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Spellman et al.

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(54) **OVERHEAD SPACE UTILIZATION DEVICE**

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Related U.S. Application Data

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B64D 11/00 (2006.01)

(52) **U.S. Cl.**
CPC ***B64D 11/00*** (2013.01); *B64D 2011/0076* (2013.01); *B64D 2011/0084* (2013.01)

(58) **Field of Classification Search**
CPC B64D 11/00
USPC 105/314, 315, 316, 344, 345; 244/118.5, 118.6, 118.1, 118.2
See application file for complete search history.

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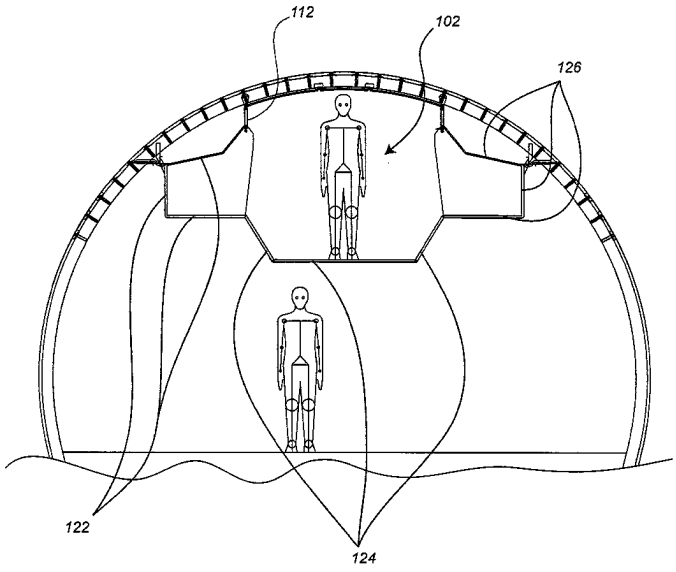
(57) **ABSTRACT**

One particular overhead space utilization device, adapted for installation in a hull structure, incorporates at least one berth module with first and second berth portions, first and second intermediate support members, and first and second coupling members. Each berth module has two opposing berth members with a walkway therebetween. The first and second intermediate support members each has a first end pivotably coupled to the corresponding one of the first and second berth portions, and a second end configured to be pivotably coupled to the hull structure. The first and second coupling members are configured to pivotably couple the second berth portions to the hull structure. The first and second coupling members and the second berth portions are configured to be positioned outboard of the first berth portion.

15 Claims, 14 Drawing Sheets



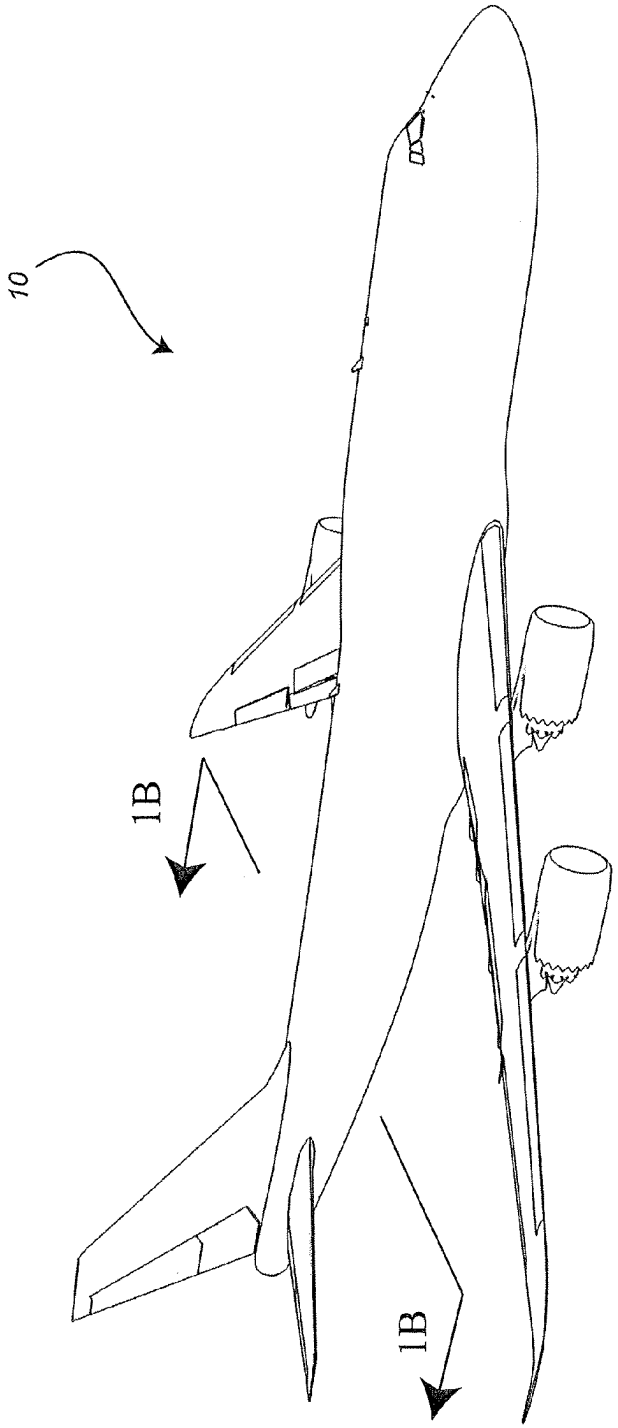


FIG. 1A (PRIOR ART)

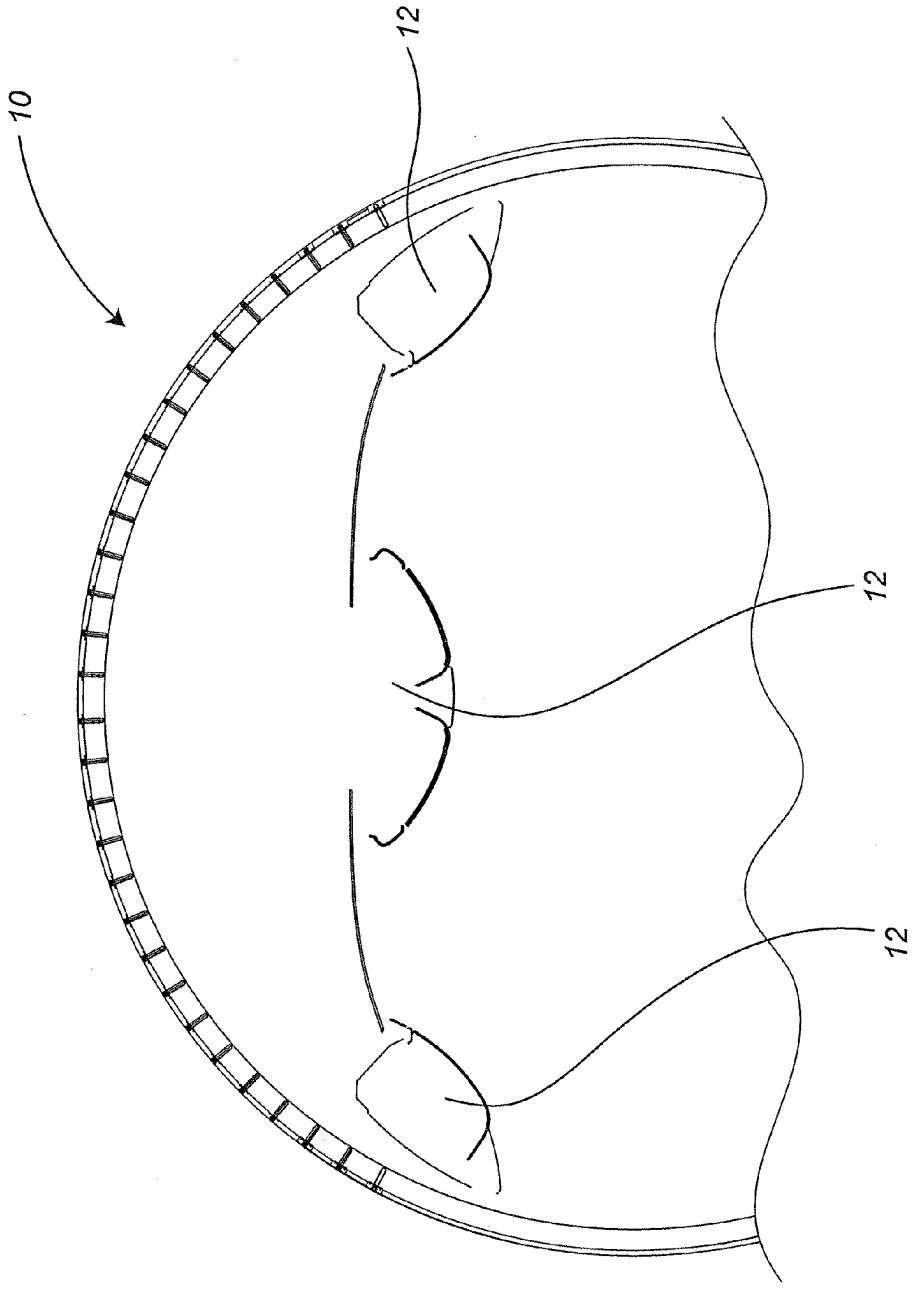


FIG. 1B (PRIOR ART)

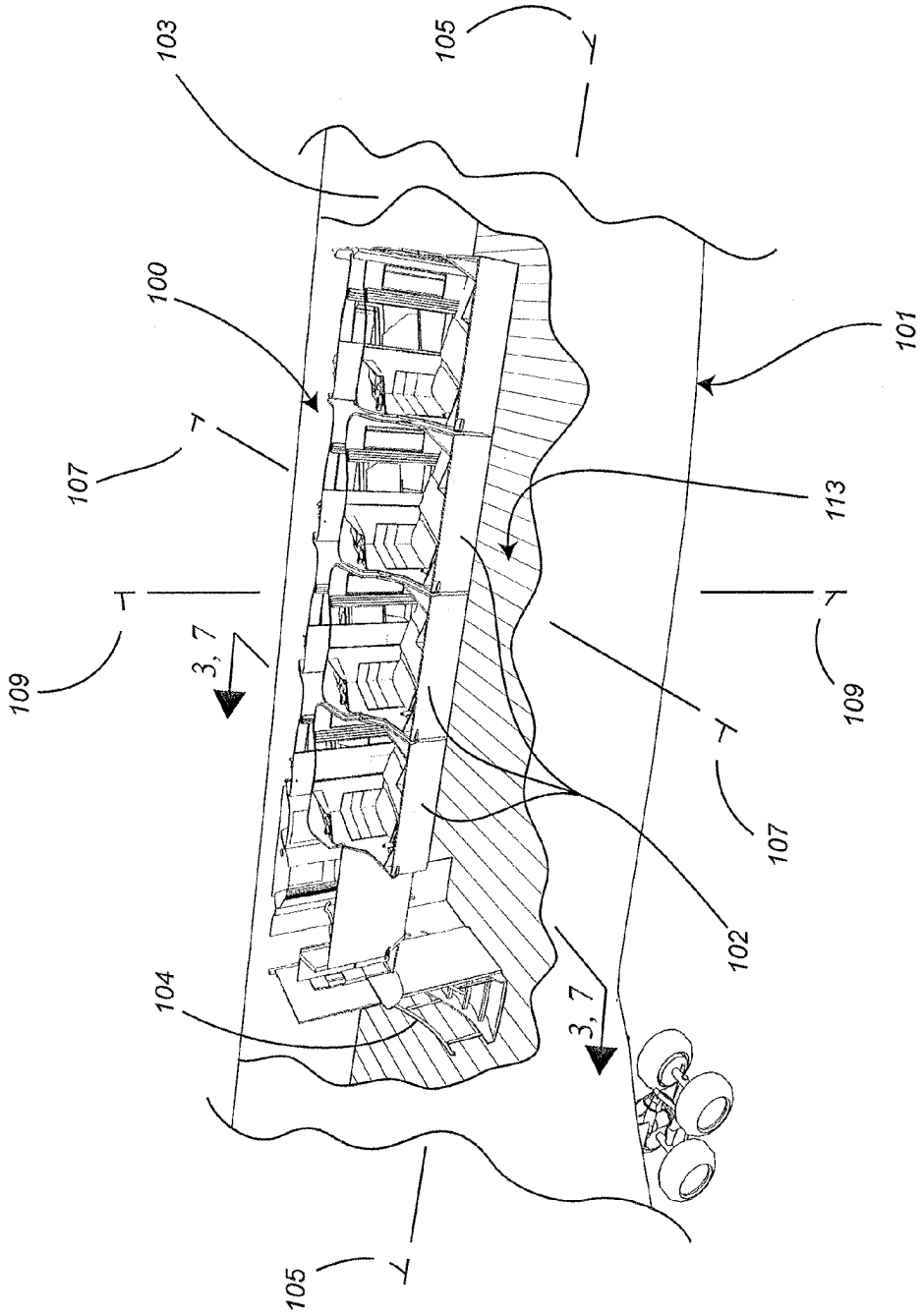


FIG. 2

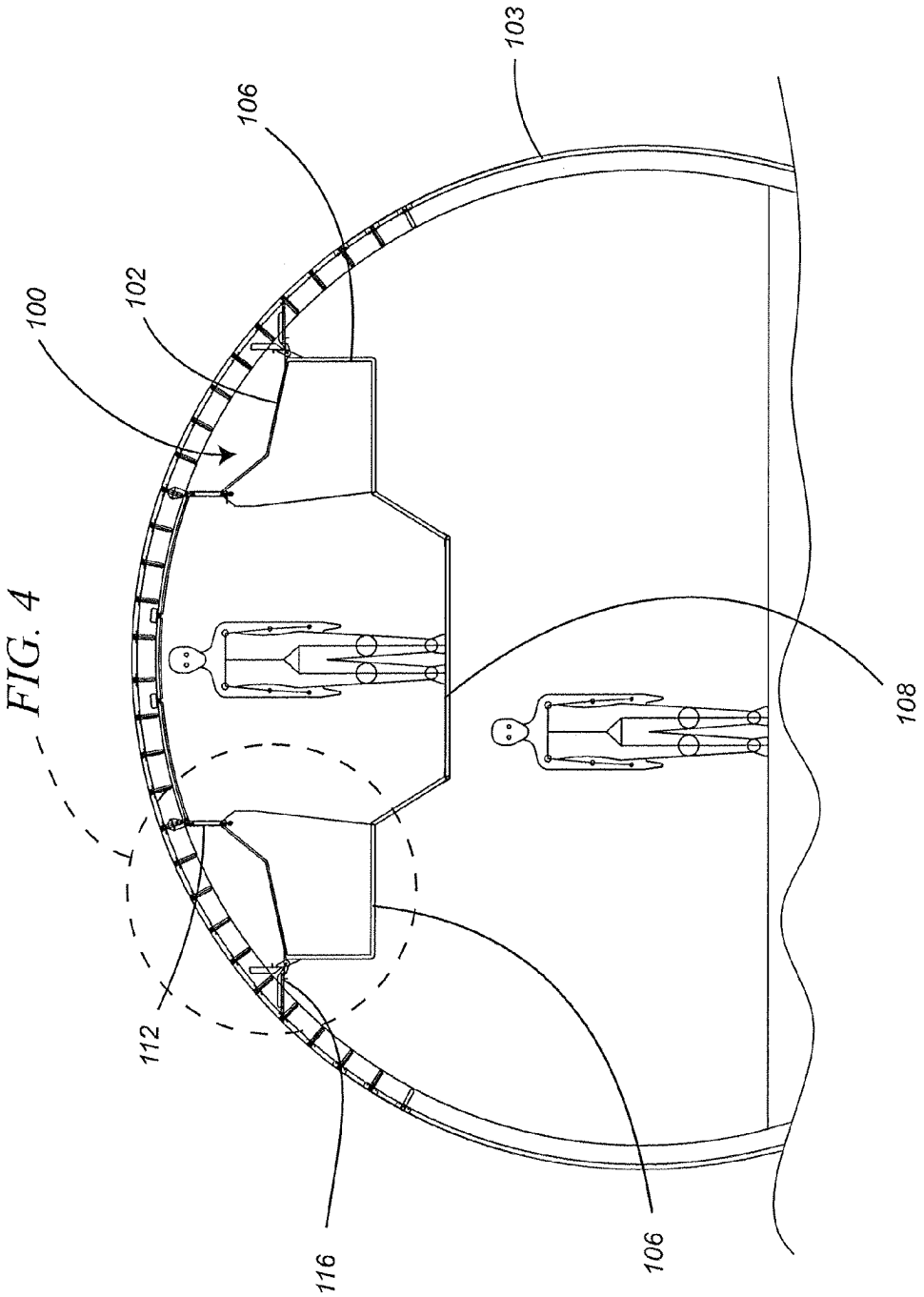


FIG. 3

FIG. 4

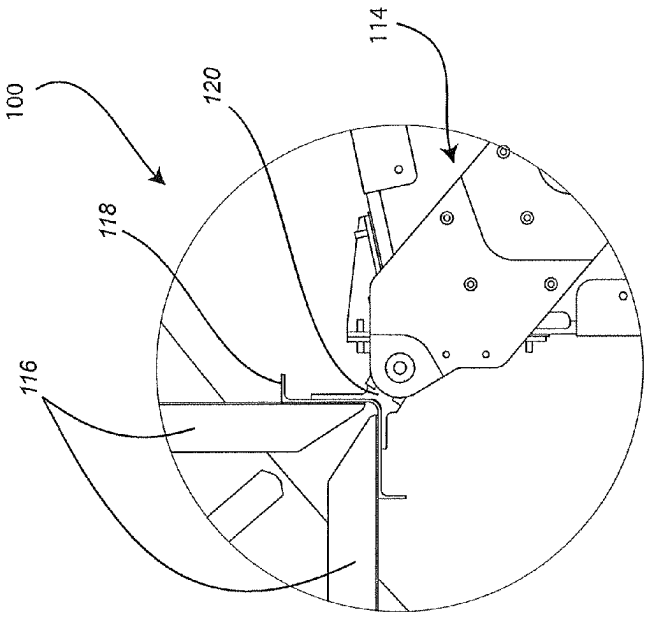


FIG. 5

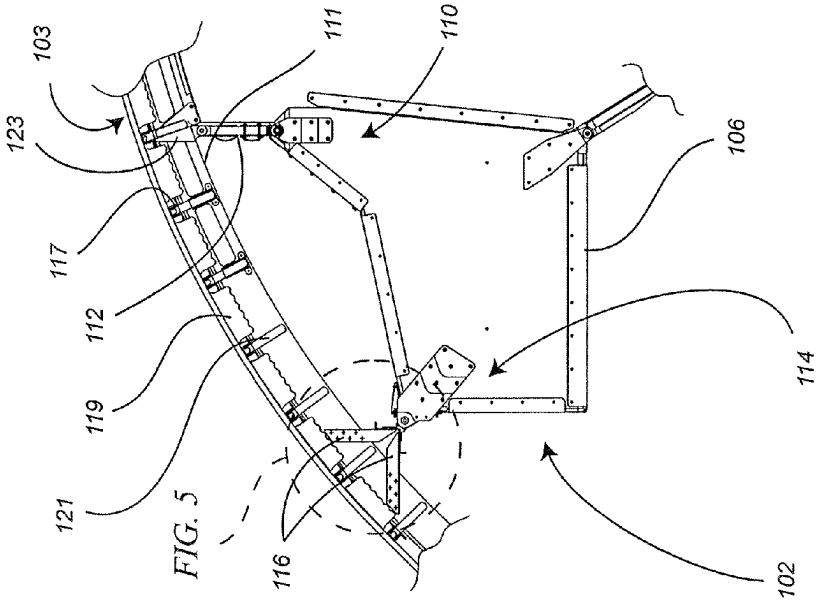


FIG. 5

FIG. 4

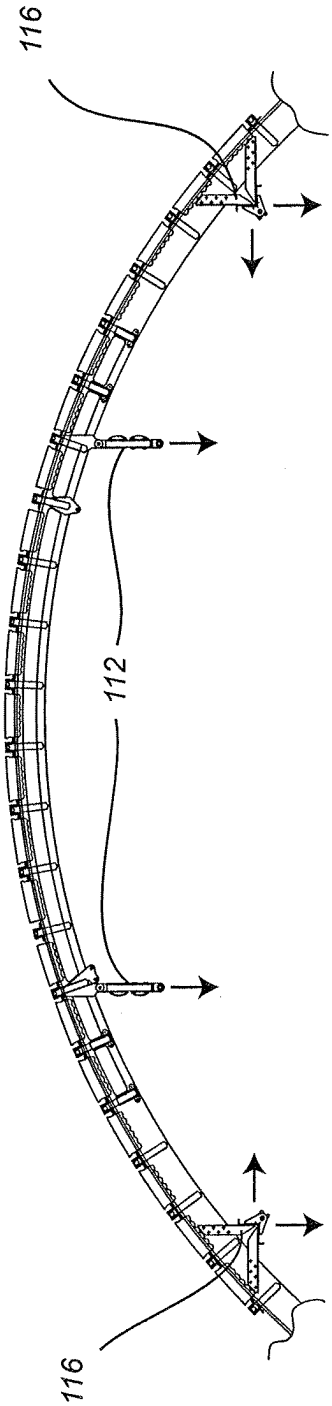


FIG. 6

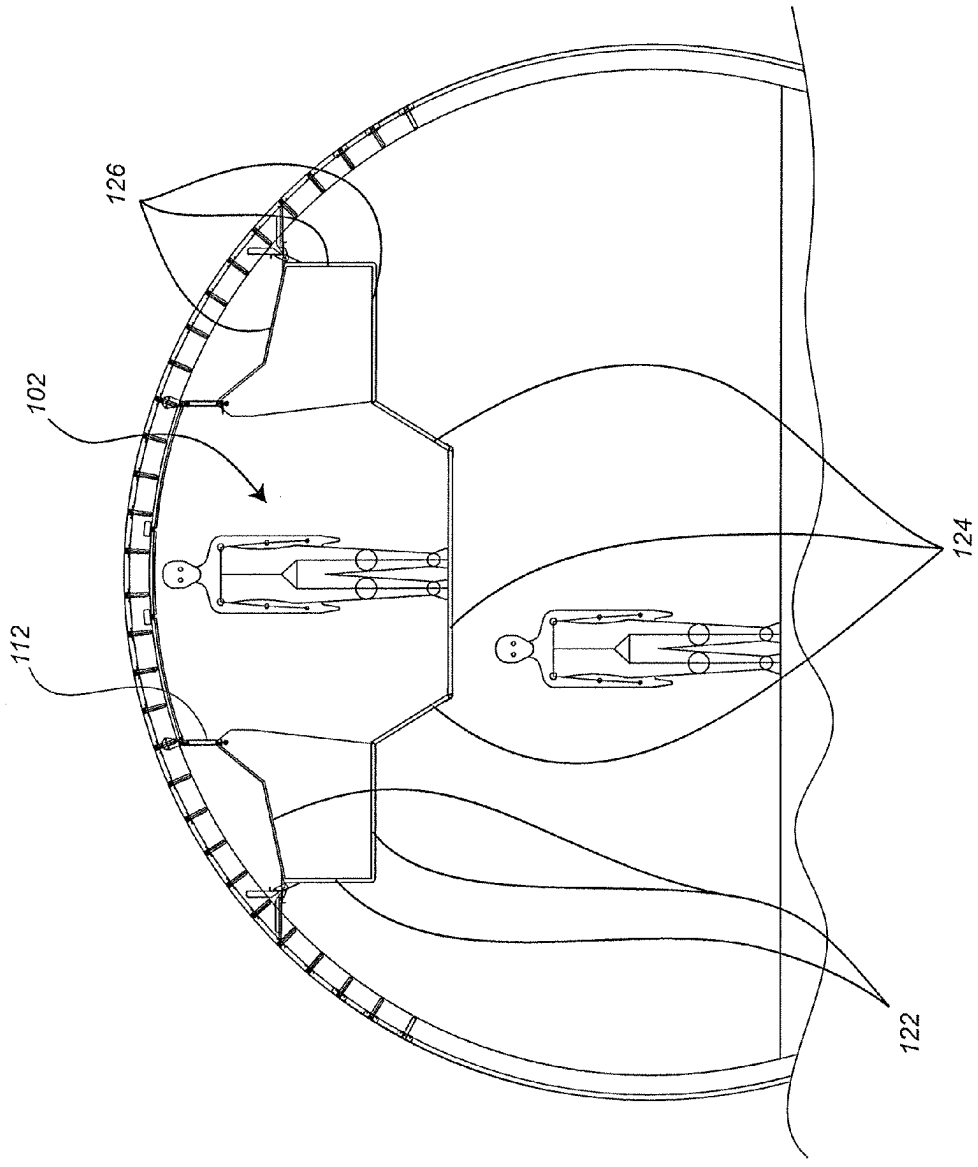


FIG. 7

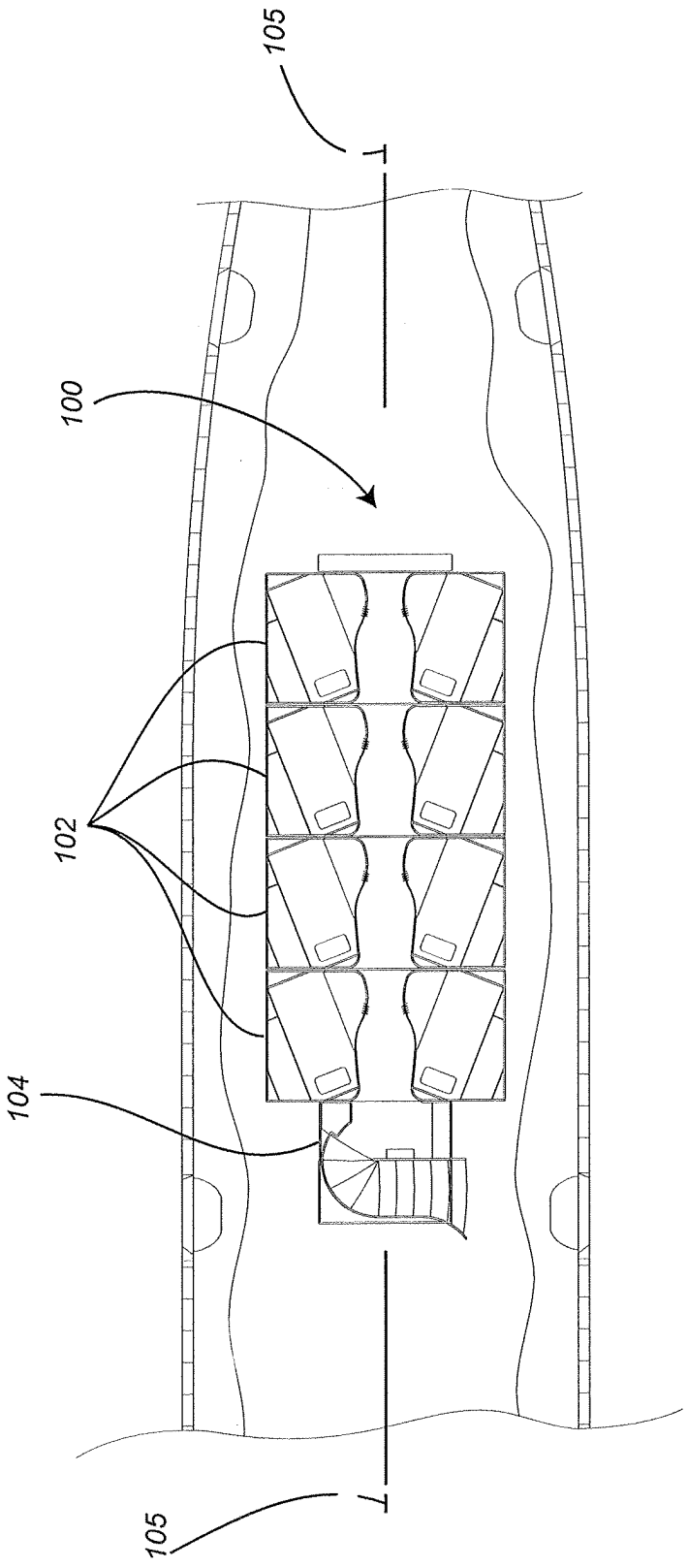


FIG. 8

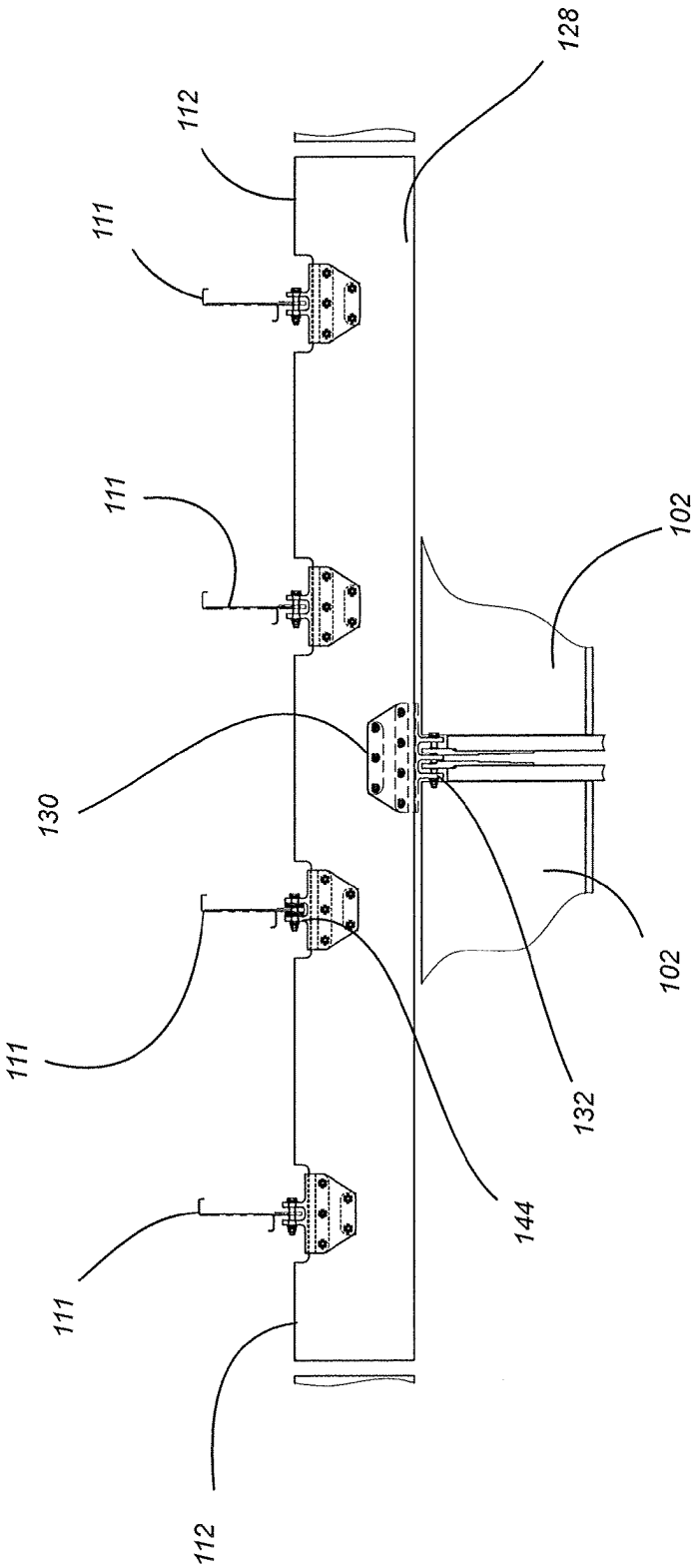


FIG. 9

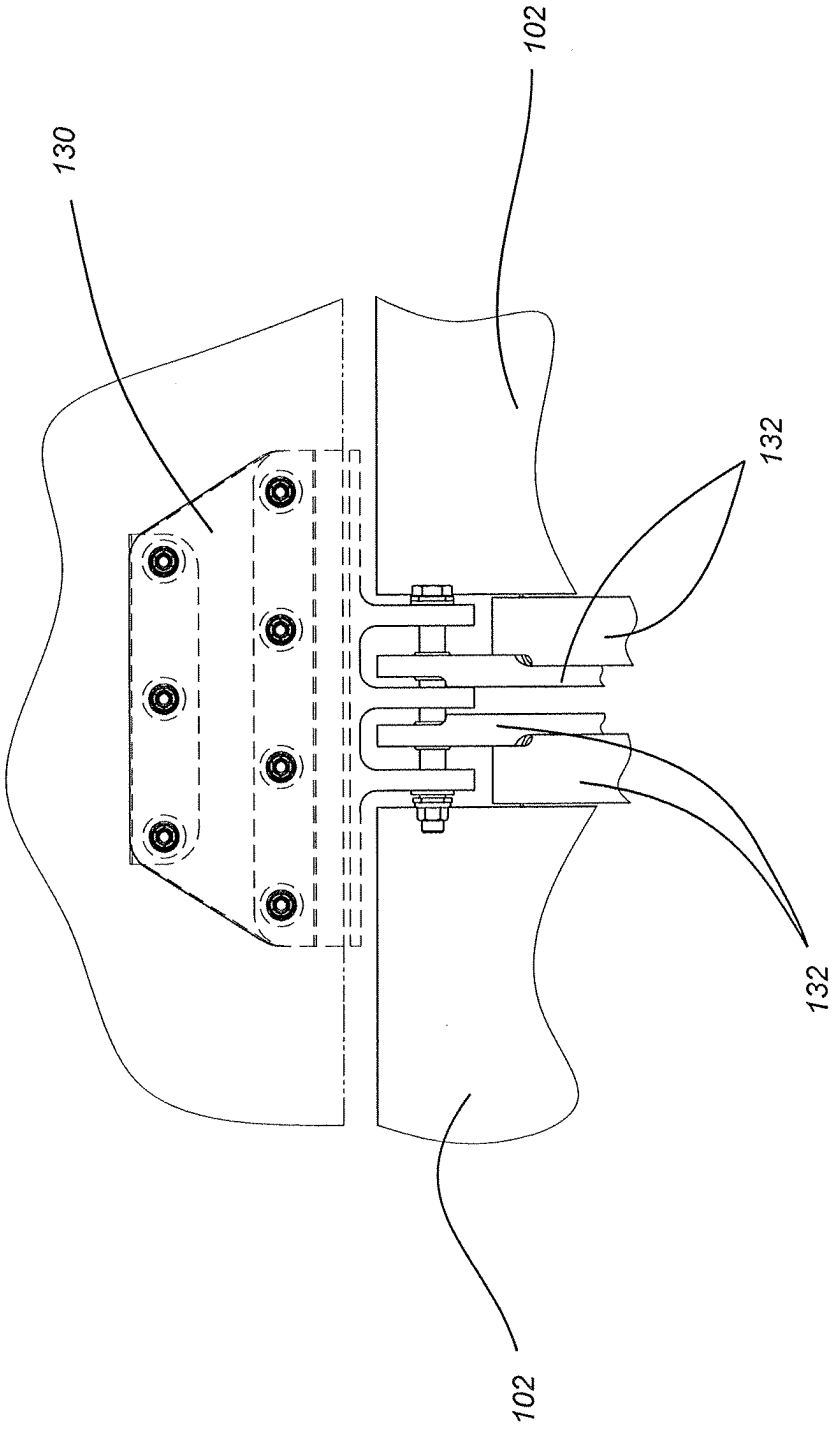


FIG. 10

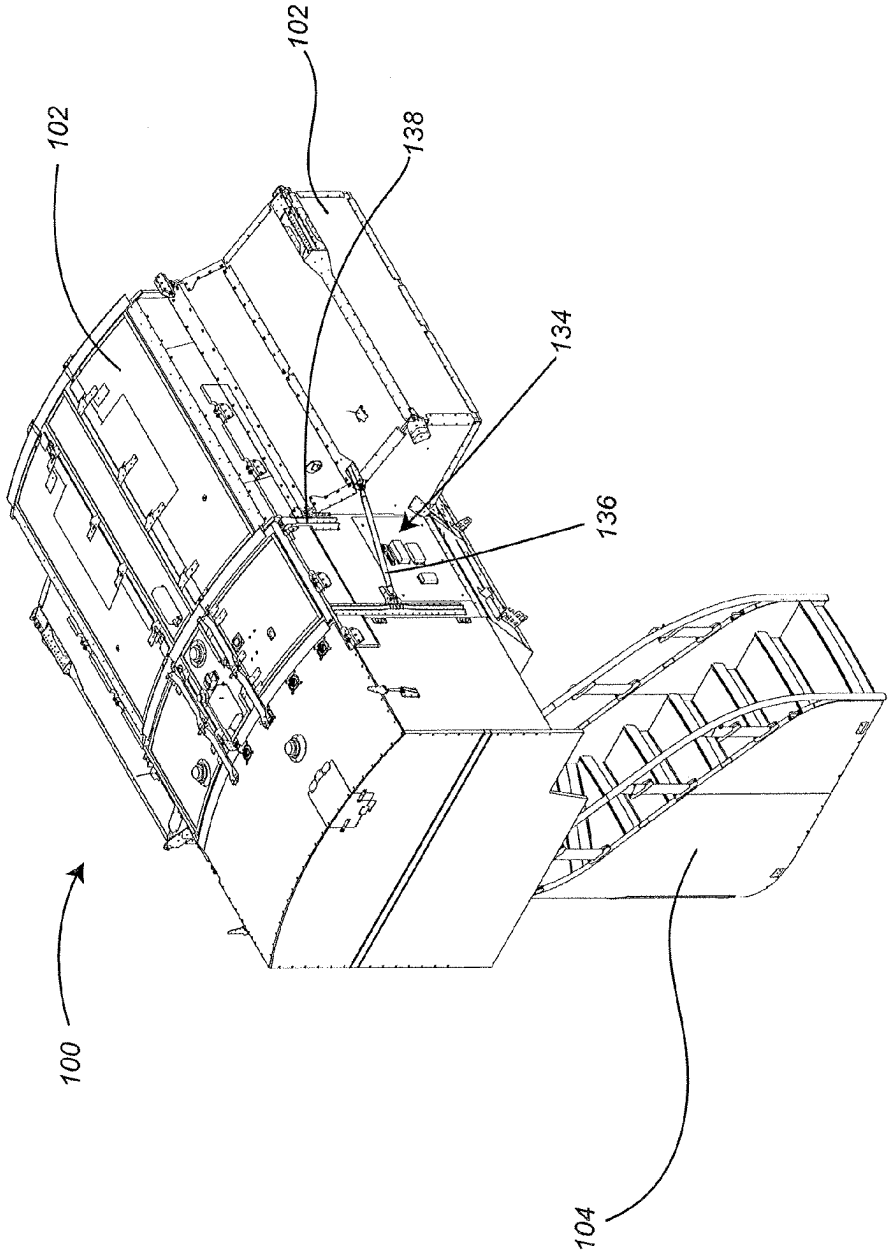


FIG. 11

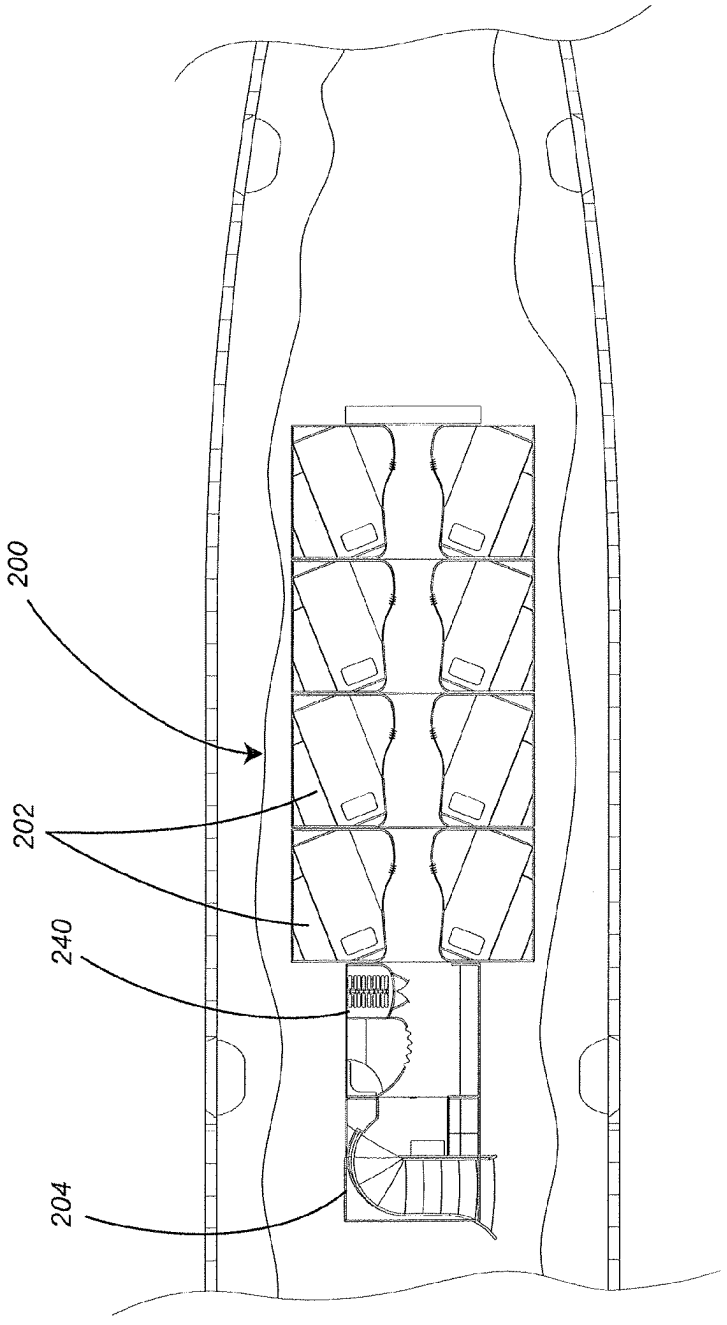


FIG. 12

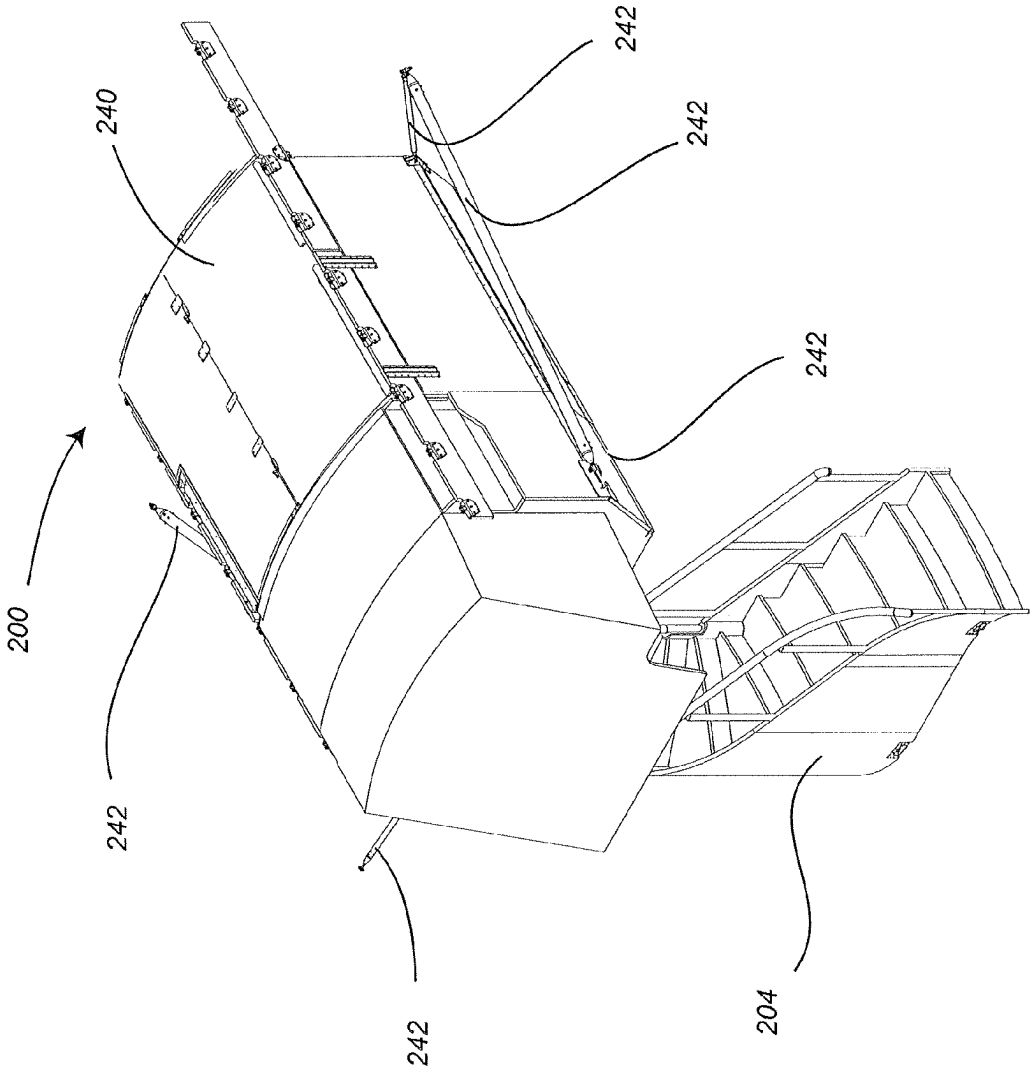


FIG. 13

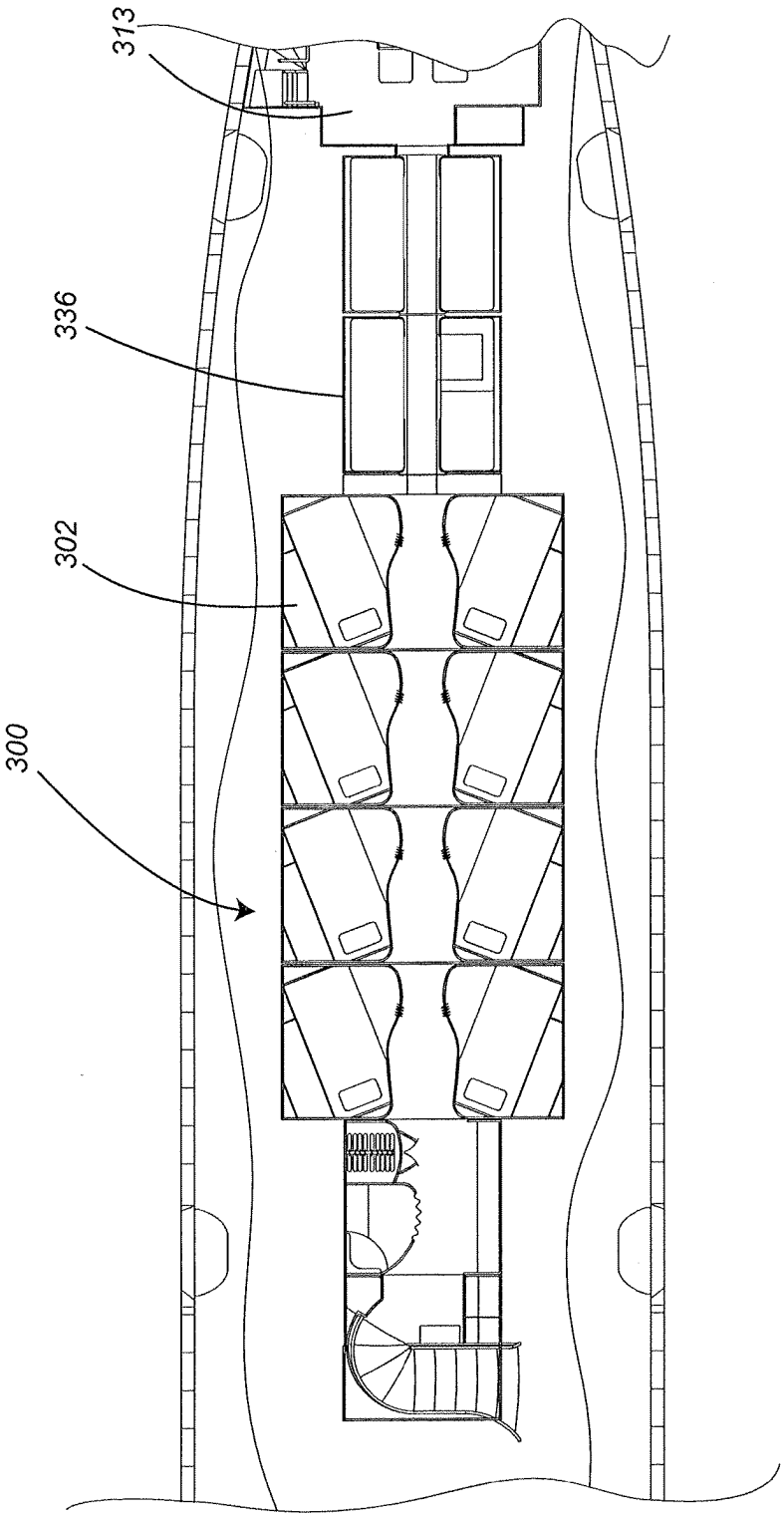


FIG. 14

OVERHEAD SPACE UTILIZATION DEVICE

BACKGROUND

1. Technical Field

The present disclosure generally relates to interior accommodations or monuments in a vessel, and more particularly, to an overhead space utilization device converting a space inside a vessel, such as an aircraft, into usable quarters.

2. Description of the Related Art

Vessels such as aircraft, trains, ships, boats, buses, and the like, generally may include quarters for resting or other purposes at one end of the vessel or somewhere else in the vessel, occupying space in the vessel cabin. For example, in aircraft, crew rest areas are included toward one end of the aircraft taking up useful space that can otherwise be used as a galley, entertainment system, a bathroom, or simply be left empty to allow more walking room. Certain aircraft with sufficient cabin height may raise the crew rest area, however, these designs are limited in size and location due to adverse impacts their stiff connection may have when the aircraft fuselage deforms or bends when in motion.

FIG. **1**A illustrates an aircraft vessel **10** according to prior art. FIG. **1**B illustrates a partial cross-sectional view of the aircraft vessel **10**. Typically, the aircraft **10** is equipped with overhead stow bins **12**. In certain applications it may be desirable for space utilization to use the overhead space for something other than stow bins. For example, in private or military aircraft applications, the user may prefer to have more personal use space, such as sleeping quarters, offices, gaming rooms, lounge, or the like. However, in existing aircraft interior configurations, stow bins and on-aircraft floor crew rest areas consume valuable space without offering any alternatives to more efficiently take advantage of the volume of aircraft.

SUMMARY OF THE INVENTION

In one embodiment, an overhead space utilization device, adapted for installation in a hull structure, incorporates at least one berth module with first and second berth portions, first and second intermediate support members, and first and second coupling members. Each berth module has two opposing berth members with a walkway therebetween. The first and second intermediate support members each has a first end pivotably coupled to the corresponding one of the first and second berth portions, and a second end configured to be pivotably coupled to the hull structure. The first and second coupling members are configured to pivotably couple the second berth portions to the hull structure. The first and second coupling members and the second berth portions are configured to be positioned outboard of the first berth portion.

In another embodiment, an overhead space utilization device incorporates a berth module having two opposing berths, and is configured to be installed in an aircraft fuselage. Each berth incorporates first and second coupling locations, the first coupling location being positioned above and inboard the second coupling location when the berth module is installed in the aircraft. First and second isolated brackets have distal ends configured to be fixedly coupled to the fuselage and proximal ends converging toward each other with a space between the proximal ends. A rail member is coupled to the first and second isolated brackets toward the proximal ends thereof. A fitting is coupled to the second coupling location of a corresponding one of the opposing berths and pivotably coupled to the rail member.

In an embodiment, an aircraft incorporates a fuselage, a first berth, a second berth, and a walkway therebetween. The first berth has first and second locations pivotably coupled to the fuselage. The second berth also has first and second locations pivotably coupled to the fuselage. The walkway is positioned between, and is pivotably coupled to, the first and second berths.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. **1**A is an isometric view of an aircraft having a fuselage according to prior art.

FIG. **1**B is a partial cross-sectional view of the aircraft fuselage of FIG. **1**A according to prior art, taken across section **1**B-**1**B.

FIG. **2** is a cutaway isometric view of a portion of an aircraft having a fuselage with an overhead space utilization device according to an embodiment installed therein.

FIG. **3** is a partial cross-sectional view of the aircraft fuselage and overhead space utilization device of FIG. **2**, taken across section **3**-**3**.

FIG. **4** is a partial front view of a coupling region of an overhead space utilization device according to one embodiment.

FIG. **5** is a partial front view of the coupling region of FIG. **4** according to one embodiment.

FIG. **6** is a front view of coupling regions of an overhead space utilization device and schematic depiction of directions in which movement is inhibited according to one embodiment.

FIG. **7** is a partial cross-sectional view of the aircraft fuselage and overhead space utilization device of FIG. **2**, taken across section **7**-**7**.

FIG. **8** is a cutaway view of an aircraft fuselage illustrating a plan view of an overhead space utilization device according to an embodiment.

FIG. **9** is a side view of a portion of an overhead space utilization device coupling the device to the fuselage according to an embodiment.

FIG. **10** is a side view of a portion of the coupling portion the overhead space utilization device of FIG. **9** according to an embodiment.

FIG. **11** is an isometric view of a portion of an overhead space utilization device according to an embodiment.

FIG. **12** is a cutaway view of an aircraft fuselage and a plan view of an overhead space utilization device according to an embodiment.

FIG. **13** is an isometric view of a portion of an overhead space utilization device according to an embodiment.

FIG. **14** is a cutaway view of an aircraft fuselage and a plan view of an overhead space utilization device according to an embodiment.

DETAILED DESCRIPTION

For clarity, embodiments of the present disclosure are described in relation to a case where the vessel is an aircraft; however, it is understood that various embodiments may be used on other types of vessels or vehicles, such as trains, ships, boats, buses, cars, spacecraft and the like, or even buildings or boathouses susceptible to moving or relative deformation during movement.

FIG. **2** illustrates one embodiment of an overhead space utilization device **100** shown in an installed configuration inside an aircraft **101**. In one aspect, the device **100** includes at least one or more berth modules or quarters **102** coupled to

the aircraft **101** and configured to move with respect to a fuselage **103** of the aircraft **101**, preventing or mitigating rigid reactions to fuselage deflections during flight, taxying, or any other condition under which the fuselage **103** may deflect or otherwise move or shift.

In one embodiment, the device **100** includes a stair module **104** coupled to the fuselage **103**, for example to a floor structure **113** thereof, such as seat tracks or floor beams, and leading and/or coupled to at least one of the berth modules **102**. Typically the fuselage **103** includes a longitudinal or roll axis **105** substantially perpendicular to a lateral or pitch axis **107** extending laterally, and to a yaw axis **109** extending between lower and upper portions of the fuselage **103**.

FIG. **3** illustrates a cross-sectional view of one embodiment of a berth module **102** of the device **100** installed in the fuselage **103**. In one aspect, each berth module **102** can include opposing berths **106** and walkway **108** therebetween. Other suitable configurations are contemplated to be within the scope of the present disclosure.

FIG. **4** illustrates one aspect of a coupling between one berth **106** and the fuselage **103**, and the opposing berth's connection with the fuselage **103** can be substantially similar according to one embodiment. In one aspect, the berth module **102** is configured to be movably coupled with respect to the fuselage **103**. For example, in one embodiment, each berth **106** includes a first berth portion **110** rotatably or pivotably coupled with respect to the fuselage **103**, for example rotatably or pivotably coupled thereto to be free to rotate or pivot about an axis parallel to the longitudinal axis **105** (FIG. **2**).

In one aspect the first berth portion **110** is coupled to the fuselage such that movement of the berth **106** along a direction parallel to the yaw axis **109** is inhibited or prevented. For clarity, the direction parallel to the yaw axis **109** will be referred to as "up" and "down" without any intention to limit the generality or scope of the present disclosure. For clarity, "rotatable" and "pivotable" relationships shall be referred to as "pivotable" without any intention to limit the generality or scope of the present disclosure.

The first berth portion **110** of the berth **106** can in various embodiments be differently configured to be pivotably coupled to the fuselage **103**. For example, in some embodiments, the berth **106** can be pivotably coupled to one or more fuselage frame **111**, stringer **117**, shear tie **119**, and/or intercostal **121**, or any combination thereof, via a coupling member **123** such as a clevis, fitting, support beam, support panel, tie-rod, bearing, or any other pivotable connection, and/or any combination thereof.

In the illustrated embodiment of FIG. **4**, the device **100** includes an intermediate support member **112** having a first end pivotably coupled to the fuselage **103** and a second end pivotably coupled to the first berth portion **110**. The intermediate support member **112** is configured to substantially prevent or inhibit or mitigate the first berth portion **110** from translating in the up and down direction **109** (FIG. **2**). The intermediate support member **112** can include any suitable intermediate structure, such as but not limited to a tie-rod, link, support beam configured to extend longitudinally along an axis parallel to the longitudinal axis **105** (FIG. **2**).

In one embodiment, the berth **106** includes a second berth portion **114** configured to be rotatably or pivotably coupled to the fuselage **103**. For example, in the illustrated embodiment of FIG. **4**, the second berth portion **114** is coupled to the fuselage **103** such that it can pivot with respect to the fuselage **103** about the longitudinal axis **105** (FIG. **2**).

The second berth portion **114** can be configured to be pivotably coupled to the fuselage **103** or at least one frame **111**, stringer **117**, shear tie **119**, or intercostal **121**, or any combination thereof, via any suitable pivotable attachment. For example, in the illustrated embodiment of FIG. **4**, the device **100** can include support fittings **116** coupled to at least one of the fuselage **103** frame **111**, stringer **117**, shear tie **119**, intercostal **121** or any combination thereof.

As more clearly illustrated in FIG. **5**, the device **100** can further include a support rail or other coupling member **118** coupling the fittings **116** together, which may or may not be directly coupled to each other, and both are coupled to the support rail **118**. In the illustrated embodiment, the fittings **116** are not coupled directly to each other. The support rail **118** may extend along an axis substantially parallel to the longitudinal axis **105** (FIG. **2**). In one aspect, the device **100** includes a coupling member **120** such as a clevis, fitting, support beam, support panel, tie-rod, bearing, or any other pivotable connection, pivotably coupling the second berth portion **114** to the fuselage **103**.

Referring to FIG. **4**, in one aspect, portions and/or corners of the berth **106**, other than the first and second berth portions **110**, **114** are floating and not connected to the fuselage **103**. In one aspect, the first and second berth portions **110**, **114** are positioned toward an upper region of the berth **106**, and the second berth portion **114** is located outboard and lower than the first berth portion **110**.

The device **100** can generally be installed in a crown or upper region of an aircraft interior toward where typically stow bins are otherwise located, after removal of the stow bins or in place of stow bins. However it is understood that some embodiments can be installed in any region of a vessel while exhibiting relative motions described herein.

FIG. **6** illustrates one embodiment of the intermediate support member **112** and fittings **116** of the device **100** along with schematic arrows depicting directions along which the berths **106** are inhibited from translating axially or linearly. Referring to FIGS. **1**, **3**, **4**, and **6**, in one embodiment, as the fuselage **103** deforms through flight, landing, take off, fueling, or the like, the berth module **102** can pivot toward the first and second berth portions **110**, **114** on opposing berths **106** to prevent or inhibit exerting hardpoint stresses on the fuselage **103** and on the berth module **102**. Furthermore, in an aspect, the above relative pivoting of the berth module **102** with respect to the fuselage **103** mitigates berth occupant(s) realizing fuselage **103** deformations, therefore, providing a comfortable atmosphere for occupants.

In the illustrated embodiment of FIGS. **3** through **6**, the intermediate support member **112** being pivotably coupled at opposing ends to the fuselage **103** and berth module **102**, respectively, prevents or inhibits side loads from being exerted from the berth module **102** to the fuselage **103**. In an aspect, the second berth portion **114**, the coupling member **120** is substantially fixedly coupled to the fuselage **103** via the fittings **116** and pivotably coupled to the berth module **102**, transferring side loads to the fuselage **103**.

This combination substantially prevents, inhibits, or mitigates adverse moments and bending in the fuselage portion between the aforementioned two berth coupling locations. In one aspect, this combination on opposing sides of the berth module **102** facilitates expansion or slight deformation of the berth modules **102** when the fuselage **103** pressurizes and expands. Such expansion in some embodiments can range from 0.01 inch to 0.10 inch, and in one example 0.3 inch. Other deflections and deflection measures are possible and contemplated. In the illustrated embodiment, the berth module **102** coupling to the fuselage **103**, as described above,

provides the berth module **102** lateral flexibility qualities to accommodate fuselage **103** expansion, contraction, and/or other deformation.

In one embodiment, as shown in FIGS. **3** and **4**, the cross-sectional shape of the berth module **102** further may promote expansion or outboard deformation of the berth module **102** in response to the fuselage **103** expanding outboard due to pressurization or other reason. For example, in one embodiment, two panels lead from the first coupling portion **110** to the second coupling portion **114**, and form upper boundaries of the berth module **102**. These panels in one aspect form obtuse angle with between them, lending to better allowing the berth module **102** to expand. In some aspects, one or both of these panels can be removal to facilitate inspecting the fuselage **103** section above the berth module **102**.

Referring to FIG. **7**, in one embodiment, the berth module **102** can be made from three sections **122**, **124**, **126**. In one aspect the three sections **122**, **124**, **126** are coupled to one another. In some embodiments, one or more connections between these sections or portions of these sections can be movably or pivotably coupled to each other. In one embodiment, the coupling region between lower section **124** and side sections **122**, **126**, respectively, can be hinged or pinned to allow limited pivoting of these sections with respect to each other and accommodate berth module **102** expansion discussed above. In some embodiments, a fitting and/or formed plate can be used to further couple the lower section **124** to side sections **122**, **126**, respectively.

The panels making up the three sections **122**, **124**, **126** can include any suitable material, including any material exhibiting at least some elastic properties to allow slight deformations and expansions, including but not limited to various metals such as aluminum, composites such as fiberglass, various honeycomb material, Kevlar®, Teklam®, polymeric or fiber-reinforced polymeric material, thermoplastics, composite laminates and/or carbon fiber, or any combination thereof, or any other suitable material.

In one embodiment as illustrated in FIG. **8**, the device **100** may include multiple berth modules **102** and coupled to the stair module **104** toward one end. In one aspect the berth modules **102** can be coupled to adjacent berth modules **102**. In some embodiments, the berth modules **102** can be coupled via a common coupling device to the fuselage **103** or to the intermediate support member **112** (FIG. **7**).

For example, in the embodiment illustrated in FIG. **9**, the intermediate support member **112** discussed earlier can include a support beam **128** extending along an axis parallel to the fuselage longitudinal axis **105** (FIG. **1**) and being pivotably coupled via respective pivotable coupling members **144**, such as a hinge or a pivotable fitting or the like, to a plurality of fuselage frames **111** toward a first end or side of the support beam **128**. In one aspect the device **100** includes a berth coupling member **130** pivotably coupled to adjacent berth modules **102**. For example, in one aspect the berth coupling member **130** can include a plate fixedly coupled to the support beam **128** and a clevis member pivotably coupled to adjacent berth modules **102**.

As shown in FIG. **9**, in some embodiments, multiple support beams **128** can be used to prevent the support beam **128** from picking up unwanted fuselage loads. In one aspect, the support beam **128** is coupled to multiple frames **111** distributing berth **102** loads therebetween.

In one embodiment, the intermediate support member **112** can include structure or members to independently or separately receive each berth module **102**. For example, as illustrated in FIG. **10**, in one embodiment, the berth coupling member **130** can be configured to separately be coupled to each berth module **102** through distinct coupling portions **132** of each berth module **102**. In such embodiments a large set of multiple berths can form a long structure along the aircraft without overly stiffening the aircraft fuselage **103** (FIG. **2**). In some embodiments, each berth may also be coupled to the fuselage **103** or to the beam **128** via an adjustable tie-rod, for example extending longitudinally for adjusting berth positions with respect to each other.

In other embodiments, the berth coupling member can be pivotably coupled to the support beam and the adjacent berths, or be fixedly coupled to the berths and pivotably coupled to the support beam.

In one embodiment, as illustrated in FIG. **11**, an upper region of the stair module **104** can be stabilized through at least one coupling or stabilizing assembly **134** connecting the stair module **104** to at least one of the berth modules **102**. For example, in one aspect, the stabilizing assembly **134** may include a drag brace or tie-rod **136** coupling a portion of the stair module **104** to a portion of the berth module **102**. In one embodiment, the drag brace **136** can be pivotably coupled to the stair module **104** and berth module **102**, toward opposing ends of the drag brace **136**. In another embodiment, the drag brace **136** can be fixedly coupled to at least one of the stair module **104** and berth module **102**.

In some embodiments, the stabilizing assembly **134** can include coupling plates or stiffeners **138** spanning at least a portion of the stair module **104** and at least a portion of the berth module **102**.

In some embodiments, other types of modules can be incorporated or coupled to the berth modules.

For example, FIG. **12** illustrates an embodiment of an overhead space utilization device **200**, which includes a plurality of berth modules **202** and stair module **204**, and a lounge module **240** coupled therebetween. In one embodiment, the lounge module **240** and stair module **204** can be integrated or fixedly coupled to each other.

In some embodiments, the lounge module **240** can be pivotably coupled to at least one of the berth module **202** and the stair module **204**.

In some embodiments, as illustrated in FIG. **13**, at least one of the lounge module **240** and stair module **204** can be supported and/or stabilized through at least one or more drag braces or tie-rods **242** configured to couple the lounge module **240** and/or stair module **204** to the fuselage of the aircraft. The drag braces **242** in one embodiment are pivotably coupled to the fuselage and stair module **204** and/or lounge module **240**, toward opposing ends of the respective drag braces **242**. In some embodiments, the stair and lounge modules can be integrated.

In some embodiments, an overhead space utilization device can also be coupled, or allow occupants to move from the overhead space utilization device, to an existing structure or enclosure in an aircraft.

For example, in one embodiment as illustrated in FIG. **14**, an overhead space utilization device **300** can further include additional modules such as changing or storage rooms **336**, which can be integrated similarly to that described with respect to the lounge module above. In some embodiments, the device **300** can be configured to be installed in an aircraft having a crew rest area **313**. In one aspect, the device **300** can include an end berth module **302** configured to be coupled to, or positioned adjacent, an entry to the crew rest area **313**. The device **300** may include an adaptor plate pivotably or fixedly coupling end berth module **302** to a portion of the crew rest area **313**.

In some embodiments, a flight attendant seat and station may be incorporated into the overhead space utilization

device. In some embodiments, in-flight entertainment panels and controls may be incorporated in each berth of an overhead space utilization device. In some embodiments, control panel and environmental controls of an overhead space utilization device may be integrated with the main cabin controls.

The various embodiments described above can be combined to provide further embodiments. All of the U.S. patents, U.S. patent application publications, U.S. patent application, foreign patents, foreign patent application and non-patent publications referred to in this specification and/or listed in the Application Data Sheet are incorporated herein by reference, in their entirety. Aspects of the embodiments can be modified, if necessary to employ concepts of the various patents, application and publications to provide yet further embodiments.

These and other changes can be made to the embodiments in light of the above-detailed description. In general, in the following claims, the terms used should not be construed to limit the claims to the specific embodiments disclosed in the specification and the claims, but should be construed to include all possible embodiments along with the full scope of equivalents to which such claims are entitled. Accordingly, the claims are not limited by the disclosure.

The invention claimed is:

1. An overhead space utilization device adapted to install in a hull structure, the device comprising:

at least one berth module having a first berth member and an opposing second berth member, each of the first berth member and the second berth member having a first location and a second location respectively configured to be pivotably coupled to the hull structure;

a walkway positioned between, and pivotably coupled to, the first and second berth members;

a first support beam extending generally parallel to a longitudinal axis of the hull structure, the first support beam having a first side pivotably coupled to the first location of the first berth member and a second side configured to be pivotably coupled to the hull structure; and

a second support beam extending generally parallel to the longitudinal axis of the hull structure, the second support beam having a first side pivotably coupled to the first location of the second berth member and a second side configured to be pivotably coupled to the hull structure.

2. The device of claim **1**, further comprising:

first and second coupling members configured to pivotably couple the second location of each of the first and second berth members to the hull structure, wherein the first and second coupling members and the second locations are configured to be positioned outboard of the first locations, respectively.

3. The device of claim **2** wherein the first and second support beams and the first and second coupling members are configured to inhibit berth module movement along an axis substantially parallel to a yaw axis of the hull structure.

4. The device of claim **1**, further comprising:

more than one berth module wherein the more than one berth modules are positioned adjacent one another and independently pivotably coupled to at least one of the first and second support members.

5. The device of claim **1**, further comprising:

a stair module positioned adjacent the at least one berth module; and

at least one drag brace having first and second ends, the first end pivotably coupled to the stair module and the second end configured to be pivotably coupled to at least one of the hull structure and the berth module.

6. An overhead space utilization device comprising:

a berth module having two opposing berths and configured to be installed in an aircraft fuselage, each berth having: first and second coupling locations, the first coupling location positioned above and inboard the second coupling location when the berth module is installed;

a support fitting having first and second isolated brackets, each of the first and second isolated brackets having distal ends configured to be fixedly coupled to the fuselage and proximal ends converging toward each other with a space between the proximal ends;

a rail member coupled to the first and second isolated brackets toward the proximal ends thereof; and

a coupling member coupled to the second coupling location of a corresponding one of the opposing berths and pivotably coupled to the rail member.

7. The overhead space utilization device of claim **6**, further comprising:

first and second support beams, each of the first and second support beams having first and second ends, and configured to be pivotably coupled to the fuselage toward the first end and pivotably coupled to the first coupling location of a corresponding one of the opposing berths.

8. The device of claim **6** wherein the berth module is made from a material that is elastic.

9. The device of claim **8** wherein the material includes at least one of aluminum, composite, and honeycomb.

10. An aircraft comprising:

a fuselage;

a first berth having first and second locations respectively pivotably coupled to the fuselage;

a second berth having first and second locations respectively pivotably coupled to the fuselage;

a first walkway positioned between, and pivotably coupled to, the first and second berths;

a first support beam extending generally parallel to a longitudinal axis of the fuselage, the first support beam having a first side pivotably coupled to the first location of the first berth and a second side pivotably coupled to the fuselage; and

a second support beam extending generally parallel to the longitudinal axis of the fuselage, the second support beam having a first side pivotably coupled to the first location of the second berth and a second side pivotably coupled to the fuselage.

11. The aircraft of claim **10** wherein the first location of the first and second berths is pivotably coupled to the fuselage to pivot about two axes.

12. The aircraft of claim **10**, further comprising:

a third berth adjacent the first berth, and having first and second locations respectively pivotably coupled to the fuselage;

a fourth berth adjacent the second berth, and having first and second locations respectively pivotably coupled to the fuselage; and

a second walkway positioned between, and pivotably coupled to, the third and fourth berths, the first and second support beams pivotably coupling the third and fourth berths to the fuselage, respectively, the first and third berths being independently pivotably coupled to the first support beam and the second and fourth berths being independently pivotably coupled to the second support beam.

13. The aircraft of claim **10** wherein the second location of each of the first and second berths includes:

a support fitting having first and second isolated brackets respectively having distal ends fixedly coupled to the

fuselage and proximal ends converging toward each other with a space between the proximal ends;

a rail member coupled to the first and second isolated brackets toward the proximal ends thereof; and

a coupling member coupled to the second coupling location of a corresponding one of the opposing berths and pivotably coupled to the rail member.

14. An overhead space utilization device adapted to install in a hull structure, the device comprising:

at least one berth module having a first berth and an opposing second berth and a first walkway therebetween, each of the first and second berths having a first berth portion and a second berth portion;

first and second intermediate support members, each of the first and second intermediate support members having first and second ends, the first ends pivotably coupled to the corresponding first portions of the first and second berths, and the second ends configured to pivotably coupled to the hull structure;

first and second coupling members configured to pivotably couple the second berth portions of the first and second berths, respectively, to the hull structure, wherein the first and second coupling members and the second berth portions are configured to be positioned outboard of the corresponding first berth portions;

a stair module positioned adjacent the at least one berth module; and

at least one drag brace having first and second ends, the first end of the at least one drag brace pivotably coupled to the stair module and the second end of the at least one drag race configured to be pivotably coupled to at least one of the hull structure and the at least one berth module.

15. The device of claim **14** wherein each of the first and second births includes:

a support fitting having first and second isolated brackets respectively having distal ends fixedly coupled to the hull structure and proximal ends converging toward each other with a space between the proximal ends;

a rail member coupled to the first and second isolated brackets toward the proximal ends thereof; and

a coupling member coupled to the second berth portions of a corresponding one of the first and second berths and pivotably coupled to the rail member.

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