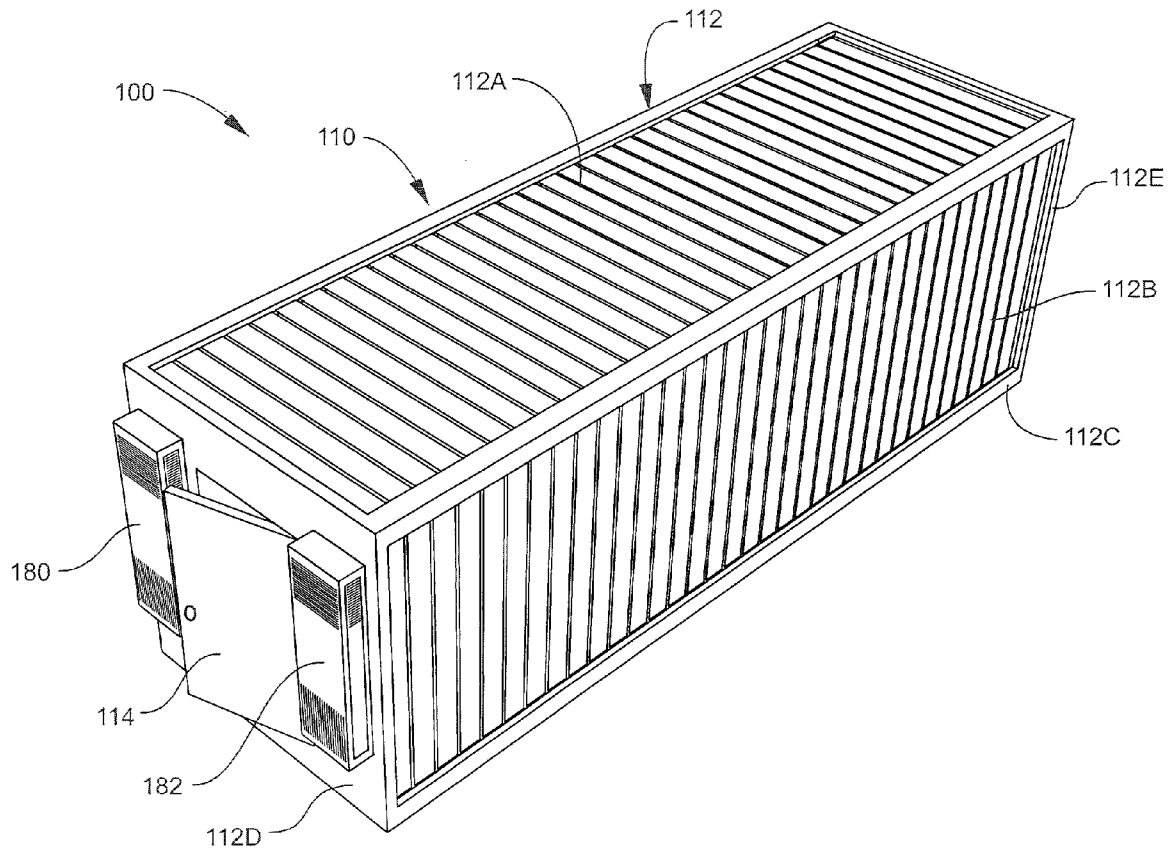




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(19) **United States**(12) **Patent Application Publication**
Mandarino(10) **Pub. No.: US 2012/0085109 A1**(43) **Pub. Date: Apr. 12, 2012**(54) **CONTAINED UPS SYSTEM WITH
TEMPERATURE CONTROL**(52) **U.S. Cl. 62/89; 62/186**(75) **Inventor: Angelo Louis Mandarino,**
Louisburg, NC (US)(57) **ABSTRACT**(73) **Assignee: Eaton Corporation**(21) **Appl. No.: 13/016,487**(22) **Filed: Jan. 28, 2011****Related U.S. Application Data**(60) **Provisional application No. 61/390,807, filed on Oct.
7, 2010.****Publication Classification**(51) **Int. Cl.**
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F25D 17/04 (2006.01)

An uninterruptible power supply (UPS) system includes an enclosure, a floor system, a UPS, and at least one air conditioning unit. The enclosure defines an interior chamber. The floor system is disposed in the interior chamber. The floor system includes a floor that defines within the interior chamber a main compartment above the floor and a plenum below the floor. The at least one battery is disposed in the plenum. The UPS is disposed in the main compartment and is electrically connected to the at least one battery. The at least one air conditioning unit is operable to generate a first conditioned air flow through the main compartment and a second conditioned air flow through the plenum such that the main compartment is maintained at a first temperature and the plenum is maintained at a second temperature different from the first.



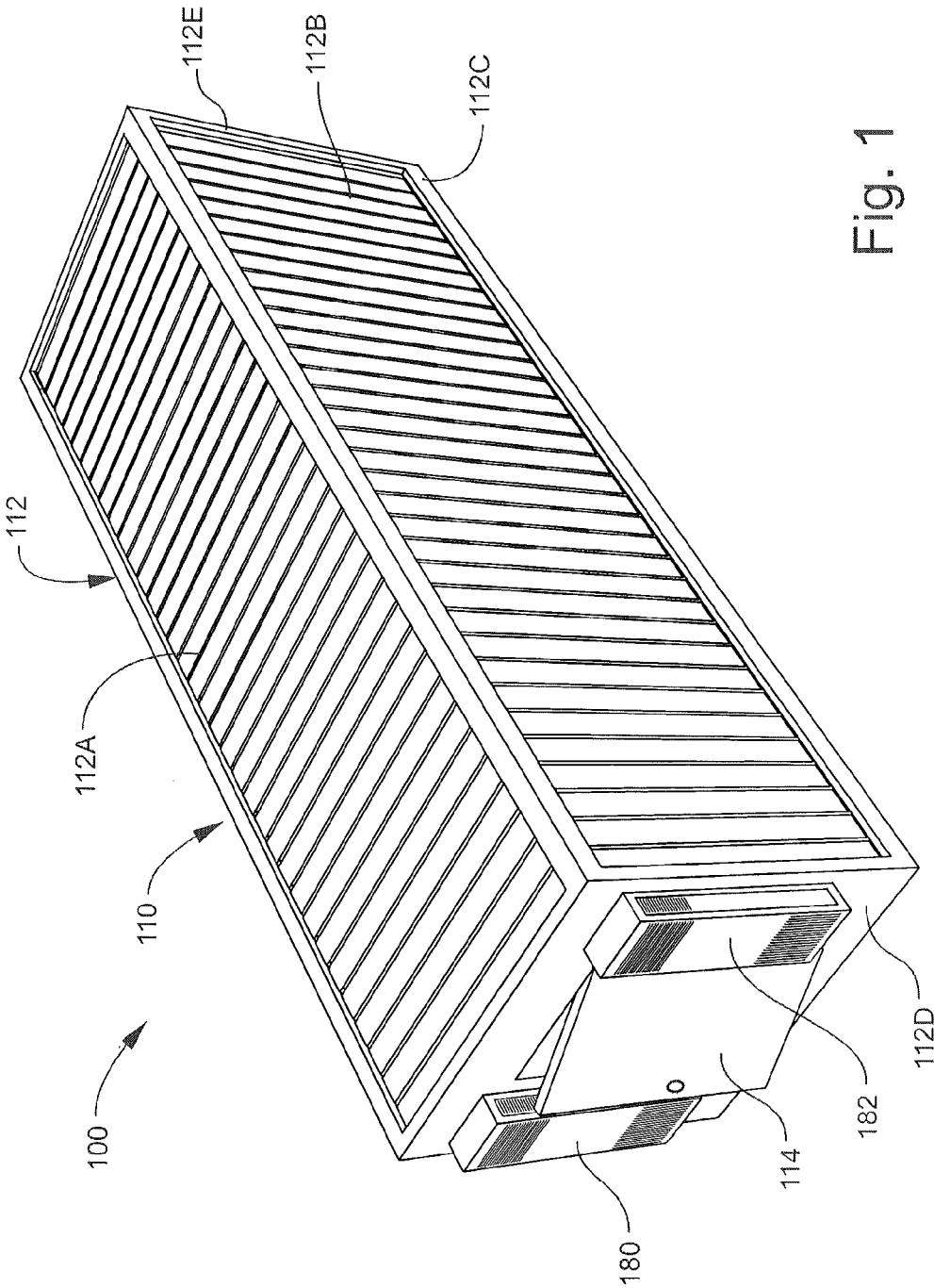
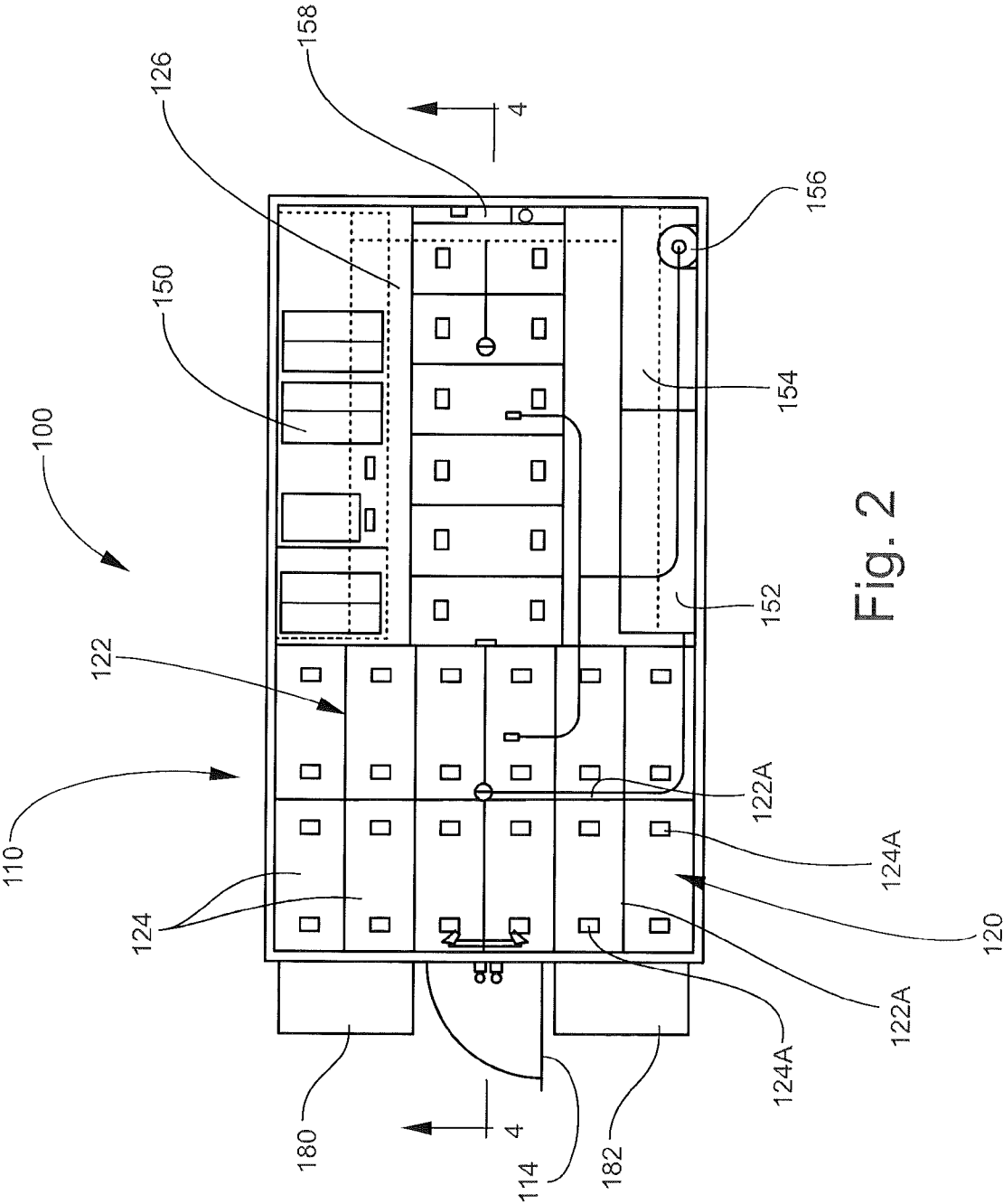


Fig. 1



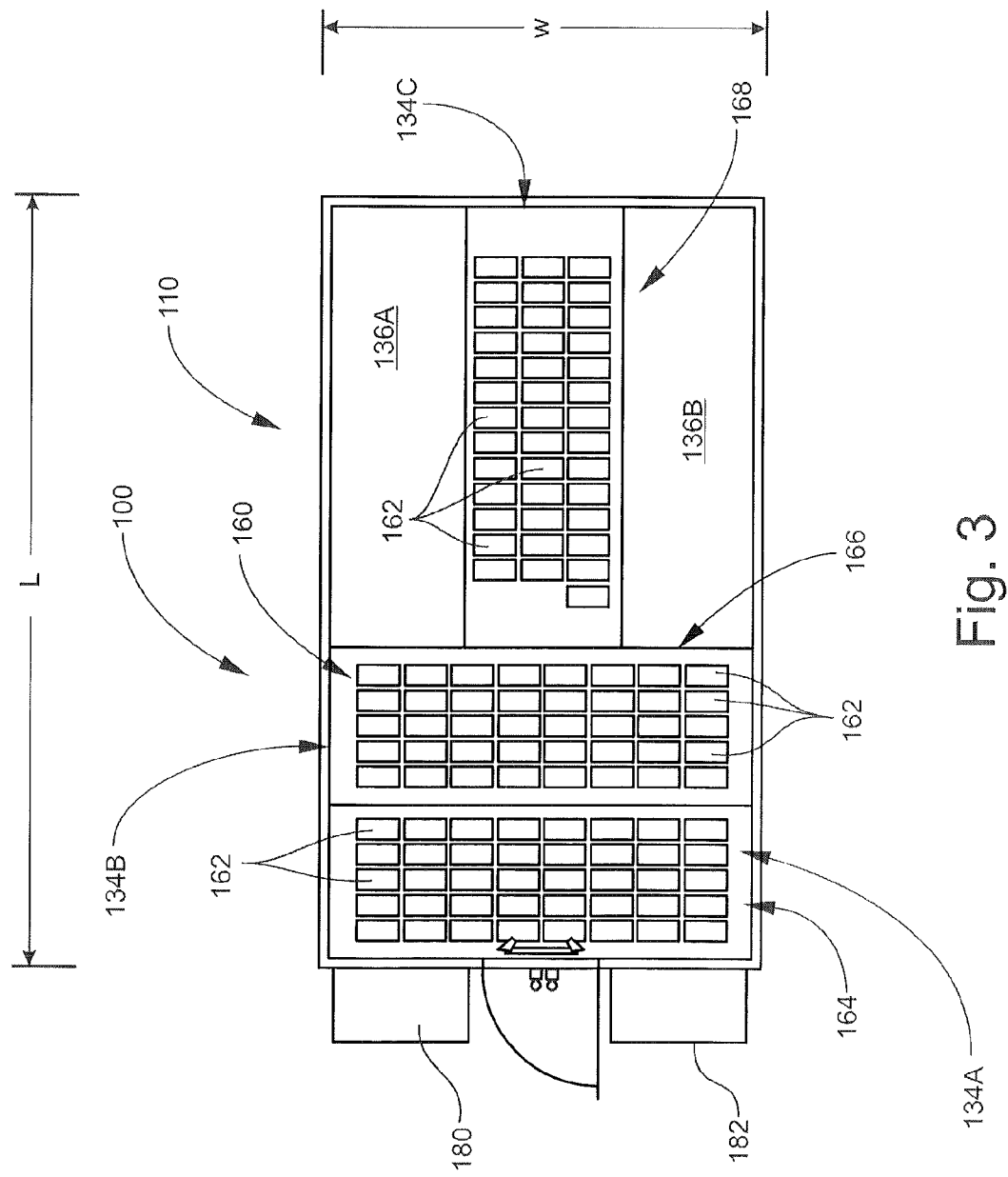


Fig. 3

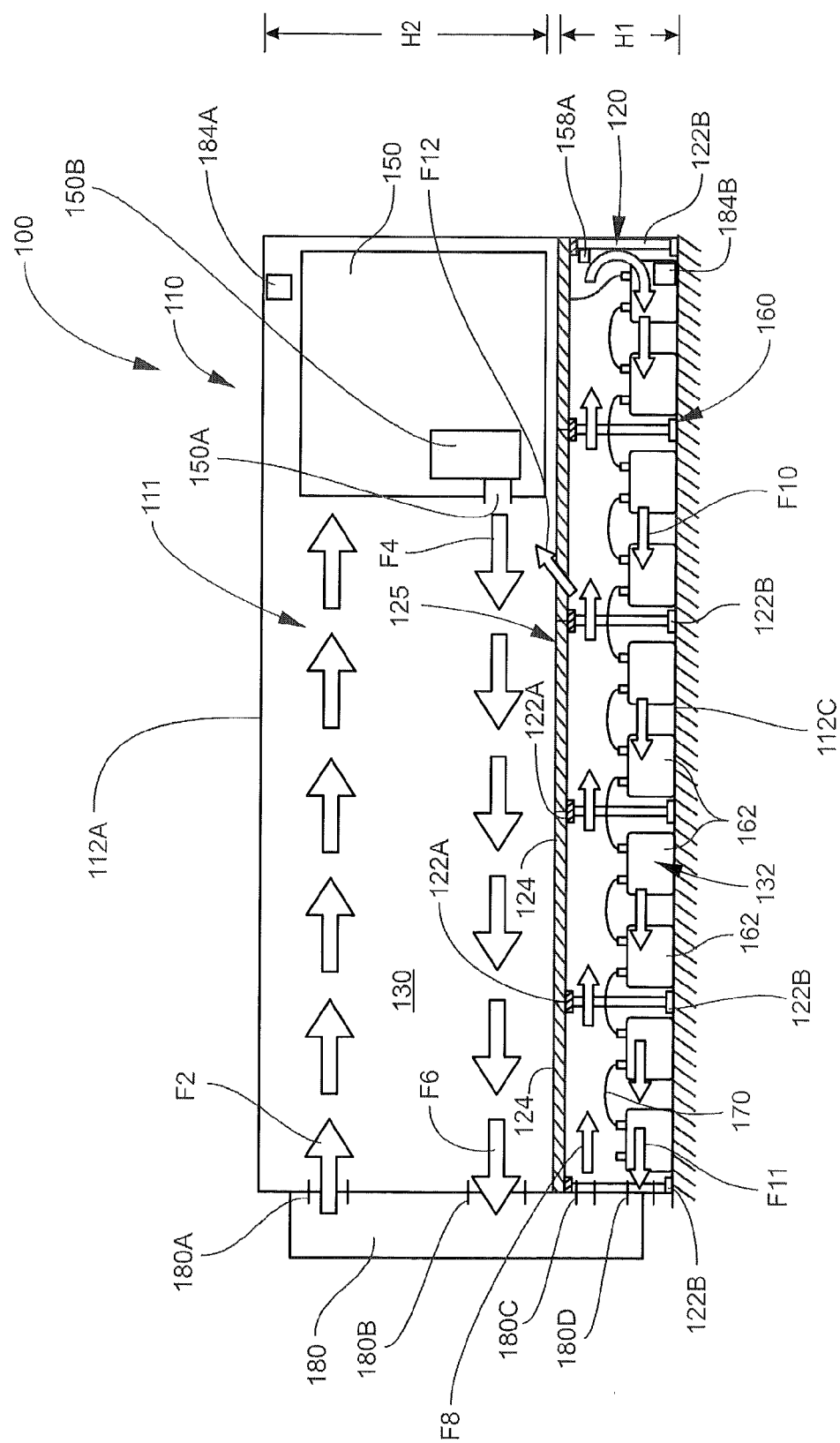


Fig. 4

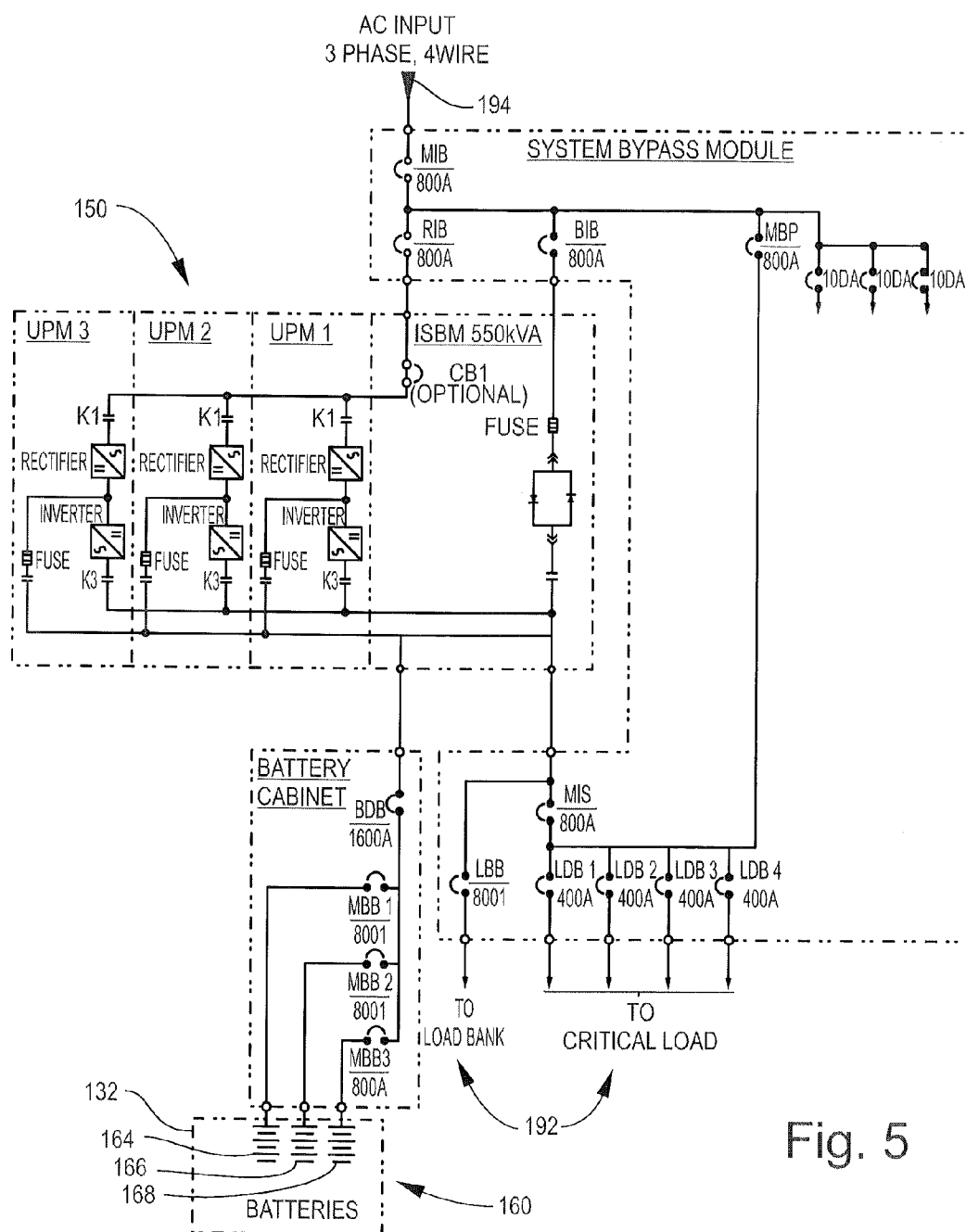


Fig. 5

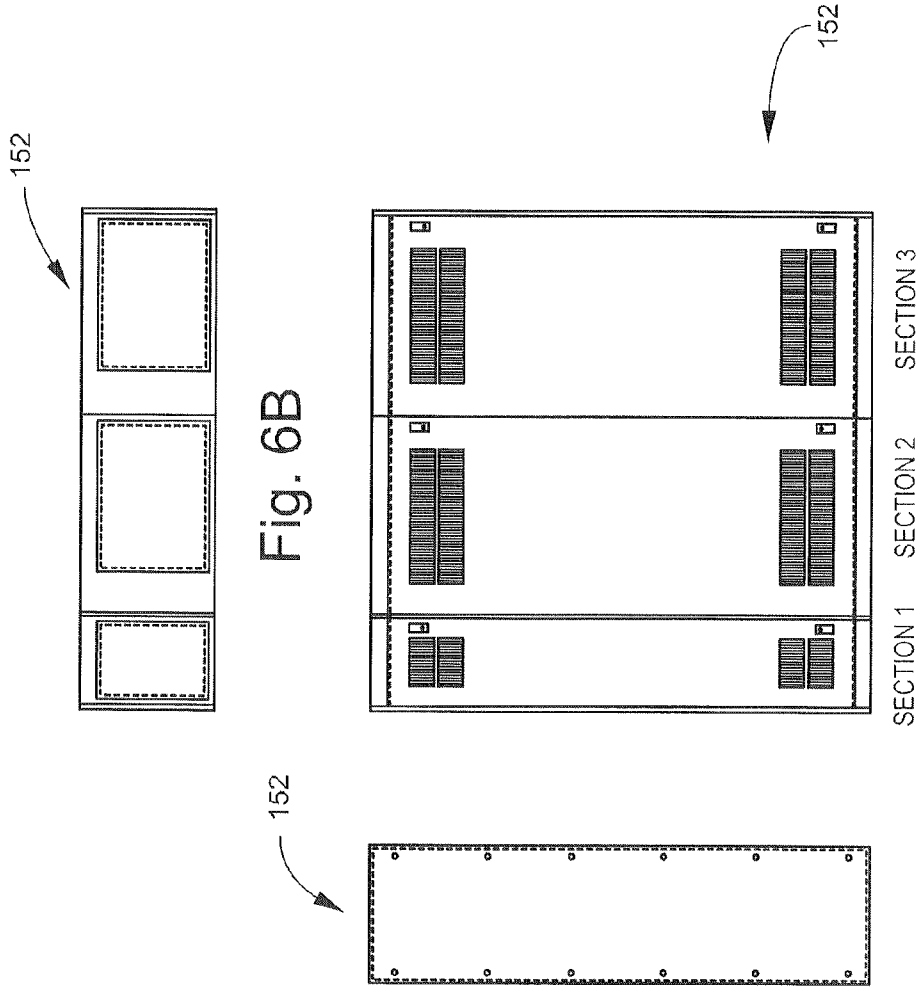
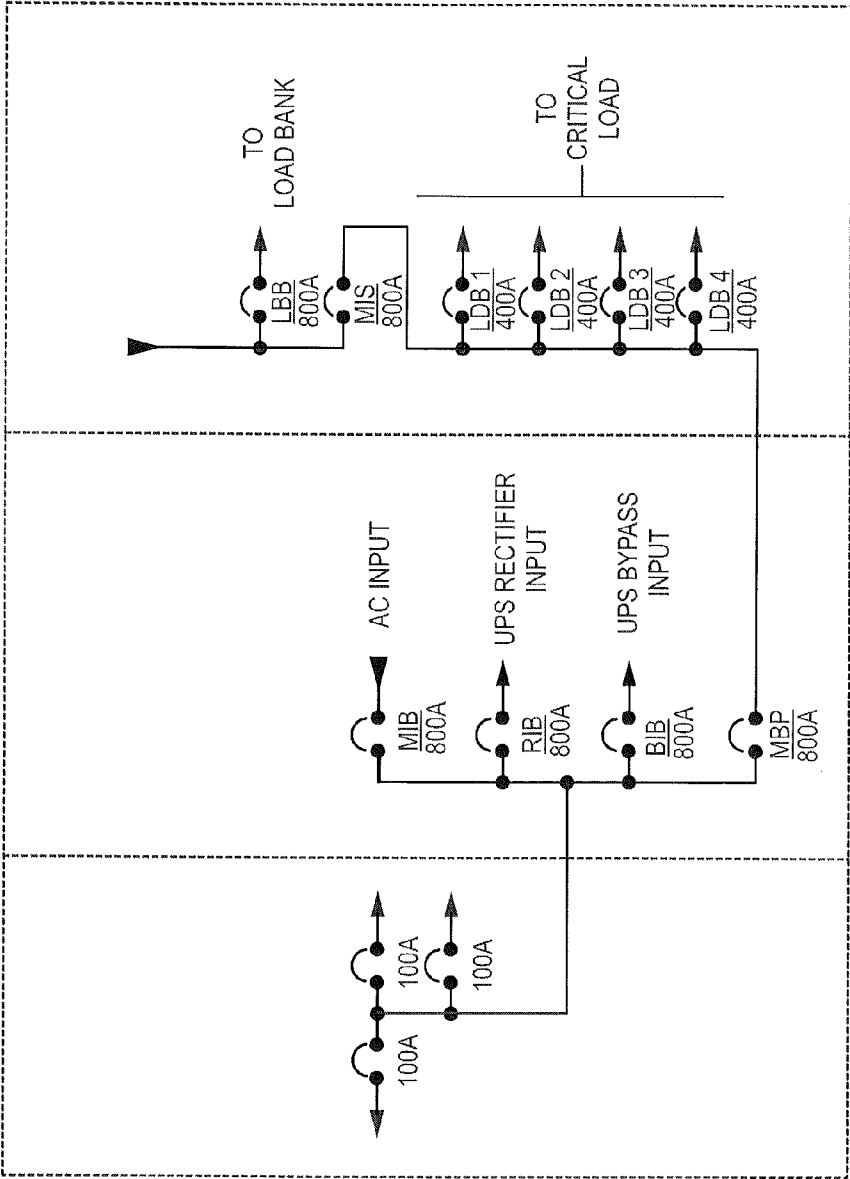


Fig. 6A

Fig. 6B

Fig. 6C



SECTION 3

SECTION 2

SECTION 1

Fig. 6D

152

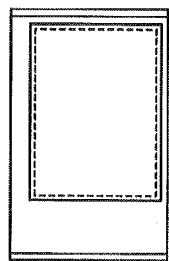


Fig. 7B

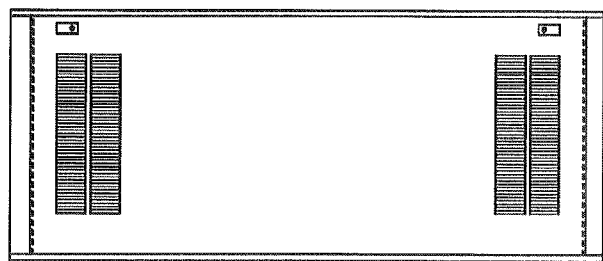


Fig. 7A

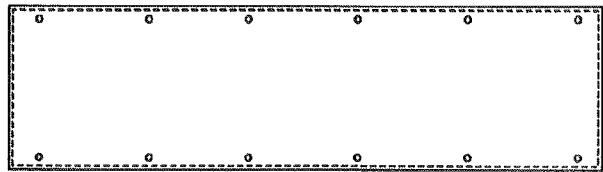


Fig. 7C

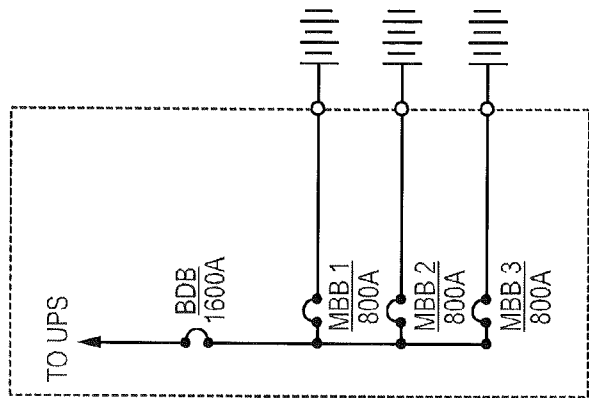


Fig. 7D

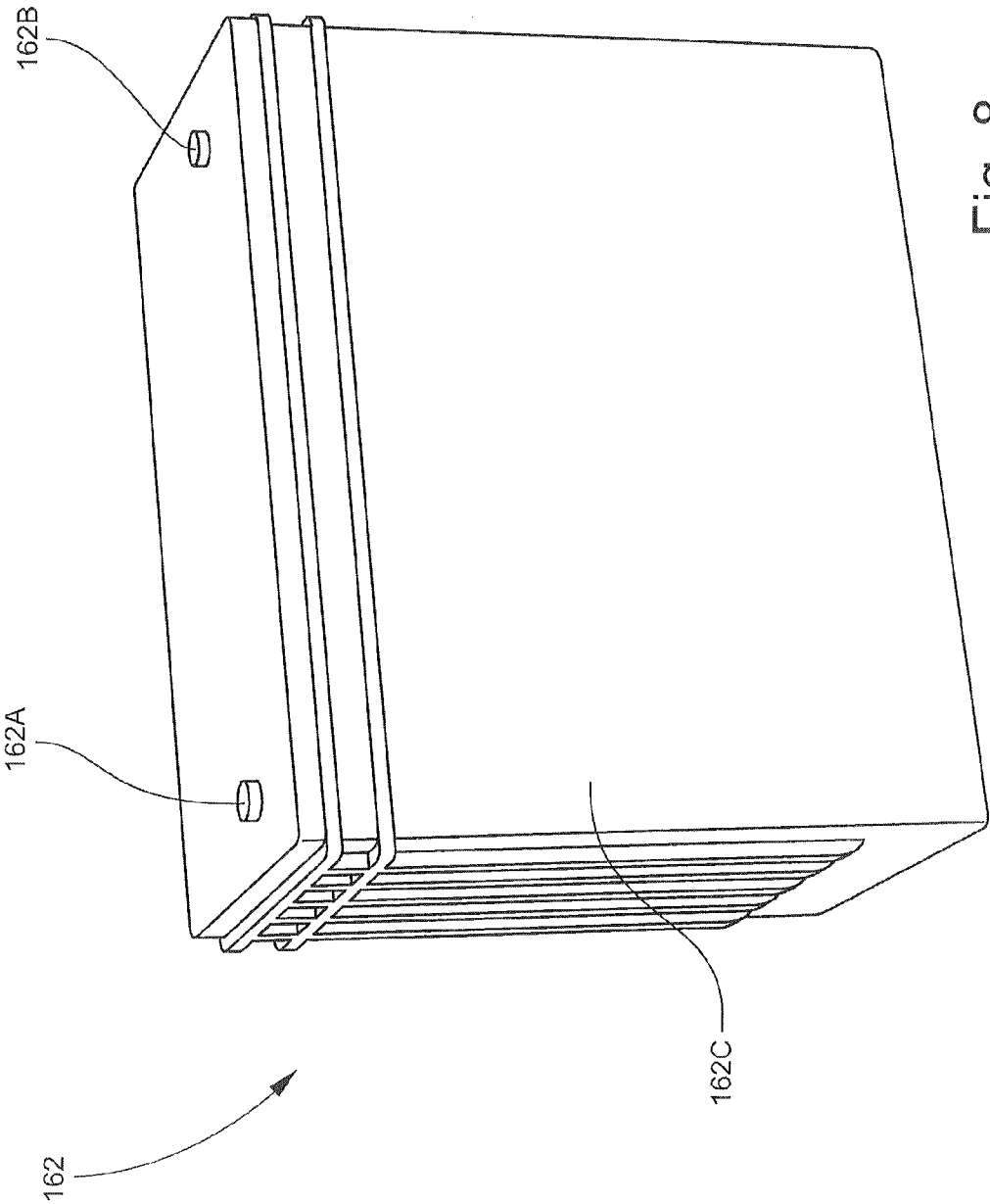
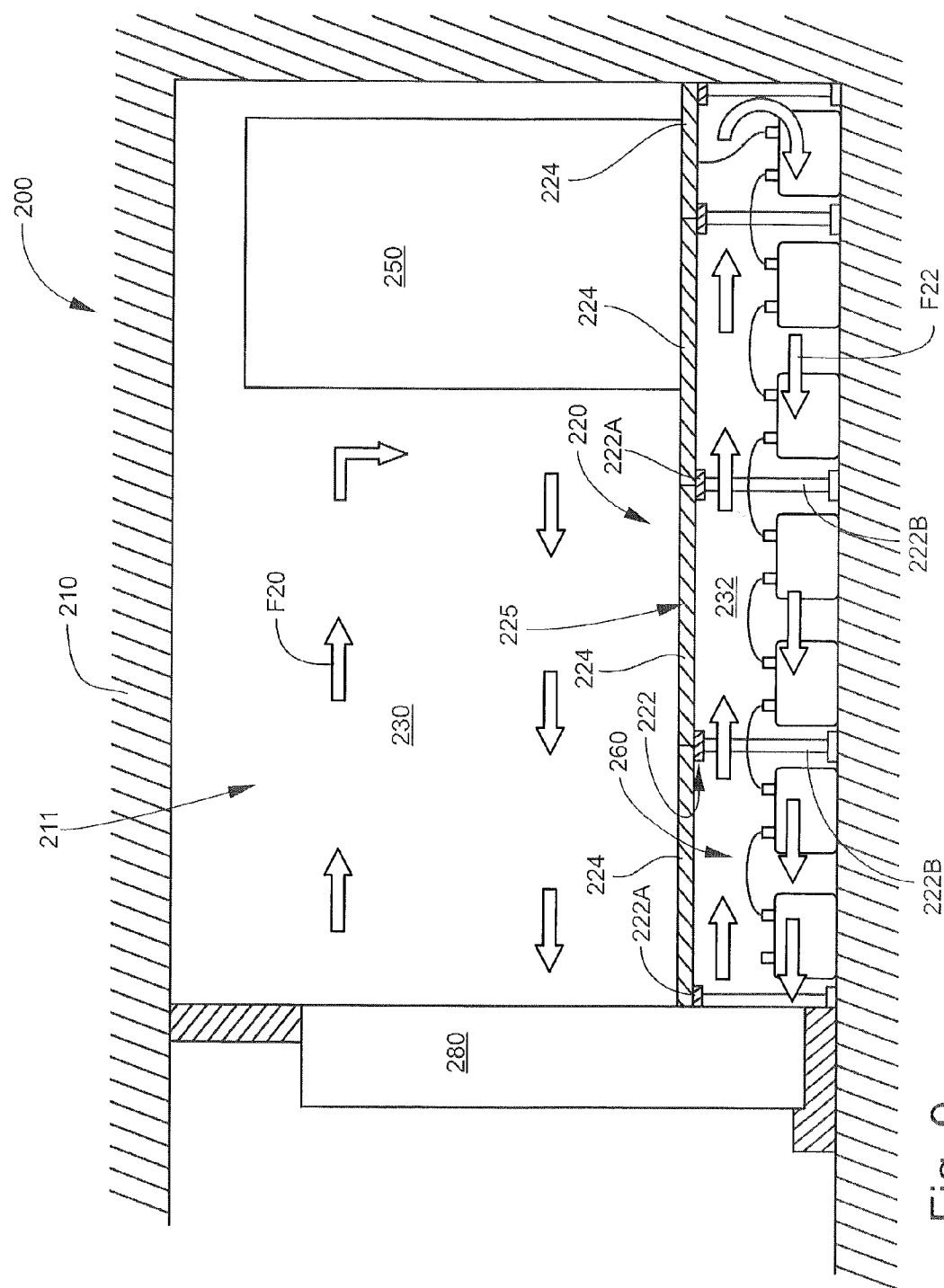


Fig. 8



CONTAINED UPS SYSTEM WITH TEMPERATURE CONTROL

RELATED APPLICATIONS

[0001] This application claims the benefit of and priority from U.S. Provisional Patent Application No. 61/390,807, filed Oct. 7, 2010, the disclosure of which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to uninterruptible power supply (UPS) systems and, more particularly, to contained UPS systems.

BACKGROUND OF THE INVENTION

[0003] Uninterruptible power supply (UPS) systems are commonly used to provide emergency backup or auxiliary power to electronic equipment that may enable critical functions (e.g., computer systems, telecommunications systems and medical equipment). A UPS system may include various equipment such as one or more UPS modules, protective switchboards and the like (hereinafter, "UPS equipment") as well as one or more energy storage batteries, housed together in a chamber of a room or container. It is desirable to maintain the batteries at a fixed temperature of 77° F. Therefore, even though the UPS equipment can tolerate higher temperatures, it is necessary to cool the chamber to a temperature in the range suitable for the batteries.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is a front perspective view of a self-contained UPS system according to embodiments of the present invention.

[0005] FIG. 2 is a top plan view of the UPS system of FIG. 1 with a roof panel thereof removed.

[0006] FIG. 3 is a top plan view of the UPS system of FIG. 1 with a floor and overlying components removed to reveal the contents below the floor.

[0007] FIG. 4 is a schematic cross-sectioned view of the UPS system of FIG. 1 taken along the line 4-4 of FIG. 2.

[0008] FIG. 5 is a schematic electrical diagram representing the UPS system of FIG. 1.

[0009] FIGS. 6A-6D are views of an A/C protective switchboard forming a part of the UPS system of FIG. 1.

[0010] FIGS. 7A-7D are views of a DC protective switchboard forming a part of the UPS system of FIG. 1.

[0011] FIG. 8 is a top perspective view of an exemplary battery forming a part of the UPS system of FIG. 1.

[0012] FIG. 9 is a schematic, cross-sectional view of a UPS system according to further embodiments of the present invention.

SUMMARY OF THE INVENTION

[0013] According to embodiments of the present invention, an uninterruptible power supply (UPS) system includes an enclosure, a floor system, a UPS, and at least one air conditioning unit. The enclosure defines an interior chamber. The floor system is disposed in the interior chamber. The floor system includes a floor that defines within the interior chamber a main compartment above the floor and a plenum below the floor. The at least one battery is disposed in the plenum. The UPS is disposed in the main compartment and is electrically

connected to the at least one battery. The at least one air conditioning unit is operable to generate a first conditioned air flow through the main compartment and a second conditioned air flow through the plenum such that the main compartment is maintained at a first temperature and the plenum is maintained at a second temperature different from the first.

[0014] In some embodiments, the at least one air conditioning unit generates and forces a first supply air flow into the main compartment and generates and forces a second supply air flow into the plenum, and the second supply air flow is cooler than the first supply air flow.

[0015] According to some embodiments, the second temperature is at least 8° C. less than the first temperature.

[0016] In some embodiments, the first temperature is in the range of from about 30° C. to 35° C., and the second temperature is in the range of from about 22° C. to 27° C.

[0017] In some embodiments, the second conditioned air flow is a circulating air flow that originates at the at least one air conditioning unit and returns to the at least one air conditioning unit.

[0018] According to some embodiments, at least a portion of the second conditioning air flow is directed from the plenum into the main compartment. In some embodiments, the redirected portion of the second conditioning air flow is directed to an intake port of a integrated cooling system forming a part of the UPS.

[0019] According to some embodiments, the volume of the plenum is less than the volume of the main compartment.

[0020] In some embodiments, the plenum is separated from the main compartment by a floor, the floor includes at least one floor panel, and the at least one floor panel is removable to permit access to the at least one battery from the main compartment.

[0021] The at least one battery may include a plurality of batteries electrically connected to form a battery string in the plenum.

[0022] In some embodiments, the enclosure includes a mobile container.

[0023] According to method embodiments of the present invention, a method for providing an uninterruptible power supply includes providing an uninterruptible power supply (UPS) system including: an enclosure defining an interior chamber; a floor system in the interior chamber, the floor system including a floor that defines within the interior chamber a main compartment above the floor and a plenum below the floor; at least one battery disposed in the plenum; a UPS disposed in the main compartment and electrically connected to the at least one battery; and at least one air conditioning unit. The method further includes operating the at least one air conditioning unit to generate a first conditioned air flow through the main compartment and a second conditioned air flow through the plenum such that the main compartment is maintained at a first temperature and the plenum is maintained at a second temperature different from the first.

[0024] In some embodiments, the method includes generating and forcing a first supply air flow into the main compartment and generating and forcing a second supply air flow into the plenum using the at least one air conditioning unit, wherein the second supply air flow is cooler than the first supply air flow.

[0025] According to some embodiments, the second temperature is at least 8° C. less than the first temperature.

[0026] According to some embodiments, the first temperature is in the range of from about 30° C. to 35° C., and the second temperature is in the range of from about 22° C. to 27° C.

[0027] In some embodiments, the second conditioned air flow is a circulating air flow that originates at the at least one air conditioning unit and returns to the at least one air conditioning unit.

[0028] According to some embodiments, the method includes directing at least a portion of the second conditioning air flow from the plenum into the main compartment. The method may further include directing the redirected portion of the second conditioning air flow to an intake port of a integrated cooling system forming a part of the UPS.

[0029] In some embodiments, the volume of the plenum is less than the volume of the main compartment.

[0030] According to some embodiments, the plenum is separated from the main compartment by a floor, the floor includes at least one floor panel, and the method includes removing the at least one floor panel to access the at least one battery from the main compartment.

[0031] Further features, advantages and details of the present invention will be appreciated by those of ordinary skill in the art from a reading of the figures and the detailed description of the embodiments that follow, such description being merely illustrative of the present invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0032] The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which illustrative embodiments of the invention are shown. In the drawings, the relative sizes of regions or features may be exaggerated for clarity. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

[0033] It will be understood that when an element is referred to as being “coupled” or “connected” to another element, it can be directly coupled or connected to the other element or intervening elements may also be present. In contrast, when an element is referred to as being “directly coupled” or “directly connected” to another element, there are no intervening elements present. Like numbers refer to like elements throughout. As used herein the term “and/or” includes any and all combinations of one or more of the associated listed items.

[0034] In addition, spatially relative terms, such as “under”, “below”, “lower”, “over”, “upper” and the like, may be used herein for ease of description to describe one element or feature’s relationship to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as “under” or “beneath” other elements or features would then be oriented “over” the other elements or features. Thus, the exemplary term “under” can encompass both an orientation of over and under. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

[0035] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms “a”, “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. As used herein the expression “and/or” includes any and all combinations of one or more of the associated listed items.

[0036] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0037] With reference to FIGS. 1-8, a self-contained UPS system **100** according to embodiments of the present invention is shown therein. The UPS system **100** includes an enclosure or container **110** (FIG. 1), a floor system **120** (FIGS. 2-4), an uninterruptible power supply (UPS) **150** (FIGS. 2, 4 and 5), an A/C protection switchboard **152** (FIGS. 2 and 6A-6D), a DC protection switchboard **154** (FIGS. 2 and 7A-7D), a fire suppression system **156** (FIG. 2), a battery subsystem **160** (FIGS. 2-5), a first air conditioning (HVAC) unit **180**, and a second HVAC unit **182**.

[0038] Turning to the container **110** in more detail, the container includes a shell **112** that may be formed of substantially rigid panels. According to some embodiments, the shell **112** is formed of metal (e.g., steel) panels. The shell **112** includes a roof panel **112A**, opposed side panels **112B**, a bottom panel **112C**, a front panel **112D**, a rear end panel **112E**, and an access door **114**. Other container configurations may be employed. The shell **112** defines an interior chamber **111**.

[0039] With reference to FIGS. 2-4, the floor system **120** includes a support subframe **122** (FIG. 2) supporting a plurality of individual removable floor panels **124**. The floor subframe **122** includes a network or grid of horizontally extending floor joists **122A** and a plurality of legs, pedestals or stanchions **122B** mounted on the bottom panel **112C** and supporting the joists **122A**. The floor panels **124** rest on the joists **122A** and define a platform or floor **125** (FIG. 4) that is raised above the bottom panel **112C**. The floor **125** also includes a perforated or louvered panel **126** (FIG. 2) mounted on the subframe **122**.

[0040] The subframe **122** and the floor panels **124**, **126** may be formed of any suitable material. According to some embodiments, the subframe **122** and the floor panels **124**, **126** are formed of metal (e.g., steel). The floor panels **124** may be provided with handholds, handles or other suitable features **124A** to assist in removing the floor panels **124** from the subframe **122**.

[0041] The floor system **120** defines or divides the chamber **111** into a main compartment **130** above the floor **125** and a battery compartment or plenum **132** (FIG. 4) below the floor **125**. The plenum **132** includes a first battery storage zone

134A, a second battery storage zone **134B**, a third battery storage zone **134C**, and a pair of opposed equipment zones **136A**, **136B** (FIG. 3)

[0042] The battery subsystem **160** includes a plurality of batteries or jars **162** (as shown, 120 batteries; FIG. 8). Each battery **162** may have a positive terminal **162A** and a negative terminal **162B** and a battery cell contained in a housing **162C**. The batteries **162** are grouped in groups of forty as a first battery string **168** (FIG. 3). In each battery string, the batteries **162** thereof may be electrically connected to one another in series by cabling **170**. Each battery string **164**, **166**, **168** is also electrically connected to the UPS **150** by cabling.

[0043] The batteries **162** may be of any suitable type and construction. According to some embodiments, the batteries **162** are sealed recombinant technology batteries. Suitable batteries for the batteries **162** may include the Eaton 12V 500 W (PWHR12500SUFR) battery available from Eaton Corporation.

[0044] Each of the battery strings **164**, **166** and **168** is disposed in a respective one of the battery storage zones **134A**, **134B**, and **134C** and interposed between the floor **125** and the bottom panel **112C**. The equipment zones **136A**, **136B** are free of batteries, but may be used to store other equipment or supplies.

[0045] The UPS **150**, the switchboards **152**, **154** and the other associated equipment may be disposed in the main compartment **130** and supported by the floor **125** and/or a panel **112A**, **112B**, **112D**, **112E** of the shell **112**. According to some embodiments, none of the floor panels **124** overlying a battery string **162**, **164**, **166** support equipment in the main compartment **130**. This may ensure that the batteries **162** can all be accessed directly by removing the overlying floor panel **124** without having to move the equipment.

[0046] The HVAC units **180**, **182** are mounted on the front end panel **112D** and each fluidly communicate with the interior chamber **111**. More particularly, each of the HVAC units **180**, **182** has or is fluidly connected to a main supply port **180A**, a main return port **180B**, a plenum supply port **180C**, and a plenum return port **180D** (FIG. 4). With reference to FIG. 4, each of the HVAC units **180**, **182** is operative to generate and force a supply flow **F2** of conditioned air into the main compartment **130** through the port **180A**, to draw in a return flow **F6** of air from the main compartment **130** through the port **180B**, to generate and force a supply flow **F8** of conditioned air into the plenum **132** through the port **180C**, and to draw in a return flow **F6** of air from the plenum **132** through the port **180D**. The UPS system **100** may be configured such that the main supply flow **F2** becomes a circulating flow **F4** that thereafter becomes the main return flow **F6**. Likewise, the UPS system **100** may be configured such that the plenum supply flow **F8** becomes a circulating flow **F10** that thereafter becomes the plenum return flow **F11**. A portion **F12** of the plenum supply flow **F8** may exit the plenum **132** through the floor panel **126** into the main compartment **130**. According to some embodiments, the floor panel **126** is located adjacent an intake **150A** of the UPS **150** so that the diverted flow **F12** is drawn in by an on-board cooling system **150B** of the UPS **150**.

[0047] Suitable HVAC units for the HVAC units **180**, **182** may include the wall mount six ton air conditioner available from Bard.

[0048] The electrical circuit of the UPS system **100** can be configured in any suitable manner and an exemplary UPS circuit **190** is illustrated in FIG. 5. Suitable UPSs for the UPS

150 include the Eaton 9395 UPS available from Eaton Corporation. The battery subsystem **160** and desired load equipment **192** are each electrically connected to the UPS circuit **190**. The load equipment **192** may be, under normal operation, supplied by a line power supply **194**. The line power can be routed to the load equipment **192** under the control of and/or via a power supply management controller of the UPS **150**. In the event of a loss of power from the line power supply **194**, the power supply management controller can direct power from the battery subsystem **160** (and, more particularly, the batteries **162**) to the load equipment **192** to provide a backup or emergency power supply that enables continued operation of the load equipment **192**. The battery subsystem **160** and the UPS **150** may function in the same manner as known UPSs, for example, and it will be appreciated that other circuit designs may be employed.

[0049] The A/C protection switchboard **152** may be of any suitable construction. FIGS. 6A-6D show a front view (FIG. 6A), top view (FIG. 6B), side view (FIG. 6C), and schematic electrical diagram (FIG. 6D) representing an exemplary A/C protection switchboard **152**.

[0050] The DC protection switchboard **152** may be of any suitable construction. FIGS. 7A-7D show a front view (FIG. 7A), top view (FIG. 7B), side view (FIG. 7C), and schematic electrical diagram (FIG. 7D) representing an exemplary DC protection switchboard **154**.

[0051] In use, the HVAC units **180**, **182** are each operated to generate dual zone cooling. In particular, each HVAC unit **180**, **182** generates upper or main zone cooling (i.e., flows **F2**, **F4** and **F6**) and lower or plenum zone cooling (i.e., flows **F8**, **F10**, **F12** and **F14**). The main zone (i.e., main compartment **130**) is cooled to and maintained at a main temperature T_m , in a first temperature range that is desired for the equipment housed in the main compartment **130**. The plenum zone (i.e., the plenum **132**) is cooled and maintained at a plenum temperature T_p in a second temperature range that is desired for the batteries **162** and that is different from the main temperature T_m . According to some embodiments, the plenum temperature T_p is less than the main temperature T_m . According to some embodiments, the plenum temperature T_p is in the range of from about 22 to 27° C. According to some embodiments, the main temperature T_m is in the range of from about 30 to 35° C. According to some embodiments, the plenum temperature T_p is at least 8° C. less than the main temperature T_m .

[0052] The HVAC units **180**, **182** can automatically adjust the temperature of the conditioned air flows **F2** and **F8** supplied to the chambers **130** and **132** as needed to properly maintain the desired temperatures. Temperature sensors **184A** and **184B** (FIG. 4) may be provided to separately detect the ambient temperatures of the main compartment **130** and the plenum **132**, respectively, to provide feedback for control of the HVAC units **180**, **182**.

[0053] By separately controlling the temperatures of the compartments **130** and **132**, the UPS system **100** can maintain the batteries **162** in a preferred range for the batteries **162** without having to maintain all of the UPS equipment at such a reduced temperature. As a result, adequate cooling can be provided for both the batteries **162** and the UPS equipment **150**, **152**, **154** with improved efficiency in energy consumption for air conditioning. Maintaining the batteries in the preferred temperature range can significantly extend the battery life. Moreover, efficient use is made of the space available in the interior chamber **111**.

[0054] According to some embodiments, the spacings between the joists 122A are selected to maximize or optimize the permitted packing density of the batteries 162.

[0055] While the flows of conditioned air through the main compartment 130 and the plenum 132 have been described and illustrated as following generally circular or looped flow paths originating and terminating at the HVAC units 180, 182, other air flow management configurations may be employed. For example, an air return port can be provided remotely from the HVAC unit (e.g., at the end of the plenum 132 opposite the HVAC unit 180) and directed back to the return port 180D (e.g., via a connecting duct). Apparatus may be provided for selectively distributing the supplied air flows, such as a manifold or ducts with supply ports distributed along the length and/or width of the plenum 132. Air flow through the plenum 132 may be augmented by one or more powered fans.

[0056] According to some embodiments, the height H1 (FIG. 4) of the plenum 132 is between about 20 inches and 35 inches. According to some embodiments, the height H1 is between about 8 inches and 24 inches greater than the corresponding height of the batteries 162. According to some embodiments, the height H2 (FIG. 4) of the main compartment 130 is between about 10.5 feet and 13 feet. According to some embodiments, the compartments 130 and 132 each have a length L (FIG. 3) in the range from about 19 feet to 24 feet and a width (FIG. 3) in the range of from about 11 feet to 13 feet.

[0057] According to some embodiments, the volume of the plenum 132 is less than the volume of the main compartment 130.

[0058] According to some embodiments, the floor 125 is metal and is grounded through the shell 112 to serve as a ground plane.

[0059] The H₂ detection system 158 includes an H₂ sensor 158A (FIG. 4), which may be located in the plenum 132. The H₂ sensor 158A detects gas and, in the event a potentially dangerous concentration of H₂ gas is detected, the H₂ detection system 158 will automatically disconnect the batteries 162 and activate a fan to purge the plenum 132.

[0060] According to some embodiments, the UPS system 100 is configured such that upon failure of one of the HVAC units 180, 182, the UPS 150 will enter a high efficiency-mode.

[0061] While the temperature maintenance has been discussed hereinabove in terms of cooling, the HVAC units 180, 182 or other air conditioning units may be used to heat the compartments 130, 132 as needed to maintain the temperatures T_m, T_p in the target ranges.

[0062] While the HVAC units 180, 182 have been described herein as dual zone units, alternative units or configurations may be employed. For example, separate, dedicated HVAC units may be provided for each of the main compartment 130 and the plenum 132. The compartments 130 and 132 may be supplied with conditioned air from a common source but with an intervening air handler or damper that selectively controls the mass flow rates of the air flows supplied to the respective compartments 130, 132.

[0063] According to some embodiments, the UPS system 100 is mobile or semi-mobile. The container 110 may be sized and configured to permit and enable highway transport on a truck. According to some embodiments, the weight of the UPS system 100 is less than 46,000 pounds.

[0064] With reference to FIG. 9, a UPS system 200 according to further embodiments is shown therein. The UPS system 200 includes a building 210 or other permanent or semi-

permanent structure defining an interior chamber 211. A floor system 220 corresponding to the floor system 120 subdivides the interior chamber 211 into a main compartment 230 and an underlying plenum 232. The floor system 220 may include a support subframe 222 (including joists 222A and legs 222B) corresponding to the support subframe 122, and removable floor panels 224 corresponding to the floor panels 124. A UPS 250 and other equipment may be housed in the main compartment 230 and supported by the floor 225. One or more HVAC units provide differential cooling (or heating) flows F20 and F22 in the main compartment 230 and the plenum 232, respectively.

[0065] The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although a few exemplary embodiments of this invention has been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention. Therefore, it is to be understood that the foregoing is illustrative of the present invention and is not to be construed as limited to the specific embodiments disclosed, and that modifications to the disclosed embodiments, as well as other embodiments, are intended to be included within the scope of the invention.

That which is claimed is:

1. An uninterruptible power supply (UPS) system comprising:
 - an enclosure defining an interior chamber;
 - a floor system in the interior chamber, the floor system including a floor that defines within the interior chamber a main compartment above the floor and a plenum below the floor;
 - at least one battery disposed in the plenum;
 - a UPS disposed in the main compartment and electrically connected to the at least one battery; and
 - at least one air conditioning unit operable to generate a first conditioned air flow through the main compartment and a second conditioned air flow through the plenum such that the main compartment is maintained at a first temperature and the plenum is maintained at a second temperature different from the first.
2. The UPS system of claim 1 wherein:
 - the at least one air conditioning unit generates and forces a first supply air flow into the main compartment and generates and forces a second supply air flow into the plenum; and
 - the second supply air flow is cooler than the first supply air flow.
3. The UPS system of claim 1 wherein the second temperature is at least 8° C. less than the first temperature.
4. The UPS system of claim 1 wherein:
 - the first temperature is in the range of from about 30° C. to 35° C.; and
 - the second temperature is in the range of from about 22° C. to 27° C.
5. The UPS system of claim 1 wherein the second conditioned air flow is a circulating air flow that originates at the at least one air conditioning unit and returns to the at least one air conditioning unit.
6. The UPS system of claim 1 wherein at least a portion of the second conditioning air flow is directed from the plenum into the main compartment.

7. The UPS system of claim 6 wherein the redirected portion of the second conditioning air flow is directed to an intake port of an integrated cooling system forming a part of the UPS.

8. The UPS system of claim 1 wherein the volume of the plenum is less than the volume of the main compartment.

9. The UPS system of claim 1 wherein:

the plenum is separated from the main compartment by a floor;

the floor includes at least one floor panel; and

the at least one floor panel is removable to permit access to the at least one battery from the main compartment.

10. The UPS system of claim 1 wherein the at least one battery includes a plurality of batteries electrically connected to form a battery string in the plenum.

11. The UPS system of claim 1 wherein the enclosure includes a mobile container.

12. A method for providing an uninterruptible power supply, the method comprising:

providing an uninterruptible power supply (UPS) system including:

an enclosure defining an interior chamber;

a floor system in the interior chamber, the floor system including a floor that defines within the interior chamber a main compartment above the floor and a plenum below the floor;

at least one battery disposed in the plenum;

a UPS disposed in the main compartment and electrically connected to the at least one battery; and

at least one air conditioning unit; and

operating the at least one air conditioning unit to generate a first conditioned air flow through the main compartment and a second conditioned air flow through the plenum such that the main compartment is maintained at a first temperature and the plenum is maintained at a second temperature different from the first.

13. The method of claim 12 including:

generating and forcing a first supply air flow into the main compartment and generating and forcing a second supply air flow into the plenum using the at least one air conditioning unit;

wherein the second supply air flow is cooler than the first supply air flow.

14. The method of claim 12 wherein the second temperature is at least 8° C. less than the first temperature.

15. The method of claim 12 wherein:

the first temperature is in the range of from about 30° C. to 35° C.; and

the second temperature is in the range of from about 22° C. to 27° C.

16. The method of claim 12 wherein the second conditioned air flow is a circulating air flow that originates at the at least one air conditioning unit and returns to the at least one air conditioning unit.

17. The method of claim 12 including directing at least a portion of the second conditioning air flow from the plenum into the main compartment.

18. The method of claim 17 including directing the redirected portion of the second conditioning air flow to an intake port of an integrated cooling system forming a part of the UPS.

19. The method of claim 12 wherein the volume of the plenum is less than the volume of the main compartment.

20. The method of claim 12 wherein:

the plenum is separated from the main compartment by a floor;

the floor includes at least one floor panel; and

the method includes removing the at least one floor panel to access the at least one battery from the main compartment.

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