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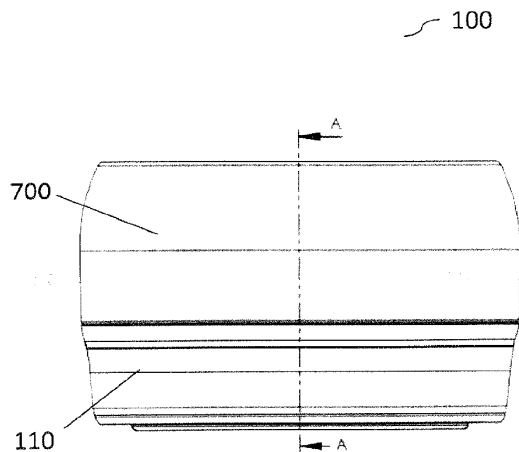


Fig. 1A

(57) Abstract: An apparatus for receiving a container, comprising: a weighing unit arranged to measure the mass of the container provided thereon during a predetermined interval; a processor arranged to possess the measured mass during the predetermined interval to provide information relating to the consumption of the content stored in the container.

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AN APPARATUS FOR RECEIVING A CONTAINER

TECHNICAL FIELD

5 The present invention relates to an apparatus for receiving a container and more particularly, although not exclusively, relates to an apparatus for receiving a container having a weighing unit arranged to measure the mass of the container provided thereon during a predetermined interval.

BACKGROUND

10 Among numerous ways to monitor a baby's growth, diet pattern has been proven to be an effective reference for infant health analysis. In Hong Kong, the Department of Health advises parents to record their baby weight and milk consumption pattern for 1.5 years. However, the present practice for tracking infant nutrition is performed by manually logging each feed with
15 a baby journal. Although one may track the infant nutrition with mobile applications, such application still requires the manual logging of the infant nutrition while the data presentation of the infant nutrition may not reflect the diet habit of the infant. Thus, the current practice still lacks accuracy to a certain extent and there remains much room for improvement in the field of infant diet tracking.

20 SUMMARY OF THE INVENTION

 To address or reduce at least some of the above problems, examples of the present invention may disclose an apparatus having a weighing unit e.g. a half bridge weight sensor for measuring the mass of the container provided thereon repetitively during a predetermined
25 interval, and a processor with an algorithm for deriving the nutritional uptake by a user from the consumed content of the container based on the measured mass accordingly.

 In accordance with a first aspect of the present invention, there is provided an apparatus for receiving a container, comprising: a weighing unit arranged to measure the mass of the container provided thereon during a predetermined interval; a processor arranged to possess the
30 measured mass during the predetermined interval to provide information relating to the consumption of the content stored in the container.

 In one embodiment of the first aspect, the weighing unit is isolated from the lower portion of the apparatus underneath.

In one embodiment of the first aspect, the weighing unit is received within a sandwich layer structure having at least an upper layer, a lower layer, and an intermediate layer therebetween.

5 In one embodiment of the first aspect, the weighing unit is mounted on the intermediate layer and the intermediate layer is mated with the upper layer.

In one embodiment of the first aspect, the lower layer includes a standing structure for stabilising the apparatus.

In one embodiment of the first aspect, the weighing unit includes a half bridge weight sensor.

10 In one embodiment of the first aspect, the accuracy of the weighing unit is calibrated by a backend comparison.

In one embodiment of the first aspect, further comprising a temperature sensing unit for measuring the temperature of the content stored in the container.

15 In one embodiment of the first aspect, the temperature of the content is measured by an infrared signal of the temperature sensing unit.

In one embodiment of the first aspect, the temperature sensing unit is provided below the container.

20 In one embodiment of the first aspect, further comprising an aperture or a transparent window between the container and the temperature sensing unit whereby the infrared signal penetrating therethrough.

In one embodiment of the first aspect, the total consumption of the content stored in one or more containers during the predetermined interval is monitored by a plurality of measured mass.

25 In one embodiment of the first aspect, each measured mass is obtained at a regular interval.

In one embodiment of the first aspect, each measured mass is obtained from the average of a plurality of successive measurements.

In one embodiment of the first aspect, further comprising an indicator for providing an indication associated with the operation of the apparatus to a user.

30 In one embodiment of the first aspect, the indication is visually depicted by a plurality of light indications with various wavelengths.

In one embodiment of the first aspect, the indicator is segregated into a plurality of partitions whereby each depicts a light indication with a unique colour.

In one embodiment of the first aspect, the indicator is a ring-shaped indicator.

In one embodiment of the first aspect, the indication is provided on a remote device in
5 communication with the apparatus.

In one embodiment of the first aspect, the indication represents the thermal status of the content relative to a predefined temperature range.

In one embodiment of the first aspect, the indicator provides a first indication when the thermal status of the content exceeds the predefined temperature range.

10 In one embodiment of the first aspect, the indicator provides a second indication when the thermal status of the content is below the predefined temperature range.

In one embodiment of the first aspect, the operation includes at least one of the power charging, pairing with a remote server or a remote device, and power on/off.

In one embodiment of the first aspect, further comprising a tilt sensing unit for sensing
15 the tilting of the apparatus.

In one embodiment of the first aspect, the weighing unit is activated or temporarily deactivated based on the measured tilt.

In one embodiment of the first aspect, the tilt sensing unit includes an accelerometer.

In one embodiment of the first aspect, the processor includes an algorithm for deriving
20 the nutrition uptake by a user through the consumption of the content stored in the container from the measured mass.

In one embodiment of the first aspect, the processor is in data communication with a database storing the data associated with at least one of the food or beverages and the user info.

In one embodiment of the first aspect, the food or beverages data includes the
25 corresponding nutrition content of various food or beverages.

In one embodiment of the first aspect, the type of food or beverages stored in the container is matched with the food or beverages data prior to the consumption.

In one embodiment of the first aspect, the total nutrition uptake by the user through a plurality of consumptions during the predetermined interval is derived from the accumulated
30 measured mass.

In one embodiment of the first aspect, the food or beverages data includes at least one of the origin, manufacturer info, and market price of the food or beverages.

In one embodiment of the first aspect, the user data includes at least one of the height, mass, head circumferences, age, and diet data of the user.

5 The height, mass, head circumferences, age, and diet data of the user applies to the user of that is taking the feed, and may be the child, infant or baby.

In one embodiment of the first aspect, further comprising a holder for receiving the container.

10 In one embodiment of the first aspect, the friction between the holder and the container restrains the movement of the container, thereby improving the accuracy of the measured mass.

In one embodiment of the first aspect, the holder includes a valve-like structure.

In one embodiment of the first aspect, the holder is made of materials with a high friction coefficient.

In one embodiment of the first aspect, the holder is made of silicon.

15 In one embodiment of the first aspect, the holder is coupled to the apparatus through a magnetic coupling.

In one embodiment of the first aspect, further comprising a pair of magnets of which each provided on the opposing surfaces of the holder and the apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

20

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1A shows a front view of the apparatus in accordance with one embodiment of the present invention;

25 Figure 1B shows a cross sectional view of the apparatus taking along the line A-A in Figure 1A;

Figure 2A shows a perspective view of the weighing device in accordance with one embodiment of the present invention;

30 Figure 2B shows a front view of the weighing device in accordance with one embodiment of the present invention;

Figure 2C shows a cross sectional view of the weighing device taking along the line A-A in Figure 2B;

Figure 2D shows an explosive view of the weighing device in Figure 2A;

Figure 3A shows a perspective view of the holder in accordance with one embodiment of
5 the present invention;

Figure 3B shows a bottom view of the holder in accordance with one embodiment of the present invention;

Figure 3C shows a cross sectional view of the holder taking along the line A-A in Figure 3B;

10 Figure 4A shows a front view of the apparatus in accordance with another embodiment of the present invention;

Figure 4B shows a cross sectional view of the apparatus taking along the line A-A in Figure 4A;

Figure 4C shows another cross sectional view of the apparatus taking along the line B-B
15 in Figure 4A;

Figure 5 is a schematic diagram showing the operation flow of the apparatus in accordance with one embodiment of the present invention; and

Figure 6 is a block diagram of the apparatus, illustrating an example of its computer processor and the data in which the processor processes.

20 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Figures 1A to 4C, there is provided an apparatus 100 for receiving a container comprising: a weighing unit 200 arranged to measure the mass of the container provided thereon during a predetermined interval; a processor 300 arranged to process the
25 measured mass during the predetermined interval to provide information relating to the consumption of the content stored in the container.

In one example embodiment of the apparatus 100, the apparatus 100 is arranged to monitor and measure the consumption of milk, juice, water or any other suitable beverage by a child, toddler or baby by weighing the mass of the contents within a feeding bottle fitted to the
30 apparatus 100 during a feed. Preferably, the bottle may be snugly fitted to the apparatus 100 by firstly inserting it snugly within a detachable holder 700, and then the holder 700, together with

the bottle may then be engaged to the apparatus 100 via a coupling arrangement that may include the use of a magnetic coupler such that the apparatus 100 may begin its interaction with the bottle to measure its mass and/or temperature or other characteristics to determine consumption of the beverage over a time interval. Thus when the user starts a feed for a child, infant or any other user, the user may alternate between a feeding position (bringing the bottle to the child so as to take the beverage) and placing the bottle onto a surface, such as a table during a feeding break. In turn the apparatus 100 may weigh the mass of the bottle during the feeding break and can determine the weight of any contents that has been consumed over an interval of time as measured from the start of the feed, or when the bottle is in the feeding position. In some alternative embodiments, the holder 700 may also be formed to be part of the apparatus 100 such that the bottle is directly engaged with the apparatus 100 when the bottle is inserted within the holder 700, thus allowing a user to manipulate the bottle with the apparatus 100 as attached to the bottle.

By measuring the consumption of the beverage by a child (calculated based on the amount of beverage that remains in the bottle as determined by the overall mass of the bottle) over a set interval of time, say the feeding time of the child by a parent or caretaker, the information can then be recorded and processed so as to assist the parent or caretaker to track the feeding patterns of the child.

Researches indicate that a baby only needs about 2.5 oz per lb of their weight per 24 hours up until they reach about 10 pounds. Preferably, the apparatus 100 may be used to keep tracking the bottle feeding progress of an infant from time to time. For instance, the apparatus 100 may include a holder arranged to snug fit a bottle with customised size. Initially, the parent or the caretaker may place an empty container horizontally on a flat, stable surface of the holder above the apparatus 100. The user may then pour the milk powder and the preheated water into the bottle, and mix up the content in the bottle vigorously until the milk powder has been fully dissolved. The parent or the caretaker may read the measured mass of the container from the apparatus 100 anytime during milk preparation.

Depending on the feeding habit of the infant, the bottle feeding may not be completed in one go. For example, the infant may not consume the milk continuously and one may even require several breaks in between. Thus, it may be particularly useful to monitor the mass of the bottle throughout a predetermined interval, i.e. the duration of the milk consumption process. Advantageously, the parent or the caretaker may retrieve the data information relevant to the content or the infant, e.g. the remaining mass in the bottle, or the consumption rate of the infant

anytime, for example during each interruption. Such information may be uploaded to the cloud database simultaneously through the apparatus 100 for further data analysis.

Preferably, the size of the holder may be tailor made to snug fit with the bottle. For example, the inner circumference of the holder may tight fit the outer circumference of the bottle, thereby ensuring the bottle is placed on the apparatus 100 securely without any tilting. Alternatively, a bottle with a much smaller outer circumference may also be securely received within the holder through an adaptor or annular ring, preferably made of resilient materials such that the bottle would not be loosened from the apparatus 100 accidentally.

In this embodiment, the apparatus 100 includes a weighing device 110 for measuring the mass of a container (not shown) provided thereon. The weighing device 110 may comprise an upper housing 112 and a lower housing 114, where the two housing portions 112 and 114 and the inner components of the weighing device 110 received therein form a sandwich layer structure 120 having an upper layer, a lower layer and an intermediate layer therebetween.

In this sandwich layer structure 120, a weighing unit 200 is positioned between the upper housing 112 and the lower housing 114 for measuring the mass of a container provided on the upper housing 112. For instance, the weighing unit 200 may be mounted on the intermediate layer, of which mates together with the upper housing 112 or the upper layer of the sandwich layer structure 120. On the other hand, the lower housing 114 may be provided a standing structure 122 underneath as a counterweight against tilting for stabilising the weighing device 110 with respect to the surface where the weighing device 110 is rested thereon. Preferably, the standing structure 122 may further include a pair of pillars 124 made of elastic materials, e.g. rubber for vibration dampening.

Preferably, the weighing unit 200 may be a high sensitivity sensor e.g. a half bridge weight sensor 200 for measuring the volume changed of the container. Advantageously, the weight sensor 200 may be arranged to contact directly only with the upper housing 112, thereby eliminating any errors associated with the weighing of the lower housing 114. For instance, the weight sensor 200 may include a pair of screws 126 for mounting the body of the weight sensor 200 to the upper housing 112 or the upper layer of the sandwich layer structure 120 through a sensor holder 202. The weighing unit 200 is thus isolated from the lower portion of the weighing device 110 underneath, and this may significantly reduce the inaccuracy of the weighing unit 200.

In one embodiment, the weighing unit 200 may measure the total mass of a container and the content stored therein. The mass of the content within each of the plurality of containers are monitored by a plurality of measured mass during the predetermined interval and the differences

between the measured mass of the same container i.e. before and after consumption, is recorded to monitor the total consumption of the content stored in one or more containers. Each measured mass may be obtained at a regular interval. Advantageously, each measured mass may be obtained from the average of a plurality of successive measurements, for example, each record
5 may be averaged from five measurements. The averaged mass may omit the uncertainty of the weighing unit 200 for filtering purpose.

Optionally, the weighing unit 200 may be calibrated by a backend comparison from time to time to maintain its measurement accuracy. For instance, the backend comparison may be conducted with the recent readings, e.g. the six recent readings to ensure that the accuracy of the
10 weighing unit 200 is maintained within its tolerance range throughout the life time.

In one embodiment, the weighing device 110 may include a temperature sensing unit 400 e.g. a noncontact temperature sensor, more preferably an infrared sensor 400 for measuring the temperature of the content stored in the container. Preferably, the infrared sensor 400 may be made of transparent plastic material, thereby allowing the infrared signal to penetrate
15 therethrough. The temperature of the content is measured by the temperature sensing unit 400 based on the infrared signal reflecting from the inner portion of the container, and each temperature measurement is recorded by the temperature sensing unit 400 for further processing.

The temperature sensing unit 400 may be provided adjacent to the container and within a readable range of the infrared radiation. For instance, the temperature sensing unit 400 may be
20 provided within the upper housing 112 below the container. Optionally, there may be provided an opening at the upper housing 112, thereby allowing the infrared signal to be emitted to the container by the temperature sensing unit 400 and the reflecting infrared signal from the container to be received by the temperature sensing unit 400 respectively.

For instance, the upper housing 112 may be provided an aperture or a transparent
25 window 130 between the container and the temperature sensing unit 400 whereby the infrared signal may penetrate therethrough. The temperature sensing unit 400 may record the temperature of the container, and in turn transmit the information associated with the temperature to the processor 300 for further processing.

In one embodiment, the weighing device 110 may include an indicator 500 for providing
30 an indication associated with the operation of the apparatus 100 to a user. For instance, the indication may be visually depicted by a plurality of light indications with various wavelengths to indicate the operation, such as the type of content stored in the container, power charging,

pairing with a remote server or a remote device, or power on/off, active mode or sleep mode of the apparatus 100.

Preferably, the indicator 500 may be a ring-shaped LED indicator 500 and more preferably transparent or at least translucent window disposed about the circumference of the weighing device 110 between the upper housing 112 and the lower housing 114. The indicator 500 may be segregated into a plurality of partitions 502, 504, 506 etc. For instance, the LED indicator 500 may be divided into 120-degree partitions along the ring 500 whereby each partition 502, 504, 506 depicts a light indication with at least one unique colour.

Optionally, each of the indicator 500 or each of the plurality of partitions 502, 504, 506 may be provided a set of multi-colour LEDs group to provide a variety of visual status indicators or visual effects associated with the colour of the LEDs, e.g. a circular movement and colour changes of LED lights which are readily observable by the user through the indicator 500 or each of the plurality of partitions 502, 504, 506.

In one embodiment, the indication of the indicator 500 may represent the thermal status of the content stored in the container relative to a predefined temperature range. For instance, the information associated with the temperature is received from the temperature sensing unit 400 by the processor 300 for further processing. Based on a predefined temperature range, the processor 300 may provide a signal to the indicator 500 for indicating the thermal status of the content relative to the predefined temperature range. For instance, the indicator 500 may provide a first indication when the thermal status of the content exceeds the predefined temperature range, and alternatively, provide a second indication when the thermal status of the content is below the predefined temperature range. Thus in this embodiment, each partition 502, 504, 506 may have a plurality of colours to indicate different information, depending on the partition and the colour as shown. Each partition may represent a unique meaning and in turn allow users to switch partition by pressing the button. For example in one preferred embodiment, the partition may be used to indicate the meal type - partition 1 Breast milk, partition 2 Formula Milk, partition 3 Water. The light indication may also have a unique colour coding system. As an example, the indicators can take the following format:

Status	Color	Partition	Light Status
Charging	Red	All	On
Fully Charged	Green	All	On
Loading	Red	1 of the partitions only indicating meal type	On

Active Mode, connected with mobile App	Blue	1 of the partitions only indicating meal type	On
Active Mode, disconnected with mobile App	White	1 of the partitions only indicating meal type	On
Active Mode, connected with mobile App, finish taking measurement	Blue	1 of the partitions only indicating meal type	Off for 0.5 second
Active Mode, disconnected with mobile App, finish taking measurement	White	1 of the partitions only indicating meal type	Off for 0.5 second

In one example application, the temperature sensing unit 400 and the indicator 500 may function together to monitor the temperature of hot content e.g. milk, thereby ensuring that the content is suitable for consumption by an infant. For instance, the temperature of the content in the container may be measured by the temperature sensing unit 400. The indicator 500 may provide a red light i.e. a first indication to indicate that the milk is too hot for the baby to consume, and on the other hand, provide a blue light i.e. a second indication to indicate that the milk is too cold for the baby to consume. Optionally, the indicator 500 may provide a green light or a colour different from the first and second indications as a third indication to indicate that the temperature of the milk is suitable for consumption.

Preferably, the indication may be depicted by the ring-shaped LED indicator 500. Alternatively, a LED indicator 410 may be located inside the temperature sensing unit 400 and underneath the upper housing 112 such that the indication may be observed by the user through the aperture or the transparent window 130, or alternatively the indication may be visible by the user through the housing 112 and 114. Optionally, the indication may also be provided in an application of a remote device (not shown) in communication with the apparatus 100.

The inventors have discovered that the mass measurement operation by the weighing unit 200 may be highly battery demanding. If the weighing unit 200 is operated continuously throughout the consumption of the content by the user, the battery of the apparatus 100 may be drained too fast and would not be able to last until the operation is completed.

In one embodiment, the weighing device 110 may include a tilt sensing unit 600, preferably an accelerometer 600 for sensing the tilting of the weighing device 110 and thus selectively activate or temporarily deactivate the apparatus 100 or at least some of the components e.g. the weighing unit 200 and the temperature sensing unit 400 or features of the apparatus 100 based on the measured tilt for power saving. For instance, when the weighing device 110 is idled (at a resting position) i.e. no tilting is detected over a predetermined interval by

the tilt sensing unit 600, the apparatus 100 would enter a sleep mode 1500. The operation of the device 100 with respect to one example method of minimizing its power consumption based on its present detected usage state is outlined in the flow diagram of Figure 5.

As shown in this example, when a slight tilting of the weighing device 110 is detected by the tilt sensing unit 600, the tilt sensing unit 600 may provide an Inertial Measurement Unit (IMU) signal 1502 to the apparatus 100 and the apparatus 100 would switch from the sleep mode 1500 to a standby mode (active) 1504 for further operations, including recording of measured data 1506 or the communication with a smartphone or computer 1508 to exchange data or upload of data to a central cloud server or system 1510 as shown in the operation flow of Figure 5. For example, the weighing unit 200 may be activated to measure the mass of the container.

Advantageously, the tilt sensing unit 600 may provide a power saving function to reduce the battery consumption of the weighing device 110 and prolong the battery life of the weighing device 110. Furthermore, the weighing unit 200 may be activated only if a tilting act has been performed by the user, such that the mass would be measured intentionally at a desirable time. Thus, this may also improve the accuracy of the measured mass and avoid any undesirable measurements when the consumption process is still in progress.

As shown with reference to Figure 6, in one embodiment, the processor 300 of the weighing device 110 may include an algorithm 310 for possessing the measured mass during the predetermined interval to provide information relating to the consumption of the content stored in the container. Preferably, the apparatus 100 may include a database 320 for storing the data associated with food or beverages. For instance, the food or beverages data may include the corresponding nutrition content, origin, manufacturer info, and expected market price of the food or beverages. The nutrition uptake by a user through the consumption of the content stored in the container may be computed by the processor 300 based on the measured mass and the data stored in the database 320. Advantageously, the total nutrition uptake by the user through a plurality of consumptions during the predetermined interval may be derived by the algorithm 310 based on the accumulated measured mass.

Preferably, the nutrition uptake by a user may be derived by the processor 300 through a nutrient consumption computation. Initially, the type of food or beverages stored in the container may be matched with the food or beverages data on the database 320 prior to the consumption and the mass measurement by the weighing unit 200. Upon the matching is completed, the processor 300 may obtain the corresponding nutrition content, e.g. the suggested milk concentration ratio from the database 320 and the algorithm 310 may then convert the

measured mass into the milk consumption by multiplying the measured mass with the obtained concentration ratio. Advantageously, the individual consumption of each nutrient from the content stored in the container such as carbohydrates, proteins, fat, and minerals may also be derived by multiplying the measured mass with the nutrition information.

5 In one example application, the database 320 may be a local database 320 for storing food and beverage information or tracking information for a specific brand of milk formula. The database 320 may be retrieved by a smart device through a barcode-reading mechanism with an imaging device, e.g. the camera of a smartphone. When the user need to input new types of food and beverage consumed or the milk formula consumed by an infant, one may input the
10 information associated with the nutrition, for example scanning the barcode on the product or milk formula packaging by the imaging device.

In the event of any missing data, the application may prompt the user to scan the barcode on the product or milk formula packaging and capture the nutrition information. Such information would be uploaded to a cloud database 330 and any missing information e.g. missing
15 item or missing brand of the formula milk would be completed by the cloud database 330. The completed information would finally be stored on the local database 320.

Optionally, the database 320 may also include the data associated with the user info, for example the social network account of the user, the infant growth data including the height, mass, head circumferences, age, and diet data of the user including the milk formula brand,
20 breastfeeding situation, feeding frequency, duration, time and volume.

Preferably, the database 320 may also include additional information obtained from the internet. Initially, the data may be obtained from online sources e.g. World Health Organisation (WHO) and the information may be possessed and presented to the user with a more accessible format in an application on a smart device. Advantageously, the data may be further possessed to
25 provide some guidance on the diet habit to the user, for example the recommended consumption volume of milk of the infant.

In one embodiment, the apparatus 100 may include a holder 700 between the container and the upper housing 112 for receiving the container thereon. Preferably, the holder 700 may be made of materials with a high friction coefficient, e.g. silicon and more preferably, in the form of
30 a ring-shaped holder 700 with a central opening 702 for the infrared signal of the temperature sensing unit 400 passing therethrough.

In this arrangement, the surface of the holder 700 may contact with the container extensively. Advantageously, the friction between the holder 700 and the container on the

contacting surface may restrain the movement of the container, thereby reducing the resulting horizontal force due to the undesirable orientation of the container and thus improve the accuracy of the measured mass.

In one embodiment, the holder 700 may further include a valve-like structure 710 at the lower portion thereof for contacting with the upper housing 112 without contacting the lower housing 114 or the outer housing 116 below the upper housing 112, as shown in Figure 4B. Advantageously, the mass of the container and the holder 700 may only be exerted on the upper housing 112 and the lower housing 114, and in turn moves the upper housing 112 and the lower housing 114 downwards. The outer housing 116 remain stationary throughout the operation.

In one embodiment, the apparatus 100 may include a magnetic coupling for coupling the holder 700 to the upper housing 112. For instance, there may be provided a pair of magnets 802 and 804, of which each being provided on the opposing contacting surfaces of the holder 700 and the upper housing 112 of the weighing device 110. Each pair of magnets 802 and 804 may be mounted with opposite polarity for providing a coupling force between the holder 700 and the adjacent upper housing 112, thereby achieving a snap-fit coupling. Optionally, the upper housing 112 may further include a press-fit locking structure for mounting the magnet 804.

Preferably, the holder 700 may be detachably mounted on and removed from the upper housing 112 through rotation, such that a unique and instant alignment of the holder 700 and upper housing 112 may be completed. Advantageously, the holder 700 and the container may be coupled to the upper housing 112 and detached therefrom readily for frequent replacement and cleaning of the container.

Alternatively, the coupling between the holder 700 and the upper housing 112 may be implemented by a screw-cap mechanism 810, as shown in Figure 4B. The outer housing 116 may be provided a screw-like outer surface 820 along the outer circumference for mounting the holder 700 thereon.

In one embodiment, the apparatus 100 may include a circuitry arrangement 900 having a circular and double-partition structure for dividing the hardware components into two compartments 910 and 920 based on the functionality to maximise the space utility. The first compartment 910 may receive the weighing unit 200, the temperature sensing unit 400 and a data processing amplifier 302. The second compartment 920 may receive the processor 300 and a Bluetooth module 930 for broadcasting its Universally Unique Identifier (UUID) and transmitting data to a paired smart device, and the tilt sensing unit 600.

Optionally, the weighing device 110 may include a home button 1000 preferably at the central bottom of the lower housing 114 positioned within an overmolded plastic 1010. For instance, the overmolded plastic 1010 may firmly attach the home button 1000 to the lower housing 114 for providing a water proof and dust proof function to the housings 112 and 114.

5 Preferably, the home button 1000 may be received within a button holder 1020, and mated to the weighing unit 200, the circuitry 900 within the upper housing 112. For instance, the home button 1000 may also be held together with the weighing unit 200, the circuitry 900 and the upper housing 112 by the pair of screws 126.

10 In one example arrangement, the home button 1000 may be pressed by the user and the press motion may be detected by a microcontroller 940 of the circuitry 900. Advantageously, the user may activate the apparatus 100 or input different parameters e.g. the type of food or beverages to the processor 300 by pressing the home button 1000 for a predefined duration or force magnitude in various scenario.

Optionally, the apparatus 100 may be powered by a rechargeable battery 1100. The battery 1100 may be charged by a power supply through a charging port 1110 e.g. a micro USB port located on the upper housing 112. The charging port 1110 may be covered by a plastic lid 1120 to offer water resistance to the apparatus 100 during normal operations. Preferably, the circuitry 900 may monitor the charging current and the overall progress. For instance, the circuitry 900 may provide a signal associated with the charging status of the apparatus 100 to the indicator 500 for presenting a visual indication to the user.

20 In one example application, the weighing device 110 may receive a container, e.g. a baby bottle or a baby trainer cup available in the market through the holder 700. The user may select the liquid type, such as breast milks, formula milk or water by pressing the home button 1000. The weighing unit 200 may measure the mass and deliver the baby consumption information to the baby logging mobile application to record the baby diet patterns.

Optionally, the baby logging mobile application may allow the manual entry of other necessary metrics such as infant height, weight, and potentially milk formula brand. The mobile application may synched with a cloud database 330, which is managed by the manufacturer and includes an algorithm for providing tailor made recommendations e.g. suggested nutritional uptake for each infant user.

30 In yet another example application, the weighing device 110 may receive an ingredient plate 701 mounted with magnets 802. When the apparatus 100 is paired with the recipes mobile application via Bluetooth module 930, the user may measure and send the measured mass of each

gradient listed in the recipes. In practice, the user first needs to select the ingredient being measured on the mobile application, thereby matching the type of ingredient to be measured with the data on the database 320. When the LED indicator 500 indicates a successful pairing, the user may put the ingredient on the ingredient plate 701. Upon successful measurement, the user
5 may repeat the same process until all the ingredients are measured. Advantageously, the mobile application may generate real-time nutrition facts of each meal. The recipes mobile application may also customise the recipe based on the user preference such as avoidance of particular food ingredients, goals on calories or other specific nutrient intake criteria.

In yet another example application, the weighing device 110 may receive directly a bottle
10 or a bowl mounted with magnets 802. The apparatus 100 may be customised for users to select their pre-set drink types by pressing the home button 1000. The beverage logging mobile application may allow the users to record a certain types of drinks and their corresponding nutrition fact. When the apparatus 100 is paired with the diet logging mobile application, the user may select the food type from the database 320, creating a new food type with the barcode
15 mechanism or beverage prepared with known ingredients. The apparatus 100 may measure the mass of the beverage and sends the consumption information to the beverage logging mobile application to record beverage consumption patterns, and to the diet logging mobile application to record diet patterns respectively.

Optionally, the apparatus 100 may provide a growth monitoring function to the user. For
20 instance, the comprehensive data on baby's growth factors on weight, length and head circumferences, infant growth trend may be plotted onto the WHO Growth Curve to determine the percentile the baby falls into, thereby monitoring the growth of the infant with respect to the overall population in the world.

Optionally, the apparatus 100 may also provide a nutrition management function to the
25 user. For instance, the apparatus 100 may correlate the infant health condition with growth and diet pattern. With a comprehensive nutrition breakdown obtained from the measured mass, the apparatus 100 may review if the infant has reached the Adequate Intake (AI) requirement or have exceeded the Upper Limit (UL). The apparatus 100 may recommend a balance diet for an infant so as to ensure the infant is under a healthy development and supplied with sufficient macro- and
30 micro-nutrients.

Optionally, the apparatus 100 may further provide an allergy prediction function to the user. For instance, the apparatus 100 may determine if the baby is potentially allergic to particular

nutrition on dairy products e.g. proteins by providing checkboxes for user to record infant allergy symptoms and referencing to the infant nutrient consumption trends.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without
5 departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

Any reference to prior art contained herein is not to be taken as an admission that the information is common general knowledge, unless otherwise indicated.

CLAIMS

1. An apparatus for receiving a container, comprising:
 - a weighing unit arranged to measure the mass of the container provided thereon during a
5 predetermined interval;
 - a processor arranged to possess the measured mass during the predetermined interval to provide information relating to the consumption of the content stored in the container.
2. The apparatus according to claim 1, wherein the weighing unit is isolated from the lower portion of the apparatus underneath.
- 10 3. The apparatus according to claim 1, wherein the weighing unit is received within a sandwich layer structure having at least an upper layer, a lower layer, and an intermediate layer therebetween.
4. The apparatus according to claim 3, wherein the weighing unit is mounted on the intermediate layer and the intermediate layer is mated with the upper layer.
- 15 5. The apparatus according to claim 3, wherein the lower layer includes a standing structure for stabilising the apparatus.
6. The apparatus according to claim 1, wherein the weighing unit includes a half bridge weight sensor.
7. The apparatus according to claim 1, wherein the accuracy of the weighing unit is
20 calibrated by a backend comparison.
8. The apparatus according to claim 1, further comprising a temperature sensing unit for measuring the temperature of the content stored in the container.
9. The apparatus according to claim 8, wherein the temperature of the content is measured by an infrared signal of the temperature sensing unit.
- 25 10. The apparatus according to claim 8, wherein the temperature sensing unit is provided below the container.
11. The apparatus according to claim 8, further comprising an aperture or a transparent window between the container and the temperature sensing unit whereby the infrared signal penetrating therethrough.

12. The apparatus according to claim 1, wherein the total consumption of the content stored in one or more containers during the predetermined interval is monitored by a plurality of measured mass.
13. The apparatus according to claim 12, wherein each measured mass is obtained at a regular interval.
14. The apparatus according to claim 12, wherein each measured mass is obtained from the average of a plurality of successive measurements.
15. The apparatus according to claim 1, further comprising an indicator for providing an indication associated with the operation of the apparatus to a user.
16. The apparatus according to claim 15, wherein the indication is visually depicted by a plurality of light indications with various wavelengths.
17. The apparatus according to claim 15, wherein the indicator is segregated into a plurality of partitions whereby each depicts a light indication with a unique colour.
18. The apparatus according to claim 15, wherein the indicator is a ring-shaped indicator.
19. The apparatus according to claim 15, wherein the indication is provided on a remote device in communication with the apparatus.
20. The apparatus according to claim 15, wherein the indication represents the thermal status of the content relative to a predefined temperature range.
21. The apparatus according to claim 20, wherein the indicator provides a first indication when the thermal status of the content exceeds the predefined temperature range.
22. The apparatus according to claim 20, wherein the indicator provides a second indication when the thermal status of the content is below the predefined temperature range.
23. The apparatus according to claim 15, wherein the operation includes at least one of the power charging, pairing with a remote server or a remote device, and power on/off.
24. The apparatus according to claim 1, further comprising a tilt sensing unit for sensing the tilting of the apparatus.
25. The apparatus according to claim 24, wherein the weighing unit is activated or temporarily deactivated based on the measured tilt.
26. The apparatus according to claim 24, wherein the tilt sensing unit includes an accelerometer.

27. The apparatus according to claim 1, wherein the processor includes an algorithm for deriving the nutrition uptake by a user through the consumption of the content stored in the container from the measured mass.
28. The apparatus according to claim 27, wherein the processor is in data communication
5 with a database storing the data associated with at least one of the food or beverages and the user info.
29. The apparatus according to claim 28, wherein the food or beverages data includes the corresponding nutrition content of various food or beverages.
30. The apparatus according to claim 29, wherein the type of food or beverages stored in the
10 container is matched with the food or beverages data prior to the consumption.
31. The apparatus according to claim 30, wherein the total nutrition uptake by the user through a plurality of consumptions during the predetermined interval is derived from the accumulated measured mass.
32. The apparatus according to claim 28, wherein the food or beverages data includes at least
15 one of the origin, manufacturer info, and market price of the food or beverages.
33. The apparatus according to claim 28, wherein the user data includes at least one of the height, mass, head circumferences, age, and diet data of the user.
34. The apparatus according to claim 1, further comprising a holder for receiving the container.
- 20 35. The apparatus according to claim 34, wherein the friction between the holder and the container restrains the movement of the container, thereby improving the accuracy of the measured mass.
36. The apparatus according to claim 34, wherein the holder includes a valve-like structure.
37. The apparatus according to claim 34, wherein the holder is made of materials with a high
25 friction coefficient.
38. The apparatus according to claim 34, wherein the holder is made of silicon.
39. The apparatus according to claim 34, wherein the holder is coupled to the apparatus through a magnetic coupling.
40. The apparatus according to claim 39, further comprising a pair of magnets of which each
30 provided on the opposing surfaces of the holder and the apparatus.

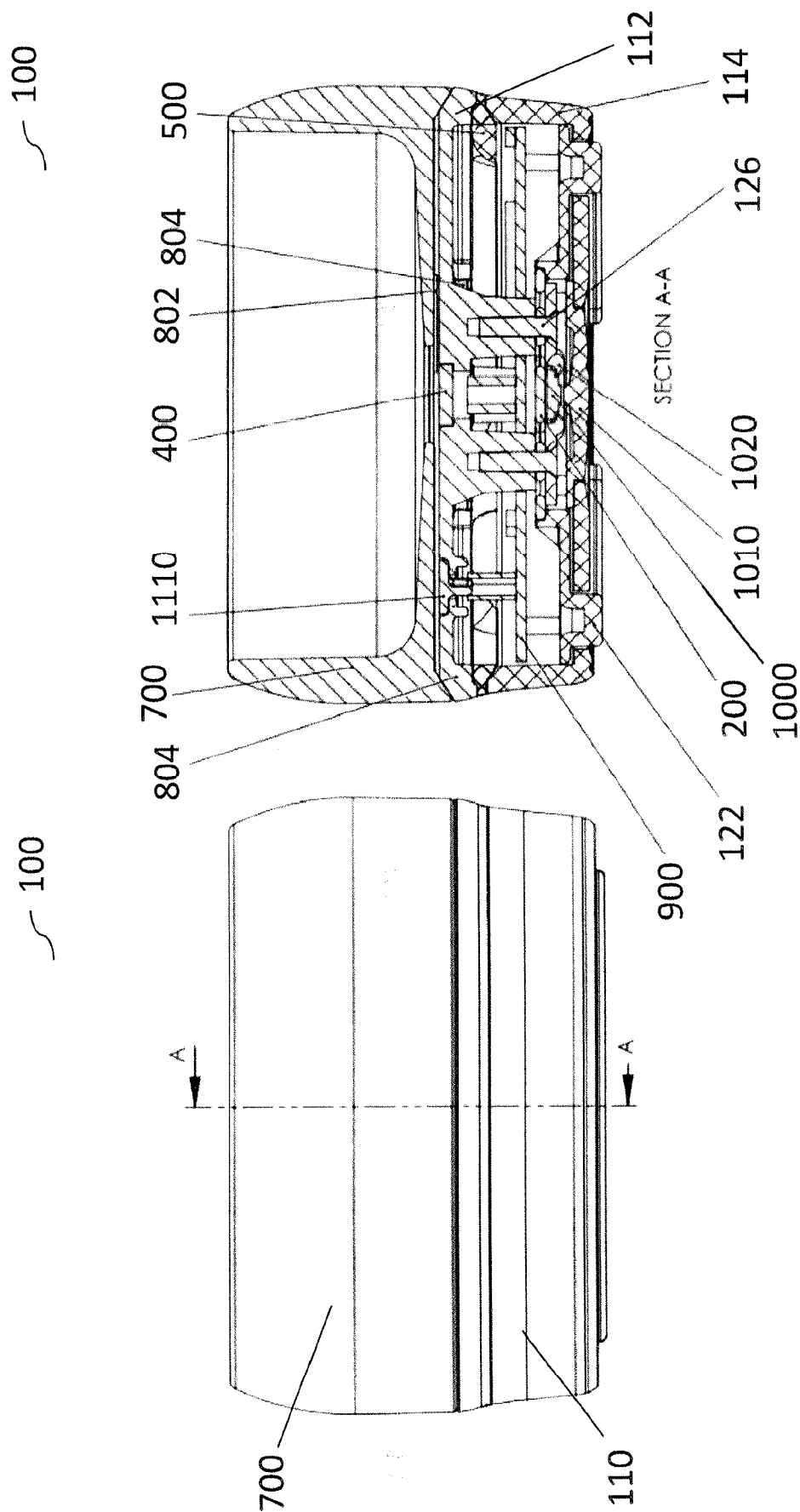
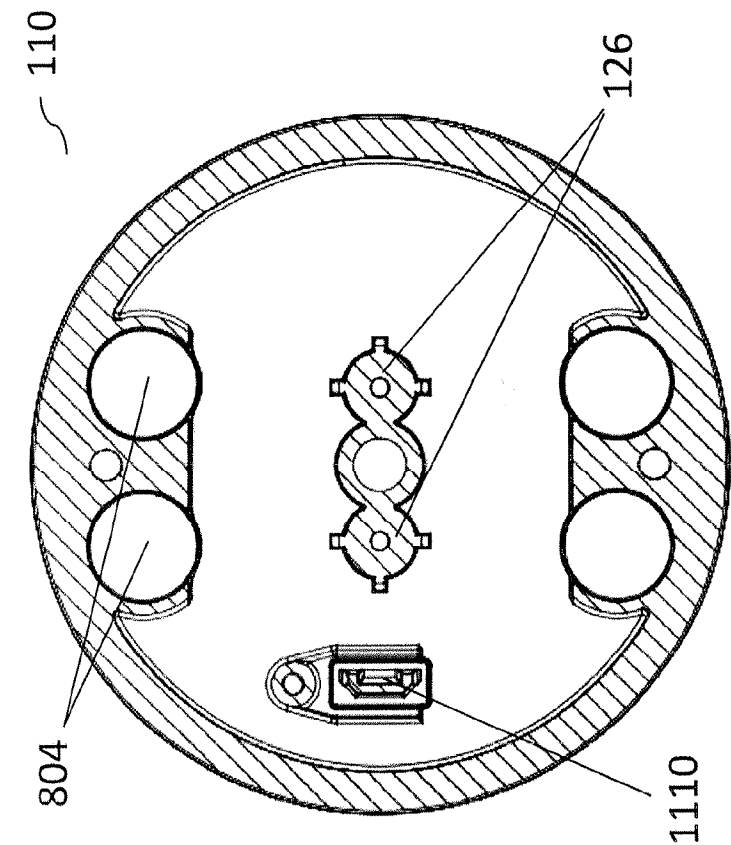


Fig.1A

Fig.1B



SECTION A-A

Fig.2C

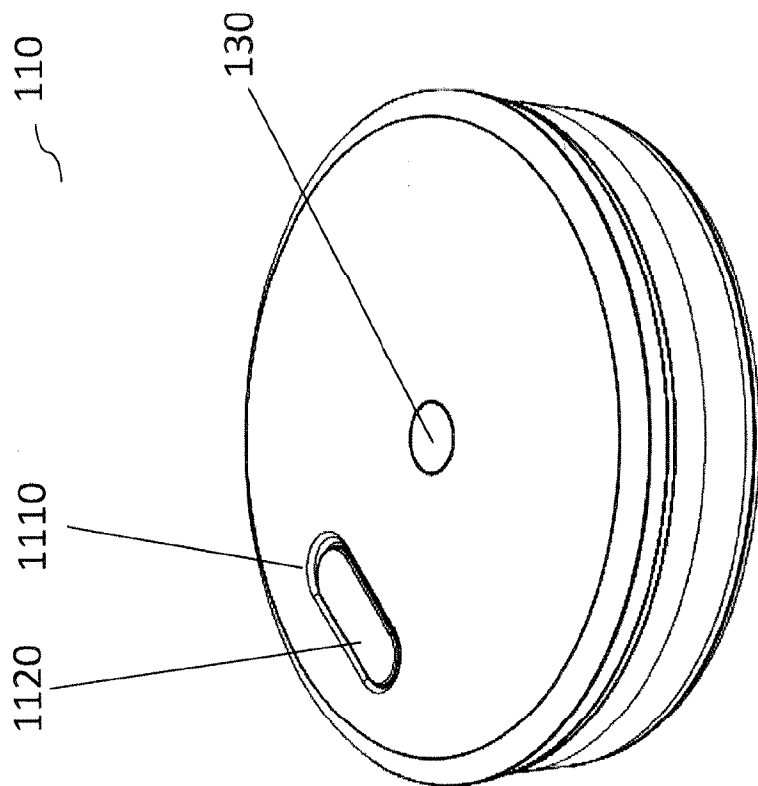


Fig.2A

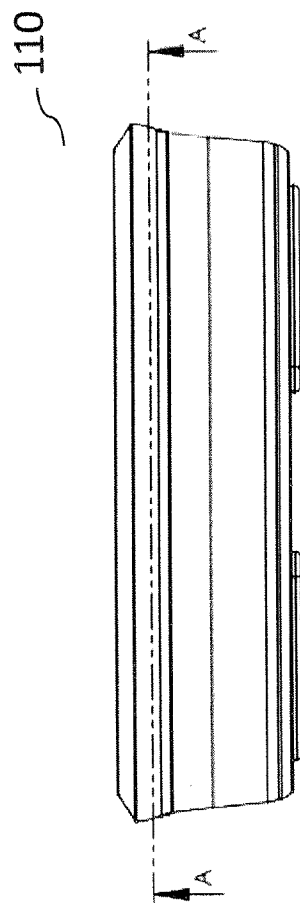


Fig.2B

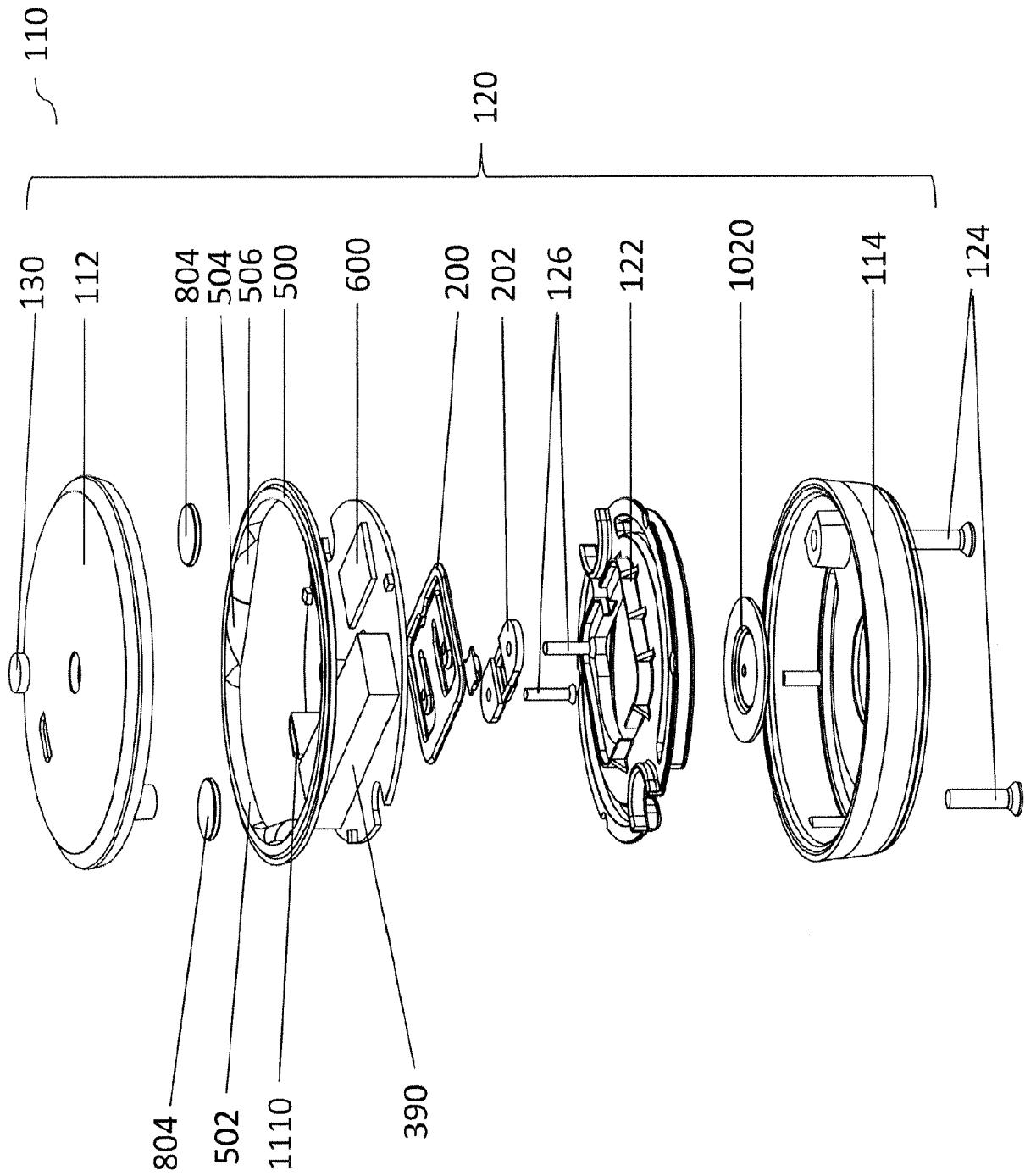


Fig.2D

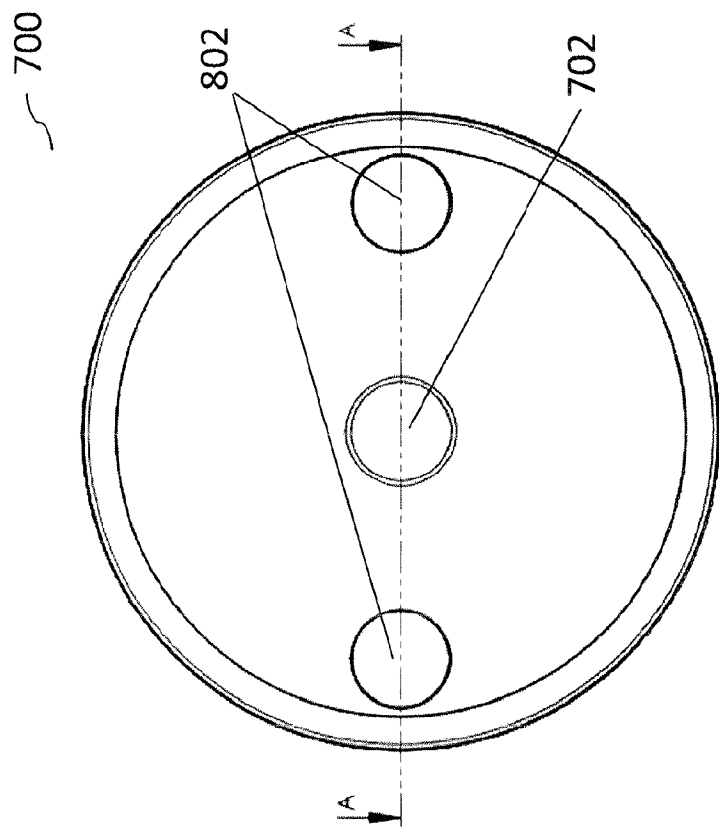


Fig. 3A

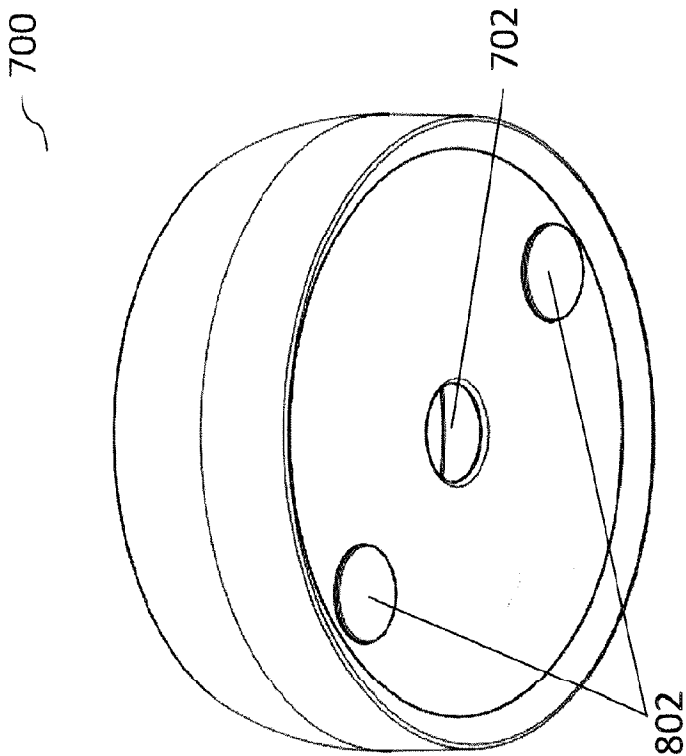


Fig. 3B

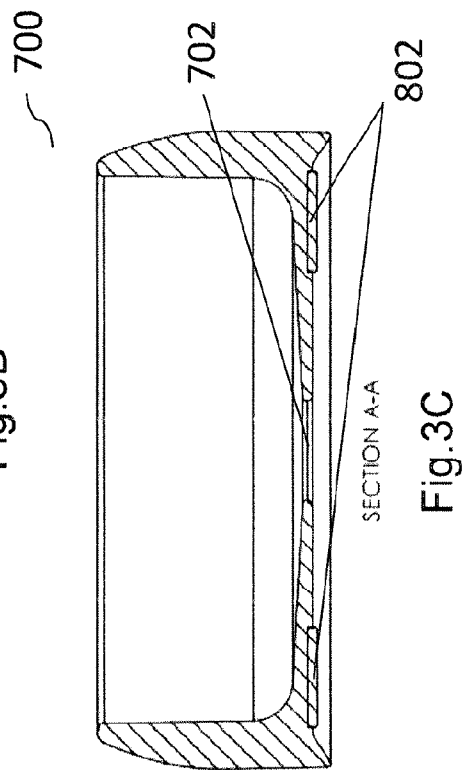
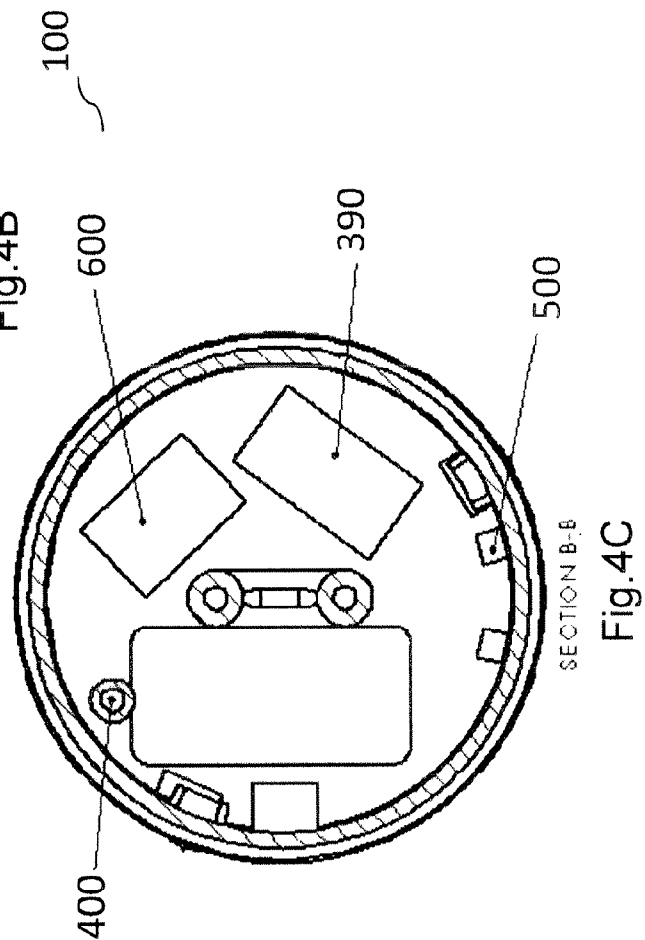
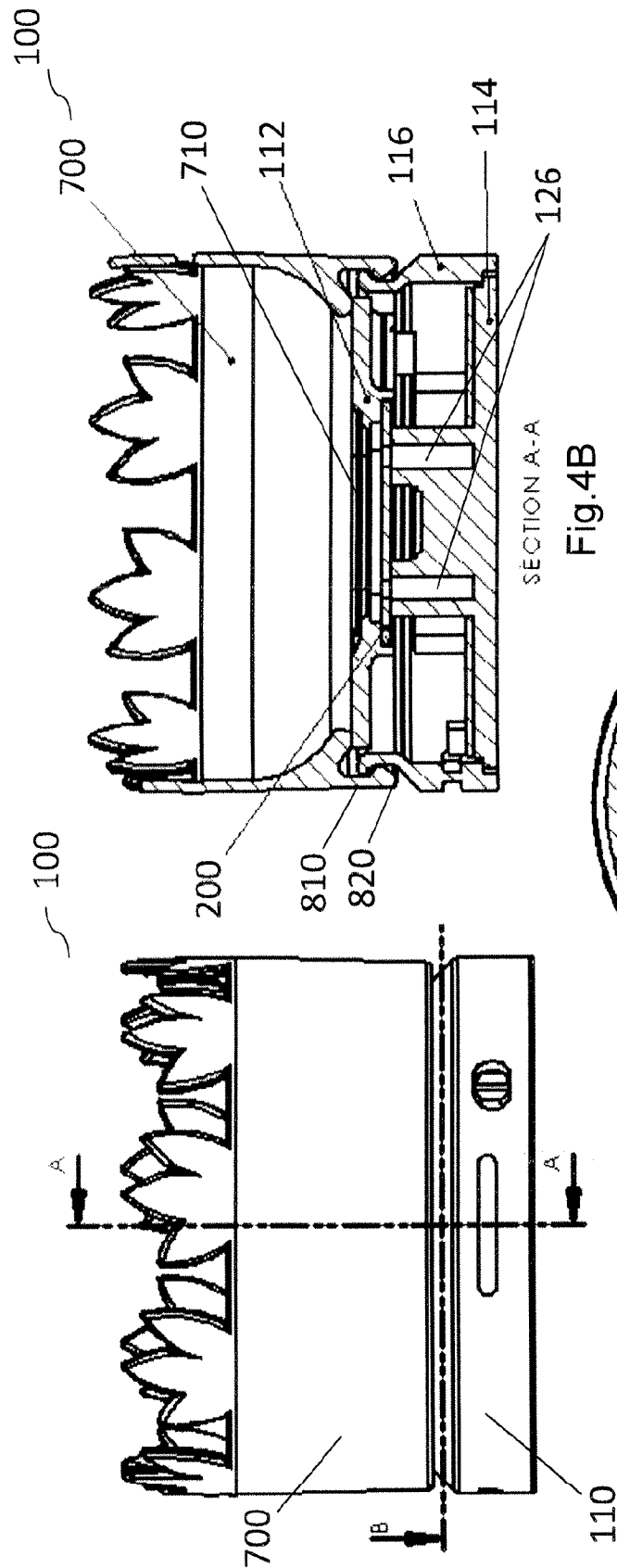


Fig. 3C



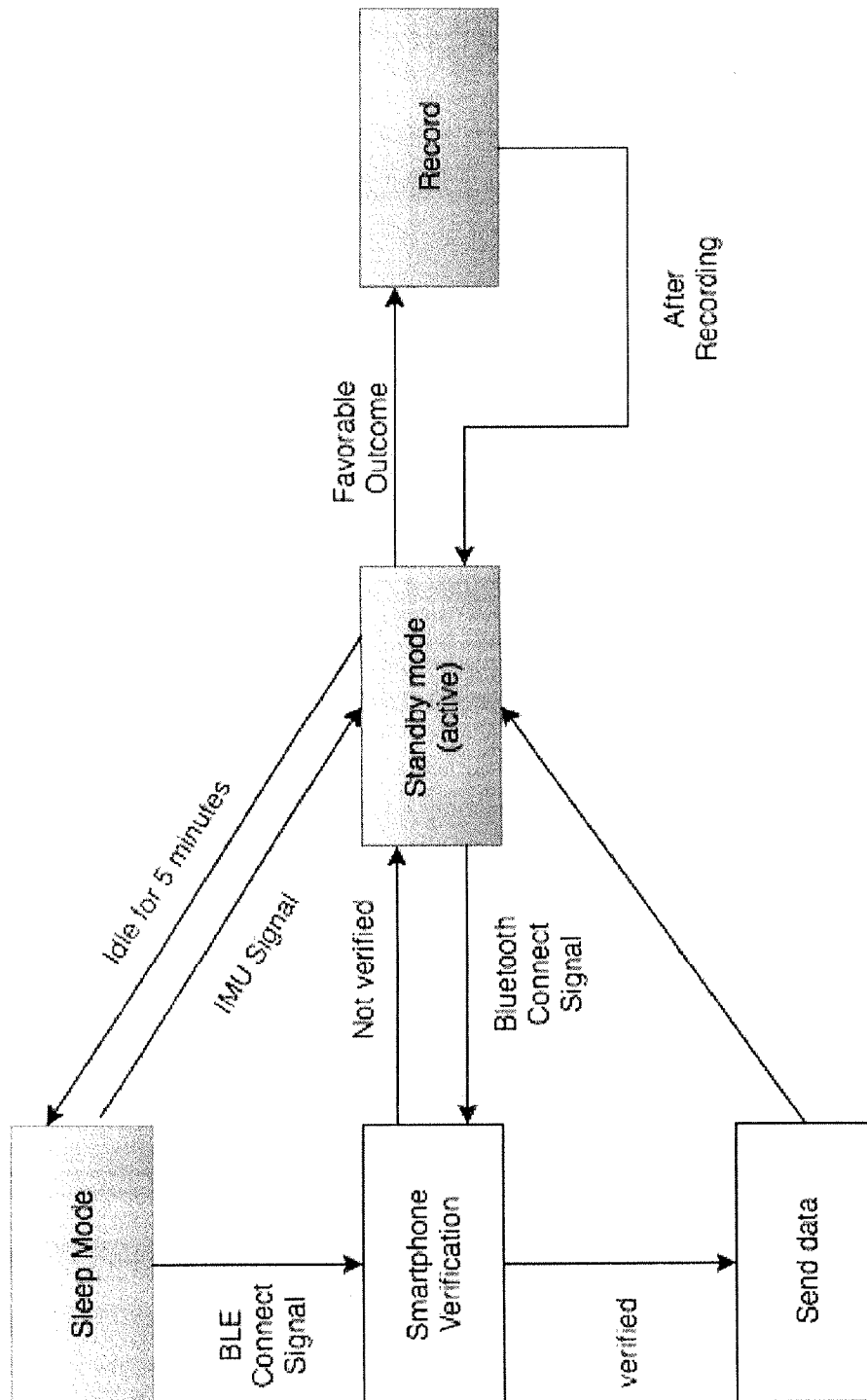


Fig.5

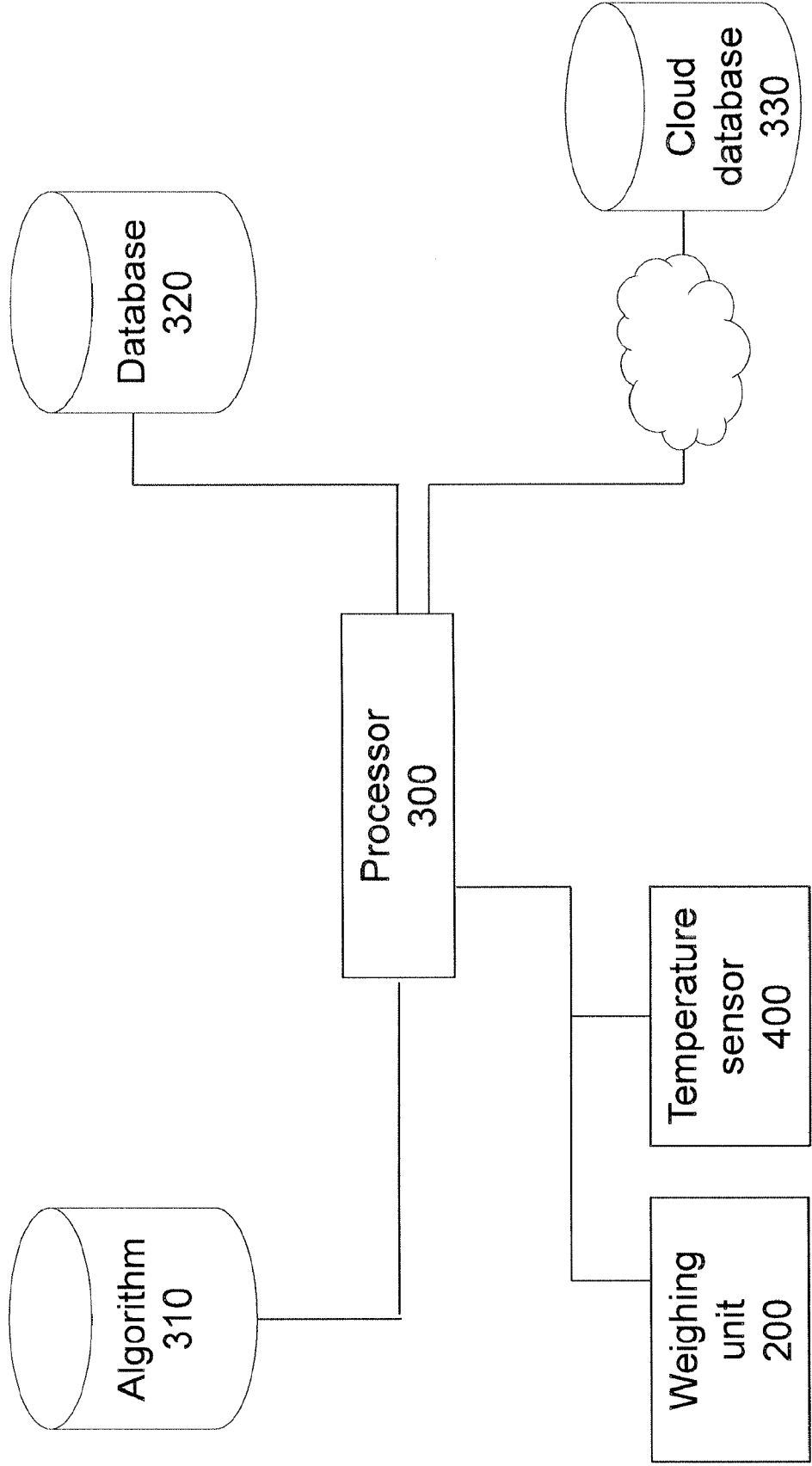


Fig.6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2017/083146

A. CLASSIFICATION OF SUBJECT MATTER

G01G 19/40(2006.01)i; G01G 23/38(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G01G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS;SIPOABS;HKABS;VEN: WEIGH, MEASURE, MASS.PROCESSOR, CONSUMPTION, CONTAINER, TRACK, DIET, HEALTH, ANALYSIS, NUTRIENT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2015168207 A1 (SURGITRAC CORP) 18 June 2015 (2015-06-18) description, paragraphs [0029]-[0060], figures 1-12	1-7, 12-23, 34-40
Y	US 2015168207 A1 (SURGITRAC CORP) 18 June 2015 (2015-06-18) description, paragraphs [0029]-[0060], figures 1-12	27-33
Y	WO 2016031246 A1 (HAIER ASIA CO LTD) 03 March 2016 (2016-03-03) abstract	27-33
X	US 2014262553 A1 (SURGITRAC CORP) 18 September 2014 (2014-09-18) figures 1-12 and their explanations	1-7, 12-23, 34-40
A	US 5629498 A (POLLOCK RICHARD A) 13 May 1997 (1997-05-13) the whole document	1-40
A	KR 101507118 B1 (TECH INTERNAT CO LTD G) 30 March 2015 (2015-03-30) the whole document	1-40

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

14 June 2017

Date of mailing of the international search report

12 July 2017

Name and mailing address of the ISA/CN

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Telephone No. (86-10)62085325

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/083146

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
US	2015168207	A1	18 June 2015	US	9347817	B2	24 May 2016
WO	2016031246	A1	03 March 2016	None			
US	2014262553	A1	18 September 2014	US	8963025	B2	24 February 2015
US	5629498	A	13 May 1997	AU	4917196	A	07 August 1996
				EP	0804718	A4	16 June 1999
				WO	9622510	A1	25 July 1996
				CA	2213504	A1	25 July 1996
				EP	0804718	A1	05 November 1997
KR	101507118	B1	30 March 2015	None			