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Martin et al.

(54) EXPEDITIONARY POD CONSTRUCTION

(75) Inventors: **Tony M. Martin**, Fayetteville, NC (US); **Donald A. Pleasants**, Wake Forest, NC (US)

Correspondence Address:
DORITY & MANNING, P.A.
POST OFFICE BOX 1449
GREENVILLE, SC 29602-1449 (US)

(73) Assignee: **STRATEGIC SOLUTIONS UNLIMITED, INC.**, Fayetteville, NC (US)

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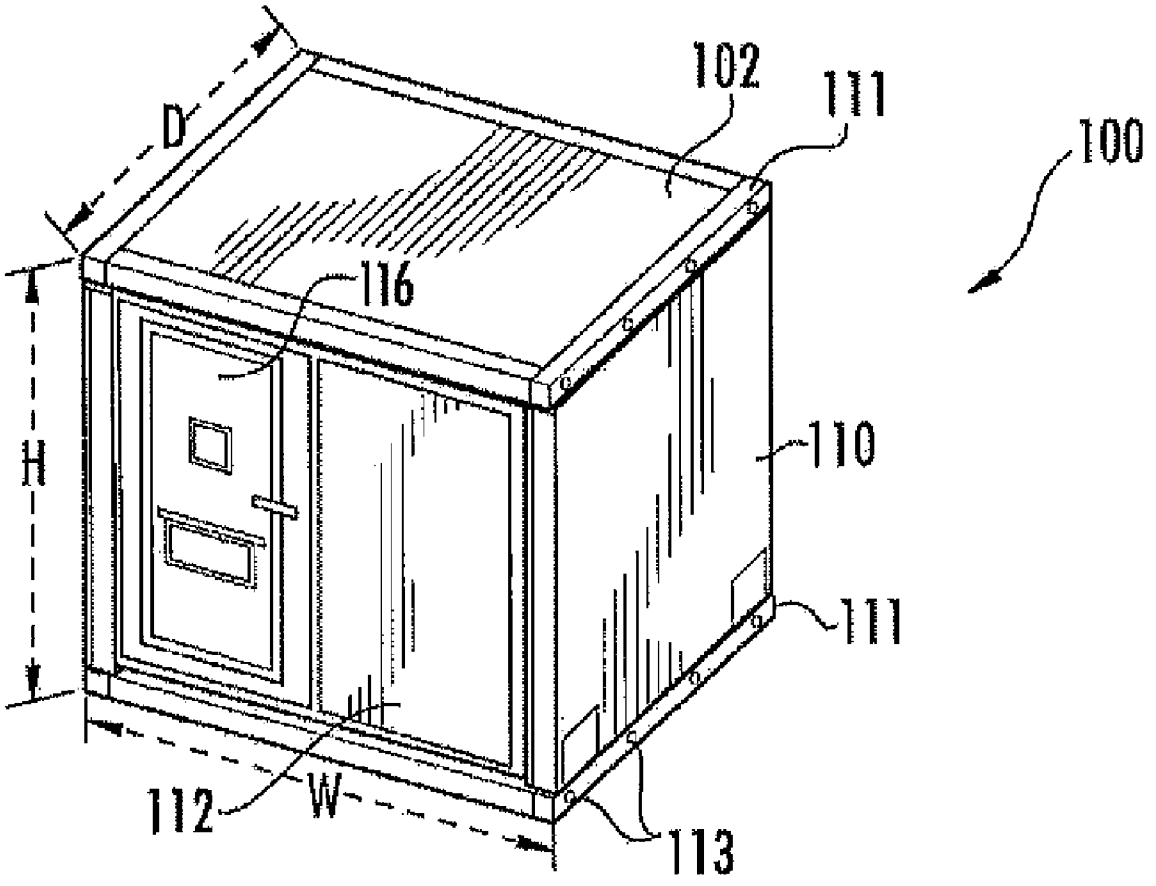
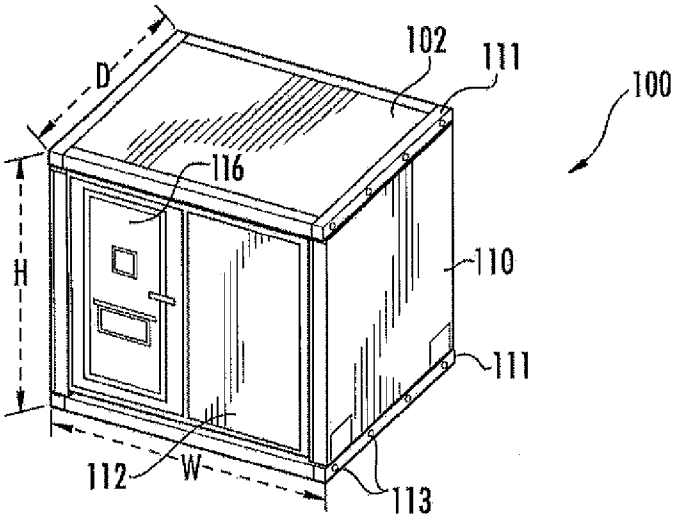
E04C 2/20	(2006.01)

(52) **U.S. Cl.** **52/79.5**; 52/143; 52/127.7; 52/220.1; 52/309.1; 52/79.1; 52/79.9

(57) **ABSTRACT**

A modular pod assembly capable of being readily assembled and disassembled for transportation includes a plurality of modular panels and a plurality of connectors. Each said modular panel includes a rigid and substantially planar structure delimited along one or more edges by respective coupling portions, each coupling portion formed to define a plurality of preconfigured access points for receiving respective connectors. Multiple connectors are provided to securely fasten a coupling portion of a given modular panel to a coupling portion of another adjacent modular panel at a selected access point. The plurality of modular panels may be provided in an assembled state to include at least one top panel, bottom panel, and a plurality of respective side walls, all securely fastened together at respective coupling portions with the plurality of connectors to form an integrated enclosure.




102
111
100
D
116
H
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111
112
W
113

FIG. 1

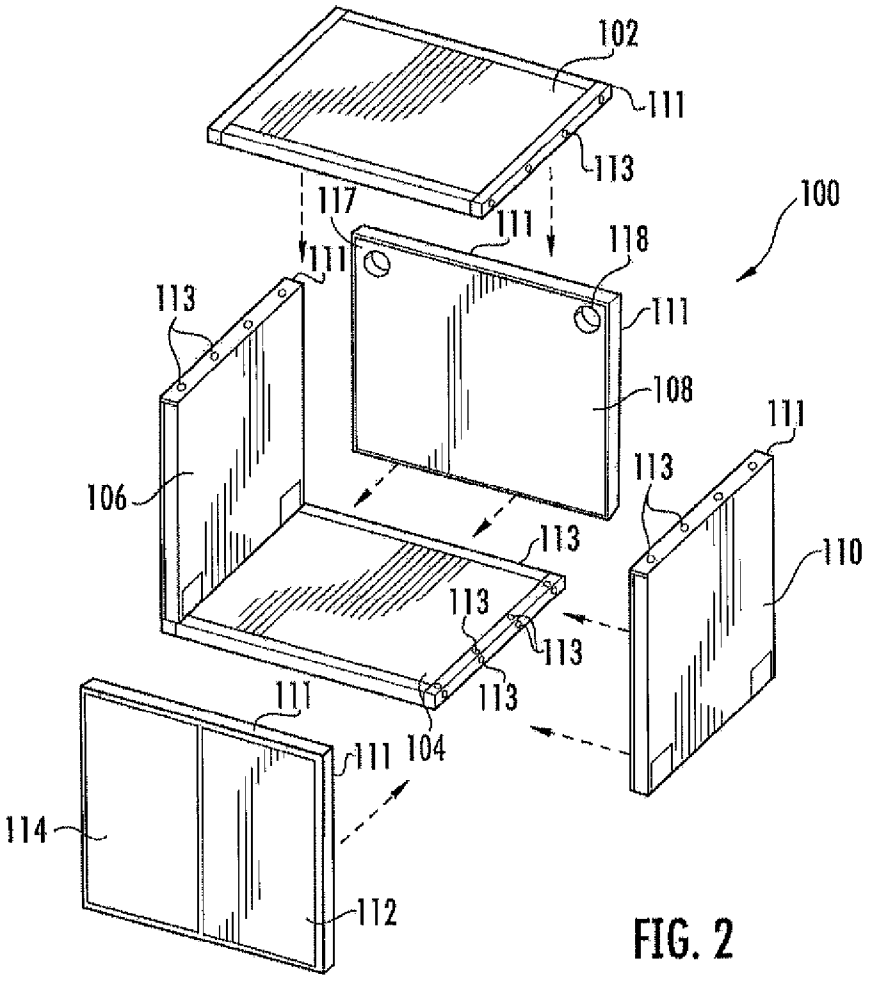
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FIG. 2

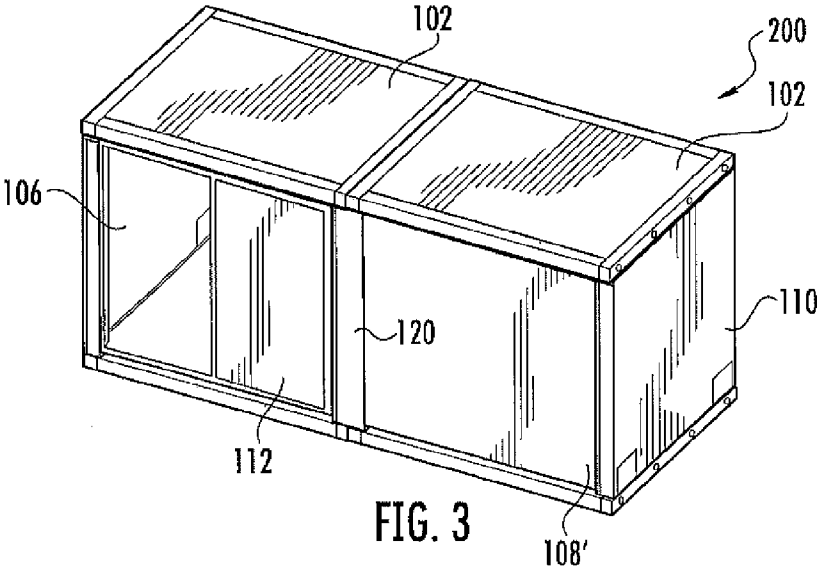
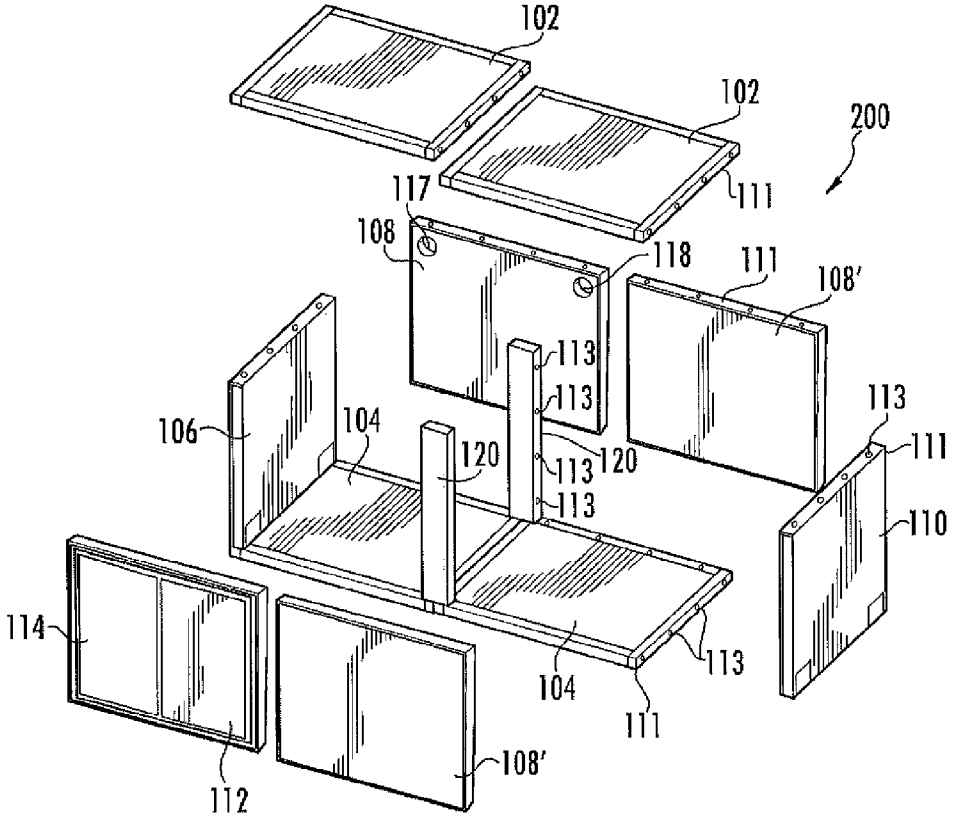

102
200
102
106
110
120
112
108'

FIG. 3


102
102
200
117
111
108
118
111
108'
113
113
113
106
104
120
120
113
111
113
110
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104
113
111
108'
112

FIG. 4

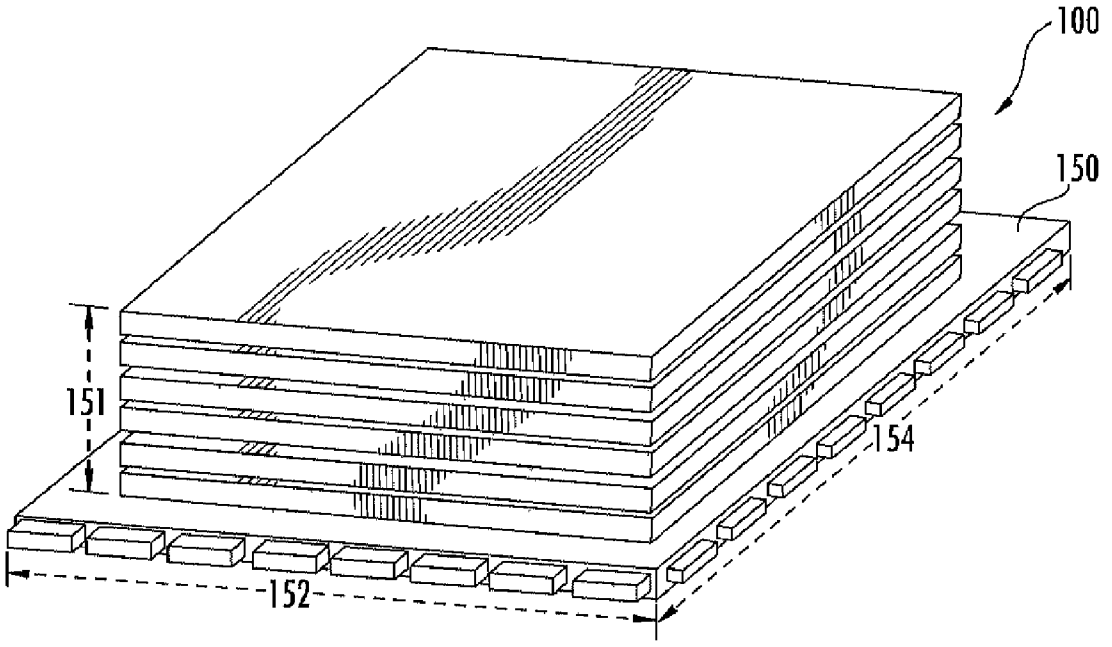


FIG. 5

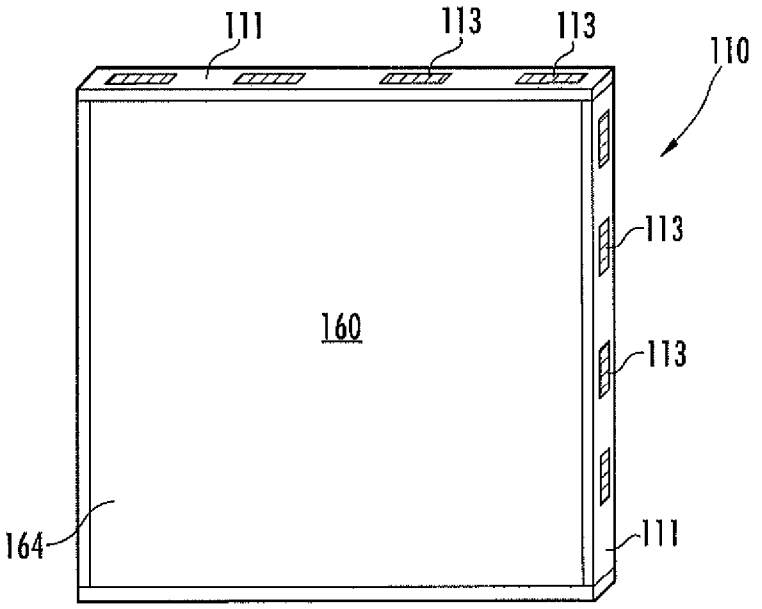
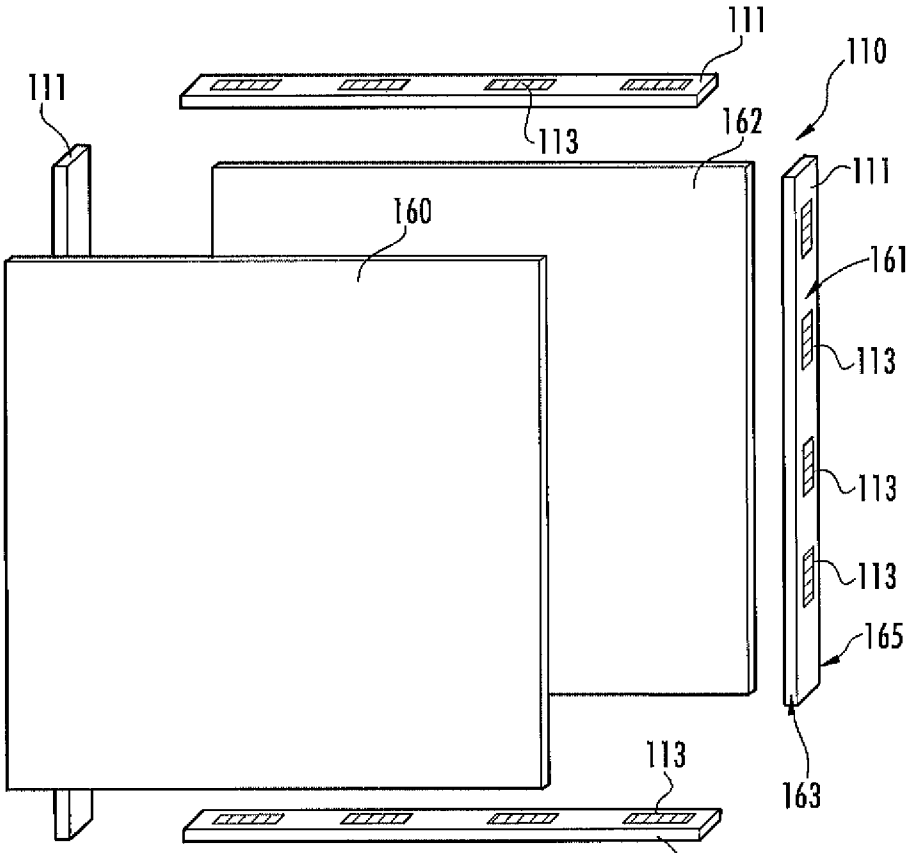

111
113
113
110
113
160
113
164
111

FIG. 6


111
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162
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160
161
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113
113
165
113
163
111

FIG. 7

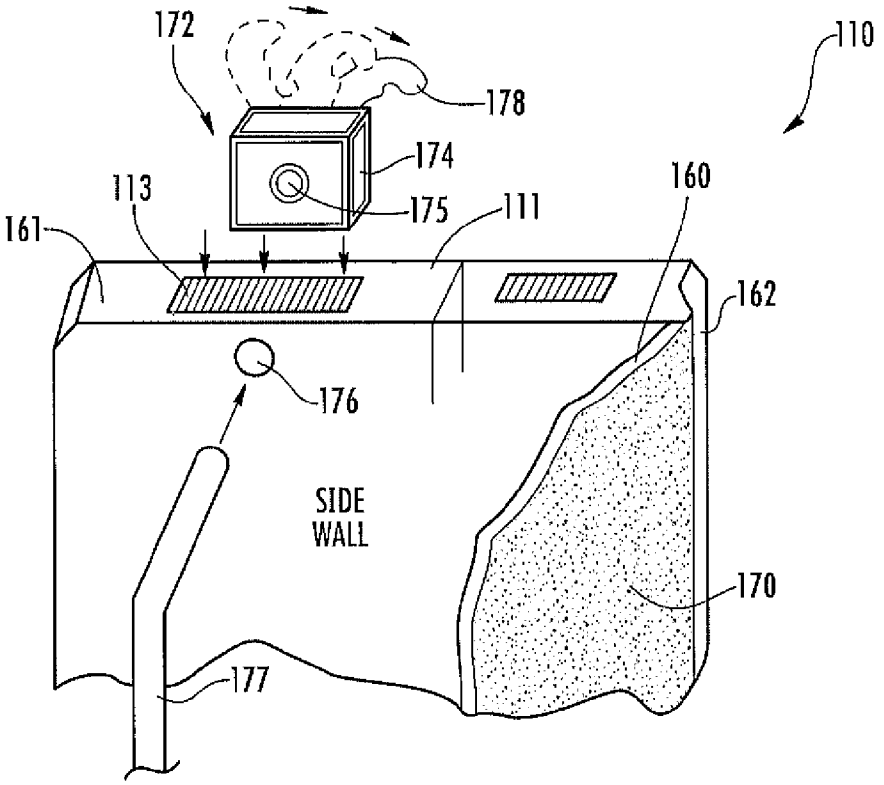

172
178
110
174
113
175
111
160
161
162
176
SIDE
WALL
170
177

FIG. 8

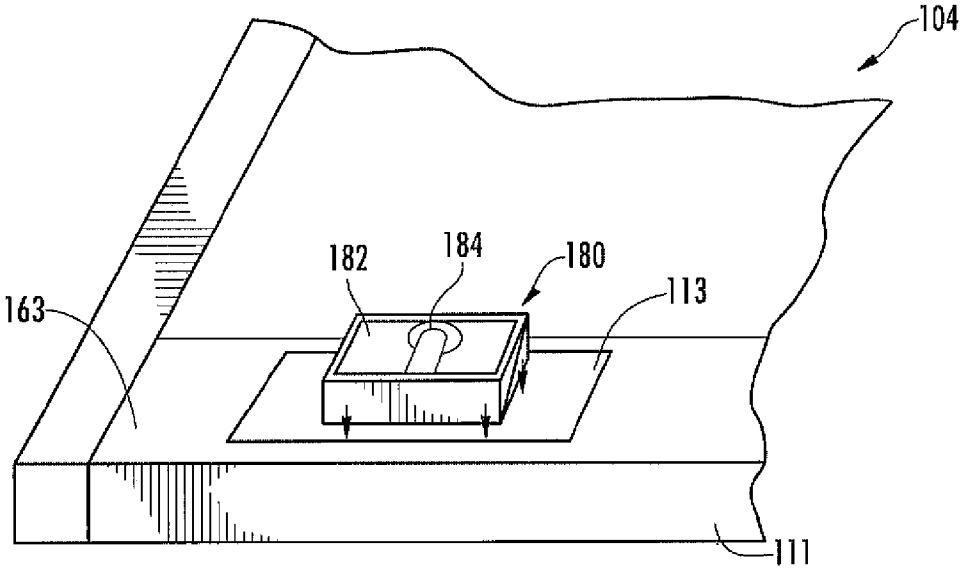
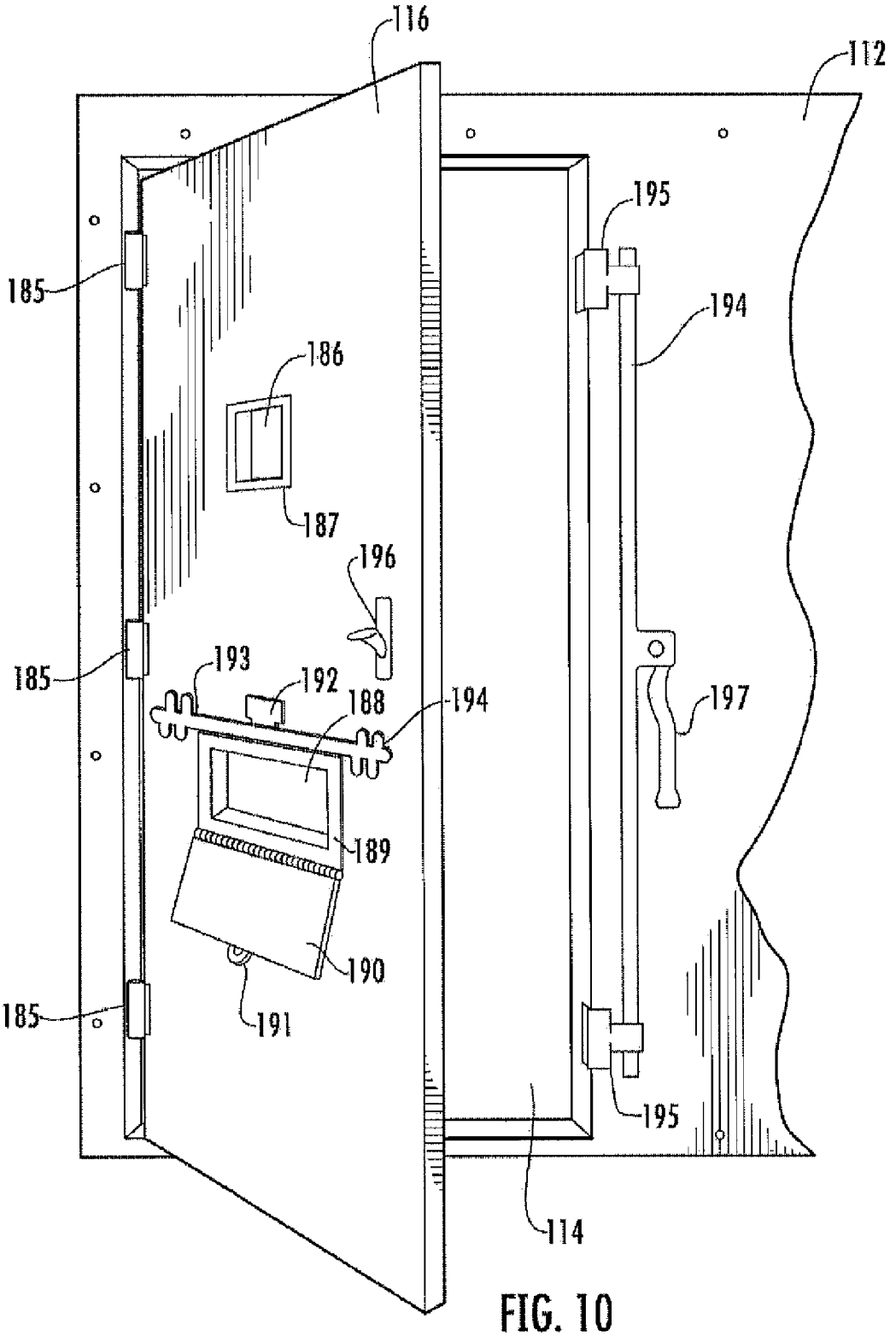

104
182
184
180
113
163
111

FIG. 9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191
195
114

FIG. 10

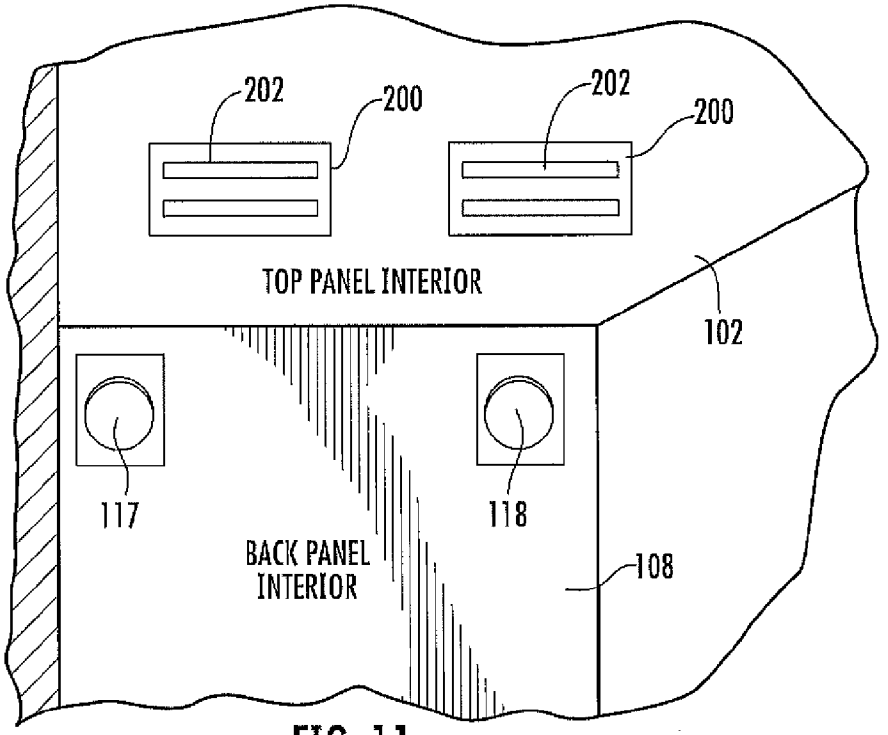
202
200
202
200
TOP PANEL INTERIOR
102
117
118
BACK PANEL
INTERIOR
108

FIG. 11

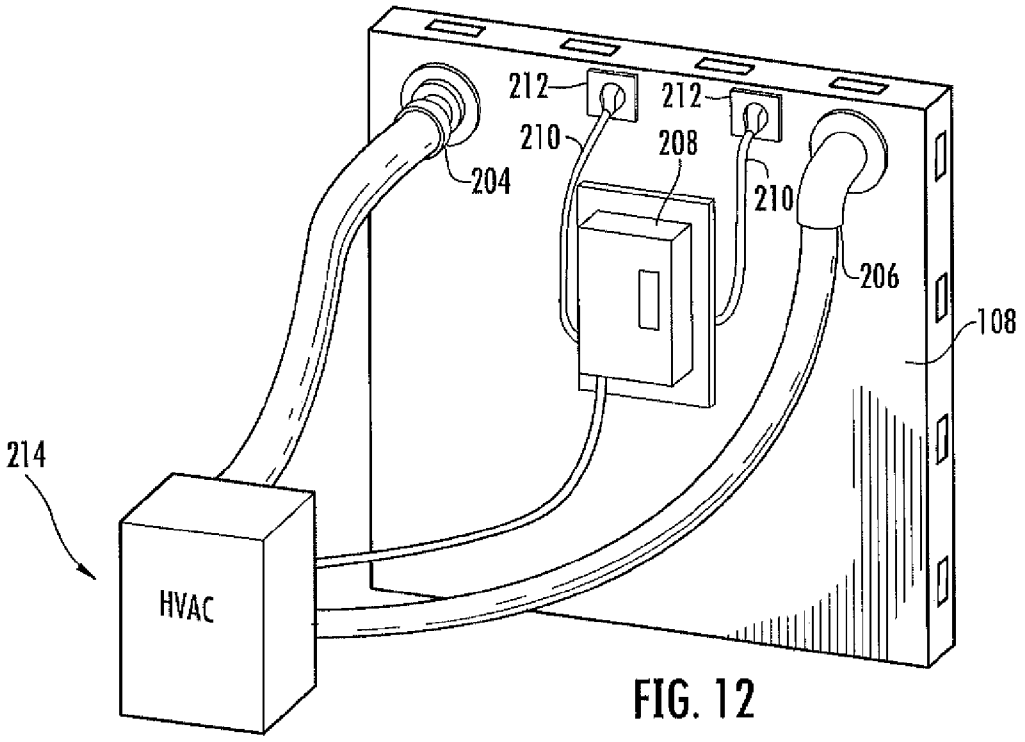
212
212
210
208
204
210
206
108
214
HVAC

FIG. 12

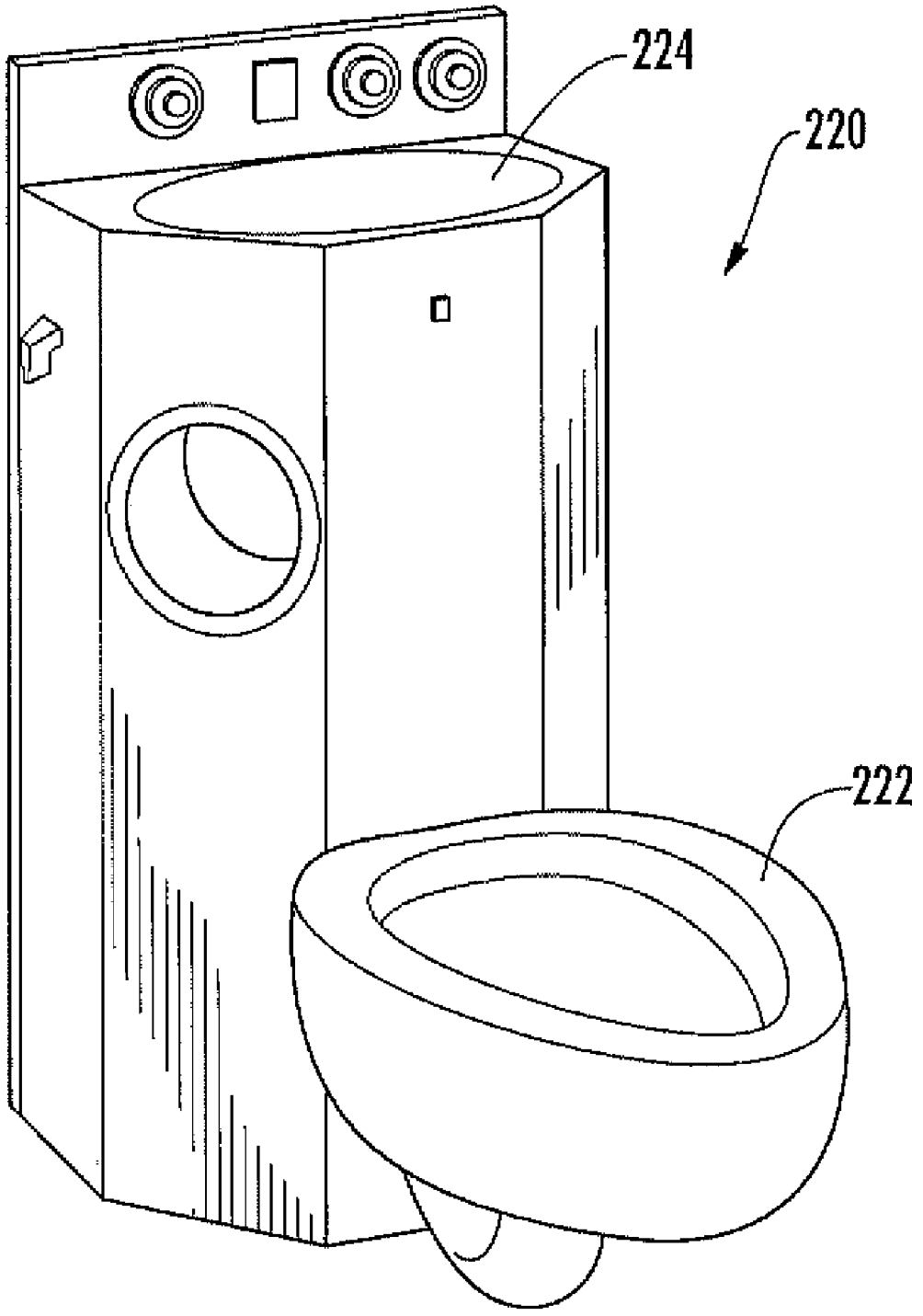

FIG. 13

EXPEDITIONARY POD CONSTRUCTION

PRIORITY CLAIM

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 61/189,465 filed Aug. 20, 2008, entitled "EXPEDITIONARY POD CONSTRUCTION" and having the same inventors as present, which is incorporated herein by reference for all purposes.

FIELD OF THE INVENTION

[0002] The present subject matter generally relates to modular pod assemblies, and more particularly to transportable and easily configured high security building assemblies of modular panels.

BACKGROUND OF THE INVENTION

[0003] Portable buildings are useful in a variety of potential environments, including but not limited to storage facilities, temporary housing, and the like. Most such structures are configured for a single occurrence of assembly and/or placement, at which point the structure remains intact or in its assembled location. The true transportability of such a structure is limited when it is not easily disassembled or movable after initial assembly. As such, a need exists for construction assemblies that are capable of repeated expedient transitioning from an assembled to disassembled configuration to provide a readily transportable configuration.

[0004] An additional need exists for structures capable of withstanding austere and demanding environments. In particular, a structure is needed that provides more than mere protection from the elements, but that offers a highly secure and rugged environment for a variety of potential uses and/or locations. Such a need may be particularly prevalent in military-related expeditions, when secure yet portable structures may be needed for use in remote locations.

[0005] In light of the various issues encountered in the field of portable housing structures, a need remains for a transportable and easily configured high security assemblies of modular panels. While various aspects and alternative features are known in the construction field, no one design has emerged that generally addresses all of the issues as discussed herein.

BRIEF SUMMARY OF THE INVENTION

[0006] In view of the recognized features encountered in the prior art and addressed by the present subject matter, improved modular pod assemblies and associated features and components have been developed.

[0007] The presently disclosed features and others associated with the subject modular pod assemblies result in a highly secure and temporary space for living, working or storage in remote, austere and demanding environments that can be quickly assembled on location. Units may be disassembled and reconfigured in multiple configurations resulting in different shapes and/or sizes. Once assembled, pods are structurally capable of being stacked one on top of the other to form a stacked assembly of multiple units. One exemplary disassembled embodiment may be adapted for rapid delivery and mission support via the standard 108"×88" (463L) air cargo pallet system used by the U.S. military. Such an exemplary disassembled modular pod may weigh about 1000-1500 pounds and stand between about 36-42 inches high on a standard pallet, such that two disassembled pods can easily fit on one pallet. The resultant fully transportable, high security custom buildings can advantageously provide a variety of different uses, including but not limited to sound proof interview rooms, showers, sleeping quarters, work areas, etc.

[0008] Additional aspects and advantages of the present subject matter are set forth in, or will be apparent to, those of ordinary skill in the art from the detailed description herein. Also, it should be further appreciated that modifications and variations to the specifically illustrated, referred and discussed features, elements, and steps hereof may be practiced in various embodiments and uses of the present subject matter without departing from the spirit and scope of the subject matter. Variations may include, but are not limited to, substitution of equivalent means, features, or steps for those illustrated, referenced, or discussed, and the functional, operational, or positional reversal of various parts, features, steps, or the like.

[0009] Still further, it is to be understood that different embodiments, as well as different presently preferred embodiments, of the present subject matter may include various combinations or configurations of presently disclosed features, steps, or elements, or their equivalents (including combinations of features, parts, or steps or configurations thereof not expressly shown in the Figures or stated in the detailed description of such Figures). Additional embodiments of the present subject matter, not necessarily expressed in the summarized section, may include and incorporate various combinations of aspects of features, components, or steps referenced in the summarized embodiments above, and/or other features, components, or steps as otherwise discussed in this application.

[0010] One exemplary embodiment of the present technology concerns a modular pod assembly capable of being assembled and disassembled for transportation. The modular pod assembly includes a plurality of modular panels and a plurality of connectors. Each modular panel includes a rigid and substantially planar structure delimited along one or more edges by respective coupling portions, each coupling portion formed to define a plurality of preconfigured access points for receiving respective connectors. Each connector is provided to securely fasten a coupling portion of a given modular panel to a coupling portion of another adjacent modular panel at a selected access point, wherein multiple connectors are used to securely fasten each coupling portion of a modular panel to a coupling portion of an adjacent modular panel. The plurality of modular panels when provided in an assembled state include at least one modular panel forming a top panel for the modular pod assembly, at least one modular panel forming a bottom panel, and a plurality of modular panels forming respective side walls, with all modular panels being securely fastened together at respective coupling portions via the plurality of connectors to form an integrated enclosure. The plurality of modular panels may be characterized by a total height of less than about 96 inches when provided in an assembled state, and less than about 36-48 inches when provided in a disassembled state and stacked one on top of another.

[0011] Another exemplary modular pod assembly embodiment includes a plurality of rigid and substantially planar modular panels and a plurality of connectors. Each modular panel includes first and second support layers and an insulating layer in between the first and second support layers. Each modular panel further includes respective coupling portions along selected edges, each coupling portion formed to define a plurality of preconfigured access points for receiving

respective connectors. Each connector is capable of transitioning between a locked and an unlocked state and is provided to securely fasten a coupling portion of a given modular panel to a coupling portion of another adjacent modular panel at a selected access point, wherein multiple connectors are used to securely fasten each coupling portion of a modular panel to a coupling portion of an adjacent modular panel. The plurality of modular panels are securely attached to one another at the coupling portions via the plurality of connectors to form an integrated enclosure with at least one modular panel forming a top panel for the modular pod assembly, at least one modular panel forming a bottom panel, and a plurality of modular panels forming respective side walls.

[0012] A still further exemplary modular pod assembly embodiment of the subject technology includes a plurality of rigid modular panels, a plurality of connectors, a door, an electrical panel and an HVAC unit. Each of the plurality of rigid modular panels is characterized by four perimeter portions. The plurality of connectors securely fastens each perimeter portion of each modular panel to another perimeter portion of another rigid modular panel to form an integrated enclosure having at least one top panel, at least one bottom panel and a plurality of respective side walls. The integrated enclosure has respective interior and exterior surfaces of each rigid modular panel. At least one of the plurality of side walls corresponds to a front wall that is formed to define an opening therethrough. The door is positioned within the opening defined in the front wall and is securely attached to the front wall. At least one of the plurality of rigid modular panels is formed to define at least first and second access points. The electrical panel is coupled to an exterior location of one of the plurality of rigid modular panels and is adapted to provide an electrical interface for a power supply. The HVAC unit is connected to the electrical panel and includes at least first and second air ducts coupled to the first and second access points formed within at least one of the plurality of rigid modular panels.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] A full and enabling disclosure of the present subject matter, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended Figures, in which:

[0014] FIG. **1** is a perspective view of a first exemplary embodiment of an assembled modular pod assembly in accordance with an aspect of the subject technology;

[0015] FIG. **2** is an exploded view of the first exemplary embodiment of a modular pod assembly as shown in FIG. **1**;

[0016] FIG. **3** is a perspective view of a second exemplary embodiment of a modular pod assembly in accordance with an aspect of the subject technology;

[0017] FIG. **4** is an exploded view of the second exemplary embodiment of a modular pod assembly as shown in FIG. **3**;

[0018] FIG. **5** is a perspective view of a single exemplary modular pod assembly in disassembled form stacked on a pallet for transportation;

[0019] FIG. **6** is a perspective view of a single exemplary modular panel for use in the presently disclosed pod assemblies;

[0020] FIG. **7** is an exploded view of the single exemplary modular panel as shown in FIG. **6**;

[0021] FIG. **8** is a partial cross-sectional perspective view of a modular panel, particularly providing a magnified and partially exploded view of a first coupling portion of an exemplary cam lock connector used to fasten adjacent panels together;

[0022] FIG. **9** is a partial perspective view of a modular panel, particularly providing a magnified and partially exploded view of a second coupling portion of an exemplary cam lock connector used to fasten adjacent panels together;

[0023] FIG. **10** is partial perspective view of an exemplary modular panel including a door feature in accordance with an aspect of the subject technology;

[0024] FIG. **11** is a partial perspective view of interior portions of an modular pod assembly, including interior rear and top modular panels, and illustrating exemplary optional features of a modular pod assembly including lighting and ventilation access points;

[0025] FIG. **12** is perspective view of a rear modular panel with exemplary optional features of a modular pod assembly including ventilation access points and electrical power supply features; and

[0026] FIG. **13** is a schematic view of an exemplary personal hygiene unit for mounting within a modular pod assembly in accordance with an aspect of the subject technology.

[0027] Repeat use of reference characters throughout the present specification and appended drawings is intended to represent same or analogous features, elements, or steps of the present subject matter.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0028] As discussed in the Summary of the Invention section, the present subject matter is particularly concerned with modular pod or housing assemblies, and more particularly to a transportable and easily configured high security assembly of modular panels. Selected combinations of aspects of the disclosed technology correspond to a plurality of different embodiments of the present subject matter. It should be noted that each of the exemplary embodiments presented and discussed herein should not insinuate limitations of the present subject matter. Features or steps illustrated or described as part of one embodiment may be used in combination with aspects of another embodiment to yield yet further embodiments. Additionally, certain features may be interchanged with similar devices or features not expressly mentioned which perform the same or similar function.

[0029] Reference will now be made in detail to the presently preferred embodiments of the subject modular pod assemblies. Referring now to the drawings, FIGS. **1** and **2** illustrate a first exemplary modular pod assembly **100**, which is easily configured to transform between an assembled state as shown in FIG. **1** and a disassembled state. FIG. **2** shows a partially disassembled view of first exemplary modular pod assembly **100**, and FIG. **5** shows a fully disassembled view of first exemplary modular pod assembly **100**. The ability to repeatedly transform between assembled and disassembled states makes the subject assemblies particularly and advantageously adapted for transportation to and implementation in a variety of different locations. In one embodiment, the transformation between assembled and disassembled states is made possible by three men in less than 30 minutes. It will be appreciated that various specific aspects of the modular assemblies, including one or more of the modular nature of the panels used to form such assemblies, the provision of coupling portions along peripheral locations of the modular panels, and the types of removable connectors used to couple

adjacent panels together, may help to selectively facilitate such ease of assembly and disassembly.

[0030] Referring still to FIGS. **1** and **2**, first exemplary modular pod assembly **100** includes a plurality of modular panels, **102-112**, respectively, all or some of which may be configured to have the same or similar construction. Modular panels **102-112** may generally be formed as rigid and substantially planar structures. In one example, as illustrated in more detail in FIGS. **6** and **7**, modular panels **102-112** have first and second support layers sandwiched around an inner layer of insulating material. Modular panels **102-112** may also respectively include coupling portions **111** provided along one or more edges thereof. Each coupling portion **111** may be formed to define a plurality of preconfigured access points **113** for receiving respective connectors. In one example, coupling portions **111** are provided on each of four peripheral edges of each modular panel, and access points **113** are formed at multiple locations along each coupling portion **111**, on edge surface(s) and/or face surface(s) of each coupling portion **111**. Although coupling portions **111** and corresponding access points **113** are illustrated as distinct parts of a modular panel, it should be appreciated that the coupling portions or access points **113** may alternatively be formed as integral parts of a modular panel, for example by directly incorporating such features into various peripheral locations of a modular panel.

[0031] The perimeter of modular panels **102-112** may be formed in a variety of particular shapes, including but not limited to the substantially rectangular shape as illustrated in the figures. Modular panels **102-112** may also be formed in a variety of particular sizes. In one particular embodiment, each panel is characterized by at least first and second dimensions that are within a range of between about 80-100 inches, and an overall weight of between about 100-200 pounds (e.g., 160 pounds).

[0032] In the embodiment of FIGS. **1** and **2**, the plurality of modular panels **102-112** may be configured in an assembled state such that at least one modular panel corresponds to a top panel (e.g., panel **102**), at least one modular panel corresponds to a bottom panel (e.g., panel **104**), and a plurality of additional modular panels correspond to side walls (e.g., panels **106**, **108**, **110** and **112**). At least one of such sidewall panels may be referred to herein as a front panel (e.g., panel **112**), and at least one of such sidewall panels may be referred to herein as a rear panel (e.g., panel **108**). It should be appreciated that all references to panels as top, bottom, front, rear and/or side panels is provided for ease of reference to discuss relative positioning of such panels. Such characterizations should not impose unnecessary limitations to the described panels.

[0033] Referring still to FIGS. **1** and **2**, one exemplary embodiment of a front panel **112** is formed to define an opening **114** therethrough. The front panel opening **114** is optionally provided as an opening for securely receiving a door **116** for the modular pod assembly **100**. Additional details of an exemplary door **116** are illustrated in and discussed with reference to FIG. **10**. In one exemplary embodiment of a rear panel **108**, such panel is formed to define first and second access points **117**, **118**. The optional access points **117** and **118** may be provided as ventilation access points to interface with first and second air ducts associated with an HVAC unit, as further illustrated in and discussed with reference to FIGS. **11** and **12**.

[0034] In FIG. **1**, the plurality of modular panels **102-112** are securely fastened together using a plurality of connectors. Each connector securely fastens a coupling portion **111** of a given modular panel to a coupling portion of another modular panel at selected access points **113**. Multiple connectors may be used to securely fasten each coupling portion of a modular panel to a coupling portion of an adjacent modular panel. In the embodiment shown in FIGS. **1** and **2**, four access points **113** and corresponding connectors are provided along each of one or more selected faces of coupling portion **111**, although it should be appreciated that the number and location of such access points and connectors may vary in other embodiments of the subject technology.

[0035] When the plurality of modular panels are securely fastened together in an assembled state, as shown in FIG. **1**, modular pod assembly **100** forms an integrated and secure enclosure. When fully assembled in such a standalone, single unit embodiment, exemplary dimensions of the assembly **100** may be configured to meet particularly chosen design requirements for human occupancy. In one non-limiting example, an integrated assembly formed of six modular panels as shown in FIG. **1** is characterized by respective width (W), depth (D) and height (H) dimensions of between about 80 and 100 inches, respectively. In one particular example, exterior width dimension (W) corresponds to about 96 inches, exterior height dimension (H) corresponds to about 96 inches and exterior depth dimension (D) corresponds to about 81 inches. In accordance with this particular example, corresponding interior dimensions may correspond to a depth of about 72 inches, a width of about 87 inches and a height of about 84 inches.

[0036] It should be appreciated that modular pod embodiments may be assembled in multiple alternative configurations to accommodate a need for varied shapes and/or sizes. The modular nature of the panels facilitates the variety of possible configurations of modular pod assemblies in accordance with the subject technology. FIGS. **3** and **4** illustrate one possible alternative configuration including expandable modular panels to create a second exemplary modular pod assembly **200** that is generally twice the size of the assembly in FIGS. **1** and **2**. Although the second exemplary modular pod assembly **200** is expanded only in a single dimension and only with two respective bottom and top panels, it should be appreciated that additional numbers of modules may be provided in lateral and/or longitudinal alignments to yield a plethora of potential combinations.

[0037] Referring more particularly to FIGS. **3** and **4**, second exemplary modular pod assembly **200** includes two bottom panels **102** and two top panels **104**, side panels **106** and **110**, rear panel **108**, front panel **112** and additional expandable wall panels **108'**. Expandable panels **108'** may be generally the same shape and size as the front and rear panels **108**, **112**, although may be formed without a door opening **114** or first and second access points **117**, **118**. When larger configurations of modular assemblies are created, additional openings and/or access points may be provided as suitable for the combined enclosure. Adjacent panels in an expanded modular pod assembly may be directly connected to one another, or additional adapter posts **120** may be utilized as a connecting interface between one or more panels. When utilized, adapter posts **120** may consist of or be adapted to include respective coupling portions and access points **113** as described with reference to the modular panels **102-112**. For example, adapter post **120** may include a plurality of preconfigured

access points **113** for receiving respective connectors, such that the adapter post **120** serves as an interface between two or more adjacent modular panels.

[0038] As previously described, a particular advantage of exemplary embodiments of the subject modular pod technology allows a given assembly to be easily assembled, disassembled and reconfigured. Referring now to FIG. **5**, an exemplary modular pod assembly **100** such as that shown in FIGS. **1** and **2** is shown in a disassembled configuration, with each of a plurality of six modular panels stacked one on top of another. The entire stack of modular panels is shown positioned on a pallet **150**, which may be used to transport the disassembled modular pod components from one location to another. In one example, pallet **150** corresponds to a 463L pallet such as used by the United States Air Force and/or other military or contracted entities to transport cargo and the like. Exemplary dimensions for a pallet **150** may include a width dimension **152** of about 108 inches and a depth dimension of about 88 inches. Cargo limits for pallet **152** may be limited to such surface dimensions of the pallet, a height of less than about 96 inches and a weight of about 10,000 pounds. The particularly chosen exemplary dimensions for the modular panels and corresponding pod assembly **100** may be particularly chosen such that two disassembled pods can be stacked one on top of another and fit within the cargo limits of a 463L pallet. A plurality of six modular panels provided in a disassembled and stacked state as shown in FIG. **5** may be characterized by a total height **151** of less than about 48 inches, less than about 42 inches, or less than about 36 inches in various exemplary embodiments. When the plurality of modular panels is provided in a stacked configuration, as shown in FIG. **1**, and then positioned on top of pallet **150**, the height of the assembled pod may be characterized by a total height of less than about 96 inches, or between about 80-96 inches in one embodiment. The stacked plurality of panels as shown in FIG. **5** may be further characterized by a total weight of less than about 1500 pounds, between about 1000 and 1500 pounds, or about 1200 pounds in various exemplary embodiments.

[0039] Referring now to FIGS. **6** and **7**, a particular non-limiting example of a modular panel construction for use in modular panels **102-112** is shown. FIG. **6** provides a perspective view of an exemplary modular panel **110** and FIG. **7** shows an exploded view of some parts of the same panel. Although FIGS. **6** and **7** are discussed with reference to a particular modular panel **110**, it should be appreciated that aspects disclosed with reference to panel **110** can be selectively applied to some or all of the other panels used in a modular pod assembly.

[0040] In the example of FIGS. **6** and **7**, modular panel **110** may correspond to a structurally integrated panel (SIP) having first and second support layers **160** and **162** sandwiched around an inner layer of insulating material **170** (see FIG. **8**). In a more particular example, a modular panel construction **110** includes first and second support layers **160** and **162** of a rigid material such as plywood, lightweight steel, aluminum, or other metals, fiberglass, oriented strand board (OSB), fiber cement board or other suitable materials with a layer of substantially uniformly distributed adhesive and insulating material in a space formed between the two layers. The use of multiple support layers for each panel provides advantageous levels of strength for the panels, while maintaining a relatively lightweight design. In one example, the insulating material comprises a polyurethane spray foam, which is particularly advantageous to provide both adhesive bonding to support layers **160** and **162** as well as insulating characteristics. Other insulating foam such as expanded polystyrene or other materials may be utilized. Each completed modular panel **110** may be characterized by a thickness of between about 4-8 inches and an insulating R-Value of higher than R-15 and up to about R-30 or higher, thus providing substantial insulation as well as noise reduction for the modular pod assemblies. One example of a modular panel construction for use with the subject technology may correspond to insulated panels such as offered for sale by Better Building Products LLC and/or W.A. Brown & Son, Inc. of Salisbury, N.C.

[0041] Referring still to FIGS. **6** and **7**, coupling portions **111** or other perimeter portions may be provided on some or all of the peripheral edges of each modular panel **110**, and may selectively include access points **113** as previously described. The illustrations of FIGS. **6** and **7** show access points **113** formed within each coupling portion only along respective edge surfaces **161** of the coupling portion **111** and corresponding modular panel, although it should be appreciated that access points **113** may also be formed on face surfaces **163** and/or **165** of a coupling portion **111** and corresponding modular panel, such as shown in FIGS. **1-4**.

[0042] In some embodiments of the subject technology, after first and second support layers **160** and **162** are adhered together with insulating foam, the entire modular panel **110**, or optionally selected interior and/or exterior surfaces thereof are substantially coated with a protective coating **164**. Coating **164** may be applied by painting, spraying, depositing with a trowel, knife or squeegee or other suitable method. In one embodiment, such a protective coating **164** may correspond to a polyurethane coating that is substantially non-toxic, waterproof, anti-microbial and fire retardant. In a particular example, protective coating **164** corresponds to an acrylic-reinforced aliphatic aromatic polyurethane protective coating which yields excellent abrasion resistance, water resistance, high tensile strength, superior elongation and tear properties, high non-skid rating, and excellent UV stability and weathering characteristics. Protective coating **164** may also be chemically engineered to have very few free carbons which are a primary cause of biological growth. Additional additives may be provided in protective coating **164** to enhance the low carbon nature of the coating to inhibit or control potential growth of mold, mildew and/or bacterias. Protective coating **164** may be chosen with a specific color tint (e.g., desert sand or military green) to provide discreteness or camouflaging functionality. Specific examples of such a protective coating correspond to Scorpion XO2, ZBG and FR brand protective coatings such as manufactured by Scorpion Protective Coatings, Inc. of Cloverdale, Ind.

[0043] Referring now to FIGS. **8** and **9**, a particular example of a connector for use in securely fastening the perimeter/coupling portions of each modular panel to an adjacent modular panel is shown. The particular connector shown in FIGS. **8** and **9** is a cam lock type connector including first and second separate coupling elements that are selectively provided within the access points **113** previously discussed. However, it should be appreciated that alternative connectors may be used to securely fasten the subject modular panels to one another. For example, the access points **113** may be configured to receive one or more carriage bolts which are fed through respective openings in angle irons provided at the

corner location between adjacent perpendicular panels and/or at the seam location between adjacent laterally aligned panels.

[0044] FIG. **8** shows a partially exploded and cutaway view of an exemplary modular panel **110** having a perimeter/coupling portion **111** and at least one access point **113** formed therein. Access point **113** is formed to define an opening for receiving an engaging connector portion **172**. The engaging connector portion **172** may include a mounting assembly **174** that may be positioned within access point **113** and securely mounted therein. Mounting assembly **174** may include at least first and second opposing mounting plates for attachment to first and second side surfaces within coupling portion **111**. Engaging connector portion **172** may also include a cylinder **175**, accessible through a connector access point **176** formed within a surface of the coupling portion **111** or other portion of modular panel **110**. Cylinder **175** may be further configured to receive a locking tool **177** (e.g., hex tool or alien wrench) capable of actuating the engaging connector portion **172** between first and second (i.e., locked and unlocked) states. For example, locking tool **177** may be inserted into the cylinder **175** to turn a rotatable latch **178** that is coupled to cylinder **175** from an unlocked state where it is not latched over a receiving member to a locked state where the rotatable latch engages and securely connects with a receiving member.

[0045] One exemplary receiving member is shown in the partially exploded view of FIG. **9**. More particularly, a receiving connector portion **180** includes a mounting assembly **182** that may be positioned within an access point **113** and securely mounted therein. Mounting assembly **182** may include at least first and second opposing mounting plates for attachment to first and second side surfaces within access point **113** of coupling portion **111**. Receiving connector portion **180** may further include a rigid receiving rod **184** around which the rotatable latch **178** of engaging connector portion **172** may securely fasten.

[0046] As shown in FIGS. **1-4**, it should be appreciated that some of the access points **113** within some of the coupling portions **111** in the plurality of modular panels include respective engaging connector portions **172**, while others of the access points **113** include respective receiving connector portions **180**. As such, each adjacent access point in the modular pod assembly where a given modular panel is connected to an adjacent modular panel includes one engaging connector portion and one receiving connector portion. Because adjacent modular panels are sometimes mounted in a relative configuration in which the panels are substantially perpendicular to one another, access points formed in the coupling portions of adjacent panels to be connected may be formed on different surfaces. For example, as shown in FIGS. **8** and **9**, engaging connector portions may be formed on edge surfaces **161** of a coupling portion **111**, while receiving connector portions **180** may be formed on face surfaces **163** of a coupling portion **111**.

[0047] Additional connectors and/or attachment hardware may be provided in the subject modular pod assemblies. One particular example of a suitable connector is a snake eye security screw or center post hex screw or other connectors that are not easily removed without specialized tools, thus helping to ensure the security of a configured enclosure.

[0048] Referring now to FIG. **10**, additional details are presented for an exemplary door **116** securely affixed with bolted hinges **185** within an opening **114** defined by exemplary front panel **112**. Door **116** corresponds to a high security entry door having an optional view opening **186** for looking into and out of a modular pod assembly and an optional access opening, or pass-through panel **188** to serve as a food pass or other access point for the modular pod assembly when used for a secure detaining environment. Door **116** may be formed of any suitable rigid and secure material, such as but not limited to the materials previously described for use in modular panels **102-112**. In a particular example, door **116** is formed of polyurethane stiffened steel with 20 gage vertical steel stiffeners welded to face skins having a 6-inch foamed-in-place waterproof urethane core substantially filling the inside of the door **116**.

[0049] The optional view opening **186** and access opening **188** may be cut through a standard door. Subsequently, respective frames **187** and **189** may be made out of flat steel, cut to size and welded in place into each opening **186** and **188** to form a water tight seal for the respective openings. The view opening **186** may be covered on inner and/or outer surfaces with at least one layer of a transparent or semi-transparent thermoplastic material, such as a substantially clear polymer-based material, for example a polycarbonate resin thermoplastic including but not limited to a LEXAN brand material such as manufactured by SABIC Innovative Plastics.

[0050] An access door **190** may be securely mounted to door **116** below the access opening **188** and capable of being alternately provided between open and closed positions. When in a closed position, a hook **191** on access door **190** engages a latch **192** securely mounted on door **116** at a position above access opening **188**. Locking pins **193** and **194** may be provided in a sliding configuration to securely contain the access door **191** in a closed position. When the door itself **116** is in a closed position, additional latching and/or locking features may be provided to secure the door and prevent exit from within the modular pod assembly as desired. In one example, as shown in FIG. **10**, a bolted pipe feature **194** is securely mounted to the front panel with a plurality of retaining braces **195**. Attached to the pipe feature **194** is a rotatable handle **195** that is capable of lifting and rotating to engage with a receiving channel **196** to securely fasten the door **116** in a closed position.

[0051] Referring now to FIGS. **11** and **12**, additional optional features of an exemplary modular pod assembly are illustrated. As shown in FIG. **11**, at least one surface (e.g., an interior surface) of a top panel or other panel may be formed to define at least one opening therein for receiving a recessed light fixture **200** and corresponding light source **202**. In one particular embodiment, light sources **202** correspond to standard two-inch fluorescent lights. Light sources **202** may also be covered with at least one layer (e.g., ½-¾ inches thick) of a transparent or semi-transparent thermoplastic material, such as a substantially clear polymer-based material, for example a polycarbonate resin thermoplastic including but not limited to a LEXAN brand material such as manufactured by SABIC Innovative Plastics.

[0052] FIG. **12** shows an exemplary exterior surface of a modular panel such as rear panel **108** with first and second air ducts **204** and **206** coupled to the first and second access points **117** and **118**. The first and second air ducts **204** and **206** may provide the input and output air flow points for connection to an HVAC unit/system **214**. One exemplary HVAC system **214** for use with a modular pod assembly corresponds to a mobile, dolly mounted air conditioning and heating unit

with a 30,000 BTU 220 v or 110 v, 30 amp CFM 630 system with a powder coated frame. Such an HVAC system **214** may be capable of heating and/or cooling the modular pod assembly to within a desired range of temperatures from about 50 degrees to about 95 degrees Fahrenheit. An electrical panel **208** including circuit breaker elements may be coupled to an exterior location on panel **108** or another panel to serve as an electrical interface for a power supply. Electrical panel **208** may be rated, for example, at 100-200 Amps or more depending on the power requirements of associated electrical features provided with a pod assembly. First and second electrical connections **210** may lead from the electrical panel **208** to first and second electrical inputs **212** of the pod assembly. Electrical inputs **212** may be coupled to provide power to the light sources **202**, HVAC system **214** or other pod features.

[0053] FIG. **13** illustrates a still further optional feature for inclusion within exemplary modular pod assemblies of the present technology. A personal hygiene unit **220** may include a toilet **222** and sink **224** provided in an integrated unit for secure mounting to an interior surface of one of the modular panels forming a modular pod assembly. Although not shown, hygiene unit may further include a shower or water spraying device. Hygiene unit **220** may be made of a durable material such as stainless steel and may be coupled to one or more supply piping locations.

[0054] Still further features for optional incorporation with a modular pod assembly of the present technology include interior 110 volt electrical outlets, CAT6 or other data network connections, phone connections, plumbing and water connections and supplies, and the like. A floor drain may be provided in a bottom panel to eliminate any water introduced into the modular pod assembly. Additional mobility and/or alignment features, for example a plurality of externally mounted removable wheels, may be mounted to a bottom surface of an assembled modular pod for easy alignment, movement or leveling on most surfaces. Exemplary modular pod assemblies may also come mounted on 4"×4"×7" skids.

[0055] The aforementioned features and others associated with the subject modular pod assemblies result in a highly secure and temporary space for living, working or storage in remote, austere and demanding environments that can be quickly assembled on location. The resultant fully transportable, high security custom buildings can advantageously provide a variety of different uses, including but not limited to sound proof interview rooms, showers, sleeping quarters, work areas, etc. Once assembled, pods are structurally capable of being stacked one on top of the other to form a stacked assembly of multiple units. The design is such that two people can completely assemble the pod and connect the HVAC and power in less than one hour using simple locking tools or cordless power tools. When cam lock connectors as shown in FIGS. **8** and **9** are used to connect the subject modular panels, assembly in as quick as 20 minutes has been implemented.

[0056] Units may be disassembled and reconfigured in multiple configurations resulting in different shapes and/or sizes. In particular, such modular pod assemblies can be rapidly delivered for mission support via the standard 108"×88" air cargo pallet system used by the U.S. military. An exemplary disassembled modular pod weighs about 1200 pounds and stands about 42 inches high on a standard pallet, such that two disassembled pods can easily fit on one pallet. As such, material for 36 separate stand-alone pod assemblies can be transported on a single C-17 military aircraft. The lightweight and modular nature of the pod assemblies also makes the assemblies suited for transport in a disassembled state via other military aircraft including other fixed wing and rotary wing aircraft (e.g., CH-53, CH-47, AH-60 and others).

[0057] While the present subject matter has been described in detail with respect to specific embodiments thereof, it will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing, may readily produce alterations to, variations of, and equivalents to such embodiments. Accordingly, the scope of the present disclosure is by way of example rather than by way of limitation, and the subject disclosure does not preclude inclusion of such modifications, variations and/or additions to the present subject matter as would be readily apparent to one of ordinary skill in the art.

What is claimed is:

1. A modular pod assembly capable of being assembled and disassembled for transportation, comprising:

a plurality of modular panels, each said modular panel comprising a rigid and substantially planar structure delimited along one or more edges by respective coupling portions, each coupling portion formed to define a plurality of preconfigured access points for receiving respective connectors;

a plurality of connectors, each connector provided to securely fasten a coupling portion of a given modular panel to a coupling portion of another adjacent modular panel at a selected access point, wherein multiple connectors are used to securely fasten each coupling portion of a modular panel to a coupling portion of an adjacent modular panel;

wherein the plurality of modular panels when provided in an assembled state include at least one modular panel forming a top panel for the modular pod assembly, at least one modular panel forming a bottom panel, and a plurality of modular panels forming respective side walls, all modular panels securely fastened together at respective coupling portions via said plurality of connectors to form an integrated enclosure;

wherein the plurality of modular panels when provided in a disassembled state and stacked one on top of another are characterized by a total height of less than about 96 inches.

2. The modular pod assembly of claim **1**, wherein each said modular panel comprises:

first and second rigid and substantially planar support layers;

an adhesive insulating layer in between said first and second rigid and substantially planar support layers; and

a protective sealant provided on outer surfaces of the first and second rigid and substantially planar support layers.

3. The modular pod assembly of claim **1**, wherein each connector comprises an angle iron and plurality of carriage bolts, each said access point in each said coupling portion configured to receive at least one of said plurality of carriage bolts.

4. The modular pod assembly of claim **1**, wherein each connector is a cam lock connector comprising an engaging connector portion and a receiving connector portion, some of said access points within some of said coupling portions in the plurality of modular panels including respective engaging connector portions and some of said access points within some of said coupling portions in the plurality of modular panels including respective receiving connector portions such that each adjacent access point in the modular pod assembly

where a given modular panel is connected to an adjacent modular panel comprises one engaging connector portion and one receiving connector portion.

5. The modular assembly of claim **4**, wherein each said engaging connector portion comprises a cylinder for receiving a locking tool capable of actuating the engaging connector portion between a locked and an unlocked state.

6. The modular pod assembly of claim **1**, further comprising one or more adapter posts having additional coupling portions, each coupling portion of each adapter post formed to define a plurality of preconfigured access points for receiving respective connectors, each adapter post provided as an interface between two or more of said plurality of modular panels.

7. The modular pod assembly of claim **1**, further comprising a plurality of wheels mounted to a plurality of outer locations on said bottom panel.

8. The modular pod assembly of claim **1**, wherein said integrated enclosure formed when six of said modular panels are provided in an assembled state is characterized by respective length, width and height dimensions of between about 80 and 100 inches.

9. The modular pod assembly of claim **1**, wherein the plurality of modular panels when provided in a disassembled state and stacked one on top of another are characterized by a total height of between about 30 inches and about 48 inches.

10. The modular pod assembly of claim **1**, wherein the plurality of modular panels when provided in a disassembled state and stacked one on top of another are characterized by a total weight of less than about 1500 pounds.

11. A modular pod assembly, comprising:

a plurality of rigid and substantially planar modular panels, each said modular panel comprising first and second support layers and an insulating layer in between said first and second support layers, each said modular panel further comprising respective coupling portions along selected edges, each coupling portion formed to define a plurality of preconfigured access points for receiving respective connectors;

a plurality of connectors, each connector capable of transitioning between a locked and an unlocked state and provided to securely fasten a coupling portion of a given modular panel to a coupling portion of another adjacent modular panel at a selected access point, wherein multiple connectors are used to securely fasten each coupling portion of a modular panel to a coupling portion of an adjacent modular panel;

wherein the plurality of modular panels are securely attached to one another at said coupling portions via said plurality of connectors to form an integrated enclosure with at least one modular panel forming a top panel for the modular pod assembly, at least one modular panel forming a bottom panel, and a plurality of modular panels forming respective side walls.

12. The modular pod assembly of claim **11**, wherein each said rigid and substantially planar modular panel comprises:

first and second planar support layers;

an adhesive insulating layer in between said first and second planar support layers; and

a polyurethane protective coating provided on outer surfaces of the first and second rigid and substantially planar support layers.

13. The modular pod assembly of claim **11**, wherein each connector is a cam lock connector comprising an engaging connector portion and a receiving connector portion, some of said access points within some of said coupling portions in the plurality of modular panels including respective engaging connector portions and some of said access points within some of said coupling portions in the plurality of modular panels including respective receiving connector portions such that each adjacent access point in the modular pod assembly where a given modular panel is connected to an adjacent modular panel comprises one engaging connector portion and one receiving connector portion.

14. The modular assembly of claim **13**, wherein each said engaging connector portion comprises a rotatable latch and a cylinder for receiving a locking tool capable of actuating the rotatable latch into engagement with an adjacent receiving connector portion.

15. The modular pod assembly of claim **11**, further comprising one or more adapter posts having additional coupling portions, each coupling portion of each adapter post formed to define a plurality of preconfigured access points for receiving respective connectors, each adapter post provided as an interface between two or more of said plurality of modular panels.

16. The modular pod assembly of claim **11**, wherein at least one of said plurality of side walls corresponds to a front wall that is formed to define an opening therethrough, and wherein said modular pod assembly further comprises a door positioned within the opening defined in said front wall and securely attached to said front wall.

17. The modular pod assembly of claim **11**, wherein at least one of said plurality of rigid modular panels is formed to define at least first and second access points for respectively interfacing with an input air duct and an output air duct of an HVAC unit.

18. The modular pod assembly of claim **17**, further comprising:

an electrical panel coupled to an exterior location of one of said plurality of rigid modular panels; and

an HVAC unit comprising at least first and second air ducts coupled to said at least first and second access points formed within at least one of said plurality of rigid modular panels, said HVAC unit being electrically connected to said electrical panel.

19. The modular pod assembly of claim **11**, further comprising an acrylic-reinforced polyurethane protective coating applied over selected interior and exterior surfaces of said plurality of rigid modular panels.

20. A modular pod assembly, comprising:

a plurality of rigid modular panels each characterized by four perimeter portions;

a plurality of connectors securely fastening each said perimeter portion of each said modular panel to another perimeter portion of another one of said plurality of rigid modular panels to form an integrated enclosure having at least one top panel, at least one bottom panel and a plurality of respective side walls, the integrated enclosure having respective interior and exterior surfaces of each rigid modular panel;

wherein at least one of said plurality of side walls corresponds to a front wall that is formed to define an opening therethrough, and wherein said modular pod assembly further comprises a door positioned within the opening defined in said front wall and securely attached to said front wall;

wherein at least one of said plurality of rigid modular panels is formed to define at least first and second access points;

an electrical panel coupled to an exterior location of one of said plurality of rigid modular panels and adapted to provide an electrical interface for a power supply; and

an HVAC unit comprising at least first and second air ducts coupled to said at least first and second access points formed within at least one of said plurality of rigid modular panels, said HVAC unit being electrically connected to said electrical panel.

21. The modular pod assembly of claim **20**, further comprising an acrylic-reinforced polyurethane protective coating applied over selected interior and exterior surfaces of said plurality of rigid modular panels.

22. The modular pod assembly of claim **20**, further comprising an integrated hygiene unit mounted to an interior surface of one of said side walls, said integrated hygiene unit comprising a sink and a toilet.

23. The modular pod assembly of claim **20**, wherein an interior surface of said top panel is formed to define at least one opening therein, and wherein said modular pod assembly further comprises at least one light source mounted in the opening formed within the interior surface of said top panel.

24. The modular pod assembly of claim **23**, further comprising a transparent thermoplastic covering over said at least one light source.

25. The modular pod assembly of claim **20**, wherein said door comprises a view opening covered with at least one fixed layer of rigid transparent thermoplastic material.

26. The modular assembly of claim **20**, wherein said door comprises an access opening and access door securely mounted to said door and capable of being alternately provided between an open position to allow limited exchange through the access opening and a closed position secured with at least one latch mechanism.

27. The modular assembly of claim **20**, wherein said bottom panel is formed to define at least one opening therein, and wherein said modular pod assembly further comprises a drain affixed within the at least one opening formed in said bottom panel.

28. The modular pod assembly of claim **20**, wherein each said rigid modular panel further comprises:

first and second planar support layers;

an adhesive insulating layer in between said first and second planar support layers; and

a polyurethane protective coating provided on outer surfaces of the first and second rigid and substantially planar support layers.

29. The modular pod assembly of claim **20**, wherein selected connectors of said plurality of connectors is a cam lock connector comprising an engaging connector portion and a receiving connector portion, some of said access points within some of said coupling portions in the plurality of rigid modular panels including respective engaging connector portions and some of said access points within some of said coupling portions in the plurality of rigid modular panels including respective receiving connector portions such that each adjacent access point in the modular pod assembly where a given rigid modular panel is connected to an adjacent modular panel comprises one engaging connector portion and one receiving connector portion.

30. The modular pod assembly of claim **20**, further comprising one or more adapter posts having additional coupling portions, each coupling portion of each adapter post formed to define a plurality of preconfigured access points for receiving respective connectors, each adapter post provided as an interface between two or more of said plurality of rigid modular panels.

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