

INGREDIENT SUPPLY SYSTEM FOR DISPENSING AN INGREDIENT INTO A CONTAINER

BACKGROUND OF THE INVENTION

[001] Water is crucial for the human being. Every system in the body depends on water. The human body made up of between 55 and 75 percent water, is in need of timely water replenishment. Lack of water can lead to dehydration, a condition that occurs when someone does not have enough water in his/her body to carry on normal functions. Even mild dehydration - as little as a 1 percent to 2 percent loss of the body weight – can exhaust the energy and make a person tired. Dehydration poses a particular health risk for the very young and the very old. Signs and symptoms of dehydration includes but not limited to excessive thirst, fatigue, headache, dry mouth, little or no urination, muscle weakness, dizziness etc. People seem to carry bottled water everywhere they go. Health practitioners all over the world suggest drinking at least eight glasses of water a day.

[002] Adding supplements such as vitamins, minerals, salts, oil etc. to water may have several major advantages. The major reasons for drinking water includes maintaining the balance of body fluids, controlling calories, energizing muscles, maintaining skin quality, and the like. Accordingly, adding supplements such as vitamins and minerals may help in maintaining many of these functions. Adding active and non-active supplements such as medicine, flavors, vitamins, syrup, salts, isotones, food coloring, minerals and nutrients are to liquids such as water, juices or other beverages adds benefits, particularly those useful for the health of the consumer.

SUMMARY OF THE INVENTION

[003] Aspects of the invention are related to an ingredient supply system for a container for beverages. The system may include: a cap holding: an ingredient compartment, a nozzle; a dispenser for dispensing the ingredient from the ingredient compartment via the nozzle to the container, a first sensor for measuring an amount of liquid in the container and a controller. The controller may be configured to: receive an initiation signal, receive a measurement of the amount of the liquid in the container, receive an ingredient profile, calculate a first amount of ingredient to be dispensed to the liquid in the container by the dispenser, based on the measured amount and the ingredient profile and control the dispenser to add the first amount of ingredient to the liquid.

[004] Other aspects of the invention are related to a method of controlling an ingredient supply system for a container for beverages. The method may include: receiving an initiation signal, receiving a measurement of the amount of the liquid in the container, receiving an ingredient profile, calculating a first amount of ingredient to be dispensed to the liquid in the container by the dispenser, based on the measured amount and the ingredient profile and controlling the dispenser to add the first amount of ingredient to the liquid.

BRIEF DESCRIPTION OF THE DRAWINGS

[005] The subject matter regarded as the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, together with objects, features, and advantages thereof, may best be understood by reference to the following detailed description when read with the accompanying drawings in which:

[006] Fig. 1 is an illustration of an ingredient supply system for a container according to some embodiments of the invention;

[007] Fig. 2A is an illustration of a side cross section view of the ingredient supply system of Fig. 1 according to some embodiments of the invention;

[008] Fig. 2B is an illustration of a side view of the ingredient supply system of Fig. 1 according to some embodiments of the invention;

[009] Fig. 3 is an illustration of an ingredient compartment and a nozzle of the ingredient supply system of Fig. 1 according to some embodiments of the invention;

[0010] Fig. 4 is an illustration of an ingredient supply system for a container according to some embodiments of the invention; and

[0011] Fig. 5 is a flowchart of a method of controlling ingredient supply system for a container according to some embodiments of the invention.

[0012] It will be appreciated that for simplicity and clarity of illustration, elements shown in the figures have not necessarily been drawn to scale. For example, the dimensions of some of the elements may be exaggerated relative to other elements for clarity. Further, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0013] In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by those skilled in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, and components have not been described in detail so as not to obscure the present invention.

[0014] Fig. 1 is an illustration of an ingredient supply system for a container for beverages according to some embodiments of the invention. A system 100 may be assembled or connected (e.g., screwed) on top of a container 102 comprising a neck 108. System 100

may be in wireless communication with a user device 104, for example, a smartphone, a tablet, a smartwatch etc. In some embodiments, system 100 includes a cap 110 for holding: an ingredient compartment 130, a nozzle 132, a dispenser 116 for dispensing the ingredient from ingredient compartment 130 via nozzle 132 to container 102, a first sensor 134, a second sensor 136 and a controller 114.

[0015] Cap 110 may be configured to be assembled or attached to container 102 in such way that may allow the passage of a liquid (e.g., a beverage) from container 102, through neck 108, for example, towards a user for drinking a beverage, as illustrated in Fig. 2B. Cap 110 may include an ergonomic opening 126 of the cap 110 and an indent 124 for holding second sensor 136. Returning to Fig. 1, cap 110 may further be designed to hold and support various components of system 100. Cap 110 may include a printed circuit board (PCB) 112 having a nozzle slot 128, for holding and connecting, dispenser 116, first sensor 134, second sensor 135 and controller 114. PCB 112 may further hold and connect a communication unit (not illustrated) to wirelessly communicate with user device 104, for example, using Bluetooth, Bluetooth smart (BLE), Li-Fi, Wi-Fi, ANT, ZigBee, or any other proprietary communication protocol/frequency (band).

[0016] Controller 114 may include any processing unit (i.e., a processor) such as CPU a chip or the like configured to execute instructions stored in a memory included or associated with controller 114. The memory may store instruction to be executed by the processing unit of controller 114 according to some embodiments of the invention, for example, according to some of the operations of the flowchart of Fig. 5. The memory may further store data related to container 102, the user, the ingredient and/or the liquid (e.g., a beverage).

[0017] In some embodiments, ingredient compartment 130 is configured to be attached and detached from cap 110. Ingredient compartment 130 may be a dispensable capsule that can be replaced with a new capsule after being use. The user may select to attach to cap 110 one of several types of capsules. For example, the user may select to attach a capsule that includes an ingredient having orange flavor and vitamin C.

[0018] In some embodiments, dispenser 116 creates a pressure on the nozzle 132 to receive ingredient from compartment 130 and then further the ingredient passes through nozzle 132 and is dispensed into container 102. Examples of dispenser 116 include but not limited to: dispensing pump, electronic controlled valve, MEMS tipping module etc. The arrangements of dispenser 116 with respect to nozzle 132 and compartment 130 is better understood from the illustration in Fig. 2A.

[0019] In some embodiments, first sensor 134 is to measure the amount of liquid in container 102. Examples for first sensor 134 include but not limited to an optical sensor, a capacitive sensor, and an ultrasonic sensor. First sensor 134 may measure the level of liquid in container 102.

[0020] In some embodiments, second sensor 136 is disposed in indent 124 and detects the opening and closure of ergonomic opening 126 of cap 110, the attachment or detachment of cap 110 from container 102 and the like. Sensor 136 includes but not limited to touch sensor, a gyro sensor, a vibration sensor, magnetic sensor, optical sensor, and an electro-mechanic sensor.

[0021] In some embodiments, system 100 includes an output unit 138. Output unit 138 may include but not limited to an audio unit for generating audio signals on receiving reminder signals from controller 114, one or more light emitting sources connected to illuminate on receiving reminding signals from controller 114, and a vibration unit to produce vibration

signals on receiving reminding signals from the controller 114. Examples of light emitting sources include but not limited to LED, organic lighting and florescent effect; and examples of audio unit include but not limited to speakers, buzzer, piezoelectric buzzer etc.

[0022] In some embodiments, cap 100 includes a housing unit 122 for housing a battery holder 120, a battery 118, dispenser 116, controller 114 and printed circuit board 112. Housing unit 122 may include compartment 130 for storing the ingredient and nozzle 132 protruding from compartment 130 passes through nozzle receiving slot 128, dispenser 116 and neck 108 for transferring the ingredient into the container 102.

[0023] Reference is now made to Fig. 3 which is an illustration of a side perspective view of a housing unit 122 in accordance with some embodiments of the invention. An ingredient 302 is stored inside compartment 130. Examples of ingredient 302 include but not limited to medicine, flavors, vitamins, syrup, salts, isotones, food coloring, minerals and nutrients.

[0024] Reference is now made to Fig. 4 which is an illustration of an ingredient supply system for a container for beverages according to some embodiments of the invention. A system 400 may include substantially the same components as system 100. System 400 may be assembled or connected (e.g., screwed) on top of a container 402 comprising a neck 408. System 400 may be in wireless communication with a user device 404, for example, a smartphone, a tablet, a smartwatch etc. In some embodiments, system 400 includes a cap 410 for holding an ingredient compartment 430, a nozzle 432 and a dispenser 416 for dispensing the ingredient from the ingredient compartment via nozzle 408 to the container. In some embodiments, cap 410 includes an ergonomic opening 426. In some embodiments, system 400 includes a first sensor, such as sensor 134 a second sensor, such as sensor 136 and a controller such as controller 114 (illustrated in Fig. 1).

[0025] In some embodiments, system 400 further includes a collector assembly 423 positioned within neck 408 of the container 402. Collector assembly 423 may include a collector 425, a first thread 427 and a second thread 429. Collector 425 may receive ingredient from nozzle 432 through neck 408. Collector 425 may have a first side 425a and a second side 425b. In some embodiments, first thread 427 is to connect first side 425a of collector 425 to neck 408 and second thread 429 to connect second side 425b of collector 425 to neck 408. In some embodiments, first thread 427 and second thread 429 maintain the position of collector 425 parallel to the indent.

[0026] In some embodiments, a purpose of moving the ingredient inside collector 425 is to avoid the mixing of the ingredient with the liquid (e.g., beverage) in container 402. The user can easily consume the ingredient with the beverage without dropping the ingredient into the beverage. For example, the ingredient is an oil based vitamin, such as Omega 3 or vitamin E, which is to be drunk with water but, cannot be mixed with the water and therefore the oil based vitamin is dropped in the container to tilt it slightly on the top layer of the water and to be drunk through the neck 408 of the container 402. In some embodiments, water based ingredients are also added using collector 425 to assure that the entire amount of ingredient (e.g., vitamins) are consumed by the user with the first drink from the container.

[0027] In some embodiments, system 400 further includes a printed circuit board 412 to hold and connect, a controller (not shown in FIG. 4), dispenser 416, a battery 418, a battery holder 420 and a communication unit (not illustrated) for wirelessly communicate with user device 404. In some embodiments, printed circuit board 412 is placed on cap 410 parallel to the indent in cap 410. Printed circuit board 412 may have a nozzle receiving slot (not shown in FIG. 4).

[0028] In some embodiments, system 400 includes housing unit 422 that includes compartment 430 for storing the ingredient, nozzle 432 protruding from the compartment 430

passes through the nozzle receiving slot (not shown in FIG. 4) and neck 408 for transferring the ingredient into the container 402.

[0029] Reference is now made to Fig. 5 which is a flowchart of a method of controlling ingredient supply system for a container for beverages according to some embodiments of the invention. Embodiments of the method of Fig. 5 are performed by controller 114 included in an ingredient supply system such as system 100 and/or system 400 or by an external processor in communication with controller 114. The external processor may be included in a user device such as user device 104 or 404, or may be a server communicating with user device 104 or 404 over the internet. In operation 510, embodiments include receiving an initiation signal. The initiation signal may be received from a second sensor, such as second sensor 136. The initiation signal may include an attachment of system 100 or 400 from container 102 or 402 and the opening or closure of ergonomic opening 126 of cap 110. Upon the attachment/opening/closure controller 114 or the processor may initiate a sequence of time dependent actions. In some embodiments, the initiation signal may be received from a user device, such as user device 104 or 404. For example, the user may click on an application running on a mobile phone and associated with system 100 or 400 and initiate the sequence of time dependent actions.

[0030] In some embodiments, the following time dependent action is receiving a measurement of an amount of the liquid (e.g., beverage) in the container from a first sensor, such as sensor 134, in operation 515. Sensor 134 may measure the level of the liquid in container 102 or 402, for example, using optical signals, ultrasonic signals and the like. In operation 520, embodiments include receiving an ingredient profile. For example, when system 100 is attached to a 1/2 liter container, sensor 134 may send a measurement that 400 milliliters of liquid are currently held in the container. The

ingredient profile may be received from user device 104 or 404 via the communication unit, from an external database over the internet, or may be stored in a memory associated with controller 114 or the processor. The ingredient profile may include the material content of the ingredient (e.g., vitamins, minerals, flavors, etc.), the concentration of the materials in the ingredient, the state of the ingredient (e.g., solid powder, liquid solution, etc.) and the like.

[0031] In some embodiments, controller 114 or the processor may further receive a user profile from user device 104/404, in operation 425. The user profile may include, age, gender, medical data, geographic location and the like. In some embodiments, controller 114 or the processor may receive from user device 104/404 additional data, such as the time and date, weather reports and the like.

[0032] In operation 530, embodiments include calculating a first amount of ingredient to be dispensed to the liquid in container 102/402 by a dispenser (e.g., dispenser 116 or 416) located in cap 110/410 of container 102/402, based on the measured amount and the ingredient profile. In some embodiments, controller 114 or the processor may calculate the first amount also based on the user profile and/or the additional data.

[0033] An example for calculation the first amount of ingredient the in operation 530 was conducted for adding vitamin C to water in a 1/2 liter container, when a measurement from the first sensor indicated that the container is full. The ingredient profile includes a vitamin C that has daily ingredient dosage of 90 milligram/Day (recommended daily intake by the U.S. Food and Nutrition Board of the Institute of Medicine for men above 18 years old). The user profile included a 20 years old male weighing 70 Kg. at a height of 170 cm that is expected to consume 2 liters of water/day. Assuming that the average

number of hours the user holds or potentially drink from the container is 9 hours/day, calculation is:

$$\frac{\text{Daily Ingredient dosage}}{\text{Average number of hours with the container}} = 90 \text{ milligram} / 9 \text{ Hours} = 10 \text{ milligram} / \text{hour}$$

$$\frac{\text{Daily water intake}}{\text{Average number of hours with the container}} = 2 \text{ Liter} / 9 \text{ Hours} = 222 \text{ milliliter/Hour}$$

The calculation of the first amount of ingredient to be dispensed into a full container is 20 milligrams.

[0034] In operation 535, embodiments include controlling the dispenser to add the first amount of ingredient to the liquid. Controller 114 or the processor may control dispenser 116/416 to add the first amount (e.g., 20 milligram of vitamin C) to the liquid in the container.

[0035] In operation 540, embodiments include receiving measurements of the amount of liquid in the container from the first sensor. First sensor 134 may measure the amount of liquid in the container, following the drinking profile of the user. As long as the user drinks from the container the amount of beverage decreases with time. In operation 545, embodiments include detecting an increase in the amount of the liquid in the container. When the user refills the container with a liquid (e.g., add water) an increase in the amount of the liquid is to be detected by sensor 134.

[0036] Accordingly, the concentration of the ingredient in the liquid is reduced (sometimes dramatically) and an addition of ingredient may be required. In operation 550, embodiments include calculating a second amount of ingredient to be dispensed to the liquid in the container by the dispenser, based on the detected increase in the amount of

liquid, and the ingredient profile. In some embodiments, the calculation may further include the user's profile and additional data.

[0037] An example for the calculation of the second amount of ingredient in operation 550 was conducted for adding more vitamin C to the water in the 1/2 liter container of the previous example.

When a sensor such as sensor 134 detects a decrease of 250 milliliter an additional 250 milliliter of water was added to the container to fill it up. Accordingly, the second amount of vitamin C that needs to be added to the water in order to maintain the same concentration of vitamin C is 10 milligrams.

[0038] In operation 555, embodiments include controlling the dispenser to add the second amount of ingredient to the liquid. Controller 114 or the processor may control dispenser 116/416 to add the second amount (e.g., 10 milligrams of vitamin C) to container 102/402.

[0039] While certain features of the invention have been illustrated and described herein, many modifications, substitutions, changes, and equivalents will now occur to those of ordinary skill in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.

The invention claimed is:

1. An ingredient dispensing system for dispensing an ingredient into a container, wherein the ingredient dispensing system communicates with a computing device over a communication network, and the container includes a neck and stores material, the ingredient dispensing system comprising:
 - a cap configured to receive the neck of the container, the cap comprising an indent parallel to the neck of the container, the cap comprising an ergonomic opening;
 - a printed circuit board placed on the cap parallel to the indent in the cap, the printed circuit board having a nozzle receiving slot;
 - a controller connected to the printed circuit board programmed to release signals;
 - a dispenser connected to the printed circuit board and configured to dispense the ingredient on receiving the signal from the controller;
 - a battery to power the controller and the dispenser;
 - a battery holder for holding the battery on the printed circuit board;
 - a housing unit attached to the cap for housing the battery holder, the battery, the dispenser, the controller and the printed circuit board, the housing unit comprising:
 - a compartment for storing the ingredient; and
 - a nozzle protruding from the compartment and passing through the nozzle receiving slot, the dispenser and the neck for transferring the ingredient into the container;wherein the dispenser dispenses the ingredient in the compartment to move through the nozzle into the container on receiving the processed signals from the controller.
2. The ingredient dispensing system according to claim 1 further comprising a first sensor connected to the printed circuit board and further disposed in the indent of the cap for sensing the material level inside the container, wherein the controller communicates the received sensed signals from the first sensor to the computing device.
3. The ingredient dispensing system according to claim 1 further comprising a second sensor connected to the printed circuit board and further disposed in the indent of the cap for detecting the opening and closing of the ergonomic opening of the cap, wherein the controller communicates the received sensed signals from the second sensor to the computing device.

4. The ingredient dispensing system according to claim 2 further comprising an output unit connected to the printed circuit board for releasing output signals on receiving command from the controller.
5. The ingredient dispensing system according to claim 4 wherein the output unit releases output signals when the detected level of the material inside the container by the first sensor is below then a predefined level of the material inside the container.
6. The ingredient dispensing system according to claim 4 wherein the output unit releases output signals on exceeding a pre-stored time programmed in the controller.
7. The ingredient dispensing system according to claim 6 wherein the controller receives commands from the computing device for releasing signals for at least one of the dispenser; the output unit; the first sensor; and the second sensor.