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(54) **SYSTEM OF PREFABRICATED  
STRUCTURES ARRANGED IN A  
COMPLEMENTARY LAYOUT**

**Publication Classification**

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(52) **U.S. Cl. .... 52/745.02; 52/220.1**

(57) **ABSTRACT**

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A system of cooperating prefabricated structures arranged in a complementary layout comprises a set of prefabricated structures having substantially the same dimensions. The set of prefabricated structures each include a shell and an extension deployed out from a nested position within the shell. A first deck extends from a first shell. A second deck extends from a second deck, wherein the first prefabricated structure is arranged opposite the second prefabricated structure so that the first deck abuts the second deck. A third deck extends from a third shell, wherein the third prefabricated structure is arranged transverse to the first prefabricated structure and the second prefabricated structure so that the third deck abuts and extends along the width of the first prefabricated structure and the second prefabricated structure. A fourth deck extends from a fourth shell, wherein the fourth prefabricated structure is arranged transverse to the first prefabricated structure and the second prefabricated structure and opposite the third prefabricated structure so that the fourth deck abuts and extends along the width of the first prefabricated structure and the second prefabricated structure. The first deck, the second deck, the third deck, and the fourth deck form a common walkway.

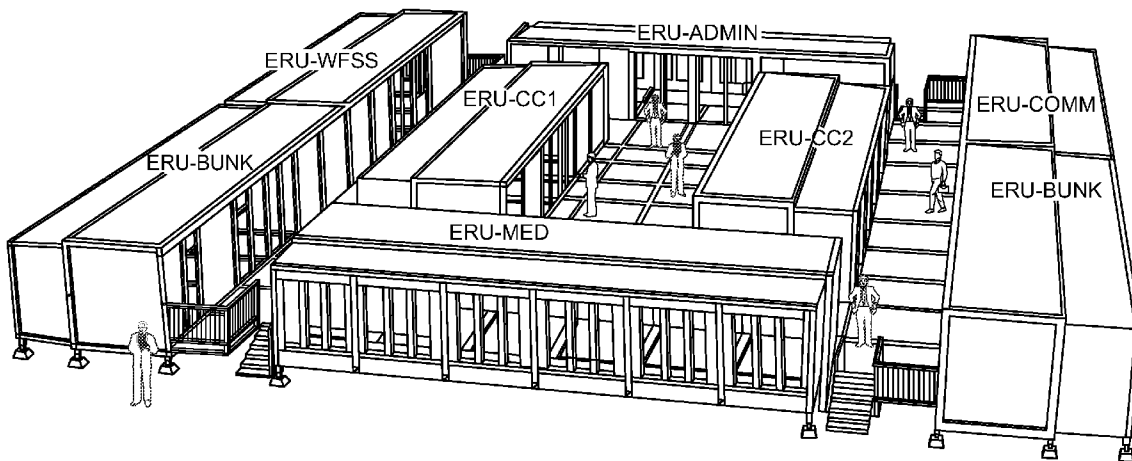
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(21) **Appl. No.: 12/250,493**

(22) **Filed: Oct. 13, 2008**

**Related U.S. Application Data**

(60) **Provisional application No. 61/084,532, filed on Jul.  
29, 2008.**



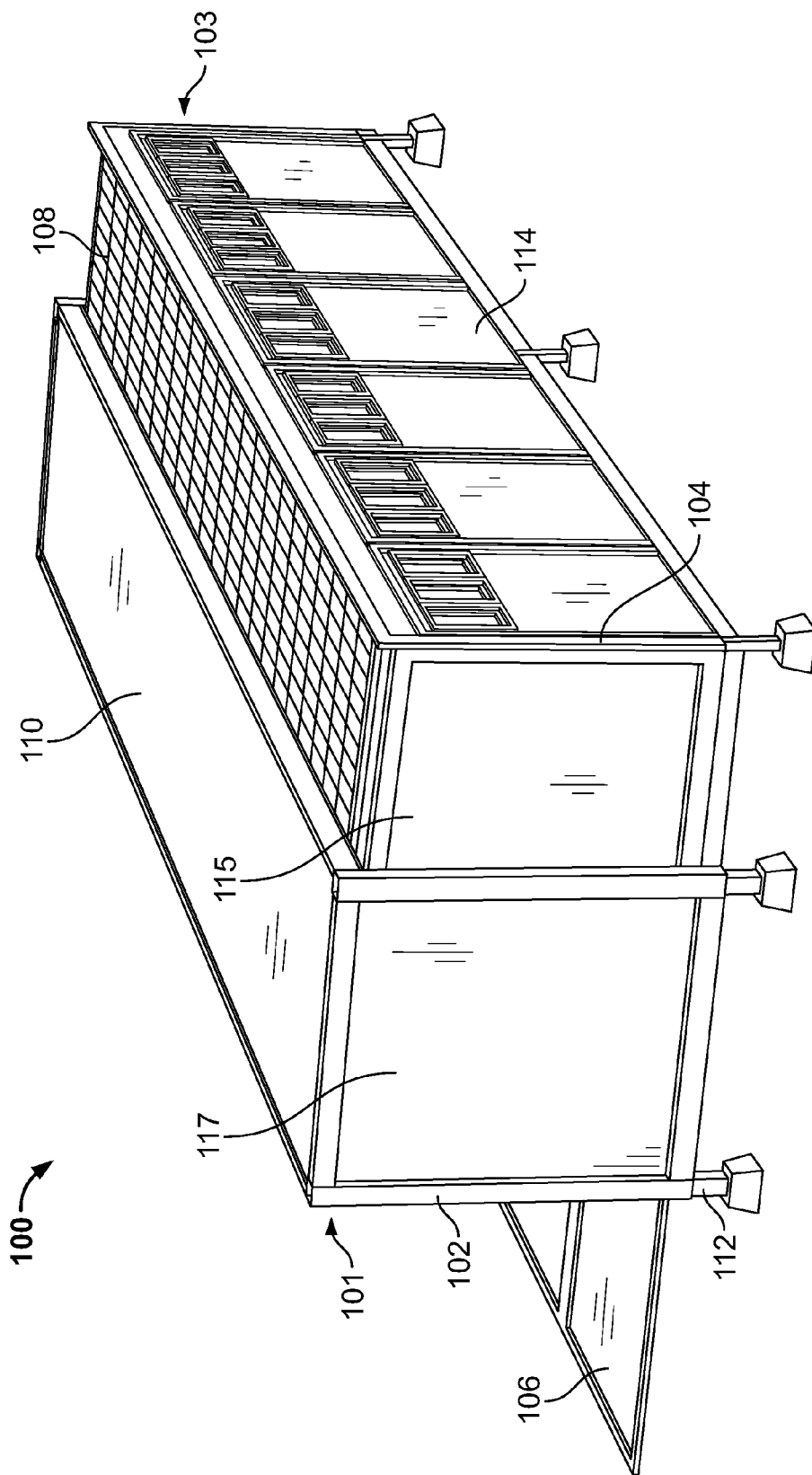


FIG. 1A

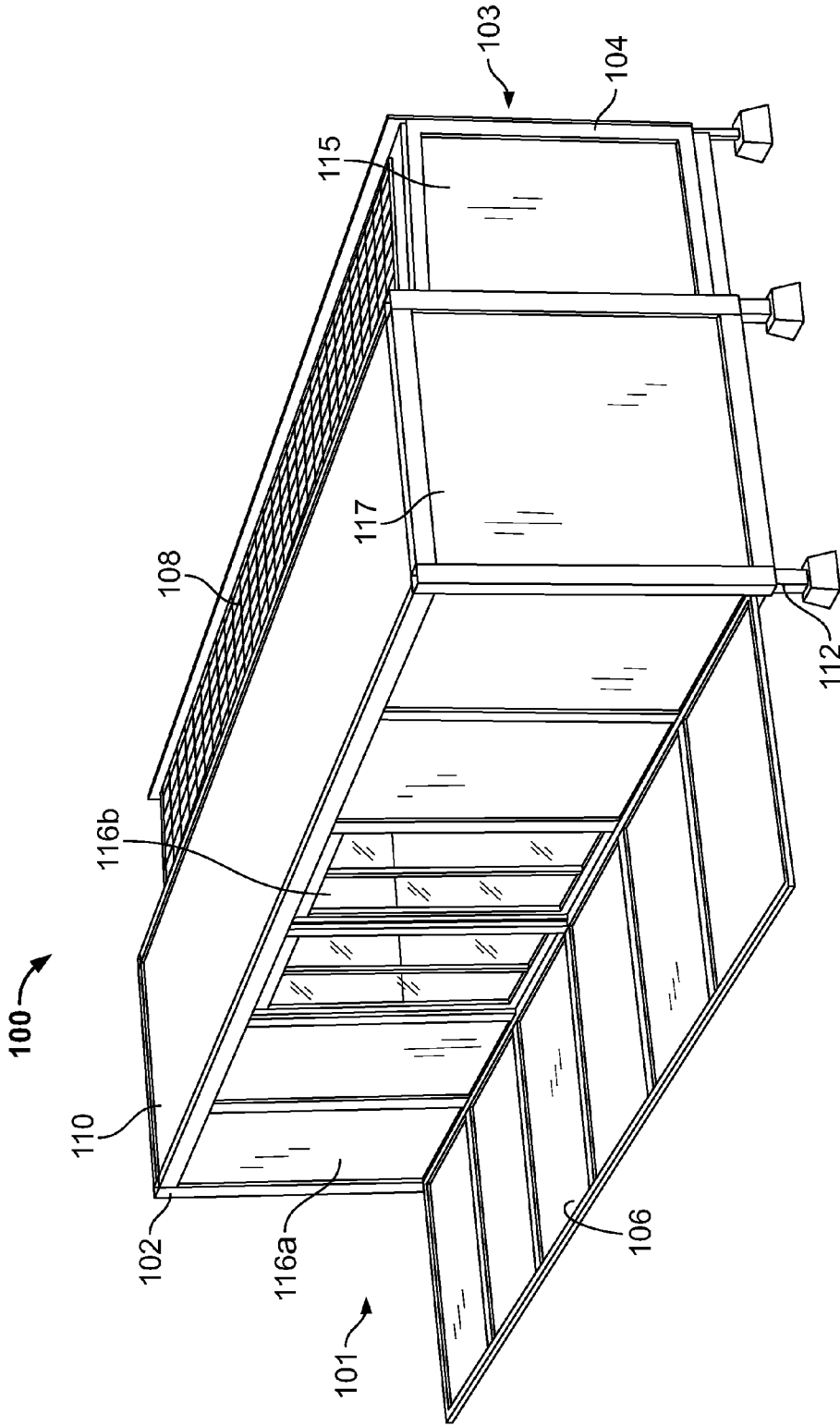


FIG. 1B

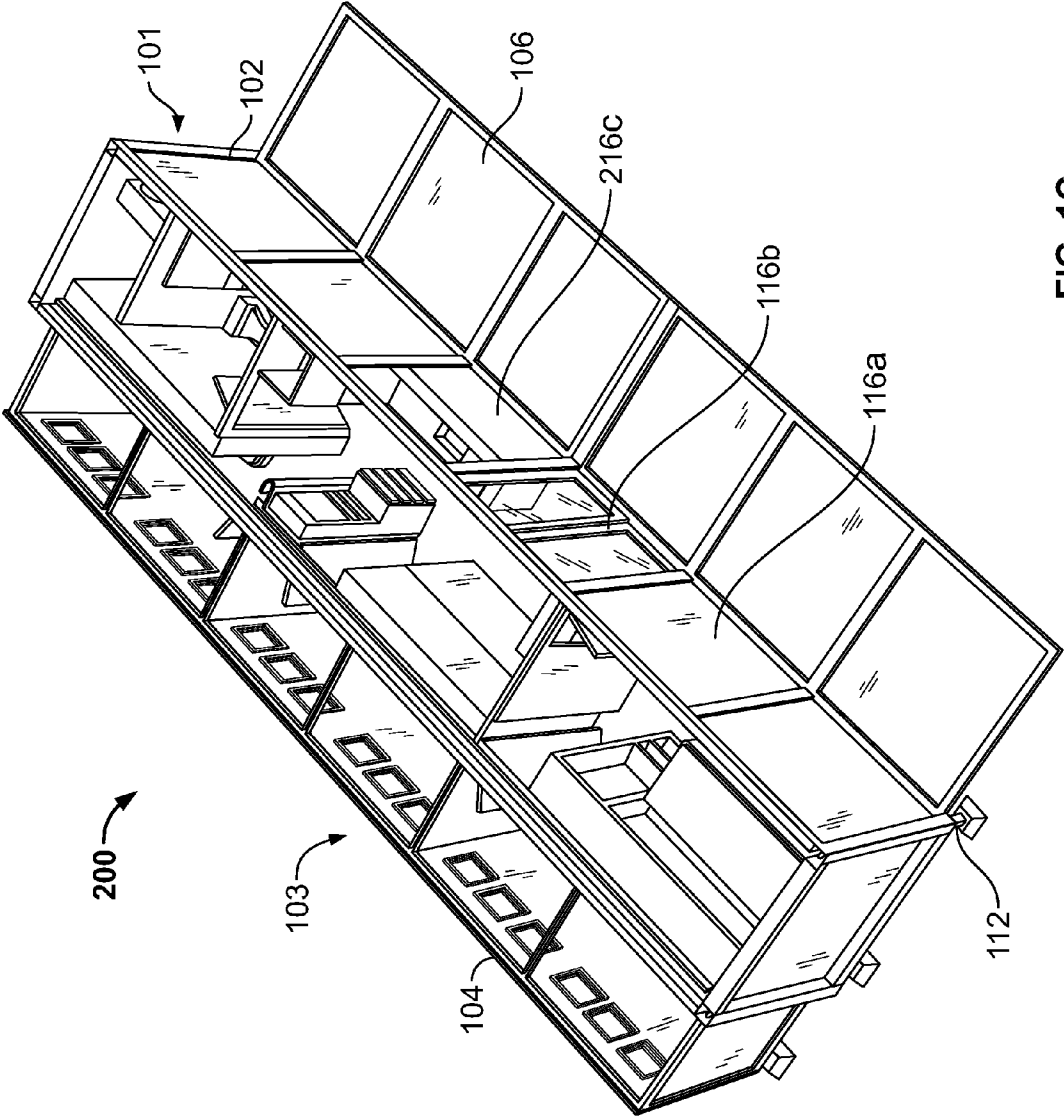


FIG. 1C

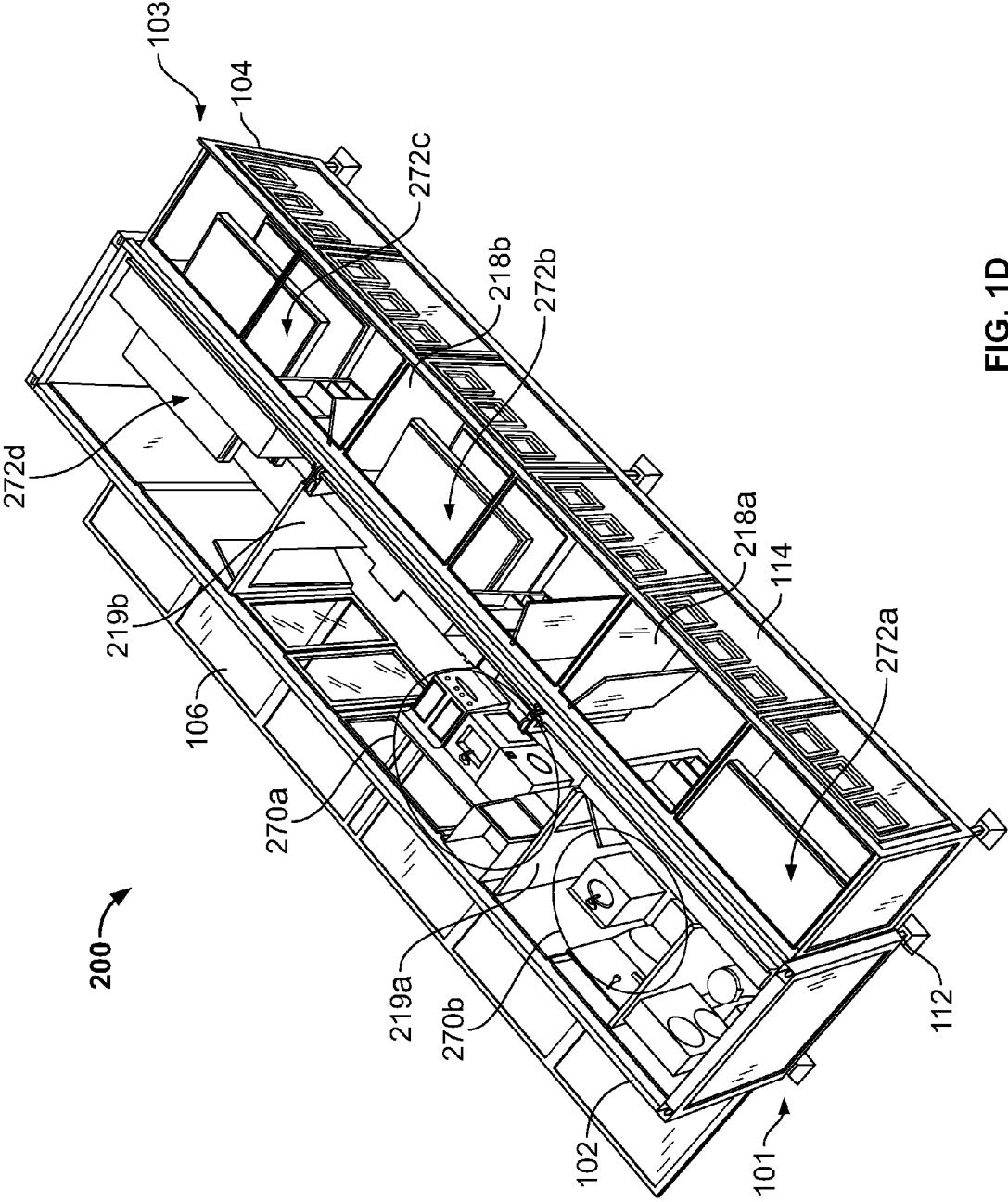


FIG. 1D

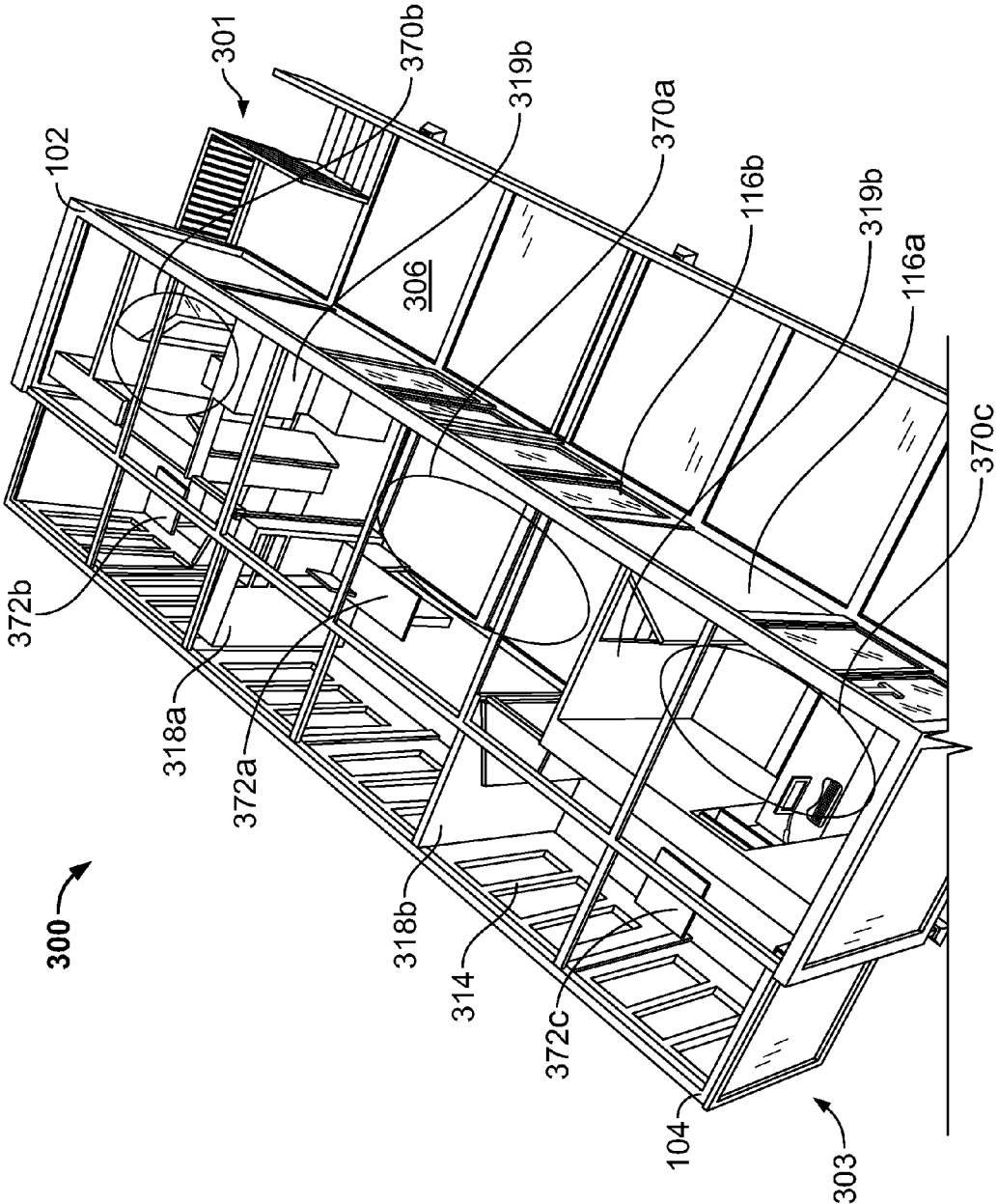


FIG. 1E

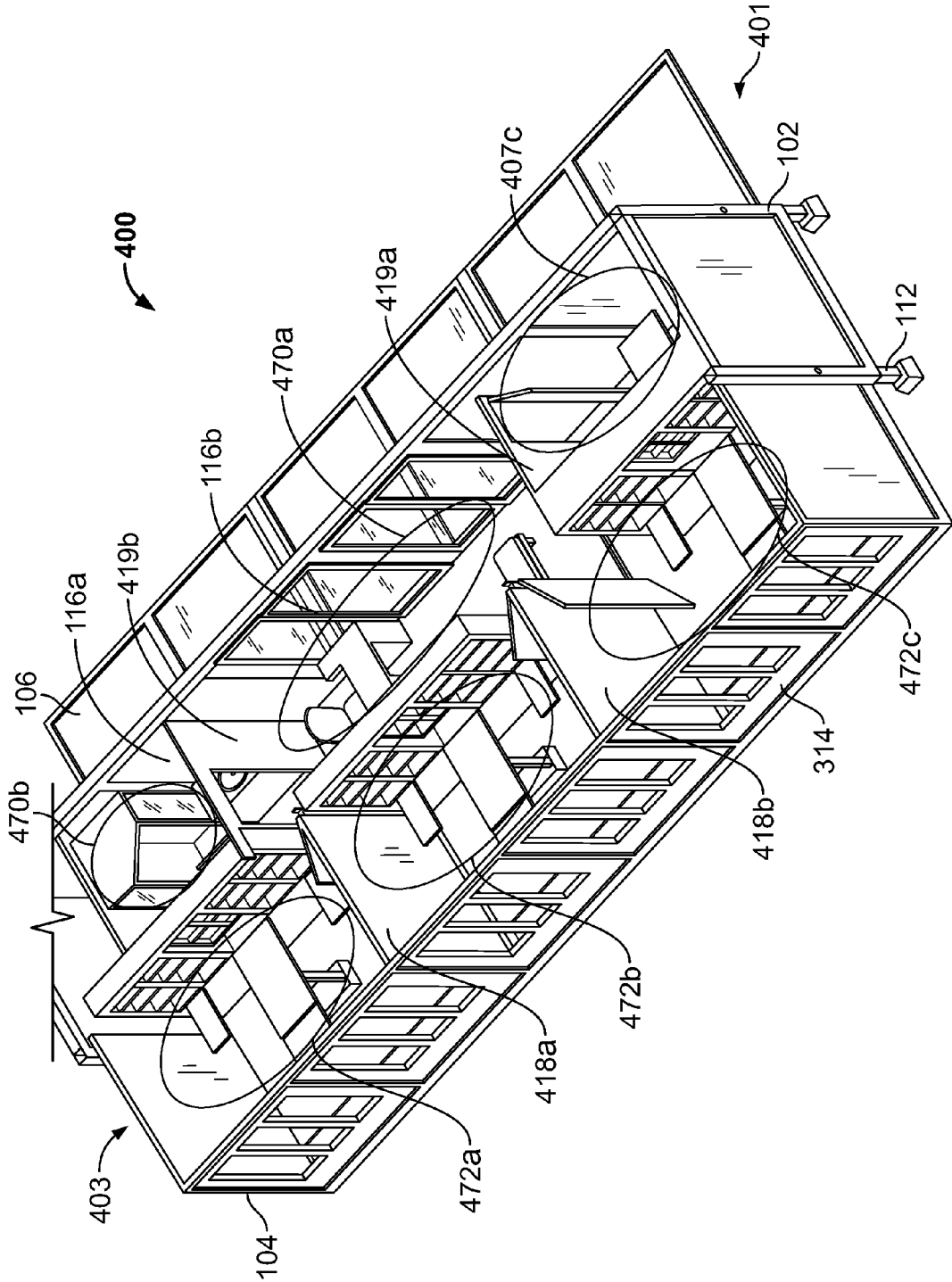


FIG. 1F

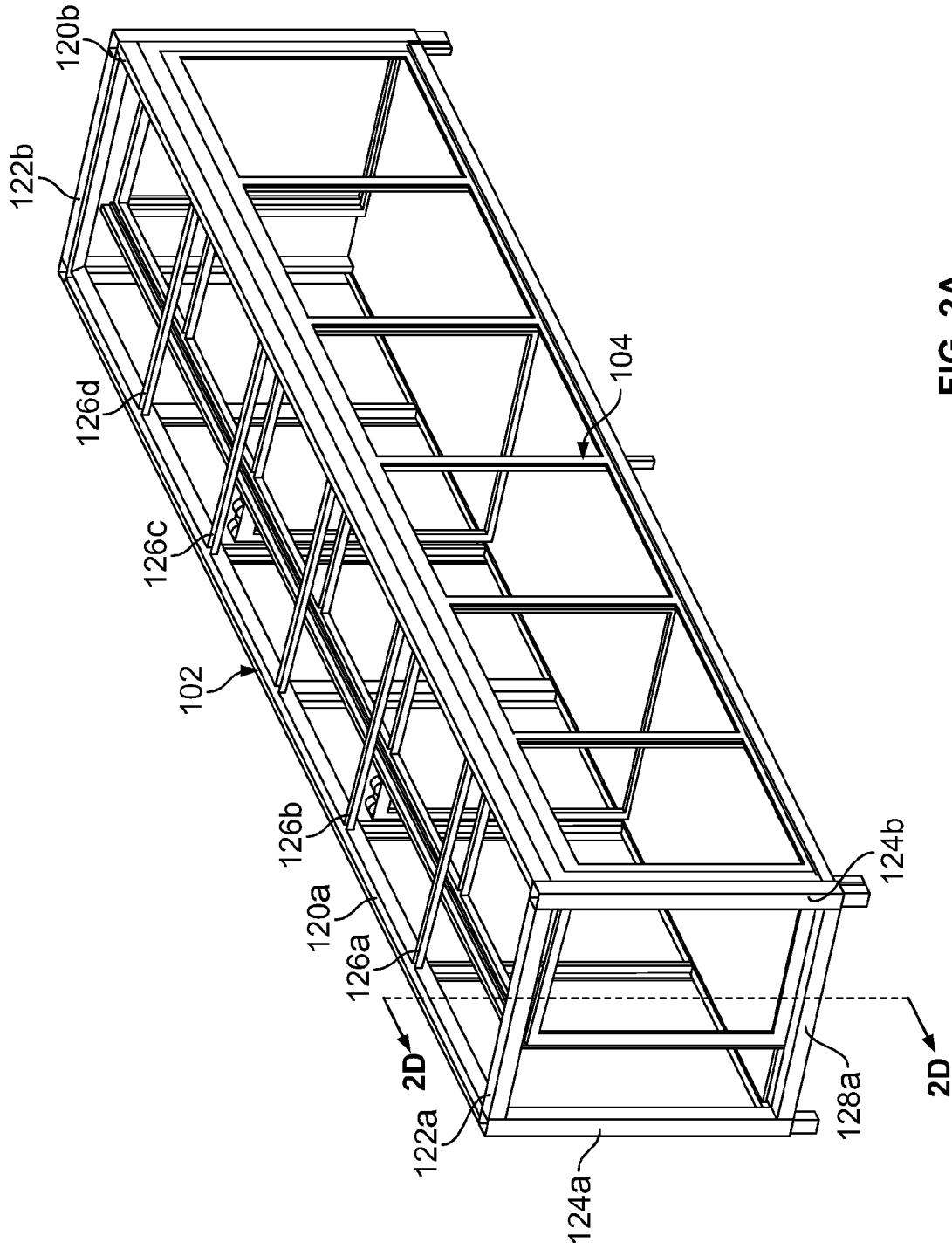


FIG. 2A



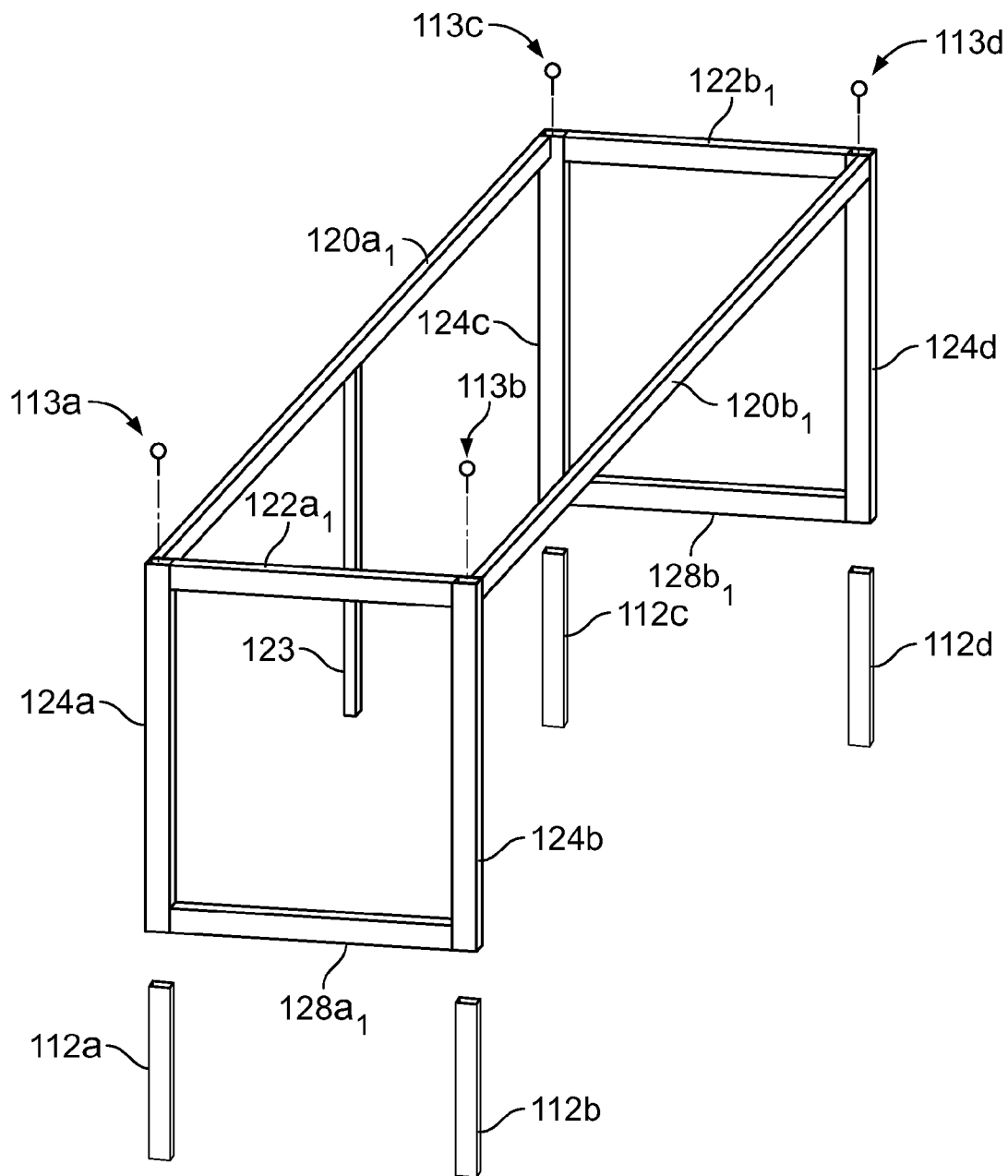


FIG. 2B

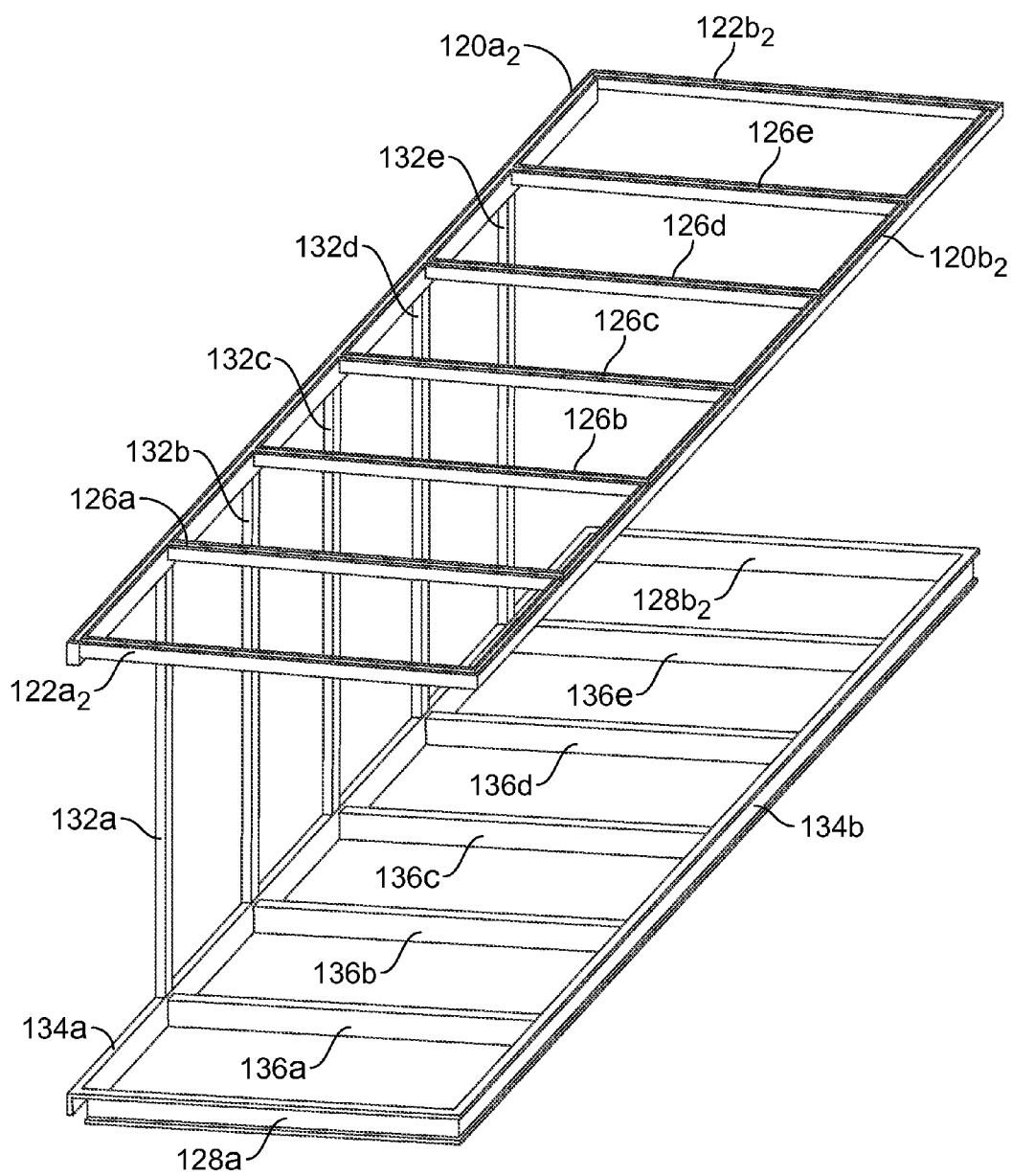


FIG. 2C

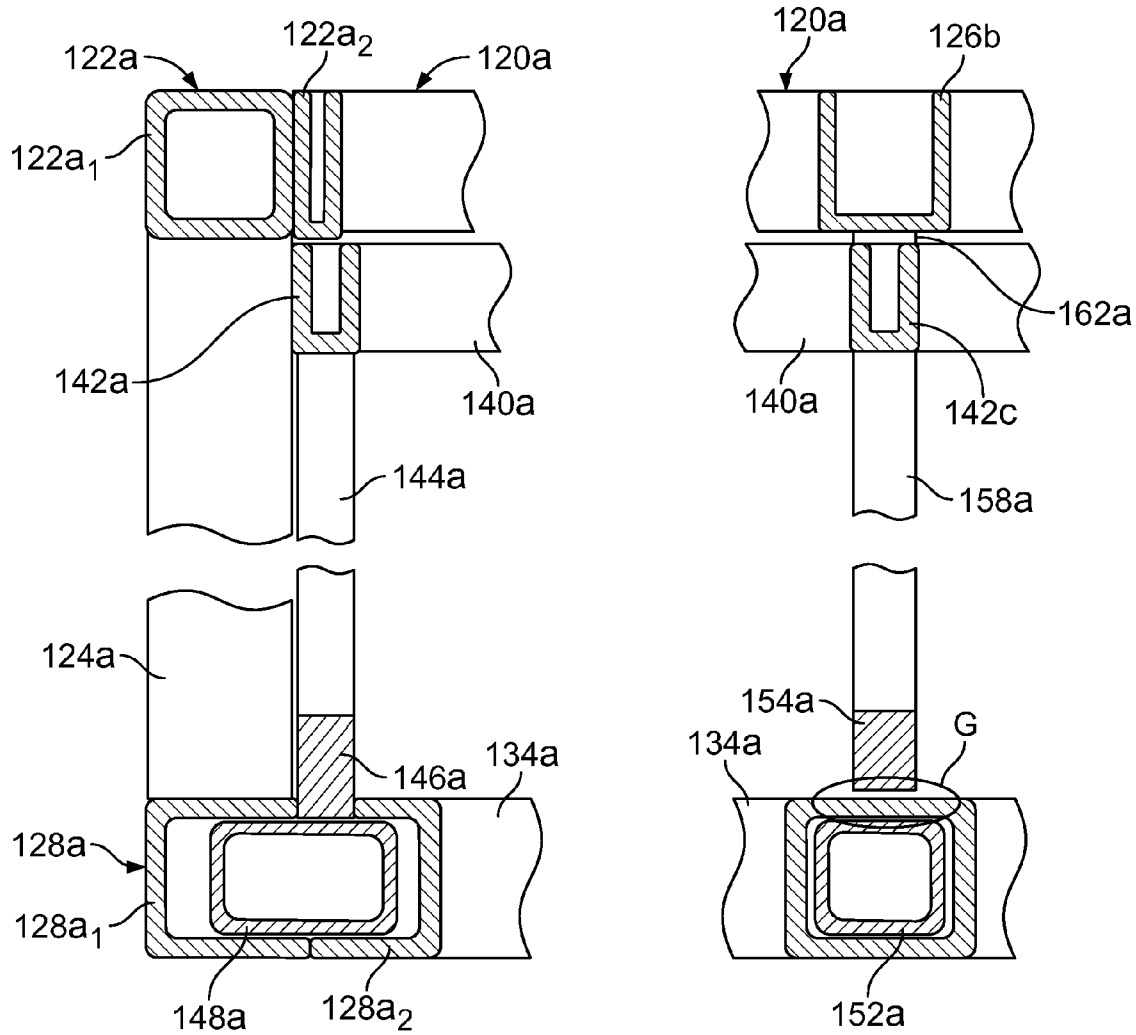


FIG. 2D

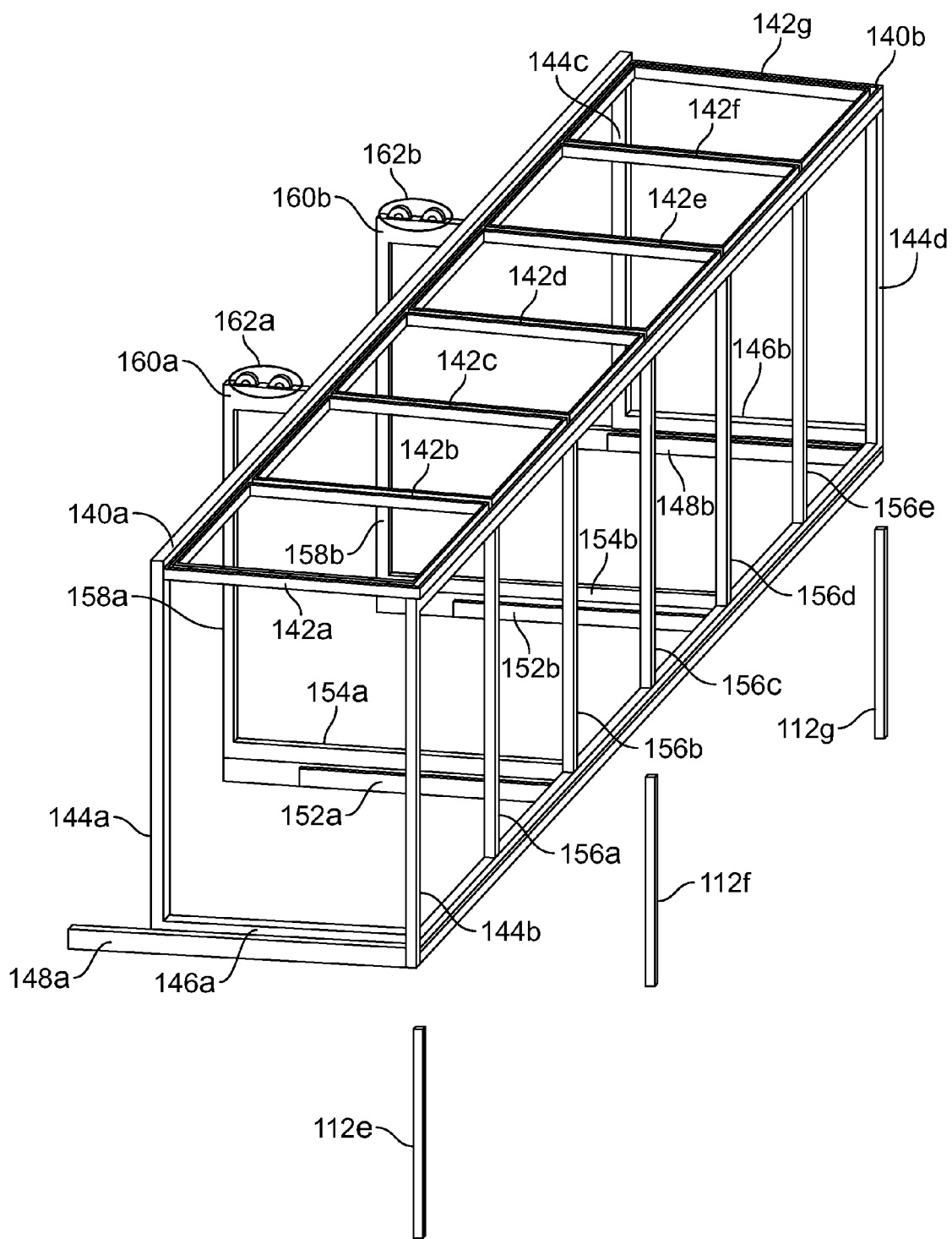


FIG. 2E

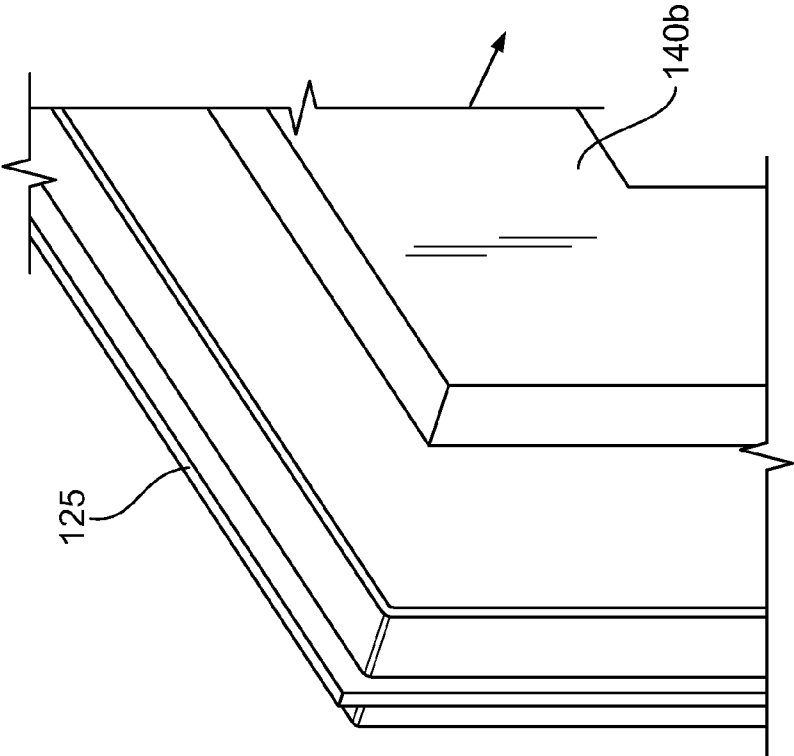


FIG. 3A

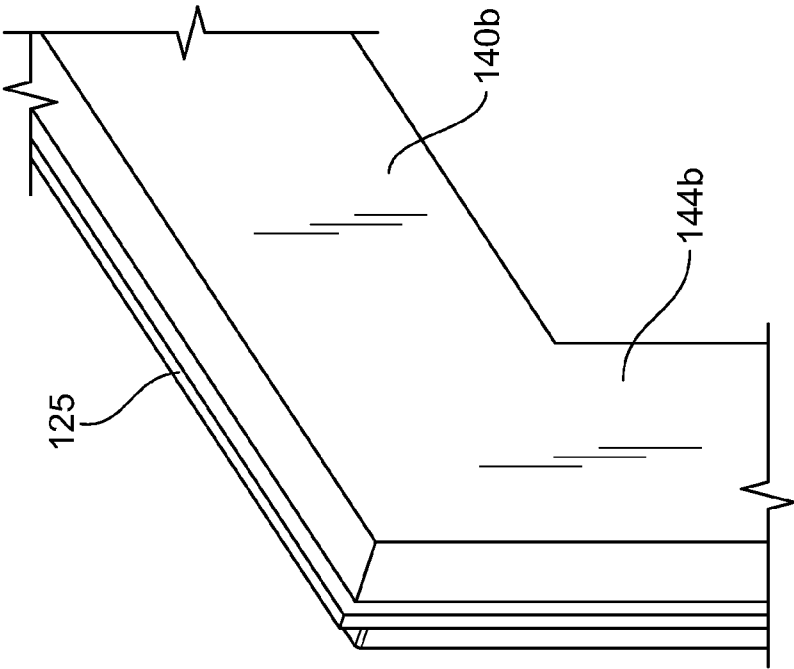


FIG. 3B

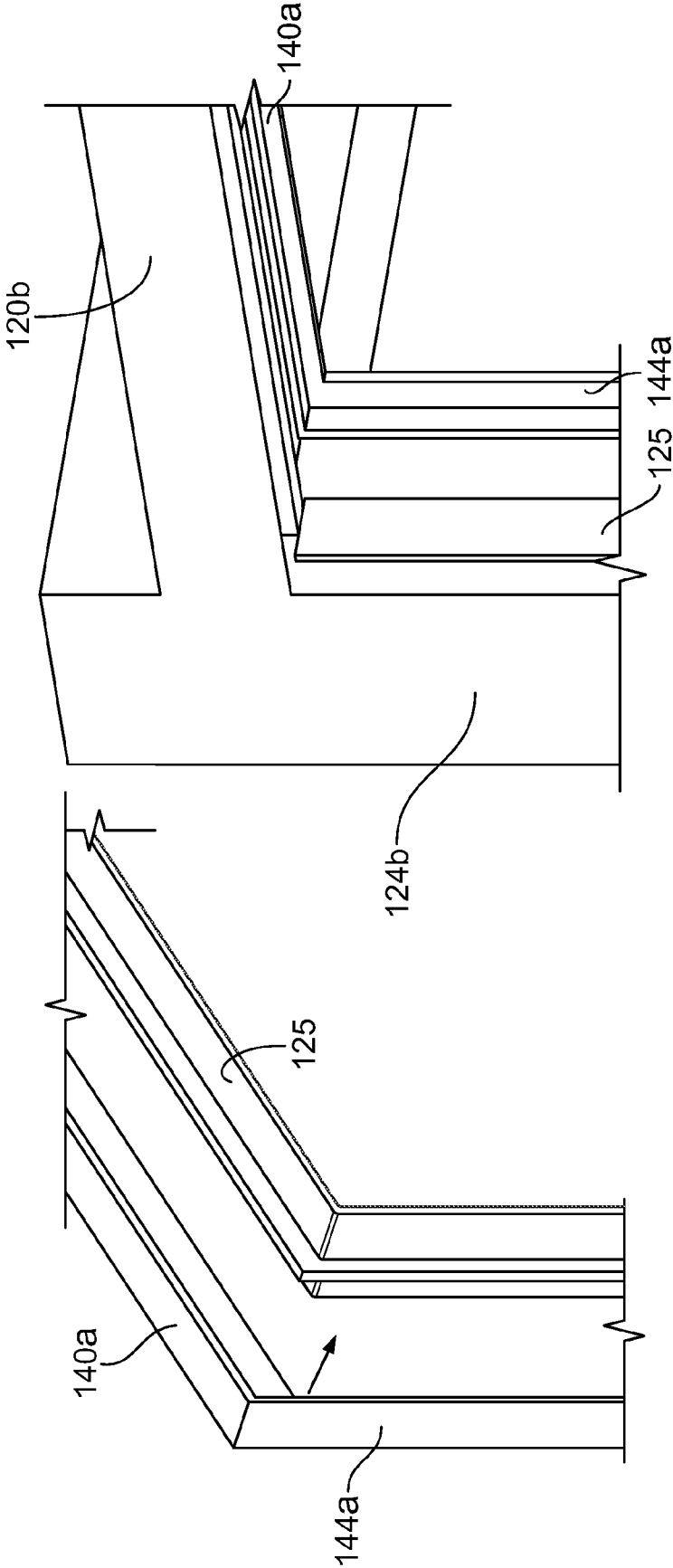


FIG. 3C

FIG. 3D

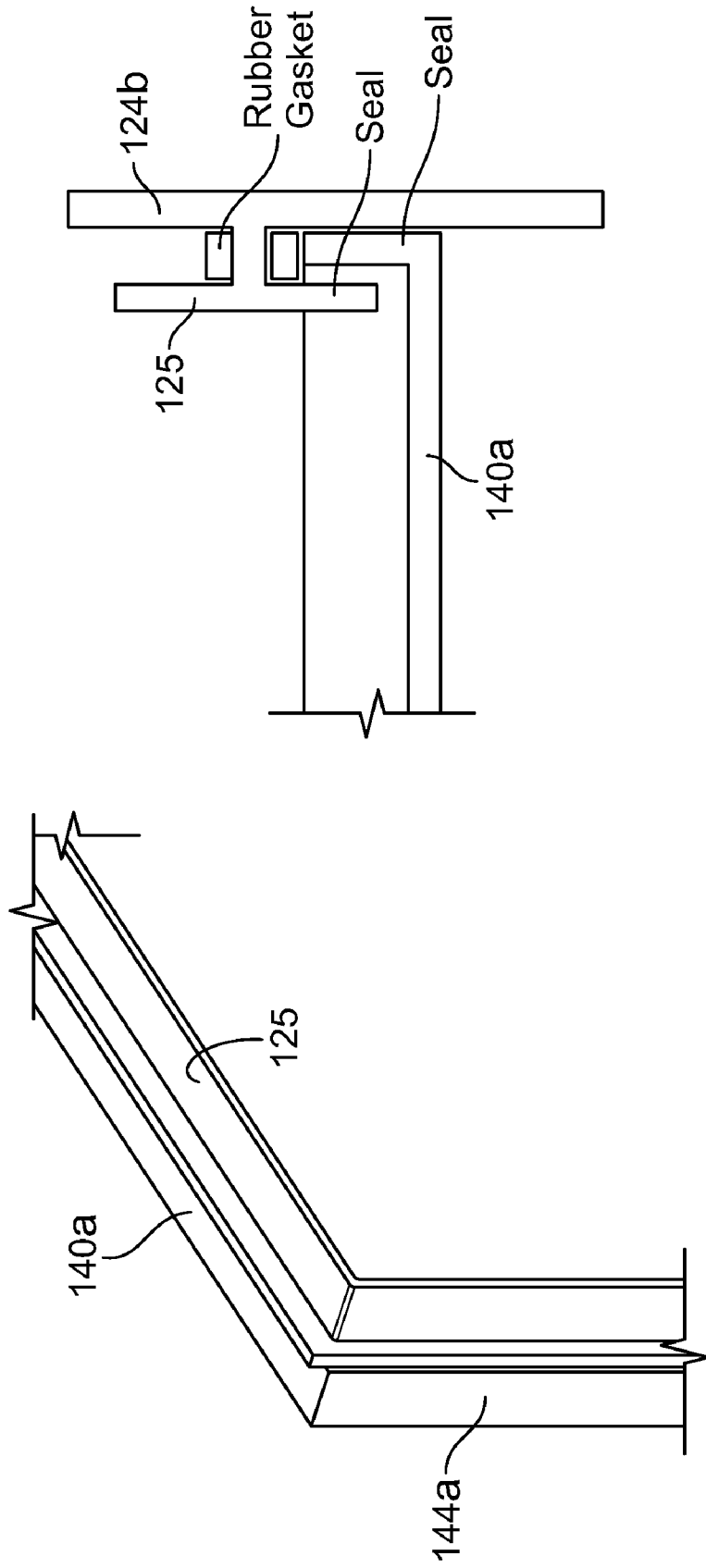


FIG. 3F

FIG. 3E

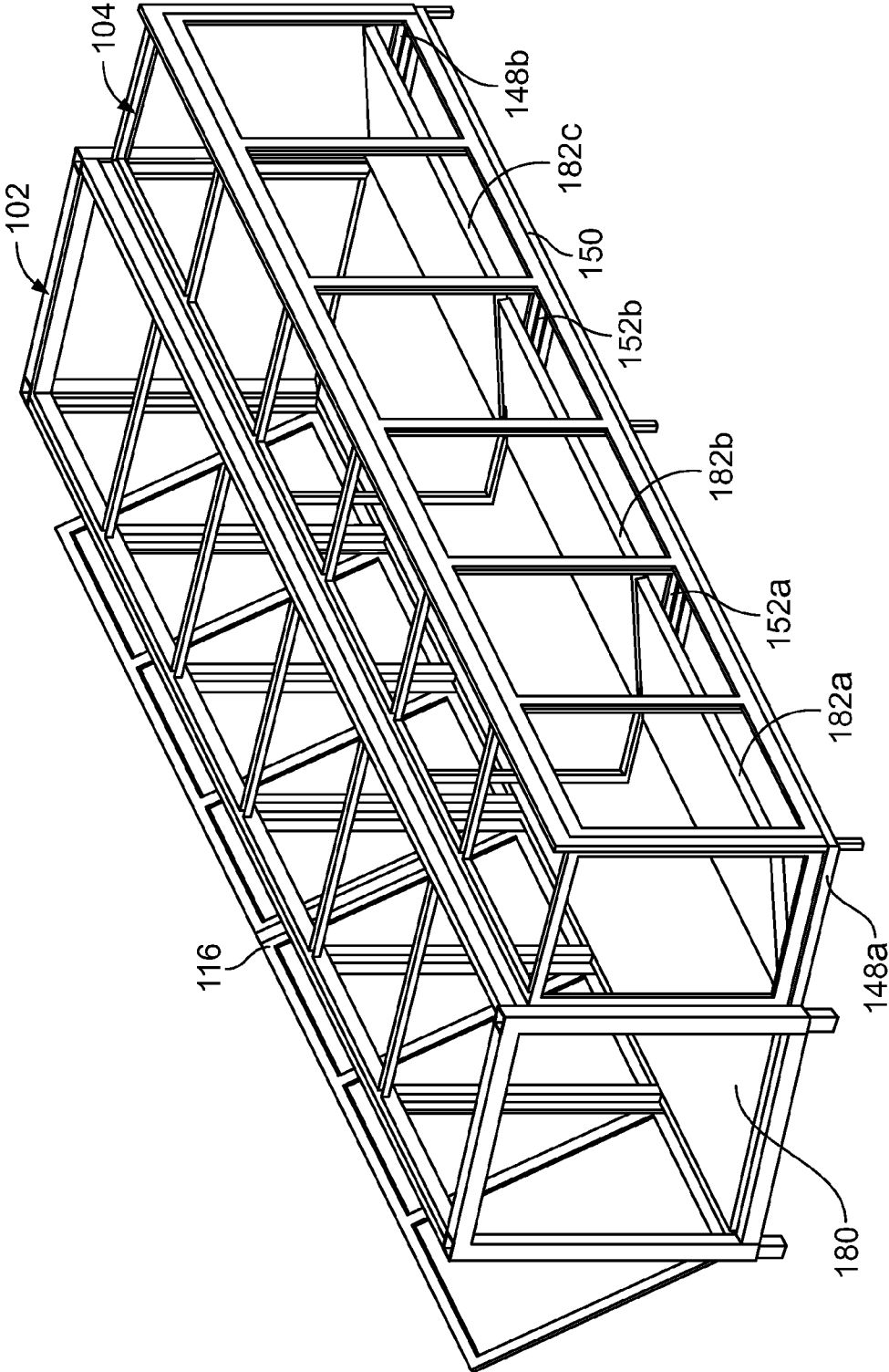


FIG. 4A



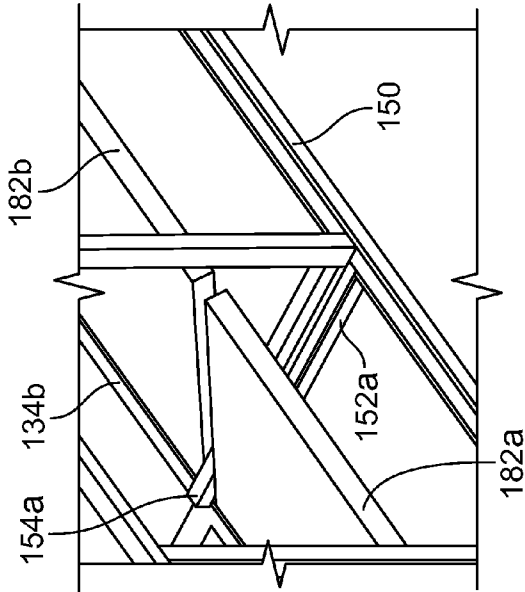


FIG. 4C

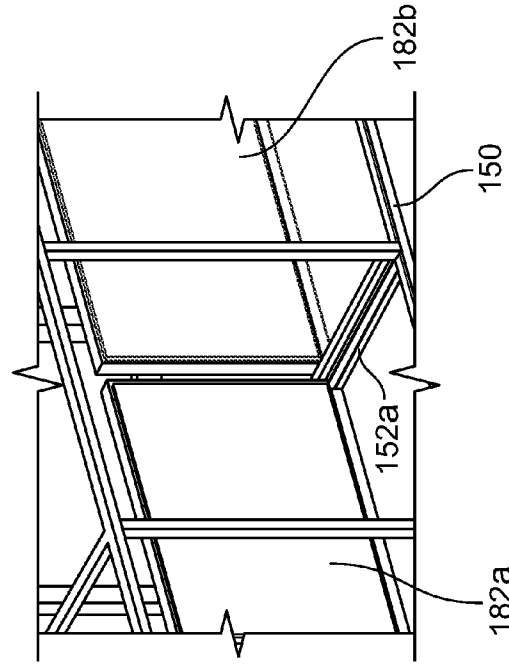


FIG. 4B

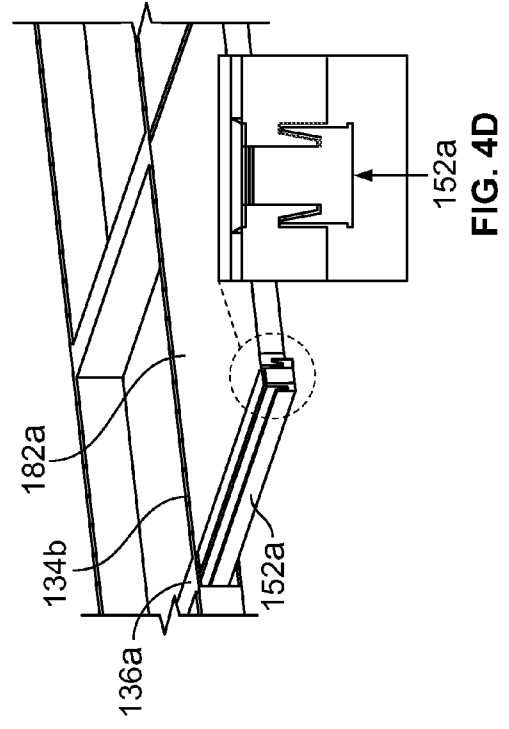


FIG. 4D

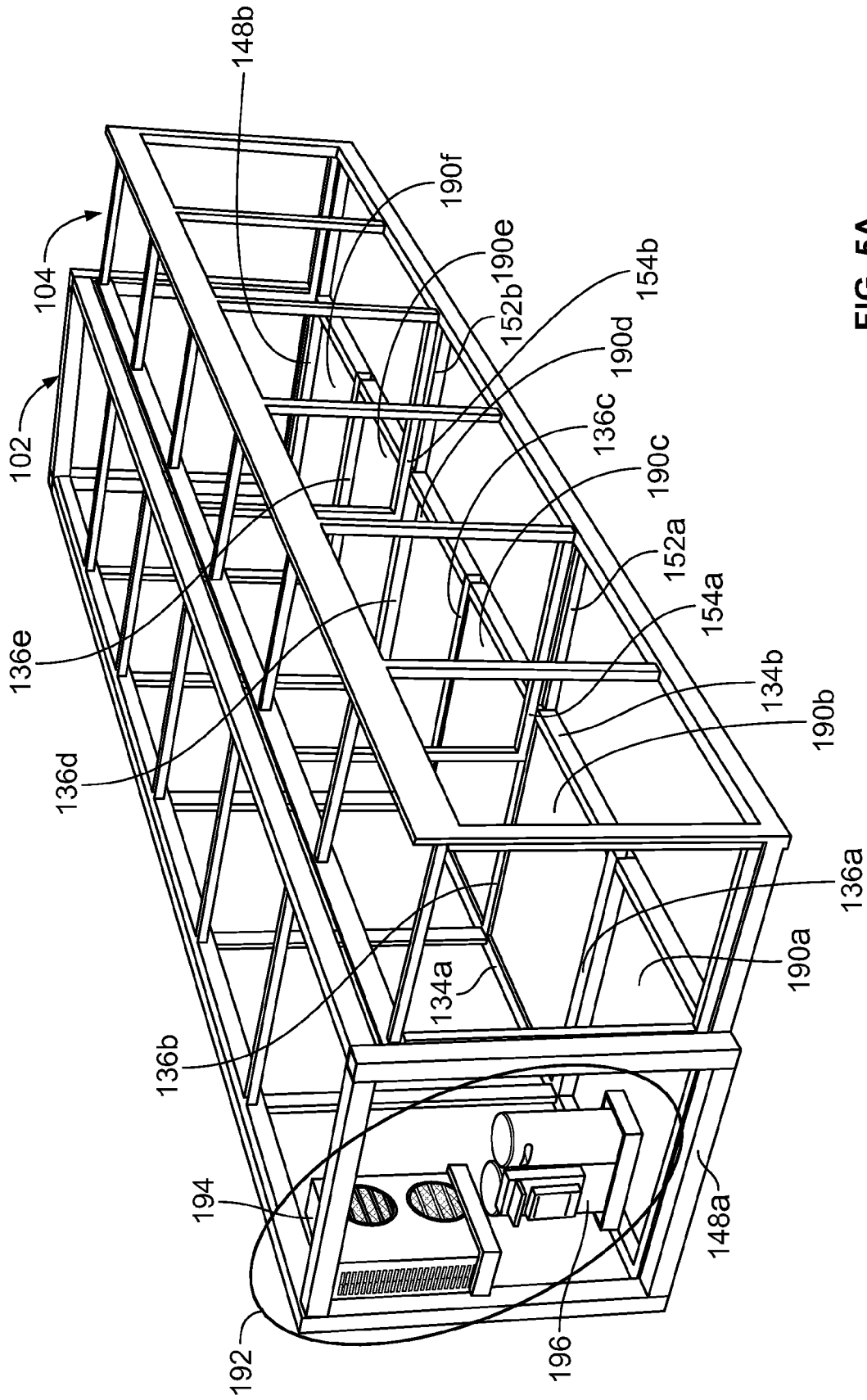


FIG. 5A

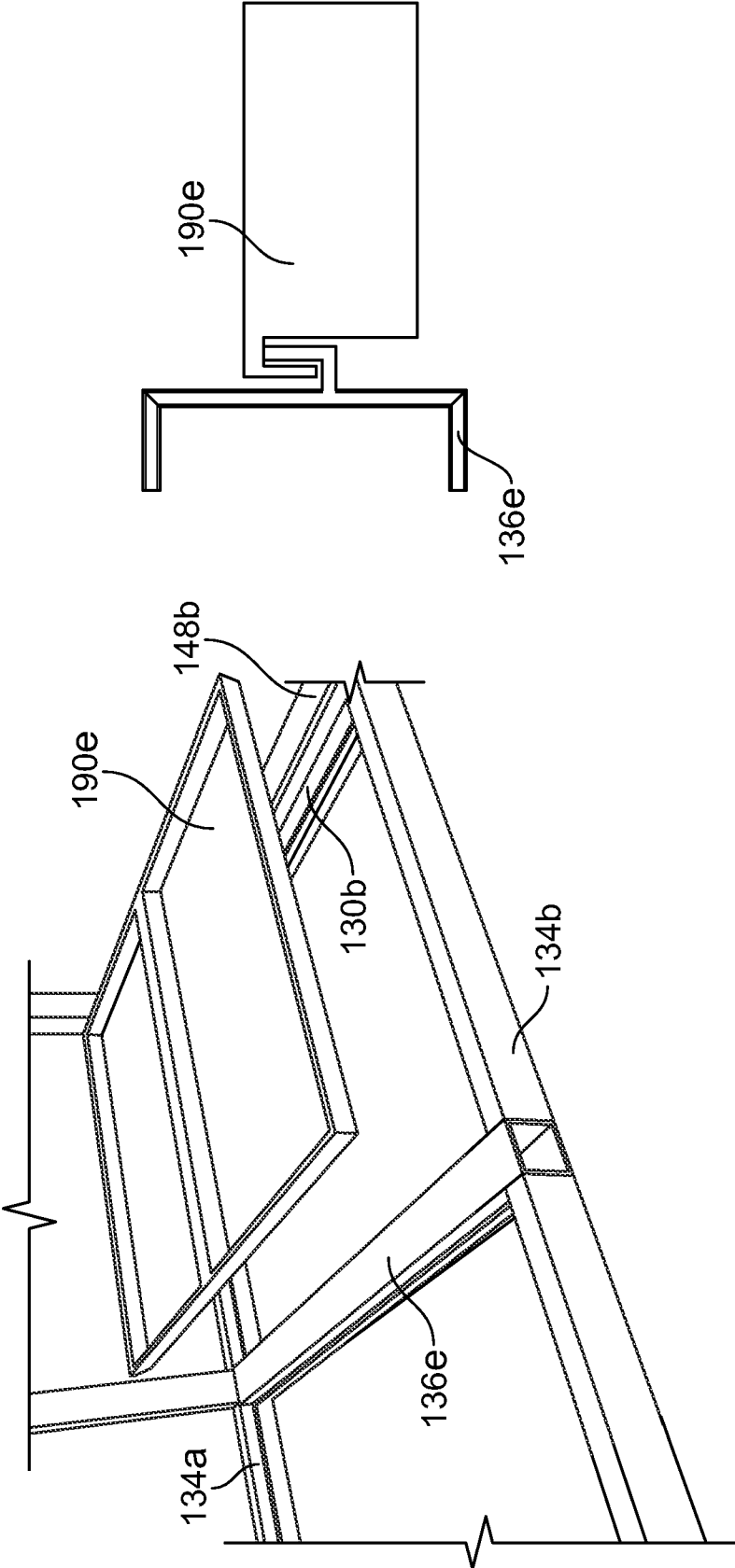


FIG. 5C

FIG. 5B

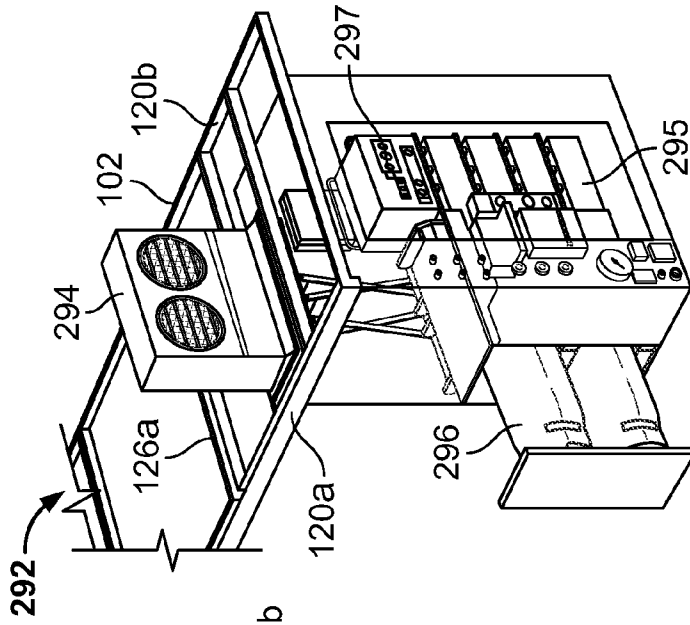


FIG. 5D

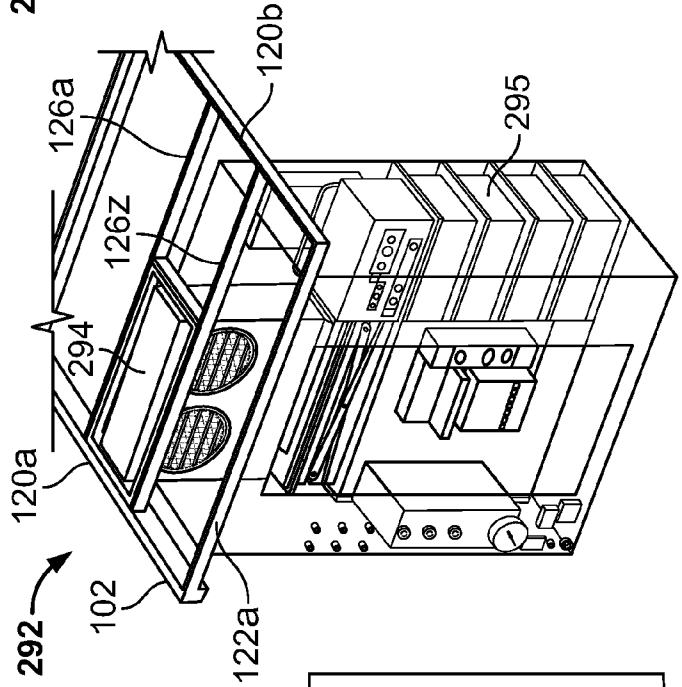


FIG. 5E

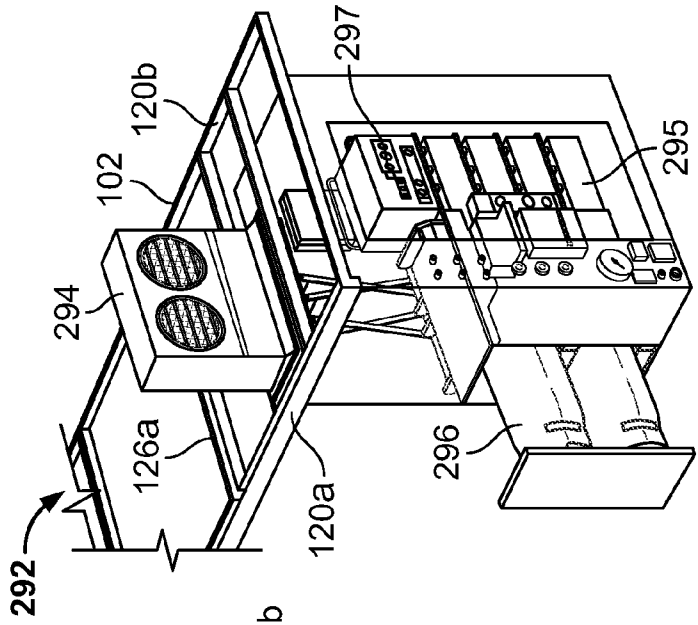


FIG. 5F

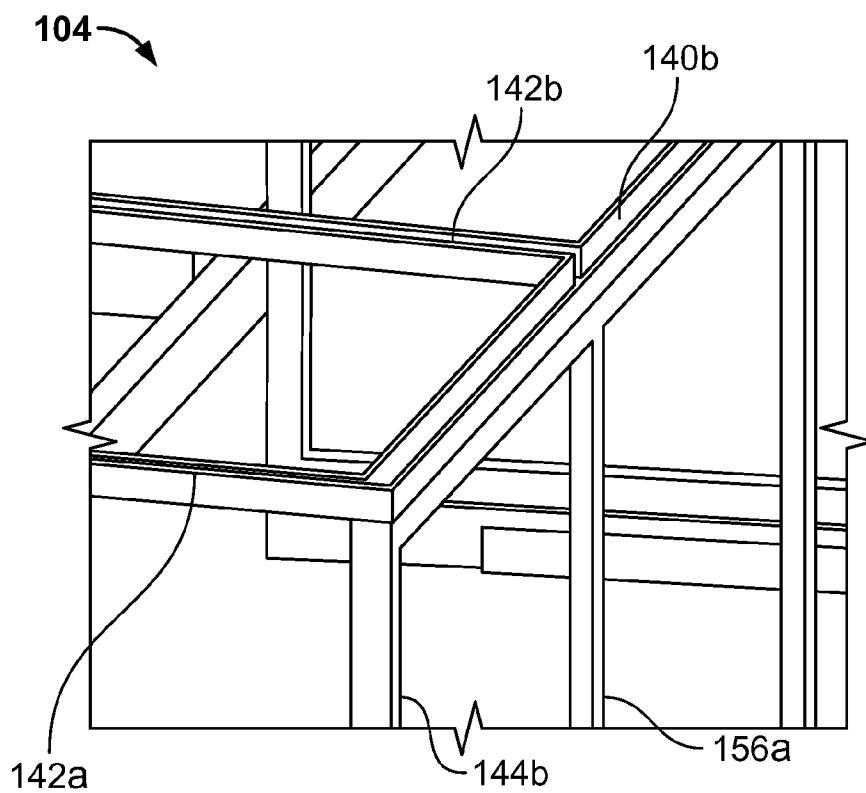


FIG. 6A

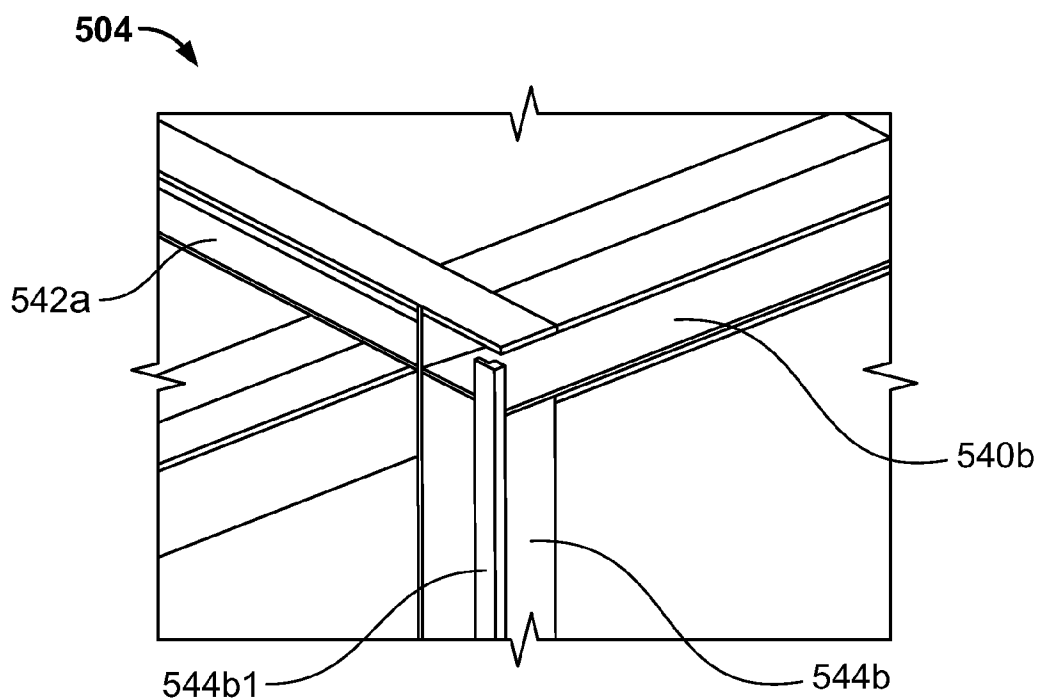


FIG. 6B

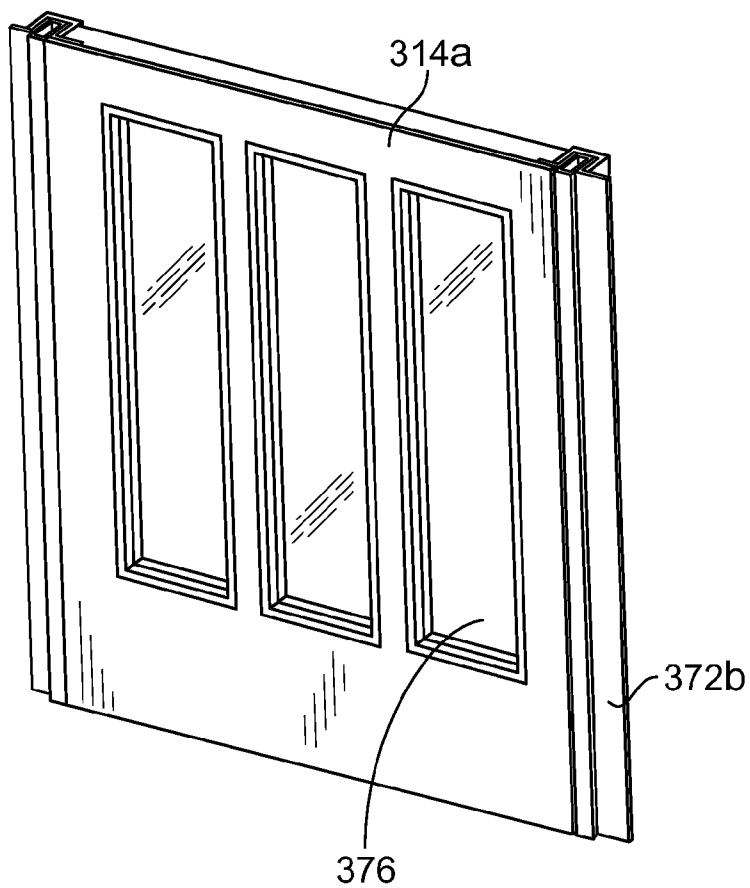


FIG. 6C

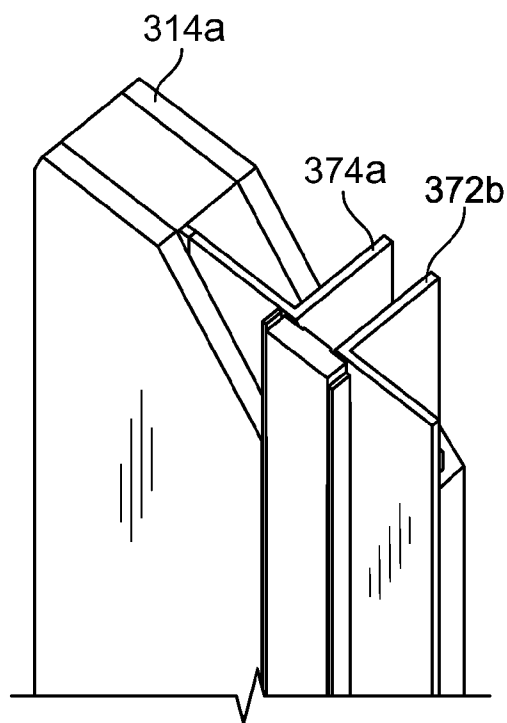


FIG. 6D

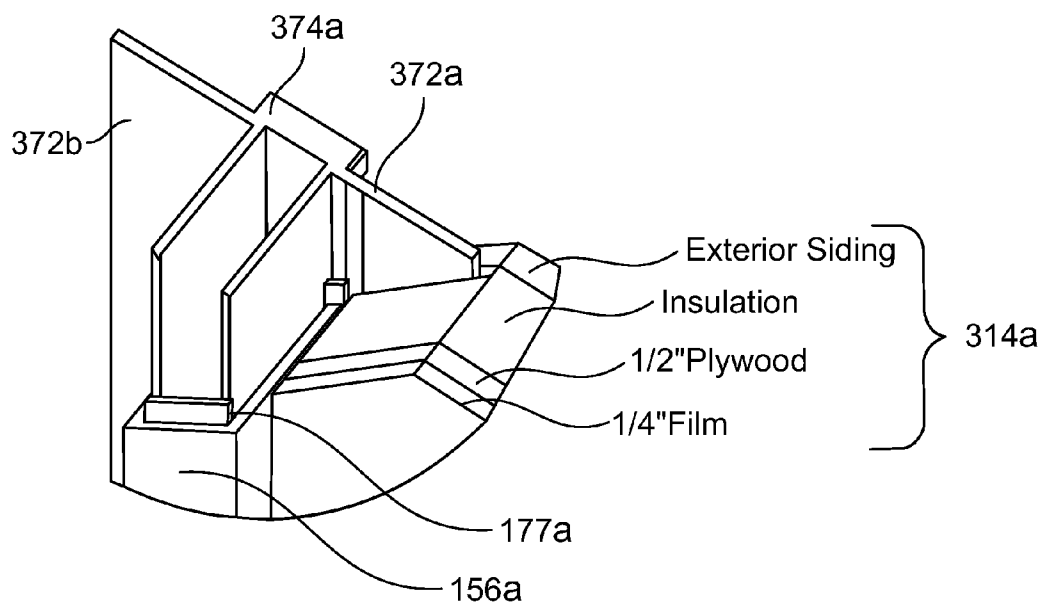


FIG. 6E

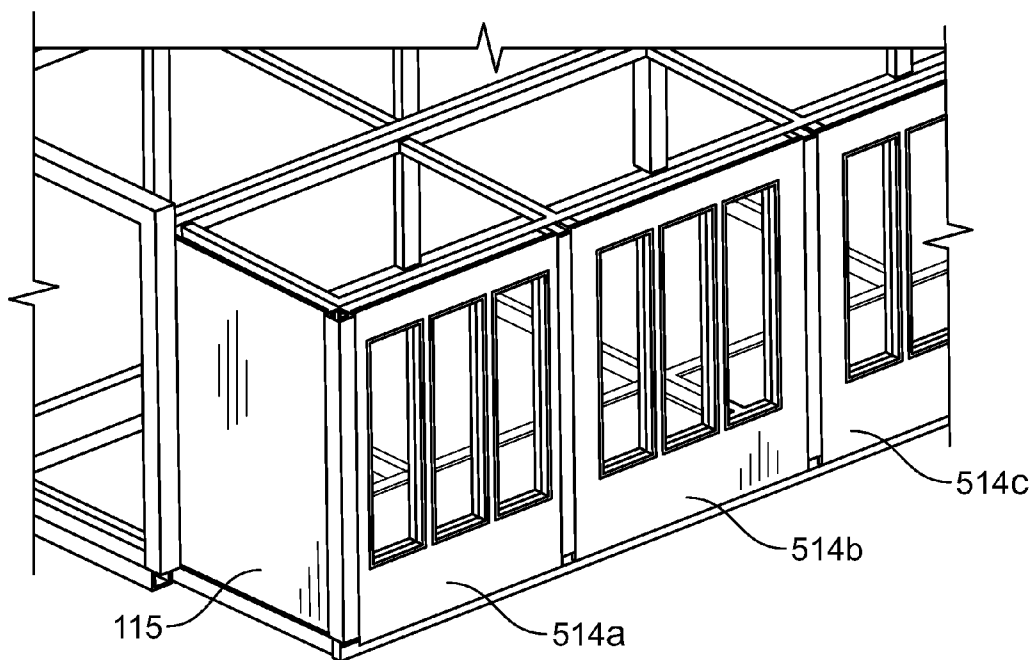


FIG. 6F

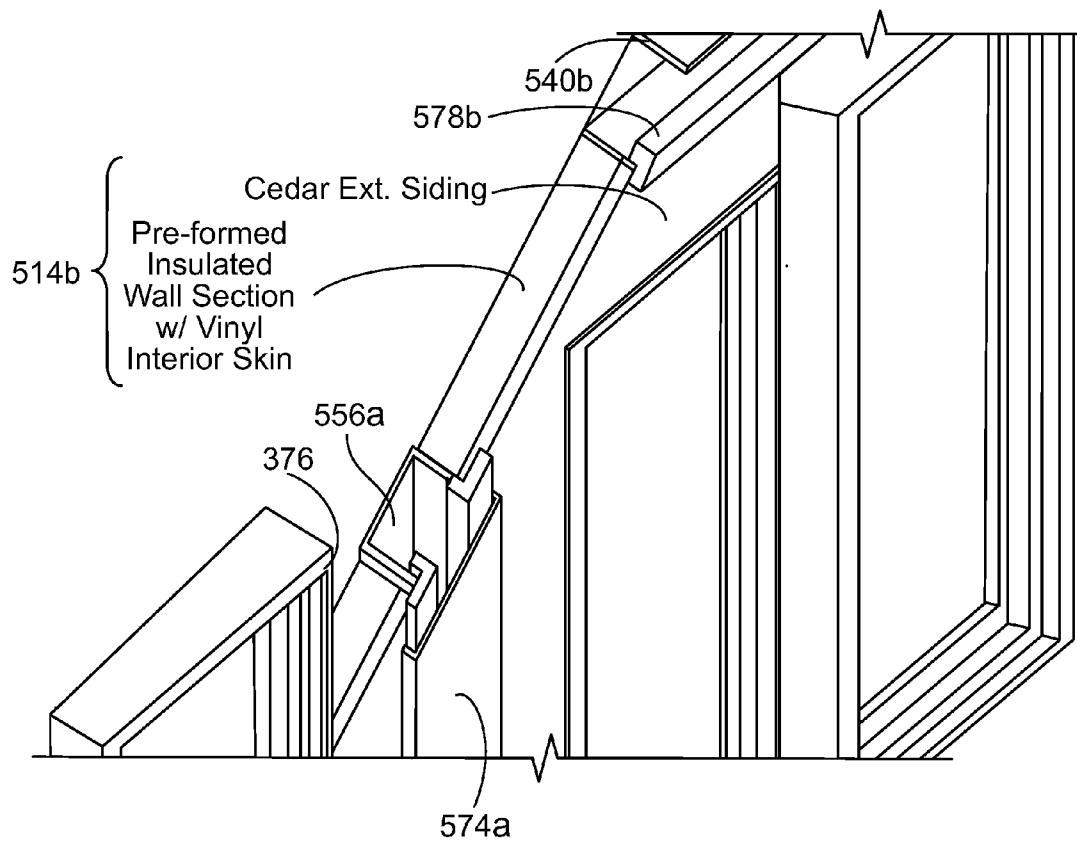


FIG. 6G



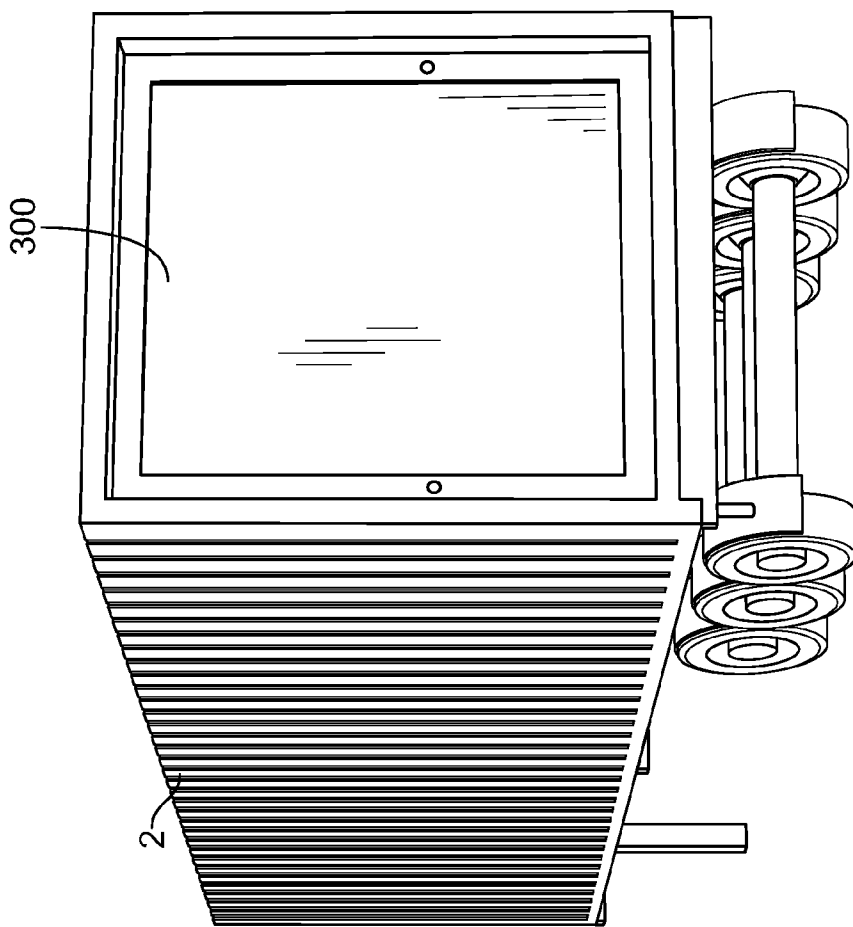


FIG. 7A

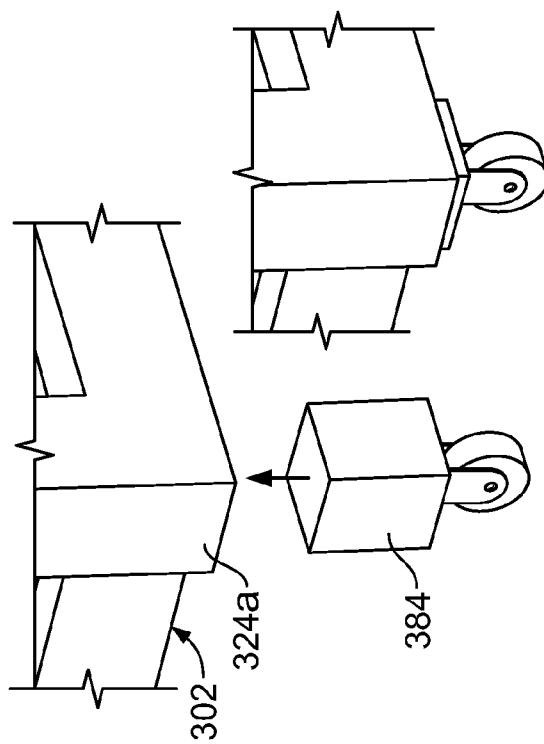


FIG. 7B

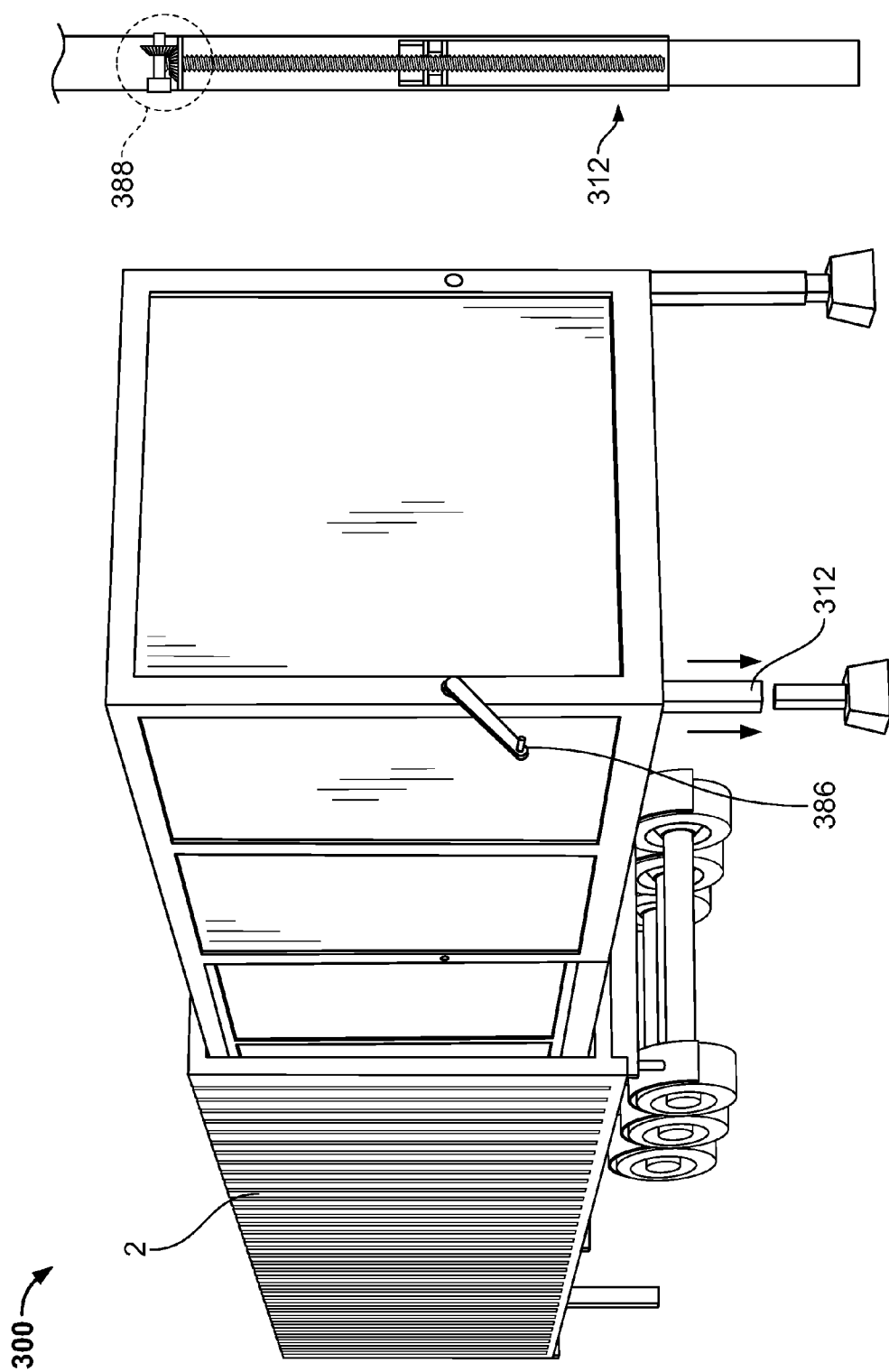


FIG. 7D

FIG. 7C

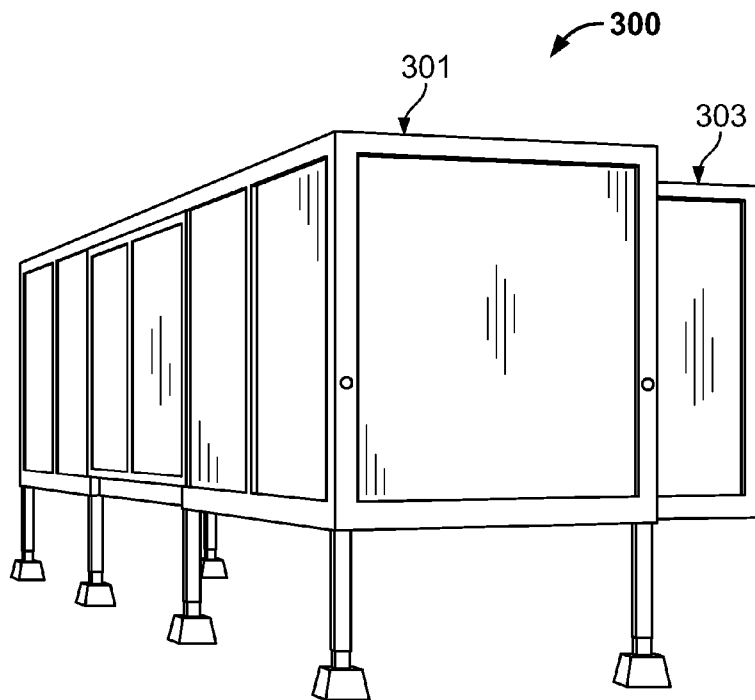


FIG. 7E

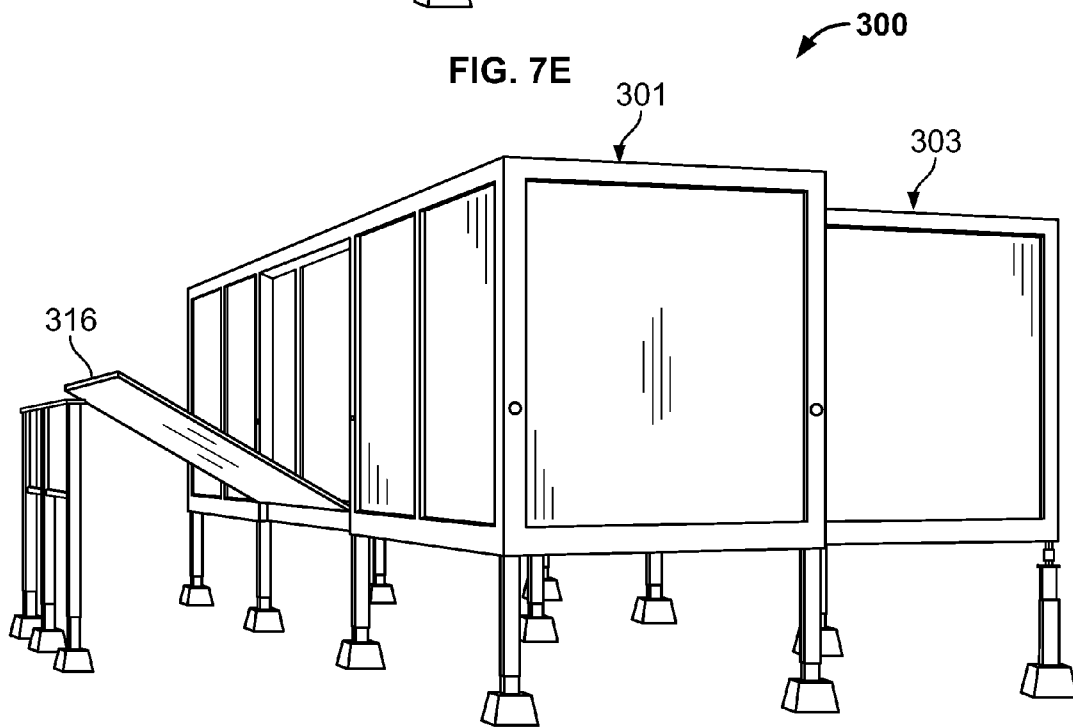


FIG. 7F

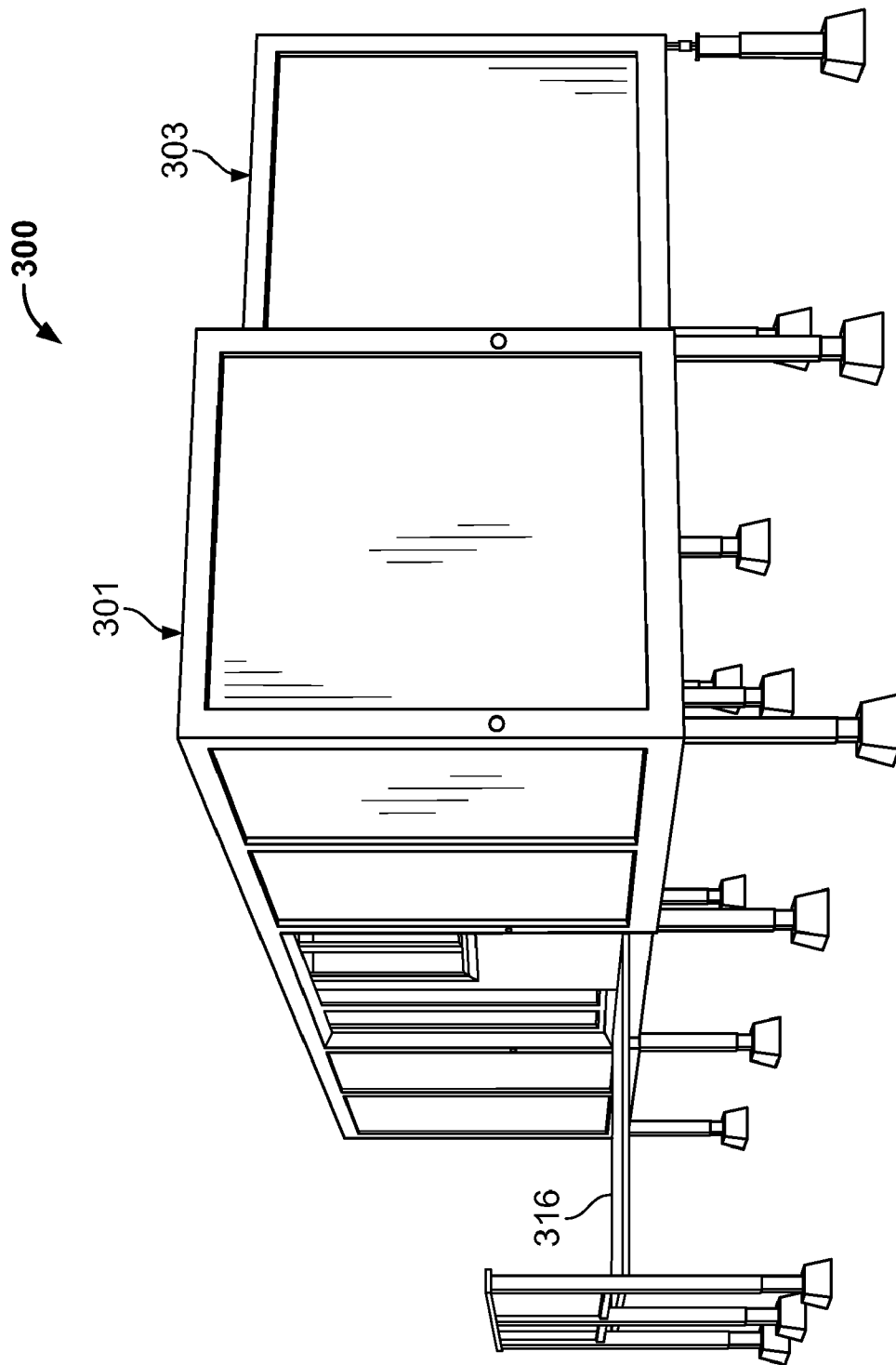


FIG. 7G

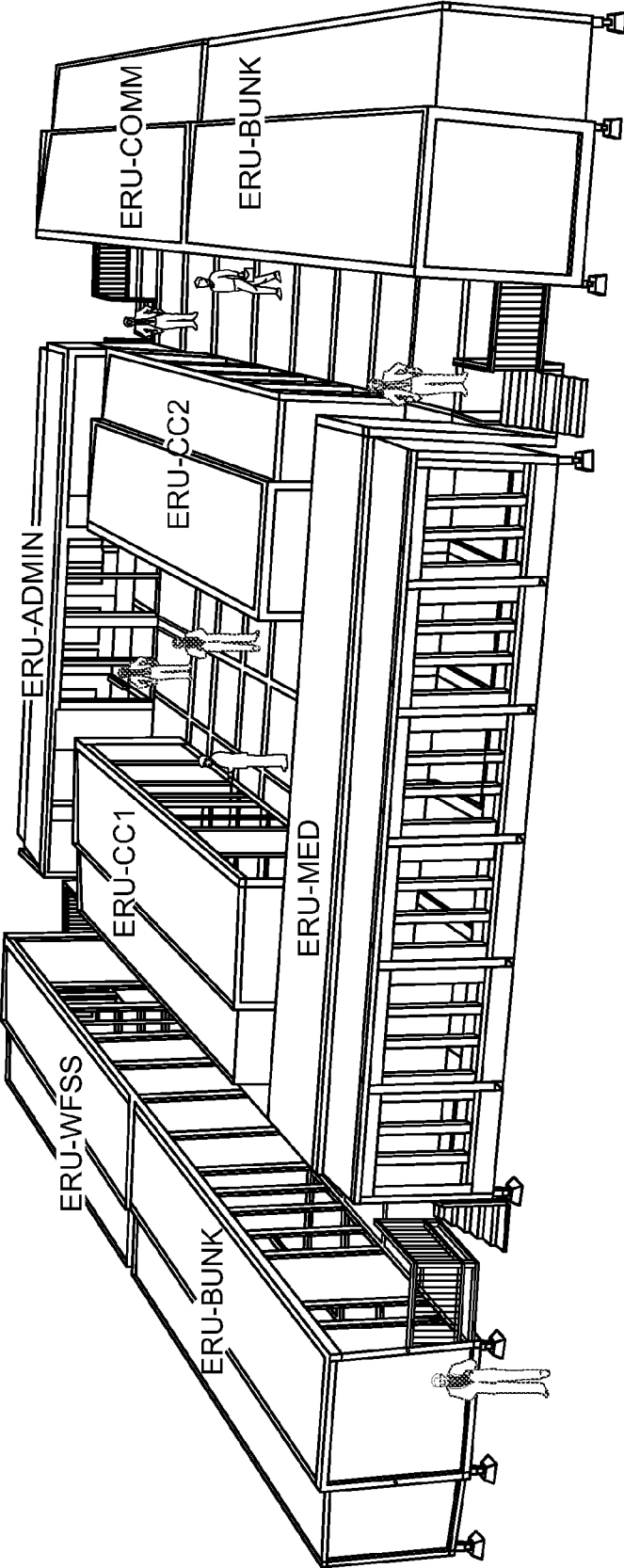


FIG. 8

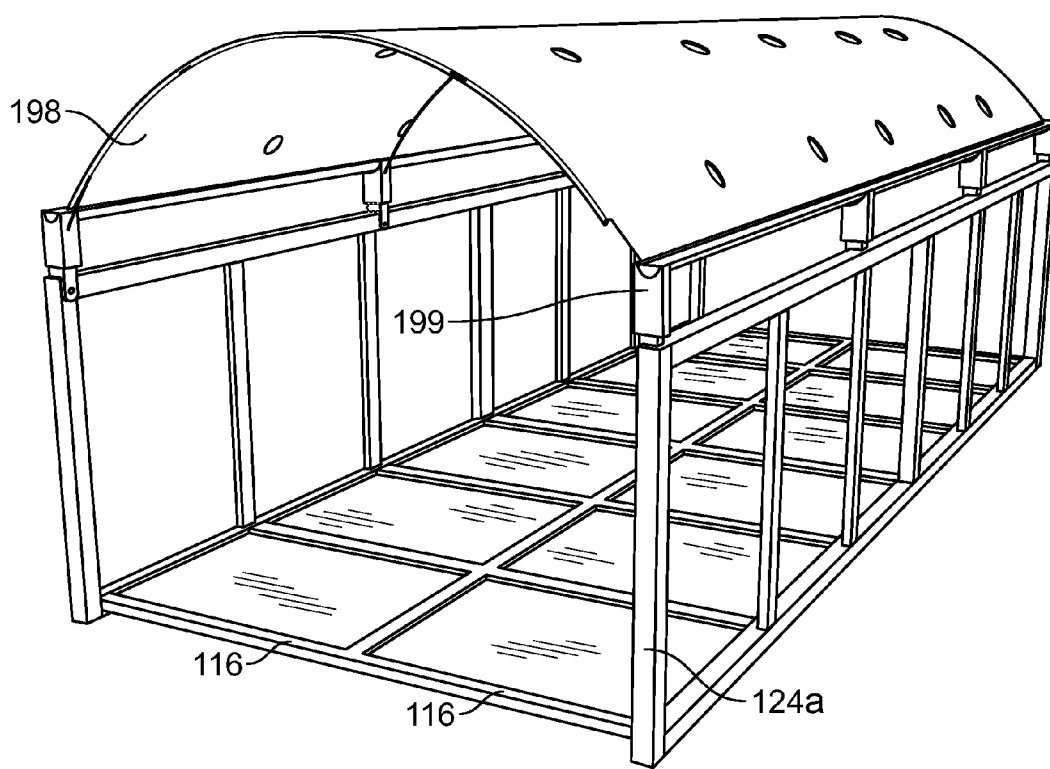


FIG. 9

**SYSTEM OF PREFABRICATED STRUCTURES ARRANGED IN A COMPLEMENTARY LAYOUT**

**CLAIM OF PRIORITY**

[0001] This application claims benefit to the following U.S. Provisional patent application:

[0002] U.S. Provisional Patent Application No. 61/084, 532, entitled "Deployable Prefabricated Structure," by James D. Pope, Attorney Docket No. POPE-01000US0, filed Jul. 29, 2008

**CROSS-REFERENCE TO RELATED PATENT APPLICATIONS**

[0003] This application incorporates by reference the following co-pending patent applications:

[0004] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Deployable Prefabricated Structure with a Nested Extension Structure," by James D. Pope, Attorney Docket No. POPE-01000US1, filed concurrently.

[0005] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Method of Deploying a Prefabricated Structure," by James D. Pope, Attorney Docket No. POPE-01000US2, filed concurrently.

[0006] U.S. patent application Ser. No. \_\_\_\_\_, entitled "System of Cooperating Prefabricated Structures," by James D. Pope, Attorney Docket No. POPE-01000US3, filed concurrently.

[0007] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Method for Deploying Cooperating Prefabricated Structures," by James D. Pope, Attorney Docket No. POPE-01000US4, filed concurrently.

[0008] U.S. patent application Ser. No. \_\_\_\_\_, entitled "System and Method to Stabilize a Deployable Structure," by James D. Pope, Attorney Docket No. POPE-01000US5, filed concurrently.

[0009] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Deployable Prefabricated Structure with an Extension Structure and a Deployable Floor" by James D. Pope, Attorney Docket No. POPE-01000US6, filed concurrently.

[0010] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Deployable Prefabricated Structure with an Extension Structure That is Sealable to the Prefabricated Structure Upon Deployment from the Prefabricated Structure," by James D. Pope, Attorney Docket No. POPE-01000US7, filed concurrently.

[0011] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Deployable Prefabricated Structure with an Extension Structure and Interlocking Elements," by James D. Pope, Attorney Docket No. POPE-01000US8, filed concurrently.

[0012] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Method of Deploying and Redeploying a Prefabricated Structure," by James D. Pope, Attorney Docket No. POPE-01000US9, filed concurrently.

[0013] U.S. patent application Ser. No. \_\_\_\_\_, entitled "Method for Deploying Prefabricated Structures Arranged in a Complementary Layout," by James D. Pope, Attorney Docket No. POPE-01001US1, filed concurrently.

**BACKGROUND**

[0014] Recent catastrophic events, such as Hurricane Katrina and the Boxing Day Tsunami of 2004 have demonstrated a persisting need for prefabricated structures that can be eas-

ily and quickly deployed to disaster sites that do not necessarily have access to preexisting utilities and that can provide multiple logistical services to victims. Prefabricated structures suited for easy and quick deployment can further be used in other settings where preexisting utilities may not be present for temporary use such as at construction sites, or for more permanent use, such as at remote, undeveloped homestead.

**BRIEF DESCRIPTION OF THE FIGURES**

[0015] FIG. 1A is a rear-facing perspective view of an embodiment of a prefabricated structure in accordance with the present invention.

[0016] FIG. 1B is a front-facing perspective view of the prefabricated structure of FIG. 1B.

[0017] FIG. 1C is a top-down perspective view of an alternative embodiment of a prefabricated structure in accordance with the present invention.

[0018] FIG. 1D is a top-down perspective view of a still further embodiment of a prefabricated structure in accordance with the present invention.

[0019] FIG. 1E is a top-down perspective view of a further embodiment of a prefabricated structure in accordance with the present invention.

[0020] FIG. 1F is a top-down perspective view of a further embodiment of a prefabricated structure in accordance with the present invention.

[0021] FIG. 2A is a perspective view of a shell frame and an extension frame nested within the shell frame of the prefabricated structure of FIG. 1A.

[0022] FIG. 2B is a perspective view of a roof support of the shell frame of FIG. 2A.

[0023] FIG. 2C is a perspective view of a floor support of the shell frame of FIG. 2A.

[0024] FIG. 2D is a cross-section of a portion of the extension frame and shell frame showing the relationship of telescoping members.

[0025] FIG. 2E is a perspective view of the extension frame of FIG. 2A.

[0026] FIG. 3A-3F are perspective blow-up views of a portion of a double seal system to seal the prefabricated structure when the extension is in a deployed position and an undeployed position.

[0027] FIG. 4A is a perspective view of the pre-fabricated structure showing the hinged connection of the deck and the extension floor.

[0028] FIGS. 4B-4D are perspective views of the extension floor in progressive stages of deployment.

[0029] FIG. 5A is a perspective view of the prefabricated structure showing the connection of water tanks between joists of the shell frame.

[0030] FIG. 5B perspective view of a water tank positioned between and above the joists.

[0031] FIG. 5C illustrates complementary structures extending from the joists and the water tank so that the water tank is suspended between adjacent joists.

[0032] FIG. 5D is a isolated view of a service pack including a heat pump.

[0033] FIGS. 5E and 5F are perspective views of the service pack of FIG. 5D positioned within the shell frame in an undeployed and deployed state.

[0034] FIG. 6A is a partial perspective view of the extension frame having channels extending through beams and joists of the roof support of the extension.

[0035] FIG. 6B is a partial perspective view of the extension frame of an alternative embodiment of a prefabricated structure in accordance with the present invention having channels extending through the face of the beams and vertical structures of the extension frame.

[0036] FIGS. 6C-6E are perspective views of a panel and a connection system for meeting the panel with of the prefabricated structure of FIG. 1A.

[0037] FIG. 6F is a perspective view of the prefabricated structure showing a plurality of panels made it with the extension frame.

[0038] FIG. 6G is a perspective, partial cross-section of adjacent panels connected at a vertical structure of the extension frame.

[0039] FIGS. 7A, 7C, and 7E-7G illustrate progressive steps of an embodiment of a method of deploying the prefabricated structure of FIG. 1A in accordance with the present convention.

[0040] FIG. 7B illustrates a roller joined with the shell frame of the prefabricated structure.

[0041] FIG. 7D is a schematic view of a support post showing a mechanism for actuating the support post.

[0042] FIG. 8 is a representation of an embodiment of a system of cooperating prefabricated structures in accordance with the present invention.

[0043] FIG. 9 the perspective view of a walkway canopy structure capable of directing precipitation into a water channel for filtration and use.

#### DETAILED DESCRIPTION

[0044] Common reference numerals are used throughout the drawings and detailed description to indicate like elements; therefore, reference numerals used in a drawing may or may not be referenced in the detailed description specific to such drawing if the associated element is described elsewhere.

[0045] Embodiments of a prefabricated structure and a system of cooperating prefabricated structures in accordance with the present invention can be quickly and efficiently anchored and deployed to reduce setup time, set up expense, and site preparation. Such embodiments can benefit structures intended for permanent use, emergency use such as for disaster relief, and/or for planned temporary use such as for classroom facilities and construction site administration.

[0046] Referring to FIGS. 1A and 1B, an embodiment of a prefabricated structure 100 in accordance with the present invention is shown in a deployed arrangement. The prefabricated structure 100 includes a shell 101, an extension 103 deployed from the shell 101, and a deck 106 extending from an opposite side of the shell 101 from the extension 103. As shown, the prefabricated structure 100 is fixed in place by support posts 112 joined with a concrete base anchored by rebar driven into the ground. The support posts 112 can be adjusted vertically so that the prefabricated structure 100 can be leveled. Existing techniques for determining leveling can be applied to assist adjustment of the vertical deployment of the support posts 112 from the frames of the shell 101 and extension 103. As will be described below, the prefabricated structure 100 can be deployed in stages so that the support posts 112 can be extended and fixed in a systematic fashion.

[0047] The prefabricated structure 100 can be substantially self-contained, in that it need not be connected to preexisting electrical grids, water and/or sewage service lines. The prefabricated structure 100 includes a service pack comprising

one or more batteries (shown below) providing electrical power for lighting and appliances, as well as for electrical tools and gadgets accessorizing the living space. The one or more batteries are recharged by a solar panel 108 connected with a roof of the extension 103. The service pack further comprises a generator for providing electrical power to the prefabricated structure 100 and/or supplementally recharging the one or more batteries. The generator can be driven by propane, or some other liquid or gas fuel.

[0048] Panels 114, 115, 117 can be mated with the shell frame 102 and extension frame 104 to provide exterior walls and to seal the prefabricated structure 100 from moisture and suppress undesirable heat exchange with the environment. Panels can be selected based on the function or configuration of structures within the prefabricated structure 100. For example, the prefabricated structure of FIGS. 1A and 1B can include panels 114 connected with the extension frame 104 having windows to pass natural light into the extension 103. Two different types of panels 116a,b are connected to the shell frame 102 along the length of the shell 101 to provide a wall (116a) and an entryway (116b). In other embodiments, some other combination and shape of panel can be used. For example window panels can substitute for solid panels.

[0049] Referring to FIGS. 1C and 1D an alternative embodiment of a prefabricated structure 200 in accordance with the present invention differs from the embodiment of FIGS. 1A and 1B in that panels having three different configurations 116a-c are connected along the length of the shell frame 102. A panel 216c including a window is connected with the shell frame 102 and positioned adjacent to a panel 116b providing an entrance to the prefabricated structure 200. Use of panels connected between support structures of the frames 102, 104 allows a prefabricated structure in accordance with the present invention to be adapted to intended use and/or customized to individual taste. Use of panels may further require only partial replacement when the prefabricated structure is damaged by severe weather, for example, or vandalism, or refurbished for reuse.

[0050] The roofs of the extension 203 and shell 201 of the prefabricated structure 200 of FIGS. 1C and 1D are removed to illustrate furniture and appliances that can be installed within the prefabricated structure 200 prior to delivery to a site. The shell 201 comprises a kitchen having kitchen appliances 270a, and a bathroom having bathroom fixtures 270b separated from the kitchen by a wall 219a. As shown, the shell 201 further comprises sleeping quarters separated from the entrance by a wall 219b and having a pair of bunks 272d. The extension 203 includes sleeping quarters separated into three rooms each of which includes a pair of bunks 272a-c. The bunks are pivotably connected with a fixed wall or structure separating the shell 201 from the extension 203, and pivot down into place upon deployment of the extension 203. Walls 218a,b separating the rooms of the extension 203 are positioned across the shell 201 when the extension 203 is nested within the shell 201, and are drawn out when the extension 203 is deployed. The walls 218a,b can be received in the shell 201 so that the walls 218a,b fill unoccupied space. For example, a wall 218a can be received in a space provided between appliances 270a of the kitchen. The prefabricated structure 200 as shown is intended to provide shelter for eight occupants.

[0051] Referring to FIG. 1E a further embodiment of a prefabricated structure 300 in accordance with the present invention configured for use as an administrative unit is



shown. The shell 301 of the prefabricated structure 300 includes panels having two different configurations 116a,b connected along the length of the shell frame 102. Further, the extension 303 of the prefabricated structure 300 includes panels 314 connected along the length of the extension frame 104 having windows that extend lower than windows of previously described embodiments. The shell 301 comprises a receiving area 370a, a bathroom having bathroom fixtures 370b separated from the receiving area 370a by a wall 319a. The shell 301 further comprises an office 370c separated from the receiving area 370a by a wall 319b and having a desk that pivots down from a collapsed position upon deployment of the prefabricated structure 300. The extension 303 includes a reception desk 372a that pivots down from a collapsed position within a wall 318a. The reception desk 372a separates two offices 372b,c of the extension 303 and the two offices 372b,c are accessed by way of the receiving area 370a. Each office 372b,c includes a desk that pivots down from a collapsed position upon deployment of the extension 303 from the shell 301. As above, walls 318a,b separating the offices 372b,c of the extension 103 are positioned across the shell 301 when the extension 303 is nested within the shell 301, and are drawn out when the extension 303 is deployed. The walls 318a,b can be received in the shell 301 so that the walls 318a,b fill unoccupied space. The prefabricated structure 300 as shown can serve as a stand-alone administration building, for example at a construction site, or can be associated with a plurality of other units, for example, the prefabricated structure 300 can be connected with a cluster of cooperating units and serve as the administration unit for the cluster of cooperating units.

[0052] Referring to FIG. 1F a still further embodiment of a prefabricated structure 400 in accordance with the present invention configured for use as a medical unit is shown. The shell 401 of the prefabricated structure 400 includes panels having two different configurations 116a,b connected along the length of the shell frame 102. Further, the extension 403 of the prefabricated structure 400 includes panels 314 connected along the length of the extension frame 104 having windows that extend low. The shell 401 comprises a reception area 470a, a bathroom having bathroom fixtures 470b separated from the reception area 470a by a wall 419a. The reception area includes a reception desk and seating. The shell 401 further comprises an examination room 470c separated from the reception area 470a by a wall 419b and having an examination table that pivots down from a collapsed position upon deployment of the extension 403. The extension 403 includes three examination rooms 472a-c including an examination table that pivots down from a collapsed position and a pair of additional tables for holding instruments, charts, etc. that pivot down from a collapsed position upon deployment of the extension 403 from the shell 401. As above, walls 418a,b separating the examination rooms 472a-c of the extension 403 are positioned across the shell 401 when the extension 403 is nested within the shell 401, and are drawn out when the extension 403 is deployed. The walls 418a,b can be received in the shell 401 so that the walls 418a,b fill unoccupied space.

[0053] The embodiments of prefabricated structures shown in FIGS. 1A-1F comprise substantially the same frame structure. Referring to FIG. 2A, the frame structure is shown without panels or furniture, and comprises the extension frame 104 nested within the shell frame 102. A floor support of the extension frame 104 telescopically engages a floor support of the shell frame 102 and a floor of the extension 103

can be deployed in roughly the same plane as the floor of the shell 101. The roof support of the extension frame 104 is positioned at a height shorter than a height of the shell frame 102.

[0054] Referring to FIGS. 2B and 2C, the shell frame 102 is shown in two portions. An inner portion is shown in FIG. 2B comprising a first pair of roof beams 120a1,b1 extending lengthwise along the shell and a second pair of roof beams 122a1,b1 extending between and transverse to the first pair of roof beams 120a1,b1. The roof beams 122a1,b1 are connected with corresponding floor beams 128a1,b1 of the floor by vertical structures 124a-d (vertical structures that provide primary resistance to compressive forces are hereinafter referred to as columns). The columns 124a-d include cavities extending through at least a portion of the columns 124a-d to house support posts 112a-d extendable from the bottoms of the columns 124a-d and eye hooks 113a-d detachably received in a cavity in the tops of the columns 124a-d. The eye hooks can enable positioning of the prefabricated structures through use of a crane or helicopter, for example. An additional vertical support 123 extends down from a roof beam 120a1. An outer portion of the shell frame 102 is shown in FIG. 2C comprising a pair of floor beams 134a,b extending lengthwise along the shell and a pair of beams 128a2,b2 having a J-shaped cross-section (seen more clearly in FIG. 2D) fixedly connecting with the floor beams 128a1,b1 of the outer portion to define a slotted beam 128a,b extending between and transverse to the pair of floor beams 134a,b of the inner portion. FIG. 2D is a partial cross-section of the extension frame 104 received within the shell frame 102, illustrating the relationship between the outer portion and inner portion of the shell frame 102 and between the shell frame 102 and the extension frame 104. As shown, the outer portion of the shell frame 102 is fixedly connected with the inner portion of the shell frame 102 so that a slotted beam 128a is formed that receives a floor beam 148a of the extension frame 104 in a telescoping fashion, while passing a wall base 146a and vertical structures 144a of the extension frame 104. The inner portion comprises a pair of inner roof joists 122a2,b2 connected with or integrally formed with the second pair of roof beams 122a1,b1 of the outer portion and a plurality of roof joists 126a-e extending between and transverse to the first pair of roof beams 122a2,b2. The inner portion further comprises a plurality of floor joists 136a-e extending between and transverse to the floor beams 134a,b and spaced along the shell frame between the pair of slotted beams 128a,b and a series of vertical structures 132a-e extending between a floor beam 134a and a roof beam 120a. In an embodiment, the vertical structures 132a-e can be C-channels, as explained in more detail below.

[0055] In a preferred embodiment the outer portion is fabricated from aluminum or an aluminum alloy and the inner portion is fabricated from steel or a steel alloy. The components of the inner portion and the outer portion can be welded, riveted, bonded or otherwise fixedly connected. In other embodiments, the inner portion and outer portion can be fabricated from the same material. Further, the slotted beam 128a,b can comprise the floor beams 128a2,b2 of the inner portion welded to a separate pair of beams 128a1,b2, or alternatively, the slotted beam can be fabricated from a single piece of material of a single composition. One of ordinary skill in the art in view of the teachings contained herein will appreciate the myriad different techniques for fixedly con-

necting the components of the shell frame, and the various tradeoffs in strength and weight for using different materials in fabricating the shell frame.

[0056] Referring to FIG. 2E, the extension frame 104 is shown. The extension frame 104 comprises an extension roof support and an extension floor support. The extension floor support includes a main floor beam 150 extending lengthwise, a pair of extension floor beams 148a,b extending from the main floor beam 150 and telescoping from the respective slotted beams 128a,b of the shell frame 102, and a pair of extension joists 152a,b extending from the main floor beam 150 and telescoping from corresponding floor joists 136b,d of the shell frame 102. The extension roof support includes a pair of roof beams 140a,b extending lengthwise along the shell and seven roof joists 142a-g extending between and transverse to the pair of roof beams 140a,b. The roof beams 140a,b are connected with the floor beams 148a,b by columns 144a-d. The columns 144a-d include cavities extending through at least a portion of the columns 144a-d to house support posts 112e-g extendable from the bottoms of the columns 144a-d. A series of vertical structures 156a-e extend between the floor beam 150 and a roof beam 140b. In an embodiment, the vertical structures 156a-e can be C-channels, as explained in more detail below. Two of the vertical structures 156b,d support walls of the extension 104 and are connected to corresponding wall bases 154a,b. Each wall base 154a,b is connected to an additional vertical wall support 158a,b. The vertical wall supports 158a,b are connected with the roof beam 140a by a ledge 160a,b. The vertical structure 156b,d, the wall base 154a,b, and the vertical wall support 160a,b together support a wall dividing sections of the extension 103. The wall protrudes past the roof beam 140a of the extension to provide the ledge 160a,b, which can apply a force to a complementary joist 126b,d of the shell roof to assist in maintaining the cantilever extension approximately horizontal during deployment. As shown, a pair of spring biased rollers 162a,b extend from each ledge 160a,b. The rollers 162a,b are biased toward the complementary joist 126b,d to apply force to at least partially counterbalance the moment force along the portion of the extension telescoped from the shell frame 102 while rolling to reduce impeding deployment of the extension 103 from the shell 101. As can be seen more clearly in FIG. 2D, the wall base 154a,b is separated from the floor joist 152a,b by some small gap G so that the wall base 154a,b passes over the floor joist 134a of the shell frame 102 in a sliding, or separated fashion.

[0057] It can be desirable to seal the prefabricated structure from environmental elements at least in a deployed configuration, and preferably in both a deployed configuration and a nested configuration. In a preferred embodiment of a prefabricated structure in accordance with the present invention, a T-flange can extend from structures along the perimeter of the extension. The T-shaped flange can extend inward from the extension-side columns 124b,d and the extension-side roof beam 120b. Referring to FIGS. 3A-3D and 3F, the T-shaped flange 125 is shown separate from the extension-side column 124b and extension-side roof beam 120b to more clearly explain the relationship between the extension and the T-shaped flange 125. In the embodiment shown, a pair of trim pieces is connected along the at least three edges of the extension, including the extension columns 144a-d and the roof beams 140a,b. A trim piece can have, for example, an L-shape that complements one half of the T-shaped flange 125. The trim pieces complement separate halves of the

T-shaped flange 125. Referring to FIG. 3A, the extension is shown in a closed position with a trim piece 145b mating with the T-shaped flange 125. As the extension 103 deploys, the trim piece 145b decouples from the T-shaped flange, as shown in FIG. 3B. As the extension reaches full deployment, the trim piece 145a at an opposite end of the extension approaches the T-shaped flange 125, as shown in FIG. 3D and FIG. 3E, which shows the T-shaped flange 125 connected with and extending from the extension-side column 124a. The trim piece 145a mates with the T-shaped flange as the extension 103 reaches full deployment, as shown in FIG. 3F. Referring to FIG. 3G, rubber gaskets are fixedly connected with one or both of the T-shaped flange 125 and the trim piece 145a so that when the structures are mated, a seal is formed, to suppress penetration of water and/or air at the flange.

[0058] Referring to FIG. 4A-4D, floor panels 182a-182c of the extension 103 pivot from a collapsed, upright position to a flat, seated position upon deployment of the extension frame 104. The floor panels 182a-182c are pivotably connected with one or both of the shell frame 102 and the shell floor 180 and in a collapsed position are arranged vertically so that the weight of the floor panels 182a-182c is applied to the wall of the extension 103. Referring to FIGS. 4B-4D, as the extension frame 103 deploys, the floor panels slide down the wall of the extension 104 moving from the deployed position of FIG. 4B to the partially deployed position of FIG. 4C, to the fully deployed position of FIG. 4D. As can be seen in FIG. 4D, the telescoping floor joists 152a of the extension frame 103, include a lock feature that extends laterally from the floor joist 152a and that receives a complementary lock feature of the floor panel 182a. The lock features enables the floor panel 182a to lock into position so that a surface of the floor panel 182a is generally coplanar with a surface of the floor joist 152a and approximately co-planar with floor panels 180 of the shell 101.

[0059] Referring to FIGS. 5A-5C, floor joists 136a-136e and floor beams 148a,b of the shell frame 102 can be used to position support structures below floor panels of the shell 101. The floor joists 136a-136c and the floor beams 148a,b can include lock structures resembling the lock structures of the extension floor joists 152a,b. Between a pair of floor joists 136a-136c, or a floor beam 148a,b, one of a supply water tank for providing water to the prefabricated structures (e.g., to appliances) and a grey water tank for receiving used water for filtering and dumping and/or recycling can be positioned. The tank 190e of FIG. 5B is shown open for illustration of the geometry of a typical tank. However, in embodiments of the present invention, supply water tanks and grey water tanks will be enclosed. Further, the tank 190e includes a single dividing structure dividing the tank to at least partially control movement of water within the tank. In further embodiments, a supply water tank and/or grey water tank of the prefabricated structure can be baffled to further control movement of water in the tank. Controlling movement of water within the tank can resist catastrophic unbalancing of the prefabricated structure during periods of high winds, such as during tropical storms or hurricanes. Water within the tank can add weight to the prefabricated structure while lowering a center of gravity of the prefabricated structure, thereby increasing stability of the prefabricated structure. In a preferred embodiment shown in FIG. 5A, the prefabricated structure can include four supply water tanks and two grey water tanks, so that water tanks are positioned along substantially the length of the shell 101. Referring to FIG. 5C, the tanks can be supported by locking

structures of the floor joist **136e** that complement structures of the tank **190e**. As shown, the tank is supported so that a top of the tank is below the surface of the floor joist **136e**. Floor panels (**180** in FIG. 4A) of the shell **101** can be positioned above the tanks so that the floor panels **180** are supported by the tanks **190a-e** or alternatively by additional features of the floor joists **136a-e**.

[0060] Referring again to FIG. 5A, a service pack **192** for use with the prefabricated structure is shown positioned within the shell frame **102**. As shown, the service pack **192** comprises a heat pump **194** and propane tanks **196** for use to fuel a generator or utilities such as cooking appliances. Though not shown, the service pack **192** can include batteries, inverter/rectifier equipment, and the aforementioned generator. As shown, the heat pump **194** can be accessed by drawing the heat pump **194** from the end of the shell frame **102** between adjacent columns **124a,124b**. However, the heat pump **194** is typically deployed for long periods of time, and such an arrangement may be disadvantageous, for example where cooperating prefabricated structures are positioned in close proximity to one another. FIG. 5D-5F illustrates an embodiment of a service pack **292** in accordance with the present invention for use with prefabricated structures as described herein, for example. The service pack **292** comprises a heat pump **294** mounted on a cabinet **293**. The cabinet **293** is lockable to prevent components of the service pack **292** from being removed. The heat pump **294** rests on a platform that can be raised through the roof of the shell, as shown in FIGS. 5E and 5F. The shell frame **102** comprises an additional roof joist **126z** so that the heat pump **294** and a door or other structure (not shown) sealing the roof when the heat pump **294** is in an undeployed position is supported between the additional roof joist **126z** and the roof joist **126a** of the shell frame **102** as described above. The heat pump **294** can be raised by a motor or mechanically. With the heat pump raised through the roof of the shell, the heat pump **294** can be left deployed without potentially interfering with additional prefabricated structures that may be placed in close proximity so that the prefabricated structures can cooperate in one or both of electrical and water utilities. Further, the heat pump **294** may function more efficiently when placed above the prefabricated structure, allowing air to more freely circulate around the heat pump **294**. Fuel tanks such as propane tanks **296** can be drawn from the front of the shell **296**. Because fuel tanks **296** are only accessed briefly for replacement, the fuel tanks **296** do not protrude from the shell when not serviced. The cabinet **293** also contains a bank of batteries **295** that are recharged by electrical wiring connected with solar panels of the extension roof and/or by a generator that can be fueled by the propane tank **296**. The cabinet **293** also includes inverter and/or rectifier equipment **297** to convert DC to AC and AC to DC. Use of a unified or partially unified service pack **292** can increase likely reusability of service components of the prefabricated structure, for example when the prefabricated structure is refurbished for deployment at an alternative site.

[0061] The shell frame **102** and extension frame **104** can provide channels for communicating one or both of electrical wiring and water ducts. FIG. 6A illustrates an extension frame **104** of embodiments such as shown in FIGS. 1A-5E. Electrical wiring can communicate, for example, electrical power collected from a solar panel arranged on a roof of the extension to a battery or bank of batteries, and can communicate electrical power from the battery or bank of batteries to lighting and/or outlets of the prefabricated structure. Electrical

wiring can be connected between the extension **103** and the shell **101** as a single harness that extends through both frames when deployed or undeployed, or alternatively the electrical wiring can exist as separate harnesses extending through the shell **101** and extension **103**, respectively, that can be connected upon deployment of the extension **103** from the shell **101**. The electrical wiring rests or is seated within channels, for example as defined by roof beams **140b,142a** of the extension frame **104**. Roofing can overlay the channels to protect electrical wiring from environmental elements. Such an arrangement can protect electrical wiring and water ducts from damage during transport and use and can provide improved aesthetics by hiding electrical wiring and water ducts. In alternative embodiments, the extension frame **504** can comprise channels within roof beams **542a,540b** arranged differently than as shown in FIG. 6A. For example, the channels can face outwardly.

[0062] Vertical structures of both the shell frame **102** and the extension frame **104,504** can comprise C-channels adapted to receive L-channels **372a,372b** fixedly embedded in panels **314a** or fixedly connected with panels **314**, as shown in FIGS. 6C-6G. Embodiments of prefabricated structures in accordance with the present invention can be configured to suit myriad different applications and tasks using the shell frames **102** and extension frames **104,504** described above, by selecting and mating panels having suitable features with the shell frame **102** and extension frame **104,504**. The panel **314a** of FIG. 6C resembles panels **314** of FIGS. 1E and 1F, and includes three windows **376** that extend along a large portion of the height of the panel **314a**. The panel **314a** can comprise, in an embodiment, a structure insulated from environmental elements such as rain and wind. The panel **314a** can further resist heat exchange between air within the prefabricated structure and the environment, helping to reduce heating of the prefabricated structure by hot outside air, and cooling of the prefabricated structure by cold outside air. The panel **314a** can comprise any material or combination of materials that allow an L-channel to be embedded or fixedly connected with the panel **314a**, and that provides at least insulation from moisture and wind. For example, as shown in FIG. 6E, the panel can include exterior siding bonded to insulation, bonded to a light, rigid material such as plywood which is sealed by a film, such as vinyl. As shown, the L-channel **372a,372b** is fixedly embedded between the exterior siding and insulation of the panel **314a**. The panel **314a** can be mated with adjacent vertical structures **156a** so that the L-channel **372a,372b** fits in the C-channel of the vertical structure **156a** and the C-channel is seated between the panel **314a** and the L-channel **372a**. A seal **177a** can be bonded, for example adhesively, with the C-channel so that the L-channel presses against the seal **177a**, preventing environmental elements from penetrating the prefabricated structure. A shim **374a** can be placed between panels **314a** to force panels **314a** against opposite sides of the C-channel **156a**, improving the seal. An alternative embodiment of a panel is shown in FIGS. 6F and 6G comprising an L-channel bonded to an exterior of a panel **514b** rather than embedded. The shim **574a** caps adjacent L-channels rather than urging them apart. The panel **514b** of FIGS. 6F and 6G further comprises an L-channel **578b** mating with a roof beam **540b** of the extension frame. The window **376** of the panel is shown partially separated from the panel **514b**.

[0063] FIGS. 7A-7G illustrate an embodiment of a method of deploying a prefabricated structure **300** including a shell

and an extension nested within the shell in accordance with the present invention. The method comprises positioning a container 2 or support surface such as a flat-bed or rail car supporting the prefabricated structure at a site. The prefabricated structure 300 can be supported on a plurality of rollers 384 and/or casters connected with the prefabricated structure 300. The prefabricated structure 300 can be urged so that a first set of roller 384 extends from the container 2. As shown in FIG. 7B, the first set of rollers can be separated from columns of the prefabricated structure 300. A first set of support posts 312 can be lowered from the columns. The support posts 312 can be lowered, in an embodiment, using a worm gear device 388, such as shown in FIG. 7D. A crank 386 can be mated with a gear 388 arrangement and rotated to lower the support post 312. In alternative embodiments, the support post 312 can be lowered using a motor. Once the support posts 312 are lowered, the support posts 312 can be anchored. The prefabricated structure 300 is then drawn from the container 2 or support structure so that more of the prefabricated structure 300 is cantilevered out from the container 2 or support structure. Preferably, the prefabricated structure 300 is drawn so that a column of the shell is cantilevered from the support surface. In a fashion repeated at each pair of columns along the shell, a set of rollers or casters is cantilevered from the support surface, and separated from the column. Support posts are then lowered from the column and anchored at the site. Referring to FIGS. 7E and 7F, once the prefabricated structure 300 has been drawn from the support surface, the extension 303 can be deployed from the shell 301. In a preferred embodiment, a rack-and-pinion mechanism can be employed to urge the extension 303 from the shell 301. The rack-and-pinion mechanism can comprise a shaft extending from the floor beams of the shell and through the floor joists of the shell, the shaft including pinions mating with racks at each or several of the floor joists and floor beams of the shell. The extension 303 can be cantilevered from the shell 301 in a fully deployed position. Once the extension is deployed, support posts of the extension 303 are extended from columns of the extension 303. The support posts are then anchored. Referring to FIGS. 7F and 7G, the deck 316 can be deployed, for example to be mated with a set of support posts.

[0064] In alternative embodiments, the prefabricated structure may be suspended by way of cables attached to eyehooks over a designated deployment site. The prefabricated structure may be held suspended over the site by a crane or other device while support posts are extended from columns of the shell and anchored in position at the site. Once the support posts are extended, the extension can be deployed from the shell. After deployment of the extension, support posts of the extension can be lowered and anchored in position at the site. In still further embodiments, the prefabricated structure can be positioned over a site by a forklift. The prefabricated structure may be held suspended over the site by the forklift while support posts are extended from columns of the shell and anchored in position at the site. As above, once the support posts are extended, the extension can be deployed from the shell. After deployment of the extension, support posts of the extension can be lowered and anchored in position at the site.

[0065] It should be noted, and will be apparent upon review of FIGS. 1A-1F described above, that the prefabricated structure 300 itself can act as a container. When the extension 303 is nested within the shell 301, the prefabricated structure is sealed. Embodiments of prefabricated structures in accordance

with the present invention are advantageously designed to be moved without a sheltering container, so that prefabricated structures can be placed directly on flatbeds, railroad cars, cargo ships, etc. without first being placed in containers. Such a scheme for transporting the prefabricated structure can reduce transport and setup time, simplify setup and reduce an amount of space required for setup (the prefabricated structure need not be drawn lengthwise from a semi-truck, for example). Further, as noted above the columns of the shell frame can include detachable eyehooks and rollers that are fitted at mounting points within the columns. Columns provide opportune locations for locking additional prefabricated structures in place when stacked for transport on a cargo ship, for example. Thus, multiple prefabricated structures can be stacked as high as can be supported by their frames (which can vary with materials selected for the frame) and transported on cargo ships to deliver to disaster relief sites, such as in Thailand and Indonesia following the Boxing Day tsunami, or Africa to assist relief efforts for refugees in Darfur, Sudan.

[0066] Embodiments of methods of using prefabricated structures and systems of cooperating prefabricated structures in accordance with the present invention can be applied to provide potential logistical solutions to multiple logistical challenges, for example encountered at a disaster area. The system can comprise two or more cooperating prefabricated structures, each prefabricated structure including a shell and a deployable extension. The prefabricated structures can cooperate in one or more ways. Cooperation can be simple, for example, the prefabricated structures can include decks that are sufficiently close to one another so as to combine to form a common walkway. Alternatively, cooperation can determine a selection of panels (e.g., window height, entry positioning and type) for the shell and extension, and the type of amenities and furniture contained within the prefabricated structures. For example, referring to FIG. 8, an embodiment of a system of cooperating prefabricated structures in accordance with the present invention is shown comprising eight prefabricated structures connected together and providing utility for multiple different logistical challenges. The system as shown comprises eight units that are arrangeable as desired to support efficient logistical flow, and the prefabricated structures are sized to be deployed as a system in a tightly configured arrangement. Thus, for example, a length of two deployed prefabricated structures is approximately equal in distance as a width of two deployed prefabricated structures and a length of one deployed prefabricated structure. Thoughtful dimensioning of the prefabricated structure to generally conform with shipping standards, as well as with deployment configurations can enable a cooperating relationship that is substantially complete upon deployment of the prefabricated structures individually. The cooperating relationship and tight configuration of units allows compact, efficient deployment, safety of use by design (e.g., little to no gaps in walkways formed by pivotably deployed decks), and improved logistical flow. The configuration also allows electrical utilities and water utilities to be predictably linked. The system of cooperating prefabricated structures of FIG. 8 can be expanded or reduced in a scaling fashion, so that in an alternative embodiment only the four inner prefabricated structures are linked together (e.g., the two prefabricated structures in the center and the two prefabricated structures arranged perpendicularly to the center structures).

**[0067]** Referring again to FIG. 8, as shown, the system comprises a pair of bunk units (“ERU-BUNK”) positioned at opposite ends of the system. The bunk units can include amenities and furniture resembling the prefabricated structure of FIGS. 1C and 1D, for example. The system also comprises an administration unit (“ERU-ADMIN”) that includes amenities and furniture resembling the prefabricated structure of FIG. 1E. The system also comprises a medical unit (“ERU-MED”) positioned between the bunk units and opposite the administration unit. The medical unit can include amenities and furniture resembling the prefabricated structure of FIG. 1F. In addition to prefabricated structures having previously described amenities, furniture, and functionality, myriad different functional configurations can be provided to prefabricated structures including shell frames and extension frames as described above.

**[0068]** As shown in FIG. 8, two commissary units (“ERU-CC1 & 2”) are provided to facilitate meetings and provide waiting areas for visitors to the administration unit and medical unit, for example. Further, an additional, dedicated communication unit (“ERU-COMM”) is shown which can provide a common hub data uplink/downlink and communication. For example, the communication unit can include broadcast transmitting and receiving equipment. Where desired, one or more of the prefabricated structures can electrically and communicatively connected to each other so that the prefabricated structures combine to provide a shared power grid. Such an arrangement can provide flexible distribution to electricity, allowing electrical power to be prioritized to one of the prefabricated structures of the shared grid. For example, medical units or communication units may be given priority where power is low. One or both of the shell frame and the extension frame of the prefabricated structures can include channels that can be accessed, allowing wire harnesses or electrical cables to be connected with other prefabricated structures.

**[0069]** Further, an additional, dedicated water filtering unit (“ERU-WFSS”) is shown which can provide a common supply water collection, filtration and distribution facility, as well as a grey water processing and dump facility. A water filtering unit can increase an overall volume of water available and provide more efficient processing of supply water that may be collected from rain water or bottled water provided by relief agencies, etc., by providing a larger and more flexible space for including equipment. Likewise, grey water can be collected from use, treated and dumped, for example in a ditch or cesspool (although the water may be sterile and usable for example for growing foods). One or more of the prefabricated structures can be connected with the water filtering unit so that the prefabricated structures combine to provide a shared water system. Such an arrangement can potentially increase an overall available amount of water by allowing dedication of water tanks in some of the prefabricated structures to supply water, for example, while the water filtering unit quickly filters and disposes of grey water.

**[0070]** As mentioned above, the water filtering unit can collect rain water and filter the water for use by the prefabricated structures. Referring to FIG. 9, one or more of the decks providing walkways for the system can further include canopies 198 anchored to columns 124a of the shell frame 102, for example, the canopies 198 providing shade to the walkways and shielding the walkways from rainfall. In such embodiments, the canopies 198 can include mounting structures 199 that direct water beading and rolling from the canopies 198 to

gutters and to tubing housed in channels of the shell frames and/or extension frames of the prefabricated structures. The tubing can communicate the water to supply water tanks, or alternatively to the water filtering unit.

**[0071]** Embodiments of methods of distributing a prefabricated structure in accordance with the present invention can be applied to manage construction and deployment costs associated with the prefabricated structures and systems of cooperating prefabricated structures. A method can comprising providing a prefabricated structure for use at a first site, the prefabricated structure including a shell with a shell frame, a plurality of wall panels mated with the shell frame, and a plurality of floor panels mated with the shell frame, and an extension with an extension frame, a plurality of wall panels mated with the extension frame, and a plurality of floor panels mated with the extension frame. The prefabricated structure can be used at a site, such as a disaster relief site, and then recovered from the site for refurbishment. Recovery can comprise a series of steps approximately reversed from the steps of deployment. For example, a prefabricated structure can be recovered by retracting the support posts of the extension into the extension, nesting the extension within the shell, retracting a first set of supports posts of the shell into the shell, joining a rollers to columns of the shell, urging a transport surface so that the set of roller is positioned on the transport surface and can roll on the surface. One of the transport surface and the shell is urged in stages at each pair of columns so that the support posts can be retracted within the column and replaced with rollers that can transfer weight of the prefabricated structure to the transport surface, until the prefabricated structure is wholly received on the transport surface. The prefabricated structure can then be transported back to a refurbishment facility and refurbished. Refurbishment may include replacing one or more floor panels and/or wall panels, amenities and/or furniture. Prefabricated structures can be refurbished so as to support a different use or the same use. It is generally believed that the shell frame extension frame is likely to be undamaged, enabling multiple uses of the prefabricated structure at multiple sites.

**[0072]** The foregoing description of the present invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations will be apparent to practitioners skilled in this art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, thereby enabling others skilled in the art to understand the invention for various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

**1.** A system of cooperating prefabricated structures arranged in a complementary layout comprising:

a set of prefabricated structures having substantially the same dimensions, the set of prefabricated structures including:

a first prefabricated structure including a first shell and a first extension deployed out from a nested position within the first shell;

a first deck hingedly connected with the first shell, the first deck extending away from the first shell so that a width of the first prefabricated structure and the first deck is about the size of half the length of the prefabricated structures;

- a second prefabricated structure including a second shell and a second extension deployed out from a nested position within the second shell;
- a second deck hingedly connected with the second shell, the second deck extending away from the second shell so that a width of the second prefabricated structure and the second deck is about the size of half the length of the prefabricated structures;
- wherein the first prefabricated structure is arranged opposite the second prefabricated structure so that the first deck abuts the second deck;
- a third prefabricated structure including a third shell and a third extension deployed out from a nested position within the third shell;
- a third deck hingedly connected with the third shell, the third deck extending away from the third shell so that a width of the third prefabricated structure and the third deck is about the size of half the length of the prefabricated structures;
- wherein the third prefabricated structure is arranged transverse to the first prefabricated structure and the second prefabricated structure so that the third deck abuts and extends along the width of the first prefabricated structure and the second prefabricated structure;
- a fourth prefabricated structure including a fourth shell and a fourth extension deployed out from a nested position within the fourth shell; and
- a fourth deck hingedly connected with the fourth shell, the fourth deck extending away from the fourth shell so that a width of the fourth prefabricated structure and the fourth deck is about the size of half the length of the prefabricated structures;
- wherein the fourth prefabricated structure is arranged transverse to the first prefabricated structure and the second prefabricated structure and opposite the third prefabricated structure so that the fourth deck abuts and extends along the width of the first prefabricated structure and the second prefabricated structure; and
- wherein the first deck, the second deck, the third deck, and the fourth deck form a common walkway.
2. The system of claim 1, wherein:  
the prefabricated structures further include:  
electrical wiring,  
a supply water duct, and  
a grey water duct; and  
the electrical wiring of the prefabricated structures is connected so that the prefabricated structures share a common electrical system;  
the supply water ducts of the prefabricated structures are connected so that the prefabricated structures share a supply water system; and  
the grey water ducts of the prefabricated structures are connected so that the prefabricated structures share a grey water system.
3. The system of claim 2, further comprising:  
a canopy connected across the first deck and the second deck;  
a gutter associated with the canopy for collecting water from the canopy; and  
wherein the gutter is communicatively connected with the supply water system.
4. The system of claim 3, wherein a water purification device is positioned between the gutter and the supply water tank to purify collected water for introduction to the supply water system.
5. The system of claim 3, wherein the gutter is mounted on a vertical support structure of the shell frame.
6. The system of claim 1, further comprising:  
another set of prefabricated structures having substantially the same dimensions as prefabricated structures of the set, the another set of prefabricated structures including:  
a fifth prefabricated structure including a fifth shell and a fifth extension deployed out from a nested position within the fifth shell;  
a fifth deck hingedly connected with the fifth shell, the fifth deck extending away from the fifth shell so that a width of the fifth shell and the fifth deck is about the size of half the length of the prefabricated structures; wherein the fifth prefabricated structure is arranged transverse to the third prefabricated structure so that the fifth deck abuts the third deck and extends along approximately half the length of the second extension of the second prefabricated structure;  
a sixth prefabricated structure including a sixth shell and a sixth extension deployed out from a nested position within the sixth shell;  
a sixth deck hingedly connected with the sixth shell, the sixth deck extending away from the sixth shell so that a width of the sixth shell and the sixth deck is about the size of half the length of the prefabricated structures;  
wherein the sixth prefabricated structure is arranged transverse to the fourth prefabricated structure so that the sixth deck abuts the fourth deck and the fifth deck and extends along approximately half the length of the second extension of the second prefabricated structure;  
a seventh prefabricated structure including a seventh shell and a seventh extension deployed out from a nested position within the seventh shell;  
a seventh deck hingedly connected with the seventh shell, the seventh deck extending away from the seventh shell so that a width of the seventh shell and the seventh deck is about the size of half the length of the prefabricated structures;  
wherein the seventh prefabricated structure is arranged transverse to the third prefabricated structure so that the seventh deck abuts the third deck and extends along approximately half the length of the first extension of the first prefabricated structure;  
an eighth prefabricated structure including an eighth shell and an eighth extension deployed out from a nested position within the eighth shell; and  
an eighth deck hingedly connected with the eighth shell, the eighth deck extending away from the eighth shell so that a width of the eighth shell and the eighth deck is about the size of half the length of the prefabricated structures;  
wherein the eighth prefabricated structure is arranged transverse to the fourth prefabricated structure so that the eighth deck abuts the fourth deck and the seventh deck and extends along approximately half the length of the first extension of the first prefabricated structure; and

- wherein the fifth deck, the sixth deck, the seventh deck, and the eighth deck form a common walkway.
- 7.** The system of claim **6**, wherein the system is substantially square in layout.
- 8.** The system of claim **6**, wherein the first deck, the second deck, the third deck, the fourth deck, the fifth deck, the sixth deck, the seventh deck, and the eighth deck form a common walkway.
- 9.** The system of claim **6**, wherein:
- a prefabricated structure from the first set of prefabricated structures provides an administration unit;
  - a prefabricated structure from the first set of prefabricated structures provides a commissary unit;
  - a prefabricated structure from the second set of prefabricated structures provides a communication unit; and
  - a prefabricated structure from the second set of prefabricated structures provides a bunk unit.
- 10.** The system of claim **9**, wherein:
- a prefabricated structure from the first set of prefabricated structures provides a medical unit; and
  - a prefabricated structure from the second set of prefabricated structures provides a water filtering unit.
- 11.** The system of claim **10**, wherein:
- the prefabricated structures further include:
- electrical wiring,
  - a supply water duct, and
  - a grey water duct; and
- the electrical wiring of the prefabricated structures is connected so that the prefabricated structures share a common electrical system;
- wherein the communication unit controls distribution of electricity;
- the supply water ducts of the prefabricated structures are connected so that the prefabricated structures share a supply water system; and
- the grey water ducts of the prefabricated structures are connected so that the prefabricated structures share a grey water system;
- wherein the water filtering unit treats grey water and purifies collected water for introduction to the supply water system.
- 12.** A system of cooperating prefabricated structures arranged in a complementary layout comprising:
- a set of prefabricated structures having substantially the same dimensions, the set of prefabricated structures including:
    - a first prefabricated structure including a first shell and a first extension deployed out from a nested position within the first shell;
    - a first deck hingedly connected with the first shell, the first deck extending away from the first shell;
    - a second prefabricated structure including a second shell and a second extension deployed out from a nested position within the second shell;
    - a second deck hingedly connected with the second shell, the second deck extending away from the second shell;
  - wherein the first prefabricated structure is arranged opposite the second prefabricated structure so that the first deck abuts the second deck;
  - a third prefabricated structure including a third shell and a third extension deployed out from a nested position within the third shell;
  - a third deck hingedly connected with the third shell, the third deck extending away from the third shell;
  - wherein the third prefabricated structure is arranged transverse to the first prefabricated structure and the second prefabricated structure so that the third deck abuts and extends along the width of the first prefabricated structure and the second prefabricated structure;
  - a fourth prefabricated structure including a fourth shell and a fourth extension deployed out from a nested position within the fourth shell; and
  - a fourth deck hingedly connected with the fourth shell, the fourth deck extending away from the fourth shell;
  - wherein the fourth prefabricated structure is arranged transverse to the first prefabricated structure and the second prefabricated structure and opposite the third prefabricated structure so that the fourth deck abuts and extends along the width of the first prefabricated structure and the second prefabricated structure; and
  - wherein the first deck, the second deck, the third deck, and the fourth deck form a common walkway.
- 13.** The system of claim **12**, wherein:
- the prefabricated structures further include:
- electrical wiring,
  - a supply water duct, and
  - a grey water duct; and
- the electrical wiring of the prefabricated structures is connected so that the prefabricated structures share a common electrical system;
- the supply water ducts of the prefabricated structures are connected so that the prefabricated structures share a supply water system; and
- the grey water ducts of the prefabricated structures are connected so that the prefabricated structures share a grey water system.
- 14.** The system of claim **13**, further comprising:
- a canopy connected across the first deck and the second deck;
  - a gutter associated with the canopy for collecting water from the canopy;
  - wherein the gutter is communicatively connected with the supply water system; and
  - wherein a water purification device is positioned between the gutter and the supply water tank to purify collected water for introduction to the supply water system.
- 15.** The system of claim **12**, further comprising:
- another set of prefabricated structures having substantially the same dimensions as prefabricated structures of the set, the another set of prefabricated structures including:
    - a fifth prefabricated structure including a fifth shell and a fifth extension deployed out from a nested position within the fifth shell;
    - a fifth deck hingedly connected with the fifth shell, the fifth deck extending away from the fifth shell;
  - wherein the fifth prefabricated structure is arranged transverse to the third prefabricated structure so that the fifth deck abuts the third deck and extends along approximately half the length of the second extension of the second prefabricated structure;
  - a sixth prefabricated structure including a sixth shell and a sixth extension deployed out from a nested position within the sixth shell;
  - a sixth deck hingedly connected with the sixth shell, the sixth deck extending away from the sixth shell;

wherein the sixth prefabricated structure is arranged transverse to the fourth prefabricated structure so that the sixth deck abuts the fourth deck and the fifth deck and extends along approximately half the length of the second extension of the second prefabricated structure;

a seventh prefabricated structure including a seventh shell and a seventh extension deployed out from a nested position within the seventh shell;

a seventh deck hingedly connected with the seventh shell, the seventh deck extending away from the seventh shell;

wherein the seventh prefabricated structure is arranged transverse to the third prefabricated structure so that the seventh deck abuts the third deck and extends along approximately half the length of the first extension of the first prefabricated structure;

a eighth prefabricated structure including a eighth shell and a eighth extension deployed out from a nested position within the eighth shell; and

a eighth deck hingedly connected with the eighth shell, the eighth deck extending away from the eighth shell;

wherein the eighth prefabricated structure is arranged transverse to the fourth prefabricated structure so that the eighth deck abuts the fourth deck and the seventh deck and extends along approximately half the length of the first extension of the first prefabricated structure; and

wherein the fifth deck, the sixth deck, the seventh deck, and the eighth deck form a common walkway.

16. The system of claim 15, wherein the system is substantially square in layout.

17. The system of claim 15, wherein the first deck, the second deck, the third deck, the fourth deck, the fifth deck, the sixth deck, the seventh deck, and the eighth deck form a common walkway.

18. The system of claim 15, wherein:

a prefabricated structure from the first set of prefabricated structures provides an administration unit;

a prefabricated structure from the first set of prefabricated structures provides a commissary unit;

a prefabricated structure from the second set of prefabricated structures provides a communication unit; and

a prefabricated structure from the second set of prefabricated structures provides a bunk unit.

19. The system of claim 18, wherein:

a prefabricated structure from the first set of prefabricated structures provides a medical unit; and

a prefabricated structure from the second set of prefabricated structures provides a water filtering unit.

20. The system of claim 19, wherein:

the prefabricated structures further include:

electrical wiring,

a supply water duct, and

a grey water duct; and

the electrical wiring of the prefabricated structures is connected so that the prefabricated structures share a common electrical system;

wherein the communication unit controls distribution of electricity;

the supply water ducts of the prefabricated structures are connected so that the prefabricated structures share a supply water system; and

the grey water ducts of the prefabricated structures are connected so that the prefabricated structures share a grey water system;

wherein the water filtering unit treats grey water and purifies collected water for introduction to the supply water system.

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