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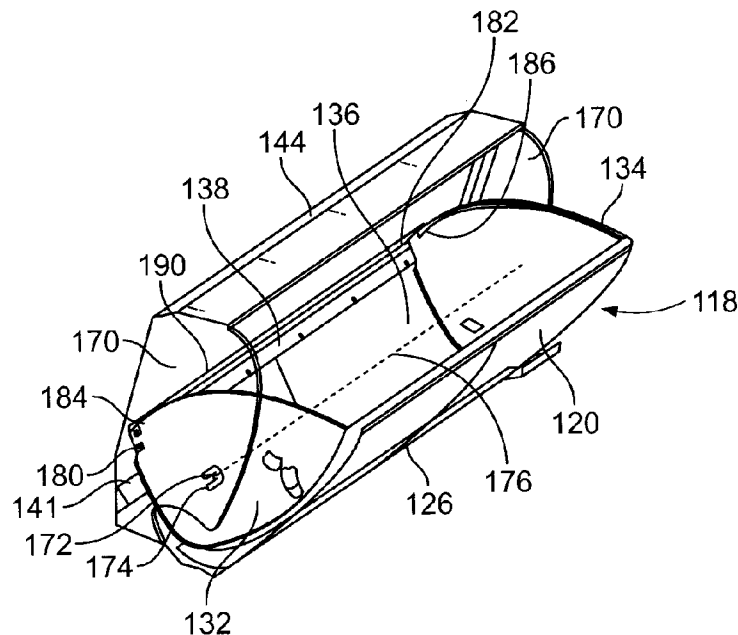
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(54) Title: OVERHEAD STOWAGE BIN ASSEMBLY FOR A VEHICLE



(57) Abrégé/Abstract:

A bin assembly configured to be positioned above at least a portion of one or more seats within a vehicle and pivotally connected to a strongback secured to the vehicle is disclosed. The bin assembly comprises a forward end panel, an aft end panel and a front panel extending between the forward and aft end panels. A closeout bracket extends along a length of the front panel between the forward and aft end panels to span between the forward and aft end panels. The closeout bracket comprises a closeout flange configured to be spaced apart from the strongback through an entire range of motion of the pivot bin with respect to the strongback. The closeout flange may reduce a clearance space between the bin assembly and the strongback to minimize items falling from the bin assembly into the strongback.

ABSTRACT

A bin assembly configured to be positioned above at least a portion of one or more seats within a vehicle and pivotally connected to a strongback secured to the vehicle is disclosed. The bin assembly comprises a forward end panel, an aft end
5 panel and a front panel extending between the forward and aft end panels. A closeout bracket extends along a length of the front panel between the forward and aft end panels to span between the forward and aft end panels. The closeout bracket comprises a closeout flange configured to be spaced apart from the strongback through an entire range of motion of the pivot bin with respect to the
10 strongback. The closeout flange may reduce a clearance space between the bin assembly and the strongback to minimize items falling from the bin assembly into the strongback.

OVERHEAD STOWAGE BIN ASSEMBLY FOR A VEHICLE

FIELD

Embodiments of the present disclosure generally relate to stowage bin
5 assemblies within vehicles.

BACKGROUND

Commercial aircraft typically include an interior cabin that may be divided into numerous sections. A cockpit is generally separated from a passenger cabin, which may include a first class section, a business class section, and a coach section. The
10 passenger cabin may also include one or more work areas for flight personnel, such as galleys, which may include food and beverage storage structures. One or more aisles pass through the passenger cabin and connect each of the passenger sections to one or more paths to one or more doors of the aircraft.

Overhead stowage bins are typically positioned above rows of seats within a
15 commercial aircraft. Each overhead stowage bin is configured to be moved between an open position and a closed position. In the open position, passengers may place carry-on luggage within a moveable bin or bucket. Before the aircraft leaves a terminal, flight attendants ensure that each stowage bin is securely closed.

Due to time constraints, security requirements, and airline policies regarding
20 checked luggage, many passengers decide to carry baggage and personal items onto an aircraft. As such, carry-on baggage has increased in size and often includes large, rectangular rigid bags. Larger capacity stowage bins have been, and continue to be, employed by carriers to accommodate the increase in carry-on baggage.

Often, however, there are not enough stowage bins on an aircraft to
25 accommodate all of the carry-on baggage of a particular flight. For example, as passengers board a plane, the total amount of available overhead bin space decreases. Passengers who board later may be unable to stow their baggage due

to the limited amount of available space. Further, many carry-on bags are simply too large to fit within stowage bins of particular aircraft. For example, smaller aircraft may include smaller stowage bins that are unable to accommodate carry-on baggage that exceeds a particular size.

- 5 Accordingly, a need exists for a stowage bin that is able to accommodate an increased amount of carry-on baggage. Further, a need exists for a stowage bin that is able to accommodate larger carry-on baggage.

SUMMARY OF THE DISCLOSURE

- 10 Certain embodiments of the present disclosure may provide a stowage bin assembly configured to be positioned above at least a portion of one or more seats within a vehicle, such as a commercial aircraft. The stowage bin assembly may include a pivot bin including a forward end panel, an aft end panel that is opposed to the forward end panel, a front panel extending between the forward and aft end panels, and a closeout bracket secured to the forward end panel, the aft end panel, 15 and the front panel. A baggage retaining chamber is defined between the forward end panel, the aft end panel, and the front panel. The closeout bracket spans between the forward end panel and the aft end panel. The stowage bin assembly may also include or otherwise be connected to a strongback. The pivot bin may be pivotally secured to the strongback. The pivot bin is configured to be pivoted 20 between open and closed positions. The closeout bracket may be secured to a bottom end of the front panel, such as a bottom portion of a bottom panel connected to, or part of, the front panel.

- The stowage bin assembly may be devoid of an upper panel. In at least one embodiment, no portion of any panel extends past the closeout bracket between the 25 forward and aft end panels.

Each of the forward end panel, the aft end panel, and the front panel may be formed of composite honeycomb sandwich panels. The closeout bracket may be formed from a unitary piece of metal, such as sheet metal, aluminum, or the like.

5 The baggage retaining chamber may be configured to support standard sized roller bags in a vertically-oriented position in open and closed positions. An interior surface of the front panel is configured to support sides of the standard sized roller bags in the open and closed positions.

A standard sized roller bag may have dimensions of **22" x 14" x 9"**, for example. A stowage bin assembly according to an embodiment of the present disclosure may be configured to contain six of such standard sized roller bags in an upright, on-side orientation.

The closeout bracket may include a closeout flange that is configured to be spaced apart from a strongback through an entire range of motion of the pivot bin with respect to the strongback. The closeout flange may include an upturned edge of a longitudinal main body. In at least one embodiment, the closeout bracket may include a main body having a first portion connected to a second portion through an intermediate curved portion. The main body may be configured to cradle lower curved corner portions of the forward and aft end panels. The closeout bracket may also include one or more securing tabs extending perpendicularly from one or both of the first and second portions. Each of the securing tab(s) may include a through-hole configured to receive a fastener that secures the closeout bracket to one or more of the front panel, the forward end panel, or the aft end panel.

Certain embodiments of the present disclosure may provide a method of forming a pivot bin of a stowage bin assembly that is configured to be positioned above at least a portion of one or more seats within a vehicle. The method may include separately forming a forward end panel, an aft end panel, and a front panel, aligning the forward end panel, the aft end panel, and the front panel with respect to

closeout bracket, and securing the forward end panel, the aft end panel, and the front panel to the closeout bracket.

5 The aligning operation may include using the closeout bracket as an assembly jig or other such alignment guide for the forward end panel, the aft end panel, and the front panel. The securing operation may include one or both of adhesively securing the forward end panel, the aft end panel, and the front panel to the closeout bracket or using one or more fasteners to secure the forward end panel, the aft end panel, and the front panel to the closeout bracket.

10 The method may also include upturning an edge of the closeout bracket to form a closeout flange.

The method may refrain from securing an upper panel to any of the forward end panel, the aft end panel, and the front panel. The method may also refrain from folding any panel portions to form any of the forward end panel, the aft end panel, and the front panel.

15 The separately forming operation may include forming the front panel with a different thickness than the forward and aft end panels.

20 In one embodiment, there is provided a stowage bin assembly configured to be positioned above at least a portion of one or more seats within a vehicle and pivotally connected to a strongback secured to the vehicle. The stowage bin assembly includes a pivot bin. The pivot bin includes a forward end panel, an aft end panel that is opposed to the forward end panel, and a front panel extending between the forward and aft end panels. A baggage retaining chamber is defined between the forward end panel, the aft end panel, and the front panel. The pivot bin further includes a closeout bracket extending along a length of the front panel between the forward and aft end panels. The closeout bracket spans between the forward and aft end panels and the closeout bracket includes a closeout flange that is configured to be spaced apart from the strongback through an entire range of motion of the pivot bin with respect to the strongback.

25

In another embodiment, there is provided a stowage bin assembly configured to be positioned above at least a portion of one or more seats within a vehicle. The stowage bin assembly includes a strongback configured to be fixed to a portion of the vehicle and a pivot bin pivotally secured to the strongback. The pivot bin is
5 configured to be pivoted between open and closed positions. The pivot bin includes a forward end panel, an aft end panel that is opposed to the forward end panel, and a front panel extending between the forward and aft end panels. Each of the forward end panel, the aft end panel, and the front panel are formed of composite honeycomb sandwich panels. A baggage retaining chamber is defined between the
10 forward end panel, the aft end panel, and the front panel. The baggage retaining chamber is dimensioned to support standard sized roller bags having dimensions of approximately 22" x 14" x 9" in a vertically-oriented position when the pivot bin is in the open and closed positions. When the standard sized roller bags are supported in the baggage retainer chamber, an interior surface of the front panel directly supports
15 sides of the standard sized roller bags when the pivot bin is in the open and closed positions. The pivot bin further includes a closeout bracket secured to a bottom end of the front panel. The closeout bracket spans between the forward end panel and the aft end panel. The closeout bracket includes a closeout flange that is configured to be spaced apart from the strongback through an entire range of motion of the
20 pivot bin with respect to the strongback.

In another embodiment, there is provided a method of forming a pivot bin of a stowage bin assembly that is configured to be positioned above at least a portion of one or more seats within a vehicle and to be pivotally connected to a strongback of the vehicle. The method involves separately forming a forward end panel, an aft end
25 panel, a front panel, and a closeout bracket. Forming the closeout bracket involves forming a closeout flange configured to be spaced apart from the strongback through an entire range of motion of the pivot bin with respect to the strongback when the pivot bin is pivotally secured to the strongback. The method further involves: aligning the forward end panel, the aft end panel, and the front panel with respect to the

closeout bracket; and securing at least one of the forward end panel, the aft end panel, and the front panel to the closeout bracket.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a perspective top view of an aircraft, according to an
5 embodiment of the present disclosure.

Figure 2A illustrates a top plan view of an internal cabin of an aircraft, according to an embodiment of the present disclosure.

Figure 2B illustrates a top plan view of an internal cabin of an aircraft, according to an embodiment of the present disclosure.

10 Figure 3 illustrates a perspective interior view of an internal cabin of an aircraft, according to an embodiment of the present disclosure.

Figure 4 illustrates a perspective front view of a stowage bin assembly in a closed position within an internal cabin, according to an embodiment of the present disclosure.

5 Figure 5 illustrates a perspective front view of a stowage bin assembly in an open position within an internal cabin, according to an embodiment of the present disclosure.

Figure 6 illustrates a simplified axial cross-sectional view of a stowage bin assembly in an open position within an internal cabin, according to an embodiment of the present disclosure.

10 Figure 7 illustrates a simplified axial cross-sectional view of a stowage bin assembly in a closed position, according to an embodiment of the present disclosure.

Figure 8 illustrates a perspective front view of a stowage bin assembly in a closed position, according to an embodiment of the present disclosure.

15 Figure 9 illustrates a perspective front view of a stowage bin assembly in an open position, according to an embodiment of the present disclosure.

Figure 10 illustrates a front view of a stowage bin assembly in an open position, according to an embodiment of the present disclosure.

Figure 11 illustrates a perspective end view of a closeout bracket secured to a forward end panel, according to an embodiment of the present disclosure.

20 Figure 12 illustrates an end view of a closeout bracket secured to a forward end panel, according to an embodiment of the present disclosure.

Figure 13 illustrates a flow chart of a method of forming a stowage bin assembly, according to an embodiment of the present disclosure.

Figure 14 illustrates a simplified top plan view of an internal cabin having a plurality of stowage bin assemblies, according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

5 The foregoing summary, as well as the following detailed description of certain embodiments will be better understood when read in conjunction with the appended drawings. As used herein, an element or step recited in the singular and preceded by the word "a" or "an" should be understood as not necessarily excluding the plural of the elements or steps. Further, references to "one embodiment" are not
10 intended to be interpreted as excluding the existence of additional embodiments that also incorporate the recited features. Moreover, unless explicitly stated to the contrary, embodiments "comprising" or "having" an element or a plurality of elements having a particular property may include additional elements not having that property.

 Embodiments of the present disclosure may provide a stowage bin assembly
15 that is configured for use with a vehicle, such as a commercial aircraft. For example, embodiments of the present disclosure may be used with a Boeing 737 aircraft. The stowage bin assembly is configured to accommodate six standard sized roller bags in a vertical orientation (for example, propped up on a side), in a bin having a length of 60". It has been found that embodiments of the present disclosure
20 increase overall overhead baggage count within a Boeing 737-800, for example, from 118 bags to 174 bags. The stowage bin assemblies offer passengers and crew more room and flexibility for loading bags, and increases the opportunity for all passengers to be able to find a suitable place for their bag within an internal cabin of a vehicle, such as a commercial aircraft. Additionally, the stowage bin assemblies
25 are configured for relatively low closing force without the need for a complex bin assist mechanism.

 A standard sized roller bag may have dimensions of 22" x 14" x 9", for example. A stowage bin assembly according to an embodiment of the present

disclosure may be configured to contain six of such standard sized roller bags in an upright, on-side orientation.

By increasing the amount of baggage that may be stowed in an internal cabin of a vehicle, such as a Boeing **737** aircraft, passenger stress level is reduced, as they may rest assured that there will be room in the overhead stowage bin assemblies for their baggage. Additionally, the increased space for overhead baggage reduces stress and workload of staff at boarding gates, as there will be less need to request that passengers check their bags at the gate. Moreover, the increased overhead baggage space allows for more efficient boarding, as passengers are able to quickly and easily find space for their bags. In comparison to known stowage bins, embodiments of the present disclosure provide stowage bin assemblies that provide large bin cross sections that are able to accommodate an increased number of bags.

Embodiments of the present disclosure provide a stowage bin assembly that may include a closeout bracket, for example. The stowage bin assembly may include a forward end panel, an aft end panel, and a curved front or face panel. A closeout bracket is used to secure the end panels to the front panel. For example, a closeout bracket may be attached to the forward end panel at one end and attached to the aft end panel at an opposite end. The closeout bracket may be a span-wise bracket or connection joint that extends between the forward and aft end panels. The closeout bracket may include a closeout flange having a length such that clearance between a pivot stowbin and a fixed support structure, such as a strongback, is minimized or otherwise reduced. The closeout bracket may be substantially rectangular with honeycomb sandwich panels attached to three of the four sides of the bracket (for example, the pivot bin may not include a top panel). A gap defined by a minimum distance from the flange to the strongback may vary as the pivot bin proceeds through a range of motion. The gap may have a maximum distance between **0.2" – 0.3"**, so as to prevent overhead baggage and personal

items from falling therethrough. Alternatively, the gap may have a greater or lesser maximum distance.

Because there is no top to the stowage bin assembly, the assembly may be manufactured such that large panel pieces may be assembled to tight tolerances, and aligned quickly and properly without having separate pieces hanging together by a face sheet. For example, embodiments of the present disclosure provide a method of manufacturing a stowage bin assembly that may include aligning three honeycomb composition panels with a closeout bracket, and attaching the three honeycomb composite panels to the closeout bracket. The aligning operation may include using the closeout bracket as an assembly jig. The attaching operation may include gluing and fastening. At least one of the three composite panels may have a different thickness than the other two.

Embodiments of the present disclosure provide a stowage bin assembly including a pivot bin or bucket having a reduced stiffness. The closeout bracket may stiffen the pivot bin to prevent unwanted deflection. Embodiments of the present disclosure provide a stowage bin assembly that is aesthetically pleasing, lightweight, easy to manufacture, and tamper resistant. Compared to other known stowage bin, embodiments of the present disclosure provide a reliable stowage bin assembly having less parts. Further, the stowage bin assembly is less susceptible to jamming, as the pivot bin is easier to close. Embodiments of the present disclosure provide a stowage bin assembly that has a greater capacity for overhead baggage.

Embodiments of the present disclosure may be configured to pivot between open and closed positions, such as shown and described in the background example found in United States Patent No. **8,262,022**, entitled "Overhead Stowage Bin Load Transfer and Balance System".

Figure 1 illustrates a perspective top view of a vehicle, such as an aircraft (or aircraft assembly), according to an embodiment of the present disclosure. The aircraft **10** may include a propulsion system **12** that may include two turbofan

engines **14**, for example. Optionally, the propulsion system **12** may include more engines **14** than shown. The engines **14** are carried by wings **16** of the aircraft **10**. In other embodiments, the engines **14** may be carried by a fuselage **18** and/or an empennage **20**. The empennage **20** may also support horizontal stabilizers **22** and
5 a vertical stabilizer **24**.

The fuselage **18** of the aircraft **10** defines an internal cabin, which may include a cockpit, one or more work sections (for example, galleys, personnel carry-on baggage areas, and the like), one or more passenger sections (for example, first class, business class, and coach sections), and an aft section in which an aft rest
10 area assembly may be positioned. Each of the sections may be separated by a cabin transition area, which may include one or more class divider assemblies. Overhead stowage bin assemblies may be positioned throughout the internal cabin.

Alternatively, instead of an aircraft, embodiments of the present disclosure may be used with various other vehicles, such as automobiles, buses, locomotives
15 and train cars, seacraft, spacecraft, and the like.

Figure **2A** illustrates a top plan view of an internal cabin **30** of an aircraft, according to an embodiment of the present disclosure. The internal cabin **30** may be within a fuselage **32** of the aircraft. For example, one or more fuselage walls may define the internal cabin **30**. The internal cabin **30** includes multiple sections,
20 including a front section **33**, a first class section **34**, a business class section **36**, a front galley station **38**, an expanded economy or coach section **40**, a standard economy or coach section **42**, and an aft section **44**, which may include multiple lavatories and galley stations. It is to be understood that the internal cabin **30** may include more or less sections than shown. For example, the internal cabin **30** may
25 not include a first class section, and may include more or less galley stations than shown. Each of the sections may be separated by a cabin transition area **46**, which may include class divider assemblies between aisles **48**.

As shown in Figure 2A, the internal cabin **30** includes two aisles **50** and **52** that lead to the aft section **44**. Optionally, the internal cabin **30** may have less or more aisles than shown. For example, the internal cabin **30** may include a single aisle that extends through the center of the internal cabin **30** that leads to the aft section **44**.

Figure 2B illustrates a top plan view of an internal cabin **80** of an aircraft, according to an embodiment of the present disclosure. The internal cabin **80** may be within a fuselage **81** of the aircraft. For example, one or more fuselage walls may define the internal cabin **80**. The internal cabin **80** includes multiple sections, including a main cabin **82** having passenger seats **83**, and an aft section **85** behind the main cabin **82**. It is to be understood that the internal cabin **80** may include more or less sections than shown.

The internal cabin **80** may include a single aisle **84** that leads to the aft section **85**. The single aisle **84** may extend through the center of the internal cabin **80** that leads to the aft section **85**. For example, the single aisle **84** may be coaxially aligned with a central longitudinal plane of the internal cabin **80**.

Figure 3 illustrates a perspective interior view of an internal cabin **100** of an aircraft, according to an embodiment of the present disclosure. The internal cabin **100** includes outboard walls **102** connected to a ceiling **104**. Windows **106** may be formed within the outboard walls **102**. A floor **108** supports rows of seats **110**. As shown in Figure 3, a row **112** may include two seats **110** on either side of an aisle **113**. However, the row **112** may include more or less seats **110** than shown. Additionally, the internal cabin **100** may include more aisles than shown.

Passenger service units (PSUs) **114** are secured between an outboard wall **102** and the ceiling **104** on either side of the aisle **113**. The PSUs **114** extend between a front end and rear end of the internal cabin **100**. For example, a PSU **114** may be positioned over each seat **110** within a row **112**. Each PSU **114** may include a housing **116** that generally contains vents, reading lights, an oxygen bag

drop panel, an attendant request button, and other such controls over each seat **110** (or groups of seats) within a row **112**.

Overhead stowage bin assemblies **118** are secured to the ceiling **104** and/or the outboard wall **102** above and inboard from the PSU **114** on either side of the aisle **113**. The overhead stowage bin assemblies **118** are secured over the seats **110**. The overhead stowage bin assemblies **118** extend between the front and rear end of the internal cabin **100**. Each stowage bin assembly **118** may include a pivot bin or bucket **120** pivotally secured to a strongback (hidden from view in Figure **3**). The overhead stowage bin assemblies **118** may be positioned above and inboard from lower surfaces of the PSUs **114**. The overhead stowage bin assemblies **118** are configured to be pivoted open in order to receive passenger carry-on baggage and personal items, for example.

As used herein, the term “outboard” means a position that is further away from a central longitudinal plane **122** of the internal cabin **100** as compared to another component. The term “inboard” means a position that is closer to the central longitudinal plane **122** of the internal cabin **100** as compared to another component. For example, a lower surface of a PSU **114** may be outboard in relation to a stowage bin assembly **118**.

As shown, a gap **124** extends along a length of the internal cabin **100** between the PSUs **114** and the stowage bin assemblies **118** on each side of the aisle **113**. The gap **124** allows the pivot bins **120** of the stowage bins **118** to be pivoted between open and closed positions. A closeout panel may be secured to a strongback and extend into the gap **124**, as described in background example United States Patent Application No. **14/682,197**, filed April **9, 2015**, entitled “Systems and Methods for Positioning a Section Divider Assembly Within a Vehicle”.

Figure **4** illustrates a perspective front view of a stowage bin assembly **118** in a closed position within the internal cabin **100**, according to an embodiment of the present disclosure. The stowage bin assembly **118** includes a pivot bin **120** having

a front panel **126** connected to forward and aft end panels (hidden from view in Figure 4). As shown, the front panel **126** may be an arcuate panel having a curved outer surface that curves downwardly toward the outboard wall **102**. As such, a top portion **128** of the front panel **126** is inboard in relation to a lower portion **130**.

5 Figure 5 illustrates a perspective front view of the stowage bin assembly **118** in an open position within the internal cabin **100**, according to an embodiment of the present disclosure. As shown, the front panel **126** is secured to a forward end panel **132** and an aft end panel **134**, which may generally be opposed and parallel to one another. The front panel **126** and the end panels **132** and **134** may also connect to
10 a bottom panel **136**. The bottom panel **136** may be an inwardly curved portion of the front panel **126**, for example. A closeout bracket **138** may span between the end panels **132** and **134** and provide a rigid bracing support therebetween. The front panel **126** may be thicker than the end panels **132** and **134**, as the front panel **126** is configured to directly support a weight of overhead bags. As such, the front panel
15 **126** may have increased thickness in order to provide additional support strength and rigidity.

Notably, the pivot bin **120** does not include an upper panel that extends between the end panels **132** and **134**. Because there is no upper panel or portion thereof extending between the end panels **132** and **134**, an upper volume of the
20 pivot bin **120** is unobstructed and is therefore able to accommodate taller bags, such as roller bags, on their sides.

A baggage retaining chamber **140** is defined between the front panel **126**, the end panels **132** and **134**, and the bottom panel **136**. The baggage retaining chamber **140** is configured to receive baggage when the stowage bin assembly **118**
25 is in the open position. The baggage retaining chamber **140** is configured to accommodate an increased number of bags **142** as compared to other known stowage bins. For example, six or more standard-sized roller bags may be positioned within the baggage retaining chamber **140**. Moreover, the baggage

retaining chamber **140** is configured to accommodate the bags **142** in a vertical, on-edge orientation, as shown.

Figure **6** illustrates a simplified axial cross-sectional view of the stowage bin assembly **118** in an open position within the internal cabin **100**, according to an embodiment of the present disclosure. The pivot bin **120** may be pivotally secured to a fixed structure, such as a strongback **144**, which is secured to the outboard wall **102** and/or the ceiling **104**. The PSU **116** may be secured to a lower edge **146** of the strongback **144** through a PSU rail **148**.

The pivot bin **120** may not include a top panel or wall. Instead, as shown, the front panel **126** connects to the bottom panel **136**, which may connect to the closeout bracket **138**. In the open position, an edge or lip **150** of the front panel **126** is at a level that is a distance d lower than a front panel **160** of a previous stowage bin **162**. For example, the distance d may be 3". As such, passengers may find it easier to load bags into the baggage retaining chamber **140**. The lower level of the lip **150** in the open position provides easier loading of baggage easier, and easier visual inspection by flight attendants.

Figure **7** illustrates a simplified axial cross-sectional view of the stowage bin assembly **118** in a closed position, according to an embodiment of the present disclosure. As shown, the baggage retaining chamber **140** is large enough to accommodate bags **142** in a vertical orientation in which they are oriented in an upright position, supported on a side (in contrast to resting on a front or back). As such, the stowage bin assembly **118** is able to accommodate an increased number of bags **142**, as the bags **142** may be positioned on their edges or sides, which allows more room for additional bags to be positioned within the baggage retaining chamber **140**.

Figure **8** illustrates a perspective front view of the stowage bin assembly **118** in the closed position, according to an embodiment of the present disclosure. The front panel **126** is secured to the forward end panel **132** and the aft end panel **134**

(hidden from view in Figure 8). The end panels **132** and **134** may generally be parallel to one another. Each end panel **132** may be pivotally secured to a retaining panel **170** of the strong back **144**.

Figure 9 illustrates a perspective front view of the stowage bin assembly **118** in the open position, according to an embodiment of the present disclosure. The front panel **126** and the end panels **132** and **134** may connect to the bottom panel **136**. The closeout bracket **138** may span between the end panels **132** and **134** and provide a rigid bracing support therebetween.

For the sake of clarity, a front retaining panel **170** is shown as transparent. Each of the end panels **132** and **134** may include a pivot pin **172** extending from an outer surface that is pivotally retained within a pivot bearing **174** extending from an internal surface of the retaining panel **170**. Alternatively, the pivot bearing may be positioned on the outer surface of an end panel **132** or **134**, while the pivot pin **172** extends inwardly from the retaining panel **170**. The pivotal engagement of the pivot pins **172** within the pivot bearings **174** defines a pivot axle **176** about which the pivot bin **120** pivots between open and closed positions. Pivotal movement of the stowage bin assembly and the location of the pivot axle **176** may be described in United States Patent No. **8,262,022**, for example.

The closeout bracket **138** secures the forward end panel **132** to the aft end panel **134**. The closeout bracket **138** may secure to each of the end panels **132**, **134** and the front panel **126** (the bottom panel **136** may be a lower curved portion of the front panel **126**). A forward end **180** of the closeout bracket **138** may attach to the forward end panel **132** and an aft end **182** of the closeout bracket **138** may be attached to the aft end panel **134**. As shown, the closeout bracket **138** secures to the end panels **132** and **134** at lower edges **184** and **186**. The closeout bracket **138** may extend over edge portions of the end panels **132** and **134** a short distance, such as less than **3"**.

The closeout bracket **138** spans between the forward and aft end panels **132** and **134**, and may include a closeout flange **190** that extends between the forward and aft end panels **132** and **134**. The closeout flange **190** may be sized and shaped so that a clearance space between the pivot bin **120** and the strongback **144** is
5 minimized or otherwise reduced in order to prevent items within a baggage retaining chamber from falling therethrough.

The closeout bracket **138** may be substantially rectangular and formed of sheet metal (such as aluminum), thereby providing bracing rigidity to the pivot bin **120**. Each of the panels **126**, **132**, and **134** may be formed of a composite material
10 having a honeycomb structure. A gap defined between the closeout flange **190** and the strongback **144** may vary as the pivot bin **120** proceeds through a range of motion. For example, the gap may have a maximum distance between **0.2"** – **0.3"**, to prevent baggage or overhead items from falling therethrough. That is, the gap between the closeout flange **190** and the strongback **144** (throughout a range of
15 motion of the pivot bin **120**) may be small enough to prevent baggage, overhead personal items (such as laptop computers), and the like from passing therethrough. At the same time, because the closeout flange **190** is separated from the strongback **144** by the gap, the pivot bin **120** is able to easily move between the open and closed positions. In short, the closeout flange **190** does not interfere with the
20 strongback **144** as the pivot bin **120** pivots between open and closed positions.

The stowage bin assembly **118** may also include a blade seal **191** secured to a lower portion of the strongback **144**. The blade seal **191** may be formed of plastic, composite, metal, or the like, and is configured to provide a sealing engagement with the closeout bracket **138** when the pivot bin **120** is in the closed position. In this
25 manner, a closed interface may exist between the blade seal **191** and the closeout bracket **138** that ensures that items remain within the pivot bin **120** in the closed position.

Figure **10** illustrates a front view of the stowage bin assembly **118** in the open position, according to an embodiment of the present disclosure. As shown, the

baggage retaining chamber **140** is formed between the end panels **132**, **134**, and the front panel **126**, which may include the bottom panel **136**. The closeout bracket **138** extends and spans between the opposed end panels **132** and **134**.

Figure **11** illustrates a perspective end view of the closeout bracket **138** secured to the forward end panel **132**, according to an embodiment of the present disclosure. Figure **12** illustrates an end view of the closeout bracket **138** secured to the forward end panel **132**. Referring to Figures **11** and **12**, it is to be understood that the closeout bracket **138** may be secured to the aft end panel **134** (not shown in Figures **11** and **12**) in a similar fashion. As shown in Figures **11** and **12**, the pivot bin **120** is in an open position with respect to the strongback **144**.

The closeout bracket **138** includes a longitudinal main body **192** that spans between the end panels **132** and **134**. The main body **192** includes a first portion, such as a ledge **194** that connects to the bottom panel **136** and overlays bottom edge portions **196** of the end panels **132** and **134**. The first portion **194** connects to a second portion, such as an upper rail **198** through a curved intermediate transition portion **200** that conforms to an outer edge portion of a portion of the end panels **132** and **134**. The second portion **198** overlays lower upstanding edge portions **201** of the end panels **132** and **134**. As such, distal, lower curved corner portions of the end panels **132** and **134** are cradled within the main body **192** of the closeout bracket **138**.

Securing tabs **202** may extend perpendicularly from distal edges **204** of the main body **192** on either end. The securing tabs **202** are configured to overlay an outer lateral surface portion of the end panel **132**, for example, As shown, one securing tab **202** may be proximate to the bottom panel **136** while the other securing tab **202** may be above the bottom panel **136**. More or less securing tabs **202** than shown may be used. Each securing tab **202** includes a fastener through-hole that is configured to receive a fastener **206**, such as a screw, that is used to securely fasten the closeout bracket **138** to the pivot bin **120**.

The closeout flange **190** may be an upturned portion of the second portion **198**. For example, the closeout flange **190** may be outwardly bent from the second portion **198** at a **90** degree angle. Alternatively, the angle may be greater or lesser than **90** degrees. The closeout flange **190** has a depth (extending from the second portion **198** to the strongback **144**) such that a gap **210** is formed between the closeout flange **190** and an interior surface of the strongback **144**. The gap **210** ensures that the closeout flange **190** does not abut into a surface of the strongback **144** throughout a range of motion of the pivot bin **120**. The size of the gap **210** may vary at different pivotal locations of the pivot bin **120** with respect to the strongback **144**. The maximum distance of the gap **210** throughout a range of motion of the pivot bin **120** may be less than **1"**, in order to prevent items from falling between the pivot bin **120** and the strongback **144**, but at the same time prevent the closeout flange **190** from scraping the interior surface of the strongback **144** (so as to allow free and easy movement of the pivot bin **120** between open and closed positions). In at least one embodiment, the gap **210** may have a maximum distance between **0.2"** and **0.3"**.

The closeout bracket **138** may be secured to a terminal end of the bottom panel **136**, which may be an extended portion of the front panel **126**. No panel portion may extend beyond the closeout bracket **138** between the end panels **132** and **134**. The bottom panel **136** may not extend over lateral edges **220** of the end panels **132** and **134**. Indeed, the pivot bin **120** may be devoid of a separate and distinct panel or portion of another panel that secures over the lateral edges **220** of the end panel **132** and **134**. Instead, the closeout bracket **138** extends between the end panels **132** and **134**. The closeout bracket **138** may extend over a short distance of the lateral edges **220**. For example, closeout bracket **138** may extend over less than **2"** of the lateral edges **220**. In this manner, the pivot bin **120** is able to provide a baggage retaining chamber **140** having an increased volume and height, as there is no closing panel or wall portion that closes off lateral edges **220** of the end panel **132** and **134**. Instead of having a separate and distinct composite, honeycomb panel that wraps around the lateral edges **220**, the closeout bracket **138**

extends between distal, lower corner portions of the end panels **132** and **134**, and provides bracing support therebetween. The upturned closeout flange **190** prevents stored overhead items from falling between the pivot bin **120** and the strongback **144**.

Figure **13** illustrates a flow chart of a method of forming a stowage bin assembly, according to an embodiment of the present disclosure. The method begins at **300**, in which multiple panels, such as composite panels, are aligned with a closeout bracket, which may be formed of a metal, such as aluminum. The panels may not include an upper panel that extends over any portion of a baggage retaining chamber.

The closeout bracket may provide an assembly jig or other such alignment structure. For example, the closeout bracket may include portions that cradle portions of a front panel and end panels in position. The closeout bracket may include ridges, recesses, channels, or the like that receive and retain portions of the panels so that they are secured in position.

After being aligned in position by the closeout bracket, the panels are securely attached at the closeout bracket at **302**. For example, the panels may be secured to the closeout bracket through fasteners, adhesives, and/or the like. At least one of the panels may have a different thickness than the others. For example, a front panel may be thicker than the end panels, as the front panel is configured to directly support a weight of baggage within the baggage retaining chamber.

In contrast to known stowage bins, embodiments of the present disclosure eliminate a need for a bat wing design and construction. Embodiments of the present disclosure reduce manufacturing complexity. For example, previous stowage bins were formed through a flat bat wing shaped panel (with composite end panels and a cover cut from a single piece of composite material). The single large panel is difficult to handle and may easily be damaged (such as through tearing) at edges where it is folded. The large panel is folded to form the top and sides of the bin, and glued to a bin bucket face. Additional edge molding pieces are then glued

into place along the top edge to cover the exposed honeycomb composite edge. In contrast, embodiments of the present disclosure include the end panels that are separately cut into small, easy-to-handle pieces, which may be secured to the front panel, and attached together with the closeout bracket, which may be a sheet metal back joint. None of the portions may be folded (which may form weakened areas) to form any of the panels.

Figure 14 illustrates a simplified top plan view of an internal cabin 400 having a plurality of stowage bin assemblies, according to an embodiment of the present disclosure. Referring to Figures 1-14, the internal cabin 400 may be that of a Boeing 737 airplane. The internal cabin 400 may include 24 stowage bin assemblies 402, each having a length of 60", two front stowage bin assemblies 404, each having a length of 34", four first class stowage bin assemblies 406, each having a length of 57", two distal stowage bin assemblies 408, each having a length of 53", and two rear stowage bin assemblies, each having a length of 30". Embodiments of the present disclosure provide stowage bin assemblies similar to the stowage bin assemblies 402. Each of the stowage bin assemblies 402 may have a length of 60", and is able to accommodate six standard sized roller bags 420 on their sides. Compared to known stowage bins, the stowage bin assemblies 402 are able to contain 2 extra standard sized roller bags 420. Further, each stowage bin assembly 402 may have an internal baggage retaining chamber volume of 300-450 ft³ (depending on the size of the aircraft), which is more than 60 -80 ft³ greater than known stowage bins. In short, the internal cabin 300 includes stowage bin assemblies 402 that have increased volume and are able to contain more bags 420 than known stowage bins. The stowage bin assemblies 402 are configured to contain more bags 420 than known stowage bins, thereby allowing the internal cabin 400 to be able to accommodate substantially more bags 420.

Embodiments of the present disclosure provide stowage bin assemblies that are larger than known stowage bins, offer passengers and crew more room and flexibility for loading bags, and increase opportunity for all passengers to be able to

find a suitable overhead stowage space for their bags. Further, each stowage bin assembly may not include a complex bin assist mechanism.

Embodiments of the present disclosure provide a stowage bin assembly having increased bag-containing volume due to the closeout bracket, which may be
5 a sheet metal back joint that spans between end panels. The closeout bracket may include a closeout flange that prevents items from being inadvertently placed on top of the pivot bin, and prevents smaller items from falling behind the pivot bin. Additionally, in the open position, the pivot bin provides greater visibility into the baggage retaining chamber, which allows for quicker and easier inspection by flight
10 attendants. Unlike known stowage bins, embodiments of the present disclosure provide a stowage bin assembly that does not need a fabric closeout between a pivot bin and a strongback.

As described above, embodiments of the present disclosure provide a stowage bin assembly that may be devoid of a fabric closeout. Embodiments of the
15 present disclosure provide a stowage bin assembly having a closeout bracket, which may be formed of metal, that eliminates, minimizes, or otherwise reduce areas where items may be hidden. In short, embodiments of the present disclosure provide stowage bin assemblies that have no spaces or areas to hide items. Accordingly, embodiments of the present disclosure allow for quick and effective
20 safety inspections of overhead stowage bin assemblies.

While various spatial and directional terms, such as top, bottom, lower, mid, lateral, horizontal, vertical, front and the like may be used to describe embodiments of the present disclosure, it is understood that such terms are merely used with respect to the orientations shown in the drawings. The orientations may be inverted,
25 rotated, or otherwise changed, such that an upper portion is a lower portion, and vice versa, horizontal becomes vertical, and the like.

As used herein, a structure, limitation, or element that is “configured to” perform a task or operation is particularly structurally formed, constructed, or

adapted in a manner corresponding to the task or operation. For purposes of clarity and the avoidance of doubt, an object that is merely capable of being modified to perform the task or operation is not "configured to" perform the task or operation as used herein.

5 It is to be understood that the above description is intended to be illustrative, and not restrictive. For example, the above-described embodiments (and/or aspects thereof) may be used in combination with each other. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the various embodiments of the disclosure without departing from their
10 scope. While the dimensions and types of materials described herein are intended to define the parameters of the various embodiments of the disclosure, the embodiments are by no means limiting and are exemplary embodiments. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the various embodiments of the disclosure should,
15 therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein." Moreover, the terms "first," "second," and "third," etc. are used merely as labels, and are not intended to impose numerical
20 requirements on their objects.

 This written description uses examples to disclose the various embodiments of the disclosure, including the best mode, and also to enable any person skilled in the art to practice the various embodiments of the disclosure, including making and using any devices or systems and performing any incorporated methods. The
25 patentable scope of the various embodiments of the disclosure is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if the examples have structural elements that do not differ from the literal language of the claims, or

if the examples include equivalent structural elements with insubstantial differences from the literal language of the claims.

EMBODIMENTS IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A stowage bin assembly configured to be positioned above at least a portion of one or more seats within a vehicle and pivotally connected to a strongback secured to the vehicle, the stowage bin assembly comprising:
- 5 a pivot bin including:
- a forward end panel;
- an aft end panel that is opposed to the forward end panel;
- a front panel extending between the forward and aft end panels, wherein a baggage retaining chamber is defined between the forward end panel, the aft end panel, and the front panel; and
- 10 a closeout bracket extending along a length of the front panel between the forward and aft end panels, wherein the closeout bracket spans between the forward and aft end panels and wherein the closeout bracket comprises a closeout flange that is configured to be spaced apart from the strongback through an entire range of motion of the pivot bin with respect to the strongback.
- 15
2. The stowage bin assembly of claim 1, further comprising the strongback, wherein the pivot bin is pivotally secured to the strongback, and wherein the pivot bin is configured to be pivoted between open and closed positions.
- 20
3. The stowage bin assembly of claim 2, wherein the baggage retaining chamber is dimensioned to support standard sized roller bags having dimensions of approximately 22" x 14" x 9" in a vertically-oriented position when the pivot bin is in the open and closed positions.
- 25

4. The stowage bin assembly of claim 3, wherein, when the standard sized roller bags are supported in the baggage retaining chamber, an interior surface of the front panel directly supports sides of the standard sized roller bags when the pivot bin is in the open and closed positions.
- 5 5. The stowage bin assembly of any one of claims 1 to 4, wherein panels of the pivot bin consist solely of the forward end panel, the aft end panel and the front panel.
6. The stowage bin assembly of any one of claims 1 to 5, wherein the front panel comprises a curved portion forming a bottom panel.
- 10 7. The stowage bin assembly of any one of claims 1 to 6, wherein the closeout bracket is secured to a bottom end of the front panel.
8. The stowage bin assembly of claim 7, wherein the front panel terminates at the closeout bracket such that no portion of the front panel extends past the closeout bracket between the forward and aft end panels.
- 15 9. The stowage bin assembly of any one of claims 1 to 8, wherein each of the forward end panel, the aft end panel, and the front panel are formed of composite honeycomb sandwich panels, and wherein the closeout bracket is formed from a unitary piece of metal.
- 20 10. The stowage bin assembly of any one of claims 1 to 9, wherein the closeout bracket comprises a main body having a first portion connected to a second portion through an intermediate curved portion, wherein the main body is configured to conform to adjacent curved corner portions of the forward and aft end panels.
- 25 11. A stowage bin assembly configured to be positioned above at least a portion of one or more seats within a vehicle, the stowage bin assembly comprising:
a strongback configured to be fixed to a portion of the vehicle; and

a pivot bin pivotally secured to the strongback, wherein the pivot bin is configured to be pivoted between open and closed positions, wherein the pivot bin comprises:

a forward end panel;

5 an aft end panel that is opposed to the forward end panel;

a front panel extending between the forward and aft end panels, wherein each of the forward end panel, the aft end panel, and the front panel are formed of composite honeycomb sandwich panels, wherein a baggage retaining chamber is defined
10 between the forward end panel, the aft end panel, and the front panel, wherein the baggage retaining chamber is dimensioned to support standard sized roller bags having dimensions of approximately 22" x 14" x 9" in a vertically-oriented position when the pivot bin is in the open and closed positions, wherein,
15 when the standard sized roller bags are supported in the baggage retainer chamber, an interior surface of the front panel directly supports sides of the standard sized roller bags when the pivot bin is in the open and closed positions; and

a closeout bracket secured to a bottom end of the front panel, wherein the closeout bracket spans between the forward end
20 panel and the aft end panel, wherein the closeout bracket comprises a closeout flange that is configured to be spaced apart from the strongback through an entire range of motion of the pivot bin with respect to the strongback.

25 12. The stowage bin assembly of claim 11, wherein the closeout bracket comprises:

a main body having a first portion connected to a second portion through an intermediate curved portion, wherein the main body is configured to conform to adjacent curved corner portions of the forward and aft end panels.

5 **13.** The stowage bin assembly of claim **11** or **12**, wherein the closeout bracket comprises a metal closeout bracket.

10 **14.** A method of forming a pivot bin of a stowage bin assembly that is configured to be positioned above at least a portion of one or more seats within a vehicle and to be pivotally connected to a strongback of the vehicle, the method comprising:

15 separately forming a forward end panel, an aft end panel, a front panel, and a closeout bracket, wherein forming the closeout bracket comprises forming a closeout flange configured to be spaced apart from the strongback through an entire range of motion of the pivot bin with respect to the strongback when the pivot bin is pivotally secured to the strongback;

aligning the forward end panel, the aft end panel, and the front panel with respect to the closeout bracket; and

20 securing at least one of the forward end panel, the aft end panel, and the front panel to the closeout bracket.

15. The method of claim **14**, wherein the securing operation comprises using one or more fasteners to secure the forward end panel, the aft end panel, and the front panel to the closeout bracket.

25 **16.** The method claim **14** or **15**, wherein panels of the pivot bin consist solely of the forward end panel, the aft end panel, and the front panel.

17. The method of any one of claims 14 to 16, wherein the separately forming operation comprises forming each of the forward end panel, the aft end panel, and the front panel individually.
- 5 18. The method of any one of claims 14 to 17, wherein the separately forming operation comprises forming the front panel with a different thickness than the forward and aft end panels.

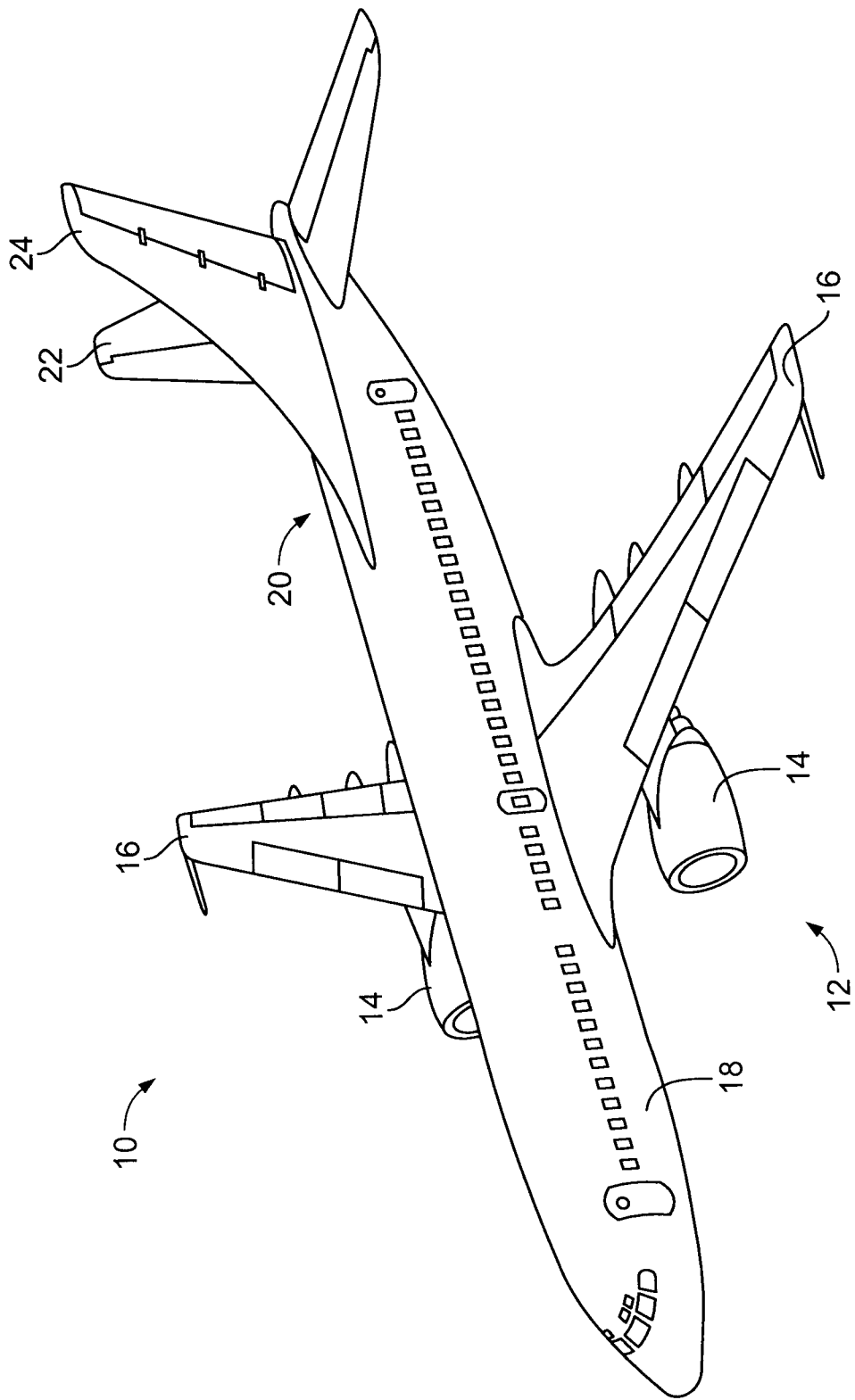


FIG. 1

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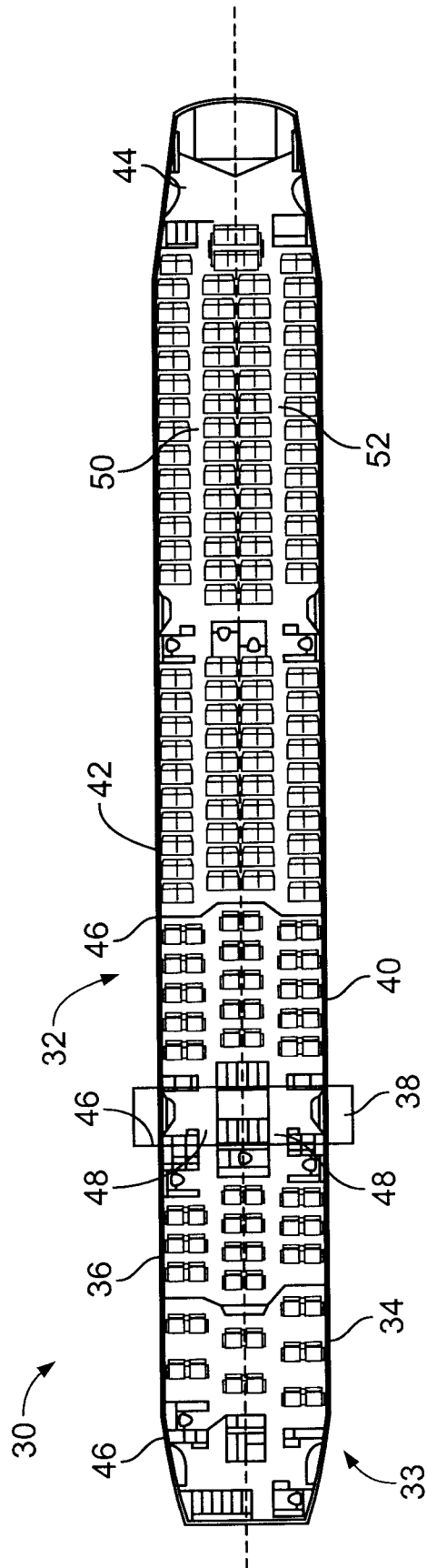


FIG. 2A

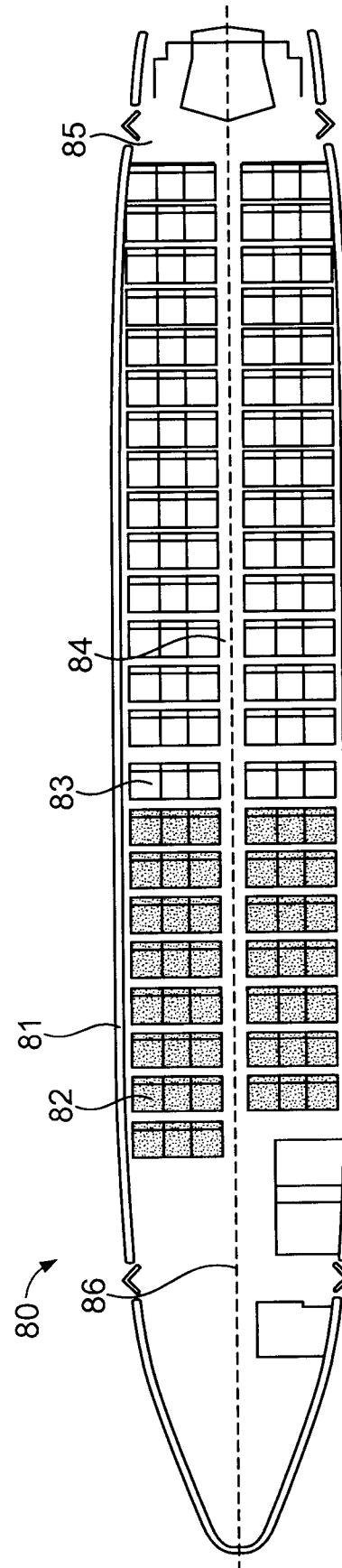


FIG. 2B

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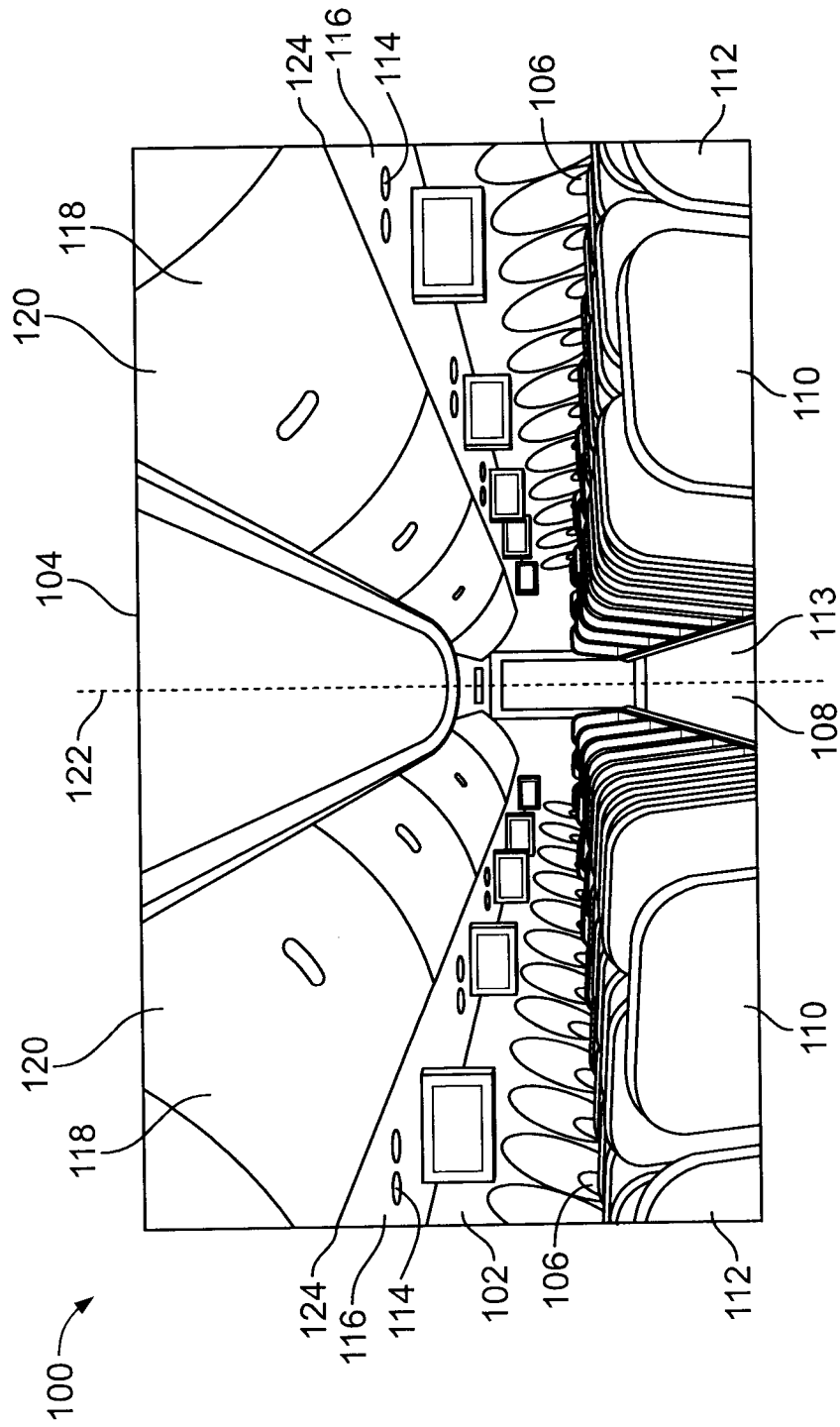


FIG. 3

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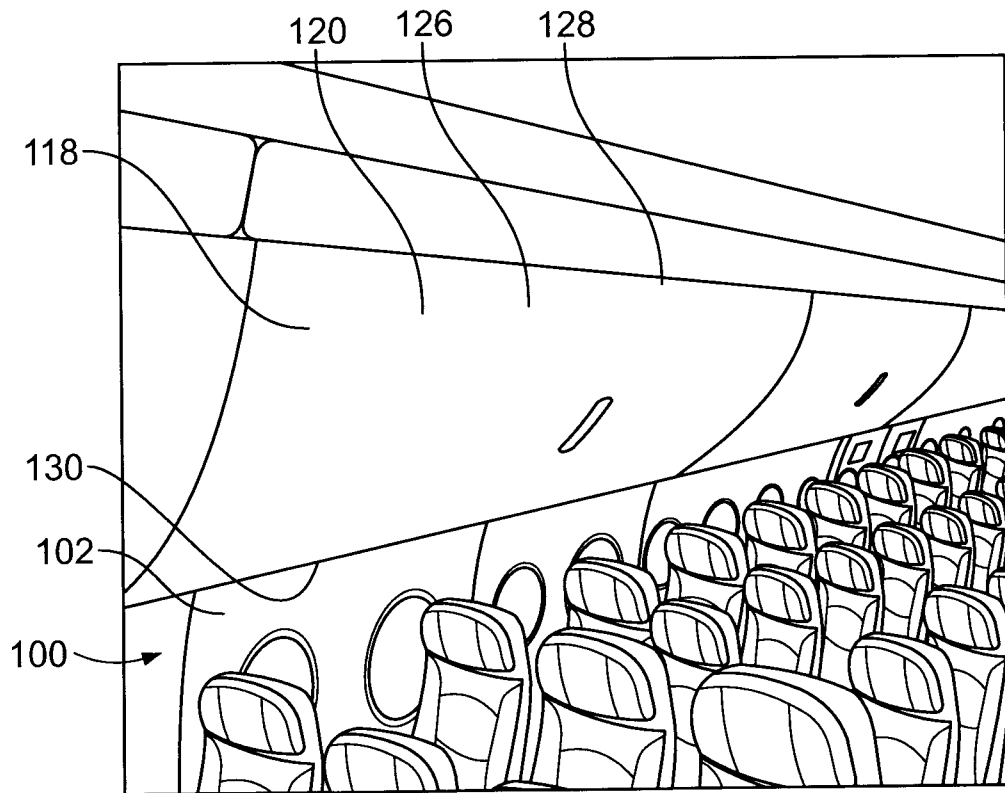


FIG. 4

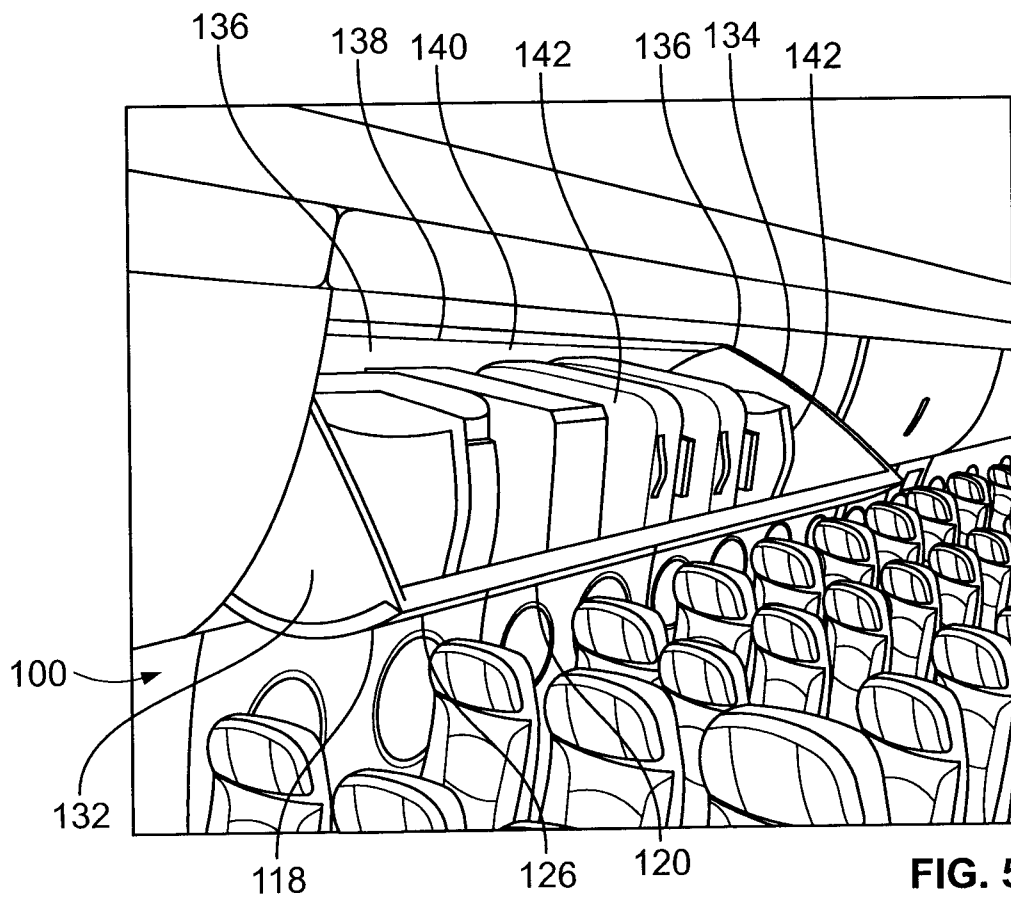


FIG. 5

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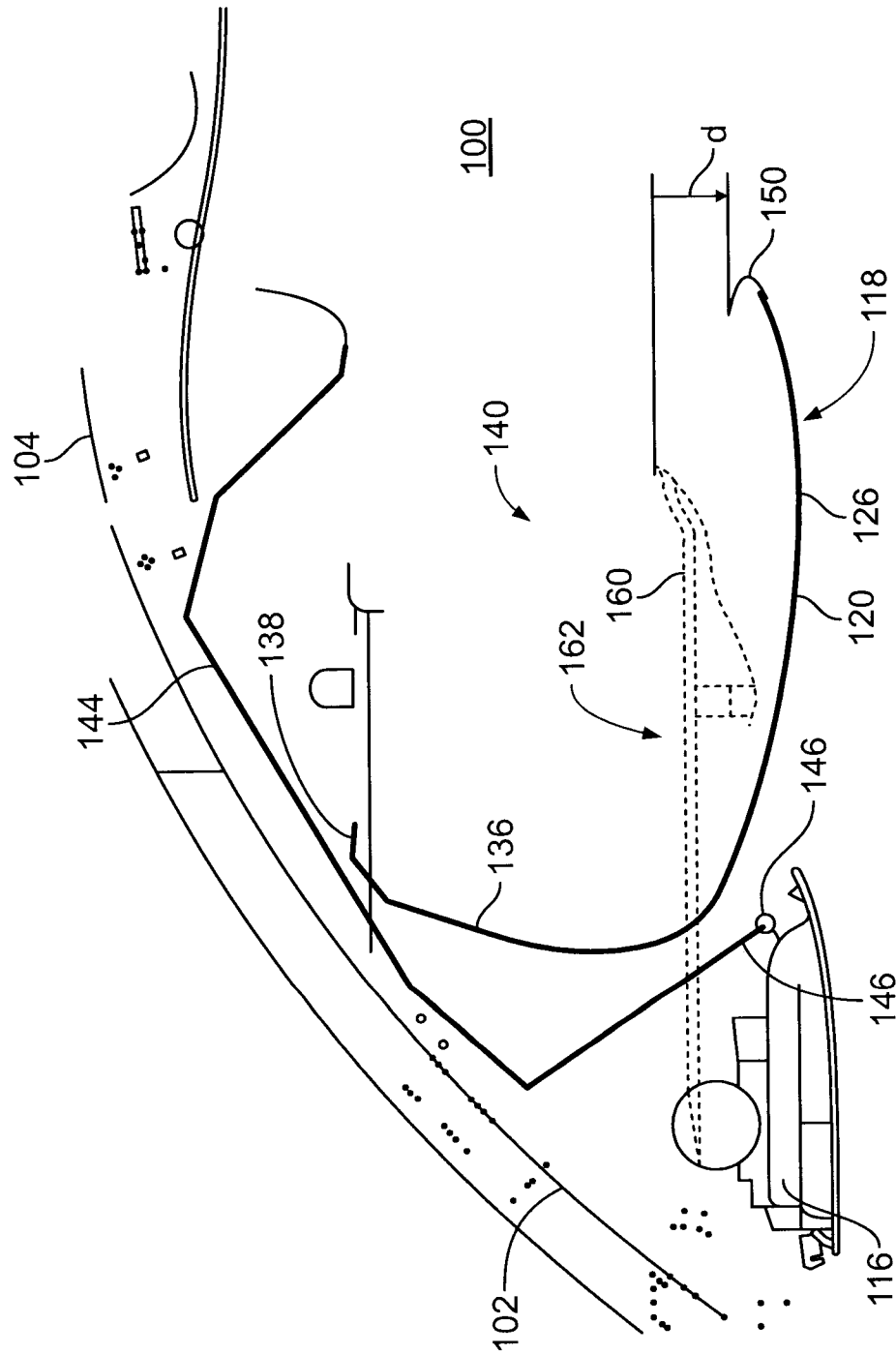


FIG. 6

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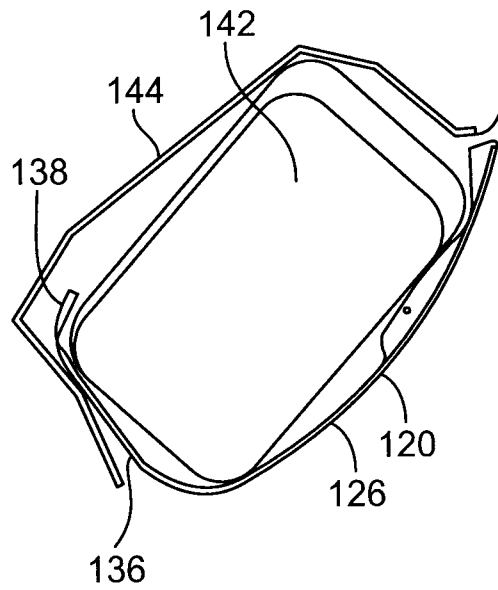


FIG. 7

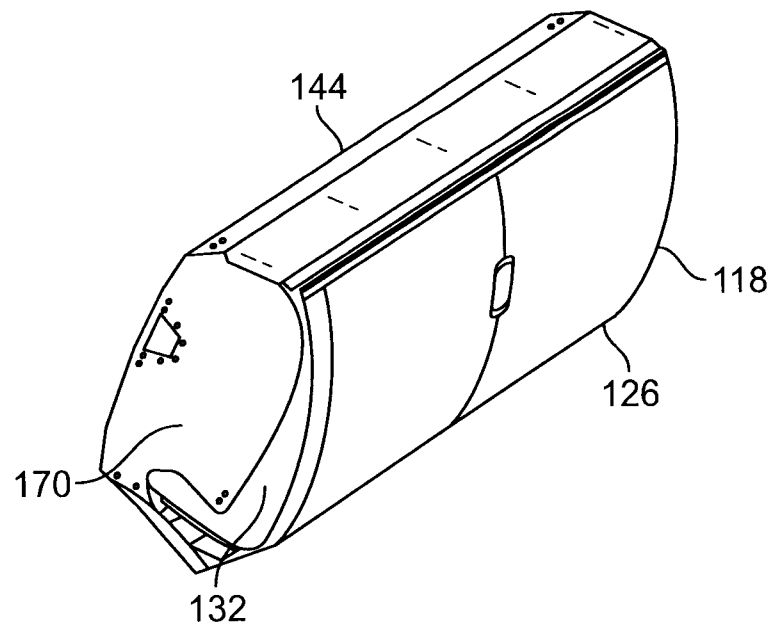


FIG. 8

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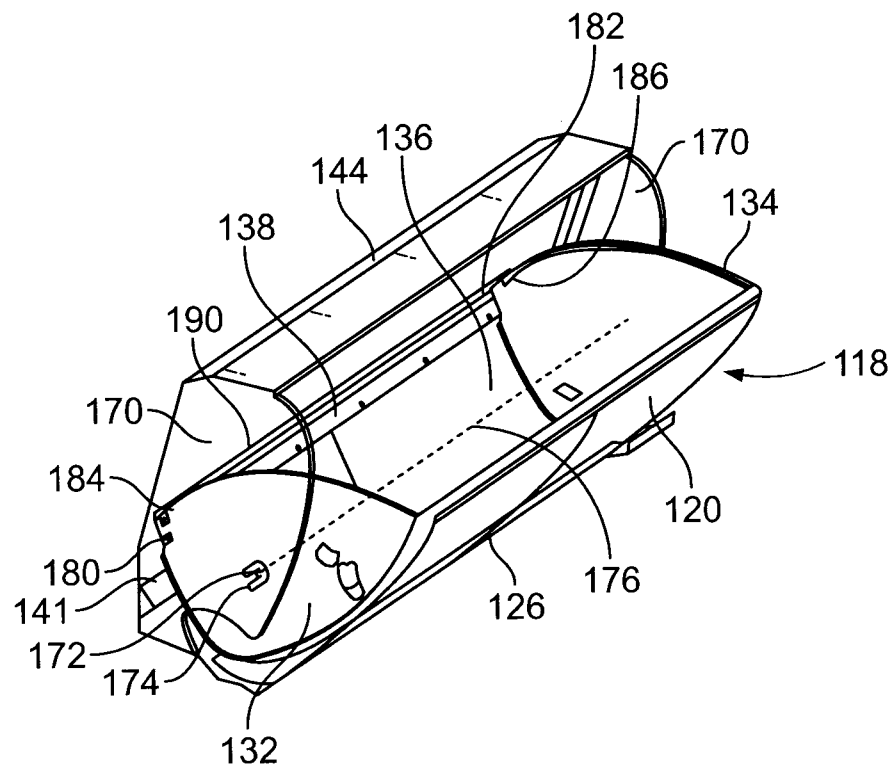


FIG. 9

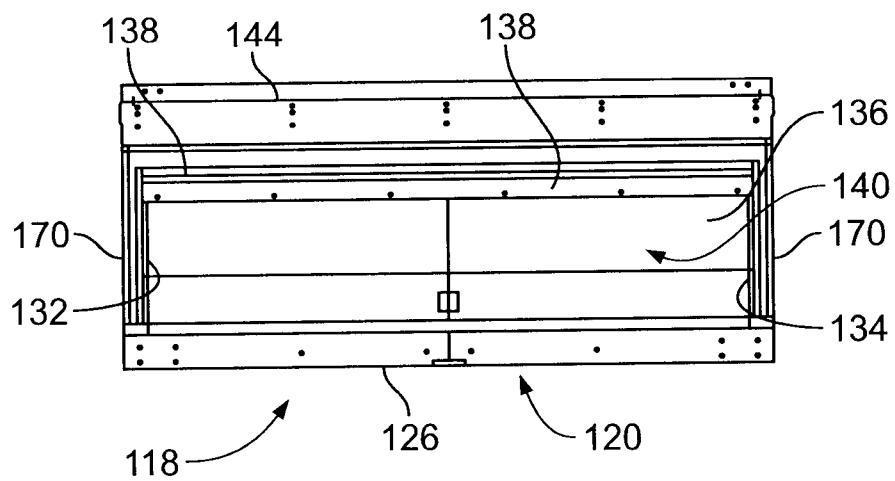


FIG. 10

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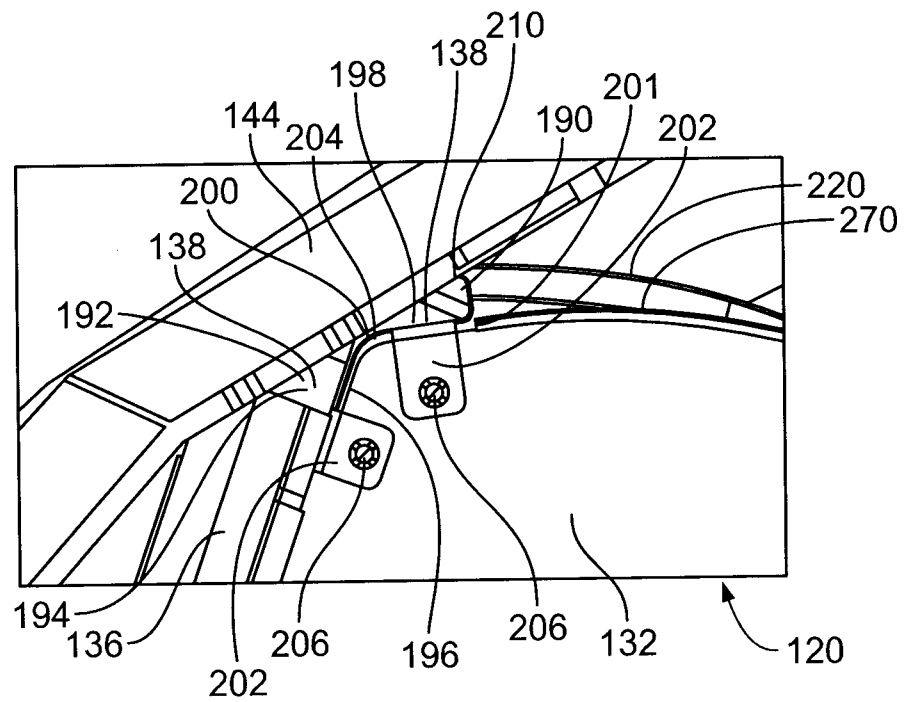


FIG. 11

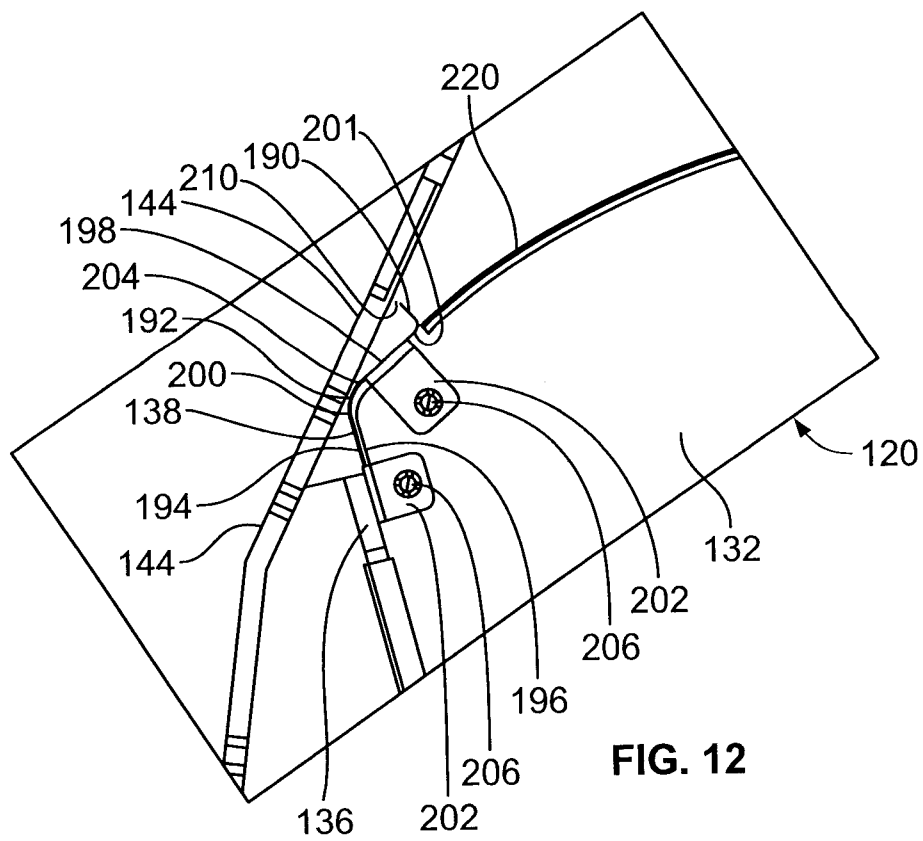


FIG. 12

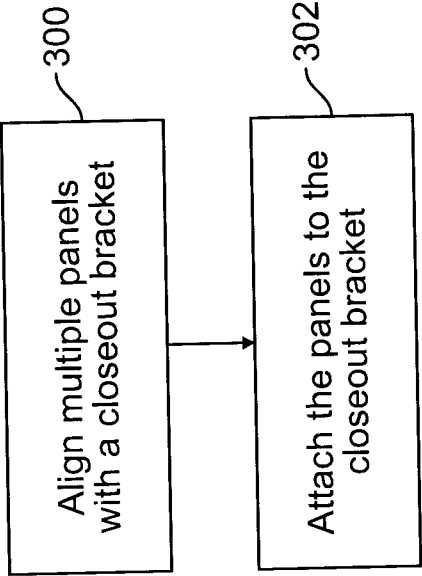


FIG. 13

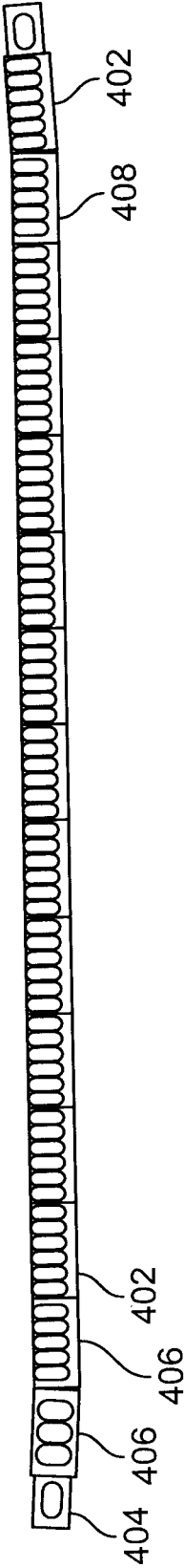
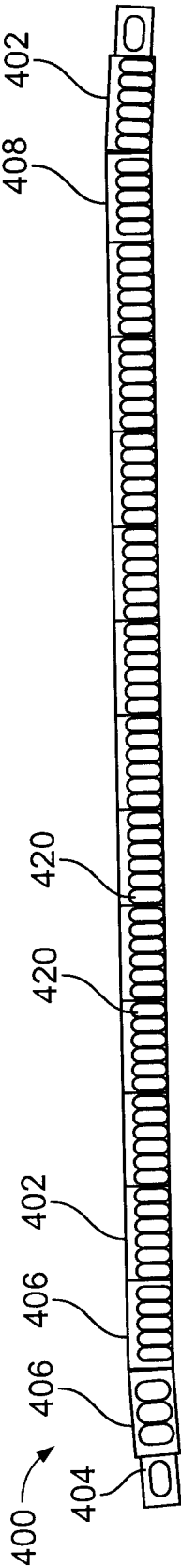


FIG. 14

