A portable, modular building structure.
On All Joints A $\frac{2}{8}$ Dia. Bead Of Butyl Caulk To Be placed On The Warm SDide Of The Panel Joint As Shown

1 Heavy Bead Of Butyloid Caulking On Panel Joint ($\frac{3}{8}$ dia. Beads Typical)

Warm Side

Cold Side

2 Beads For Freezer & All Exterior Applications, Or As Specified In Cooler Applications.

Silicone Or Approved Alternate On Panel Joints For Federally Inspected Areas Only Or As Specified.

Caulking Detail At Panel Joint

FIG. 16b
STATIC COMPRESSION BUILDING
CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of International Application No. PCT/US2011/035406, filed Sep. 27, 2011; which application claims the benefit of U.S. Patent Application No. 61/423,326, filed Dec. 15, 2010.

INCLUSION BY REFERENCE


BACKGROUND

The present disclosure generally relates to a portable structure that is modular in design, and in particular a lightweight building frame and wall elements that when assembled form the modular structure.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings emphasize the general principles of depicted embodiments of the present disclosure and are not necessarily drawn to scale. Reference characters designating corresponding components are repeated as necessary throughout the figures for the sake of consistency and clarity.

FIG. 1 is an isometric view of a first embodiment of a portable, modular structure as disclosed herein.

FIG. 2a is an exploded isometric view of a framing system for the portable, modular structure of FIG. 1.

FIG. 2b is an isometric view of the framing system of FIG. 2a and showing a tensioning system.

FIG. 3a is an exploded isometric view of a full corner assembly (absent tensioning members) of the framing system of FIG. 2a.

FIG. 3b is an isometric view of an assembled full corner assembly of the framing system of FIG. 2a.

FIG. 4a is an exploded isometric view of a side channel assembly (absent tensioning members) of the framing system of FIG. 2a.

FIG. 4b is an isometric view of an assembled side channel assembly of the framing system of FIG. 2a.

FIG. 5 is an isometric view of a portable, modular structure according to a second embodiment as disclosed herein.

FIG. 6 is an isometric view of a framing system of FIG. 5.

FIG. 7a is an exploded isometric view of a gable assembly (absent tensioning members) of the framing system of FIG. 6.

FIG. 7b is an isometric view of an assembled gable assembly of the framing system of FIG. 6.

FIG. 8a is an exploded isometric view of a side channel assembly (absent tensioning members) of the framing system of FIG. 6.

FIG. 8b is an isometric view of an assembled side channel assembly of the framing system of FIG. 6.

FIG. 9a is an exploded isometric view of an upper corner assembly (absent tensioning members) of the framing system of FIG. 6.

FIG. 9b is an isometric view of an assembled upper corner assembly of the framing system of FIG. 6.

FIG. 10 is an isometric view of a portable, modular structure according to a third embodiment as disclosed herein.

FIG. 11 is an isometric view of a framing system of FIG. 10.

FIG. 12a is an exploded isometric view of a first upper corner assembly (absent tensioning members) and an end fascia connection of the framing system of FIG. 11.

FIG. 12b is an isometric view of an assembled first upper corner assembly and an assembled end fascia assembly of the framing system of FIG. 11.

FIG. 13a is an exploded isometric view of a side fascia assembly (absent tensioning members) of the framing system of FIG. 11.

FIG. 13b is an isometric view of an assembled side fascia assembly of the framing system of FIG. 11.

FIG. 14a is an exploded isometric view of a second upper corner assembly (absent tensioning members) of the framing system of FIG. 11.

FIG. 14b is an isometric view of an assembled second upper corner assembly of the framing system of FIG. 11.

FIGS. 15a-15b illustrate alternate embodiments of the portable modular structure as disclosed herein.

FIGS. 16a and 16b are schematic views of exemplary panel(s) used with the structure disclosed herein.

FIG. 17 is an isometric view of an alternate embodiment of a portable, modular structure as disclosed herein.

FIG. 18 is an isometric view of the framing system of FIG. 17 and showing a tensioning system.

FIGS. 19a-19f are cross section views of configurations of different double capture frame members that may be used with the embodiments disclosed herein.

FIGS. 20a-20v illustrate aspects of an exemplary process of assembling a structure, in accordance with an exemplary method of the first embodiment of this disclosure.

FIG. 21 is an isometric view of a composite structure in accordance with a fourth embodiment of this disclosure.

FIG. 22 is an isometric view of a portable, modular structure of the composite structure of FIG. 21.

FIG. 23 is an exploded isometric view of a framing system for the portable, modular structure of FIG. 22.

FIG. 24 is an isometric view of the framing system of FIG. 23 and showing a tensioning system.

FIG. 25a is an exploded isometric view of a full corner assembly (absent tensioning members) of the framing system of FIG. 23, wherein the full corner assembly is for being mounted to a fixed wall of the composite structure of FIG. 21.

FIG. 25b is an isometric view of an assembled full corner assembly of the framing system of FIG. 23, wherein the full corner assembly is for being mounted to the fixed wall of the composite structure of FIG. 21.

DETAILED DESCRIPTION

Exemplary embodiments of this disclosure are described below and illustrated in the accompanying figures, in which like numerals refer to like parts throughout the several views. The embodiments described provide examples and should not be interpreted as limiting the scope of the invention. Other embodiments, and modifications and improvements of the described embodiments, will occur to
those skilled in the art and all such other embodiments, modifications and improvements are within the scope of the present invention.

[0041] The present disclosure is directed to a rigid, portable, mobile structure including a framing system and tensioning system for use as a dwelling, storage facility or general purpose building. Although disclosed primarily within the context of a rigid, portable structure including a framing system and tensioning system, the skilled artisan will recognize that the principles of the present disclosure are not so limited but extend to any type of portable structure that includes a framing system and tensioning system that is lightweight and may be assembled rapidly.

[0042] For clarity of discussion, the following three directional definitions are commonly used when discussing structures and are used throughout this application. “Longitudinal” refers to a longitudinal axis “α” oriented in a direction parallel to a first side of a structure. “Lateral” refers to a direction orthogonal to the longitudinal direction and to a lateral axis “β” oriented in a direction parallel to a second side of the structure. “Vertical” refers to a vertical axis “δ” oriented in a direction orthogonal to the longitudinal direction and the lateral direction. Collectively, the three directional axes establish a Cartesian coordinate system. The Cartesian coordinate disclosed is consistent throughout the disclosure. For purposes of the present disclosure, the longitudinal direction generally refers to a long side of the structure and the lateral direction generally refers to a short side of the structure. See for example the “directional vane” adjacent FIG. 1 of the drawings. In some configurations, such as square shaped structures, the longitudinal direction α and lateral direction β may be interchangeable. In fact, in any of the configurations or embodiments disclosed herein, the longitudinal and lateral directions α, β may be interchangeable. From time-to-time in this description, longitudinally extending walls or framing components shall be referenced as “front” and “back” solely for the purposes of ease of description. The nomenclature is not meant to be limiting to the invention, but is meant to facilitate discussion and explanation of the structure of the disclosure.

[0043] A static compression structure according to the present disclosure comprises a series of rigid panels releasably held together, at least in part, by compressive forces applied to said rigid panels by a tensioning system. According to certain embodiments, the series of rigid panels are supported by a framing system such that the panels are placed into compression by a tensioning system associated with the framing system. The structure may be formed when rigid panels are brought together with the framing system. According to certain embodiments, the framing system may generally be comprised of a plurality of panel engaging cap members cooperatively interconnecting at corner connections and co-linear member connections and a plurality of tensioning members cooperating with the cap members. According to at least one embodiment, opposing cap members engage opposing edges of at least one rigid panel, tensioning members span the distance between opposing cap members and, while being placed in tension, compress the therebetween engaged panel. When fully assembled, wall, roof and floor panels are captured in the framing by compressive forces applied along at least two axes, for example, the lateral β and vertical δ directions.

[0044] With reference now to the drawings, in which like numerals represent like components throughout the several views, a static compression structure according to one aspect of the present disclosure is a portable modular structure 10 that may comprise (with reference to FIGS. 1, 2B, 17 and 18) a pair of opposing side wall assemblies 7a, 7b, a pair of opposing end wall assemblies 8a, 8b, a roof assembly 9a and a floor assembly 9b. Since the structure 10 is modular, a plurality of side wall assemblies 7a, 7b, end wall assemblies 8a, 8b, roof assemblies 9a and floor assemblies 9b may be assembled to form a structure 10 that may have a variety of shapes and sizes (see FIGS. 15a-15b). For example, whereas FIGS. 1 and 2B illustrate aspects of a relatively large modular structure 10 of a first embodiment, FIGS. 17 and 18 illustrate aspects of a relatively small modular structure of an alternate embodiment.

[0045] Doors 28 and windows may be formed in any wall assembly of the structure 10. An example orientation of the components of the embodiment of FIG. 1, applying the directional definitions stated above, may be as follows: the side wall assemblies 7a, 7b extend in the longitudinal direction α and are spaced part in the lateral direction β; the end wall assemblies 8a, 8b extend in the lateral direction β and are spaced apart in the longitudinal direction α; and the roof assembly 9a and floor assembly 9b are spaced apart in the vertical direction δ. Respective assemblies 7a, 7b, 8a, 8b, 9a, 9b may be connected at edges of the structure 10 to form outer corners of the structure 10. For example, side wall assembly 7a may be connected with roof assembly 9a to form an outer corner of the structure 10, and side wall assembly 7a may be connected with end wall assembly 8a to form an outer corner of the structure 10. The structure 10 may be supported by a plurality of leveling bases 11. It is anticipated that each leveling base 11 will be adjustable such that the structure 10 can be positioned on a foundation or base, or uneven ground, and have a level floor.

[0046] Each side wall assembly 7a, 7b may be comprised of at least one wall panel 12, a lower cap member 14 and an upper cap member 16. The lower cap member 14 may engage with a lower edge of the wall panel 12 and the upper cap member 16 may engage with an upper edge of the wall panel 12 to support the wall panel 12 and form a portion of a framing system 5. Furthermore, according to some embodiments, the lower and upper cap members 14, 16 are interchangeable with one another. The lower and upper cap members 14, 16 should be of sufficient length to span the length of at least one wall panel 12, preferably of a length to span at least two wall panels, and most preferably of a length to span three or more panels.

[0047] Each end wall assembly 8a, 8b may be comprised of at least one wall panel 12, a lower cap member 14’ and an upper cap member 16’. The lower cap member 14’ may engage with a lower edge of the wall panel 12 and the upper cap member 16’ may engage with an upper edge of the wall panel 12 to support the wall panel 12 and form a portion of a framing system 5. Furthermore, according to some embodiments, the lower and upper cap members 14’, 16’ are interchangeable with one another. The lower and upper cap members 14’, 16’ should be of sufficient length to span the length of at least one wall panel 12, preferably of a length to span at least two wall panels, and most preferably of a length to span three or more panels.

[0048] Each roof assembly 9a may be comprised of at least one roof panel 13a, a front cap member 15 and a rear cap member 17. The front cap member 15 may engage with a first edge of the roof panel 13a and the rear cap member 17 may
engage with a second edge of the roof panel 13a to support the roof panel 13a and form a portion of a framing system 5. Furthermore, according to some embodiments, the front and rear cap members 15, 17 are interchangeable with one another. The front and rear cap members 15, 17 should be of sufficient length to span the length of at least one roof panel 13a, preferably of a length to span at least two panels, and most preferably of a length to span three or more panels. [0049] Each floor assembly 9b may be comprised of at least one floor panel 13b, a front cap member 15 and a rear cap member 17. The front cap member 15 may engage with a first edge of the floor panel 13b and the rear channel 17 may engage with a second edge of the floor panel 13b to support the floor panel 13b and form a portion of a framing system 5. Furthermore, according to some embodiments, the front and rear cap members 15, 17 may be interchangeable with one another. The front and rear cap members 15, 17 should be of sufficient length to span the length of at least one floor panel 13b, preferably of a length to span at least two panels, and most preferably of a length to span three or more panels. [0050] The structure 10 may comprise a plurality of vertically extending corner posts 19 arranged at corners of the structure 10. Alternatively, some embodiments may require no end post at intersecting wall assemblies 7a, 7b, 8a, 8b but may use a flashing or similar sheet metal material to conceal the intersection and offer some insulation benefits. A flashing or similar sheet metal material may offer the benefit of being able to form an intersection between a side wall element 7 and an end wall element 8 that is non-perpendicular intersection. [0051] Cap members 14, 15, 16, 17, 14’, 15’, 16’, 17’ are acceptably of a variety of configurations, as long as the configuration provides for at least the function of cooperating with a panel edge to accomplish the application of compression forces and so long as the configuration can cooperate with the tensioning members and the panel to effect the necessary forces, connections and stability that will be evident to one of skill in the art reading this disclosure. For example, but without limitation, the cap member may be a flat plate with acceptable panel gripping features and interfacing for the tensioning system. According to some embodiments, including those depicted in the appended drawings, each cap member is of a configuration having an elongated base plate and opposing, upstanding side plates, such that there is defined thereby an elongated, open channel or trough along the length of the cap member. This cap member configuration, which shall be referred to herein as a channel member, provides certain advantages to the current static compression structure that make the channel member more preferable than, for example, a flat plate without upstanding side plates (which, as mentioned above may be an acceptable but less preferred cap member). For example, but without limitation, the trough/channel of the channel member may engage with or accept therein an end portion of a panel 12, 13 (as opposed to simply engaging the edge of the panel). The trough of the channel member may have right-angled inner corners or may have a variety of other cross sectional shapes, including but not limited to, U-shaped, C-shaped, V-shaped, to accommodate the desired shape of the end portion of the respective panel. [0052] According to at least one embodiment of the present disclosure, all of the channel members (lower 14, 14’, upper 16, 16’, front 15, 15’, and rear 17, 17’) are formed in a particular design referred to sometimes herein as a “double capture frame member” or a “double channel configuration”. FIGS. 19a-19f illustrate but some of the possible cross section configurations for the double capture frame members. Double capture frame members may extend in the longitudinal direction α, the lateral direction β, or the vertical direction δ. For discussion purposes only, double capture frame members extending in the longitudinal direction α will have reference number 51 or 51’, double capture frame members extending in the lateral direction β will have reference number 53 or 53’ and double capture frame members extending in the vertical direction δ will have reference number 55. For ease of description, the double capture frame members 51 intended for orientation in the longitudinally extending directions shall be referred to as “longitudinal frame members 51” and the double capture frame members 53 intended for orientation in the laterally extending directions shall be referred to as “lateral frame members 53.” Double capture frame members support one edge of each of two adjacent perpendicular panels, such as, for example, a floor panel and a wall panel or a roof panel and a wall panel. The channel members 14, 15, 16, 17 may be arranged substantially orthogonal to one another when joined to form the respective double capture frame members. An example of one embodiment of a longitudinally extending double capture frame member 51 is seen by reference to FIG. 3a as having an upper channel member 16 permanently attached to a rear channel member 17, with their elongated, open channels/troughs oriented longitudinally parallel but facing at about 90 degrees to one another. It will be understood that, according to some embodiments of the present disclosure, each longitudinally extending double frame member 51 can be interchangeably used for a frame member 51 at any of the four longitudinal edges of the structure 10; for example each longitudinal double capture frame member 51 may function as any of an upper-front, upper-rear, lower-front and lower-rear frame member. Similarly, it will be understood that, according to some embodiments of the present disclosure, each laterally extending double frame member 53, 53’ can be interchangeably used for a frame member 53, 53’ at any of the four lateral edges of the structure 10; for example each lateral double capture frame member 53 may function as any of an upper-left, upper-right, lower-left and lower-right frame member. According to some embodiments, the floor panels 13b may be thicker than the wall panels 12 and thicker than the roof panels 13a, and, therefore, the upper frame members 51, 53 may not be interchangeable with a lower frame member 51’, 53’. For example, the trough opening of the channel member 15, 17 receiving the end section of a floor panel 13b may be wider than that of the channel member 15, 17 receiving either a wall panel 12 or a roof panel 13a. In such an embodiment, while the lower longitudinal frame member 51’ may still be used on either side of the floor panel 13b, it may not be useful as an upper frame member 51 supporting a roof panel 13a. The same would be true of lateral frame members 53’ in such an embodiment. For an example of a laterally extending double capture frame member 53, refer inter alia to FIG. 2a. It is not required that the double capture frame member have two channel members arranged with their channel openings directed substantially perpendicular to one another, and the channel members may be arranged at any angle relative to each other to form non-parallel piped structures. Further, alternatively, channel members forming a double capture frame member may be arranged non-parallel along their length to facilitate assembly, for example, of pitched or gabled roofs. See for example FIGS. 5-14 discussed below. Similarly, the corner post 19 may also be configured as a
double capture frame member 55 having channel members arranged to be substantially perpendicular and receive intersecting wall panels 12 at a corner of the structure 1. Alternatively, the channel members forming a double capture corner post frame members 55 may be arranged at an angle relative to one another to facilitate non-perpendicular wall arrangements.

According to some embodiments, as herein depicted, all of the channel members and double capture members are substantially rigid or semi-rigid (for example sufficiently rigid to support its own weight across an intended span without substantial sagging) and may be fabricated from a lightweight metal, such as, for example, aluminum or a steel alloy. Alternatively, the channels and double capture members may be made of a heavy durable plastic, such as, for example, polyvinyl chloride. All of the panels (wall, roof and floor) may be made of lightweight material and may have a composite structure. For example, an interior of the panels may be fabricated from a lightweight material such as foam and the exterior fabricated from a stronger material such as sheet metal.

A tensioning system 20 may be employed to place wall assemblies 7a, 7b, 8a, 8b, roof assemblies 9a and 9b and floor assemblies 9b into a compressed state. The tensioning system of the depicted embodiment may be comprised of a plurality of tensioning members 22, 26 and associated hooks or anchors (as discussed below). Lateral tensioning members 22 extend generally in the lateral direction β and vertical tensioning members 26 extend generally in the vertical direction δ. The tensioning members 22, 26 may be rigid or non-rigid depending on the particular application. Preferably, the tensioning members 22, 26 may be non-rigid. The tensioning members 22, 26 are also adjustable in length. As such, the tension associated with each tensioning member 22, 26 may be adjusted. A substantial portion of the tension in the tensioning member 22, 26 may be directly transferred to a respective wall assembly 7a, 7b, 8a, 8b, roof assembly 9a or floor assembly 9b to place the particular assembly 7a, 7b, 8a, 8b, 9a, 9b in a state of compression. The panels 12, 13a, 13b react to being placed in compression to become a stronger and more rigid panel. The tensioning system 20 may further comprise a plurality of stabilizing cables 24 that extend from the structure 10 to locations exterior the structure 10 to further anchor the structure 10 in position. The stabilizing cables 24 may also be adjustable and when installed, may be in tension. The stabilizing cables 24 may also apply additional compressive loading to the assemblies 7a, 7b, 8a, 8b, 9a, 9b. Examples, without limitation, of acceptable tensioning members include (i) a heavy-duty nylon strap with connecting hooks at two displaced locations on the strap and with mechanical ratcheting mechanisms that (releasably) cinch the strap to shorten the distance between the two hooks and (ii) a cabling system including two cables, each with a connecting hook or eye-loop at one end, joined at their non-hooked ends by a cable cinching mechanism (such as a turnbuckle) that (releasably) draws the two cables toward one another to shorten the distance between the two hooks.

FIG. 2a is an exploded isometric view of a framing system 5 for the modular portable structure 10 according to the depicted embodiments of FIGS. 1-4. The framing system 5 may be comprised of longitudinal frame members, lateral frame members, corner brackets, in-line brackets, and corner posts 19 (if required by the particular embodiment). Since the structure 10 is modular, the framing system 5 is modular as well. In fact, the modular nature of the framing system 5 enhances the modular nature of the structure 10. The longitudinal frame members 51 may have a connection element 34 at each end (see FIG. 4a). The connection elements 34 of the longitudinal frame member 51 may extend from an outer surface of the double capture frame member 51 and perpendicular to the outer surface (as illustrated and for this particular embodiment, in the lateral direction β). The connection element 34 may facilitate connection of adjacent longitudinal frame members 51 with the tensioning system 20 (see FIG. 4a). Similarly, according to the depicted embodiment of FIG. 2a, the lateral frame member 53 may have a connection element 34 at one end, also extending from an outer surface and generally perpendicular to the outer surface (as illustrated and for this particular embodiment, in the longitudinal direction δ). The lateral frame member 53 of the depicted embodiment of FIG. 2a, has a connection element 34 at one end and an elongate connection element 36 at the other end (see FIG. 3a). The elongate connection element 36 may be used at a corner assembly of the frame and may extend from the end of the lateral frame member 53 and in a direction parallel with the channel (as illustrated, in the lateral direction β). In some embodiments, it is anticipated that the double lateral frame member 53 may have an elongate connection element 36 at both ends. The connection element 34 and elongate connection element 36 may facilitate connection of the lateral frame member 53 with the tensioning system 20.

FIGS. 3a and 3b are an exploded isometric view of a corner assembly and an isometric view of an assembled corner assembly, respectively, of the framing system 5 of FIG. 2a. FIG. 3b shows elements of the tensioning system 20 at the corner assembly. A typical upper corner assembly may include a corner post 19, a longitudinal frame member 51, a lateral frame member 53, a corner bracket 32, and tensioning members 22, 26. When the upper corner assembly is assembled, the longitudinal frame member 51 and the lateral frame member 53 may engage with an upper end of the corner post 19. Similarly, when the lower corner assembly is assembled, the longitudinal frame member 51 and the lateral frame member 53 may engage with a lower end of the corner post 19. With reference to a corner assembly only, the longitudinal frame member 51 may have a connection element 34 at the frame member end forming a portion of the corner assembly and the lateral frame member 53 may have an elongate connection element 36 at the frame member end that forms a portion of the corner assembly. The corner bracket 32 includes a slot 33 (see FIG. 3a) formed therein and into which are received, side-by-side, the elongated connection element 36 and the connection element 34 of abutting, perpendicular frame members 51, 53. Alternate embodiments may have multiple parallel slots in the single corner bracket 32. In its manner of assembly, the combination of corner bracket 32 and two connection elements 34, 36 perform at least the dual function of connecting frame members 51, 53 and anchoring tensioning members 22, 26. The connection element 34 may be formed with a hook shaped or “J” shaped anchor end 34 and is intended to interact or engage with the tensioning members 26 by providing a connection location for vertical tensioning members 26 of the tensioning system and transferring a tensile load from the tensioning member to apply a compressive load to panels of the abutting side wall assembly 7 and end wall assembly 8. The elongate connection element 36 may be formed with a hook shaped or “J” shaped anchor end 36 and is also intended to interact or engage with the
vertical tensioning members 26 by providing a connection location for tensioning members 26 of the tensioning system and transferring a tensile load from the tensioning member to apply a compressive load to panels of the abutting side wall assembly 7 and end wall assembly 8. When assembled, the hook portion 34 of the connection member 34 may interface with the hook portion 36 of the elongate connection member 36 to form a common connection element. The corner bracket 32 may be generally “L” shaped and may comprise a corner bracket anchor element 38, which may be hook shaped or “J” shaped and is intended to interact or engage with the lateral tensioning members 22 by providing a connection location for tensioning members 22 of the tensioning system and transferring a tensile load from the tensioning member to apply a compressive load to panels of the abutting roof assembly 9 or floor assembly 9b. Generally, the tensioning member 26 that engages with the hook portions 34, 36 will extend in the vertical direction between vertically aligned corners, and the tensioning member 22 that engages with the corner bracket anchor element 38 will extend in the lateral direction between adjacent corners. Although the hook portions 34, 36, 38 are disclosed as hook shaped elements, the hook/anchor portions 34, 36, 38 may be any shape to satisfy the minimum requirement of engaging with the tensioning members and bearing sufficient load such that the respective side wall assembly 7, end wall assembly 8, roof assembly 9 or floor assembly 9b is placed into compression.

Collectively, the frame 5 and its subcomponents (lower and upper side channels 14, 16; front and rear channels 15, 17; corner posts 19; corner brackets 32; and brackets 30), the tensioning system and its subcomponents (tensioning members 22, 26), the wall panels 12 that form either side walls 7 or end walls 8, the panels 13a, 13b that form a portion of either the roof assembly 9a or the floor assembly 9b cooperate to produce a structure that is repeatedly assembled and disassembled, modular, rigid when assembled, and transported in its component portions. In addition to tying the structure 10 together, the tensioning system functions to place the walls, floor and roof of the structure 10 into a compressive state of loading and strengthen the structure 10.

A typical butt-splice assembly for adjacent, co-linear frame members 51 may include a pair of adjacent upper longitudinal frame members 51, or a pair of adjacent lower longitudinal frame members 51 (alternatively, a pair of adjacent upper lateral frame member 53 or a pair of adjacent lower lateral frame member 53) and a butt-splice bracket 30. With reference to FIG. 4a, the adjacent ends of the lower longitudinal frame member 51 may have a connection element 34 at each channel end and are brought together. The connection element 34, similar to that described previously, have hook shaped or “J” shaped anchor ends 34a and is intended to interact or engage with the vertical tensioning members 26 by providing a connection location for tensioning members 26 of the tensioning system and transferring a tensile load from the tensioning member to apply a compressive load to panels of an abutting side wall assembly 7. When assembled, the hook portion 34 of the connection member 34 may interface or contact with the hook portion 34 of the adjacent connection member 34 to form a common connection element. The bracket 30 may be of a construction similar to corner bracket 32, that is the butt-splice bracket 30 may be generally “L” shaped and may comprise a slot 31 (or multiple parallel slots) to accept therein the adjacent connection elements 34, and a bracket anchor element 42, which may be hook shaped or “J” shaped and is also intended to interact or engage with the lateral tensioning member 22 by providing a connection location for tensioning members 22 of the tensioning system and transferring a tensile load from the tensioning member to apply a compressive load to a panel of an abutting roof assembly 9a or floor assembly 9b. In its manner of assembly, the combination of butt-splice bracket 30 and two adjacent connection elements 34 perform at least the dual function of connecting adjacent co-linear frame members and anchoring tensioning members 22, 26. Generally, the tensioning member 22 that engages with the bracket anchor element 42 of the bracket 30 and extends in the lateral direction between spaced apart upper side channels 16 or between spaced apart lower frame members 51 and the tensioning member 26 that engages with the hook portion 34 established by the adjacent connection elements 34 will extend in the vertical direction between vertically aligned frame members (i.e. either side wall assemblies or end wall assemblies). Although the hook/anchor portions 34, 42 are disclosed as hook shaped elements, the hook/anchor portions 34, 42 may be any shape to satisfy the minimum requirement of engaging with the tensioning members 22, 26 and bearing sufficient load such that the respective side wall assembly 7, end wall assembly 8, roof assembly 9 or floor assembly 9b is placed into compression.
Experimental Assembly of the Structure:

The following describes an experimental assembly of the structure 10 of FIG. 1 and provides one example of a process actually performed for assembly of the structure 10 of the present disclosure. This assembly follows one example embodiment of an assembly process, and is experimental in that it was timed and monitored. The present disclosure, and its related inventions are not limited to this sole assembly process nor are they limited by the specific components as used in this assembly process. Rather, one skilled in the art will understand acceptable variations, based on a reading and understanding of this entire specification and the accompanying drawings.

The structure 10 of this experimental assembly generally consists of pre-manufactured cap members 14, 15, 16, 17 and post members 19, pre-manufactured floor, wall and roof panels 12, 13a, 13b, pre-manufactured brackets 30, 32, and pre-prepared tensioning straps and cables 22, 26. For this assembly, the pre-manufactured panels 12, 13a, 13b were polystyrene foam and steel composite panels. The floor panels were dimensioned, nominally, 16"x46"x6" and were thicker than the wall and roof panels, which were dimensioned, nominally, 8"x46"x4" and 16"x46"x4", respectively. For this assembly, the cap members were structural channel members formed as double capture frame members 51, 53, 51', 53' as earlier defined; and for this assembly, the troughs of the floor channel members 15', 17' were wider than the troughs for the roof channel members 15, 17. The components arrived at the building site as a package/kit ready to be assembled. The frame members 51', 53' containing the floor channel members 15', 17' were to be used to form an entire perimeter of a floor assembly 9b (in some embodiments, the floor assembly 9b may be comprised of a plurality of connected floor assemblies 9b).

FIGS. 20a through 20h illustrate aspects of the exemplary process of assembling the structure 10. As assembly begins, an elevated and level base (see leveling bases 11) is prepared. As shown in FIG. 20a, a first floor panel 13b was laid out on respective leveling bases 11, establishing the basic starting point, the location of the first end of the structure, and the lateral dimension.

Referring to FIG. 20b, opposing lower longitudinal frame members 51' were placed on respective bases 11, one on each side of the first floor panel 13b, and the opposing lower longitudinal frame members were pressed against the first floor panel capturing the longitudinal side portions of the first floor panel in the troughs of the respective channel members of the lower longitudinal frame members. A pair of collinear lateral frame members 53' were arranged perpendicular to the longitudinal frame members 51', pressed onto the lateral end portion of the first floor panel 13b, and joined with first ends of the two opposing longitudinal frame members 51' using corner brackets 32. The distance between the opposing longitudinal frame members 51' required two, collinear lateral frame members 53', and they were adjoined with one another using a butt-splice bracket 30.

Referring to FIG. 20c, a second floor panel 13b was introduced to the two opposing frame members 51', spanning the distance there-between, by sliding the front-side section and rear-side section of the panel into the trough regions of the respective channel members of the opposing frame members 51', thereby capturing the longitudinal side portions of the second floor panel in the respective channel member. The second floor panel 13b was slid toward the first end of the two opposing frame members 51', until the second floor panel abutted the first floor panel 13b. Subsequent floor panel(s) 13b were similarly introduced and slid into place in the same opposing frame members 51', so that the opposing frame members 51' accommodated three floor panels 13b. Each panel (whether it be a wall panel 12, roof panel 13a or floor panel 13b) was formed with an interlocking edge by which one panel's edge engages with (actually slips inside) an adjacent panel edge; and this “engaging joint” was employed by pushing together the adjacent panels.

Referring to FIG. 20d, as each section of floor section/assembly 9b was assembled (e.g., three floor panels 13b were captured by the pair of opposing longitudinal frame members 51'), a second longitudinal frame member 51' was abutted in collinear orientation, to each of the already in place longitudinal frame members. Referring to FIGS. 20e through 20g, a butt-splice bracket 30 was placed over the adjacent connection elements 34, and a lateral tensioning member 22 was connected between the opposing frame members 51' from bracket connection element 42 to connection element 42 of the assembled section. The tensioning member 22 used on the floor panels was wire cables with an intermediate turnbuckle; and the tensioning member was tightened by hand, through hand activation of the turnbuckle, to pull the opposing frame members 51' on each side of the structure 10 together and place the first floor section/assembly 9b in compression. The tightening of the tensioning system 20 provides strength of the system. Next, the floor panels 13b of the adjacent floor section/assembly 9b were added, in a manner similar to the first floor section. As each of the collinear frame members 51' of floor was linked together, a bracket 30 captured and secured each end of the adjacent and connecting collinear frame members. The bracket 30 not only captured the ends of the adjacent collinear frame members 51', but also provided a compression tie point for the lateral tensioning members 22 to compress the respective floor panels 13b. This procedure was repeated until the floor (all intended sections) was completed, except for including the final pair of lateral frame members 53'. Two technicians typically handled each floor panel, one at each side (front/back) edge, placing the opposing side sections into the respective channel member trough and sliding the panel into place.

Referring to FIG. 20b, the final pair of lateral frame members 53' for the floor were installed to cap the exposed lateral edge of the last installed floor panel 13b. To accomplish this closure, two, collinear lateral frame members 53' were arranged perpendicular to the longitudinal frame members 51' and joined with the ends of the two opposing longitudinal frame members 51' using corner brackets 32. The final pair of lateral frame members 53' were collinear and adjoined end-to-end with one another using a butt-splice bracket 30. Again, a cable tensioning member joined the opposing longitudinal frame members 51' and was tightened, by hand, to place the captured floor panels in compression. At the corners, the corner brackets 32 were utilized to hold the adjacent connection elements 34, 36, and a lateral tensioning member connected with the respective anchors 38, 38.

Referring to FIGS. 20i and 20k, after the floor assembly 9b was constructed; the wall panels 12 were slid from above into the upwardly open troughs of the upwardly facing channel members of the frame members 51, 53 that now established the perimeter of the floor assembly 9b. As each wall panel was introduced into the respective upwardly open trough, it was slid tightly against the adjacent wall panel,
taking advantage of the aforementioned engaging joint. One technician easily handled and lifted a single eight foot wall panel 12 into position and slid it into the engaging joint of the adjacent panel 12 already in an installed position in the framing system 5.

[0071] Referring to FIG. 20a, one at a time, beginning at one end of the structure, the upper frame members 51, 53, which are for eventually capturing the roof panels 13a, were placed on top of the wall panels 12. As each section of wall assembly 9b was assembled (e.g., three panels were captured by the pair of vertically opposed longitudinal frame members 51, 51'), a second frame member 51 was abutted, in collinear orientation, to the respective already in place frame member 51; a butt-splice bracket 30 was placed over the adjacent connection elements 34; and a vertical tensioning member 26 was connected between the vertically opposing frame members 51, 51' (from bracket connection anchor 34' to connection anchor 34') of the assembled section, as may be understood with reference to FIG. 20.

[0072] Referring to FIG. 20a, at the corners of the structure 10, before the respective upper, lateral frame members 53 were set in place, corner posts 19 were installed in each of the corners by sliding the double channel post members onto the respective end and side wall panels 12 from above. After the end wall sections 8a that form one end of the structure 10 and a few side wall sections 7a abutting the end sections 8a of the structure 10 were in an installed position and capped by the respective upper frame members 51, 53 (e.g., so that the upper portions of the walls 12 are respectively received in the downwardly open troughs of the downwardly facing channel members of the frame members 51, 53) roof panels 13a were installed. No special hoisting equipment was needed, only a few step ladders. The roof panels were installed much the same as the floor panels 13b, with two technicians typically handling each roof panel, one at each side (front/back) edge, simultaneously placing the opposing end sections into the respective channel member trough, with the aid of a step ladder, and sliding the panel toward the first end of the structure and into place. Alternatively, the edges of roof and floor panels 13a, 13b may be installed one at a time, by placing one of the opposing end sections into the respective channel member trough, followed by placing the other of the opposing end sections into the respective channel member trough. To avoid accidental tipping of the end wall, a technician was in attendance by the first-end wall until the first section of roof was installed.

[0073] Before the final roof panel 13a was installed, the final wall panels 12 for the still open end (wall assemblies 8b) were installed, allowing for the final corner posts 19 to be installed. Then, the final roof panel 13a was slid into place, and the final two lateral frame members 53 were positioned and the respective corner and butt-splice brackets installed. Referring to FIG. 20a, at the corners, the corner brackets 32 were utilized to hold the adjacent connection elements 34, 36, and a vertical tensioning member connected with the respective anchors 34, 36. The vertical tensioning member 26 used on the wall panels 12 was a fabric strap with mechanical ratchet; and the tensioning member was tightened by hand, through hand activation of the ratchet, to pull the opposing frame members at the top and bottom of the structure 10 together and place the wall sections in compression.

[0074] The system of butt-splice brackets 30 and horizontal tensioning members 22 used to assemble the floor assembly 9b were similarly used throughout assembly of the roof sections. The final tensioning members were connected and all tensioning members hand tightened to place all floor, wall and roof assemblies in compression in both the lateral β and vertical directions δ. Since all wall panels 12 are interchangeable, final placement of panels containing doors and windows were determined at the time of installation.

[0075] For this experimental installation, taking just over 68 minutes, a 685 square foot temporary or semi-permanent structure 10 was erected, using four and sometimes five technicians.

[0076] End of Experimental Assembly

[0077] FIG. 5 is an isometric view of a portable modular structure 100 according to a second embodiment, as disclosed herein. The structure 100 comprises a roof, opposing side panels and opposing end panels. The roof is gabled and has a peak along a central roof line.

[0078] FIG. 6 is an isometric view of a framing system 105 (rigid panels removed for clarity) of the structure 100 of FIG. 5. The framing system 105 may comprise a plurality of spaced apart longitudinal and lateral cap members, a plurality of corner posts, a tensioning system 120, a plurality of butt-splice brackets and a plurality of corner brackets. The cap members used in connection with this embodiment may be single channel members or double capture/channel frame members. The embodiments depicted in the drawings of FIGS. 5-9 are seen to include double capture frame members and reference below to frame members is understood to refer to, without limitation of the invention, such double capture frame members.

[0079] FIGS. 7a and 7b are an exploded isometric view and an isometric view, respectively, of a gable assembly of the structure 100 of FIG. 6. FIG. 7b shows elements of the tensioning system 120 at the gable assembly. The gable assembly 130 includes, according to one embodiment, a double capture ridge cap frame 132, a pair of fascia-end frame member 134, 136 that are also double capture frame members, and a gable bracket 138, all interconnecting in a manner apparent by following the principles of FIGS. 1-4 and referencing FIGS. 7-9. The ridge cap frame member 132, the pair of fascia-end frame members 134, 136 and the gable bracket 138 may each comprise a hook or anchor element (following the principles of the embodiments of FIGS. 1-4) that engages with the tensioning system and provides a connection location for tensioning members of the tensioning system. The gable bracket 138 interfaces with the ridge-cap frame member 132 and the pair of fascia-end frame members 134, 136 to, in part, tie the assembly 130 together and increase the rigidity and strength of the assembly 130. According to one embodiment, depicted in these FIGS. 7a, 7b, the gable frame members are examples of double capture frame members formed with channel members that are not aligned parallel to one another along their lengths. Rather, the channel members diverge in order to support the gabled roof panels at an angle to the end wall assemblies.

[0080] FIGS. 8a and 8b are an exploded isometric view of a butt-splice assembly 160 and an isometric view of an assembled butt-splice assembly 160 of the framing system 105 of FIG. 6. The butt-splice assembly 160 may comprise a pair of co-linear longitudinal frame members 122 and a side wall bracket 162. The side wall bracket 162 and longitudinal frame members 122 may each comprise a connecting element provides a connection location for tensioning members of the tensioning system 120. The side wall bracket 162 interfaces
with the frame members 122 to, in part, tie the assembly 160 together and increase the rigidity and strength of the assembly 160.

[0081] FIG. 9a is an exploded isometric view of an upper corner assembly 180 of the framing system of FIG. 6. FIG. 9b is an isometric view of an assembled upper corner assembly 180 of the framing system of FIG. 6. The corner assembly 180 may comprise a longitudinal frame member 122, a fascia-end frame member 136, a corner post 124 and a corner bracket 182. The corner bracket 182, channel 122 and fascia-end frame member 136 may each comprise a connecting element that engages with the tensioning system 120 and provides a connection location for tensioning members of the tensioning system 120. The corner bracket 182 interfaces with channel 122 and the fascia-end frame member 136 to in part tie the assembly 180 together and increase the rigidity and strength of the assembly 180. Generally, the brackets and connection elements depicted in the drawings for the embodiments described in FIGS. 5-14 are similar in principle and function to those described in FIGS. 1-4. The skilled artisan will understand by reference to the drawings and the prior written description how the brackets, connection elements, and when applicable, the slots within the brackets, cooperate with the tensioning system to place the structure into compression.

[0082] FIG. 10 is an isometric view of a portable modular structure 200 according to a third embodiment, as disclosed herein, and FIG. 11 is an isometric view of a framing system 205 of FIG. 10. The structure 200 comprises a generally pitched roof, opposing side panels and opposing end panels.

[0083] The caps members used in connection with this embodiment may be single channel members or double capture/channel frame members. The embodiments depicted in the drawings of FIGS. 5-9 are seen to include double capture frame members and reference below to frame members is understood to refer to, without limitation of the invention, such double capture frame members.

[0084] FIG. 12a is an exploded isometric view of a first corner of the framing system 220 of FIG. 11b and FIG. 12b is an isometric view of an assembled first corner 241 of the framing system of FIG. 11b. The first corner 241 may comprise a compound fascia end assembly 240 and a first corner assembly 250. The first corner assembly may comprise a first fascia frame member 246, a corner post 248, a first fascia-end frame member 244 and a front corner bracket 252. The compound fascia end assembly 240 may comprise a second fascia-end frame member 242 and the first fascia-end frame member 244. The first fascia frame member 246, the first fascia-end frame member 244 and the front corner bracket 252 may each comprise a connecting element that engages with tensioning members of the tensioning system 220 and provides a connection location for tensioning members of the tensioning system 220. The front corner bracket 252 interfaces with first fascia-end frame member 244 and the front fascia frame member 246 to, in part, tie the assembly 240 together and increase the rigidity and strength of the assembly 240. The second fascia-end frame member 242 and the first fascia-end frame member 244 of the compound fascia end assembly 240 may each comprise a connecting element that engages with the tensioning system 220 and provides a connection location for tensioning members of the tensioning system 220.

[0085] FIG. 13a is an exploded isometric view of a side fascia assembly 270 of the framing system 205 of FIG. 11b. FIG. 13b is an isometric view of an assembled side fascia assembly 270 of the framing system 205 of FIG. 11b. The side fascia assembly 270 may comprise a pair of frame members 246 and a side wall bracket 272. The side wall bracket 272 and frame members 246 may each comprise a connecting element that engages with tensioning members of the tensioning system 220 and provides a connection location for tensioning members. The side wall bracket 272 interfaces with the frame member 246 of FIG. 11b to, in part, tie the assembly 270 together and increase the rigidity and strength of the assembly 270.

[0086] FIGS. 14a and 14b are isometric views of a second corner assembly 290 of the framing system 205 of FIG. 11b. The second corner assembly 290 may comprise a second fascia-end frame member 242, a back end fascia frame member 296 and a second corner bracket 292. The second corner bracket 292 and frame members 242, 296 may each comprise a connecting element that engages with tensioning members of the tensioning system 220 and provides a connection location for tensioning members of the tensioning system 220. The second corner bracket 292 may interface with the frame members 242, 296 to in part tie the assembly 290 together and increase the rigidity and strength of the assembly 290.

[0087] FIGS. 15a-15g are alternate embodiments of the portable modular structure as disclosed herein. For example, FIG. 15a is an embodiment of a structure having a gable roof. As another example, FIG. 15b is an embodiment of a structure having an "L" shape. As another example, FIG. 15e is an embodiment of a structure having that is generally two structures placed adjacent each other to produce a structure that is wider than an individual structure. As another example, FIG. 15f is an embodiment of a structure having an "L" shape and a gable roof.

[0088] FIGS. 16a and 16b are schematic views of a wall panel or panel used with the structure disclosed herein. The panel 12, 13 has a first pair of opposing ends that interface with a frame of a modular structure and a second pair of opposing ends that interface with adjacent panels 12, 13. The panel 12, 13 is a composite structure having an "skin" that covers an inner panel material. The inner panel material may generally be a lightweight material, such as, for example, a solid foam or polymer material, that strengthens when placed in compression. The outer skin may be a thin metal, such as, for example, a sheet metal. One end of the second pair of opposing ends of the panel 12, 13 may be recessed slightly to engage with an interface element arranged to produce a joint on the other end of the second pair of opposing ends of the panel 12, 13 (see FIG. 16b). Engagement with the interface element may provide an improved fit and sealing against the elements. Caulkling may be applied at the joint to further improve sealing.

[0089] For each of the previously discussed embodiments, one or more of the floor, wall and roof assemblies may optionally be replaced with a fixed structure, such as a conventional fixed floor (e.g., concrete slab), a conventional fixed wall and/or a conventional fixed roof, to provide numerous other embodiments of this disclosure. For example, FIGS. 21-24, 25a and 25b illustrate aspects of a fourth embodiment that is like the first embodiment (e.g., see FIGS. 1, 2a, 2b, 3a, 3b, 3c, 4a, 4b, 9a, 19b, 19c), except for variations noted and variations that will be apparent to one of ordinary skill in the art. For example, the modular structure 10 of the first embodiment may be characterized as being freestanding, or at least relatively freestanding as compared to a modular structure 310 of a fourth embodiment, which is for being fixedly mounted to a
fixed upright structure that may be a fixed wall 307. The fourth embodiment is like the first embodiment, except that the side wall assembly 7a of the first embodiment is replaced with the fixed wall 307 to which the modular structure 310 of the fourth embodiment is attached. The fixed wall 307 may be any suitable conventional wall, such as a masonry, concrete and/or steel wall that is sufficiently strong for having the modular structure 310 mounted thereto. For example, the fixed wall 307 may be part of a conventional building to which the modular structure 310 is attached.

[0090] The framing system 305 of the fourth embodiment is like the framing system 5 of the first embodiment, except for example, at the side for being mounted to the fixed wall 307 the corner posts 19 and frame members 51, 51' of the first embodiment are replaced with fixedly mountable corner posts 319 and fixedly mountable frame members 351, 351'. The corner posts 319 and frame members 351, 351' each may include or define an elongated, open channel or trough, or shoulder, along the length thereof for receiving or otherwise supporting the respective edge of the associated wall, roof or floor panel 12, 13a or 13b. Each of the corner posts 319 and frame members 351, 351' include at least one flange or more holes or notches for having fasteners 375, such as bolts, extend therethrough. The fasteners 375 are for penetrating into and becoming fixedly mounted to the fixed wall 307, for mounting the corner posts 319 and frame members 351, 351' to the fixed wall. The frame members 351, 351' have connection elements 34 at their ends for holding onto respective ends of tensioning members 22.

[0091] The framing system 305 of the fourth embodiment is like the framing system 5 of the first embodiment, except for example, the frame members 53, 53' of the first embodiment that would be adjacent to the corner posts 319 are replaced with frame members 353, 353' that include at least one flange with one or more holes or notches for having fasteners 375, such as bolts, extend therethrough. The fasteners 375 are for penetrating into and becoming fixedly mounted to the fixed wall 307, for mounting the frame member 353, 353' to the fixed wall. The frame members 353, 353' further include connection elements 34 at their ends adjacent the fixed wall 307 for holding onto respective ends of tensioning members 22.

[0092] The connection elements 34 may be an integral part of the frame members 351, 351', 353, 353' or the connection elements may be mounted to the respective frame members in any suitable matter, such as by welding. In addition or alternatively, the frame members 351, 351', 353, 353' may extend from brackets or flanges that are connected to the frame members 351, 351', 353, 353' in any suitable manner, such as by welding, by way of respective ones of the fasteners 375, and/or in any other suitable manner.

[0093] The above examples are in no way intended to limit the scope of the present invention. It will be understood by those skilled in the art that while the present disclosure has been discussed above with reference to exemplary embodiments, various additions, modifications and changes can be made thereto without departing from the spirit and scope of the invention as set forth in the claims.

What is claimed is:

1. A modular structure comprising:
   at least a rigid top panel, a rigid bottom panel, two rigid opposing side panels, a rigid front panel and a rigid back panel, a tensioning system associated with said side panels, said top panel and said bottom panel, said tensioning system including a plurality of adjustable length compression applying members adjusted to be in tension about said side panels, said top panel and said bottom panel, said panels and said compression applying members cooperating to place at least one of said top, bottom, two side, front and back panels in compression along at least two axes.

2. The modular structure according to claim 1, wherein said top, bottom, opposing side panels, rigid front panel and rigid back panels are releasably held together as a temporary unitary structure.

3. The modular structure according to claim 1, wherein the tensioning system includes said tensioning members and a framing system cooperating with said tensioning members.

4. The modular structure according to claim 3, wherein the framing system includes a plurality of rigid channel members and a plurality of brackets.

5. The modular structure according to claim 4, wherein each of the rigid top panel, the rigid bottom panel, the two rigid opposing side panels, the rigid front panel and the rigid back panel have an opposing upper edge and lower edge and opposing side edges.

6. The modular structure according to claim 5, wherein each upper edge has a rigid channel member associated therewith and each lower edge has a rigid channel member associated therewith.

7. The modular structure according to claim 6, wherein the rigid channel members are sized and configured to receive either an upper edge or a lower edge of the panels.

8. The modular structure according to claim 7, wherein the tensioning members are adjustable tensioning members.

9. The modular structure according to claim 7, wherein a tensioning member extends between an upper edge and a lower edge of a panel.

10. The modular structure according to claim 1, the modular structure comprising at least two opposing side walls, a front wall and a back wall, each of the two opposing walls being formed from at least one side panel, the front wall being formed from at least one front panel and the back wall being formed from at least one back panel.

11. A framing system for a modular structure comprising:
   a plurality of longitudinally extending channels, each channel comprising a connection element disposed at each end of the channel;
   a plurality of laterally extending channels, each channel comprising a connection element at a first end and an elongate connection element at a second end;
   a plurality of vertically extending corner posts, each corner post arranged at an intersection of a longitudinally extending channel and a laterally extending channel; and a plurality of corner brackets, wherein the longitudinal channel, the connection element of the longitudinal channel, the lateral channel and the elongate connection element of the lateral channel cooperate with the corner bracket to establish a corner assembly by connecting the longitudinally extending channel, the laterally extending channel and the corner post together to form either an upper corner or a lower corner of the framing system at a respective corner post; wherein adjacent upper corners are connected by either a longitudinally extending channel or a laterally extending channel and adjacent lower corners are connected by either a longitudinally extending channel or a laterally extending channel; and
a plurality of upper corner assemblies are vertically aligned with a respective lower corner assembly and are connected to form the framing system of the modular structure.

12. The framing system according to claim 11, wherein at the corner assembly, the connection element of the longitudinal channel and the elongate connection element of the lateral channel cooperate to form an attachment feature.

13. The framing system according to claim 12, wherein the attachment feature is a hook shaped attachment feature.

14. The framing system according to claim 12, wherein a tensioning cable extends between an attachment feature of an upper corner and an attachment feature of a lower corner of a respective corner post.

15. The framing system according to claim 12, wherein the corner bracket comprises a slot for receiving the attachment feature.

16. The framing system according to claim 11, wherein the corner bracket further comprises a lateral attachment feature.

17. The framing system according to claim 16, wherein a tensioning cable extends in a lateral direction between a lateral attachment feature of a corner bracket of a corner beam and a lateral attachment feature of an adjacent corner bracket of an adjacent corner beam.

18. The framing system according to claim 11, further comprising at least two longitudinally extending channels or at least two laterally extending channels between adjacent upper corners, and at least two longitudinally extending channels or at least two laterally extending channels extending between adjacent lower corners.

19. The framing system according to claim 18, wherein adjacent longitudinal alignment flanges or adjacent lateral alignment flanges cooperate to form a vertical attachment feature that is received by a slot in a connecting bracket.

20. The framing system according to claim 19, wherein a tensioning cable extends vertically between a pair respective attachment features.

21. The framing system according to claim 11, wherein the modular structure is a parallelepiped modular structure.

22. A portable structure, comprising:
   a frame comprised of either a pair of spaced apart longitudinal channels or a pair of spaced apart lateral channels with an upper edge of a wall element supported by one of either of the pair of channels and a lower edge of the wall element supported by the other of either of the pair of channels;
   a plurality of connecting vertical walls that form the portable structure, each vertical wall comprising a wall element supported by a respective frame; and
   a plurality of corner members of the portable structure, each corner comprising a pair of vertical walls and a vertical corner member,
   wherein adjacent walls are connected by a pair of connection flanges.

23. A modular building structure comprising:
   a bottom panel;
   a first side panel adjacent a top edge of said bottom panel;
   a second side panel adjacent a bottom edge of said bottom panel;
   a first edge member joining the bottom panel and first side panel at their adjacent edges;
   a second edge member joining the bottom panel and the second side panel at their adjacent edges;
   a plurality of compression applying members extending from said first edge member to said second edge member.

24. A framing system for use with the modular structure according to claim 10 comprising:
   a plurality of longitudinally extending channels, wherein a pair of adjacent longitudinally extending channels and a bracket form a side wall assembly;
   a plurality of laterally extending channels, wherein a pair of adjacent laterally extending channels and a bracket form an end wall assembly;
   a plurality of corner assemblies, each corner assembly comprising an intersecting longitudinally and laterally extending channels, a corner post and a corner bracket, wherein the longitudinally extending channels, the laterally extending channels, the side wall assemblies, the end wall assemblies and the corner assemblies are arranged relative to one another to form the framing system.

25. A modular building structure comprised of rigid panels releasably held together, at least in part, by compressive forces, applied to said rigid panels by a tensioning assembly, said compressive forces being applied to rigid panels along at least two axes of the structure.

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