SYSTEM AND METHODS FOR MANAGING A CONTAINER OR ITS CONTENTS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 61/901,133 filed November 7, 2013, U.S. Design Application No. 29/486,557 filed March 31, 2014, U.S. Design Application No. 29/486,563 filed March 31, 2014, U.S. Provisional Application No. 61/974,230 filed April 2, 2014, U.S. Provisional Application No. 62/003,409 filed May 27, 2014, and U.S. Design Application No. 29/499,405 filed August 14, 2014, each of which is incorporated by reference in its entirety.

FIELD OF THE INVENTION

The present invention relates generally to a container management system, embodiments of which are configured to communicate with or include a computer system.

BACKGROUND OF THE INVENTION

Consumers often use containers to store food, beverages, other consumable products, cleaning products, and other non-consumable products. Basic containers permit the consumer only to store a product, but typically provide little information about the current status or historical status of the product.

For example, a basic beverage container may be configured to store a beverage. However, to obtain information about the current status of the beverage or its container, the consumer typically must physically manipulate the beverage container. As an example, to test the temperature of the beverage in the container, the consumer might touch the outside of the container, drink some of the beverage, pour a small amount of the beverage onto their hand, or dip a finger into the beverage. If the beverage is too hot, such "testing" methods might

cause a burn. Also, such testing methods may be unsanitary or otherwise contaminate the beverage.

Some more advanced containers may include a thermometer positioned within the container so that the consumer can assess the temperature without risking a burn or contaminating the beverage. However, even such advanced containers generally permit the consumer to view the temperature reading only from the thermometer itself or an integrated thermometer output display. Such containers generally lack the ability to track the temperature readings over time or permit the consumer to ascertain the temperature of the beverage from a remote location (e.g., while container is in a car and consumer is running errands).

Another disadvantage of known beverage containers is the possibility of spilling or otherwise inadvertently releasing some of the beverage from the container. Certain types of lids are designed to minimize spilling. For example, such lids may include a removable barrier positionable over a pour spout or drinking opening. However, such lids do not effectively minimize spillage if the barrier is not in place when the container tips over.

Clearly, there is a need for a container management system configured to permit detecting, tracking, recording, and communicating information about the container or its contents, such information which may include temperature of the container contents or instructions to automatically cover a lid opening. Certain embodiments of the present invention satisfy this need.

SUMMARY OF THE INVENTION

Certain embodiments of a container management system and related methods include a container system having a lid or a retainer, either of which may be configured to communicate with or include a computer system. The container management system also may be comprised of various sensors, action elements, computer elements, and additional components, which are described in more detail below.

According to a first aspect of the present invention, there is provided a container management system, comprising: a lid configured to removably connect to a retainer, the lid including: a lid shell element having a dispensing aperture, and a lid support element, each of which are configured to be securable together using securement elements; an interior lid compartment formed between the lid shell element and the lid support element when the lid shell element and the lid support element are secured together; internal computer elements, including at least a processor and system memory, positioned in the interior lid compartment; and a first sensor to: detect information about the lid, the retainer, or contents of the retainer; and communicate with at least one of the computer elements, wherein the first sensor either is positioned in the interior lid compartment or is physically attached to the lid.

According to a second aspect of the present invention, there is provided an advanced container management system, comprising: a lid configured to removably connect to a retainer defining a retainer space, the lid including a dispensing aperture and a lid support element, wherein at least some portion of the lid support element is sized and shaped to extend into the retainer space when the lid is removably connected to the retainer, thereby permitting a first sensor to be exposed directly or indirectly to the contents of the retainer while simultaneously being supported by the lid support element; a first sensor to detect information about the lid, the retainer, or contents of the retainer and configured to communicate with an external computer system, wherein the first sensor is positioned in the lid support element.

According to a third aspect of the present invention, there is provided an improved container management system including a retainer and a lid having a lid opening configured as a drink aperture, comprising: a processor; a system memory in communication with the processor via a communication infrastructure and storing instructions that, when executed by the processor, cause the processor to: receive detected information obtained by a sensor about the lid, the retainer, or contents of the retainer; and activate an action element in response to the detected information, wherein said action element is an open/close lid

opening assembly configured to block or unblock said drink aperture in response to receiving certain detected information.

According to a fourth aspect of the present invention, there is provided an upgraded container management system, comprising: a lid having a dispensing aperture, wherein the lid is configured to removably connect to a retainer, a sensor to detect information about the lid, the retainer, or contents of the retainer and configured to communicate with one or more internal computer elements; the one or more internal computer elements, including at least a processor, positioned in a compartment within the lid or a compartment within the retainer and configured to communicate with the sensor and with an application software executed by the processor or an external computer system.

aperture. The dispensing aperture may include a pour aperture, pour spout, drink aperture, drink spout, faucet spout, spray spout, straw, push-pull cap, nozzle, other aperture, to name a few examples. Certain embodiments of a lid may have additional lid edges defining additional lid openings such as a vent aperture, or system output aperture such as a display element aperture, lid input element aperture, or a computer element aperture. Any aperture configured to receive another element may be sized and shaped such that an appropriate sealing element may be positioned to generally seal (or minimize leakage in) the space between the lid edge and the other element.

In certain embodiments, the lid includes a lid body having a single unit construction, while in other embodiments the lid body has multiple components. A multi-component lid body may include a lid shell element, a lid handle element, and a lid support element. A lid shell element may form the uppermost or outermost part of the lid. A lid handle element is a component configured to permit a user to easily grip or lift the container system. A lid support element may be configured to provide a frame for certain other elements of the system, if present, such as the lid shell, any sensors, action elements, or computer elements.

Certain embodiments of a retainer or lid include a vent aperture configured to release pressure from the retainer space. Each vent aperture may include a valve configured to minimize spilling of the beverage from the container system. Also a vent aperture may be positioned to minimize spilling of the beverage from the container system.

The system and methods according to embodiments of the present invention may include one or more sensors, each configured to detect a characteristic or event related to the retainer, lid, or contents of the retainer. Each sensor may be disposed in or on a lid or a retainer or may be suspended from a lid or retainer. Each sensor may be configurable to detect some condition at certain regular or irregular time intervals, upon response to detecting a first condition (e.g., upon detecting change in orientation, detecting a certain volume; upon detecting a change in GPS location; detecting a certain temperature; etc.), upon receiving a request for information,

container system via a map display); restaurant information including a menu or price information (in addition to restaurant location information identified above); or standards information such as the standard temperature at which people usually wish to consume a beverage, standard temperature at which a beverage is too hot or too cold for safe consumption, standard time after which a beverage or other product is considered stale or otherwise no longer desirable, standard amount of beverage (e.g., water) considered as healthy or hydrated, standard amount of disposable water bottles used by consumers, standard cost of coffee at restaurant or coffee shop; standard amount of cardboard used in typical to-go coffee/tea cup, etc.

The system and methods according to embodiments of the present invention also may include certain action elements configured to cause some physical or chemical change to the retainer, lid, product, or other contents of the retainer. Action elements may be disposed in or on the retainer, lid, or both. Certain embodiments of an action element may be configured to be activated automatically, manually, or both. Examples of an action element include an open/close lid opening assembly, a lid removal assembly, a heating element, a cooling element, a stirring element, an inner compartment door element, a treatment element, or other.

An open/close lid opening assembly may be configured to block or unblock a lid opening according to whether the lid opening is open (unblocked) or closed (blocked). Certain embodiments of the open/close lid opening assembly are configurable to automatically open or close the lid opening in response information detected by one or more sensors or in response to a user input. Such "automatic" embodiments of an open/close lid opening assembly may include a motor configured to rotate a crank, which is in mechanical communication with an actuator element. The actuator element may be disposed to directly block or unblock the lid opening or may be configured to cause movement of a lever arm assembly, which is disposed to block or unblock the lid opening. Automatic embodiments of an open/close lid opening assembly may include a lid input element such as a touchscreen, touch surface (e.g., push button, capacitive surface), roller-ball, keyboard key, switch, or other element

configured to permit a user to input information, such as settings of the automatic embodiments, into the system.

Other embodiments of the open/close lid opening assembly may be configured to permit opening or closing the lid opening manually. For example, such embodiments may include a push button, which, when depressed, is disposed to physically change the position of a lid opening obstruction element.

Overall, many configurations of an open/close lid opening assembly are possible ~~and within the scope of the present invention~~.

Additional types of action elements are described below.

A lid removal assembly may be one or more components configured to automatically or manually disconnect the lid (either partially or completely) from the retainer or removably connect the lid to the retainer. As an example, in certain embodiments, a lid removal assembly may be configured to cause a lid *hinged to a retainer to disengage from the retainer at all points except the hinge* and may removably reconnect the lid and retainer as well. In another example, a lid removal assembly may be configured to completely remove a threadably connectable lid from a retainer.

A heating element may be a resistive heater, heating wire or coil, thermoelectric heater, or other type of heater configured to increase the temperature of the retainer, lid, product, or other contents of the retainer.

A cooling element may be a refrigerant, ice unit, fan, or other cooling mechanism configured to decrease the temperature of the retainer, lid, product, or other contents of the retainer.

A stirring element may be configured and disposed to mix a product or move around a product within the retainer. Examples of a stirring element include a stirring rod, a straw, a magnetic stirrer, a vibration unit, or other.

An inner compartment door element may be a wall section or flap configured to divide the retainer or lid into one or more separate compartments. Upon activation, the wall section or flap may be configured to automatically or manually change position to provide access or prohibit access to the compartment.

A treatment element may include a filtering element, ultraviolet element, other purifying element, flavor emitting element, fragrance emitting element, liquid conditioning element, cleaning element, or other treatment of the lid, retainer, product, or other contents of the retainer.

Certain embodiments of the system and methods according to embodiments of the present invention include one or more computer elements. Examples of computer elements include a processor, system memory, cache, system bus, chasses, fan, power source, basic input/output system (BIOS), hard disk drive, optical disk drive, non-transitory computer-readable medium, and USB or serial port.

Computer elements disposed in or on the lid or retainer are termed "internal computer elements," and computer elements that are generally separate from the lid and retainer are termed "external computer elements" for purposes of this application. A group of internal computer elements or a group of external computer elements may form an internal computer system or an external computer system, respectively, or "computer systems" generally. The system and methods according to embodiments of the present invention may include any type of computer system.

Examples of an external computer system include a desktop computer, laptop computer, netbook computer, personal digital assistant, tablet, smartphone, certain other types of cellular telephone, MP3 player, wearable computer unit (e.g., head-mounted unit such as a Google Glass® unit, computerized wristwatch, computerized glove, computerized shoe, e-textiles, etc.), or other handheld or personal computing device. Also, two or more external computer systems may be networked to form a cloud computing system.

Certain embodiments of the present invention may include additional components. For example, embodiments of the present invention may include a power source, such as a battery, capacitor, flywheel, RFID circuit, solar cell, generator (e.g., micro generator, thermoelectric generator, inductive generator, piezoelectric generator, etc.), or power plug (e.g., two prong, three prong, European standard). Embodiments of the present invention also may include a power distributor such as a lithium-ion power distributor.

Certain embodiments of the system and methods are configured to permit a user to monitor and manage one or more than one container system. Such embodiments may permit assigning a name or title to each container system in the user interface. Also, embodiments of the present invention may be configured for personal use (e.g., one user manages their personal water bottle and personal insulated mug), for family use (e.g., one user manages personal mug, spouse's tumbler, plus kids' water bottles), for restaurant or business use (e.g., one or more users manage multiple coffee pitchers/pump pots at a restaurant or business location), or for franchise use (e.g., franchise owner can track and review coffeepot volume/refill/temperature/cleaning information at various locations).

~~One object of certain embodiments~~ Embodiments of the present invention ~~is~~seek to permit a user to manage one or more container systems or components thereof.

~~Another object of certain embodiments~~ Embodiments of the present invention ~~is~~seek to automatically close a lid opening upon detecting certain sensor detected information. For example, certain embodiments of the present invention may be configured to automatically close a lid opening upon detecting certain spilling conditions such as the associated retainer is falling over or otherwise is in a spilling orientation. As another example, certain embodiments of the present invention may be configured to automatically close a lid opening upon detecting a temperature is above or below a certain threshold temperature or within a certain undesirable temperature range (e.g., threshold temperature or temperature range may be set by user or by manufacturer).

~~Another object of certain embodiments~~ Embodiments of the present invention ~~is~~also seek to automatically open a lid opening upon detecting certain sensor detected information. For example, certain embodiments of the present invention may be configured to automatically open a lid opening upon detecting certain "drinking" conditions such as the associated retainer is in a drinking orientation, the user's lips are touching a lid surface, or the temperature is within a certain temperature range or above or below a certain threshold temperature. Drinking conditions may be identified by detecting the orientation, the speed with which the

orientation was reached, the speed of travel, whether the orientation is typical for drinking (e.g., if the drinking opening is off-center the user would typically orient the beverage container in such a manner that the beverage travels the least distance to reach the user's mouth), whether the a person's lip is touching a lid surface, the temperature of the beverage, other information detected by the sensors, a combination of information gathered by the sensors, or user input information.

~~Another object of certain embodiments~~ Embodiments of the present invention ~~is~~also seek to permit a user to identify the geographic location of a container system (for example, to facilitate finding a lost container system).

~~Another object of certain embodiments~~ Embodiments of the present invention ~~is~~also seek to permit a user to detect, track, record, review, and communicate information about a container system or its contents.

~~The~~Embodiments of the present invention and its attributes and advantages will be further understood and appreciated with reference to the detailed description below of presently contemplated embodiments, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiments of the invention will be described in conjunction with the appended drawings provided to illustrate and not to the limit the invention, where like designations denote like elements, and in which:

FIG. 1A illustrates a general depiction of an embodiment of a container management system;

FIG. 1B illustrates a general depiction of another embodiment of a container management system;

FIG. 1C illustrates a general depiction of an additional of a container management system;

FIG. 1D illustrates a general depiction of yet another embodiment of a container management system;