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(54) **PORTABLE CONTAINER WITH TEMPERATURE REGULATOR**

TRAGBARER BEHÄLTER MIT TEMPERATURREGLER

RÉCIPIENT PORTABLE À RÉGULATEUR DE TEMPÉRATURE

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(56) References cited:
**WO-A1-2005/096869**
**CN-U- 202 902 729**
**CN-U- 202 902 729**
**JP-A- 2011 188 914**
**JP-A- 2011 188 914**
**US-A- 4 453 385**
**US-A1- 2009 145 793**
**US-A1- 2009 145 793**
**US-A1- 2010 106 625**
**US-A1- 2012 003 928**
**US-A1- 2012 003 928**
**US-A1- 2015 161 871**
**US-A1- 2016 243 000**
**US-A1- 2016 243 000**



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## Description

FIELD OF INVENTION

**[0001]** The present subject matter relates, in general, to portable containers, and, particularly but not exclusively, to a portable container with a temperature regulator.

BACKGROUND

**[0002]** Portable containers are usually used to carry food items, such as solid as well as liquid items, during journeys. Examples of the food items may include, but is not limited to, water, beverages, and snacks. Such portable containers come handy when a person has to carry any food item during a journey. Many portable containers employ insulating members to maintain the temperature of the food item. The insulating members keeps the food item isolated from ambient conditions. Example of known portable containers are shown in published documents US4453385 A or WO2005/096869 A1.

BRIEF DESCRIPTION OF DRAWINGS

**[0003]** The following detailed description references the drawings, wherein:

FIG. 1 illustrates a schematic diagram of a portable container, according to an example implementation of the present subject matter; and

FIG. 2 illustrates a block diagram of a portable container, according to an example implementation of the present subject matter.

DETAILED DESCRIPTION

**[0004]** Generally, people carry food items while travelling either for recreational purposes or when their jobs demands travelling. The food items may include any solid food item, such as snacks, baby food as well as liquid items, such as soups, beverages, and water. For example, people carry food items for being consumed either while travelling or at a later point in time. While portable containers enable people to carry food items, such containers do not facilitate in maintaining a temperature of the food item being carried. For example, if a person is carrying a hot beverage while travelling, the hot beverage may cool after certain time.

**[0005]** In order to maintain the temperature of the food items for a longer period of time, portable containers are provided with insulating members. For example, a vacuum flask includes an insulating member that lengthens the time over which the food item in the container remains hotter or cooler. Such insulating members keep the food item isolated from the outside temperature and maintain the temperature of the food item in the container. However, the insulating member is unable to maintain the temperature of the food item for a long time, especially in extreme weather conditions. In situations, where the users are carrying the food items in long journeys, the thermal insulating flasks may not serve the intended purpose.

**[0006]** Moreover, conventional portable containers with insulating members may not enable a user to set a temperature of the food item being carried in the portable container. This may be inconvenient to the users as the insulating members prevent a user from getting to know a current temperature of the food item. As a result, the user may burn their tongue due to hot food item or may experience bad taste due to extreme cold food item.

**[0007]** The present invention defines a portable container for a food item according to claim 1. The food item may include solid items as well as liquid items, including beverages. The portable container of the present subject matter includes a temperature regulator as well as a plurality of temperature sensors. The plurality of temperature sensors may detect the temperature of the food item within the portable container. The portable container may further include a charging unit that may be capable of being charged wirelessly.

**[0008]** In an implementation, the temperature regulator is embedded within the portable container to regulate a temperature of the food item inside the portable container to a desired temperature. A user may select a desired temperature for being maintained within the portable container. Once selected, the temperature sensors may continuously sense the temperature of the food item to determine whether the desired temperature is maintained or not. If the temperature of the food item varies from the desired temperature, the charging unit may turn ON the temperature regulator till the desired temperature is achieved.

**[0009]** In addition, the portable container may include a wireless transceiver to communicate with an electronic device, such as a mobile phone. The wireless transceiver may be configured to share information pertaining to the food item, with the electronic device. The information so shared may be accessed through an application on the electronic device. The application enables the user to change settings of the portable container, such as a temperature to which the food item is to be heated or cooled.

**[0010]** Accordingly, the present subject matter provides a compact and portable container for carrying a food item. In addition, the temperature regulator of the container facilitates in regulating a temperature of the food item on-the-go. The present subject matter further enables a user to communicate with the portable container through an application loaded on an electronic device.

**[0011]** The present subject matter is further described with reference to the accompanying figures. Wherever possible, the same reference numerals are used in the figures and the following description to refer to the same or similar parts. It should be noted that the description and figures merely illustrate principles of the present sub-

ject matter. It is thus understood that various arrangements may be devised that, although not explicitly described or shown herein, encompass the principles of the present subject matter. Moreover, all statements herein reciting principles, aspects, and examples of the present subject matter, as well as specific examples thereof, are intended to encompass equivalents thereof.

**[0012]** FIG. 1 illustrates a schematic diagram of a portable container 100, according to an example implementation of the present subject matter. The portable container 100 may be employed for maintaining a desired temperature of the food item. In an example, the food item may be a liquid item, such as a beverage or water. Examples of the beverage may include, but are not limited to, coffee, tea, milk, lemonade, and hot chocolate. In another example, the food item may be a solid item, such as baby food and rice.

**[0013]** The portable container 100 includes an insulative body 102 to hold a food item, such as beverages or snacks or baby food. The insulative body 102 is double walled, i.e., made of two walls (not shown). The insulative body 102 includes an inner wall and an outer wall. The inner wall may be made of a stainless steel material. In an example, the outer wall may be made of thermal insulation materials such as a plastic material. The outer wall thereby protects a user from any accidental burns. It may be noted that the inner wall and the outer wall may be made of any other suitable material.

**[0014]** Further, the portable container 100 includes a lid 104. The lid 104 covers the insulative body 102 of the portable container 100 to prevent the food item, such as a liquid item, from spilling. In an implementation, the lid 104 may be removably coupled to a top portion 106 of the insulative body 102. In an example, the lid 104 may be screwed at a neck portion (not shown) of the insulative body 102. In an example, the portable container 100 may include a handle 108 that may facilitate in easy handling of the portable container 100.

**[0015]** The portable container 100 includes a temperature regulator 110, such as a thermostat, disposed between the inner wall and the outer wall of the insulative body 102. For instance, the temperature regulator 110 may be placed along a length of the portable container 100, as shown in FIG. 1. The temperature regulator 110 may facilitate in maintaining a desired temperature of the food item within the portable container 100. Example of the temperature regulator 110, may include, but is not limited to Nichrome.

**[0016]** Further, the portable container 100 includes a plurality of temperature sensors (hereinafter referred to as temperature sensors) disposed within the inner wall of the insulative body 102. The temperature sensors are operably coupled to the temperature regulator 110. The temperature sensors may sense the temperature of the food item within the insulative body 102 based on which the temperature of the food item may be regulated. In an example, the portable container 100 may include additional sensors for detecting different aspects related to the food item within the portable container 200. For example, the sensors may detect a weight of a food item within the portable container 200.

**[0017]** The portable container 100 may further include a charging unit 112 to charge the portable container 100. In an implementation, the charging unit 112 may be charged wirelessly, such as through induction, magnetic resonance, ultrasound, or radio waves. For instance, the charging unit 112 may be a wireless coil. In an example, the charging unit 112 may be positioned at a bottom portion 114 of the portable container 100. The portable container 100 may also include one or more power storage elements 116 coupled to the charging unit 112. In an example, the power storage element 116 may be a battery, such as a Lithium Ion battery.

**[0018]** Further, the portable container 100 may include a display area 118 for displaying information pertaining to the food item within the portable container 100. For instance, in various non-limiting examples, the display area 118 may display a desired temperature that may be set by a user. The display area 118 may also display a current temperature of the food item in the portable container 100. The current temperature may be understood as an average temperature of two temperatures that may be sensed at a top portion 106 and a bottom portion 114 respectively, of the portable container 100. The display area 118 may also display a weight of the food item within the portable container 100.

**[0019]** The portable container 100 may further include a plurality of buttons 120. For example, the portable container 100 may include a power button 120-1 for turning ON or OFF the temperature regulator 110. The portable container 100 may also include a mode button 120-2 for selecting a preset temperature for regulating the temperature of the food item. The preset temperatures may be provided for various temperatures of the food item, such as a normal temperature, warm, hot, and so on. In addition, the portable container 100 may include control buttons 120-3 for controlling or adjusting a temperature of the food item within the portable container 100. In an example, temperature of the food item is controlled based on a hysteresis temperature. The hysteresis temperature prevents the temperature regulator 110 from turning ON and OFF when temperature of the food item inside the portable container 100 is within a pre-defined range from the desired temperature.

**[0020]** In an implementation, the portable container 100 may include one or more light emitting diodes (LEDs) 122 mounted on a rim of the insulative body 102. The LEDs 122 change color based on the temperature of the inner wall of the portable container 100 as well as the food item within the container 100. The LEDs 122 indicate a temperature of the food item inside the portable container 100. In an example, the temperature sensors may be connected to the LEDs 122. The temperature sensors may sense the temperature of the food item within the insulative body 102 and accordingly, the LEDs 122 may change their color to indicate the temperature of the food

item.

**[0021]** The portable container 100 includes a controller (not shown) communicatively coupled to the temperature regulator 110 to regulate the temperature of the food item based on a user input. In an example, the user may input a desired temperature of the food item through the buttons 120. The controller may obtain a current temperature of the food item from the temperature sensors. The current temperature of the food item is an average of the temperatures sensed at the top portion 106 and the bottom portion 114 of the portable container 100. Based on the current temperature, the controller may regulate the temperature of the food item.

**[0022]** FIG. 2 illustrates a block diagram of the portable container 200, according to an example implementation of the present subject matter. The portable container 200 is similar to the portable container 100 of FIG. 1. The portable container 200 may communicate with an electronic device, such as a mobile phone, a cellular phone, a tablet, a smartphone, a Personal Digital Assistant, and the like. In an example, the portable container 200 may communicate with the electronic device through a communication network (not shown). The network may be a wireless network, wired network, or a combination thereof. The network can be implemented as one of the different types of networks, such as intranet, telecom network, electrical network, local area network (LAN), wide area network (WAN), the Internet, and such.

**[0023]** The portable container 200 includes an insulative body, such as the insulative body 102. The insulative body 102 may hold the food item therewithin. The portable container 100 includes a plurality of temperature sensors 202 disposed on the insulative body 102. In an example, the portable container 200 may include two temperature sensors. One disposed near the top portion and another at the bottom portion of the insulative body 102. The temperature sensors 202 may facilitate in determination of a current temperature of the food item within the portable container 200. The current temperature may be understood as an average of the temperatures sensed at the top portion and the bottom portion of the insulative body 102.

**[0024]** In an implementation, the portable container 200 may include one or more light emitting diodes (LEDs), such as the LEDs 122 mounted on a rim of the insulative body 102. The LEDs 122 change color based on the temperature of the inner wall of the portable container 200 as well as the food item within the container 100. The LEDs 122 indicate a temperature of the food item inside the portable container 200. In an example, the temperature sensors 202 may be connected to the LEDs 122. The temperature sensors 202 may sense the temperature of the food item within the insulative body 102 and accordingly, the LEDs 122 may change their color to indicate the temperature of the food item.

**[0025]** For example, the LEDs 122 at a rim of the insulative body 102 may transform from being colorless to orange or red depending on the temperature of the inner wall 104-1 and the food item. For instance, when the portable container 200 is powered OFF, the LEDs 122 will be colorless. In another example, the LEDs 122 will have blue color when the food item is cold, and so on. In an example, when the temperature is 21 degrees Celsius, the LEDs 122 at the rim may be colorless, at 40 degrees Celsius, the LEDs 122 may be dark orange, and so on.

**[0026]** Further, the portable container 200 includes the temperature regulator 110 disposed between the inner wall and the outer wall of the insulative body. The temperature regulator 110 may facilitate in regulating the temperature of the food item based on the user input. In an example, the temperature regulator 110 may include heating elements as well as cooling elements. In an example, four heating elements were used in parallel to accommodate lower 3.7V nominal voltage of the portable container 200. The resistance of each heating element came around 3.2Ω which yielded a total parallel resistance of about 800mΩ when all four heating elements were conducting. The heating elements employed in the present subject matter are created by center-taping a 10x5 cm strip of a heating pad to yield 2 elements in parallel per strip. In addition, each of the heating elements is provided with a separate driver so the instantaneous power for heating can be set in about 4W increments.

**[0027]** In an example, the heating elements may include thermistors. Each thermistor may connect to a 2-pin female header. In an example, the thermistor is a US Sensor PT103J2. Further, a heating coil of the heating element may be a modified Abracon AWCCA53N53H50C01 B. In an example, the cooling elements of the temperature regulator 110 may provide thermoelectric cooling to the food item thereby facilitating in maintaining the desired temperature. Examples of the cooling elements may include, but are not limited to, Peltier tiles or sheets. The Peltier tiles operate according to the Peltier effect.

**[0028]** Further, the portable container 200 includes a charging unit, such as the charging unit 112, for powering the portable container 200. The charging unit 112 may be capable of being charged wirelessly. In an example, the charging unit 112 may include a wireless coil and a wireless power receiver. In an implementation, the portable container 200 of the present subject matter is also provided with a capability to adjust the current drawn from the charging unit 112 to accommodate power available from an induction charger or a Qi charger. In an example, the charging unit 112 is capable of receiving upto 15W of power from the Qi charger.

**[0029]** The portable container 200 may also include a power storage element 116 coupled to the charging unit 112. In an example, the power storage element 116 may be a battery, such as a Lithium Ion battery. The portable container 200 of the present subject matter utilizes a 1S2P configuration for a two cell Li-Ion battery.

**[0030]** In one implementation, the portable container 200 includes a processor(s) 204, memory 206 coupled

to the processor(s) 204, and interface(s) 208. The processor(s) 204 may be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, and/or any systems that manipulate signals based on operational instructions. Among other capabilities, the processor(s) 204 may be configured to fetch and execute computer-readable instructions stored in the memory 206. Further, the processor 204 may be configured to manage different processes or activities of the portable container 200. For example, the processor 204 may receive a desired temperature of the food item as provided by the user. In an example, the user may use the mode buttons to provide the desired temperature. In another example, the processor 204 may obtain the desired temperature from the memory 206.

**[0031]** The memory 206 may include any computer-readable medium known in the art including, for example, volatile memory, such as static random access memory (SRAM), and dynamic random access memory (DRAM), and/or non-volatile memory, such as read only memory (ROM), erasable programmable ROM, flash memories, hard disks, optical disks, and magnetic tapes. The memory 206 may be configured to store information, such as the temperature settings done by the user. In an example, the user may store the temperature settings or any other preferred setting on the cloud. In an implementation, the portable container 200 may facilitate the user to access the preferred settings or to store additional settings or to modify existing settings on the cloud through the communication network.

**[0032]** Further, the interface(s) 208 may include a variety of software and hardware interfaces, for example, interfaces for peripheral system(s), such as a product board, a mouse, an external memory, and a printer. Additionally, the interface(s) 208 may enable the portable container 200 to communicate with other devices. In an example, a display, such as the display area 118 may be a part of the interface(s) 208.

**[0033]** The portable container 200 also includes a controller 210 and data 212. In an example, the controller 210 may be implemented as a proportional-integral-derivative (PID) controller for accurately regulating the temperature of the food item. The controller 210 includes, an authentication engine 214 and a a temperature regulation engine 218, and may further include a monitoring engine 216 and other engine(s) 220. The other engine(s) 220 may include programs or coded instructions that supplement applications or functions performed by the portable container 200. The data 212 may include temperature data 222, user data 224, and other data 226. Further, the other data 226, amongst other things, may serve as a repository for storing data, which is processed, received, or generated as a result of the execution of one or more modules in the controller 210.

**[0034]** Although the data 212 is shown internal to the portable container 200, the data 212 can also be implemented external to the portable container 200, where the data 212 may be stored within a database communicatively coupled to the portable container 200.

**[0035]** The authentication engine 214 is configured to authenticate a user before providing access to the portable container 200. In an example, to authenticate a user, the authentication engine 214 may employ a biometric based authentication technique. In another example, the authentication engine 214 may employ any other authentication mechanism to authenticate a user. Accordingly, the authentication engine 214 may authenticate the user based on the biometrics, such as voice, fingerprints, etc. received from the user. In the present implementation, the portable container 200 may include a biometric scanner (not shown). The biometric scanner may receive credentials from the user, such as a fingerprint, a voice sample, etc. Upon receiving the credentials from the user, the authentication engine 214 compare the credentials of the user with the credentials stored in a profile of the user. The profile may be retrieved from the memory 206 of the portable container 200 or from a cloud based storage.

**[0036]** The profile includes information pertaining to preferences of the user with respect to the food items. The profile of the user may be accessed every time the user is authenticated by the controller 210. Further, the profile of the user may include a journal or record of events pertaining to the desired temperature set for different food items by the user. The authentication engine 214 retrieves the user preferences based on the type of food item held by the portable container 200.

**[0037]** Once the user is authenticated, the monitoring engine 216 may perform a check on initial parameters associated with the portable container 200. In an implementation, the initial parameters may include a charging status and a power level of the charging unit 112. In an example, monitoring engine 216 may ascertain whether the portable container 200 is being powered through the charging unit 112 or not. If the portable container 200 is being charged via the charging unit 112, the monitoring engine 216 may enable switching ON the portable container 200. If the portable container 200 is not being charged through the charging unit 112, it indicates that the power storage element 116 is powering the portable container 200.

**[0038]** At this stage, the monitoring engine 216 may determine a power level of the power storage element 116. Specifically, the monitoring engine 216 may check whether the power level of the power storage element 116 is above a pre-defined threshold value or not. In an example, the pre-defined threshold level of the power storage element 116 is 6.3 Volts. If the power level of the power storage element 116 is above the pre-defined threshold value, the monitoring engine 216 may switch ON the portable container 200. If the power level of the power storage element 116 is below the pre-defined threshold value, the monitoring engine 216 may not switch ON the portable container 200. Further, the monitoring engine 216 may display a notification on the dis-

play area 118 indicating that the food item cannot be heated.

**[0039]** In an example, the monitoring engine 216 may also monitor a temperature of the power storage element 116 and turn OFF power supply to the portable container 200 when a temperature of the power storage element 116 rises above a pre-defined threshold range. For example, while charging the power storage element 116, if the temperature of the power storage element 116 goes above a safe threshold range, the monitoring engine 216 may cut off supply to the power storage element 116. In an example, the monitoring engine 216 may be implemented as a Negative Temperature Coefficient (NTC) thermistor. The NTC thermistor suspends charging of the power storage element 116 when it detects that the temperature of the power storage element 116 has risen above about 45 degrees Celsius. In case the temperature of the power storage element 116 goes beyond 60 degrees Celsius, the NTC thermistor may disable the portable container 200.

**[0040]** In an implementation, once the portable container 200 is switched ON and the user has been authenticated, the temperature regulation engine 218 receives an input from the user. In an example, the input may be indicative of a desired temperature of the food item that the user may wish to set. In an example, the user may provide the input to the portable container 200 through the buttons, such as the buttons 120 or through a voice command. The controller 210 may, based on the inputs provided by the user and through machine learning, build a profile for the user. In an example, the profile as created may be accessed during the authentication process.

**[0041]** The temperature regulation engine 218 may then obtain a current temperature of the food item within the portable container 200. In an example, the current temperature may be obtained from the temperature sensors 202. As mentioned above, the current temperature of the food item is an average of the temperatures sensed at the top portion and the bottom portion of the portable container 200. The temperature regulation engine 218 may compare the desired temperature with the current temperature of the food item. Based on the comparison, the temperature regulation engine 218 may regulate power supply to the portable container 200.

**[0042]** In an example, if the current temperature is more than the desired temperature, the temperature regulation engine 218 may turn OFF the power supply to the temperature regulator 110. Turning OFF of the power supply may also be indicated by blinking of a blue LED for every second. In another example, if the current temperature is less than the desired temperature, the temperature regulation engine 218 may turn ON the power supply to the temperature regulator 110. Turning ON the power supply is indicated by a continuously ON blue LED.

**[0043]** In an implementation, the controller 210 may take into account a hysteresis temperature to avoid rapid turning ON and OFF of the temperature regulator 110 when the food item inside the portable container 200 is within a predefined range from the desired temperature. Upon turning ON, the power button 120-1 becomes green in color and the temperature regulator 110 is turned ON. For example, the temperature regulator 110 may heat the inner wall of the portable container 200 which may cause the food item to heat. Further, the temperature regulation engine 218 may continuously monitor the current temperature of the food item within the portable container 100. Accordingly, the portable container 200 of the present subject matter facilitates in maintaining a temperature of the food item within the container 200 as desired by the user.

**[0044]** According to the present invention, the temperature regulation engine 218 employs machine learning techniques to identify a type of food item within the portable container 200. For example, the temperature regulation engine 218 may determine the type of the food item based on a density or other properties associated with the food item. In an example, the portable container 200 may include sensing devices to measure intensity of light passing through the food item as well as the intensity of the light being reflected from the food item. When light from one or more light sources is received by the food item, the sensing devices may measure the intensity of the light and share the same with the temperature regulation engine 218. The sensing devices may also detect a wavelength at which the light is being emitted.

**[0045]** Based on the information, such as density received from the sensing devices, the temperature regulation engine 218 employs artificial intelligence and machine learning techniques to determine the type of food item within the portable container 200. In an example, the temperature regulation engine 218 may compare the intensity measurements with stored values in a database for a variety of known substances. Although the identification of the type of the food item is performed based on measurement of intensity of light, other techniques may also be employed for determining the type of the food item. Further, the portable container 200 may store the properties of the food item in the memory 206 or in the cloud storage. These properties may later be referred for analysis, such as to compute the calories consumed by the user.

**[0046]** Based on the identification of the type of the food item, a quantity of the food item within the portable container 200 is determined by the temperature regulation engine 218. Once the quantity of the food item is determined, the temperature regulation engine 218 automatically sets the desired temperature of the food item. In an example, the temperature regulation engine 218 may set the desired temperature of the food item based on an historical behavior of the user. As mentioned earlier, the historical behavior, i.e., desired temperatures and corresponding food items may be stored within the profile of the user.

**[0047]** In an example, to determine the quantity of the food item, the temperature regulation engine 218 detects an initial weight of the food item within the portable con-

tainer 200. The initial weight may be stored in a journal maintained by the portable container 200 for a specific user. Thereafter, the temperature regulation engine 218 may identify, at pre-defined intervals, a current weight of the food item within the portable container 200. A comparison of the initial weight and the current weight of the food item provides a quantity of the food item within the portable container 200.

**[0048]** Further, the temperature regulation engine 218 may determine a plurality of constituents of the food item within the portable container 200 to determine a quality of the food item. In an example, the temperature regulation engine 218 may employ an Independent Component Analysis (ICA) technique to determine the constituents of the food item.

**[0049]** In an implementation, the portable container 200 may include a wireless transceiver 230. For example, the wireless transceiver 230 may be a Wi-Fi unit, a Bluetooth®, or a Near Field Communication (NFC) unit. The wireless transceiver 230 may enable the portable container 200 to communicate with an electronic device, such as a mobile phone. In an example, the electronic devices communicate with the portable container 200 through an application. The application may be accessible by different operating systems, such as Android, iOS.

**[0050]** Once a user has downloaded the application onto the electronic device, the user may set up a connection with the portable container 200. To set up the connection, the electronic device and the portable container 100 may share Short Term Keys (STKs), to encrypt a link between the two devices. Once the user has paired with the portable container 200, the portable container 200 only receives instructions from the paired user device.

**[0051]** In an example, instructions received from the paired user device may include receiving status of the food items, such as temperature of the food item and charging status of the charging unit 112, from the portable container 200. In an example, the application may also enable the user to check or define the desired temperature, the hysteresis temperature, heating status, battery voltage, and the like. In an example, the application may allow the user to check the temperature of each temperature sensor 202 separately. For instance, Temperature 1 indicates the temperature of 1st temperature sensor and Temperature 2 indicates the temperature of 2nd temperature sensor. Further, the application may allow the user to check the heating or cooling status of the portable container 200. For example, 0 indicates that the food item is not heating, 1 indicates that the food item is heating, and 2 indicates that the charging unit 112 is charging.

**[0052]** Based on the settings made by the user, the application may communicate with the portable container 200 via the wireless transceiver 230. The user settings may be stored in the portable container 200 as the user data 224. In an example, when the user communicates the temperature settings with the portable container 200, the controller 210 of the portable container 200 may communicate with the electronic device to indicate whether or not such settings may be implemented or not. For instance, if the portable container 200 is on charging mode or the power level of the charging unit 112 is below the pre-defined threshold value, the controller 210 may send a notification to the electronic device indicating the food item cannot be heated to the set temperature.

**[0053]** In an example, the application may also store information pertaining to the calories contained in the food item that is being put in the portable container 200. For example, the application may retrieve information from a database that may include information pertaining to nutritional value of different food items. Based on the type, the quantity, and the constituents of the food item, the application may communicate with the database to retrieve information pertaining to the nutritional value of the food item within the portable container 200.

**[0054]** In an implementation, the portable container 200 may include sensors 232 for monitoring physiological parameters of a user while the user is holding the portable container 200. For example, the sensors 232 may monitor a heartbeat, a pulse rate, a blood pressure, and so on of the user who is holding the portable container 200.

## Claims

**1.** A portable container (100, 200) comprising:

an insulative body (102) to hold a food item, wherein the insulative body (102) comprises an inner wall and an outer wall;
a temperature regulator (110) disposed between the inner wall and the outer wall of the insulative body (102);
a plurality of temperature sensors (202) disposed within the inner wall of the insulative body (102), the plurality of temperature sensors (202) being operably coupled to the temperature regulator (110); and
a controller (210) communicatively coupled to the temperature regulator (110) to regulate a temperature of the food Z item according to a desired temperature,
the controller (210) comprising:

an authentication engine (214) to authenticate a user before allowing the user to operate the portable container (100), wherein the authentication of the user is based on credentials stored in a profile of the user,
**characterized in that**
the profile also
includes information pertaining to a preference of the user with respect to the food item held in the insulative body; and
wherein the controller (210) further comprises a temperature regulation engine (218) to:

identify a type of the food item within the portable container; and
upon the identification of the type of the food item, determine a quantity of the food item within the portable container (100, 200), based on determining the quantity of the food item automatically set the desired temperature of the food item.

**2.** The portable container (100, 200) as claimed in claim 1, wherein the portable container (100, 200) comprises a spill-proof lid (104) removably coupled to a top portion (106) of the insulative body (102).

**3.** The portable container (100, 200) as claimed in claim 1, wherein the authentication engine (214) comprises a biometric authentication mechanism.

**4.** The portable container (100, 200) as claimed in claim 1, wherein the portable container (100, 200) comprises:

a charging unit (112) positioned at a bottom portion (114) of the insulative body (102) to charge the portable container (100, 200); and
a power storage element (116) coupled to the charging unit (112).

**5.** The portable container (100, 200) as claimed in claim 4, wherein the charging unit (112) comprises a wireless coil.

**6.** The portable container as (100, 200) as claimed in claim 4, wherein the controller (210) comprises a monitoring engine (216) to, upon authentication of the user:

monitor a temperature of the power storage element (116); and
turn OFF power supply to the portable container (100, 200) when a temperature of the power storage element (116) rises above a pre-defined threshold range.

**7.** The portable container (100, 200) as claimed in claim 4, wherein the controller (210) comprises a monitoring engine (216) to, once the user is authenticated:

ascertain that the portable container (100, 200) is being powered through the power storage element (116);
upon ascertaining, determine a power level of the power storage element (116); and
based on the determining that the power level of the power storage element (116) is above a pre-defined threshold, switch ON the portable container (100).

**8.** The portable container (100, 200) as claimed in claim 1, wherein, to determine the quantity of the food item, the temperature regulation engine (218) is to:

detect an initial weight of the food item within the insulative body (102);
store the initial weight in a journal maintained by the portable container (100, 200) for a specific user;
identify, at pre-defined intervals, a current weight of the food item within the insulative body (102); and
compare the initial weight and the current weight of the food item to determine a quantity of the food item within the insulative body (102).

**9.** The portable container (100, 200) as claimed in claim 1, wherein the temperature regulation engine (218) is to determine a plurality of constituents of the food item within the insulative body (102) to determine a quality of the food item.

**10.** The portable container (100, 200) as claimed in claim 1, wherein the portable container (100, 200) comprises a wireless transceiver (230) to communicate with an electronic device.

**Patentansprüche**

**1.** Tragbarer Behälter (100, 200), umfassend:

einen isolierenden Körper (102) zum Halten eines Lebensmittels, wobei der isolierende Körper (102) eine Innenwand und eine Außenwand umfasst;
einen Temperaturregler (110), der zwischen der Innenwand und der Außenwand des isolierenden Körpers (102) angeordnet ist;
eine Mehrzahl von Temperatursensoren (202), die innerhalb der Innenwand des isolierenden Körpers (102) angeordnet sind, wobei die Mehrzahl von Temperatursensoren (202) operativ mit dem Temperaturregler (110) gekoppelt ist; und
einen Controller (210), der kommunikativ mit dem Temperaturregler (110) gekoppelt ist, um eine Temperatur des Lebensmittels gemäß einer gewünschten Temperatur zu regeln,
wobei der Controller (210) umfasst:

eine Authentifizierungs-Engine (214), um einen Benutzer zu authentifizieren, bevor es dem Benutzer erlaubt ist, den tragbaren Behälter (100) zu bedienen, wobei die Authentifizierung des Benutzers auf Anmeldedaten bzw. Berechtigungsnachweisen basiert, die in einem Profil des Benutzers gespeichert sind, **dadurch gekennzeichnet,**

**dass** das Profil zudem Informationen enthält, die eine Präferenz des Benutzers in Bezug auf das in dem isolierenden Körper gehaltene Lebensmittel betreffen; und
wobei der Controller (210) ferner eine Temperaturregelungs-Engine (218) umfasst zum:

Identifizieren eines Typs des Lebensmittels innerhalb des tragbaren Behälters; und
nach dem Identifizieren des Typs des Lebensmittels, Bestimmen einer Menge des Lebensmittels innerhalb des tragbaren Behälters (100, 200), basierend auf dem Bestimmen der Menge des Lebensmittels, automatisches Einstellen der gewünschten Temperatur des Lebensmittels.

**2.** Tragbarer Behälter (100, 200) nach Anspruch 1, wobei der tragbare Behälter (100, 200) einen auslaufsicheren Deckel (104) umfasst, der entfernbar mit einem oberen Abschnitt (106) des isolierenden Körpers (102) gekoppelt ist.

**3.** Tragbarer Behälter (100, 200) nach Anspruch 1, wobei die Authentifizierungs-Engine (214) einen biometrischen Authentifizierungsmechanismus umfasst.

**4.** Tragbarer Behälter (100, 200) nach Anspruch 1, wobei der tragbare Behälter (100, 200) umfasst:

eine Ladeeinheit (112), die an einem unteren Abschnitt (114) des isolierenden Körpers (102) positioniert ist, um den tragbaren Behälter (100, 200) zu laden; und
ein Leistungsspeicherelement (116), das mit der Ladeeinheit (112) gekoppelt ist.

**5.** Tragbarer Behälter (100, 200) nach Anspruch 4, wobei die Ladeeinheit (112) eine drahtlose Spule umfasst.

**6.** Tragbarer Behälter (100, 200) nach Anspruch 4, wobei der Controller (210) eine Überwachungs-Engine (216) umfasst, um nach Authentifizierung des Benutzers:

eine Temperatur des Leistungsspeicherelements (116) zu überwachen; und
die Stromversorgung des tragbaren Behälters (100, 200) auszuschalten, wenn eine Temperatur des Leistungsspeicherelements (116) über einen vordefinierten Schwellenwertbereich ansteigt.

**7.** Tragbarer Behälter (100, 200) nach Anspruch 4, wobei der Controller (210) eine Überwachungs-Engine (216) umfasst, um, sobald der Benutzer authentifiziert ist:

sicherzustellen, dass der tragbare Behälter (100, 200) durch das Leistungsspeicherelement (116) mit Leistung versorgt wird;
nach dem Sicherstellen einen Leistungspegel des Leistungsspeicherelements (116) zu bestimmen; und
basierend auf dem Bestimmen, dass der Leistungspegel des Leistungsspeicherelements (116) über einem vordefinierten Schwellenwert liegt, den tragbaren Behälter (100) einzuschalten.

**8.** Tragbarer Behälter (100, 200) nach Anspruch 1, wobei, um die Menge des Lebensmittels zu bestimmen, die Temperaturregelungs-Engine (218) dazu dient:

ein Anfangsgewicht des Lebensmittels innerhalb des isolierenden Körpers (102) zu erfassen;
das Anfangsgewicht in einem Journal bzw. Protokoll zu speichern, das von dem tragbaren Behälter (100, 200) für einen spezifischen Benutzer geführt wird;
in vordefinierten Intervallen ein aktuelles Gewicht des Lebensmittels innerhalb des isolierenden Körpers (102) zu identifizieren; und
das Anfangsgewicht und das aktuelle Gewicht des Lebensmittels zu vergleichen, um eine Menge des Lebensmittels innerhalb des isolierenden Körpers (102) zu bestimmen.

**9.** Tragbarer Behälter (100, 200) nach Anspruch 1, wobei die Temperaturregelungs-Engine (218) dazu dient, eine Mehrzahl von Bestandteilen des Lebensmittels innerhalb des isolierenden Körpers (102) zu bestimmen, um eine Qualität des Nahrungsmittels zu bestimmen.

**10.** Tragbarer Behälter (100, 200) nach Anspruch 1, wobei der tragbare Behälter (100, 200) einen drahtlosen Transceiver (230) umfasst, um mit einer elektronischen Vorrichtung zu kommunizieren.

## Revendications

**1.** Contenant portable (100, 200) comprenant :

un corps isolant (102) pour maintenir un produit alimentaire, dans lequel le corps isolant (102) comprend une paroi interne et une paroi externe ;
un régulateur de température (110) disposé en-

tre la paroi interne et la paroi externe du corps isolant (102) ;
une pluralité de capteurs de température (202) disposés dans la paroi interne du corps isolant (102), la pluralité de capteurs de température (202) étant couplés de manière opérationnelle au régulateur de température (110) ; et
un organe de commande (210) couplé par communication au régulateur de température (110) pour réguler une température du produit alimentaire selon une température souhaitée,
l'organe de commande (210) comprenant :

un moteur d'authentification (214) pour authentifier un utilisateur avant de permettre à l'utilisateur d'actionner le contenant portable (100), dans lequel l'authentification de l'utilisateur est basée sur des références stockées dans un profil de l'utilisateur,
**caractérisé en ce que** :

le profil comprend également des informations appartenant à une préférence de l'utilisateur par rapport au produit alimentaire contenu dans le corps isolant ; et
dans lequel l'organe de commande (210) comprend en outre :
un moteur de régulation de température (218) pour :

identifier un type du produit alimentaire dans le contenant portable ; et
suite à l'identification du type du produit alimentaire, déterminer une quantité du produit alimentaire dans le contenant portable (100, 200), sur la base de la détermination de la quantité du produit alimentaire automatiquement réglée à la température souhaitée du produit alimentaire.

**2.** Contenant portable (100, 200) selon la revendication 1, dans lequel le contenant portable (100, 200) comprend un couvercle anti-éclaboussures (104) couplé, de manière amovible, à une partie supérieure (106) du corps isolant (102).

**3.** Contenant portable (100, 200) selon la revendication 1, dans lequel le moteur d'authentification (214) comprend un mécanisme d'authentification biométrique.

**4.** Contenant portable (100, 200) selon la revendication 1, dans lequel le contenant portable (100, 200) comprend :

une unité de chargement (112) positionnée au niveau d'une partie inférieure (114) du corps isolant (102) pour charger le contenant portable (100, 200) ; et
un élément de stockage d'énergie (116) couplé à l'unité de chargement (112).

**5.** Contenant portable (100, 200) selon la revendication 4, dans lequel l'unité de chargement (112) comprend une bobine sans fil.

**6.** Contenant portable (100, 200) selon la revendication 4, dans lequel l'organe de commande (210) comprend un moteur de surveillance (216) pour, suite à l'authentification de l'utilisateur :

surveiller une température de l'élément de stockage d'énergie (116) ; et
arrêter l'alimentation d'énergie pour le contenant portable (100, 200) lorsqu'une température de l'élément de stockage d'énergie (116) monte au-dessus d'une plage de seuil prédéfinie.

**7.** Contenant portable (100, 200) selon la revendication 4, dans lequel l'organe de commande (210) comprend un moteur de surveillance (216) pour, une fois que l'utilisateur est authentifié :

vérifier que le contenant portable (100, 200) est alimenté par l'élément de stockage d'énergie (116) ;
après la vérification, déterminer un niveau d'alimentation de l'élément de stockage d'énergie (116) ; et
sur la base de la détermination que le niveau d'énergie de l'élément de stockage d'énergie (116) est au-dessus d'un seuil prédéfini, mettre en marche le contenant portable (100).

**8.** Contenant portable (100, 200) selon la revendication 1, dans lequel, afin de déterminer la quantité du produit alimentaire, le moteur de régulation de température (218) doit :

détecter un poids initial du produit alimentaire dans le corps isolant (102) ;
stocker le poids initial dans un journal maintenu par le contenant portable (100, 200) pour un utilisateur spécifique ;
identifier, à intervalles prédéfinis, un poids courant du produit alimentaire dans le corps isolant (102) ; et
comparer le poids initial et le poids courant du produit alimentaire afin de déterminer une quantité du produit alimentaire dans le corps isolant (102).

**9.** Contenant portable (100, 200) selon la revendication

1, dans lequel le moteur de régulation de température (218) doit déterminer une pluralité de constituants du produit alimentaire dans le corps isolant (102) afin de déterminer une qualité du produit alimentaire.

**10.** Contenant portable (100, 200) selon la revendication 1, dans lequel le contenant portable (100, 200) comprend un émetteur-récepteur sans fil (230) pour communiquer avec un dispositif électronique.

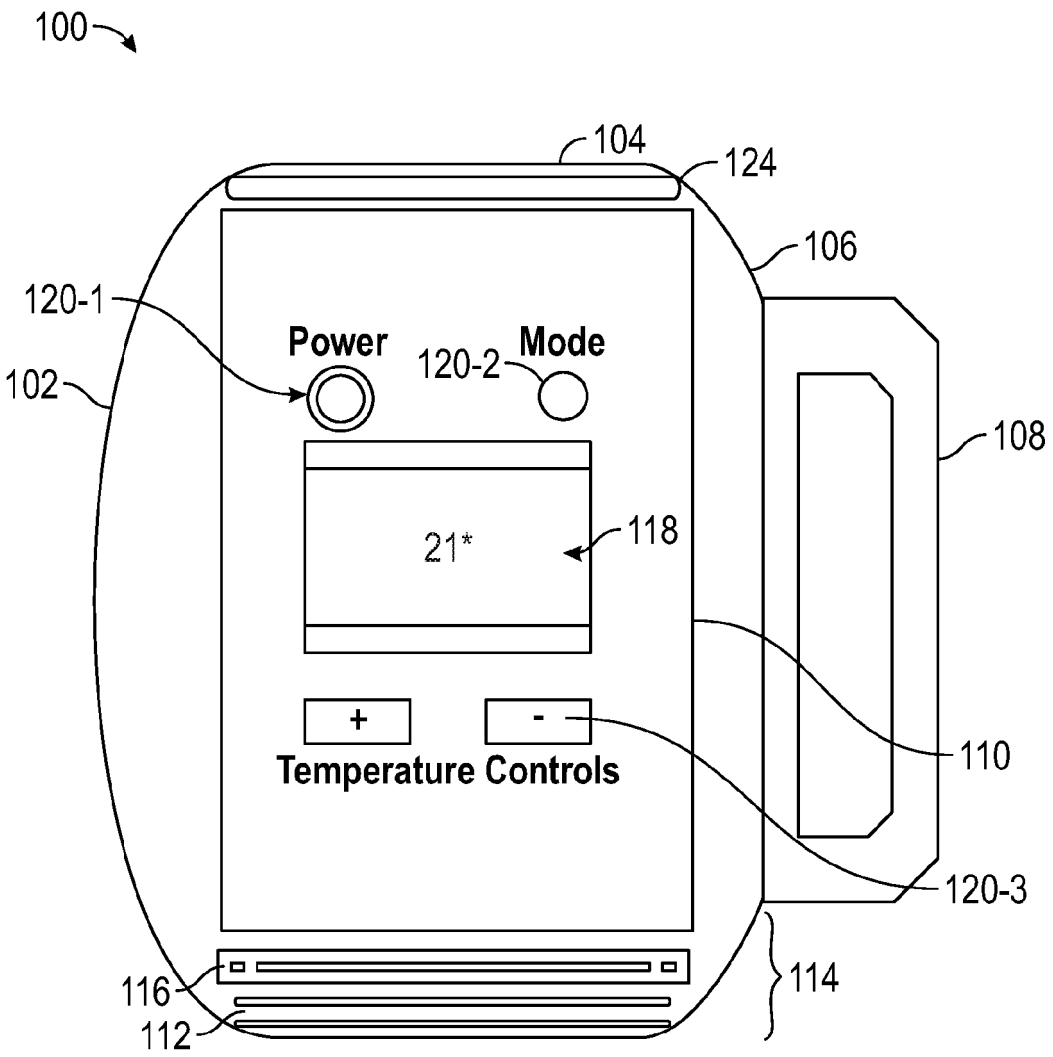
100
104
124
106
120-1
Power
120-2
Mode
102
108
21*
118
+
-
Temperature Controls
110
120-3
116
112
114

FIG. 1

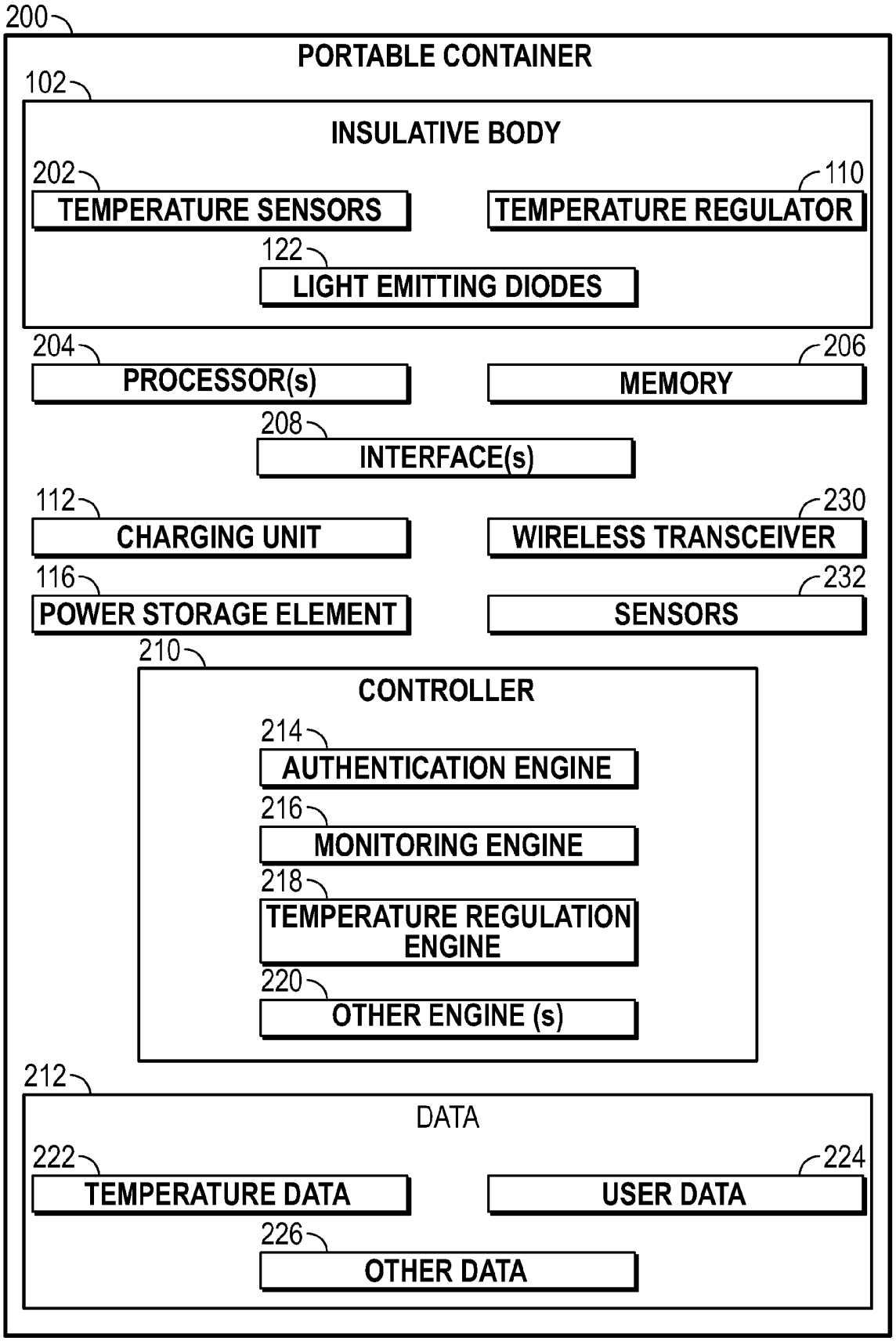
200
PORTABLE CONTAINER
102
INSULATIVE BODY
202
TEMPERATURE SENSORS
110
TEMPERATURE REGULATOR
122
LIGHT EMITTING DIODES
204
PROCESSOR(s)
206
MEMORY
208
INTERFACE(s)
112
CHARGING UNIT
230
WIRELESS TRANSCEIVER
116
POWER STORAGE ELEMENT
232
SENSORS
210
CONTROLLER
214
AUTHENTICATION ENGINE
216
MONITORING ENGINE
218
TEMPERATURE REGULATION ENGINE
220
OTHER ENGINE (s)
212
DATA
222
TEMPERATURE DATA
224
USER DATA
226
OTHER DATA

FIG. 2

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- US 4453385 A **[0002]**
- WO 2005096869 A1 **[0002]**