferably, the unit comprises a water proofing material disposed at least a portion of a boundary between the roof and the roof extension.

In forms, the unit comprises a base extension having a collapsed mode and an extended mode, in the collapsed mode the base extension extends at least in part between the base and the roof, and in the extended mode the base extension is an extension of the base. The base extension when in the collapsed mode may extend only in part between the base and the roof. The base extension may have a proximal edge adjacent the base and a distal edge. The distal edge may be configured to receive a respective edge of a panel. The distal edge may be configured to engage the panel by a pair of cooperating elements, each of the pair of elements being located on one of the distal edge and panel respectively. The cooperating elements may comprise a male element, such as a pin, configured to be located in a corresponding female element, such as a recess. Alternatively or additionally, the cooperating elements may comprise a protruding rib configured to be located in a corresponding slot. The panel may comprise at least one of a window, a wall panel and a door.

A collapsible base provides easier transport while allowing significant floor space. The use of interchangeable panels may greatly extend the flexibility of the design of the building. The panels may aid in waterproofing the building, especially compared with, for example, wall panels that are hinged to the building.

In forms, the roof is supported above the base by a plurality of posts extending between the base and the roof. Each post may be offset from a respective corner of the base. The posts may each comprise a steel tube.

Offset posts may not interfere with the roof extension and/or base extension providing more design freedom and may maximise roof and/or base extension area. When the base extension and the roof extension are in respective collapsed modes, the roof extension forms an external side surface of the unit behind which the base extension is disposed.

The external side surface may be a relatively tough surface, such as steel, which protects the base extension and other parts internal of the unit during transport.

In one form, the base extension is configured, when in the extended mode, to be supported by a plurality of columns. Columns may provide a level structure on which the base and base extension can be housed and reduce the ingress of moisture and/or pests into the building.

One or more dimensions of the unit are commensurate with the dimensions of a shipping container. When the roof and base extensions are in respective collapsed modes, the unit may have the dimensions of a shipping container. The shipping container may be an ISO shipping container. The ISO shipping container may be a high cube shipping container.

- 5 A unit which takes aspects of an ISO shipping container may conveniently take advantage of the existing shipping and handling infrastructure for shipping containers. Furthermore, the unit may be configured to receive one or more services. The unit may comprise conduits for the one or more services. At least one service may comprise one or more of a water service, a gas service, an electricity service, a communications service and a
10 sewerage service. The requirement for on site tradesmen may be thus reduced.

In one embodiment, the unit comprises opposing ends that are open. In one embodiment, an end of the unit is capped by a cap. The caps may assist in sealing the unit against the ingress of moisture etc. during transport. The caps may also provide engaging means for the existing shipping transport and handling infrastructure to engage, and may
15 subsequently be removed on site without compromising the design of the building. Removable caps provide greater freedom to configure the ends of the building which may otherwise be aesthetically unsatisfactory. The cap, which may be fabricated from a strong material such as steel for transportation and handling considerations, may be used as part of the building, instead of being unnecessarily used as ends of the building.

- 20 In forms, the unit is configured to be supported on a plurality of columns. The unit may be configured to receive within it a sub unit having dimensions commensurate with a shipping container. The sub-unit may have external dimensions of a non-high cube shipping container. The sub-unit may comprise a vessel adapted to contain a thermal mass. The sub unit may have a complete kitchen and/or bathroom, for example, reducing
25 the requirements for tradesmen on site. The use of a thermal mass may stabilise the internal temperature of the building. The vessel may be installed when empty and subsequently filled, with water from a pipe for example, which makes handling easier. Thermal masses are typically between 1000 and 10,000 kg and are thus difficult to handle. A sub-unit the height of a standard ISO shipping container may fit within units
30 having the height of a high-cube container.

In a second aspect of the invention, there is provided a sub-unit adapted to be received by a unit in accordance with the first aspect of the invention. In embodiments, the sub unit comprises a door. The sub-unit may comprise one or more services. The sub-unit may comprise a bathroom. The sub-unit may comprise a kitchen. The sub-unit may comprise
5 a vessel adapted to contain a thermal mass. The vessel may be a water tank.

In another aspect of the invention there is provided a method of erecting a building, the method comprising the steps of: providing a unit in accordance with the first aspect of the invention with the roof extension in the collapsed mode; and causing the roof extension to adopt the respective extended mode.

10 In an embodiment, the method comprises the step of causing the roof extension to adapt the elevated mode. In an embodiment, the method further comprises the steps of causing the base extension to adopt the respective extended mode. A distal edge of the base extension may receive a panel after the base extension is caused to adopt the extended mode. In an embodiment, the method comprises the step of disposing one or more posts
15 between the roof extension and the base extension. Most or all of the load of the roof extensions may be taken by the posts, instead of the panels for example, which provides considerable freedom in design. For example, the panels need not be load bearing and their other aspects, such as visual appearance, may be thus accentuated.

In an embodiment, the method comprises the step of locating the unit on a plurality of
20 columns. The method may comprise the step of installing the plurality of columns. In an embodiment, the method comprises the step of disposing a sub unit within the unit. The sub-unit comprises a bathroom and/or kitchen.

In an embodiment, the step of causing the roof extension to adopt the respective extended mode occurs before the step of causing the base extension to adopt the respective
25 extended mode.

In another aspect of the invention, there is provided a method of erecting a building comprising the step of, during erection, disposing a vessel adapted to contain a thermal mass in the building. In an embodiment, the vessel, when disposed in the building, is empty. The method may comprise the step of disposing the thermal mass in vessel. The
30 vessel may be adapted to hold water. The step of disposing the thermal mass in the vessel

may comprise filling the tank with water. In an embodiment, the vessel is part of a sub-unit in accordance with the second aspect of the invention and the step of disposing the vessel in the building comprises the step of disposing the sub-unit in the building. In an embodiment the method comprises the step of providing a unit in accordance with the first aspect of the invention and extending the unit.

According to yet another aspect of the invention there is provided an exterior panel for a building, the panel comprising: a first end and a second end spaced apart from the first end; a flange attached to one of the ends and adapted to engage an edge of either one of a base of a building and an extension of a base of a building. The panel and particularly the flange may provide thermal insulation, and may improve the water proofing of the building. In an embodiment, the flange has a surface which is adapted to be an exterior surface. In an embodiment, the flange is substantially in the same plane as a surface of one of the ends. In an embodiment, the flange comprises an insulating material. In an embodiment, the panel is configured to engage the building by a pair of co-operating elements, each of the pair of elements being located on one of the building and panel respectively. In an embodiment, the panel comprises a surface disposed between the ends. A corner may be located directly behind the flange. The corner may be adapted to receive an edge of the building. The flange may be attached to one of the ends. The flange may be is parallel to the surface disposed between the ends. In an embodiment, the flange is configured to conceal the edge.

In another aspect of the invention there is provided a collapsible wall comprising: first and second sheets of material; a structure attached to the first and second sheets having an extended mode and a collapsed mode, wherein the sheets are relatively closer when the structure is in the collapsed mode than in the extended mode.

The collapsible wall may be collapsed during, for example, transport and storage but expanded when installed in the building. In an embodiment, the structure comprises a hinge. The structure may comprise a double hinge. The hinge may comprise first and second leaves, the first leaf being attached to the first sheet and the second leaf being attached to the second sheet. In an embodiment, the structure is located between the sheets.

According to a further aspect of the invention there is provided a unit for a building comprising: a base; a roof supported above the base; a roof extension having a collapsed mode and an extended mode, in the collapsed mode a surface of the roof extension is also an external surface of the unit and in the extended mode the roof extension is an extension
5 of the roof, the roof extension having a proximal edge adjacent the roof and a distal edge that is, in the extended mode, elevated above the proximal edge.

In an embodiment, the unit comprises: a base extension having a collapsed mode and an extended mode, in the collapsed mode the base extension extends at least in part between the base and the roof, and in the extended mode the base extension is an extension of the
10 base. In an embodiment, the roof extension also has an elevated mode wherein the distal edge of the roof extension is located over the roof.

In a further aspect of the invention there is provided a modified shipping container comprising: a base; a roof supported above the base; a roof extension having a collapsed mode and an extended mode, in the collapsed mode a surface of the roof extension is also
15 an external surface of the unit and in the extended mode the roof extension is an extension of the roof. In an embodiment the roof extension has a proximal edge adjacent the roof and a distal edge that is, in the extended mode, elevated above the proximal edge.

Further advantages and preferred features will be apparent from the drawings and a reading of the specification as a whole.

20 It is to be recognised that the embodiments described may be partly conceptual in nature and that the applicant is developing further arrangements that are more likely to be put into commercial use.

It is to be recognised that various alterations and equivalent forms may be provided without departing from the spirit and scope of the present invention. This includes
25 modifications within the scope of the appended claims along with all modifications, alternative constructions and equivalents. There is no intention to limit the present invention to the specific embodiments shown in the drawings. The present invention is to be construed beneficially to the applicant and the invention given its full scope.

In the present specification, the presence of particular features does not preclude the existence of further features. The words 'comprising', 'including' and 'having' are to be construed in an inclusive rather than an exclusive sense.

5 It is to be recognised that any discussion in the present specification is intended to explain the context of the present invention. It is not to be taken as an admission that the material discussed formed part of the prior art base or relevant general knowledge in any particular country or region.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A building construction comprising a body portion having a floor extension adapted to extend from the body portion and provide a floor area wherein the floor extension includes a facility for receiving a building module.
5
2. A building construction as claimed in claim 1 wherein the building construction comprises a building unit and the building module comprises a kitchen or bathroom module.
3. A building construction as claimed in claim 1 or 2 wherein the floor extension is adapted to be mounted vertically when in a transport condition and then to be positioned horizontally to provide the floor area.
10
4. A building construction as claimed in claim 1, 2 or 3 wherein the facility comprises a fitting facility having a configuration adapted to receive the building module.
- 15 5. A building construction as claimed in claim 4 wherein the fitting facility has a configuration adapted to receive the building module by providing a recess extending into the body of the floor extension
6. A building construction as claimed in any one of claims 1 to 4 wherein the fitting facility includes a recess allowing the building module to be slid into position in the recess.
20
7. A building construction as claimed in claim 6 wherein a sliding system is used to assist with positioning the building module in the recess.
8. A building construction as claimed in claim 7 wherein the sliding system is provided in the form of two elongate horizontal abutments extending from the body portion.
25

9. A building construction as claimed in claim 7 or 8 wherein the sliding system provides a guide arrangement for guiding the building module into the recess.
10. A building construction as claimed in any one of claims 1 to 9 wherein the fitting facility includes a removable portion removable from the floor extension to provide a floor recess for receiving the building module such that the recess is adapted to receive at least a portion of the horizontal cross-section of the building module.
5
11. A building construction as claimed in claim 10 where the recess is adapted to receive the full horizontal cross-section of the building module.
- 10 12. A building construction as claimed in claim 10 or 11 wherein the removable portion comprises a floor portion adapted to be used to provide further flooring at a different location.
13. A building construction as claimed in any one of claims 10 to 12 wherein the removable portion comprises a portion adapted for use as a verandah in the building construction.
15
14. A building construction as claimed in any one of claims 1 to 13 including two modular building constructions adapted to be arranged end to end.
15. A building construction as claimed in any one of claims 1 to 13 comprising a single unitary building construction as opposed to a number of constructions arranged end to end.
20
16. A method of construction comprising: providing a building construction adapted to provide a floor area; using a facility of the floor area to receive a building module; positioning the building module such that the building module provides a portion of the floor area of the building construction.

17. A method as claimed in claim 16 where the floor area is provided by a base of the building construction and by extending a number of floor extensions from the base.
18. A method as claimed in claim 16 or 17 wherein extending the floor extensions
5 from the base of the building construction comprises moving the floor extensions from a vertical extending position to a horizontally extending position.
19. A method as claimed in claim 18 wherein positioning the building module includes removing a removable portion of one of the floor extensions to provide a recess in the floor area for accommodating the building module.
- 10 20. A method as claimed in claim 19 wherein positioning the building module includes sliding the building module from outside the building construction, towards the building construction so as to be received within the recess, the building module providing a portion of the floor area of the building construction.
- 15 21. A method as claimed in claim 20 wherein the building module is slid on at least one bearer positioned at least partly outside the periphery of the building construction.
22. A building construction providing a transportable module the transportable module providing kitchen or bathroom facilities for installation within a larger building construction.
- 20 23. A building construction as claimed in claim 22 wherein the transportable module includes a chassis and two carrier elements removably attached to the chassis, the carrier elements providing ISO standard corners.
- 25 24. A building construction comprising: a body portion and a gutter arrangement wherein the gutter arrangement includes a moveable hinge portion and a gutter portion, the moveable hinge portion being adapted to mount a roof extension to the body portion, the moveable hinge portion being movable to allow the roof

extension to be inclined at angle relative to the body portion in a position adjacent the gutter portion such that when water falls onto the roof extension the water will flow downwardly along the roof extension into the gutter portion.

- 5 25. A building construction as claimed in claim 24 wherein the gutter arrangement provides an elongate channel having a first lateral side portion and a second lateral side portion, the first lateral side portion being configured for extending along the length of the body portion and the second lateral side portion being configured for extending along an edge portion of the roof extension.
- 10 26. A building construction as claimed in claim 24 or 25 wherein the gutter arrangement is provided within lateral elongate sides of the body portion, in a transport condition, with the building construction meeting ISO shipping certification standards.
- 15 27. A building construction as claimed in claim 24, 25 or 26 wherein the gutter portion is provided as a u-shaped channel portion located between the roof extension and remainder of the body portion, the channel portion being able to be readily cleaned by virtue of the channel configuration.
28. A building as claimed in any one of claims 24 to 27 wherein the hinge portion comprises an elongate butt hinge having a first leaf for connection to the gutter portion and a second leaf for connection to the roof extension.
- 20 29. A building construction as claimed in any one of claims 24 to 28 wherein the body portion provides an inclined upper portion for causing water falling on the upper portion to flow into the gutter portion.
- 25 30. A building construction as claimed in any one of claims 24 to 29 including a floor extension that is able to be swung away from a transport condition to an extended condition to provide a floor area.

31. A building construction as claimed in any one of claims 24 to 30 including a floor extension adapted to extend from the body portion and provide a floor area wherein the floor extension is of a width similar to or less than the height of the main portion of the body portion and the hinge portion of the gutter arrangement allows for the roof extension to be substantially wider than the height of the main portion to provide a desirable feeling of spaciousness and comfort.
32. A building construction as claimed in any one of claims 24 to 31 including a rain water structure for allowing the capture of rain water from the gutter arrangement.
33. A building construction as claimed in to any one of claims 24 to 32 wherein the building construction comprises a certified ISO shipping container.
34. A building construction having a body portion of a box configuration suitable for transportation as a transport container wherein the body portion has an upper structure having at least two elongate upper external edge portions with a gutter arrangement disposed inwardly of and along at least one of the two elongate upper edge portions.
35. A building construction as claimed in claim 34 wherein gutter arrangement includes a gutter portion and a moveable hinge portion, the gutter portion for providing a channel on the upper structure for the flow of water; and the movable hinge for mounting a roof extension at an angle relative to the body portion.
36. A building construction comprising: a body portion having an upper structure and a lower structure, the lower structure being adapted to provide at least one water compartment, the at least one water compartment being adapted to be emptied and provide the lower structure with sufficient buoyancy to lift the body portion in flood conditions.
37. A building construction as claimed in claim 36 wherein the at least one water compartment is adapted to accommodate a plurality of footings extending

therethrough and to allow a dwelling to be formed using two ISO certified containers.

38. A building construction as claimed in claim 36 or 37 wherein the at least one water compartment comprises a symmetrical arrangement adapted to be fitted within the lower structure, the arrangement extending around the boundary of the body portion.
39. A building construction as claimed in any one of claims 34 to 38 including a vertical guiding system adapted to guide the body portion up and down during flood conditions.
40. A building construction as claimed in claim 39 wherein the vertical guiding system comprises four guiding members adapted provide a frame to guide the body portion during the flood conditions.
41. A building construction as claimed in claim 40 wherein the four guiding members comprise pillars.
42. A building construction comprising: at least one module, the or each module being adapted to be provided as ISO shipping container, when in a transport condition; the at least one module being adapted to provide a building body which has a floor area at least 2.5 times the combined horizontal area of the modules, when in the transport condition; and a panel system comprising a plurality of interchangeable panels allowing the building to be provided with different facade layouts suited to different site orientations and other conditions.
43. A building construction as claimed in claim 42 wherein building body includes a floor portion forming part of the sides of the or each module, when in the transport condition, the floor portion forming at least part of the floor area in the building body, the interchangeable panels being arrangeable relative to the floor area to provided the different facade layouts.

44. A building construction as claimed in claim 43 wherein the panel system includes a wall panel, a high window panel, a medium window panel, a full window panel, a door panel and a sliding window panel, where the sliding window is provided as double panel.
- 5 45. A building construction as claimed in claim 43 wherein each panel of the panel system is of the same width excluding the sliding window panel which is the width of two panels.
46. A building construction comprising: a body portion; and panel system; wherein the panel system comprises a number of interchangeable panels that can be arranged to provide the body portion with different facade layouts so as to adapt building to different site orientations and conditions.
- 10
47. A building construction for providing a building, the building construction comprising a body portion, a floor extension and a moveable hinge portion, the hinge portion mounting the floor extension to the lower end of the body portion such that the floor extension is moveable between collapsed and extended conditions; wherein in the collapsed condition the floor extension provides side walls of the building construction at least in part providing the building construction with ISO shipping certification; further wherein the building construction comprises a roof extension that is put onto the building after the floor extension has been moved to the extended condition, the floor extension being of a heavy weight in comparison to the roof extension.
- 15
- 20
48. A method of construction comprising: providing a building construction; swinging out floor extensions provided as side walls that at least in part provide the building constructions as an ISO shipping container wherein the floor extensions are of a substantial weight; and then attaching roof extensions to the building construction where the roof extension are of a relatively light weight.
- 25

49. A method as claimed in claim 48 including providing the roof extension in the form of roof panels of the same width as external wall panels used in the construction.
50. A method of construction comprising: providing a building construction, positioning roof and flooring extensions relative to a body of the building construction; and providing a flotation arrangement beneath the floor extensions to assist with lifting the building construction during flood conditions.
51. A method of construction comprising: providing a building construction; positioning roof and flooring extensions relative to a body of the building construction; using a hinge of a gutter arrangement to dispose the roof extension in an inclined condition relative to the body of the building construction such that when water falls onto the roof extension the water flows downwardly along the roof extension into the a gutter portion of the gutter arrangement.
52. A method as claimed in claim 51 including collecting the water within the building construction to provide the building construction with a relatively high thermal mass.
53. A unit for a building, the unit comprising:
a base; and
a roof supported above the base.
54. A unit defined by Claim 53 comprising a roof extension having a collapsed mode and an extended mode, in the collapsed mode a surface of the roof extension is also an external side surface of the unit, and in the extended mode the roof extension is an extension of the roof.
55. A unit defined by Claim 54 wherein the roof extension in the extended mode makes an angle of 50 – 135 degrees with the roof extension in the collapsed mode.

56. A unit defined by either one at Claim 54 and Claim 55, wherein the roof extension has a proximal edge adjacent the roof and a distal edge that is, in the extended mode, elevated above the proximal edge.
57. A unit defined by any one of the previous claims 53 to 56 wherein the roof extension also has an elevated mode wherein the distal edge of the roof extension is located over the roof.
58. A unit defined by Claim 57 wherein the roof extension in the elevated mode makes an angle of 180 – 270 degrees with the roof extension in the collapsed mode.
- 10 59. A unit defined by either one of Claim 57 and Claim 58 wherein the roof extension is one of two roof extensions and in the elevated mode respective distal edges of the roof extensions are brought together.
60. A unit defined by any one of Claims 54 to 59 wherein, in the collapsed mode the roof extension extends at least in part between the base and the roof.
- 15 61. A unit defined by Claim 60, wherein the roof extension when in the collapsed mode extends between the base and the roof.
62. A unit defined by any one of Claims 54 to 61, wherein the roof extension is pivotally attached to the roof.
- 20 63. A unit defined by any of one the Claims 55 to 61, wherein the roof extension is attached to the roof via a hinge such that the roof extension can be swung above and below the roof.
64. A unit defined by any one of the Claims 57 to 63, wherein the roof extension is swung between the collapsed, extended and elevated modes around the hinge.

65. A unit defined by either one of Claims 63 and Claim 64 wherein the hinge has more than one degree of freedom.
66. A unit defined by Claim 65 wherein the hinge is a double hinge.
67. A unit defined by any one of the Claims 64 to 66, wherein the roof extension is
5 configured to receive at least one solar collector.
68. A unit defined by any one of the Claims 54 to 67 comprising a water proofing material disposed at least a portion of a boundary between the roof and the roof extension.
69. A unit defined by any one of Claims 54 to 68 comprising a base extension having
10 a collapsed mode and an extended mode, in the collapsed mode the base extension extends at least in part between the base and the roof, and in the extended mode the base extension is an extension of the base.
70. A unit defined by Claim 69 wherein the base extension when in the collapsed mode extends only in part between the base and the roof.
- 15 71. A unit defined by either one of Claims 69 and 70, wherein the base extension has a proximal edge adjacent the base and a distal edge, and the distal edge is configured to receive a respective edge of a panel.
72. A unit defined by Claim 71 wherein the distal edge is configured to engage the
20 panel by a pair of cooperating elements, each of the pair of elements being located on one of the distal edge and panel respectively.
73. A unit defined by Claim 72 wherein the cooperating elements comprise a pin configured to be located in a corresponding recess.
74. A unit defined by Claim 72 wherein the cooperating elements may comprise a protruding rib configured to be located in a corresponding slot.

75. A unit defined by Claims 71 to 75, wherein the panel comprises at least one of a window, a wall panel and a door.
76. A unit defined by any one of the preceding Claims 53 to 75, wherein the roof is supported above the base by a plurality of posts extending between the base and the roof.
- 5
77. A unit defined by Claim 76 wherein each post is offset from a respective corner of the base.
78. A unit defined by either Claim 76 or Claim 77, wherein the posts each comprise a steel tube.
- 10
79. A unit defined by any one of the Claims 69 to 78, wherein, when the base extension and the roof extension are in respective collapsed modes, the roof extension forms an external side surface of the unit behind which the base extension is disposed.
80. A unit defined by any one of Claims 69 to 79, wherein the base extension is configured, when in the extended mode, to be supported by a plurality of columns.
- 15
81. A unit defined by any one of the preceding Claims 61 to 80, wherein one or more dimensions of the unit are commensurate with the dimensions of a shipping container.
82. A unit defined by Claim 72 wherein, when the roof and base extensions are in respective collapsed modes, the unit has the dimensions of a shipping container.
- 20
83. A unit defined by either one of Claim 61 and Claim 82, wherein the shipping container is an ISO shipping container.
84. A unit defined by Claim 83, wherein the ISO shipping container is a high cube shipping container.

85. A unit defined by any one of the previous Claims 53 to 84, wherein the unit is configured to receive one or more services.
86. A unit defined by Claim 85 comprising conduits for the one or more services.
87. A unit defined by either one of Claim 85 and Claim 86, wherein the at least one service may comprise one or more of a water service, a gas service, an electricity service, a communications service and a sewerage service.
88. A unit defined by any one of the previous Claims 53 to 87 comprising opposing ends that are open.
89. A unit defined by any one of the previous Claims 53 to 88 wherein an end of the unit is capped by a cap.
90. A unit defined by any one of the previous Claims 53 to 89, configured to be supported on a plurality of columns.
91. A unit defined by any one of the Claims 59 to 90 configured to receive within it a sub-unit having dimensions commensurate with a shipping container.
92. A unit defined by Claim 91 wherein the sub-unit has external dimensions of a non-high cube shipping container.
93. A sub-unit adapted to be received by a unit defined by any one of the preceding Claims 53 to 92.
94. A sub unit defined by Claim 93 comprising a door.
95. A sub-unit defined by either one of Claim 93 and Claim 94 comprising one or more services.
96. A sub-unit defined by Claims 95 comprising a bathroom.

97. A sub-unit defined by either one of Claims 95 and 96 comprising a kitchen.
98. A sub-unit defined by any one of the Claims 93 to 97 comprising a vessel adapted to contain a thermal mass.
99. A sub-unit defined by Claim 98 wherein the vessel is a water tank.
- 5 100. A method of erecting a building, the method comprising the steps of:
providing a unit defined by any one of the Claims 53 to 65 with the roof extension in the collapsed mode; and
causing the roof extension to adopt the respective extended mode.
- 10 101. A method defined by Claim 100 comprising the step of causing the roof extension to adapt the elevated mode.
102. A method defined by Claim 100, further comprising the steps of causing the base extension to adopt the respective extended mode and causing a distal edge of the base extension to receive a panel after the base extension is caused to adopt the extended mode.
- 15 103. A method defined by Claim 102, comprising the step of disposing one or more posts between the roof extension and the base extension.
104. A method defined by any one of the Claims 100 to 103, comprising the step of locating the unit on a plurality of columns.
- 20 105. A method defined by Claim 104, comprising the step of installing the plurality of columns.
106. A method defined by any one of the Claims 100 to 105, comprising the step of disposing a sub-unit within the unit.

107. A method defined by Claim 106 wherein the sub-unit comprises a bathroom and/or kitchen.
108. A method defined by any one of the Claims 100 to 107 wherein the step of causing the roof extension to adopt the respective extended mode occurs before
5 the step of causing the base extension to adopt the respective extended mode.
109. A method of erecting a building comprising the step of, during erection, disposing a vessel adapted to contain a thermal mass in the building.
110. A method defined by Claim 109 wherein the vessel, when disposed in the building, is empty.
- 10 111. A method defined by Claim 110 comprising the step of disposing the thermal mass in vessel.
112. A method defined by Claim 111 wherein the vessel is adapted to hold water and the step of disposing the thermal mass in the vessel comprises filling the tank with water.
- 15 113. A method defined by any one of the Claims 109 to 112 wherein the vessel is part of a sub-unit defined by any one of the Claims 93 to 99 and the step of disposing the vessel in the building comprises the step of disposing the sub-unit in the building.
114. A method defined by any one of the Claims 109 to 113 wherein the method
20 comprises the step of providing a unit defined by any one of the Claims 42 to 82 and extending the unit.
115. An exterior panel for a building, the panel comprising:
a first end and a second end spaced apart from the first end;
a flange attached to one of the ends and adapted to engage an edge of either one of
25 a base of a building and an extension of a base of a building.

116. A panel defined by Claim 115 wherein the flange has a surface which is adapted to be an exterior surface.
117. A panel defined by Claim 115 wherein the flange is substantially in the same plane as a surface of one of the ends.
- 5 118. A panel defined by Claim 115 wherein the flange comprises an insulating material.
119. A panel defined by any one of the Claims 115 to 118 wherein the panel is configured to engage the building by a pair of co-operating elements, each of the pair of elements being located on one of the building and panel respectively.
- 10 120. A panel defined by any of the Claims 115 to 119 comprising a surface disposed between the ends, and a corner directly behind the flange, the corner being adapted to receive an edge of the building, wherein the flange is attached to one of the ends and is parallel to the surface disposed between the ends.
- 15 121. A panel defined by Claim 120 wherein the flange is configured to conceal the edge.
122. A collapsible wall comprising:
first and second sheets of material;
a structure attached to the first and second sheets having an extended mode and a collapsed mode, wherein the sheets are relatively closer when the structure is in
20 the collapsed mode than in the extended mode.
123. A collapsible wall defined by Claim 122 wherein the structure comprises a hinge.
124. A collapsible wall defined by either one of Claim 122 and Claim 123 wherein the structure comprises a double hinge.

125. A collapsible wall defined by either Claim 123 or Claim 124 wherein the hinge comprising first and second leaves, the first leaf being attached to the first sheet and the second leaf being attached to the second sheet.
126. A collapsible wall defined by any one of the Claims 122 to 125 wherein the structure is located between the sheets.
127. A unit for a building comprising:
a base;
a roof supported above the base;
a roof extension having a collapsed mode and an extended mode, in the collapsed mode a surface of the roof extension is also an external surface of the unit and in the extended mode the roof extension is an extension of the roof, the roof extension having a proximal edge adjacent the roof and a distal edge that is, in the extended mode, elevated above the proximal edge.
128. A unit defined by Claim 127 comprising:
a base extension having a collapsed mode and an extended mode, in the collapsed mode the base extension extends at least in part between the base and the roof, and in the extended mode the base extension is an extension of the base.
129. A unit defined by either one of the Claims 127 and 128 wherein the roof extension also has an elevated mode wherein the distal edge of the roof extension is located over the roof.
130. A modified shipping container comprising:
a base;
a roof supported above the base;
a roof extension having a collapsed mode and an extended mode, in the collapsed mode a surface of the roof extension is also an external surface of the unit and in the extended mode the roof extension is an extension of the roof.

131. A unit defined by Claim 130 the roof extension has a proximal edge adjacent the roof and a distal edge that is, in the extended mode, elevated above the proximal edge.
- 5 132. A building construction substantially as herein described with reference to the accompanying drawings
133. A method substantially as herein described with reference to the accompanying drawings.

Fig. 1

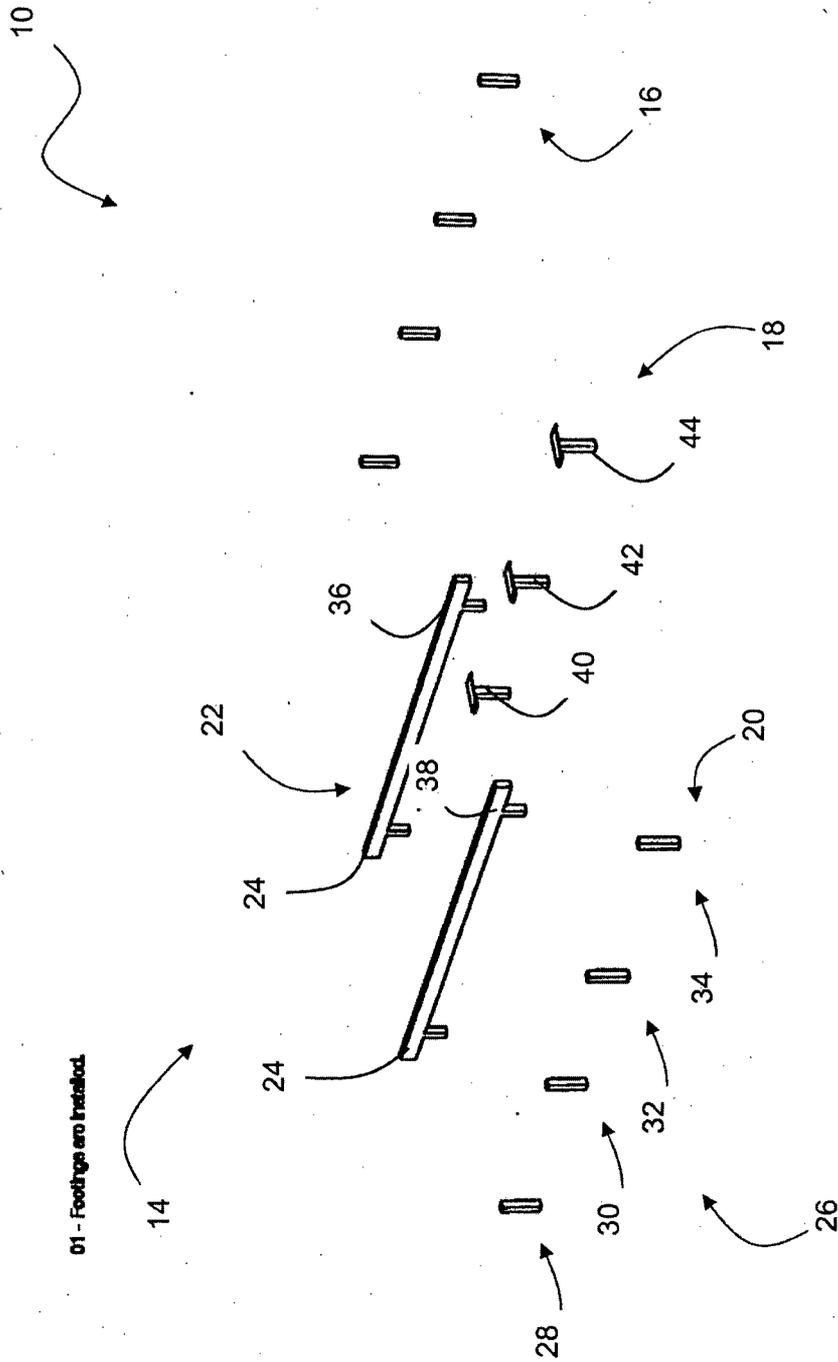
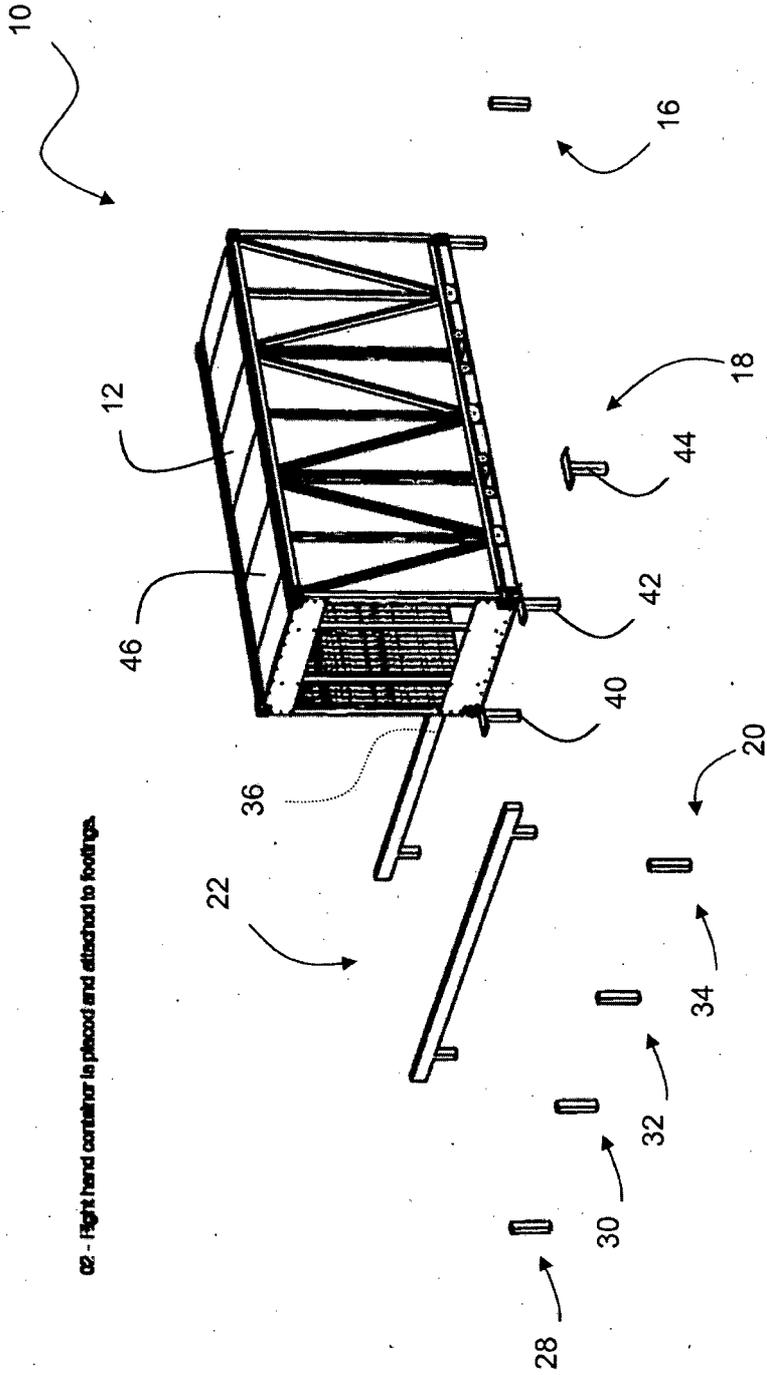


Fig. 2



02 - Right hand container is placed and attached to footings.

Fig. 3

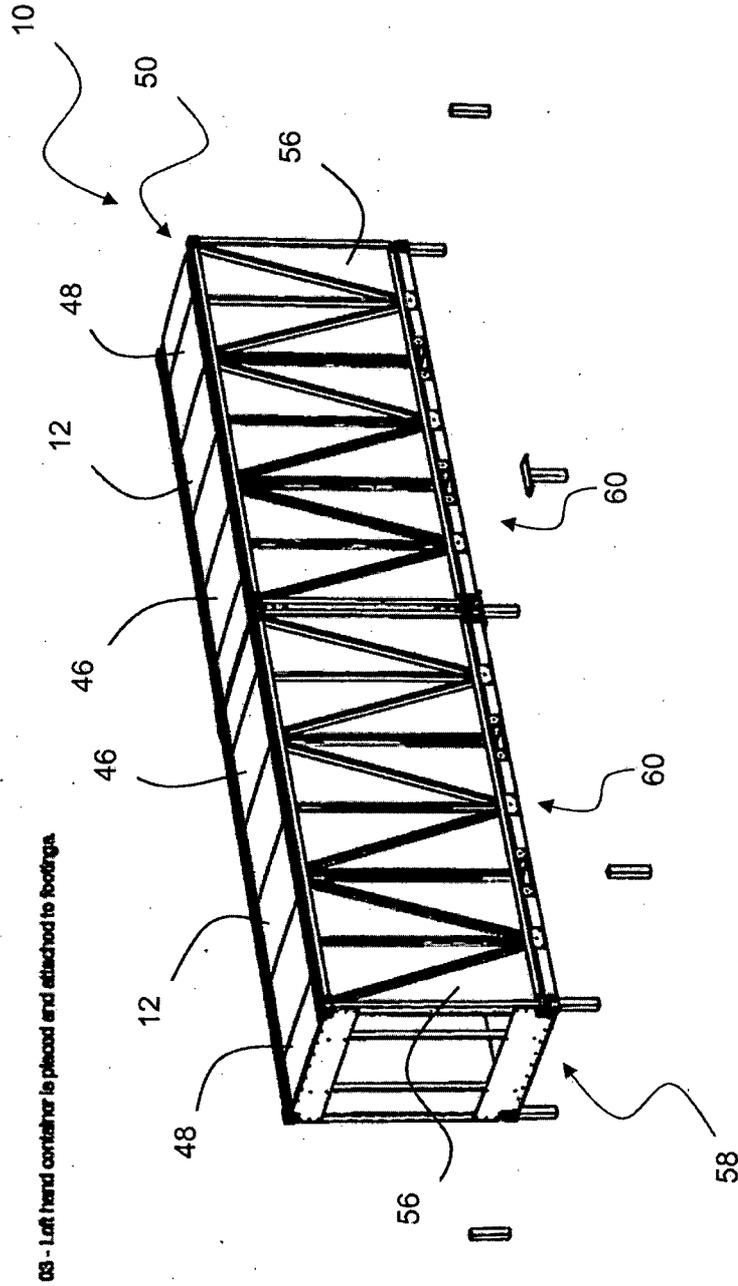


Fig. 4

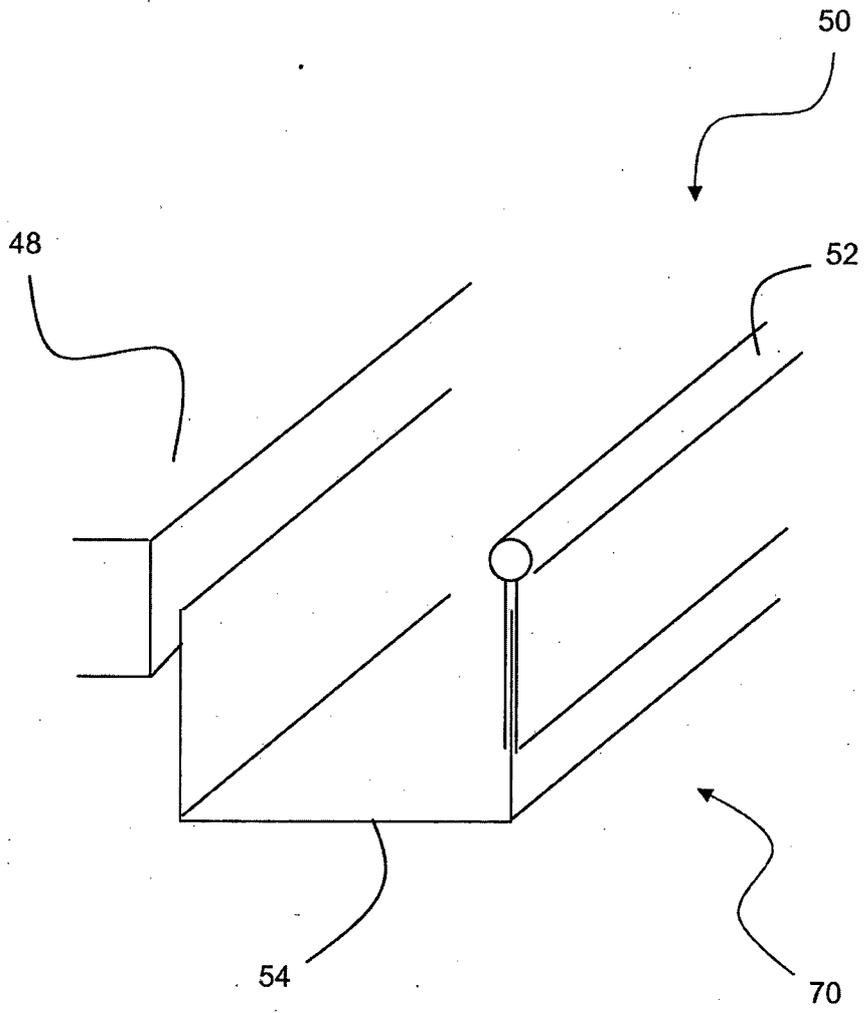
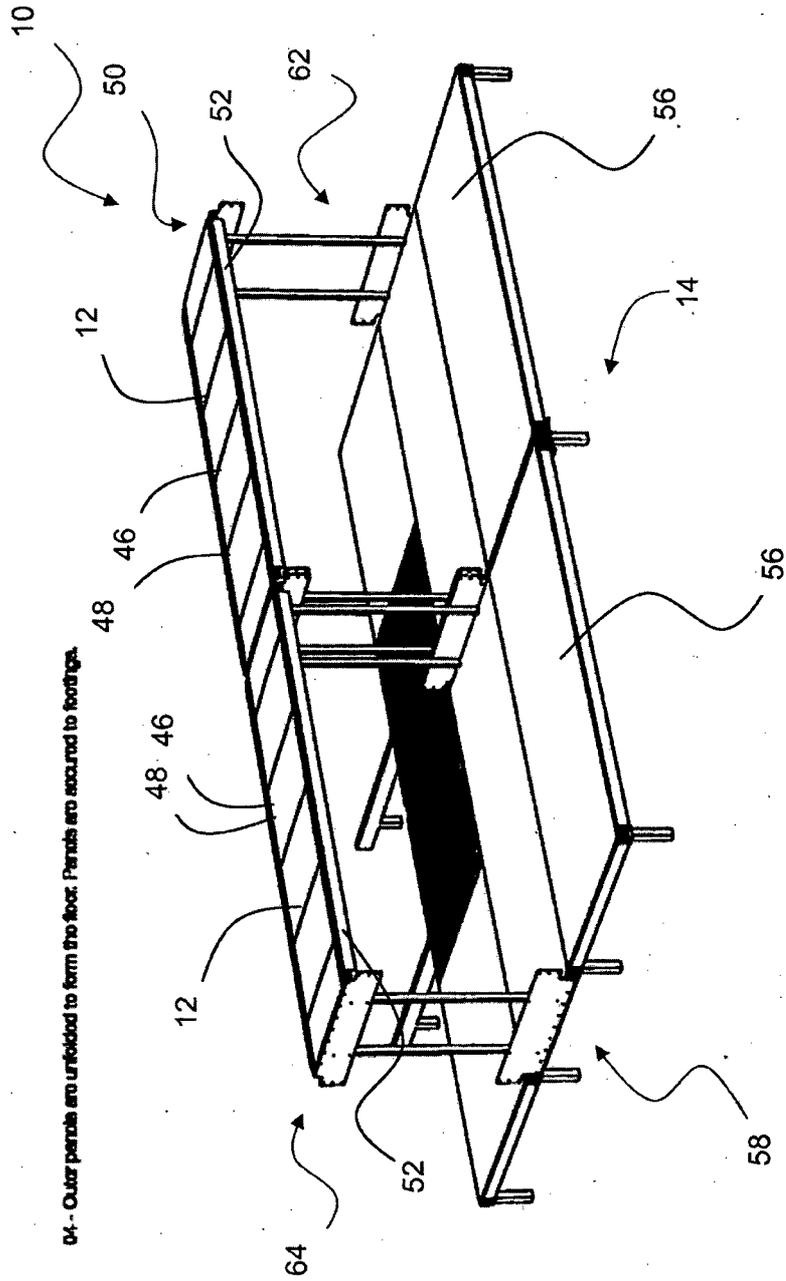
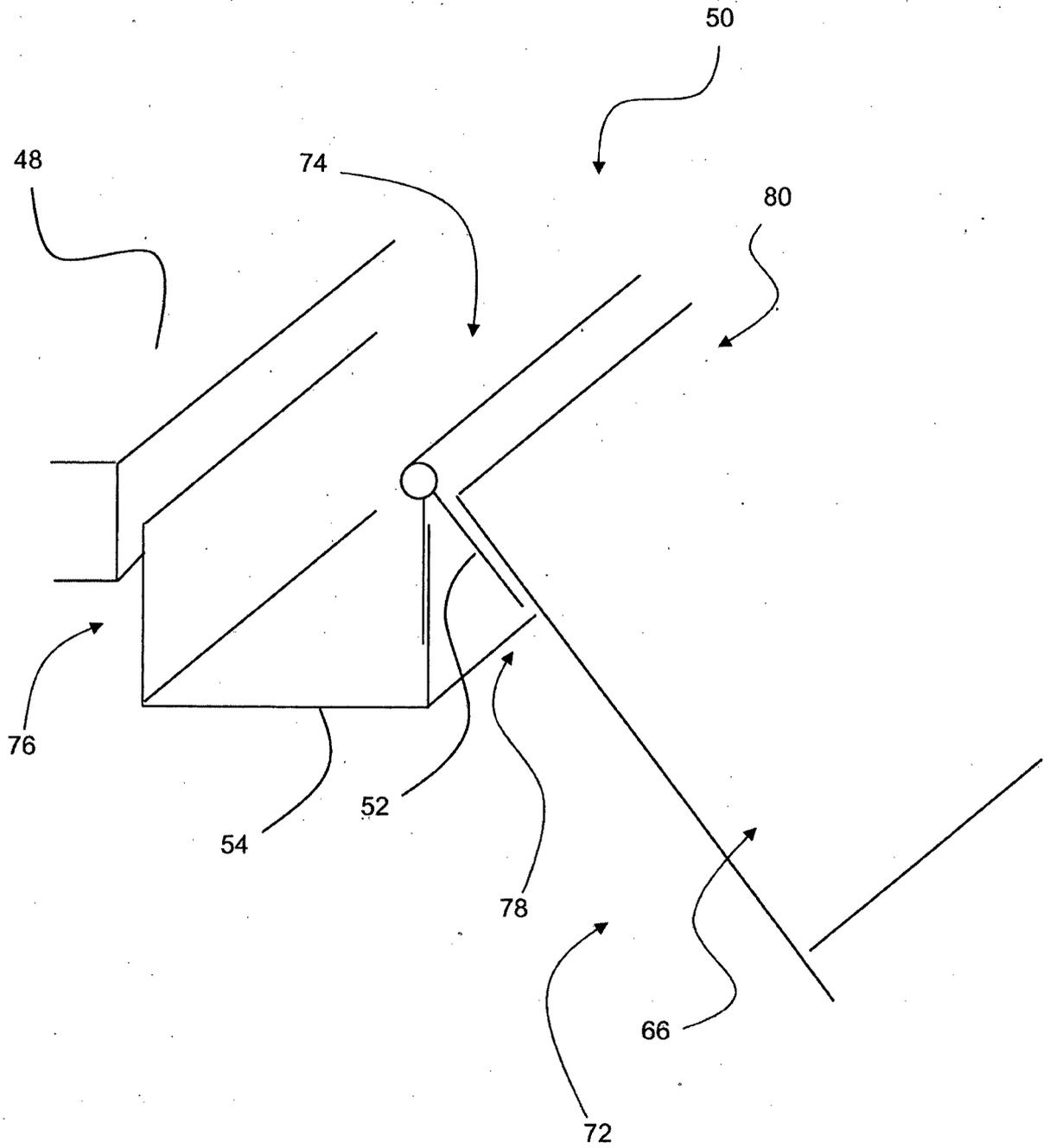


Fig. 5



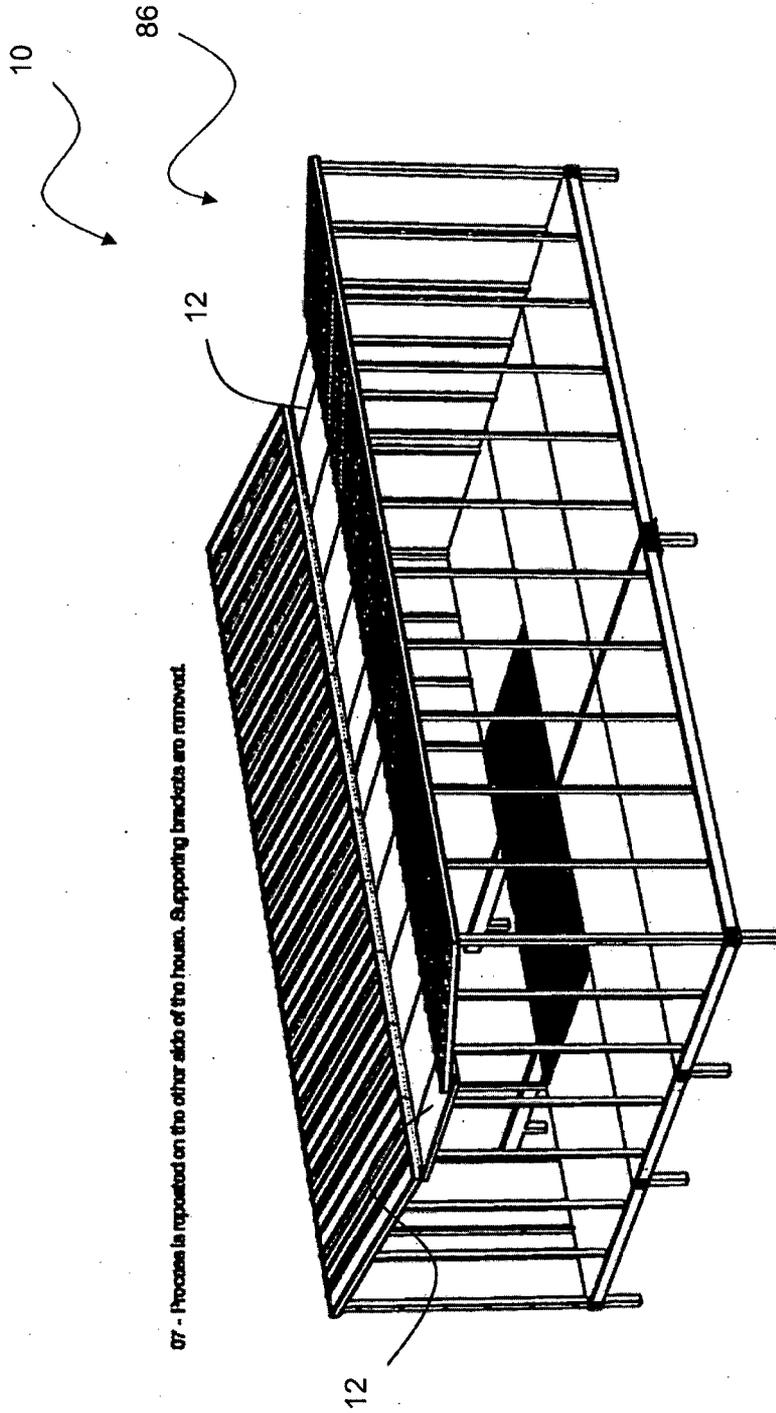
7/41

Fig. 7



9/41

Fig. 9



07 - Process is repeated on the other side of the house. Supporting brackets are removed.

10/41

Fig. 10

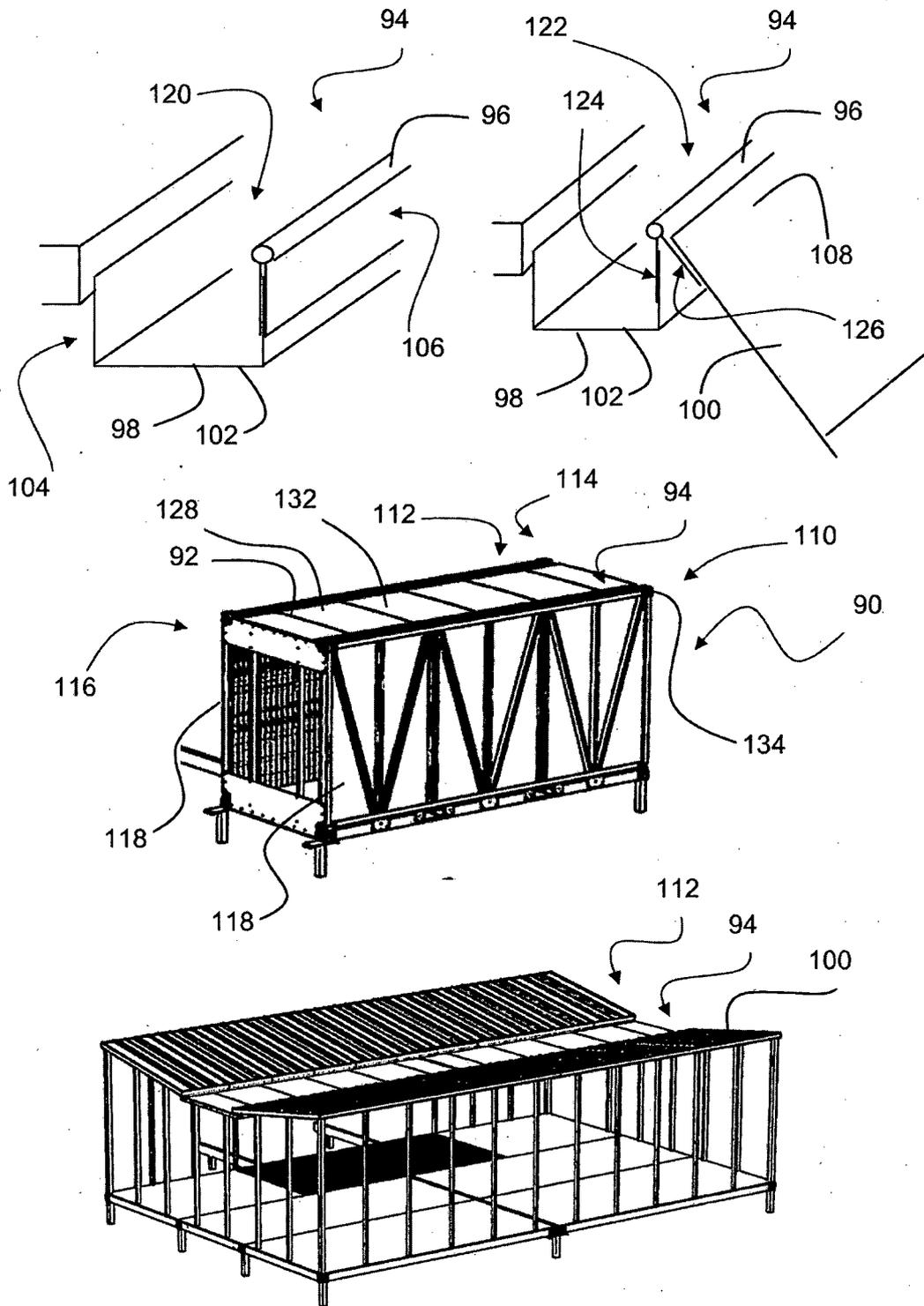


Fig. 12

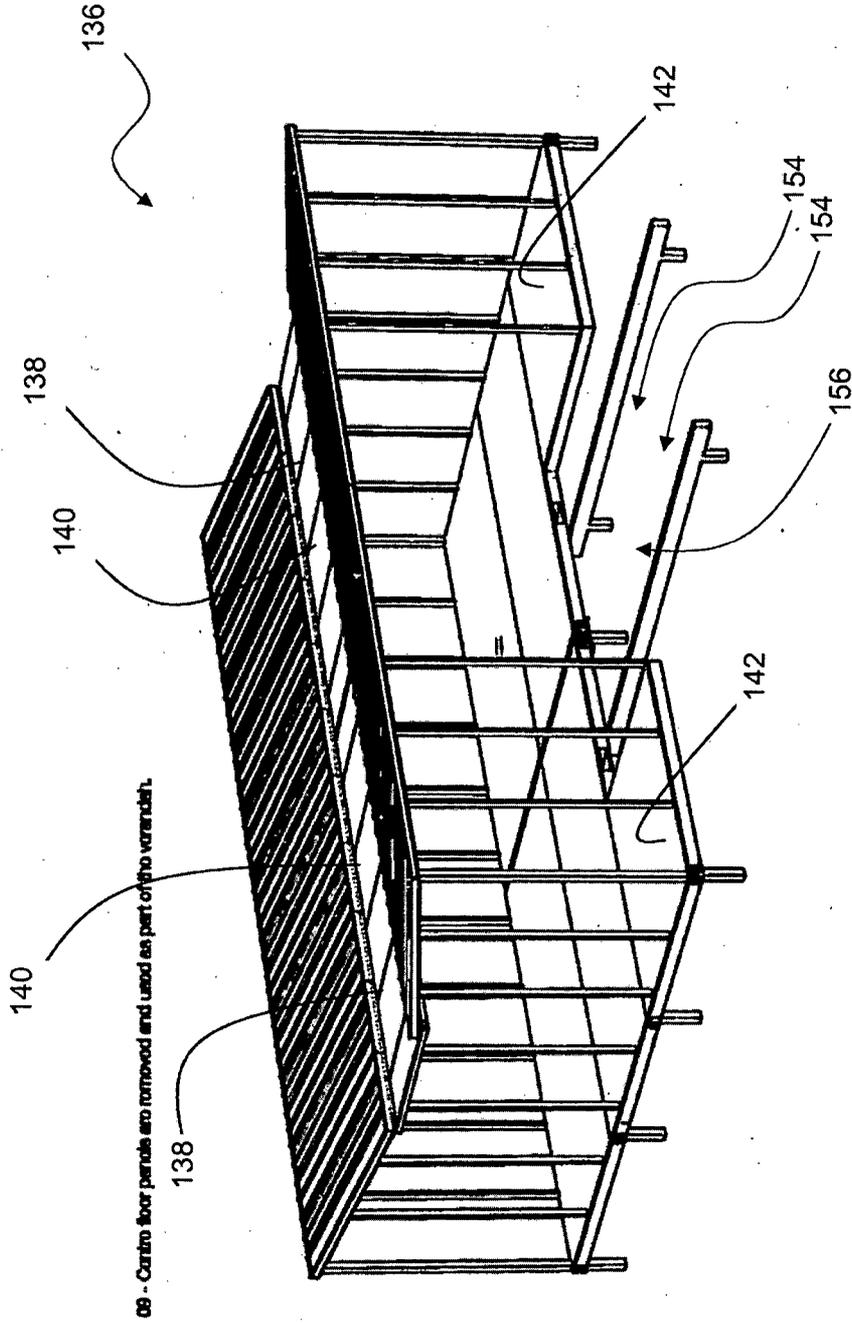


Fig. 13

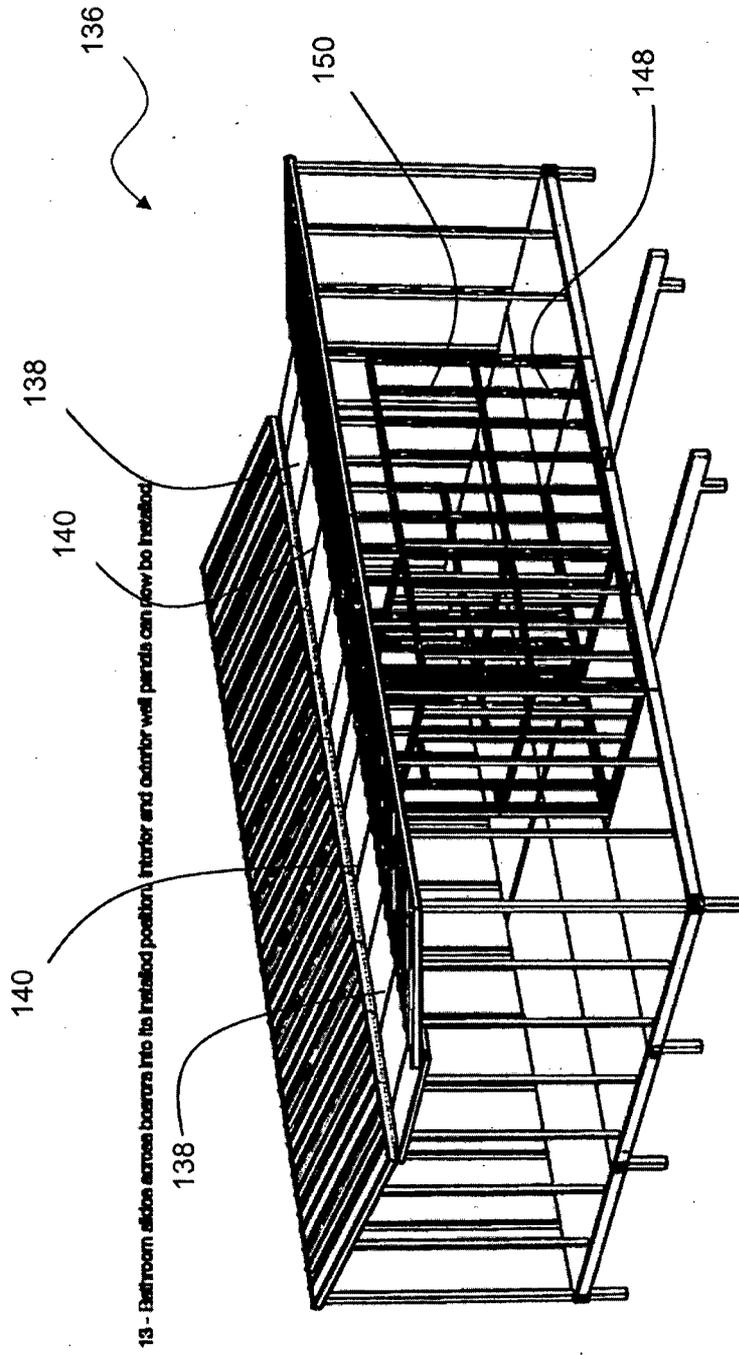


Fig. 14

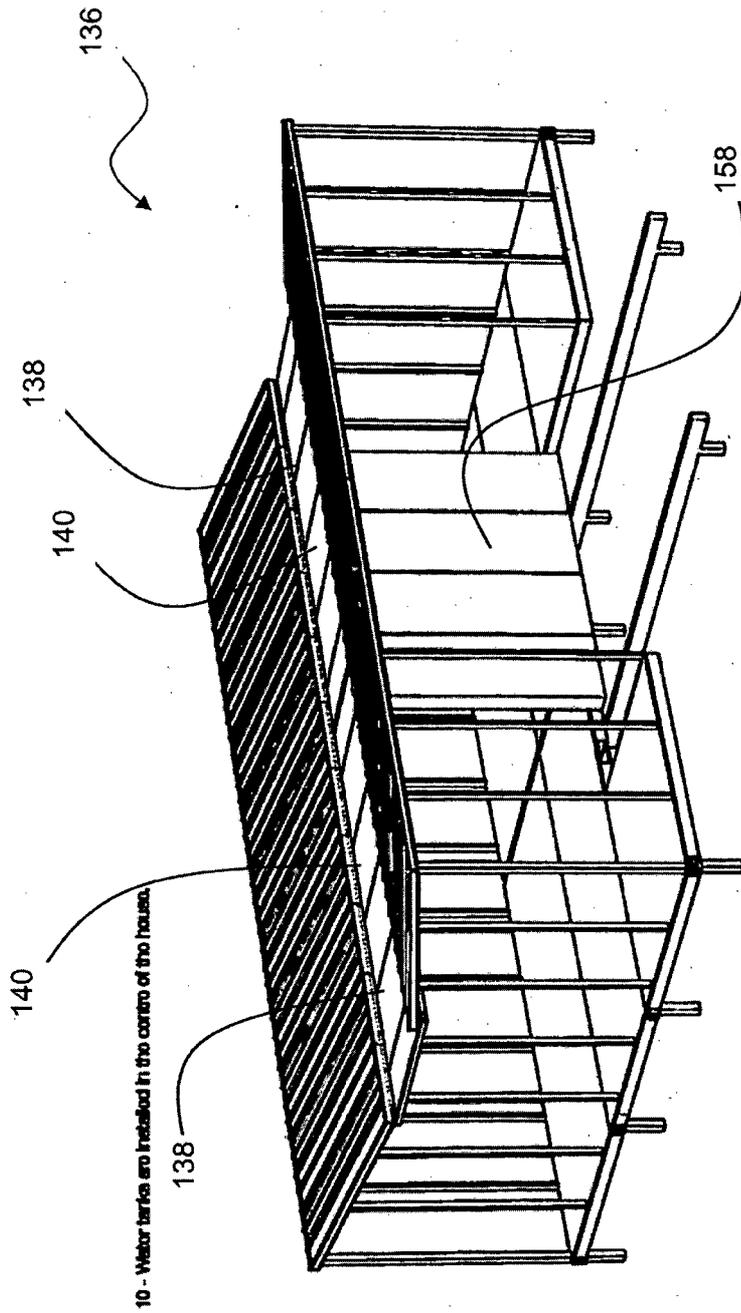


Fig. 15

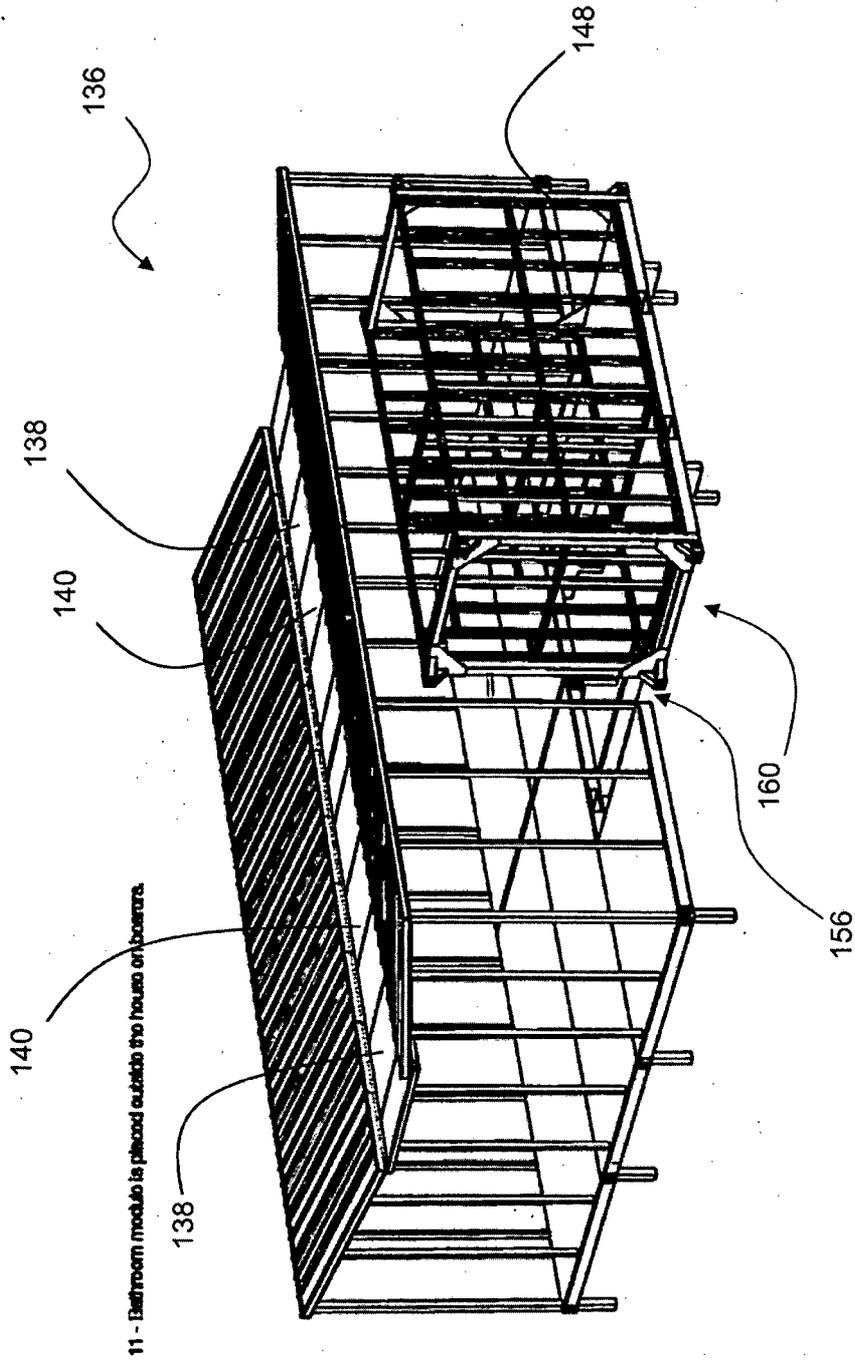


Fig. 16

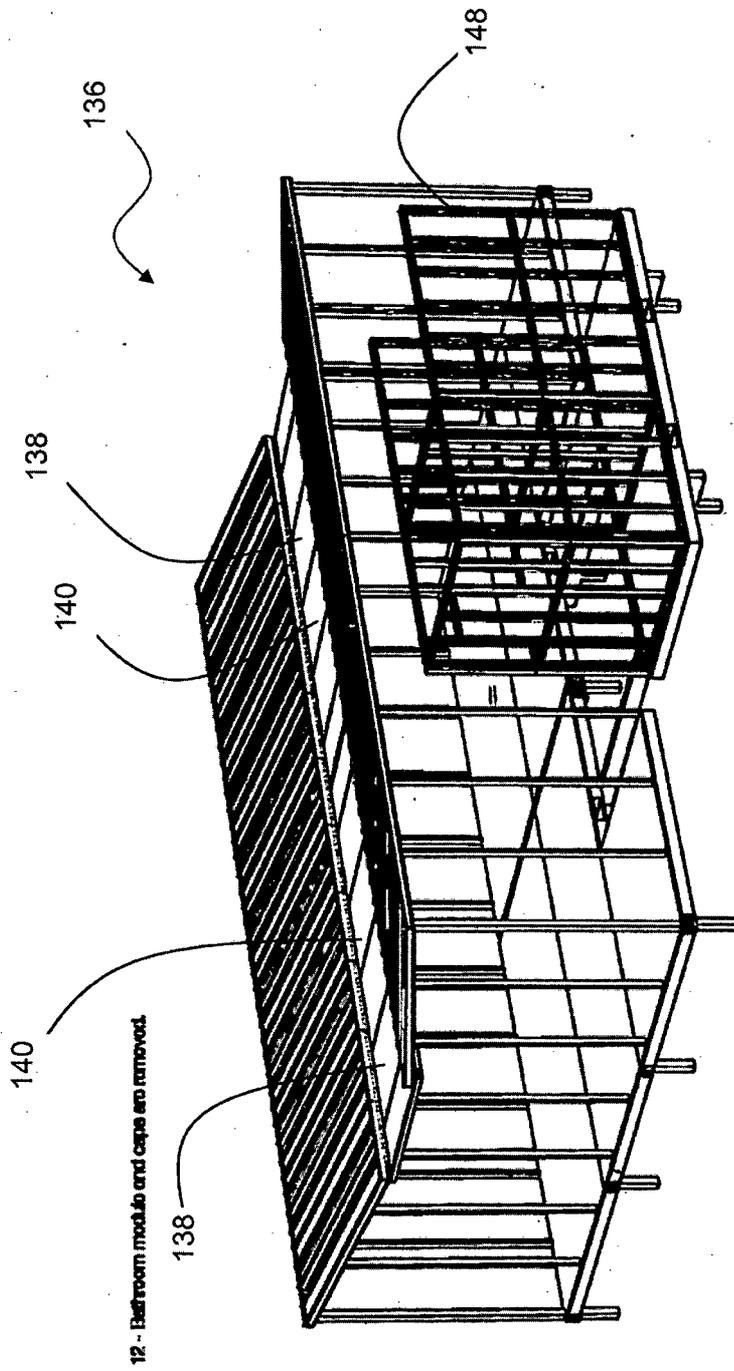


Fig. 17

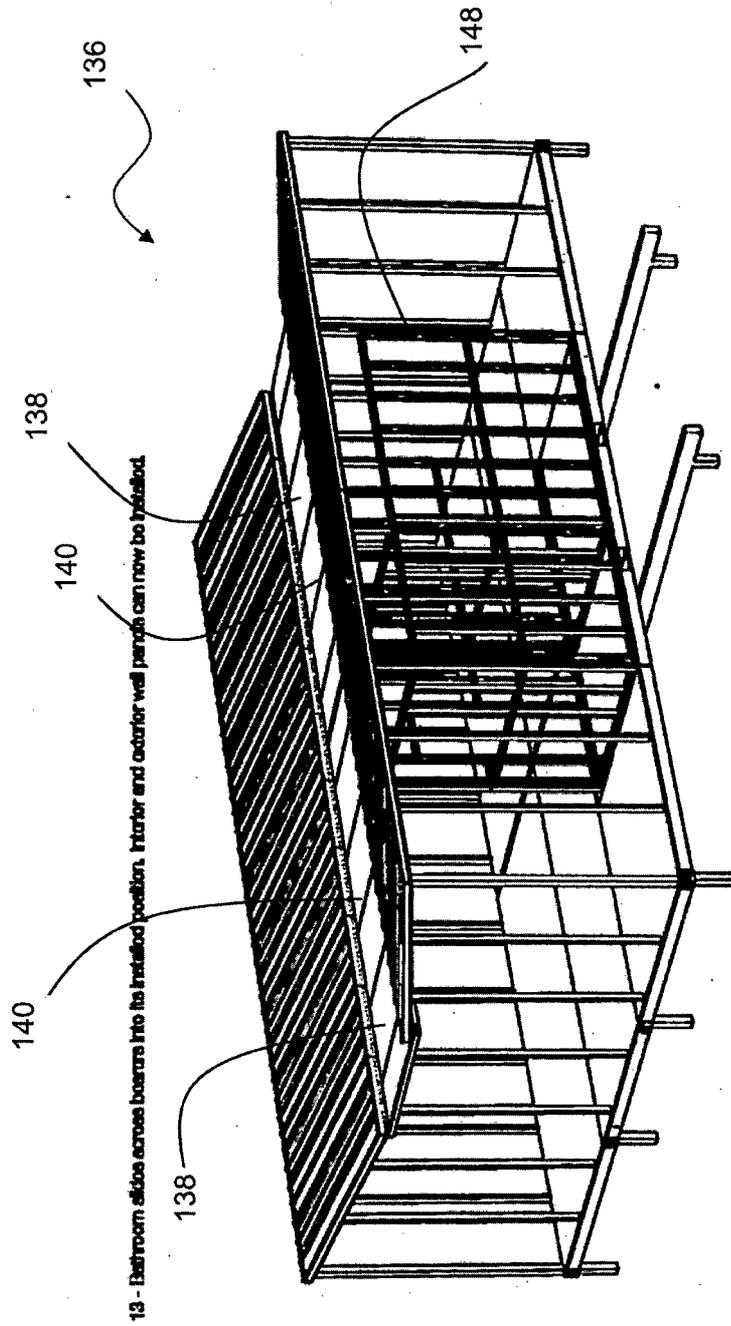
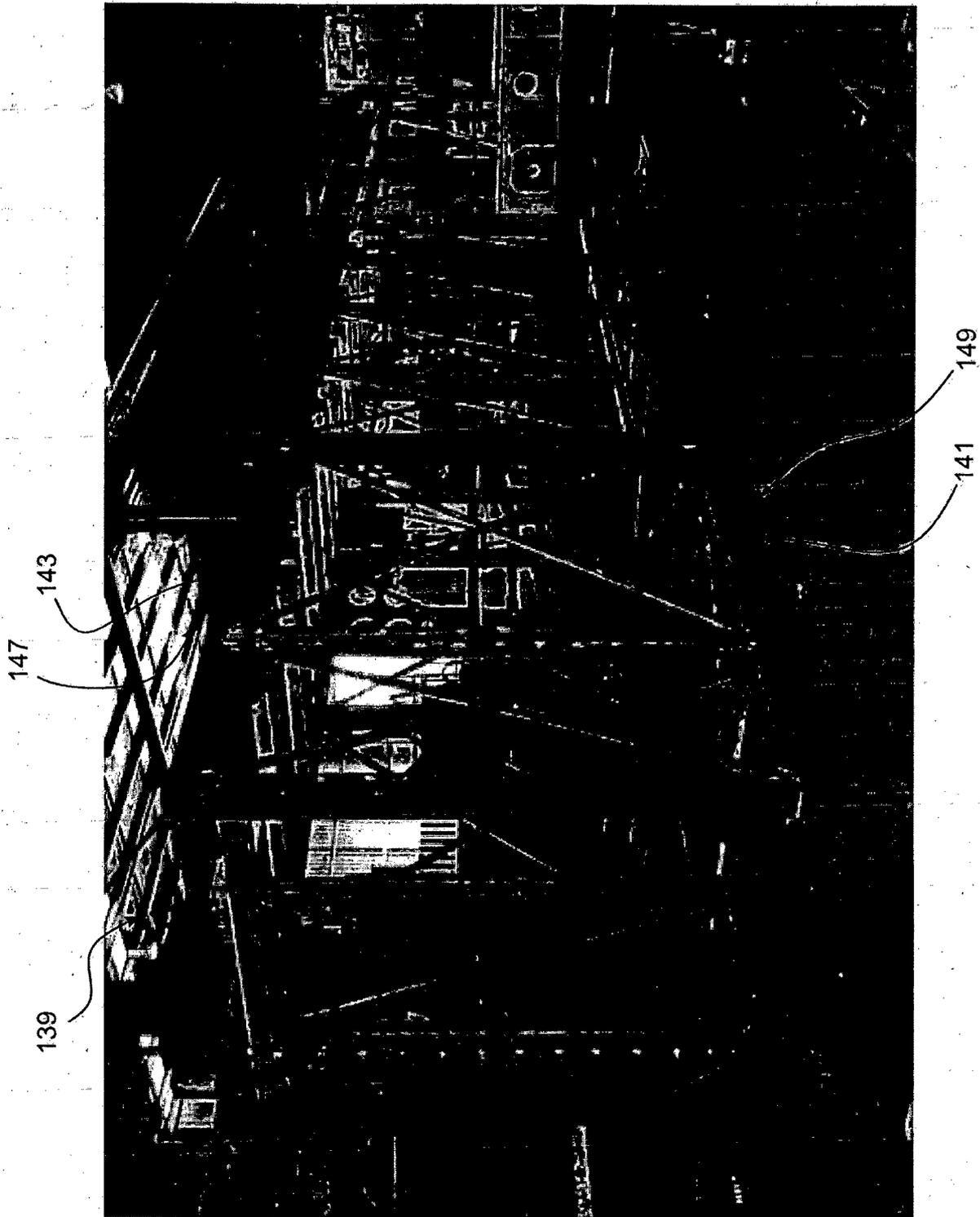
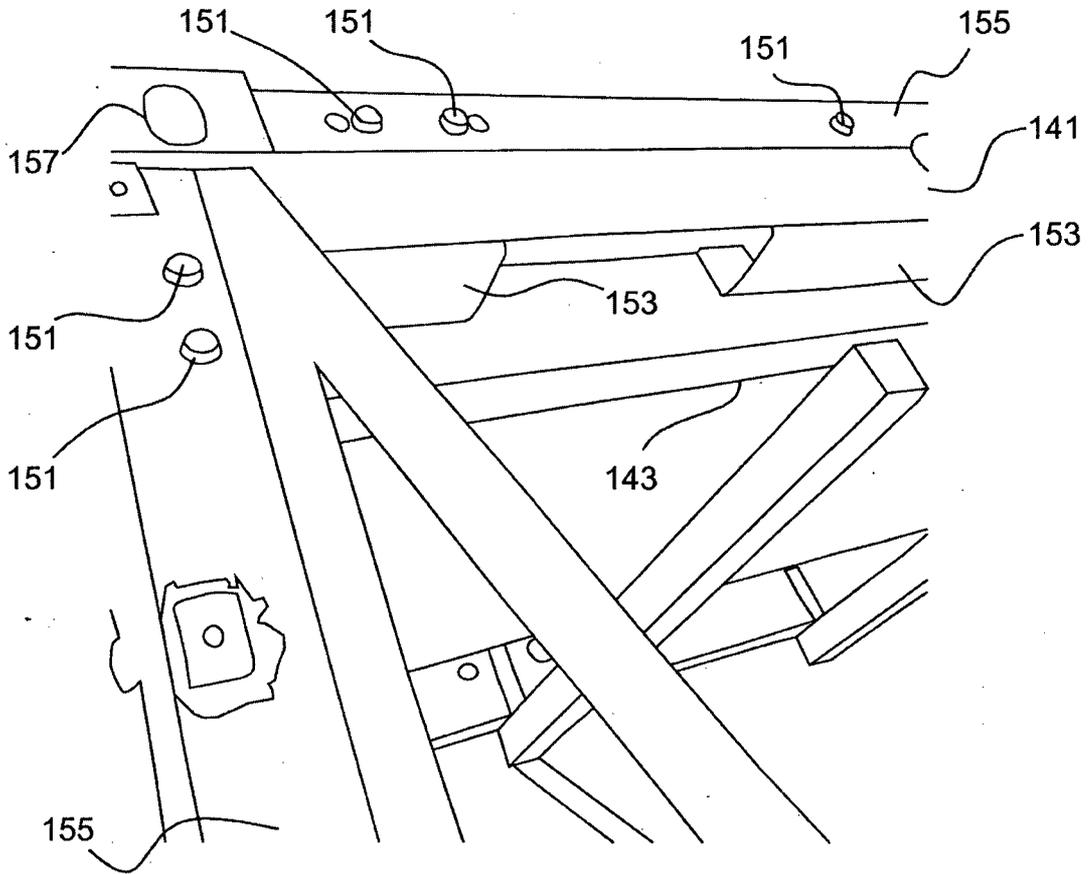


Fig. 18



19/41

Fig. 19



20/41

Fig. 20a

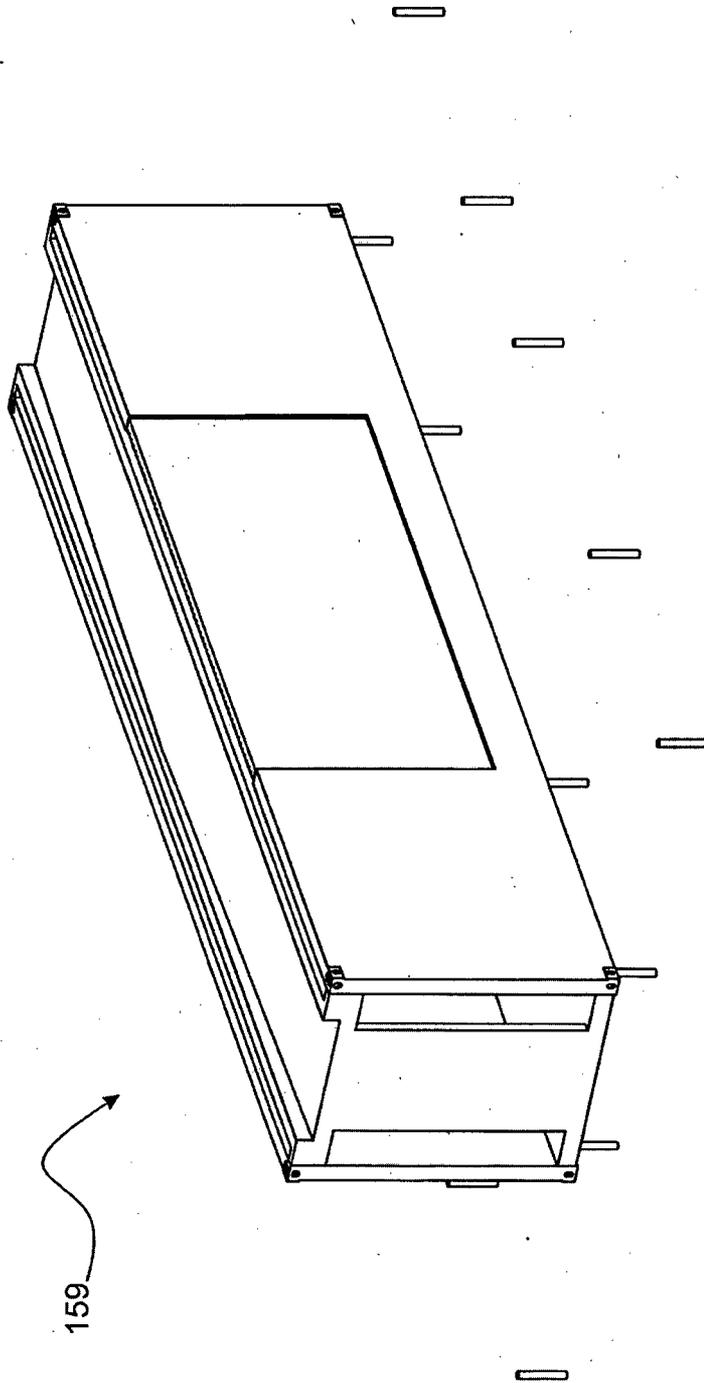
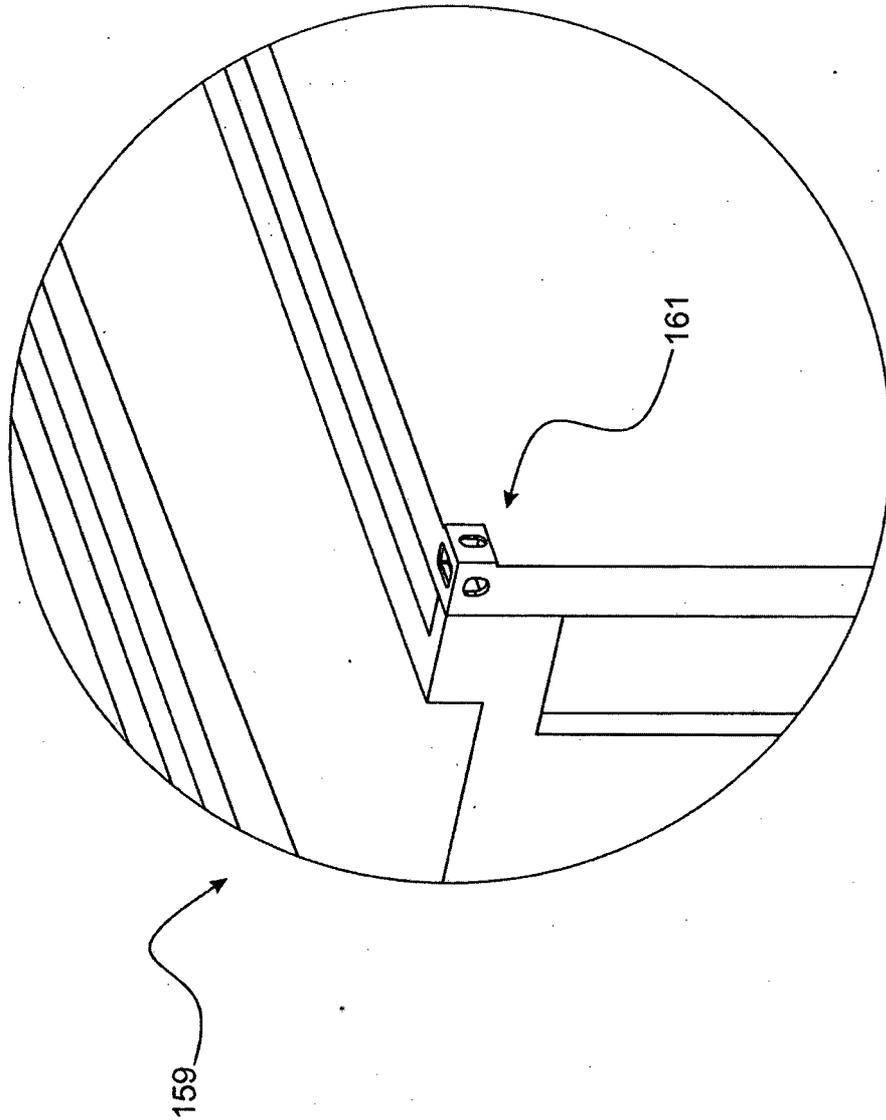
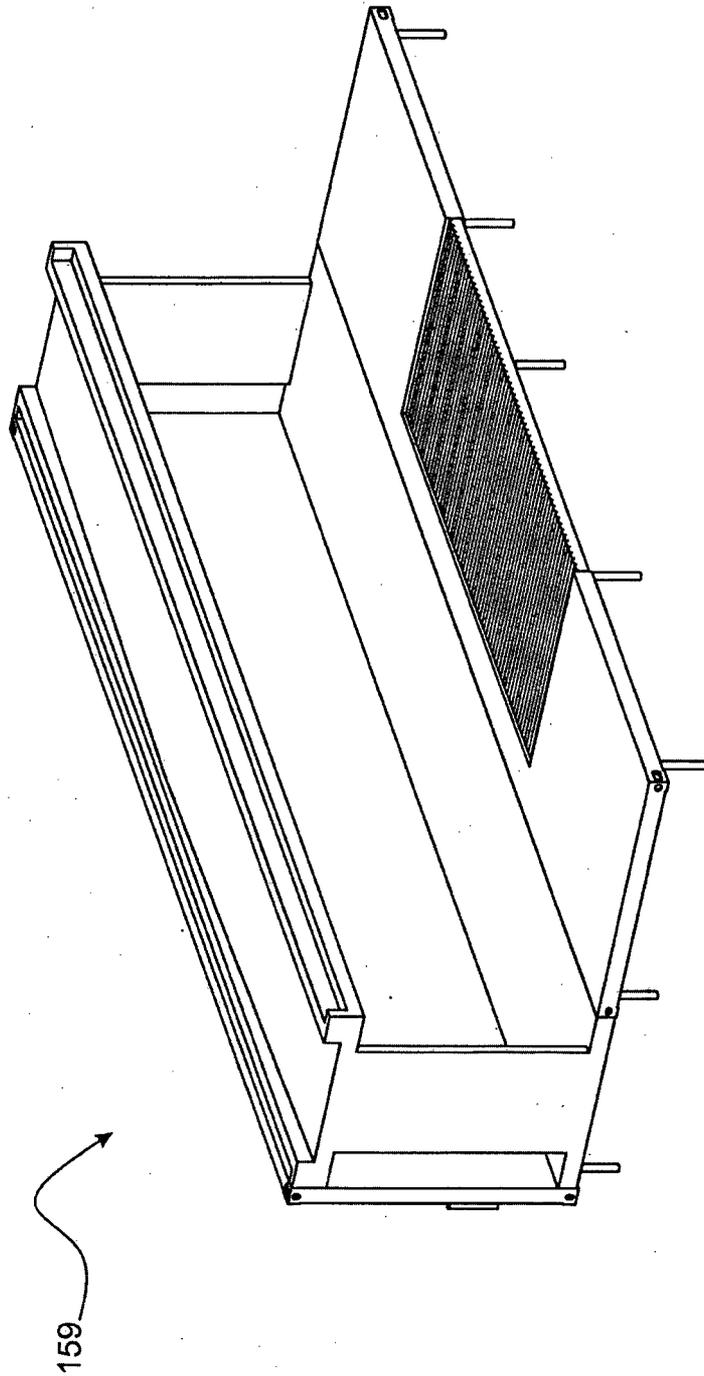


Fig. 20b



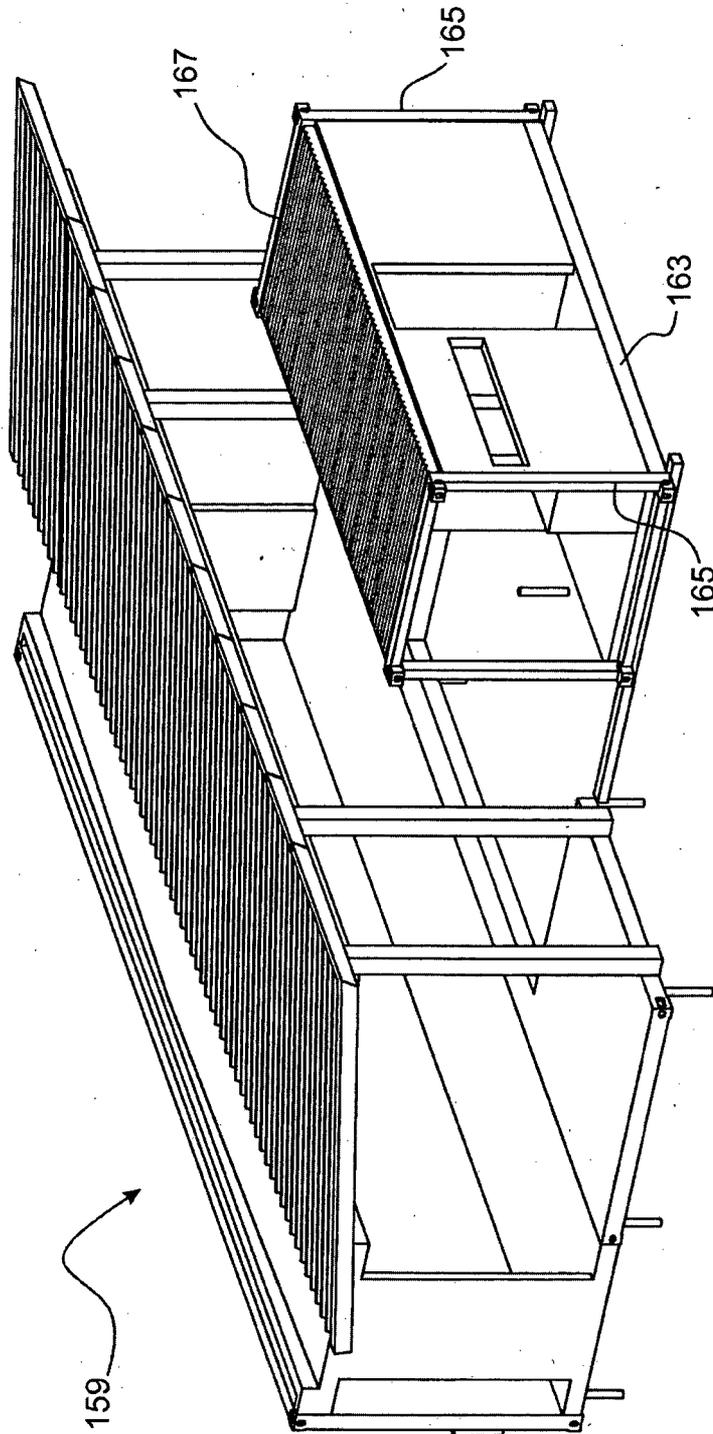
22/41

Fig. 20c



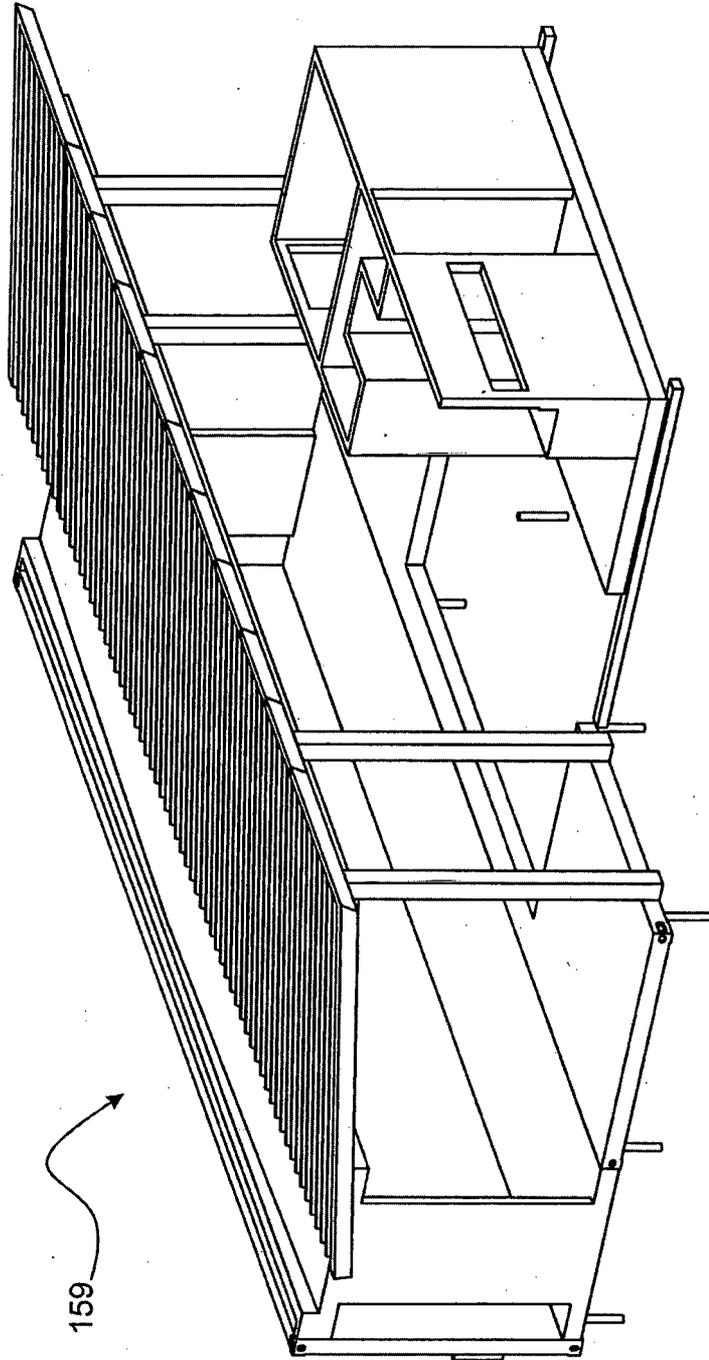
23/41

Fig. 20d



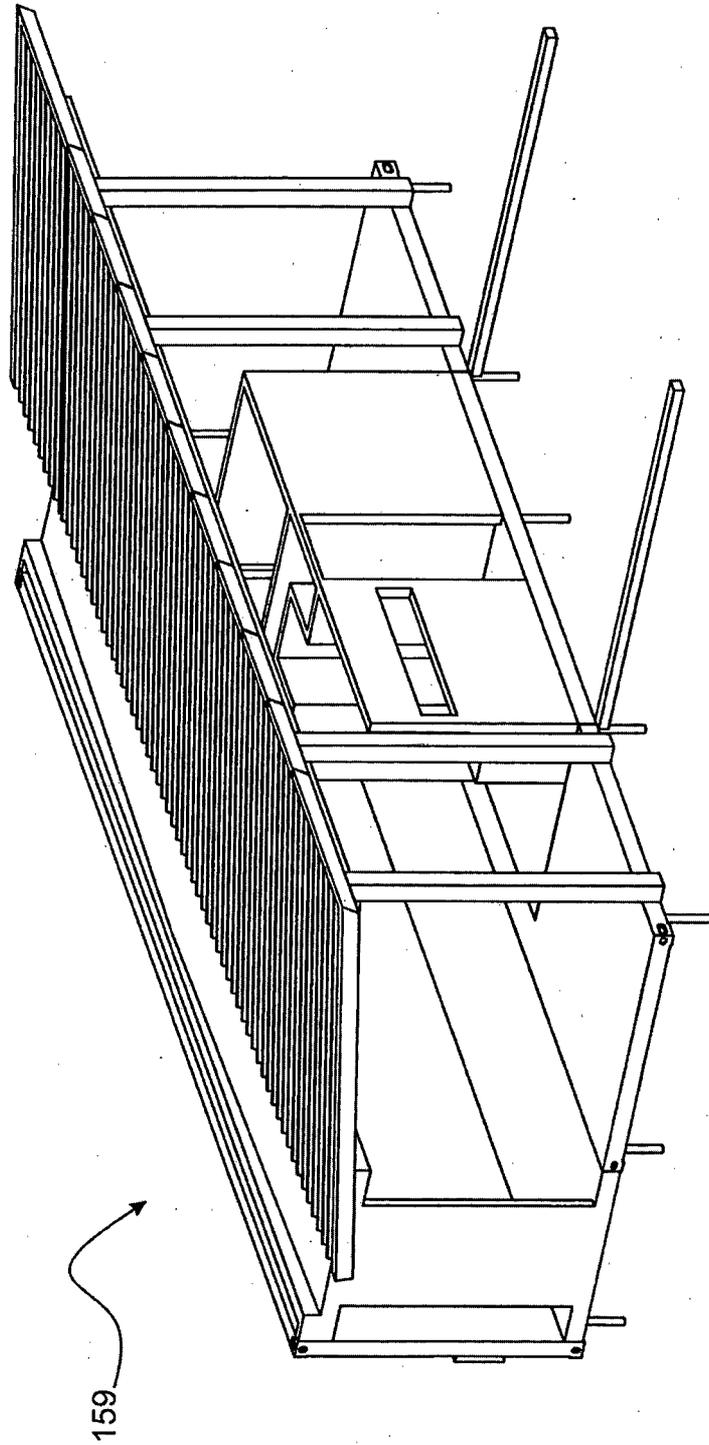
24/41

Fig. 20e



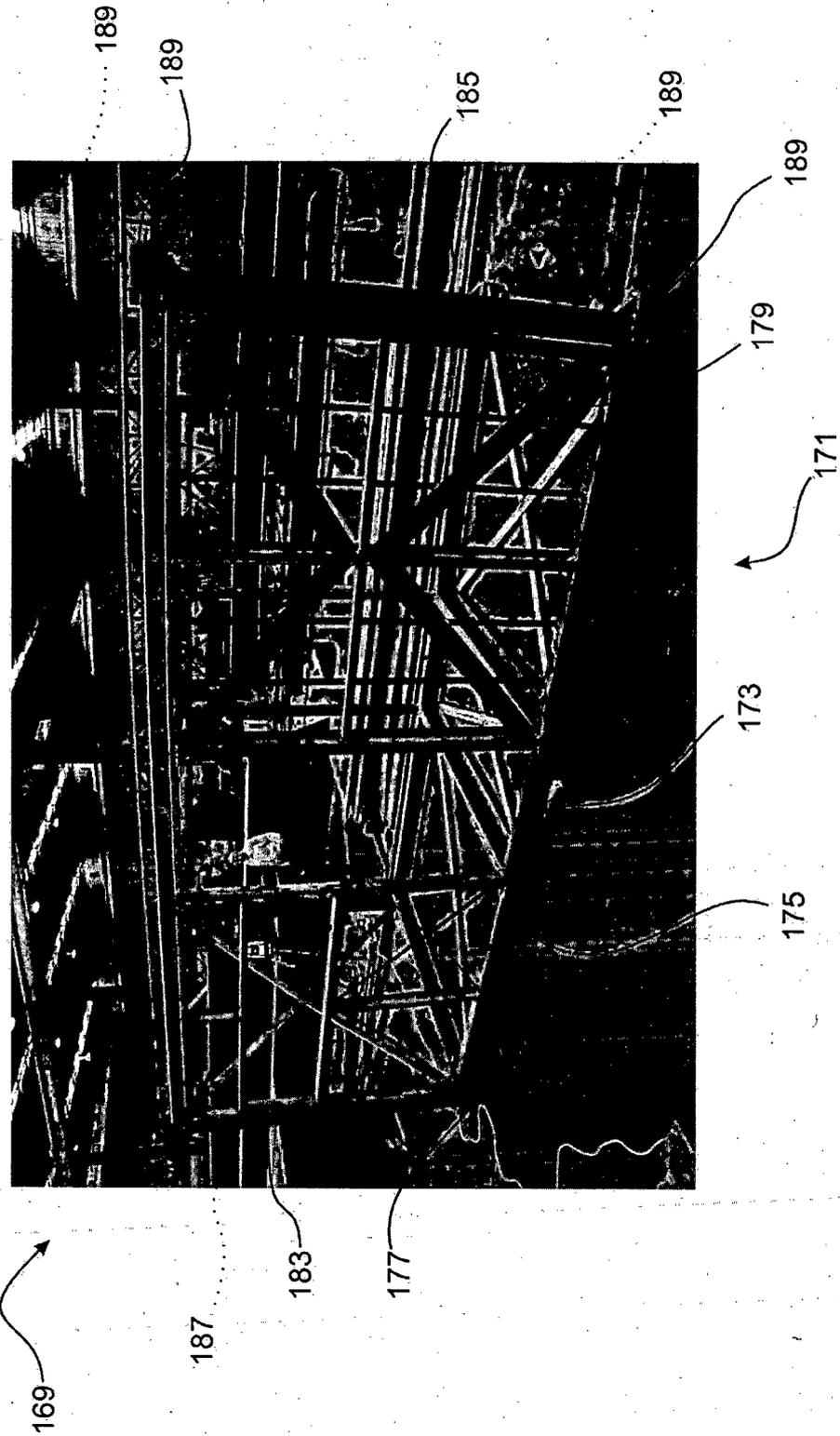
25/41

Fig. 20f



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Fig. 21



27/41

Fig. 22

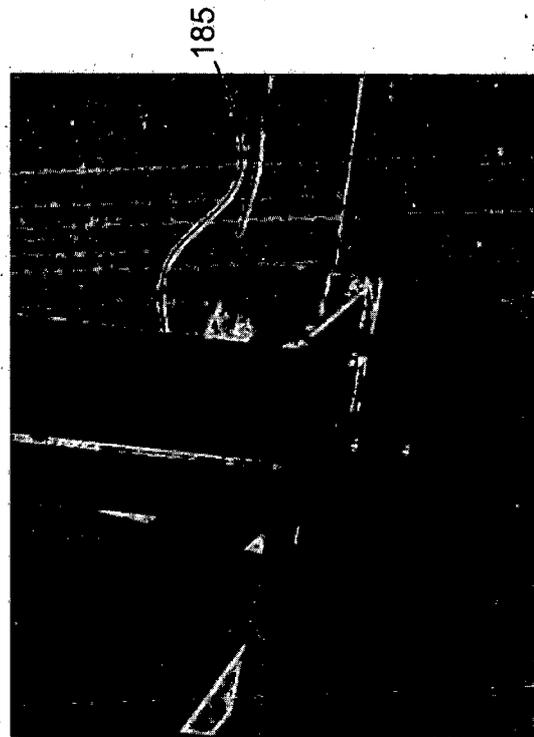
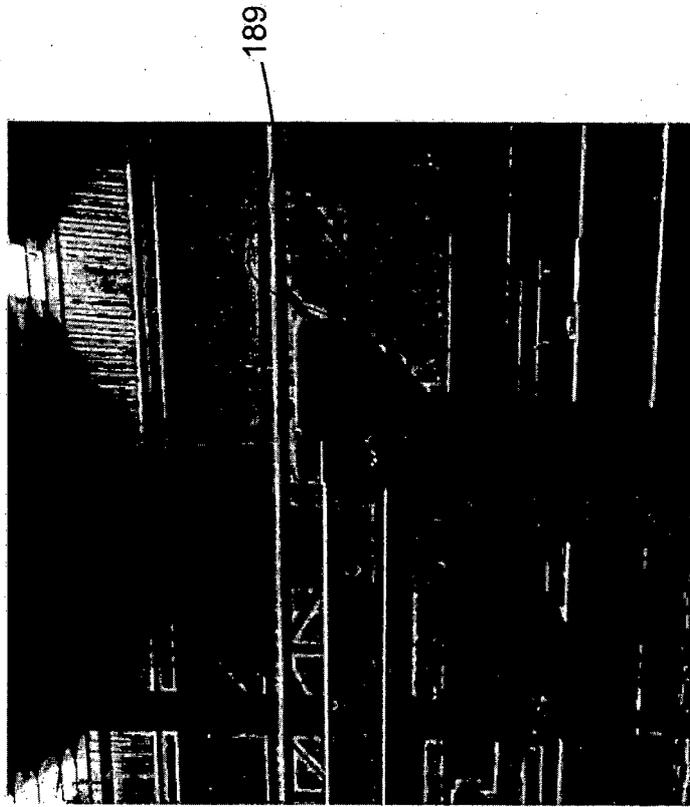


Fig. 23

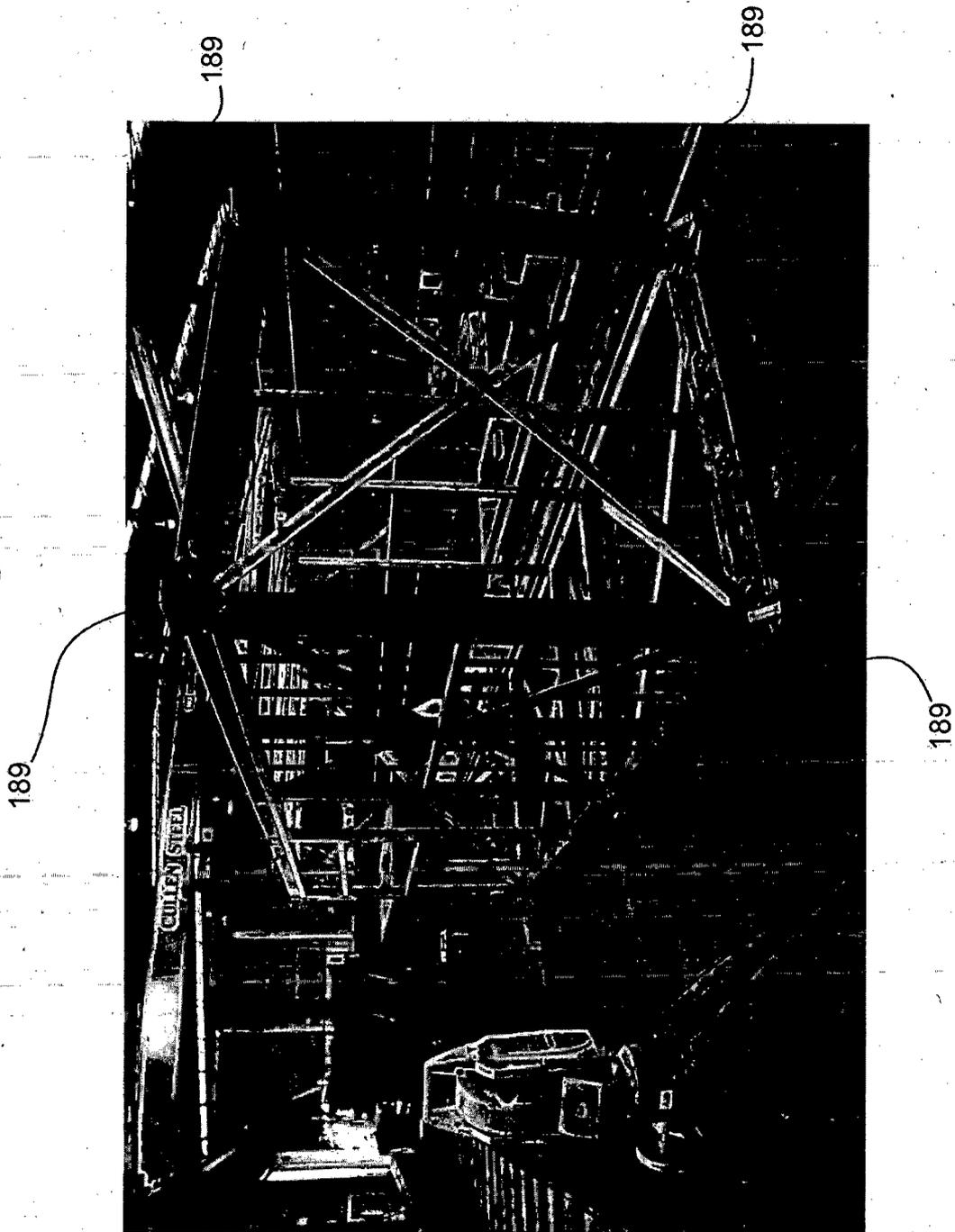
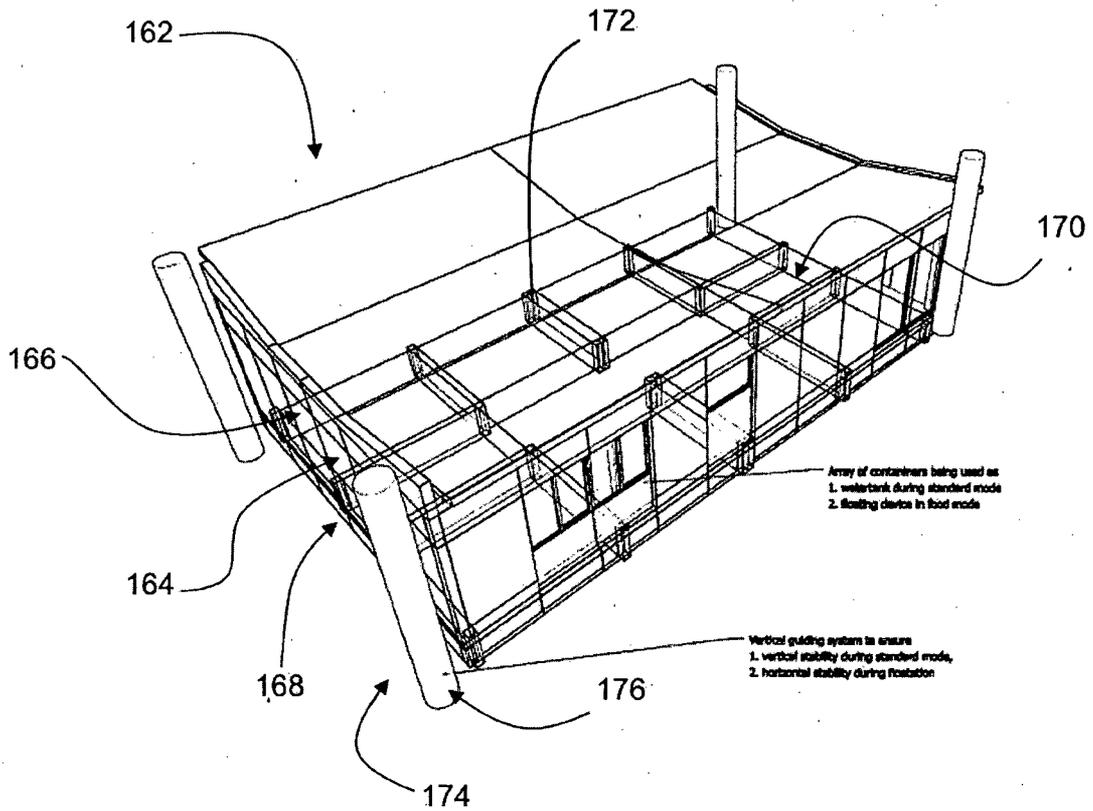
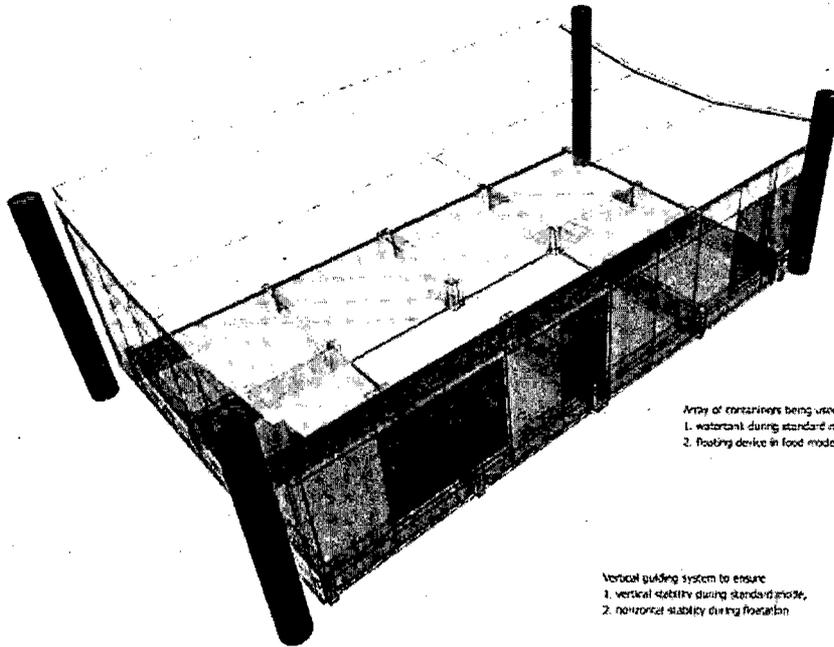


Fig. 24



30/41

Fig. 25

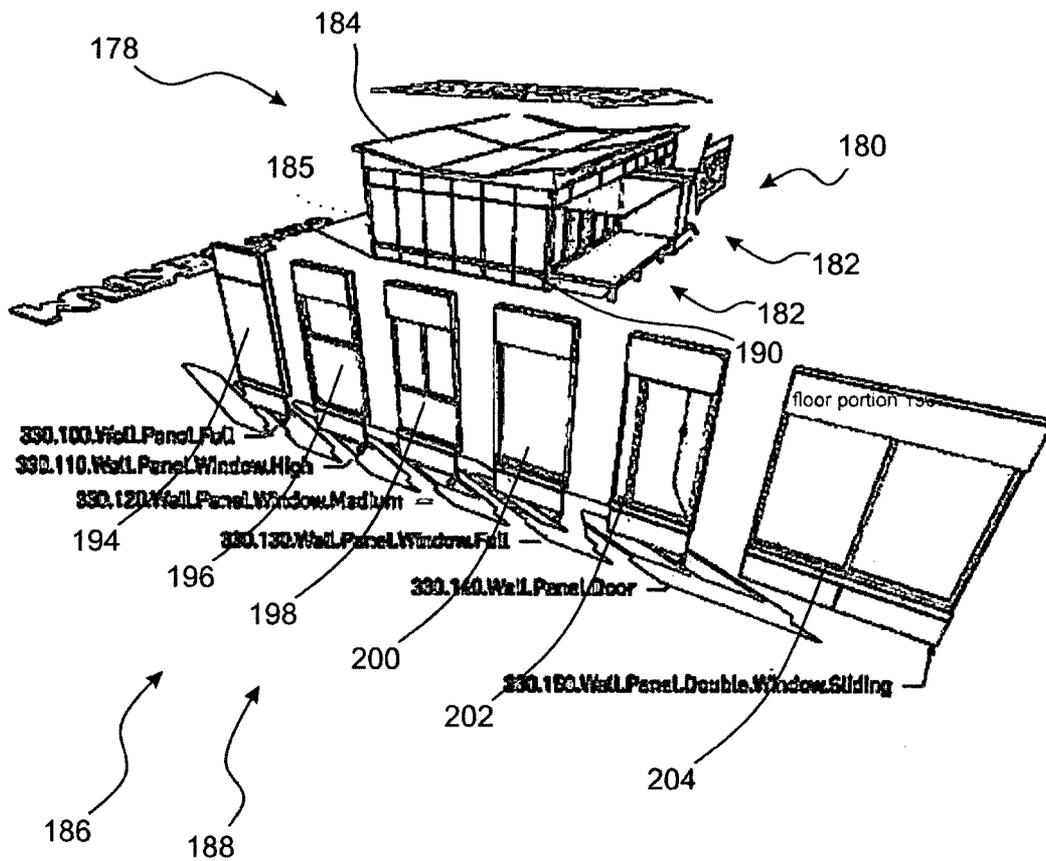
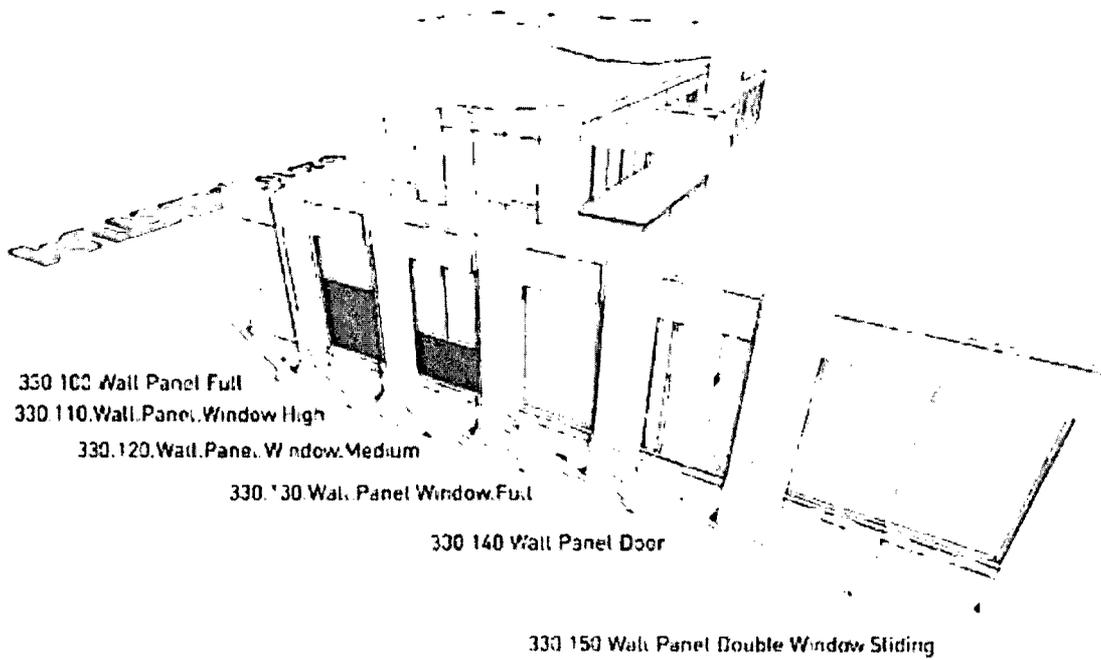


Fig. 26

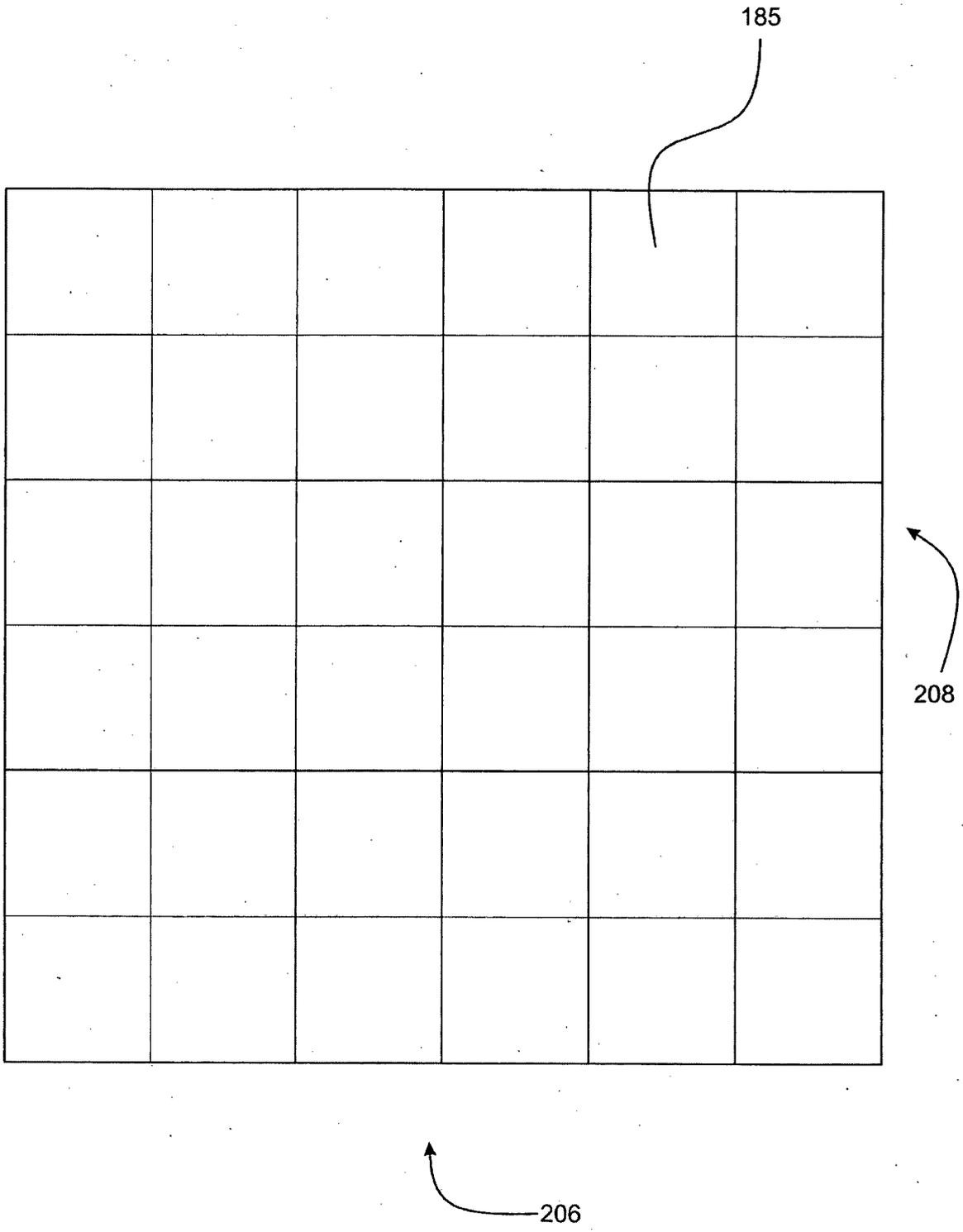


Fig. 27

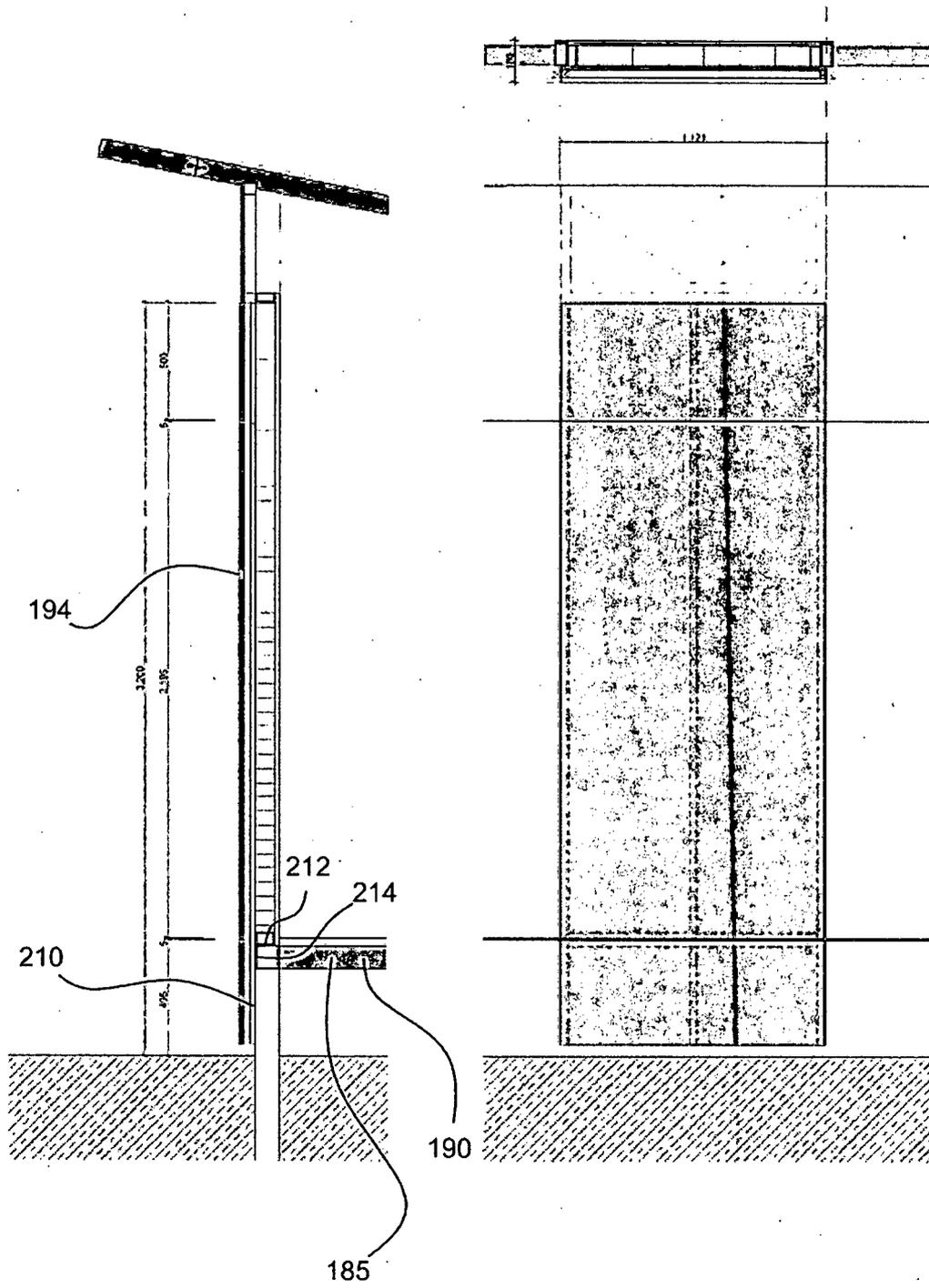


Fig. 28

33/41

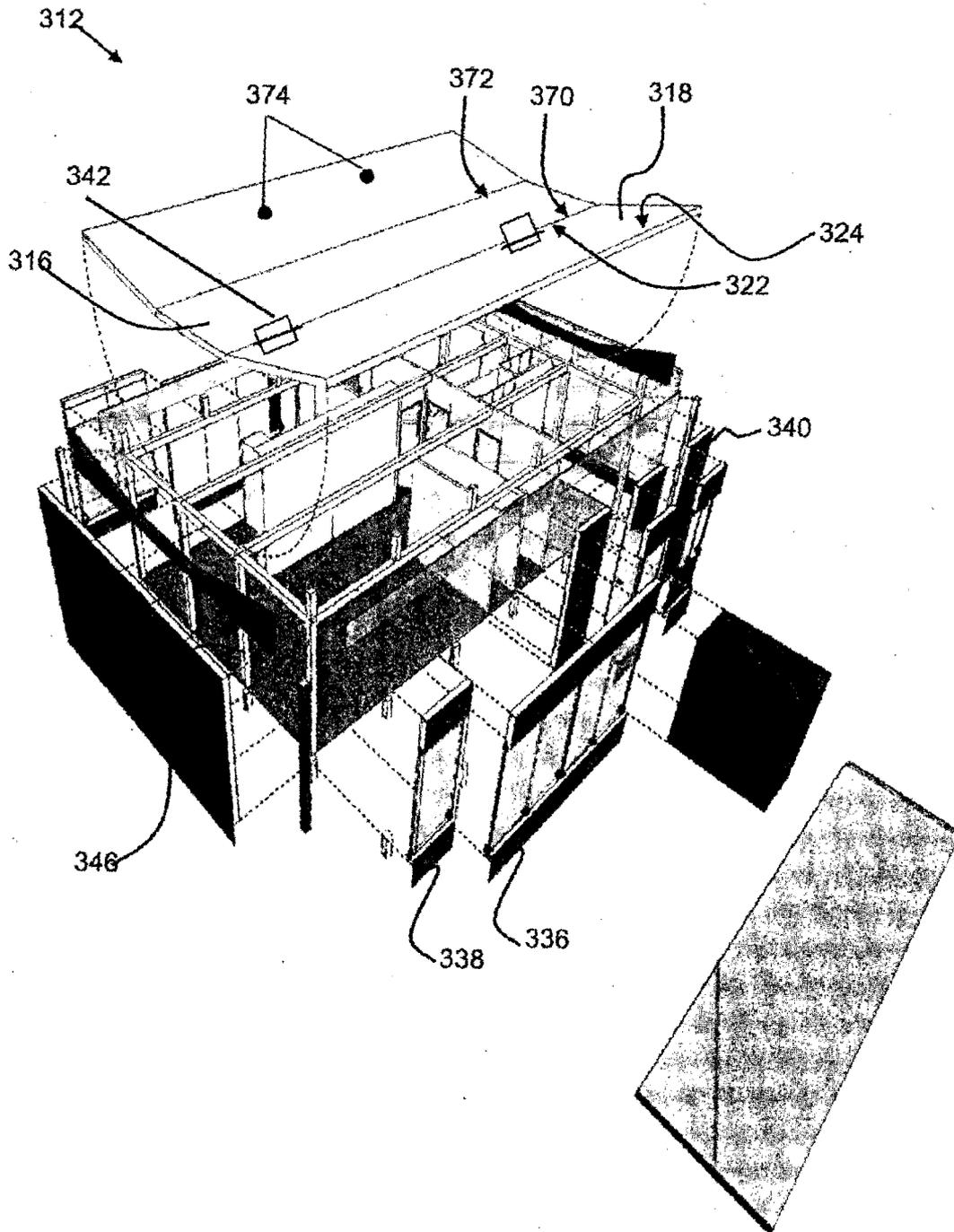


Figure 1

Fig. 29

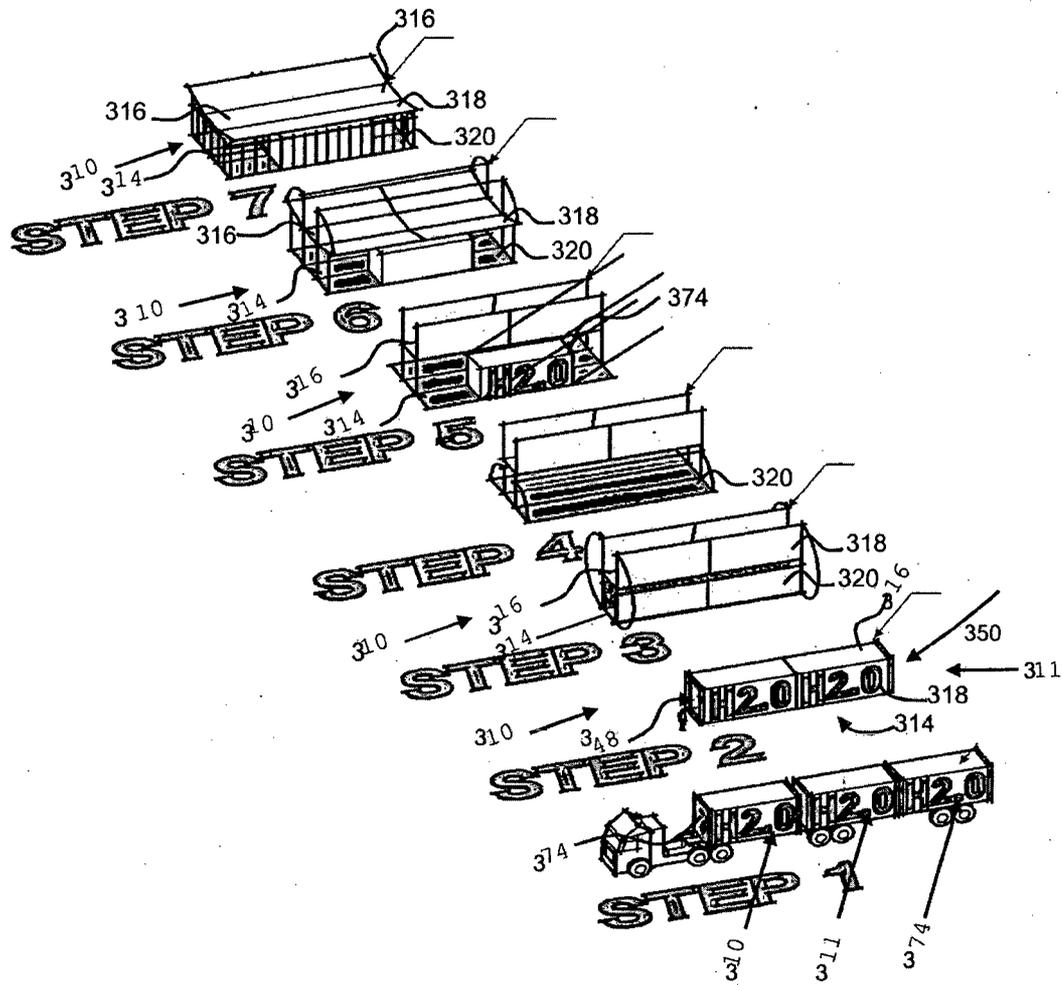


Figure 2

Fig. 30

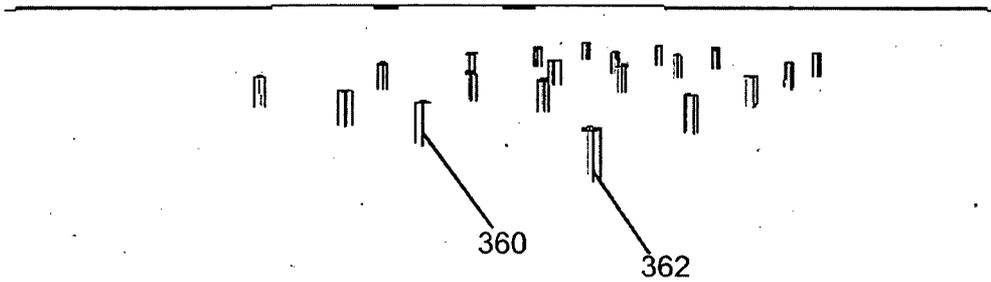


Figure 3

Fig. 31

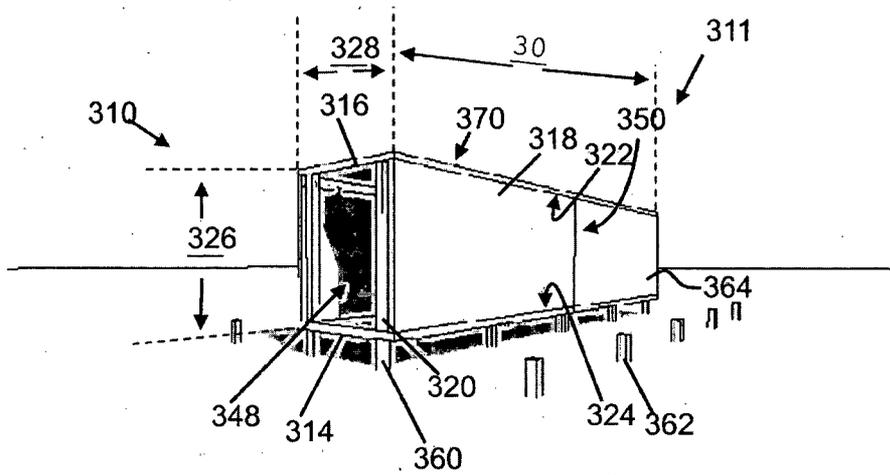


Figure 4

Fig. 32

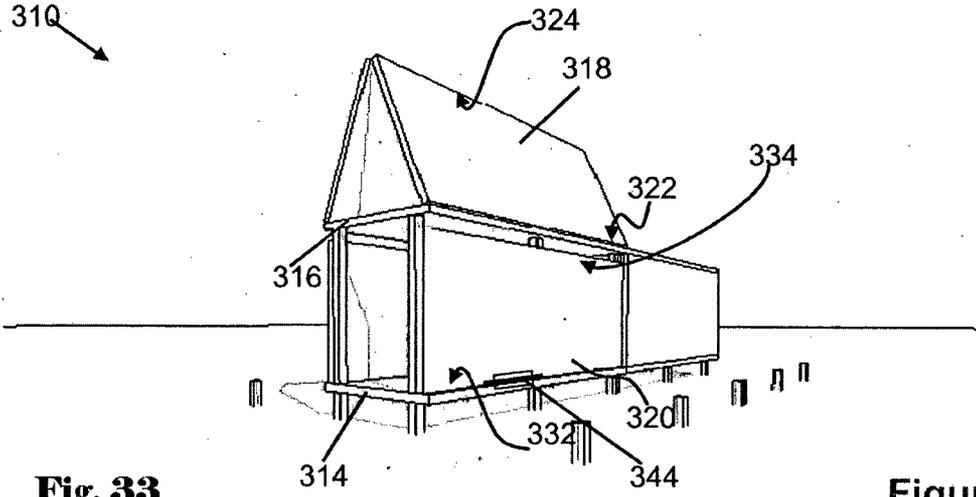


Fig. 33

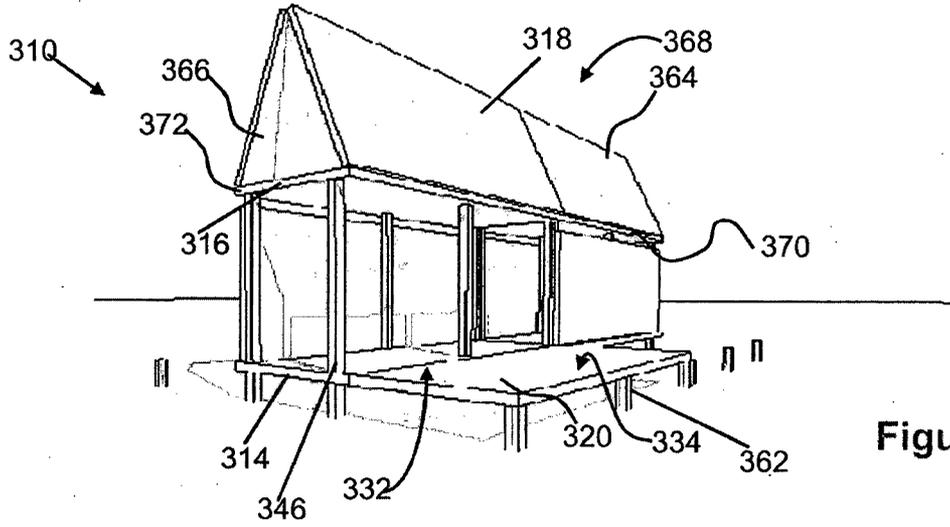


Figure 5

Fig. 34

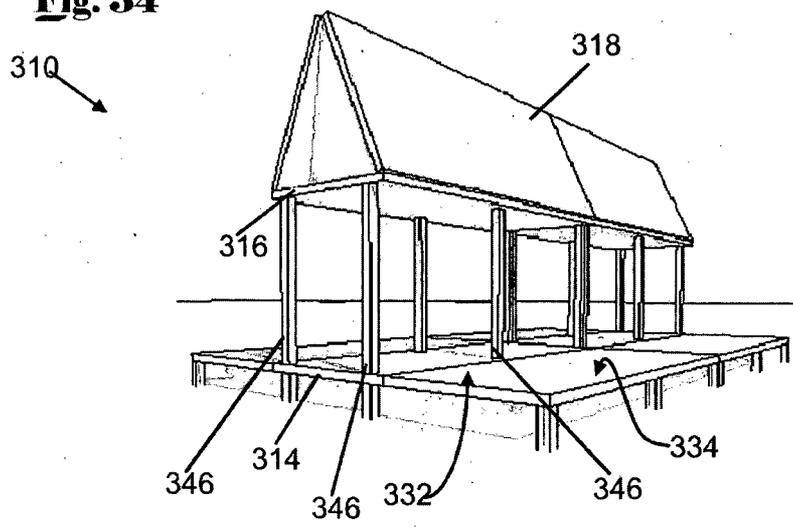


Figure 6

Figure 7

Fig. 35

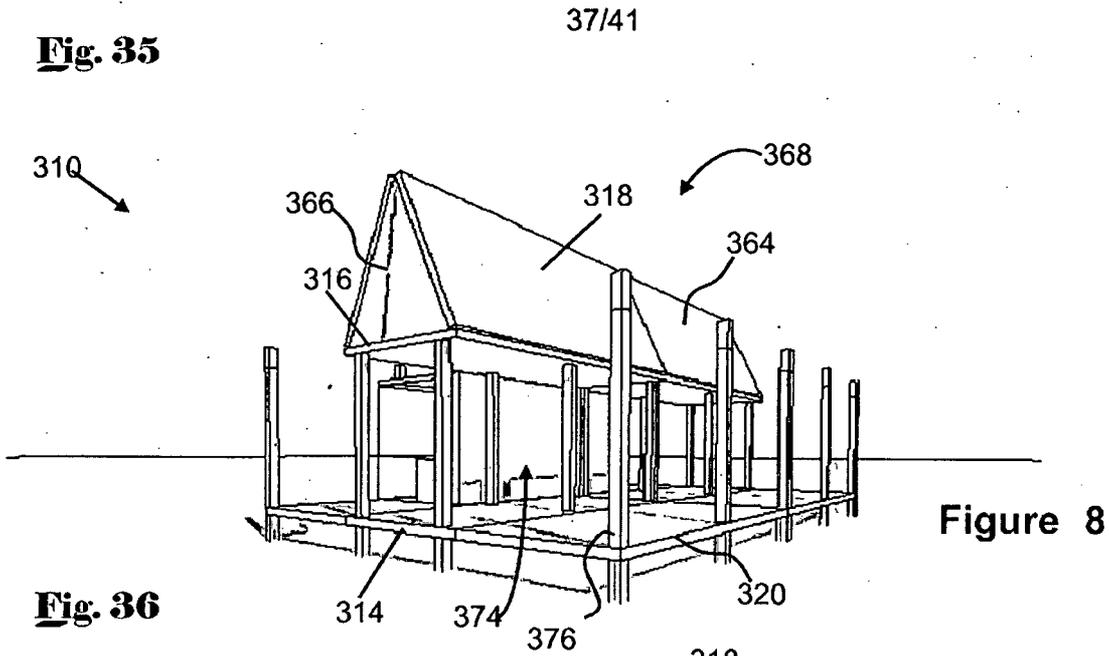


Fig. 36

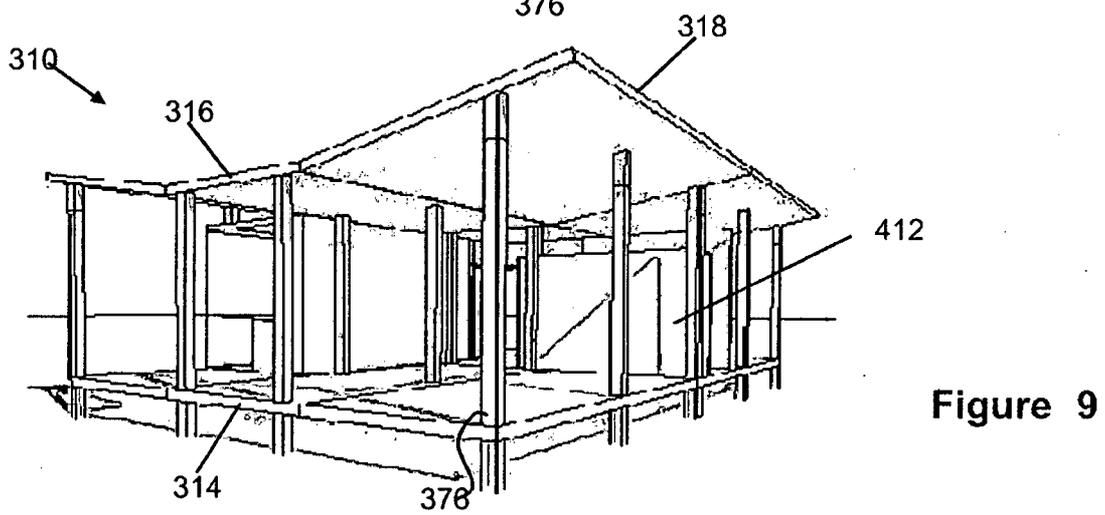


Fig. 37

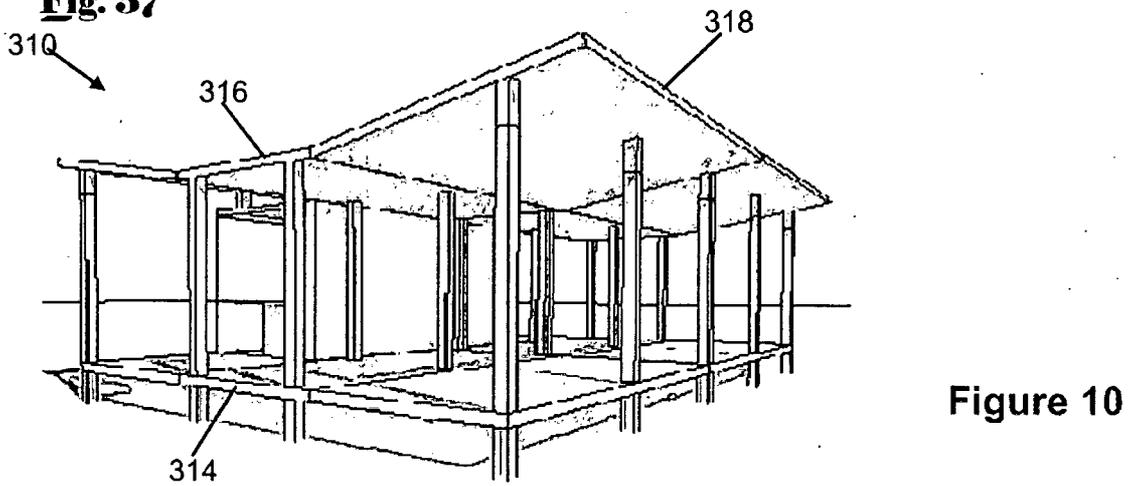


Fig. 38

38/41

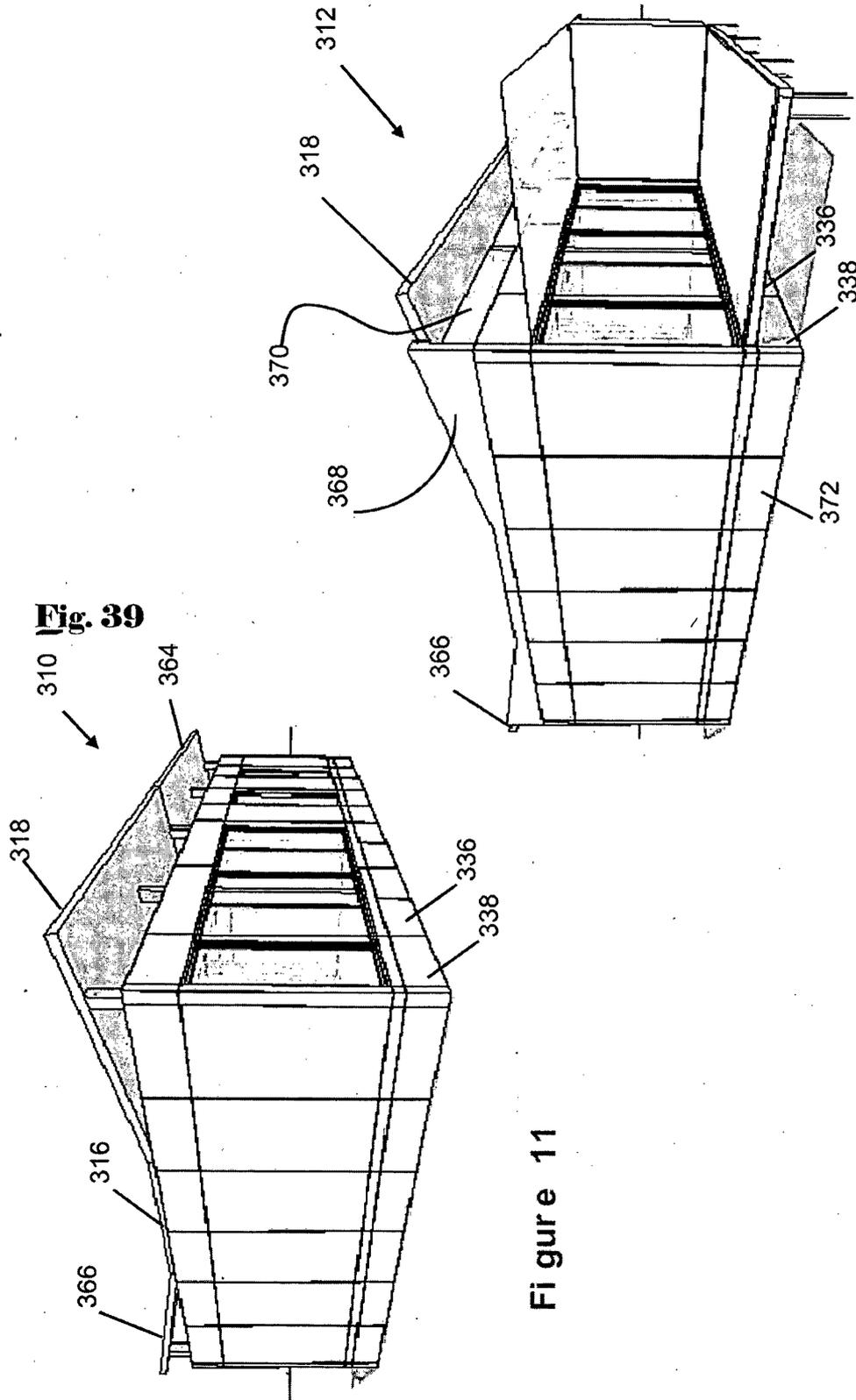


Figure 12

Figure 11

39/41

Fig. 40

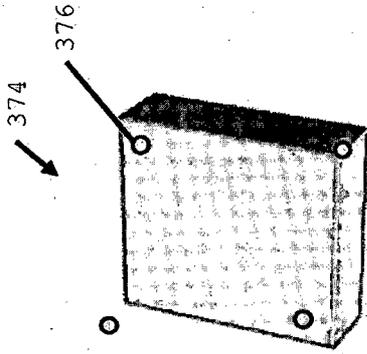


Figure 13

Fig. 41

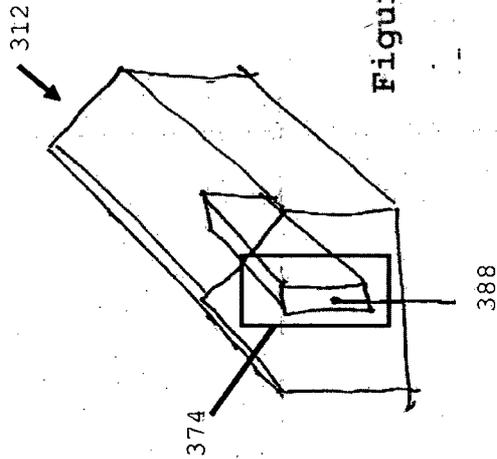


Figure 15

Fig. 42

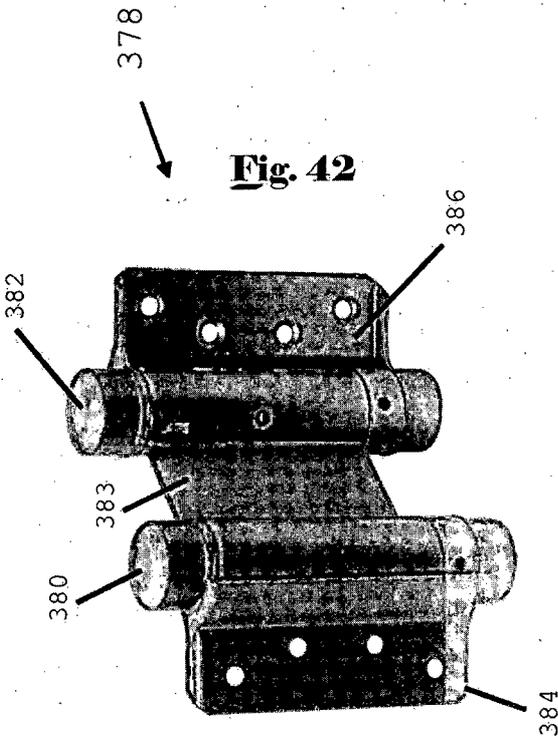


Figure 14

Fig. 43

40/41

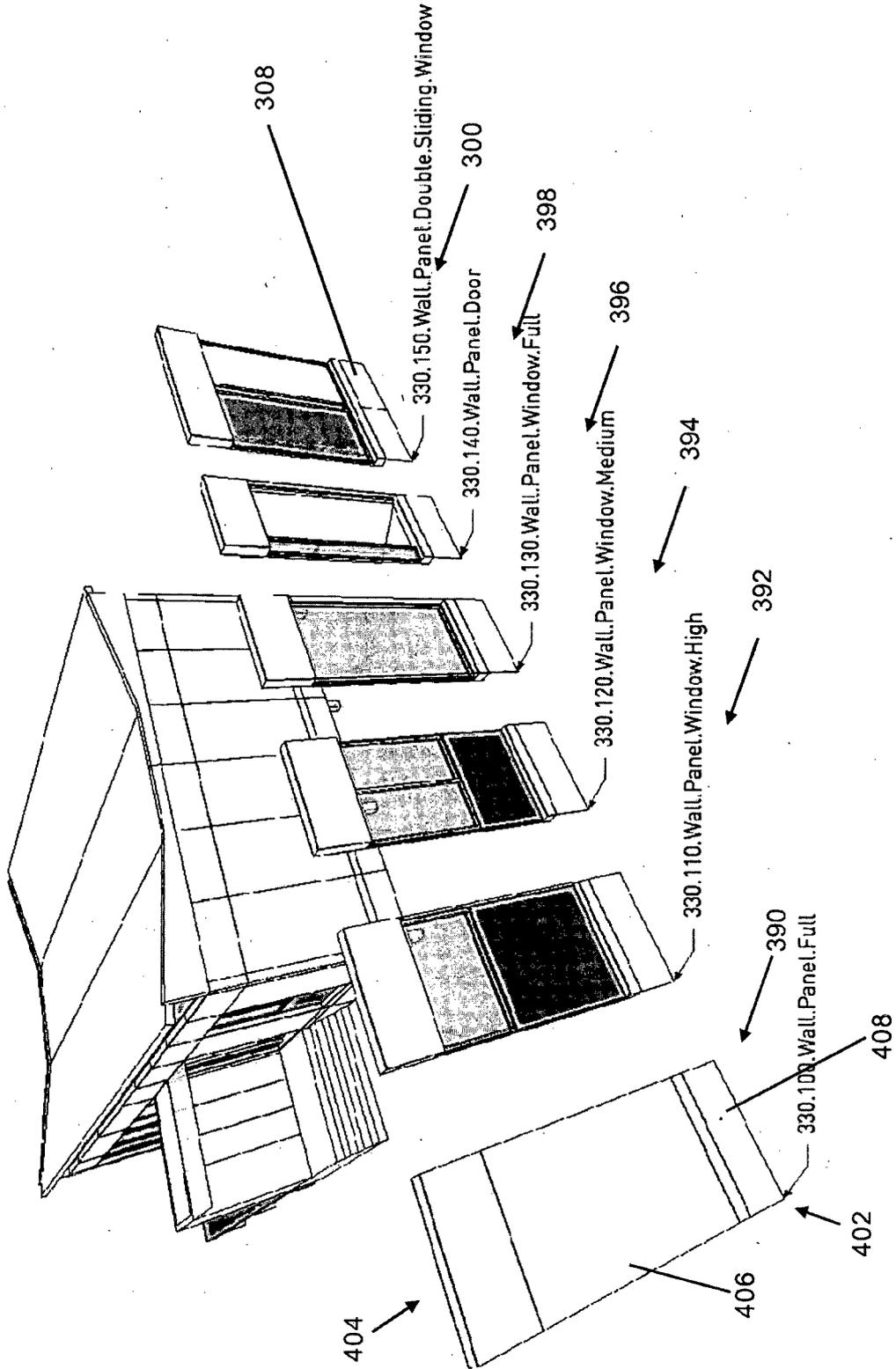


Figure 16

41/41

Fig. 44

COLLAPSED MODE:

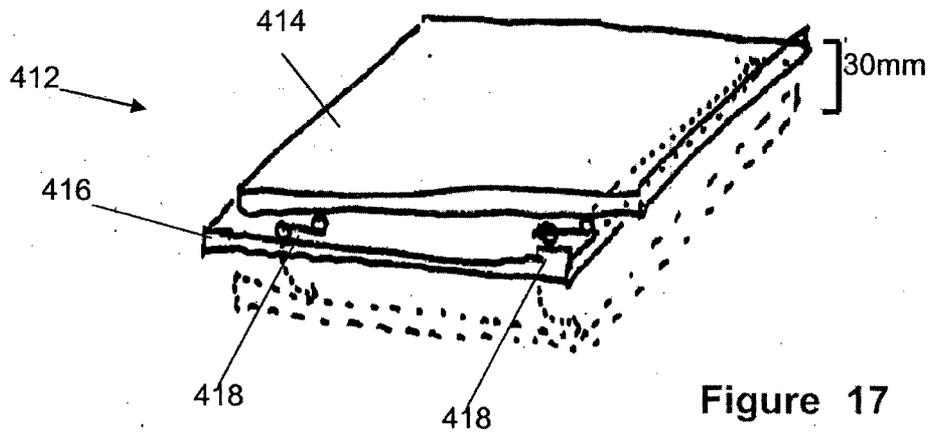


Figure 17

Fig. 45

EXPANDED MODE:

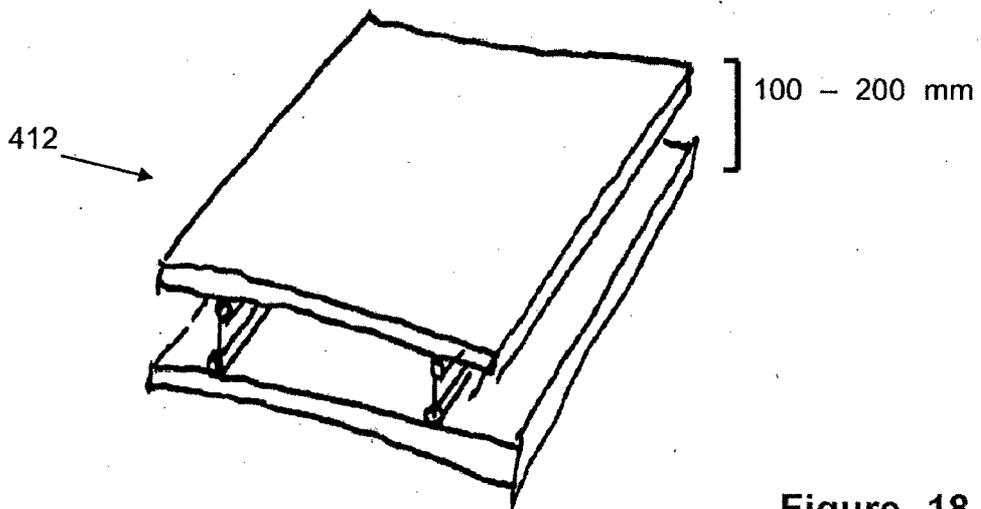


Figure 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2012/000309

A. CLASSIFICATION OF SUBJECT MATTER
E04B 1/343.(OCT 2005) E04B 1/344 (OCT 2005) E04H 1/12 (OCT 2005)

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)

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPI, EPODOC: IPC E04B1/-, E04H1/-, E04H9/- & Keywords: container, transport, ISO, collapsible, floor, wall, hinge, pivot, bath, kitchen, module, annex, prefabricated, pod, recess and like terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Documents are listed in the continuation of Box C		

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

* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 09 July 2012	Date of mailing of the international search report 19 July 2012
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Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustrialia.gov.au Facsimile No.: +61 2 6283 7999	Authorized officer John Ho AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262832329
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2012/000309

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: **132-133**
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claims 132-133 do not comply with Rule 6.2(a) because it/they rely on references to the description and/or drawings.

3. Claims Nos:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See Supplemental Box for Details

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-23, 93-99

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

C (Continuation).

DOCUMENTS CONSIDERED TO BE RELEVANT

PCT/AU2012/000309

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4447996 A (MAURER JR et al.) 15 May 1984 figures 1-6, column 1 line 46-column 3 line 55 figures 1-6, column 1 line 46-column 3 line 55	16, 22-23, 93-97 1-21
Y	US 5596844 A (KALINOWSKI) 28 January 1997 figures 1-2, 6-9 and column 2 lines 30-54 and column 5 line 61-column 2 line 36	1-21
X	US 5463833 A (BANEZ) 07 November 1995 figures 1-5 and column 2 line 49-column 3 line 55	1-6, 14-18, 93-97
X	US 2005/0108957 A1 (QUESADA) 26 May 2005 figures 13, 16dc, paragraphs 0008-0019, 0044-0049, 0062-0069	1-2, 4-9, 14-17, 22-23, 93-97
X	US 6341468 B1 (BIGELOW) 29 January 2002 figures 1-2 and column 3 line 13-column 4 line 41.	93, 95, 98-99
X	JP 05-287918 A (DAIWA HOUSE IND CO LTD) 02 November 1993 figures 1-3	16, 22-23, 93-96

Supplemental Box**Continuation of: Box III**

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups:

- Claims 1-21 are directed to a building construction and a method of construction respectively. The feature of a floor area in the building for receiving a building module is specific to this group of claims.
- Claims 22-23 and 93-99 are directed to a building construction. The feature of a transportable module or sub-unit providing kitchen, bathroom or water holding facilities for installation within a larger building or unit is specific to this group of claims.
- Claims 24-35, 51-52 are directed to a building construction including a body portion and a gutter arrangement. The feature of a gutter portion including moveable hinge for mounting a roof extension at an incline relative to the body portion is specific to this group of claims.
- Claims 36-41 and 50 are directed to a building construction having a body portion. The feature of a lower structure provided with at least one flotation arrangement with sufficient buoyancy to lift the building during flood conditions is specific to this group of claims.
- Claims 42-45 are directed to a building construction including at least one module provided as an ISO shipping container. The feature of a building body including a floor area at least 2.5 times the combined horizontal area of the module when in the transport condition and the use of a plurality of interchangeable panels to provide for different facade layouts is specific to this group of claims.
- Claim 46 is directed to a building construction including a body portion and a panel system. The feature of a plurality of interchangeable panels provided for different facade layouts is specific to this group of claims.
- Claims 47-49 are directed to a building construction and a method of building respectively including a body portion and hinged floor and roof extensions. The feature of hinged floor extensions provided as side walls wherein the floor extensions are of a heavy weight in comparison to the roof extensions is specific to this group of claims.
- Claims 53-92, 100-108 are directed to a unit for a building or a method of erecting a building. The feature of a building unit including a base and a roof supported above the base is specific to this group of claims.

Supplemental Box

- Claims 109-114 are directed to a method of erecting a building. The feature of disposing a vessel adapted to contain a thermal mass in the building during erection is specific to this group of claims.
- Claims 115-121 are directed to an exterior panel for a building . The feature of a panel having first and second ends and a flange attached to the ends to engage an edge of the base or an extension of the base is specific to this group of claims.
- Claims 122-126 are directed to a collapsible wall. The feature of a wall having first and second sheets, a structure attached to the sheets and having an extended mode and a collapsed mode wherein the sheets are relatively closer when the structure is in the collapsed mode than in the extended mode is specific to this group of claims.
- Claims 127-131 are directed to a unit for a building including a base and a roof supported above the base. The feature of a roof extension having a collapsed mode and an extended mode wherein in the collapsed mode the surface of the roof extension is also an external surface of the unit and in the extended mode the roof extension is an extension of the roof is specific to this group of claims.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

When there is no special technical feature common to all the claimed inventions there is no unity of invention.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. Therefore there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied *a priori*.

It is noted that claims 93-99 are considered to be per se claims to the sub-unit as these claims are not limited to be use with, or within, the unit of claim 53.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2012/000309

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
US 4447996 A	15 May 1984	US 4447996 A	15 May 1984
US 5596844 A	28 Jan 1997	AU 6350696 A	09 Feb 1998
		CA 2263456 A1	22 Jan 1998
		US 5596844 A	28 Jan 1997
		WO 9802626 A1	22 Jan 1998
US 5463833 A	07 Nov 1995	US 5463833 A	07 Nov 1995
US 2005/0108957 A1	26 May 2005	US 2005108957 A1	26 May 2005
US 6341468 B1	29 Jan 2002	US 6341468 B1	29 Jan 2002
JP 05-287918 A	02 Nov 1993	JP 5287918 A	02 Nov 1993
		JP 3083908 B2	04 Sep 2000

End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

Form PCT/ISA/210 (Family Annex)(July 2009)