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(51) INT CL:
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(58) Field of Search:
INT CL **E04B, E04H**
Other: **WPI, EPODOC**

(54) Title of the Invention: **A modular shelter**
Abstract Title: **A kit of parts for a modular building**

(57) A kit for a modular shelter 100 comprising a plurality of wall panels 110 having connecting portions (115, fig 3), a plurality of roof panels 130 connectable to the wall panels, a plurality of vertical support members 120 having connecting portions (425, fig 4), wherein the connecting portions of the wall panels can engage with another wall panel or with the vertical support members and the components of the kit can be assembled into different shelter configurations. The connecting portions are preferably male-female connections. The shelter may comprise flooring having floor beans and base panels, and the roof may comprise rafters, purlins and top beams. Preferably the vertical support beams and holding portions (1510, fig 15) assemble into a frame which holds the remaining components in a transport box (1500, fig 15). Further disclosed is a modular shelter assembled from the kit of parts.

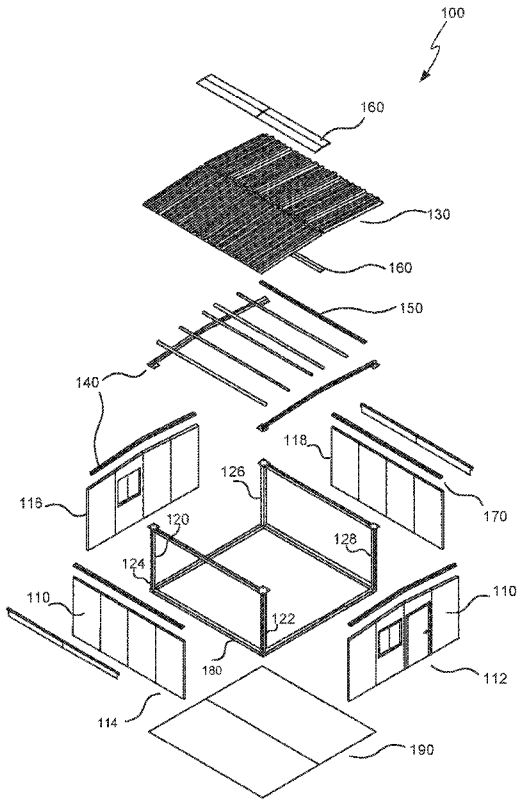


FIG. 2

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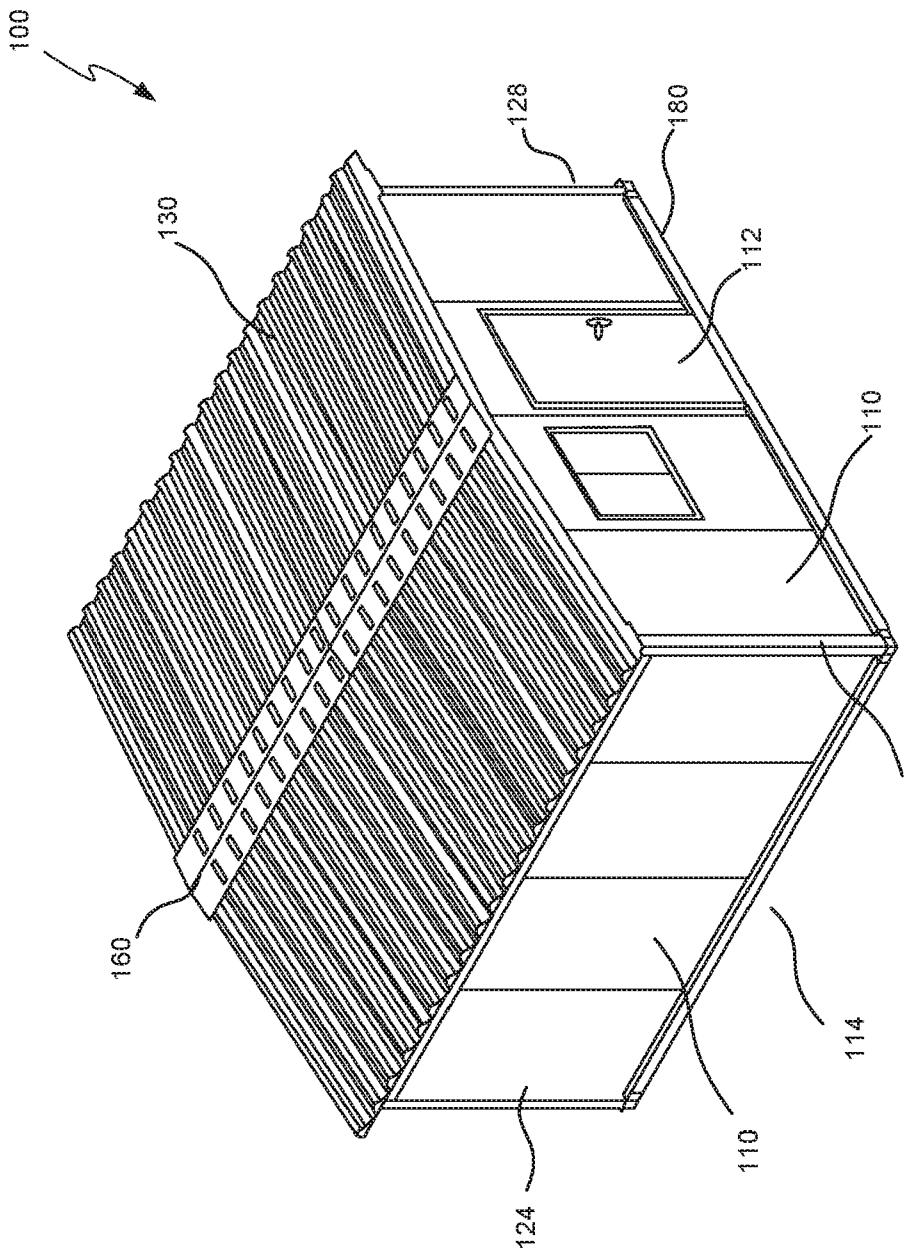


FIG. 1

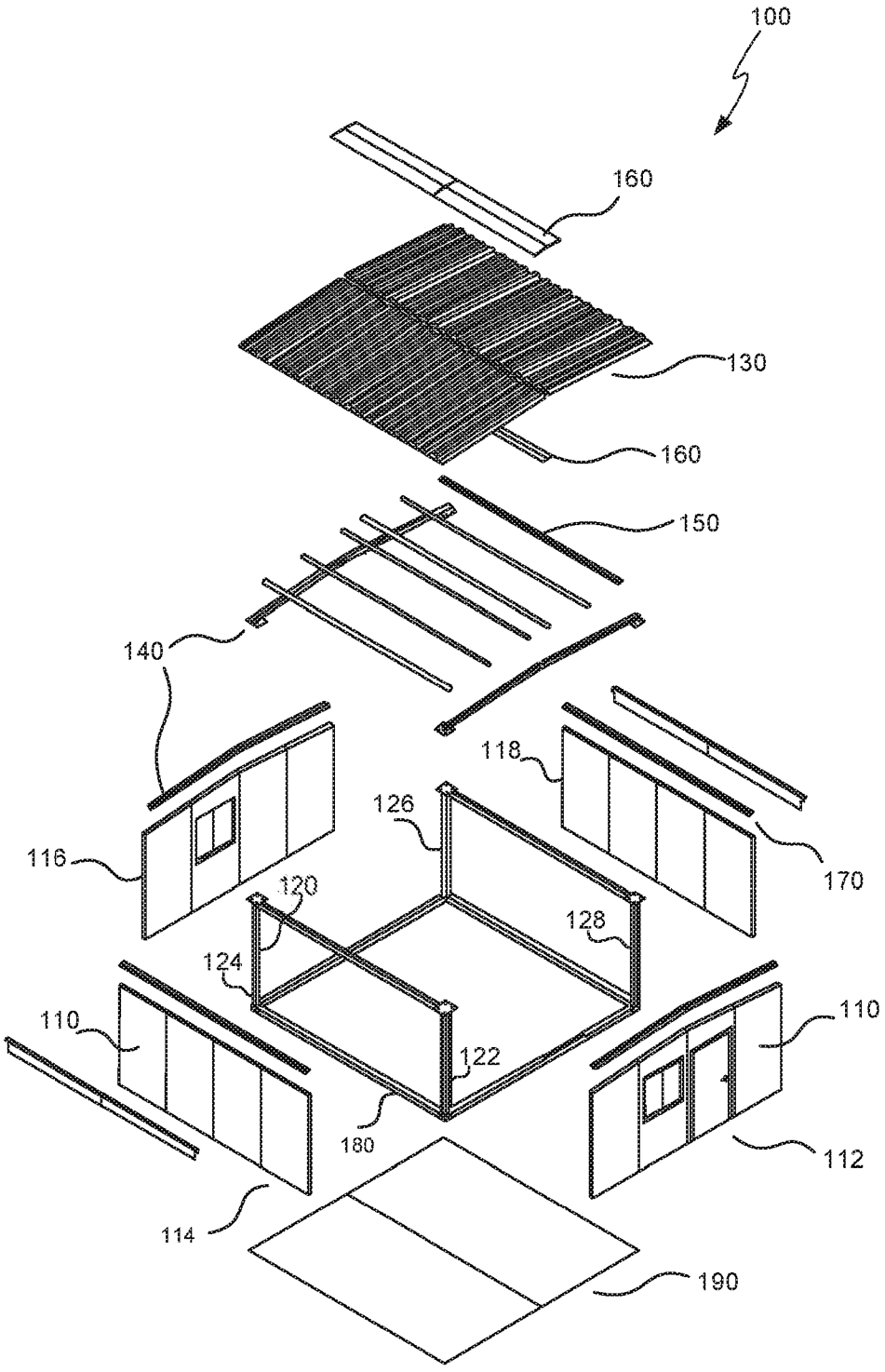

100
160
130
160
150
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118
126
116
120
170
128
124
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110
122
180
112
114
190

FIG. 2

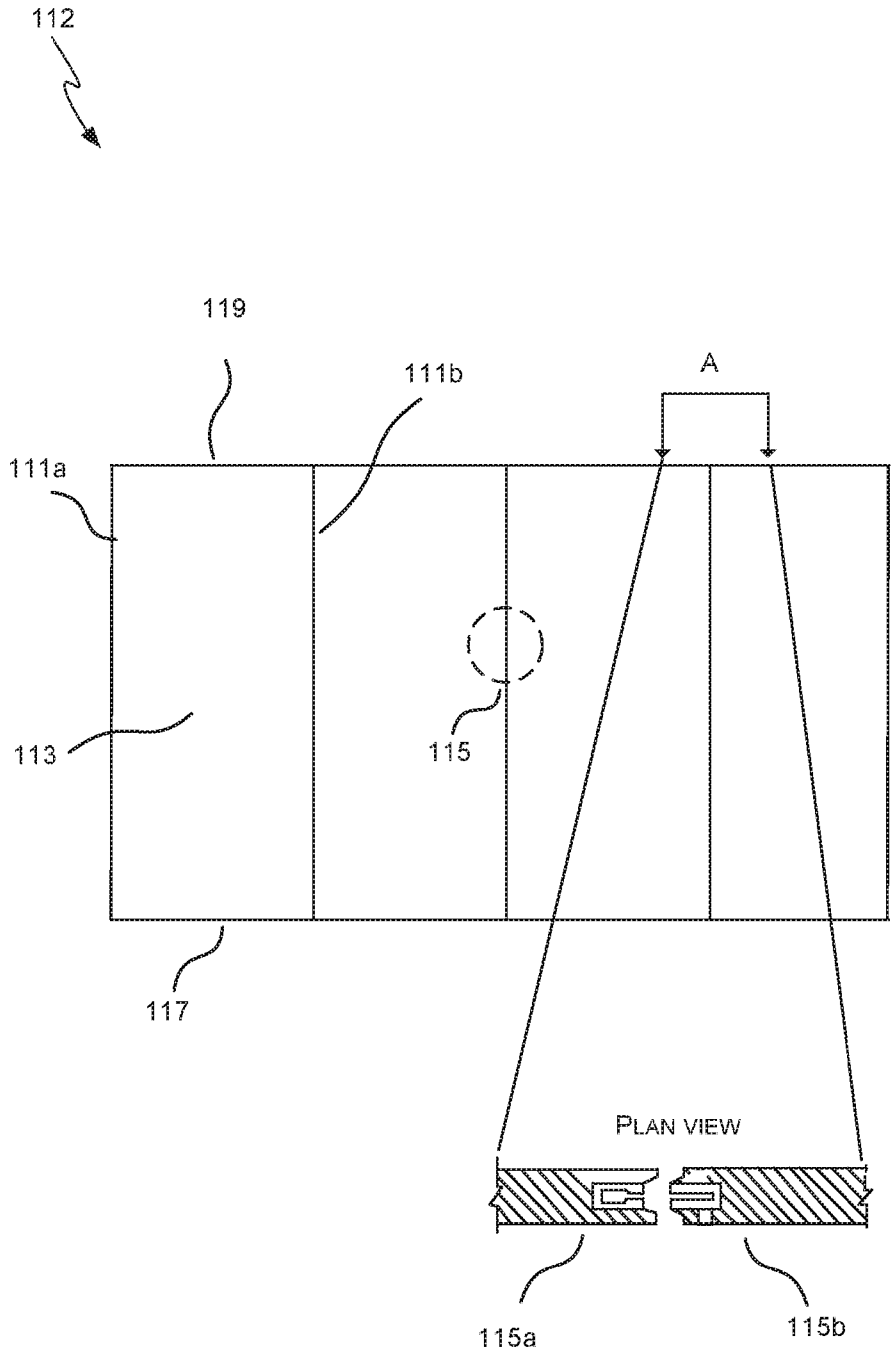


FIG. 3

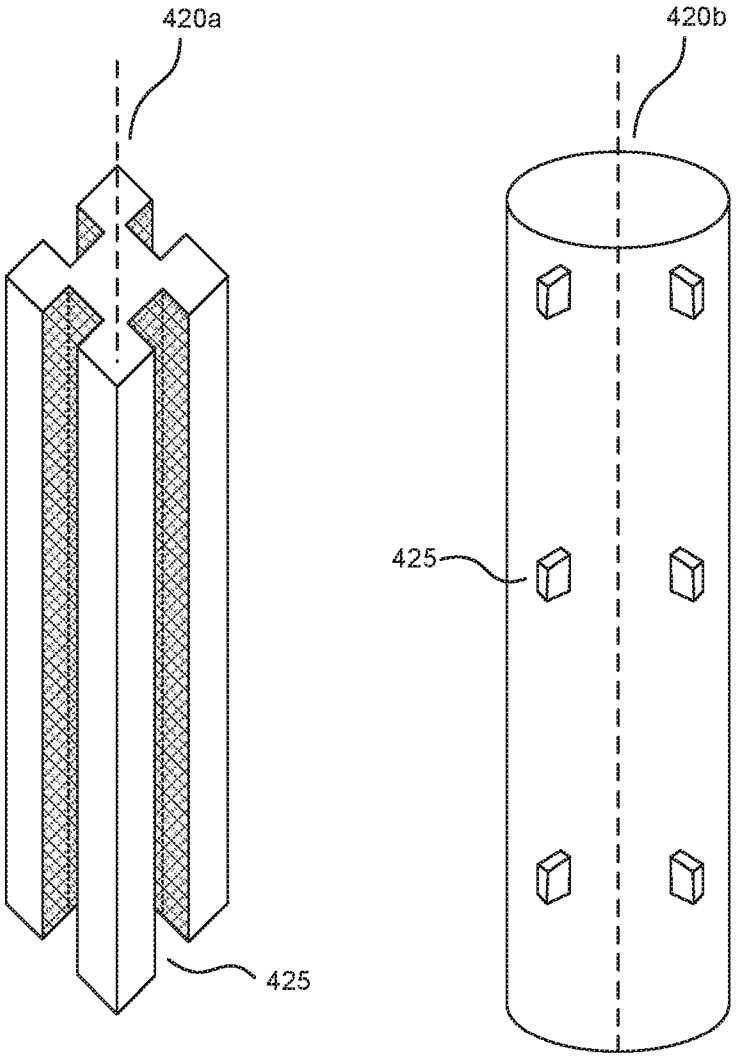


FIG. 4

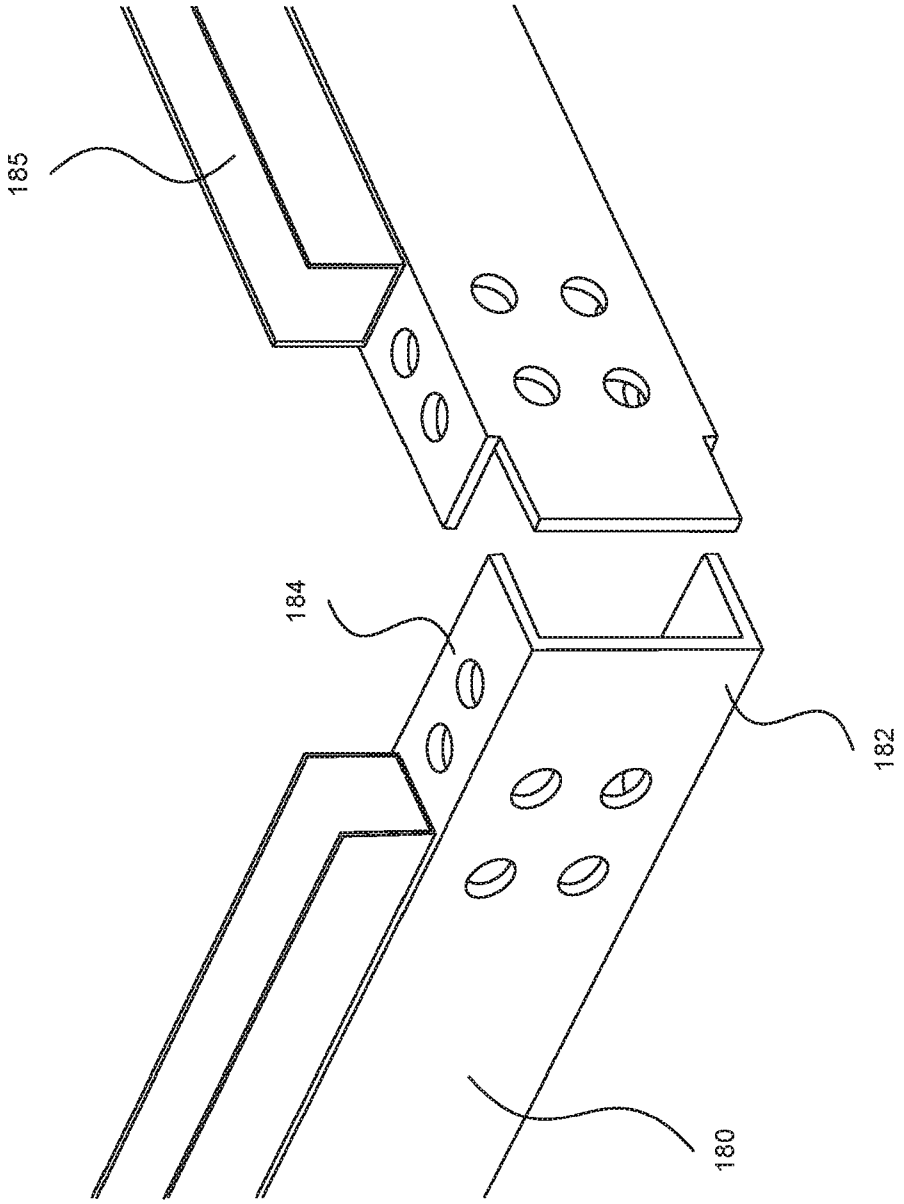


FIG. 5

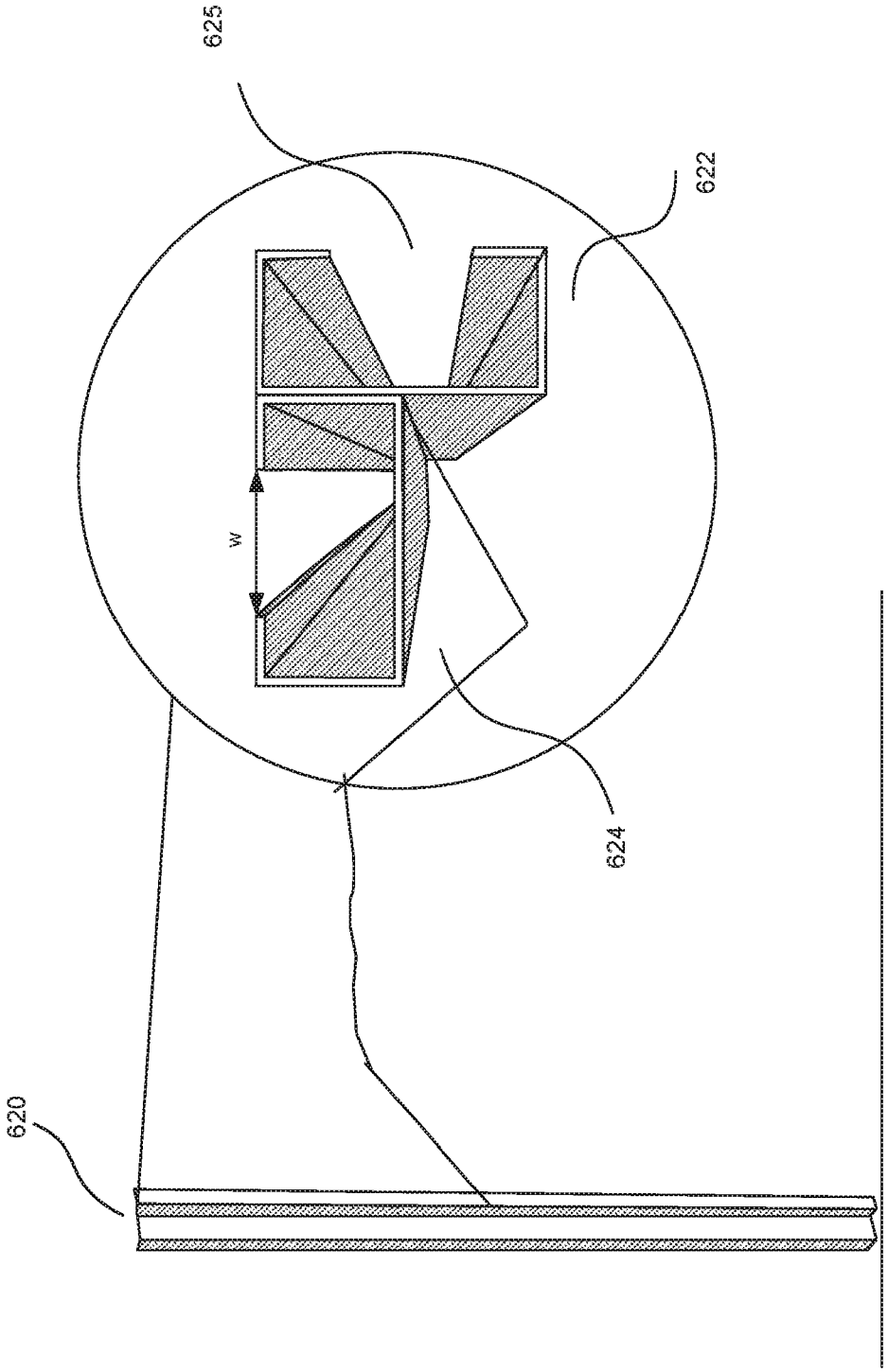


FIG. 6

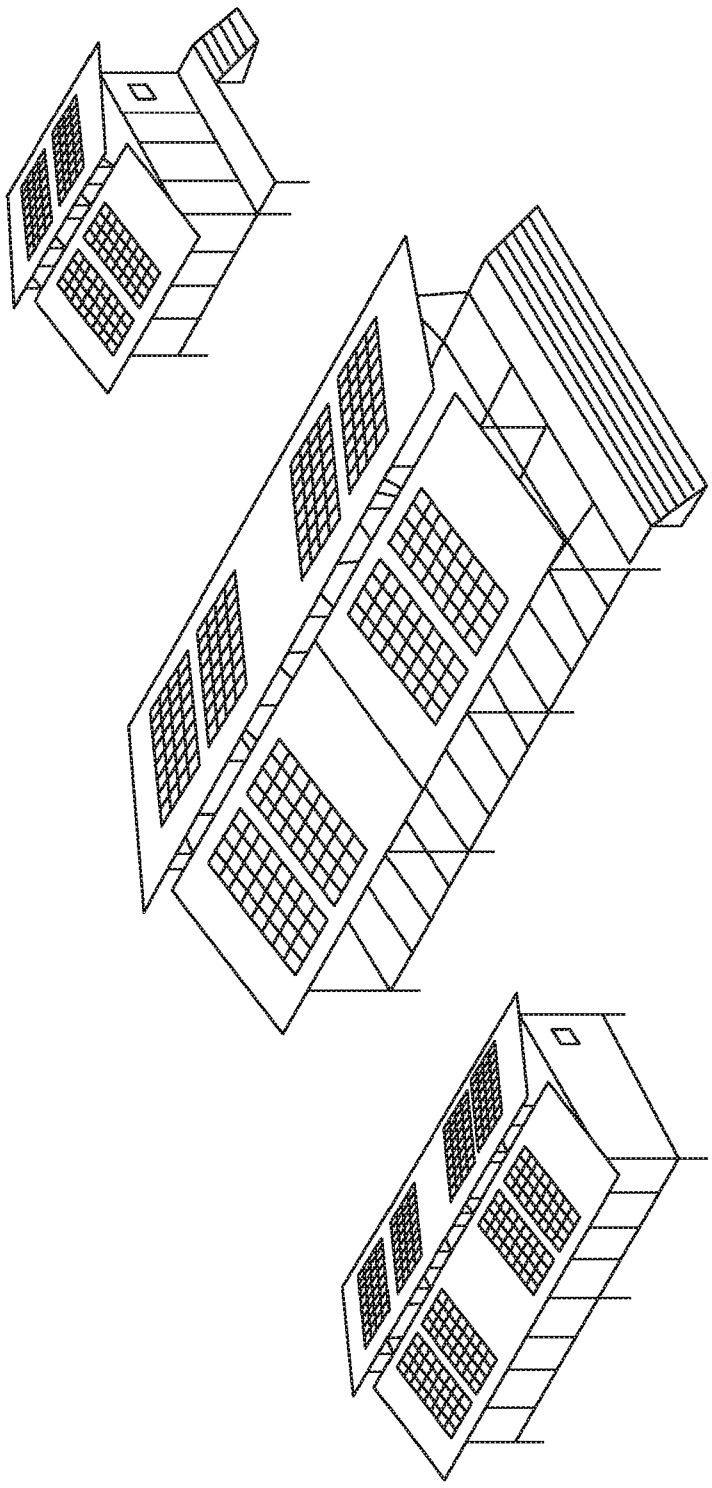


FIG. 7

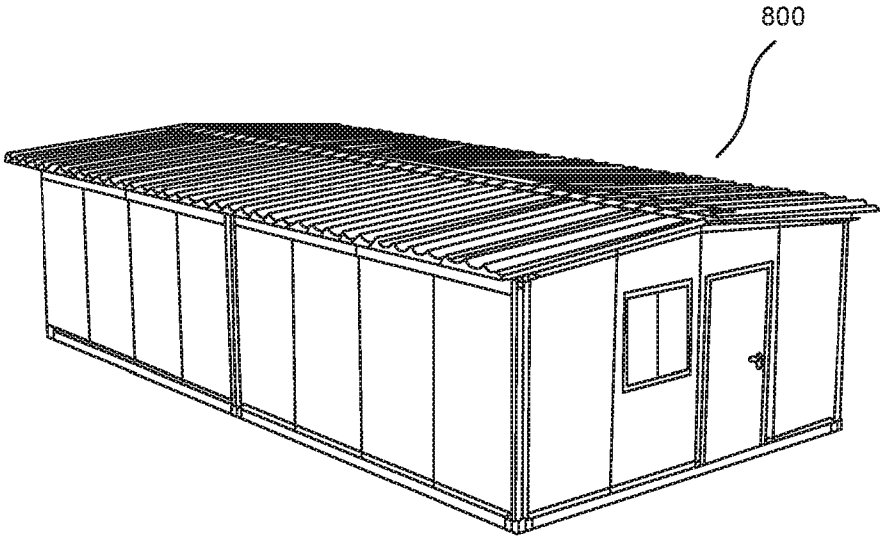


FIG. 8A

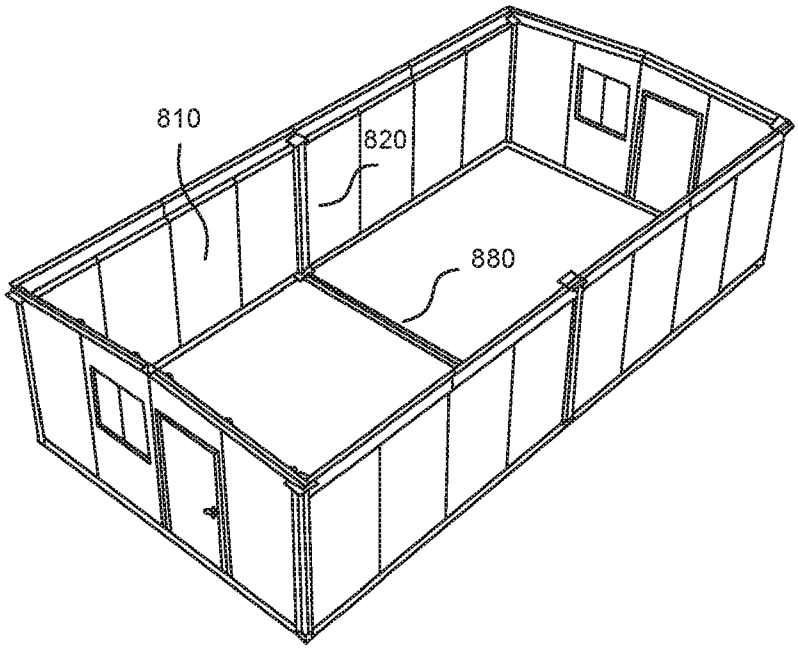


FIG. 8B

FIG. 8

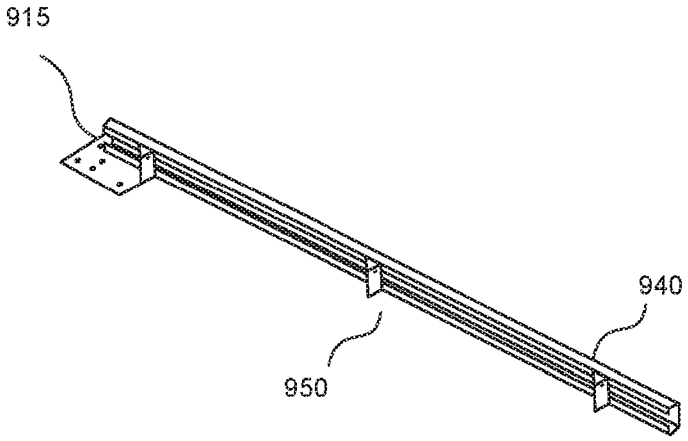


FIG. 9A

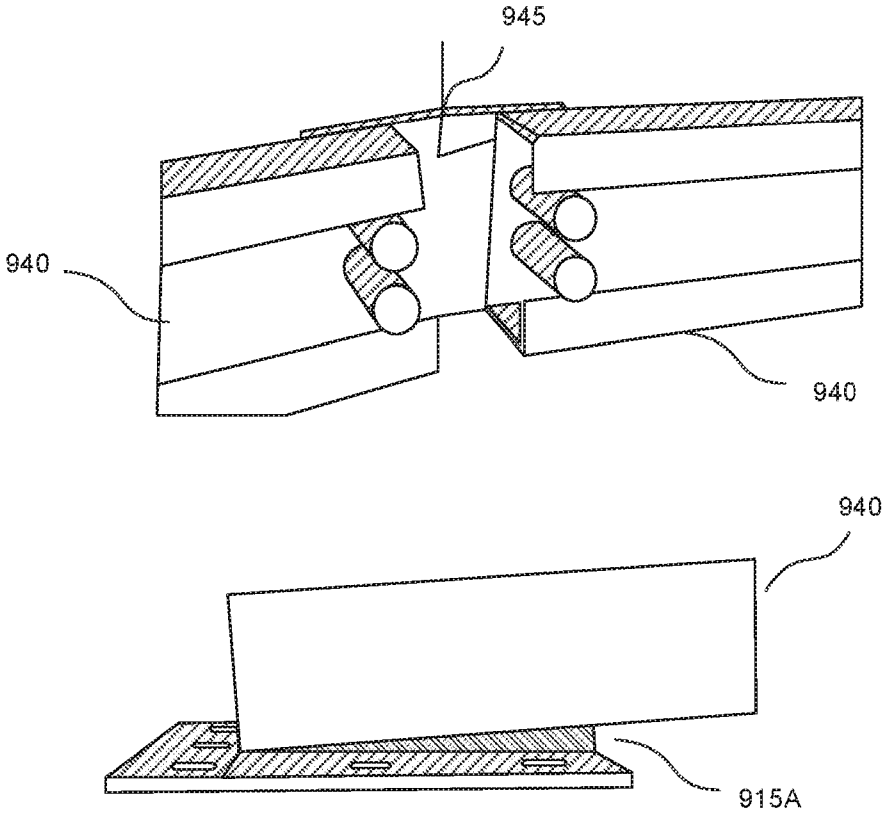


FIG. 9B

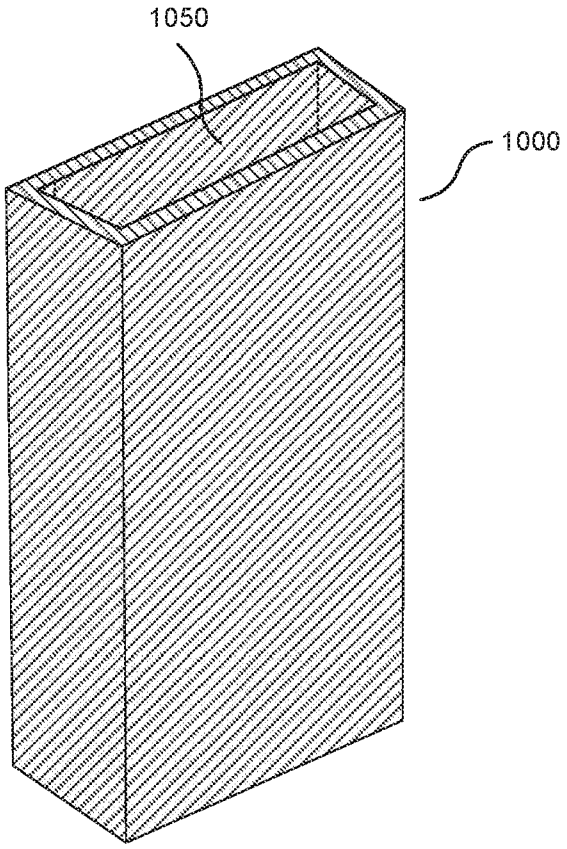


FIG. 10

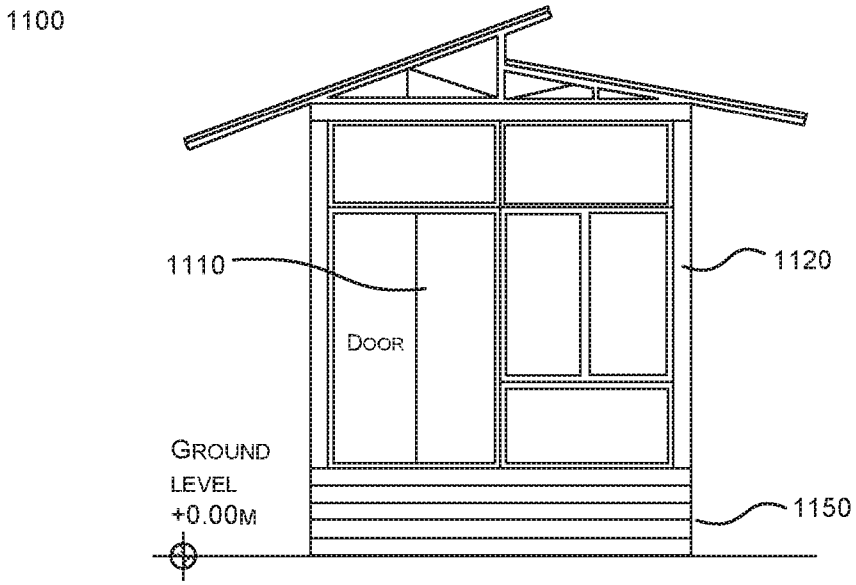


Fig. 11A

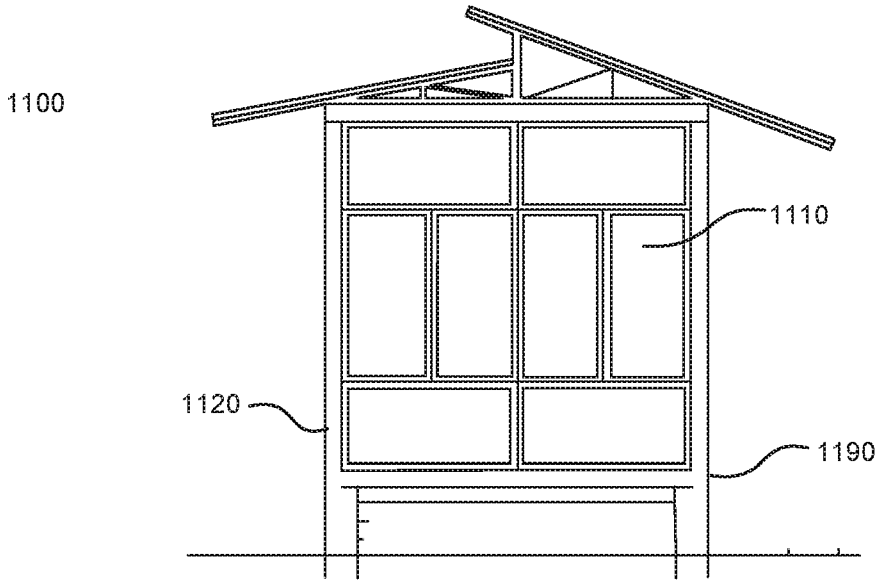


Fig. 11B

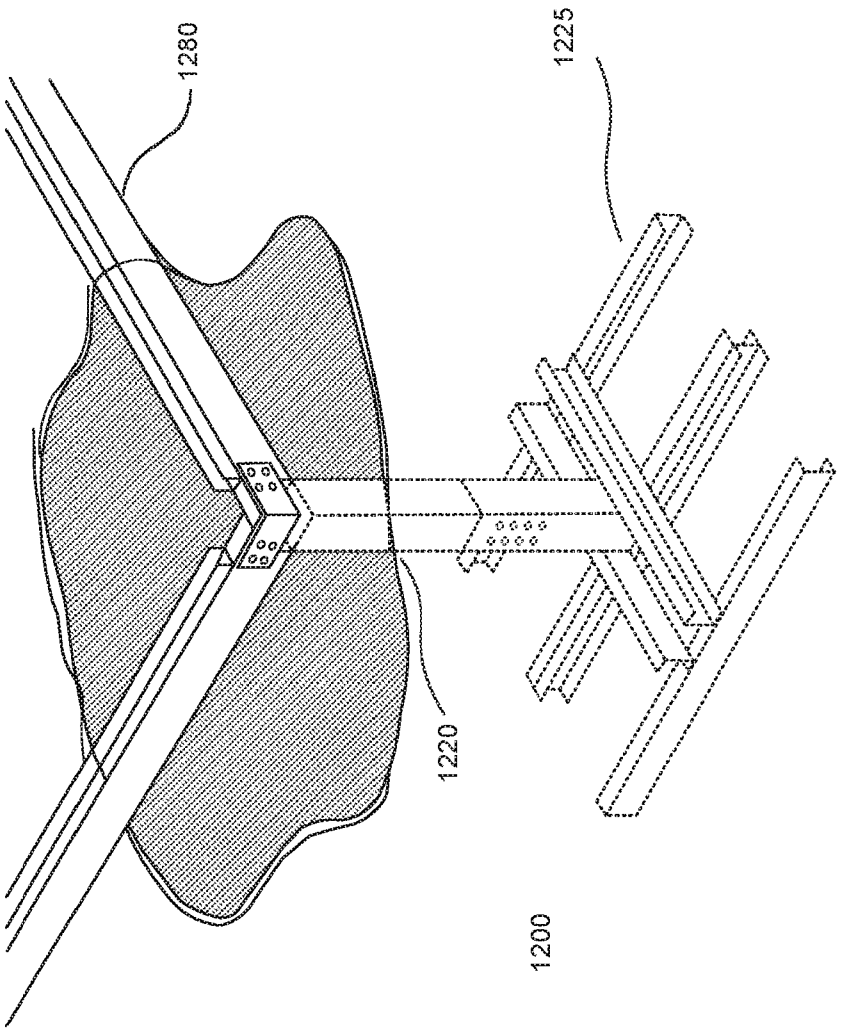


FIG. 12

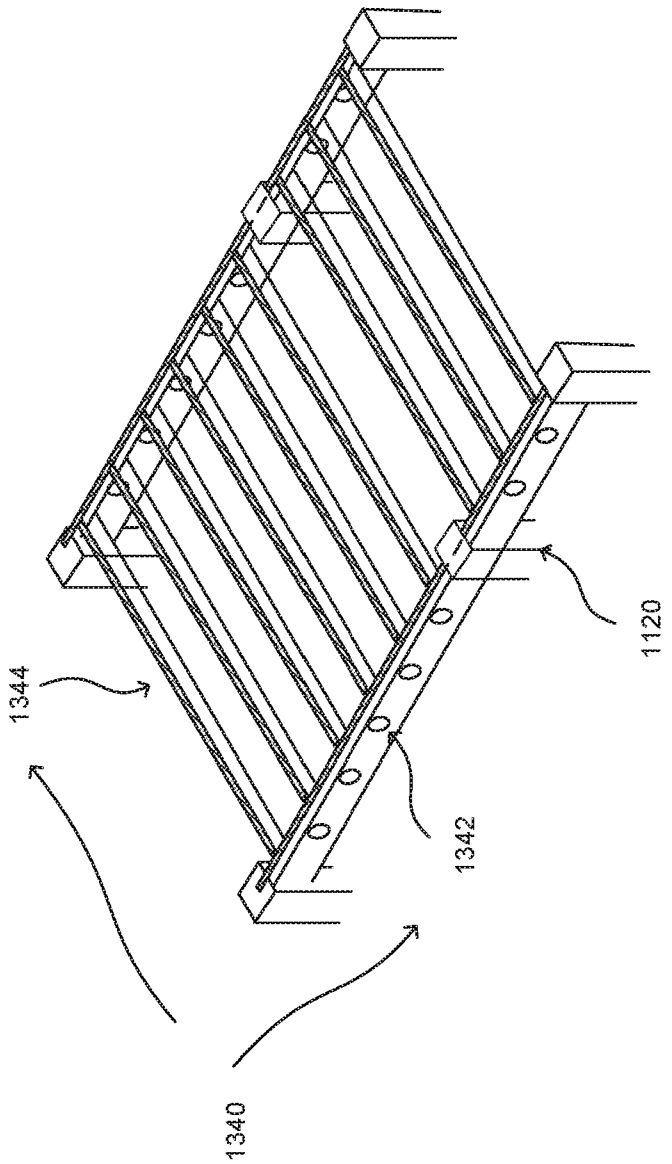


FIG. 13

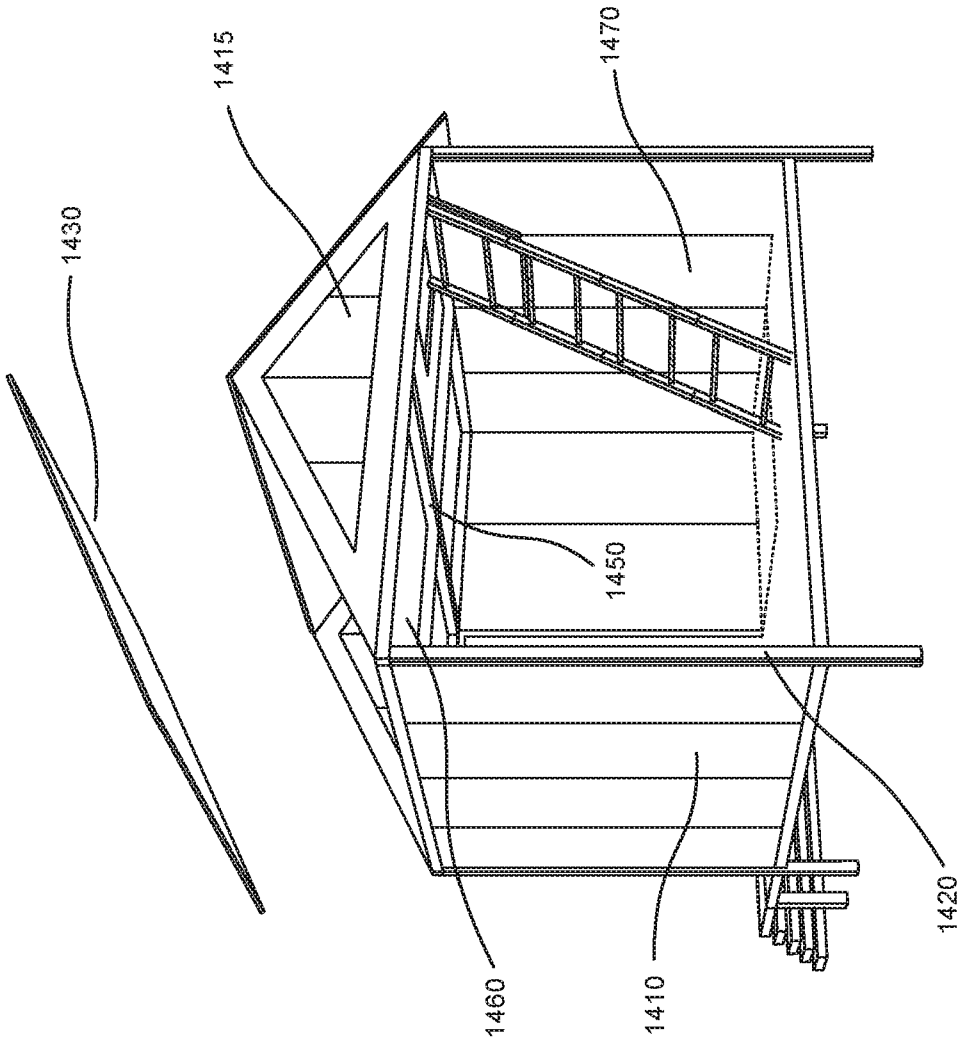


FIG. 14

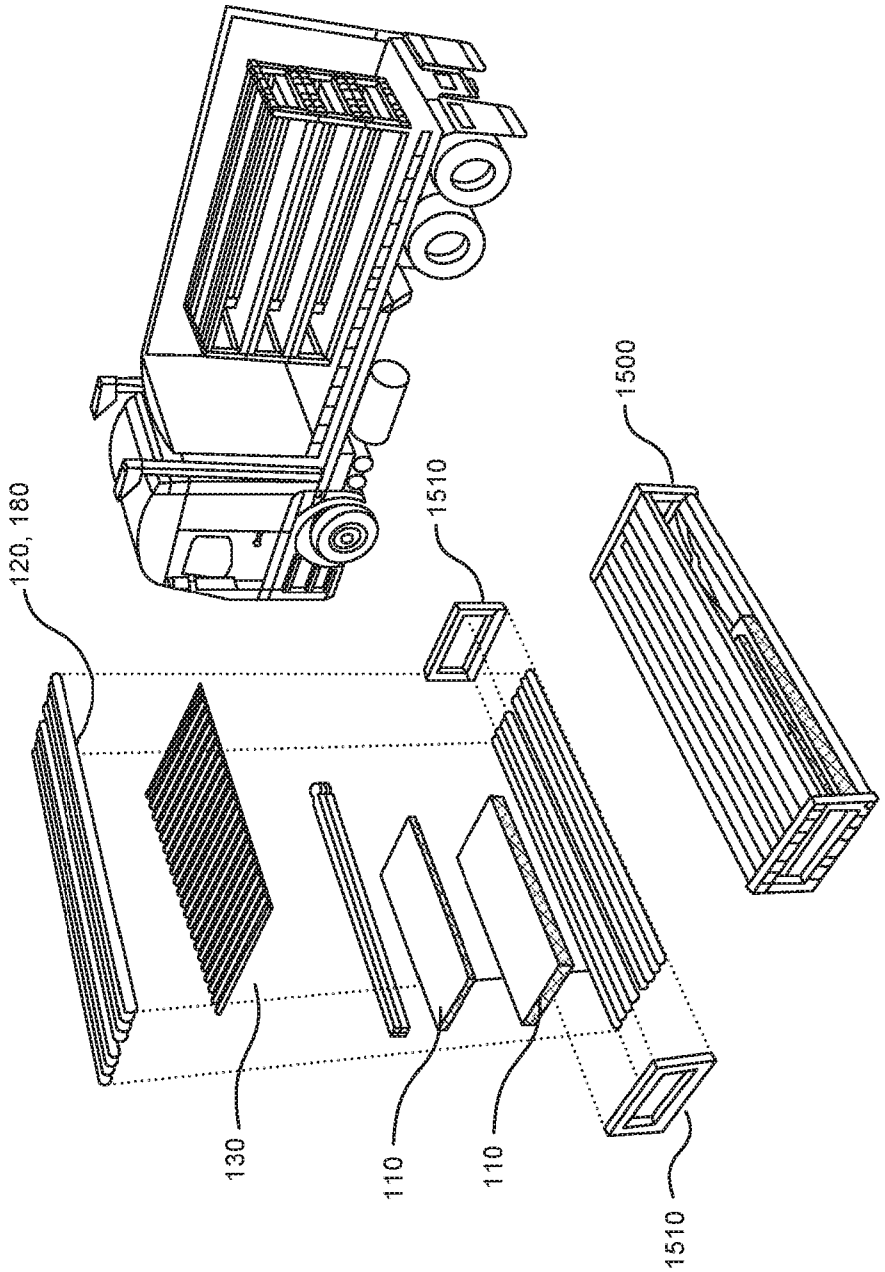


FIG. 15

A MODULAR SHELTER

Field of invention

[0001] The present invention relates generally to modular building structures and systems. In particular, the present invention relates to modular shelters and apparatus for the assembly of modular shelters.

Background

[0002] In the event of natural disaster or civil conflict, people may be forcibly displaced. Where people are suddenly displaced, temporary shelters, such as tents, are often used to provide temporary housing. Whilst these forms of temporary housing provide a much-needed temporary shelter to the forcibly displaced, due to their nature, these temporary shelters are not able to support necessary sanitation requirements to prevent the spread of illness. Additionally, these temporary shelters are often crowded.

[0003] The embodiments described below are not limited to implementations which solve any or all of the disadvantages of known temporary shelters.

Summary

[0004] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0005] According to a first aspect of the invention, there is provided a kit of parts for a modular shelter as set out in claim 1. The modular nature of the components in the kit of parts enables different modular shelter configurations to be assembled. Additionally, the modular nature of the components in the kit of parts enables the modular shelter to be assembled without specialist equipment or training. According to a second aspect of the invention, there is provided a modular shelter as set out in claim 26.

[0006] The preferred features may be combined as appropriate, as would be apparent to a skilled person, and may be combined with any of the aspects of the invention.

Brief Description of the Drawings

[0007] Embodiments of the invention will be described, by way of example, with reference to the following drawings, in which:

[0008] FIG. 1 shows a diagram of an assembled modular shelter.

[0009] FIG. 2 shows an exploded view of a modular shelter.

[0010] FIG. 3 shows a wall made of four wall panels.

[0011] FIG. 4 shows two examples of vertical support beams.

[0012] FIG. 5 shows an example of a floor beam.

[0013] FIG. 6 shows a c-column vertical support beam.

[0014] FIG. 7 shows different shelter configurations.

[0015] FIGS. 8A and 8B show a shelter configuration.

[0016] FIGS. 9A and 9B show a rafter.

[0017] FIG. 10 shows a wall panel comprising a cavity.

[0018] FIGS. 11A and 11B show two different elevated shelter configurations.

[0019] FIG. 12 shows stabilisation members.

[0020] FIG. 13 shows horizontal support members.

[0021] FIG. 14 shows a multi-level shelter.

[0022] FIG. 15 shows deconstructed shelter for transport.

[0023] Common reference numerals are used throughout the figures to indicate similar features.

Detailed Description

[0024] Embodiments of the present invention are described below by way of example only. These examples represent the best ways of putting the invention into practice that are currently known to the Applicant although they are not the only ways in which this could be achieved. The description sets forth the functions of the example and the

sequence of steps for constructing and operating the example. However, the same or equivalent functions and sequences may be accomplished by different examples.

[0025] Described herein is an improved modular shelter. The structures described below provide a temporary shelter which may provide more sanitary conditions and/or which may be more quickly deployed than known temporary shelters due to their light-weight and modular nature. The modular shelters described below are customisable and expandable so as to cater to the required situation. The components of a modular shelter described herein are of a dimension which can be easily carried by two to three people. Various example shelters are described below and it will be appreciated that features of the different examples described below may be combined to form other examples.

[0026] FIG. 1 shows a modular shelter 100 in accordance with an embodiment of the present invention. In FIG. 2, an exploded view of the modular shelter illustrated in FIG. 1 is shown. In this particular embodiment, modular shelter 100 includes a plurality of wall panels 110 and a plurality of vertical support beams 120. The plurality of wall panels 110 and vertical support beams 120 assemble to provide modular shelter 100. The wall panels 110 assemble to create a front wall 112, a first side wall 114, a second side wall 116 and a rear wall 118 with each wall being formed from a plurality of panels (e.g. two panels or more than two panels). In FIG. 2, a first side of front wall 112 is removably secured to a first side of first side wall 114 via first vertical support beam 122, a second side of first side wall 114 is removably secured to a first side of rear side wall 118 via second vertical support beam 124, a second side of rear side wall is removably secured to a first side of second side wall 116 via third vertical support beam 126 and a second side of second side wall 116 is removably secured to a second side of front wall 112 via fourth vertical support beam 128.

[0027] In FIG. 3, an example of a wall, such as front wall 112, is shown. Similarly to FIG. 2, front wall 112 comprises four wall panels 110. In this example, a rectangular wall panel 110 is shown. A rectangular wall panel 110 comprises two opposing sides 111a and 111b, one at each end of the wall panel 110, and between which runs an inner face of the wall panel 110 and an outer face 113 of the wall panel 110. The outer face of the wall panel 113 is configured to be an exterior face of the shelter 100 when assembled and the inner face of the wall panel is opposite the outer face of the wall panel 113 (and hence is not visible in FIG. 3) and is configured to face an interior of the shelter 100 once assembled.

[0028] A wall panel 110 in accordance with the embodiment of FIG. 3 further comprises an upper side 119, a lower side 117 opposite the upper side 119. Once shelter 100 is

assembled, the upper side 119 is configured to face the roof of the shelter 100 and the lower side 117 is configured to face the ground on which the shelter 100 lies.

[0029] Whilst the wall panels 110 shown in the drawings are illustrated to be rectangular in shape, it is to be interpreted that the wall panels 110 may take other polyhedral forms which together may be assembled to form walls of a shelter 100.

[0030] As shown in FIGS. 1 and 2, some wall panels 110 may comprise a window and/or door. In some embodiments, rather than having a door on a wall panel 110, a modular shelter may instead be provided with an opening created by an absence of one or more wall panels in a given front 112, rear 118 or side wall 114, 116 or by an aperture in one or more of the wall panels.

[0031] Each of the plurality of wall panels 110 comprise one or more connecting portions 115 located along two opposing sides of the wall panel 110, as shown in FIG. 3. For example, where an inner and outer face of wall panel 110 is rectangular, wall panel 110 includes one or more connecting portions located along a first side 111a and along a second side 111b. In some embodiments, one side 111a of the wall panel 110 may include one or more connecting portions 115 of a first type 115a and the other side 111b of wall panel 110 may include one or more connecting portions 115 of a second type 115b, such that when connecting portions 115a and 115b engage, the respective connecting portions 115a and 115b are configured to be removably secured together. FIG. 3 illustrates a plan view of the wall 112 from viewpoint A. Looking from the viewpoint A, connecting portions 115a and 115b can be seen. In this example, a side 111b of a first wall panel 110 comprises connecting portions 115a which enable the first wall panel 110 to engage with a second wall panel 110 via connecting portions 115b located along its side 111a.

[0032] A connecting portion of a first type 115a can be a female connecting portion and a connecting portion of a second type 115b can be a male connecting portion such that when a connecting portion of the first type 115a is brought into contact with a connecting portion of the second type 115b, they are configured to releasably engage with each other. An example of a connecting portion which may be used in the embodiments described above is a female-male camlock system.

[0033] The connecting portions 115 may be embedded within a side 111a, 111b of a wall panel 110 as shown in FIG. 3 or may be provided via an attachment which is configured be secured onto a side 111a, 111b of a wall panel 110.

[0034] Advantageously, having connecting portions 115 located on each side 111a, 111b of a wall panel 110 permits a given wall panel 110 to engage with any other wall panel 110.

[0035] In some implementations, one or more connecting portions are located at one or more vertical positions along a side of a wall panel, wherein a vertical position is defined as a position at a particular height (above the floor level) on the side of the wall panel 110 when shelter 100 is assembled. In some implementations, a connecting portion 115 in accordance with the embodiments described herein is located along substantially a whole side of a wall panel 110. The provision of a connecting portion along substantially a whole side of a wall panel provides a benefit in that a given wall panel 110 may be more easily engaged with another wall panel 110 without the need to align a given connecting portion 115. This may, therefore, reduce the assembly time for the shelter and/or enable assembly by less trained or untrained personnel.

[0036] One or more connecting portions 115 of a wall panel 110 are also configured to engage with one or more connecting portions of vertical support beam 120. Advantageously, this feature has the effect in that design constraints of a modular shelter 100 are reduced whilst keeping the number of components required to a minimum. For example, to achieve different shelter 100 configurations, it is not necessary to provide a large surplus of different types of wall panels 110 as the wall panels 110 are multifunctional (e.g. they can be connected to another wall panel or a vertical support beam).

[0037] FIG. 4 illustrates two examples of a vertical support beam 120. In FIG. 4, a first vertical support beam 420a having a cuboidal shape is shown. A second vertical support beam 420b having a cylindrical shape is also shown. Each of the vertical support beams 420a,b comprise a plurality of connecting portions 425, each of the plurality of connecting portions 425 located so as to face a different direction from another connecting portion 425. Vertical support beam 420a shows a vertical support beam where the plurality of connecting portions 425 are located at right angles to each other, with each connecting portion 425 being located on a different face of the cuboidal-shaped vertical support beam 420a. In this example, the connecting portions 425 are located along the whole length of the vertical support beam 420a, however, the connecting portions 425 may also be located along a portion of the length of a vertical support beam 420a. Vertical support beam 420b shows a vertical support beam where the plurality of connecting portions 425 are located at different radial positions around a vertical axis *a* of the vertical support beam 420b. Where a vertical support beam 420b is cylindrical, the vertical support beam may comprise

a plurality of connecting portions 425 located along a plurality of positions along a circumference of vertical support beam 420b. The plurality of connecting portions 425 may all be located at a given height along the axis *a* of the vertical support beam 420b, or may be located at different heights along the axis *a* of the vertical support beam 420b, or may be located along the whole length of the vertical support beam 420b.

[0038] Each of the plurality of connecting portions 425 of the vertical support beam 420a,b are configured to engage with one or more connecting portions 115 of a wall panel 110. In general, a vertical beam 120 may be cylindrical or may be a substantially elongated polyhedral shape, such as a cuboid. Additionally, vertical beam 120 may be provided with any of the connecting portions 425 described herein. For example, vertical beam may be provided with a plurality of connecting portions 425 located along substantially the whole length of a surface of vertical support beam 120, with a plurality of connecting portions 425 located at various heights along an axis *a* of a vertical support beam 120 or any combination thereof.

[0039] In other embodiments, a given wall panel 110 may comprise one or more connecting portions 115 which are especially configured for attachment to one or more connecting portions 425 of a vertical support beam 120 on one side of the wall panel 110. For example, a wall panel 110 may comprise one or more connecting portions 115 configured to engage with one or more connecting portions 425 of a vertical support beam 120. Where a wall panel 110 is especially configured for connection with a vertical support beam 120, only one side 111a of a given wall panel 110 may comprise one or more connecting portions 115 for engagement with one or more connecting portions 425 of a vertical support beam 120 and the other side 111b of the wall panel 110 may comprise one or more connecting portions 115 for engagement with a connecting portion 115 of another wall panel. In this particular embodiment, the modular shelter 100 is provided with a plurality of types of wall panels 110. A first type of wall panel 110 comprises connecting portions 115 on each side, wherein a first side 111a of the wall panel 110 comprises one or more connecting portions 115 configured to engage with connecting portions 115 of another wall panel, and a second side of the wall panel 110 comprises one or more connecting portions 115 configured to engage with one or more connecting portions 425 of a vertical support beam 120. A second type of wall panel 110 comprises wall panels 110 where the first side 111a and second side 111b of the wall panels 110 each comprise one or more connecting portions 115 configured to engage with connecting portions 115 of another wall panel 110.

[0040] As illustrated in FIGS. 1 and 2, in some embodiments, the shelter 100 may comprise a plurality of floor beams 180 as shown in FIG. 5. The floor beams 180 are configured to engage with the plurality of wall panels 110. For example, the floor beams 180 may comprise a channel 185 in which one or more wall panels 110 may be received. Additionally, the floor beams 180 may comprise connecting portions 182 which include one or more holes 184. The connecting portions 182 of the floor beams 180 enable the floor beams 180 to be connected in a plurality of configurations. For example, two floor beams 182 may be attached in parallel via their respective connection portions 182 to create an elongated floor beam 180. Equally, two floor beams 180 may be connected at an angle to each other using the respective connecting portions 182. The connecting portions 182 may also be used as a means to which a vertical support beam 120 may be secured. Advantageously, a floor beam 180 provides additional rigidity and support to the wall panel 110 assembly.

[0041] Vertical support beam 120 as illustrated in FIGS. 1 and 2 may also be used as a floor beam 180. Advantageously, having a single beam which is configured to be a vertical support beam 120 or a floor beam 180 improves the modularity of the modular shelter in that fewer bespoke parts are required.

[0042] FIG. 6 shows another example of a vertical support beam. Vertical support beam 620 comprises a plurality of c-columns 622, 624. The vertical support beam 620 and/or the c-columns 622, 624 as shown in FIG. 6, for example, may also be configured to provide the floor beams 180. In FIG. 6, it is shown that the connecting portions 625 are configured to engage with a wall panel 110 by receiving a connecting portion 115. For example, a width *w* of connecting portion 625 in c-column 622, 624 may be substantially the same as a width of a wall panel 110. Where the width *w* of the connecting portion 625 substantially matches the width of a wall panel 110, the wall panel 110 is configured to engage with the c-column 622, 624 through insertion of a side 111a, 111b of the wall panel 110 into the connection portion 625.

[0043] The provisions of c-columns 622, 624 to create the vertical support beam 620 provides an advantage in that it may be easily manufactured and customisable. For example, through attaching a plurality of c-columns together, it is more simple to manufacture a vertical support beam 620 which has a plurality of connecting portions 622, 624 facing in different directions, thereby enabling wall panels 110 to be attached to the vertical support beam 620 in a greater number of orientations.

[0044] Whilst FIG. 6 shows a vertical support beam 620 comprises c-columns 622, 624 in which the connecting portions 425 are configured to receive one or more connecting portions 115 of a wall panel 110, it will be understood by the skilled person that alternate arrangements may be provided. For example, the c-columns 622, 624 may comprise connecting portions 425 which extend outwards (i.e. protrude) from a face of the c-column so as to be received by a wall portion 110 (e.g. similar to the protrusions shown on vertical support beam 420b in FIG. 4).

[0045] FIG. 6 illustrates two c-columns 622 and 624, however, it is possible to provide a greater number of c-columns 622, 624 (e.g. three c-columns or four c-columns). The c-columns 622, 624 may be joined in a number of different ways which will be apparent to the skilled person. For example, the c-columns may be bolted, welded or otherwise secured together. Advantageously, providing a greater number of c-columns 622, 624 permits a greater number of configurations in which wall panels 110 may be arranged to create a modular shelter 100.

[0046] Additionally, where a side 111a, 111b of wall panel 110 itself is not configured to engage with a connecting portion 425 of the vertical support beam 120, such as with connecting portions 425, through providing a greater number of c-columns 622, 624, it is possible to provide alternate connecting means 425. For example, where a wall panel 110 comprises one side with one or more connecting portions of a first type 115a and one side with one or more connecting portions of a second type 115b, the vertical support beam 625 may comprise one or more c-columns 622, 624 configured to engage with the one or more connecting portions of a first type 115a and one or more c-columns 622, 624 configured to engage with one or more connecting portions of a second type 115b. This provides more flexibility in assembly through selection of appropriate vertical support beams dependent upon the available wall panels.

[0047] As a result of the modularity of the wall panels 110, the vertical support beams 120 and the roof panels 130, and as a result of their respective connecting portions 115, 625, it is possible to create various different shelter configurations such as those illustrated in FIG. 7. As shown in FIG. 7, some shelter configurations are smaller and others are larger. Some of the examples in FIG. 7 comprise a single modular shelter 100 (as shown in FIG. 1) whilst others are formed from multiple modular shelters 100 (e.g. two, three or six of the modular shelters 100 joined together to form a single structure). Whilst FIGS. 1 and 2 illustrate a shelter 100 having four walls, a shelter 100 may be provided with a larger or lesser number of walls. Additionally, a shelter 100 may be provided as a larger structure

which may be sub-divided into smaller compartments through using one or more wall panels 110.

[0048] Referring now to FIGS. 8A and 8B, two views are shown of a shelter in a configuration different to that of FIG. 1. The shelter 800 is provided with a plurality of wall panels 810 and vertical support columns 820. The shelter 800 may also be provided with a plurality of floor beams 880 as shown in FIG. 8B. In some implementations, the shelter 800 may further be provided with a bracket which enables floor beams 880 to be secured to each other at various lengths along a given floor beam 880.

[0049] Advantageously, the modular nature of the wall panels 810 and vertical support columns 820 enable the shelter 800 to be modified according to individual needs. As can be seen in FIGS. 8A and 8B, the shelter 800 is of a greater length with respect to the shelter 100 illustrated in FIG. 1, thereby providing a greater living capacity than a smaller shelter 100. Moreover, through the modular nature of the wall panels 810, the vertical support beams 820 and optionally the floor beams 880, it is possible to sub-divide the larger shelter 800 into smaller compartments.

[0050] As illustrated in FIGS. 1 and 2, modular shelter 100 further comprises roof panels 130 which permit the assembly of a roof. Roof panels 130 may be attached to the wall panel structure in a number of different ways. In this particular example, the roof panels 130 are attached to the wall panel structure using a series of rafters 140 and purlins 150. In one example, purlins 150 are configured to overlay rafters 140. In another example, purlins 150 are configured to attach to rafters 140 on an inner surface of rafters 140 via one or more connecting means 850 as illustrated in FIG. 9A. Roof panels 130 may each comprise a series of portions through which roof panels 130 may be secured to the wall panel structure via rafters 140 and/or purlins 150. Where purlins 150 are used, the roof panels 130 may advantageously be slid onto the roofing structure provided by the purlins 150. Where a roofing structure is provided by the purlins 150, it is possible to slide roof panels 130 such that the roof panels 130 overlay the purlins 150 and may rest on the roofing structure without having to be promptly secured into place. Advantageously, the time required to be at an elevated height above the ground in order to attach the roof panels 130 is reduced as the roof panels 130 may be secured to the roofing structure, and, therefore, the wall panel structure following the placement of all roof panels 130 required to assemble the roof. In turn, this reduces the likelihood of injury when assembling the shelter 100.

[0051] As an example, roof panels 130 may comprise a series of holes through which a connecting means may be used to attach roof panels 130 to rafters 140 and/or purlins 150. In one example, a connecting means may comprise nails, screws, dowels and the like. In another example, where purlins 150 are present, one or more j-hooks may be used to join roof panels 130 to rafters 140 via purlins 150. In this specific example, the one or more j-hooks have a curved portion which at least matches a width of a purlin 150. When assembled, a top portion of the j-hook is configured to be secured to at least the roof panel 130 via one or the one or more holes in the roof panel 130. For example, a top portion of the j-hook may comprise threading such that nut or other fixing means may be used to secure the j-hook to the roof panel 130 at a variable height along the top portion of the j-hook. The curved portion of the j-hook may then be placed into contact with a purlin 150 such that an interior surface of the j-hook is placed into contact with an exterior surface of the purlin 150. The fixing means at the top portion of the j-hook may then be adjusted to a point where tension between the j-hook, purlin 150 and roof panel 130 is sufficient to hold roof panel in place. For example, this may be achieved through tightening a nut placed at the top portion of the j-hook.

[0052] Advantageously, use of a j-hook permits rapid attachment and detachment of roof panels 130 from the wall panel structure. Through a slight release of the fixing means, such as a nut, the tension between the roof panel 130 and purlin 150 is released and the roof panel may be quickly removed from the roofing structure of the modular shelter 100.

[0053] As described herein, rafters 940 may comprise substantially flat members as shown in FIG. 9A. For example, a c-column such as that illustrated in FIG. 3 may be used as a rafter 940. In some embodiments, a rafter 940 may be secured to vertical support beam 120 such as that illustrated in FIGS. 1 and 2. A rafter 940 may comprise one or more holes through which the rafter 940 may be secured to a vertical support beam 120 via a fixing means such a screw, bolt etc. In another example, a rafter beam connecting means 915 may also be provided, wherein a rafter beam connecting means 915 is configured to attach to an end of a rafter 940, or forms an end of a rafter 940, to enable the rafter 940 to connect to a vertical support beam 120. To facilitate such a connection between the vertical support beam 120 and the rafter beam connecting means 915, the vertical support beam 120 may be further provided with means configured to cooperate with the rafter beam connecting means 915. For example, the means on the vertical support beam may be substantially the same as the rafter beam connecting means 915 such that the vertical support beam 120 may be joined to the rafter beam connecting means 915 using one or more fixing means (screws, bolts etc.). In another example, the

means of the vertical support beam 120 and the rafter beam connecting means 915 may be substantially the same, with one of the means comprising a male connecting portion and one of the means comprising a female connecting portion, such that the respective means are able to engage with each other.

[0054] In addition to, or instead of, connecting a rafter 940 to a vertical support beam 120, the modular shelter may be provided with a plurality of top-side beams 170 as illustrated in FIG. 1 and the plurality of rafters 940 may be configured to be secured to the plurality of top-side beams 170. A top-side beam 170 is configured to engage with an upper side 119 of wall panels 110. For example, wall panel 110 may be further provided with a connecting means for engaging with the top-side beam. Advantageously, the roof may be more easily secured to the wall panels 110, which improves the ease with which the shelter 100 may be assembled. Moreover, this increases the speed and safety in the assembly of the shelters as the shelters may be assembled without any specialist training. Therefore, the people who will subsequently occupy the shelter may assemble their own shelter.

[0055] Where it is desirable to have a sloped roof portion as illustrated in FIG. 1, one or more wall panels 110 may be provided with a sloped upper side. In some embodiments, the one or more rafters 940 may be directly secured to the upper side 119 of the wall portion 110 or to the top-side beam 170. In order to accommodate the sloped portion of the modular shelter 100, and to provide additional support to the plurality of rafters 940, the modular shelter may additionally be provided with a rafter connecting means 945. The incline of the rafter connecting means 945 may be different depending on the incline of roof desired.

[0056] Where the roof has a sloped portion, the rafter beam connecting means 915 may be provided with a sloped portion 915a as shown in FIG. 8B. This facilitates the connection between a rafter 940 and vertical support beam 120.

[0057] It is not necessary to provide one or more wall panels 110 with a sloping upper side. Instead, a sloping roof portion may be achieved through using one or more top-side beams 170 which have a tapered width to create a sloping portion.

[0058] Advantageously, through the use of rafters 940, tapered top-side beams 170, inclined rafter beam connecting means 915 and rafter connecting means 945, it is possible to provide a single type of wall panels which may be used in conjunction with both the flat

and inclined portion of the roof of the modular shelter 100 in a plurality of different configurations.

[0059] Where roof panels 130 are used to assemble a roof, it is advantageous to provide further means for preventing the infiltration of water through the roof assembly. Therefore, in some embodiments, mid-ridge panels 160 as shown in FIG. 1 are provided. Mid-ridge panels 160 may be used in situations where there is a smaller overlap between adjacent roof panels 130. For example, where a sloping roof is desirable, due to the change in directionality of the roof panels 130 at the point of changing slope, there may be a gap between the adjacent roof panels. In this example, it is especially advantageous to provide one or more mid-ridge panels 160 to overlap with the gap. In some embodiments, one or more mid-ridge panels are provided both above and below a portion of the roof panels 130.

[0060] Where mid-ridge panels 160 are provided, these may be secured to the roof panels using the fixing means described above. For example, where a j-hook is used, the upper end of the j-hook may be configured to extend through the one or more mid-ridge panels 160 and the roof panel 130.

[0061] In some implementations, the shelter 100 does not comprise any flooring. In other embodiments, the shelter 100 may further comprise one or more flooring members 190 as shown in FIG. 1. For example, a flooring member 190 may comprise one or more flexible flooring panels which may be rolled up for storage. Advantageously, where a single flexible flooring panel is used, the flexible flooring panel is more easily transported and more easily integrated into shelter 100 by an end user compared to use of rigid floor panels.

[0062] Where the wall panels 110 engage with each other and with the vertical support members 120 to define a continuous perimeter, this continuous perimeter, the roofing assembly and the flooring members may define an enclosed structure when assembled.

[0063] The one or more flooring members 190 may instead, or in addition to flexible flooring panels, comprise rigid flooring panels. Each rigid flooring panel comprises one or more connecting portions which enable the flooring panels to engage with connecting portions of other flooring panels, similarly to those described above in respect of the wall panels 110. The one or more connecting portions of the flooring panel may be configured to further engage with one or more connecting portions of a wall panel 110 which are located towards the lower side 117 wall panel 110. Alternatively, the floor panels may

comprise one or more connecting portions configured to engage with one or more connecting portions 185 of a floor beam 180 or with one or more connecting portions located on an interior surface of floor beam 180, wherein the interior surface of the floor beam is the surface which faces towards an interior of shelter 100 when assembled.

[0064] Whilst components are described as being removably secured to other components, it is possible to use permanent securing means. In addition to, or instead of, the use of connecting means such as connecting portions 115, 125, it is possible to use permanent securing means such as glue and the like. In various examples, the components may be secured to each other without the need for specialist tools and/or without the need for powered tools (e.g. using a spanner and/or screwdriver or similar hand tools only).

[0065] The wall panels 1010 may be solid. However, the wall panels 1010 may instead comprise a cavity 1050 as shown in FIG. 10. For example, the cavity 1050 may occupy substantially whole or part of a wall panel 1010. Say that the connecting portions have been left out for ease of view or something like that.

[0066] Advantageously, where the wall panels 1010 comprise a cavity 1050, the wall panels 910 are lighter in weight and may be more easily transportable.

[0067] Where a wall panel 1010 comprises a cavity 1050, the cavity may have an opening through which the cavity 1050 may be accessed. Advantageously, accessing the cavity 1050 enables the cavity 1050 to be filled with a material different to that of the wall panel 1010. In warmer climates, the cavity 1050 may simply be filled with air, creating a temperature gradient through which heat may be dissipated. In cooler climates, the cavity 1050 may be filled with an insulating material, such as polyurethane foam (PUF). The climate in which a shelter 100 is intended to be deployed may be used to determine the material to be used to fill the cavity 1050 of a wall panel 1010. Being able to fill the cavity 1050 with different materials provides the additional advantage in that the shelter 100 is adaptable to different climates whilst also being light and easy to assemble as the step of filling the wall panels 1010 with the relevant material takes place during construction of the shelter 100. In various examples, the cavity may be fillable with a material sourced locally to the deployment.

[0068] Additionally, the material used to fill the cavity 1050 of the wall panel 1010 may be removed following use of the shelter 100, such that the wall panels may be repurposed for different environmental contexts.

[0069] Where a shelter 100 comprises one or more base members 190, the shelter 100 may be provided with means for elevating one or more base members 190 of the shelter 100 above ground level.

[0070] In FIGS. 11A and 11B, two examples of elevated shelters 1100 are shown. In FIG. 11A, one or more base members of 1190 of shelter 1100 may be elevated using elevation members 1150. In this example, shelter 1100 may be constructed on top of elevation members 1150 to elevate a base level of shelter 1100 above ground level. An elevated shelter 1100 may be attached to the elevation members 1150 via the vertical support beams. For example, the vertical support beams 120 may comprise additional connecting portions at their respective ends, as described above in relation to the rafter beam connecting means 915. Such connecting portions permit the vertical support beams 120 to be securely connected to the elevation members 1150 such that the shelter 1100 has greater structural integrity.

[0071] In FIG. 11B, the one or more base members 1190 are elevated above ground level via vertical support beams 1120. Wall panels 1110 are configured to engage with vertical support beams 1120 such that a lowermost point of wall panel 1110 is elevated at a height above the lowermost point of the vertical support beam 1120 and at a height above ground level. In this example, vertical support beam 1120 may be configured to extend downwardly into the ground when assembled. Advantageously, in this embodiment, a modular shelter 1000 may be adapted from being elevated above ground level to being at ground level depending on the depth with which the vertical support beam 1020 extends into the ground.

[0072] Alternatively, vertical support beams 1020 may be provided with additional stabilisation members 1200, as that shown in FIG. 12, to provide additional support from the ground. Additional stabilisation members 1200 are configured to engage with a base of the vertical support beam 120 such that the additional stabilisation member forms 1200 an extension of the vertical support beam 120. Alternatively, the stabilisation members may be configured to engage with a lower surface of floor beams 1280, where present. Referring to FIG. 12, it can be seen that the stabilisation member 1200 comprises a downwardly extending portion 1220. At least a substantial part of the downwardly extending portion 1220 is configured to extend below ground level. For example, a hole may be dug in the ground and the stabilisation member 1200 may be assembled therein. Once the stabilisation member is assembled within the ground, the hole may be filled such that the ground level upon which the shelter will be placed is substantially uniform. At a distal end of the stabilisation member 1200, there are one or more outwardly extending

supports 1225. As an example, FIG. 12 illustrates a plurality of outwardly extending supports 1225, all supports 1225 located in a plane perpendicular to the downwardly extending portion 1220. Whilst the one or more supports 1225 are illustrated as being located in a plane perpendicular to that of the downwardly extending portion, the skilled person will understand that the supports 1225 may extend at any angle to the downwardly extending portion 1220.

[0073] Having a stabilisation member 1200 that extends downwardly into the ground and which has one or more members 1225 which extend away from the downwardly extending has the advantage of providing additional support to shelters 100, 1100 to stabilise the shelter 100, 1100. This increases the safety of the shelter 100, 1100 whilst providing additional resistance to climatic conditions, such as high winds, heavy rains and/or earth tremors, which could destabilise the shelter 100, 1100. As an additional advantage, stabilisation members 1200 enable shelters 100, 1100 to be adapted to terrains which are unable to provide sufficient support for a shelter 100, 1100, for example, those with loose soil.

[0074] Further, in the example elevated shelter shown in FIG. 11B, horizontal support members 1340, such as those shown in FIG. 13, may be provided to support the one or more base members 1190. Referring to FIG. 13, a first one or more horizontal support members 1342 may be provided to extend between adjacent vertical support beams 1120 at a height above a base of the vertical support beams 1120. The first one or more horizontal support members 1340 may be configured to attach around, within or extend through the vertical support beams 1120. A second one or more horizontal support members 1344 may be configured to extend at an angle to a first horizontal support member 1342 and to attach to a second horizontal support member 1342. For example, the second one or more horizontal support member 1344 may extend perpendicularly between two parallel horizontal support members 1342. As another example, the second horizontal support members 1344 may extend at angles to a first horizontal support member 1342 to provide a crisscross structure.

[0075] The second one or more horizontal support members 1344 may be configured to secure to the first one or more horizontal support members in a number of ways. For example, as shown in FIG. 13, a second horizontal member 1344 may be configured to extend through a first horizontal support member 1342. Alternatively, a second horizontal support member 1344 may be configured to be secured to a first horizontal support member 1342 at an upper or lower surface of the first horizontal support member 1342,

for example, using a connection means such as a screw, bolt etc. The horizontal support members 1340 may be of two different types or may be of the same type.

[0076] As described above in respect of the roof panels 130 and the purlins 150, j-hooks may similarly be used to secure flooring members 190 to the horizontal support members 1340. This advantageously permits quick assembly and disassembly of the flooring members 190.

[0077] Advantageously, the horizontal support members 1140 may be provided by the purlins 150. That is, a member is configured to be either a purlin 150 or a horizontal support member 1140 depending on the required use, such that the respective members may be interchangeable.

[0078] In some embodiments, a shelter 100 may comprise a combination of both elevation members 1090 and horizontal support members 1140.

[0079] In some embodiments, the wall panel 1010 may be configured to insert into the vertical support beam 1020 as described above in respect of FIG. 4, 6. Advantageously, the wall panels 1020 and their associated connecting portions need not be modified based on whether the shelter 100 is an elevated shelter 1000.

[0080] Advantageously, providing an elevated shelter 1000 provides additional protection to inhabitants of shelter 1000, especially in the event of excess ground water, for example, in the event of flooding.

[0081] In some implementations, the shelter 100 may be provided with multiple levels of flooring. Referring to FIG. 14, the multi-level shelters may be constructed similarly to the shelters, 100, 800, 1100, depicted in FIGS. 1, 8 and 11. That is, the shelters are provided with a plurality of vertical support beams 1420, wall panels 1410 and roof panels 1430. An additional floor may then be provided under the pitch of the roof. For ease of access to the additional floor, a ladder 1470 may be provided with the shelter.

[0082] Where an additional floor is provided in the roof space, support beams 1450 similar to horizontal support members 1140 may be used to provide a surface over which one or more floor panels 1460 may be placed. In some examples, the floor panels 1460 comprise connecting portions which enable the floor panels to engage with each other, similarly to connecting portions 115 in the wall panels 110. In other examples, in addition to, or instead of, connecting portions, the floor panels 1460 may comprise means through

which a j-hook may be attached. The one or more j-hooks may then be used to attach the floor panels 1460 to the support beams 1450.

[0083] Advantageously, where an additional floor as shown in FIG. 14 is provided, the roof may be assembled from within the shelter 100 such that it is not necessary to climb on top of the roof structure. In turn, this reduces the equipment needed to assemble the shelter, increases the speed with which the shelter is assembled and reduces safety hazards associated with the assembly of the shelter.

[0084] Whilst not shown in FIG. 14, purlins 150, as depicted in FIG. 2, may be included in the roof structure. As described above, providing purlins enable roof panels 1430 to be slid onto the roof structure, facilitating assembly and removal. Where purlins are not provided in the multi-level shelters, the roof panels 1430 may be assembled from within the structure. The roof panels may be secured using fixing means known to the skilled person, such as bolts, screws and the like.

[0085] To accommodate for the additional floor, where the additional floor is constructed in the roof space, the angle of the roof may be designed such that there is sufficient space to accommodate a person (in a resting and/or a standing position). For example, where a rafter connecting means 945 is used, this may be provided at a steeper angle such that the rafters 940, and therefore the roof, are provided at a steeper angle. Where the roof is provided at a steeper angle, roof panels 1430 may be overlayed with each other similarly to how they would be overlayed in a standard shelter.

[0086] Advantageously, where an additional floor is provided in the roof space, this increases the capacity of the shelter as the shelter may accommodate more people. Additionally, providing an additional floor in the roof space provides additional security to its inhabitants. That is, the people living in the shelter may dwell at a higher level above the ground, which is especially advantageous in flood-prone areas.

[0087] Moreover, in the case of flooding, fire, or other scenarios where it is desirable to gain the attention of, for example, a helicopter or other emergency services personnel, it is possible to stand on the additional floor and remove one or more roof panels 1430. Advantageously, people living in precarious situations and in need of help may be more visible to emergency services and may take shelter at an elevation away from, for example, the excess ground water, until they are rescued. This further enables the rescue of occupants from the air in the event of a flood, for example, by helicopter.

[0088] Advantageously, the modular shelters described here may be deconstructed for easy transport. For example, due to the modular nature of the components used to build a shelter 100, the components of the shelter 100 occupy approximately 6% of the volume of the shelter 100 when constructed. This is achieved via the symmetry of the shelter, when constructed, about its centre when facing the front of the shelter, and via the modularity of the components used to construct the shelter.

[0089] Due to the compact nature of the components used to construct the shelter, more shelters may be transported compared to conventional building structures. This is especially advantageous in the event of displacement of people, due to social and/or environmental factors, as a large number of units may be quickly deployed. Moreover, as the shelters do not require specialist equipment or knowledge to assemble, the components to assemble the shelter may be transported in deconstructed form, thereby maximising the available space in a transport vehicle.

[0090] Referring to FIG. 15, an example is shown of how the components of the shelter may be packaged. The components of the shelter 100, 1100 may be transported in transport box 1500. Advantageously, transport box 1500 may be constructed from the components of the shelter itself. Looking at FIG. 15, the frame of the transport box 1500 is constructed from the vertical support beams 120 and/or the floor beams 180. Where the floor beams 180 and the vertical support beams are provided by the same component, this single component may be used to provide the frame of the transport box 1500.

[0091] Additional holding portions 1510 are also provided, wherein the holding portions provide part of a frame which may be used to form the transport box 1500. In some examples, at least one of the holding portions 1510 may comprise an opening through which one or more shelter components may be inserted. For example, as shown in FIG. 15, the opening of the holding portion 1510 is rectangular. In other examples, the holding portions may not comprise an opening through which components may enter and may instead be one uniform component. At least some of the plurality of vertical support beams 120 and/or floor beams 180 may also be configured to engage with the holding portions 1510 to provide the remainder of the frame for the transport box 1500. For example, the holding portions 1510 may be provided with slots into which the vertical support beams 120 and/or the floor beams 180 may be inserted. Alternatively, the vertical support beams 120 and/or the floor beams 180 may be configured to be held in place in the through tension when inserted though the holding portions 1510.

[0092] The remaining components, such as the roof panels 130 and the wall panels 110, of the shelter may then be arranged within the frame provided by the holds 1510 and the plurality of vertical support beams 120 and/or floor beams 180. Advantageously, the components of the shelter are secured in place through compressive forces provided by the frame of the transport box 1500. Securing the components in the frame in this way ensures that all the components are held in place, and within their respective unit, during transport – reducing the likelihood that components of one shelter will be confused with those of another.

[0093] As a further advantage, the components themselves form the transport means for the shelter. This reduces the packaging that is required to transport the units, reduces the amount of waste produced at the site of deployment and, therefore, increases the sustainability of the shelters. Moreover, when the shelters are no longer required at the site of deployment, the shelters may be deconstructed and assembled into the transport box 1500 without requiring any additional materials to transport the shelter for subsequent use.

[0094] Where the holding portions 1510 are not one uniform component, the holding portions themselves may additionally be used to provide components for the shelter. That is, the holding portions 1510 may be constructed from smaller units which assemble to define the holding portion 1510. For example, one use of the holding portions 1510 may be to provide a ladder, such as ladder 1470. Such a ladder may be used to facilitate assembly of the shelter and may also be used where a multi-level shelter is required. Whilst the holds are depicted as being rectangular in shape, it is anticipated that the holding portions 1510 may take other forms.

[0095] Where shelters such as those described herein are displaced, it may be desirable to provide additional functionality to the shelters to enable the shelters to be suitable for more long-term habitation. For example, the shelters may be provided with one or more sanitation. The shelters may equally be provided with one or more solar cells to generate electricity which may be used by its inhabitants, or one or more solar panels to heat water.

Claims:

1. A kit of parts for a modular shelter, the kit of parts comprising:
   a plurality of wall panels, each wall panel comprising two opposing sides, wherein each of the opposing sides comprises one or more connecting portions;
   a plurality of roof panels,
   wherein the plurality of roof panels are configured to connect to a top side of the plurality of wall panels; and
   a plurality of vertical support members, each vertical support member comprising a plurality of connecting portions and each of the connecting portions facing a different direction away from a vertical axis of the vertical support member,
   wherein the one or more connecting portions of each of the opposing sides of the wall panel are configured to engage with one or more connecting portions of another wall panel and/or engage with at least one or the plurality of connecting portions of the vertical support member,
   wherein the respective one or more connecting portions of the wall panel and respective plurality of connecting portions of the vertical support member permit the plurality of wall panels, the plurality of vertical support beams and the plurality of roof panels to be arranged in different ways to assemble different modular shelter configurations.

2. The kit of parts of claim 1, further comprising:
   a plurality of floor beams, a floor beam comprising one or more connecting portions,
   wherein the wall panel further comprises one or more connecting portions configured to engage with the one or more connecting portions of the floor beam.

3. The kit of parts of claim 1 or 2, further comprising:
   one or more flooring members,
   wherein the modular shelter is configured to define an enclosed volume when constructed with the plurality of wall panels, the plurality of roof panels and the one or more flooring members.

4. The kit of parts of claim 3, wherein the one or more flooring members comprise a flexible flooring.

5. The kit of parts of claim 3,
   wherein the one or more flooring members comprise one or more base panels, a base panel comprising one or more connection portions located along a perimeter of the base panel,
   wherein one or more connecting portions of a base panel is configured to engage with one or more connecting portions of another base panel and,
   wherein one or more connecting portions of a base panel are configured to engage with one or more connecting portions of a floor beam or one or more connecting portions of a wall panel.

6. The kit of parts of claim 1, wherein the vertical support member comprises a plurality of vertical columns, a vertical column comprising one or more connecting portions, wherein the plurality of

vertical columns are connected such that the one or more connecting portions of a vertical column faces outwards from a centre of the vertical support member.

7. The kit of parts of claim 6, wherein the vertical column is a c-column.

8. The kit of parts of claim 1, further comprising:
a plurality of rafters; and
a plurality of purlins,
wherein a rafter is configured to connect to an upper side of one or more wall panels,
wherein a purlin is configured to connect one or more rafters at an angle to the one or more rafters, and
wherein the plurality of roof panels are configured to connect to one or more purlins.

9. The kit of parts of claim 8, further comprising:
a plurality of top beams,
wherein a top beam is configured to connect to an upper side of one or more wall panels, and
wherein the rafter is configured to connect to the upper side of a wall panel via one or more top beams.

10. The kit of parts of claim 8 or 9, further comprising:
one or more hooking means, a hooking means comprising an upper substantially straight portion and a lower substantially curved portion,
wherein each of the plurality of roof panels comprises one or more portions for receiving the upper substantially straight portion of a hooking means, and
wherein the lower substantially curved portion of a hooking means substantially corresponds to a width of a purlin such that when an inner surface of the lower substantially curved portion of the hooking means is brought into contact with an outer surface of a purlin, and when the upper substantially straight portion of the hooking means is secured to a roof panel, the roof panel is secured to the purlin via a tensile force.

11. The kit of parts of claim 1, wherein a total volume of the kit of parts is approximately 6% of a volume of the modular housing unit when constructed.

12. The kit of parts of any preceding claim, further comprising:
a plurality of holding portions,
wherein the plurality of vertical support beams are configured to engage with the plurality of holding portions such that the plurality of holding portions and the plurality of vertical support beams define a frame,
wherein the frame defines a volume in which remaining components in the kit of parts are configured to be held in the frame under a compressive force from the frame.

13. The kit of parts of claim 1, wherein at least one of the plurality of wall panels comprises a cavity.

14. The kit of parts of claim 13, wherein the cavity occupies substantially a whole volume of the wall panel comprising the cavity.

15. The kit of parts of claims 13 or 14, wherein each of the one or more cavities comprises an opening, the opening permitting the cavity to be filled with a material.

16. The kit of parts of claim 15, wherein the material is selected based on climate of a deployment location of the modular shelter.

17. The kit of parts of claim 15, wherein the cavity of the wall panel is configured to be filled with an insulating material.

18. The kit of parts of claim 15, wherein the cavity of the wall panel is configured to be filed with a heat-dissipating material.

19. The kit of parts of any one of claims 3 to 5, further comprising:
one or more elevation members, wherein the one or more flooring members are configured to be placed on an upper surface of the one or more elevation members, and wherein the plurality of vertical support beams are configured to connect to the one or more elevation members.

20. The kit of parts of any one of claims 3 to 5, further comprising:
a first plurality of horizontal support members,
wherein a first horizontal support member is configured to extend between two adjacent vertical support members, and
wherein each end of a first horizontal support member is configured to engage with a vertical support member at a height above a lowermost portion of the vertical support member; and
a second plurality of horizontal support members,
wherein a second horizontal support member is configured to extend between two first horizontal support members, and
wherein the one or more flooring members are configured to be overlay the second plurality of horizontal support members.

21. The kit of parts of claim 19, wherein one or more of the second plurality of horizontal support members are configured to extend between two of more of the first plurality of horizontal support members at an angle to each first plurality of horizontal support member.

22. The kit of parts of claim 1, further comprising:
a plurality of stabilisation members,
wherein a proximal end of each of the plurality of stabilisation members is configured to engage with an end of a respective vertical support beam,
wherein a distal end of each of the plurality of stabilisation members is configured to be inserted into the ground; and

wherein each of the plurality of stabilisation members are configured to engage with one or more stabilisation support members, the one or more stabilisation support members being configured to extend outwardly from a distal end of the stabilisation member.

23. The kit of parts of claim 8, further comprising:
a plurality of roof support beams; and
a plurality of roof flooring members,
wherein each of the plurality of roof support beams are configured to engage with one or more rafters and/or one or more other roof support beams, and
wherein the plurality of roof support beams define a layer over which the plurality of roof flooring members are configured to be placed.

24. The kit of parts of claim 1, further comprising:
one or more solar cells and/or solar panels.

25. The kit of parts of claim 1, further comprising:
one or more sanitation units, wherein a sanitation unit comprises a toilet.

26. A modular shelter, the modular shelter being assembled from a kit of parts according to any preceding claim.

Amendments to the claims have been filed as follows:

Claims:

1. A kit of parts for a modular shelter, the kit of parts comprising:
a plurality of wall panels of a first type and of a second type, each wall panel comprising two opposing sides, wherein each of the opposing sides comprises one or more connecting portions, wherein a wall panel of the first type comprises a female connecting portion on a first side of its opposing sides and a male connecting portion on its other opposing side, wherein a wall panel of the second type comprises a male or female connecting portion on one side of its opposing sides and wherein at least one of the plurality of wall panels comprises a cavity;
a plurality of vertical support members, each vertical support member comprising a plurality of connecting portions and each of the connecting portions facing a different direction away from a vertical axis of the vertical support member, wherein a connecting portion of the vertical support member is a c-column,
wherein male and female connecting portions of wall panels of the first type are configured to releasably engage with each other and wherein a male or female connecting portion of a wall panel of the second type on the first side of its opposing sides is configured to releasably engage with a corresponding female or male connecting portion of a wall panel of the first type and wherein a second side of the wall panel of the second type is configured to engage with a c-column of the vertical support member,
a plurality of roof panels, a plurality of rafters and a plurality of purlins,
wherein a rafter comprises one or more holes through which the rafter is configured to be secured to a vertical support member using fixing means,
wherein a purlin is configured to attach to an inner surface of a rafter using one or more connecting means, and
wherein the plurality of roof panels each comprise a series of portions through which the roof panels are secured to the plurality of purlins.

2. The kit of parts of claim 1, further comprising:
a plurality of floor beams, wherein a floor beam comprises one or more channels which are configured to receive one or more wall panels.

3. The kit of parts of claim 1 or 2, further comprising:
one or more flooring members,
wherein the modular shelter is configured to define an enclosed volume when constructed with the plurality of wall panels, the plurality of roof panels and the one or more flooring members.

4. The kit of parts of claim 3, wherein the one or more flooring members comprise a flexible flooring.

5. The kit of parts of claim 3,
wherein the one or more flooring members comprise one or more base panels, a base panel comprising one or more connection portions located along a perimeter of the base panel,
wherein one or more connecting portions of a base panel is configured to engage with one or more connecting portions of another base panel and,

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wherein one or more connecting portions of a base panel are configured to engage with one or more connecting portions of a floor beam or one or more connecting portions of a wall panel.

6. The kit of parts of claim 1, further comprising:
one or more hooking means, a hooking means comprising an upper substantially straight portion and a lower substantially curved portion,
wherein each of the plurality of roof panels comprises one or more portions for receiving the upper substantially straight portion of a hooking means, and
wherein the lower substantially curved portion of a hooking means substantially corresponds to a width of a purlin such that when an inner surface of the lower substantially curved portion of the hooking means is brought into contact with an outer surface of a purlin, and when the upper substantially straight portion of the hooking means is secured to a roof panel, the roof panel is secured to the purlin via a tensile force.

7. The kit of parts of any preceding claim, further comprising:
a plurality of holding portions, wherein a holding portion comprises a plurality of slots,
wherein ones of the plurality of vertical support beams are configured to insert into a slot of a holding portion such that the plurality of holding portions and the plurality of vertical support beams define a frame,
wherein the frame defines a volume in which remaining components in the kit of parts are configured to be held in the frame under a compressive force from the frame.

8. The kit of parts of claim 13, wherein the cavity occupies substantially a whole volume of the wall panel comprising the cavity.

9. The kit of parts of claims 13 or 14, wherein each of the one or more cavities comprises an opening, the opening permitting the cavity to be filled with a material.

10. The kit of parts of claim 15, wherein the cavity of the wall panel is filled with an insulating material.

11. The kit of parts of claim 15, wherein the cavity of the wall panel is filed with a heat-dissipating material.

12. The kit of parts of any one of claims 3 to 5, further comprising:
one or more elevation members, wherein a vertical support beam further comprises additional connection portions at its respective ends, and wherein the additional connection portions are configured to connect to the one or more elevation members using fixing means.

13. The kit of parts of any one of claims 3 to 5, further comprising:
a first plurality of horizontal support members,
wherein each end of a first horizontal support member is configured to attach around, within or extend through a vertical support member at a height above a lowermost portion of the vertical support member; and
a second plurality of horizontal support members,
wherein a second horizontal support member is configured to be secured to an upper surface of two first horizontal support members using fixing means.

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14. The kit of parts of claim 1, further comprising:
one or more solar cells and/or solar panels.

15. The kit of parts of claim 1, further comprising:
one or more sanitation units, wherein a sanitation unit comprises a toilet.

16. A modular shelter, the modular shelter being assembled from a kit of parts according to any preceding claim.

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Intellectual Property Office

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Claims searched:	1-26	**Date of search:**	13 October 2022

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1; at least	US 2021/0395994 A1 (KOLISNEK) Figures, para [0088], noting wall panels e.g. 400 with connecting portions, vertical supports 600, roof panels 102
X	1; at least	US 2011/0258943 A1 (DE et al.) Figures, noting wall panels 108 with connecting portions 130, vertical supports 176, roof panels 108
X	1; at least	US 2008/0263968 A1 (DAY) Figures particularly 8, para [0038-39], noting wall panels WP with connecting portions, vertical supports CP, roof panels RP
X	1; at least	US 2011/0179722 A1 (SCHULZ et al.) Figures, noting wall panels 102 with connecting portions 104, vertical supports 110, roof panels 106
X	1; at least	US 2019/0010692 A1 (SEGALL) Figures, para [0086], noting wall panels 102 with connecting portions 130, vertical supports 112, roof panels 102
X	1; at least	US 2019/0383013 A1 (JARVIE) Figures, noting wall panels 6 with connecting portions 7, vertical supports 40, roof panels 26

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

E04B; E04H

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

Intellectual Property Office

International Classification:

Subclass	Subgroup	Valid From
E04H	0001/00	01/01/2006
E04B	0001/343	01/01/2006
E04B	0001/348	01/01/2006
E04H	0001/12	01/01/2006