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(71) Applicant: **Traeger Pellet Grills, LLC**
Salt Lake City, Utah 84106 (US)

(72) Inventors:
- **Alexander, Kevin**
  Salt Lake City, UT (US)
- **Byington, Breck**
  Bountiful, UT (US)

(74) Representative: **Grünecker Patent- und Rechtsanwälte**
PartG mbB
Leopoldstraße 4
80802 München (DE)

(54) TEMPERATURE CONTROLLED STORAGE CONTAINER AND RELATED SYSTEMS AND METHODS

(57) A portable storage container (100) including an insulated cavity (204), a power source (110), and a heating and/or cooling element (402) receiving power from the power source (110).

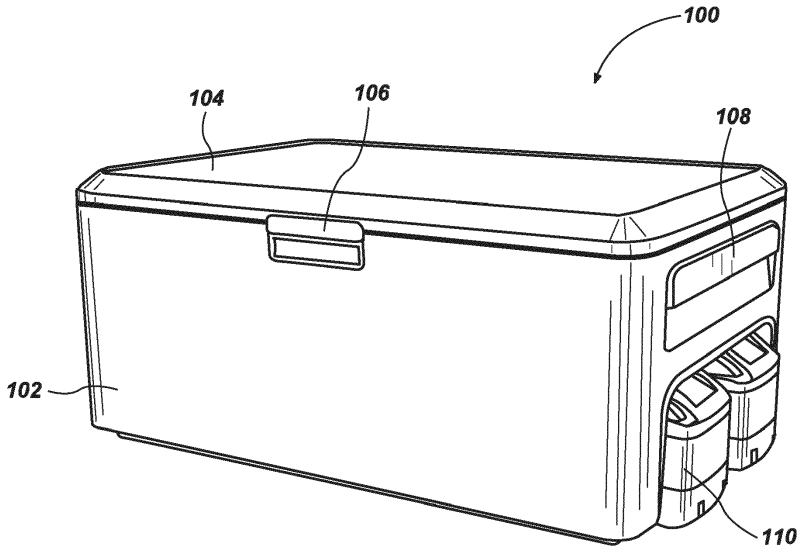

FIG. 1

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Description

PRIORITY CLAIM

[0001] This application claims the benefit under 35 U.S.C. §119(e) of U.S. Provisional Patent Application Serial No. 63/199,996, filed February 8, 2021, the disclosure of which is hereby incorporated herein in its entirety by this reference.

TECHNICAL FIELD

[0002] Embodiments of the present disclosure generally relate to storage containers. In particular, embodiments of the present disclosure relate to temperature-controlled storage containers and related systems and methods.

BACKGROUND

[0003] Personal food transportation and storage is generally accomplished by placing the food in an insulated container. The insulated container may be configured to inhibit the transfer of heat to or from the food stored therein. For example, the insulated walls of the insulated container may restrict heat transfer from the cavity formed between the insulated walls and the environment outside the insulated container. In some cases, additional items, such as ice or ice packs, may be placed therein with the food items to help maintain the temperature within the insulated container.

DISCLOSURE

[0004] Embodiments of the present disclosure may include a portable storage container. The storage container may include an insulated cavity, a power source, and a temperature control element. The temperature control element may be configured to receiving power from the power source.

[0005] Another embodiment of the present disclosure may include a food transportation system. The system may include an insulated container, a power source, a temperature control element, and a controller. The controller may include a processor, a memory device, and a non-transitory computer-readable medium storing instructions thereon. When executed by the processor, the instructions may cause the food storage system to adjust power from the power source to the temperature control element.

[0006] Another embodiment of the present disclosure may include a method of controlling an internal temperature of an insulated storage container. The method may include transmitting power to a temperature control element within a cavity of the insulated storage container. The method may further include monitoring a temperature within a cavity of the insulated storage container. The method may also include adjusting the power to the temperature control element to control the temperature within the cavity to a temperature set point.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] While the specification concludes with claims particularly pointing out and distinctly claiming embodiments of the present disclosure, the advantages of embodiments of the disclosure may be more readily ascertained from the following description of embodiments of the disclosure when read in conjunction with the accompanying drawings in which:

FIGS. 1-4 illustrate a perspective views of a storage container in accordance with an embodiment of the present disclosure; and

FIG. 5 illustrates a schematic view of the storage container of FIGS. 1-4 in accordance with an embodiment of the present disclosure.

MODE(S) FOR CARRYING OUT THE INVENTION

[0008] The illustrations presented herein are not meant to be actual views of any particular storage container or component thereof, but are merely idealized representations employed to describe illustrative embodiments. The drawings are not necessarily to scale.

[0009] As used herein, the term "substantially" in reference to a given parameter means and includes to a degree that one skilled in the art would understand that the given parameter, property, or condition is met with a small degree of variance, such as within acceptable manufacturing tolerances. For example, a parameter that is substantially met may be at least about 90% met, at least about 95% met, at least about 99% met, or even at least about 100% met.

[0010] As used herein, relational terms, such as "first," "second," "top," "bottom," *etc.,* are generally used for clarity and convenience in understanding the disclosure and accompanying drawings and do not connote or depend on any specific preference, orientation, or order, except where the context clearly indicates otherwise.

[0011] As used herein, the term "and/or" means and includes any and all combinations of one or more of the associated listed items.

[0012] As used herein, the terms "vertical" and "lateral" refer to the orientations as depicted in the figures.

[0013] Storage containers may be configured to store food items. A storage container may be configured to maintain the stored food items at a low or a high temperature, such as for use at a later time or during transportation. Food storage containers generally passively control the temperature within the food storage containers by inhibiting the transfer of heat between the enclosed cavity and the environment outside the food storage container. Actively controlling an internal temperature of the storage container may enable storage of the food items for a longer period of time and may improve the quality

of the finished food item when removed from the storage container.

[0014] FIG. 1 illustrates a perspective view of a storage container 100. The storage container 100 may include a casing 102 and a lid 104. The casing 102 and the lid 104 may include one or more insulated walls. For example, the walls of the casing 102 and/or the lid 104 may include multiple layers including at least one layer of insulating material, such as foam *(e.g.,* polyurethane foam, polystyrene foam, *etc.).* In some embodiments, the walls of the casing 102 and/or the lid 104 may be constructed from at least two layers of ridged materials, such as a hard plastic *(e.g.,* polyethylene (i.e., high-density polyethylene (HDPE), low-density polyethylene (LDPE), polyethylene terephthalate (PET)), polypropylene, polyvinyl chloride (PVC), *etc.)* or a metal material *(e.g.,* steel, stainless steel, aluminum, *etc.),* positioned on opposing sides of the at least one layer of insulating material, substantially enclosing the at least one layer of insulating material between the at least two layers of ridged materials.

[0015] In some embodiments, the lid 104 may be coupled to the casing 102 through a hinge connection. In some embodiments, the lid 104 may be configured to lift off of the casing 102 and may be releasably attached to the casing 102. For example, the lid 104 may be configured to lift completely off of the casing 102. The storage container 100 may include one or more latches 106. The latches 106 may be configured to secure the lid 104 to the casing 102, such that the lid 104 may not move relative to the casing 102 when the latches 106 are engaged.

[0016] The storage container 100 may be a size that may be easily handled (*e.g.*, carried, moved, *etc.)* by a user making the storage container 100 portable *(e.g.,* transportable, movable, easily moved, *etc.).* For example, the storage container 100 may have a length of between about 1 ft (0.3 m) and about 5 ft (1.5 m), a width between about 6 in (15.2 m) and about 3 ft (0.9 m), and a depth of between about 6 in (15.2 m) and about 3 ft (0.9 m). The storage container 100 may have a weight of less than about 100 lbs (45.4 kg), such as less than about 75 lbs (34 kg), or less than about 50 lbs (22.7 kg). In some embodiments, the storage container 100 may be sized such that the storage container 100 may be stored on standard shelves, cabinets, or on a shelf or in a cabinet beneath cooking equipment, such as a grill, smoker, pellet grill, *etc.* In some embodiments, the storage container 100 may be configured to interface with equipment, such as tool boxes, tool carts, *etc.,* such that the storage container 100 may be moved as part of a tool or equipment transportation system.

[0017] The storage container 100 may include one or more handles 108. For example, as illustrated in FIG. 1, the casing 102 may include one or more recessed regions configured to provide a handle 108 for a user to lift, move, and/or secure the storage container 100. In some embodiments, the storage container 100 may include a movable handle 108, such as a rotating arm configured to provide a single handle 108 for the user to lift, move, or secure the storage container 100. In some embodiments, the storage container 100 may include an extendable handle 108, such as a pull handle.

[0018] The storage container 100 may also include a power source 110. In some embodiments, the power source 110 may be one or more removable batteries, such as one or more power tool batteries, as illustrated in FIG. 1. In some embodiments, the power source 110 may be an internal power storage device, such as a rechargeable battery. In some embodiments, the power source 110 may be an external power source, such as a wall outlet, generator, power inverter, *etc.* In some embodiments, the power source 110 may be configured to change from external power to battery power, such that the power source 110 may draw power from an external power source when connected and may switch to an internal power storage device or removable batteries when not connected to an external power source. In some embodiments, the storage container 100 may be configured to charge the internal power storage device or removable batteries when connected to an external power source.

[0019] FIG. 2 illustrates the storage container 100 with the lid 104 open. As described above, the lid 104 may be coupled to the storage container 100 with a hinge 202. In some embodiments, the hinge 202 may extend along a length of the interface between the casing 102 and the lid 104, such as a piano hinge or continuous hinge. In some embodiments, the hinge 202 may include multiple smaller hinges arranged along the interface between the casing 102 and the lid 104, such as two hinges 202, three hinges 202, *etc.*

[0020] The casing 102 may define a cavity 204 within the casing 102 where food or other items may be stored. The casing 102 may also include a seal 206 positioned along an interface between the casing 102 and the lid 104. The seal 206 may be configured to substantially prevent air and heat from passing across the seal 206 when the lid 104 is secured to the casing 102 in a closed position. Thus, the seal 206 may substantially prevent heat from entering and/or leaving the cavity 204 when the lid 104 is secured to the casing 102 in a closed position.

[0021] The storage container 100 may include one or more removable containers configured to secure items, such as food items within the cavity 204 of the storage container 100. For example, as illustrated in FIG. 2, the storage container 100 may include a primary container 208 and a secondary container 210. The primary container 208 and/or the secondary container 210 may be configured to be removed from the cavity 204, such as for cleaning, loading, *etc.* One or more of the primary container 208 and the secondary container 210 may include retaining features 214 configured to secure the containers within the cavity 204.

[0022] In some embodiments, the retaining feature 214 may be a recess, such as the retaining feature 214 in the primary container 208 illustrated in FIG. 2. The cavity 204

may include complementary retaining features (not shown) configured to interface with the retaining feature 214 of the primary container 208. The interface between the retaining feature 214 and the complementary retaining features may substantially prevent motion of the primary container 208 relative to the casing 102 within the cavity 204. In some embodiments, the interface between the retaining feature 214 and the complementary retaining features may define a void between the bottom of the primary container 208 and the bottom of the casing 102, such as a space for other storage components, ice, cold packs, heat packs, or other elements.

[0023] In some embodiments, the retaining feature 214 may be a ridge around a border of the associated container, such as the retaining feature 214 on the secondary container 210 illustrated in FIG. 2. The cavity 204 may include a complementary retaining feature 212 configured to interface with the retaining feature 214 of the secondary container 210. The interface between the retaining feature 214 and the complementary retaining features may substantially prevent motion of the secondary container 210 relative to the casing 102 within the cavity 204.

[0024] In some embodiments, the cavity 204 may include a separation wall within the cavity 204 configured to separate the primary container 208 and the secondary container 210. For example, the separation wall may include the complementary retaining features for both the primary container 208 and the secondary container 210, such that the primary container 208 and the secondary container 210 may be supported by the separation wall. In some embodiments, the primary container 208 and the secondary container 210 may be configured to interface with one another such that the retaining features 214 of the primary container 208 and the secondary container 210 are configured to interlock, coupling the primary container 208 to the secondary container 210 for support and/or to substantially prevent the primary container 208 and secondary container 210 from moving relative to each other and the casing 102.

[0025] In some embodiments, an area of the cavity 204 beneath the secondary container 210 may be shallower than an area beneath the primary container 208. For example, the power source 110 may be positioned beneath the retaining feature 214. The cavity 204 may include a shelf 216. The shelf 216 may define an area beneath the shelf 216 to house the power source 110 and related components as described in further detail with respect to FIG. 4. In some embodiments, a side of the shelf 216 may include the complementary retaining feature configured to interface with the retaining feature 214 of the primary container 208. In some embodiments, the secondary container 210 may be configured to rest directly on the shelf 216.

[0026] FIG. 3 illustrates another view of the storage container 100 with the lid 104 open. The primary container 208 may include a primary lid 306 and the secondary container 210 may include a secondary lid 308. In some embodiments, the lids 306, 308 may provide fluid tight seals around the respective containers 208, 210. In some embodiments, the lids 306, 308 may be configured to provide an additional layer of insulation between the associated containers 208, 210 and the lid 104.

[0027] The storage container 100 may include a control system configured to control a temperature within the cavity 204 of the storage container 100, as described in further detail in FIG. 5. The controller may include a user interface 302 configured to enable the user to turn the control system on and off, start and stop programs, and adjust settings, set points, programs, *etc.* The user interface 302 may include buttons or switches configured to receive input from the user. In some embodiments, the user interface 302 may include a display configured to provide information to the user, such as temperatures, temperature set points, timers, battery life, battery capacity, available programs, *etc.* In some embodiments, the display may be a touch screen display configured to provide information and receive input from the user.

[0028] In some embodiments, the control system and/or user interface 302 may be configured to communicate with a remote device 304, such as a remote, mobile device (*e.g.,* mobile phone, tablet, *etc.),* remote computer *(e.g.,* personal computer, laptop, *etc.*), *etc.* The remote device 304 may enable a user to operate the storage container 100 wirelessly, such as through a radio signal (*e.g.,* BLUETOOTH®, *etc.)* or through the internet (*e.g.*, WIFI™, 3G, 4G, 5G, LTE, *etc.).* In some embodiments, the control system and/or user interface 302 may be configured to communicate with the remote device 304 through a cloud interface, such as a cloud server.

[0029] FIG. 4 illustrates a view of the internal components of the storage container 100 with the lid 104 in a closed position. As described above, the cavity 204 defined in the casing 102 may include the shelf 216. The shelf 216 may define an area configured to house the power source 110. The shelf 216 may also support the secondary container 210. The primary container 208 may rest adjacent to the shelf 216 in a deeper portion of the cavity 204, such that the primary container 208 may be larger than the secondary container 210 and able to carry larger items, such as larger food items.

[0030] As illustrated in FIG. 4, the primary container 208 may be supported in the cavity 204 in a manner such that the bottom of the primary container 208 may be suspended above the bottom of the cavity 204. Thus, the suspended primary container 208 may define a void 404 between the bottom of the primary container 208 and the bottom of the cavity 204. In some configurations, the void 404 may be filled with cold items, such as ice, cold packs, ice packs, *etc.,* configured to maintain a cold temperature within the cavity 204.

[0031] The storage container 100 may include a temperature control element 402 positioned in the bottom of the storage container 100. For example, the temperature control element 402 may form the bottom surface of the cavity 204. In some embodiments, the cavity 204 may include a base wall, such as a layer of material configured

to form the bottom surface of the cavity 204 and the temperature control element 402 may be positioned on an opposite side of the base wall from the cavity 204.

[0032] The temperature control element 402 may be configured to control a temperature of the cavity 204. For example, the temperature control element 402 may be a heating element, such as a resistance heating element, configured to convert electrical energy into heat through resistance. In another example, the temperature control element 402 may be an induction heating element, configured to heat a container, such as the primary container 208, by exciting electrons in the container causing a temperature increase of the surface of the container. In some embodiments, the temperature control element 402 may be a heating and/or cooling element, such as a Peltier device configured to heat or cool the cavity 204 in response to a polarity of the electricity provided to the temperature control element 402.

[0033] FIG. 5 illustrates a schematic view of the components of the storage container 100. The storage container 100 may include a controller 502, such as a control board, a central processor, *etc.* The controller 502 may be configured to receive commands from the user, such as through the user interface 302 and/or wirelessly through the remote device 304.

[0034] The controller 502 may include a processor and memory configured to store instructions or control sequences that may be performed by the processor. In some embodiments, the commands from the user may start and/or stop control sequences. For example, the controller 502 may include multiple different control sequences. The user interface 302 or remote device 304 may enable the user to select a specific control sequence and activate the specific control sequence, deactivate the control sequence, or switch to a different control sequence. In some embodiments, the user interface 302 and/or remote device 304 may enable the user to manipulate the control sequences, such as by changing set points *(e.g.,* temperature set points, start times, stop times, timers, *etc.),* changing time periods, adjusting power usage, *etc.*

[0035] The controller 502 may receive power from the power source 110 and control the power output to the temperature control element 402. For example, the controller 502 may increase or decrease power to the temperature control element 402 and/or may switch polarity of the power being supplied to the temperature control element 402 responsive to control sequence changes or sensor readings.

[0036] The controller 502 may be coupled to one or more sensors 504, such as temperature sensors, humidity sensors, *etc.*, configured to monitor conditions within the cavity 204. The controller 502 may control the electricity provided to the temperature control element 402 responsive to the readings from the sensors 504. For example, the controller 502 may increase a power output to the temperature control element 402 if the temperature within the cavity 204 does not reach the set point temperature within a specified amount of time or the controller 502 may decrease power output to the temperature control element 402 if the temperature reading overshoots the temperature set point. In some embodiments, the controller 502 may change a polarity of the power being provided to the temperature control element 402 to switch the temperature control element 402 from a heating element to a cooling element or from a cooling element to a heating element.

[0037] In some embodiments, the control sequences may be configured to maintain temperatures within the cavity 204. For example, the controller 502 may control the temperature control element 402 to maintain the temperature within the cavity 204 to a warm temperature, such as between about 100°F (37.78°C) and about 165°F (73.89°C). The warm temperature may be configured to maintain the temperature of a cooked food item until the food item is ready to be served, such as during a resting phase or during transportation. In some embodiments, the controller 502 may be configured to control the temperature control element 402 to maintain a high temperature within the cavity 204, such as a temperature of between about 165°F (73.89°C) and about 400°F (204.44°C). The high temperature may be configured to reheat food items within the cavity 204 or to cook food items within the cavity 204. In some embodiments, the controller 502 may control the temperature control element 402 to maintain the temperature within the cavity 204 to a cool temperature, such as between about 32°F (0°C) and about 40°F (4.44°C). The cool temperature may be configured to keep food items cold during transportation, to keep food items cool when waiting to be cooked, to keep drinks cool for better enjoyment, *etc.* In some embodiments, the cool temperature may be maintained through the addition of ice and/or cold packs.

[0038] In some embodiments, the controller 502 may be configured to control the temperature within the cavity 204 to different temperatures at different times. For example, the controller 502 may be configured to maintain the temperature of the cavity 204 to a warm temperature between about 100°F (37.78°C) and about 165°F (73.89°C) in a warm hold mode and then cycle to a heating mode increasing the temperature of the cavity 204 to between about 165°F (73.89°C) and about 400°F (204.44°C) prior to serving the food. In some embodiments, the user may schedule a timer configured to cause the controller 502 to switch between warm hold mode and the heating mode. In another example, the user may schedule a set time that causes the controller 502 to switch between a cool temperature storage mode to a heating mode, such as for use as a lunch storage box. For example, a meal may be prepared in advance (e.g., many hours before or even days before) and stored at a cool temperature in the cavity. The user may then schedule the controller to switch to a heating mode shortly before the planned time to eat the meal to warm the meal before eating. In some embodiments, the user may change the mode by pressing a button on the user inter-

face 302 or the remote device 304. After the heating mode, the controller 502 may be configured to return to the warm hold mode, such as after a specified time period and maintain the warm hold mode until the controller 502 is turned off by the user, such as by pressing another button on the user interface 302 or remote device 304. In some embodiment, the controller 502 may be configured to turn off when the lid 104 is opened after completing the heating mode cycle.

[0039] Embodiments of the present disclosure may enable food temperatures to be controlled during transportation. Controlling food temperatures during transportation may enable users to prepare a cook food before transporting the food while still being able to enjoy warm food without the need to reheat it. Controlling food temperatures may also enable a user to store food before cooking or during transportation in a manner that the food will be maintained at food safe temperatures until it is removed from the storage device. The embodiments of the present disclosure may further enable a user to transport the food at a safe temperature and then reheat the food without removing the food from the storage container.

[0040] Non-limiting embodiments of the disclosure may include:

Embodiment 1: A portable storage container, comprising: an insulated cavity; a power source; and a heating and/or cooling element receiving power from the power source.

Embodiment 2: The portable storage container of embodiment 1, further comprising a controller.

Embodiment 3: The portable storage container of embodiment 2, wherein the controller is configured to control the power received by a temperature control element.

Embodiment 4: The portable storage container of embodiment 2 or 3, further comprising a user interface coupled to the controller.

Embodiment 5: The portable storage container of any one of embodiments 2 through 4, wherein the controller is configured to receive instructions wirelessly from a remote device.

Embodiment 6: The portable storage container of any one of embodiments 1 through 5, wherein the power source comprises a battery.

Embodiment 7: The portable storage container of embodiment 6, wherein the battery is removable.

Embodiment 8: The portable storage container of any one of embodiments 1 through 7, wherein the heating and/or cooling element is a heating element.

Embodiment 9: The portable storage container of any one of embodiments 1 through 8, wherein the heating and/or cooling element is configured to switch between a heating element and a cooling element.

Embodiment 10: A portable food storage system comprising: an insulated container; a power source; a heating and/or cooling element; and a controller including: a processor; a memory device; and a non-transitory computer-readable medium storing instructions thereon that, when executed by the processor, cause the portable food storage system to: adjust power from the power source to the heating and/or cooling element.

Embodiment 11: The portable food storage system of embodiment 10, further comprising a temperature sensor positioned within the insulated container.

Embodiment 12: The portable food storage system of embodiment 11, wherein the instructions cause the portable food storage system to monitor the temperature sensor and adjust power from the power source to the heating and/or cooling element responsive to the temperature sensor.

Embodiment 13: The portable food storage system of any one of embodiments 10 through 12, wherein the instructions cause the portable food storage system to adjust a polarity of the power to the heating and/or cooling element.

Embodiment 14: The portable food storage system of any one of embodiments 10 through 13, the controller further comprising a receiver configured to receive instructions from a remote device.

Embodiment 15: A method of controlling an internal temperature of a portable insulated storage container, the method comprising: transmitting power to a heating and/or cooling element within a cavity of the portable insulated storage container; monitoring a temperature within the cavity of the portable insulated storage container; and adjusting the power to the heating and/or cooling element to control the temperature within the cavity to a temperature set point.

Embodiment 16: The method of embodiment 15, further comprising receiving power from a power source.

Embodiment 17: The method of embodiment 16, wherein the power source comprises a battery.

Embodiment 18: The method of embodiment 17, wherein the battery is removable.

Embodiment 19: The method of any one of embodiments 15 through 18, further comprising receiving instructions from a user interface.

Embodiment 20: The method of embodiment 19, wherein the user interface comprises a remote device.

[0041] The embodiments of the disclosure described above and illustrated in the accompanying drawing figures do not limit the scope of the invention, since these embodiments are merely examples of embodiments of the invention, which is defined by the appended claims and their legal equivalents. Any equivalent embodiments are intended to be within the scope of this disclosure. Indeed, various modifications of the present disclosure, in addition to those shown and described herein, such as alternative useful combinations of the elements de-

scribed, may become apparent to those skilled in the art from the description. Such modifications and embodiments are also intended to fall within the scope of the appended claims and their legal equivalents.

Claims

1. A portable storage container, comprising:

an insulated cavity;
a power source; and
a heating and/or cooling element receiving power from the power source.

2. The portable storage container of claim 1, further comprising a controller.

3. The portable storage container of claim 2, wherein the controller is configured to control the power received by a temperature control element.

4. The portable storage container of claim 2, further comprising a user interface coupled to the controller.

5. The portable storage container of claim 2, wherein the controller is configured to receive instructions wirelessly from a remote device.

6. The portable storage container of any one of claims 1 through 5, wherein the power source comprises a battery.

7. The portable storage container of claim 6, wherein the battery is removable.

8. The portable storage container of any one of claims 1 through 5, wherein the heating and/or cooling element is a heating element.

9. The portable storage container of any one of claims 1 through 5, wherein the heating and/or cooling element is configured to switch between a heating element and a cooling element.

10. A portable food storage system comprising:

an insulated container;
a power source;
a heating and/or cooling element; and
a controller including:

a processor;
a memory device; and
a non-transitory computer-readable medium storing instructions thereon that, when executed by the processor, cause the portable food storage system to:

adjust power from the power source to the heating and/or cooling element.

11. The portable food storage system of claim 10, further comprising a temperature sensor positioned within the insulated container, wherein the instructions cause the portable food storage system to monitor the temperature sensor and adjust power from the power source to the heating and/or cooling element responsive to the temperature sensor.

12. The portable food storage system of claims 10 or 11, wherein the instructions cause the portable food storage system to adjust a polarity of the power to the heating and/or cooling element.

13. The portable food storage system of claims 10 or 11, the controller further comprising a receiver configured to receive instructions from a remote device.

14. A method of controlling an internal temperature of a portable insulated storage container, the method comprising:

transmitting power to a heating and/or cooling element within a cavity of the portable insulated storage container;
monitoring a temperature within the cavity of the portable insulated storage container; and
adjusting the power to the heating and/or cooling element to control the temperature within the cavity to a temperature set point.

15. The method of claim 15, further comprising receiving power from a removable battery.

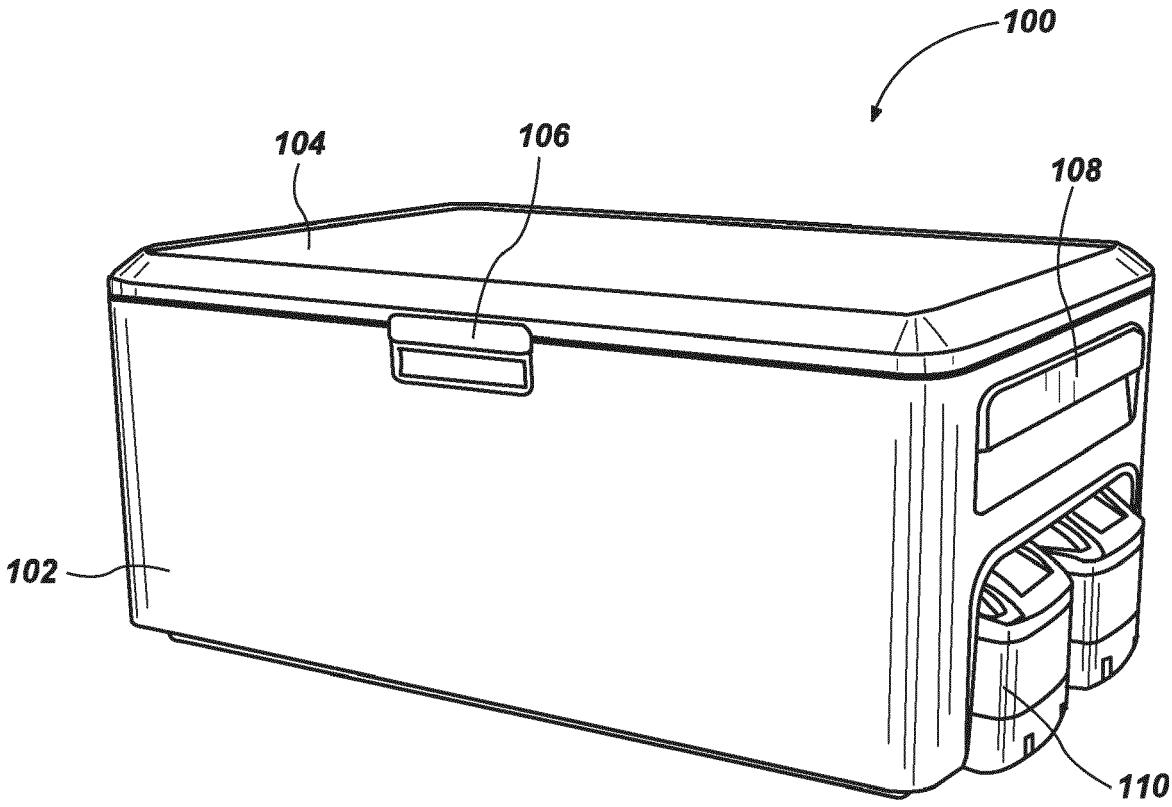

FIG. 1

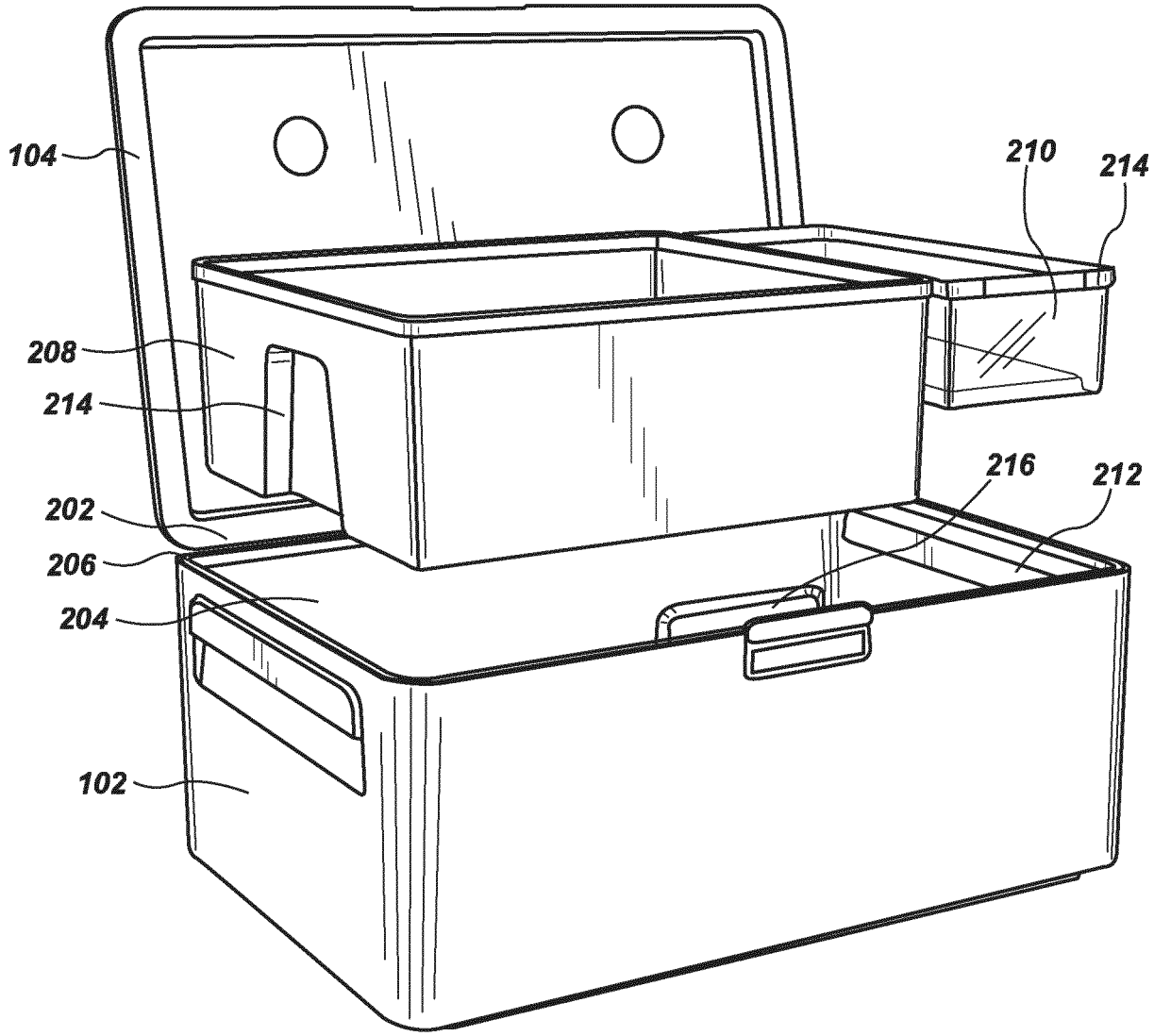

FIG. 2

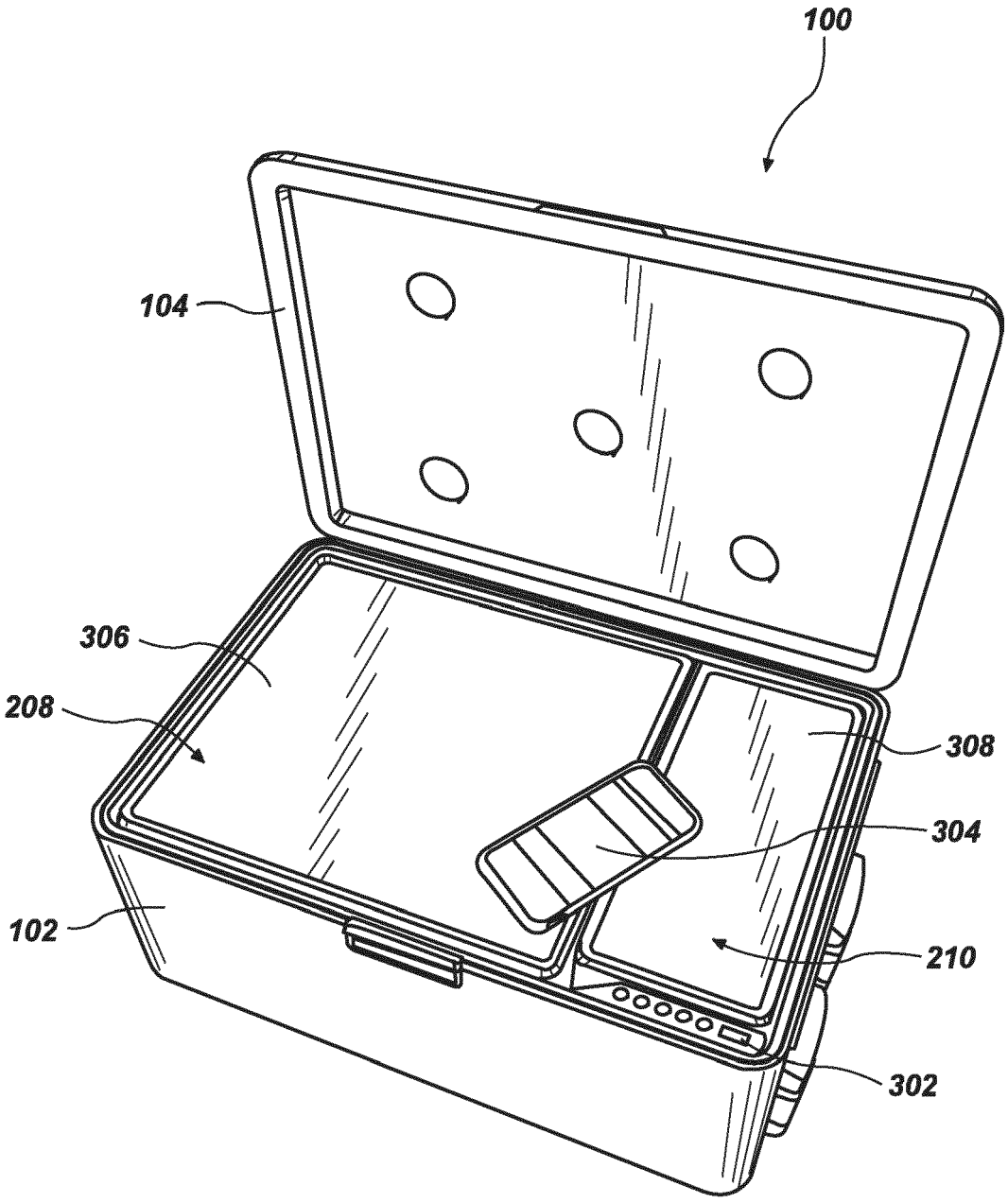

FIG. 3

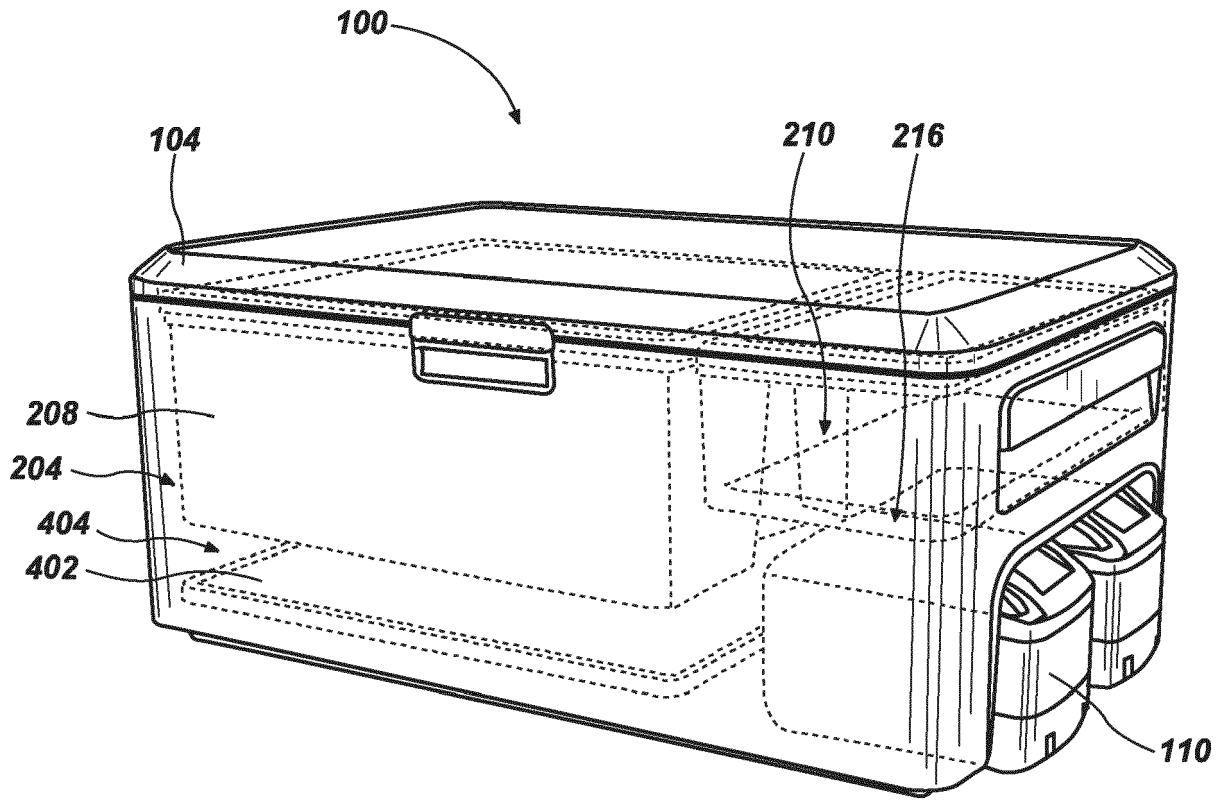

FIG. 4

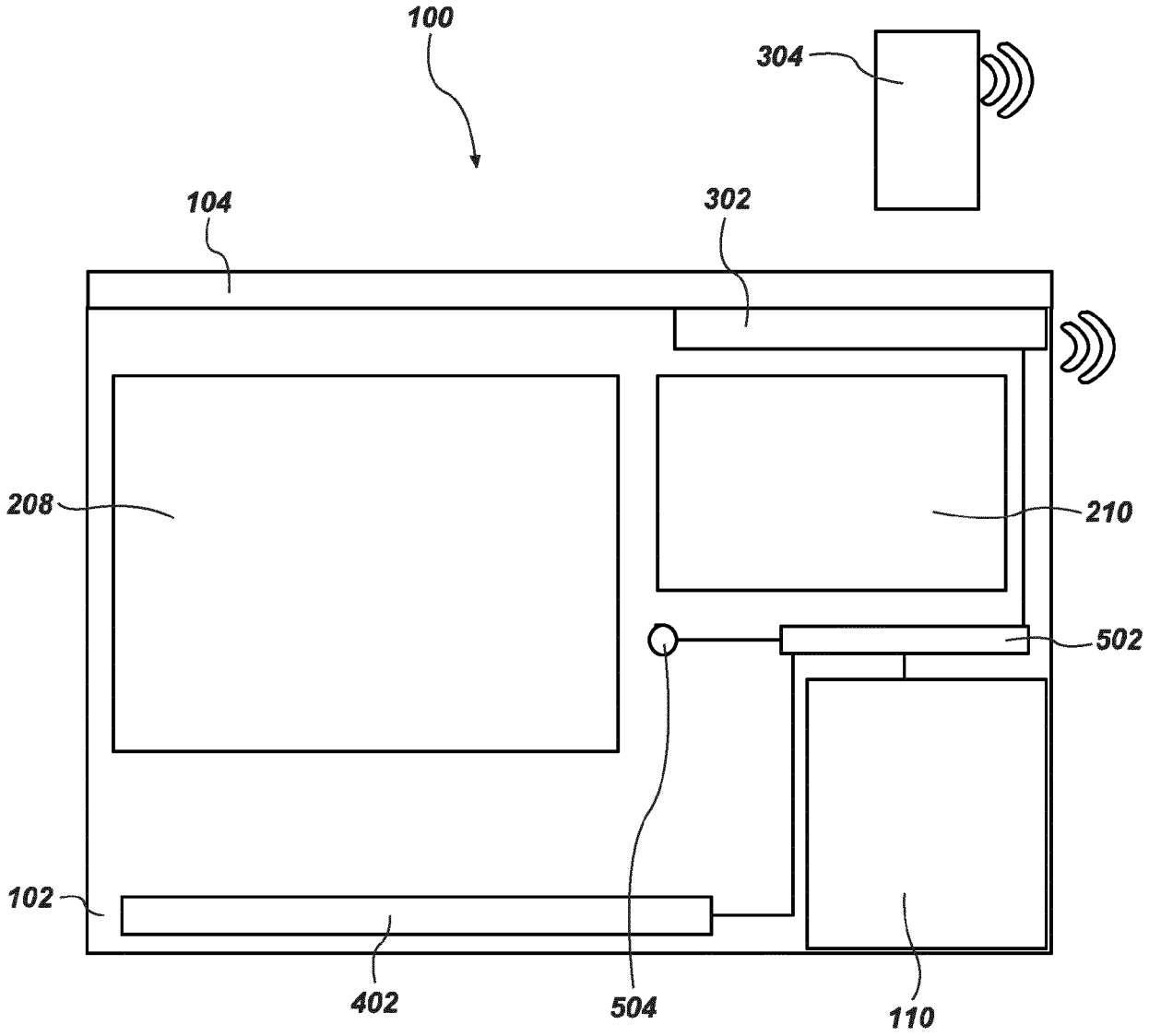

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 22 15 4487

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2020/408452 A1 (ALEXANDER CLAYTON [US] ET AL) 31 December 2020 (2020-12-31) * the whole document *	1-15	INV. F25B21/02 F25B21/04 F25B27/00 F25D29/00 B65D81/38
X	US 10 207 804 B1 (GENTRY NICHOLAS KRISTOFER [US]) 19 February 2019 (2019-02-19) * the whole document *	1-15	
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