



US 20110226643A1

(19) **United States**

(12) **Patent Application Publication**

**Kates et al.**

(10) **Pub. No.: US 2011/0226643 A1**

(43) **Pub. Date: Sep. 22, 2011**

(54) **SEALED ANALYTE SENSOR CONTAINER SYSTEMS AND STORAGE METHODS**

**Related U.S. Application Data**

(60) Provisional application No. 61/119,351, filed on Dec. 2, 2008.

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**Publication Classification**

(51) **Int. Cl.**  
**B65D 85/00** (2006.01)  
**B65B 5/00** (2006.01)

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(52) **U.S. Cl.** ..... **206/305; 53/471**

(21) Appl. No.: **13/130,703**

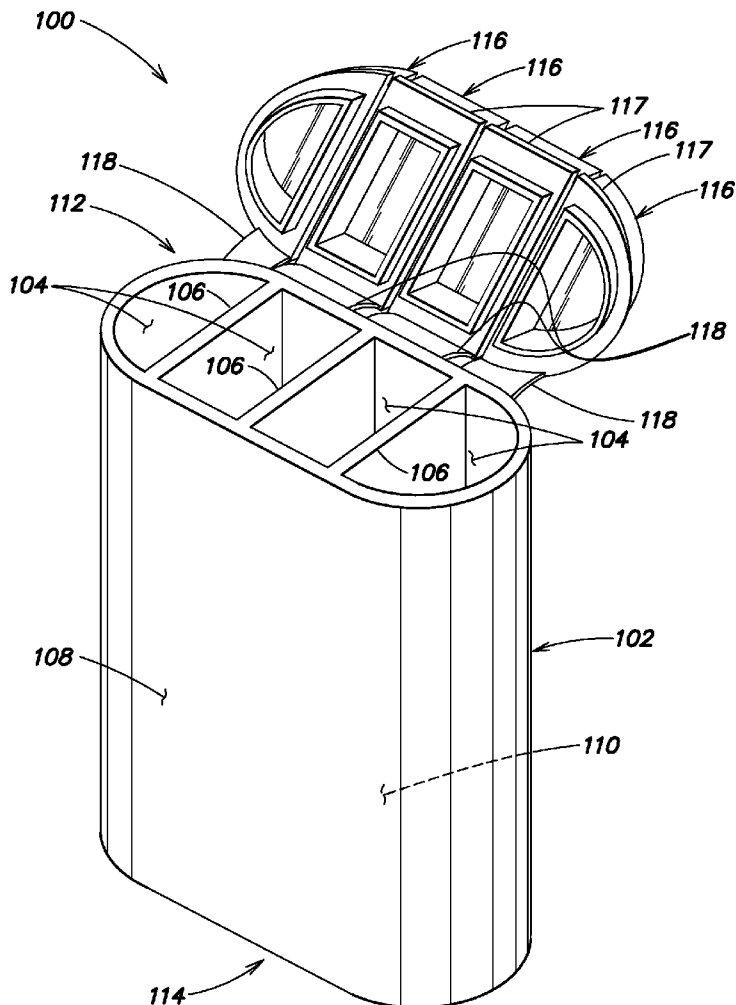
**ABSTRACT**

(22) PCT Filed: **Nov. 18, 2009**

An analyte sensor container system is provided for storing and dispensing analyte sensors. The analyte sensor container system includes a container body having a plurality of compartments, each of the plurality of compartments including at least one analyte sensor, and a sealing member individually sealing each of the plurality of compartments. Methods of storing analyte sensors are provided as are numerous other aspects.

(86) PCT No.: **PCT/US2009/064949**

§ 371 (c)(1),  
(2), (4) Date: **May 23, 2011**



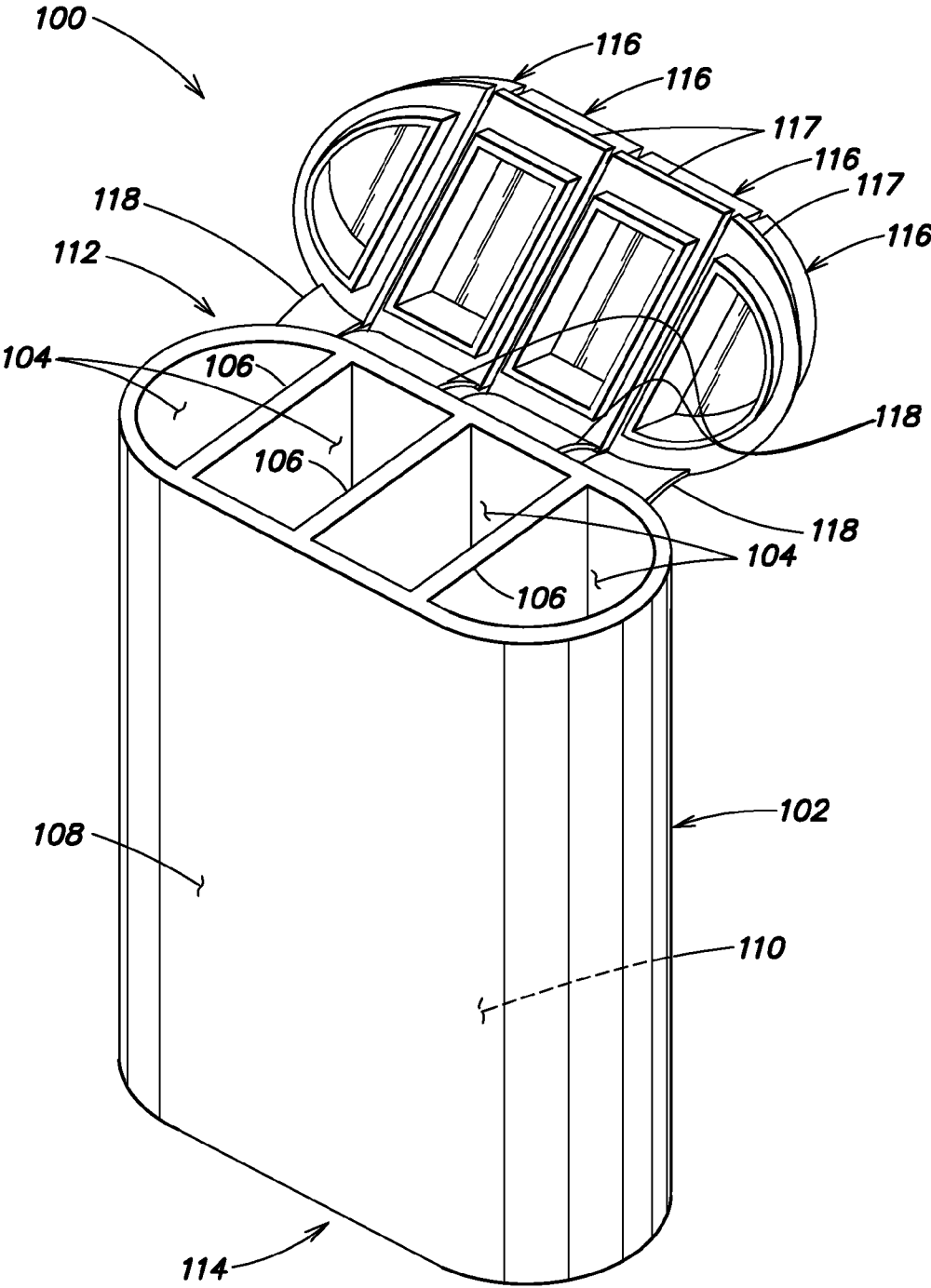
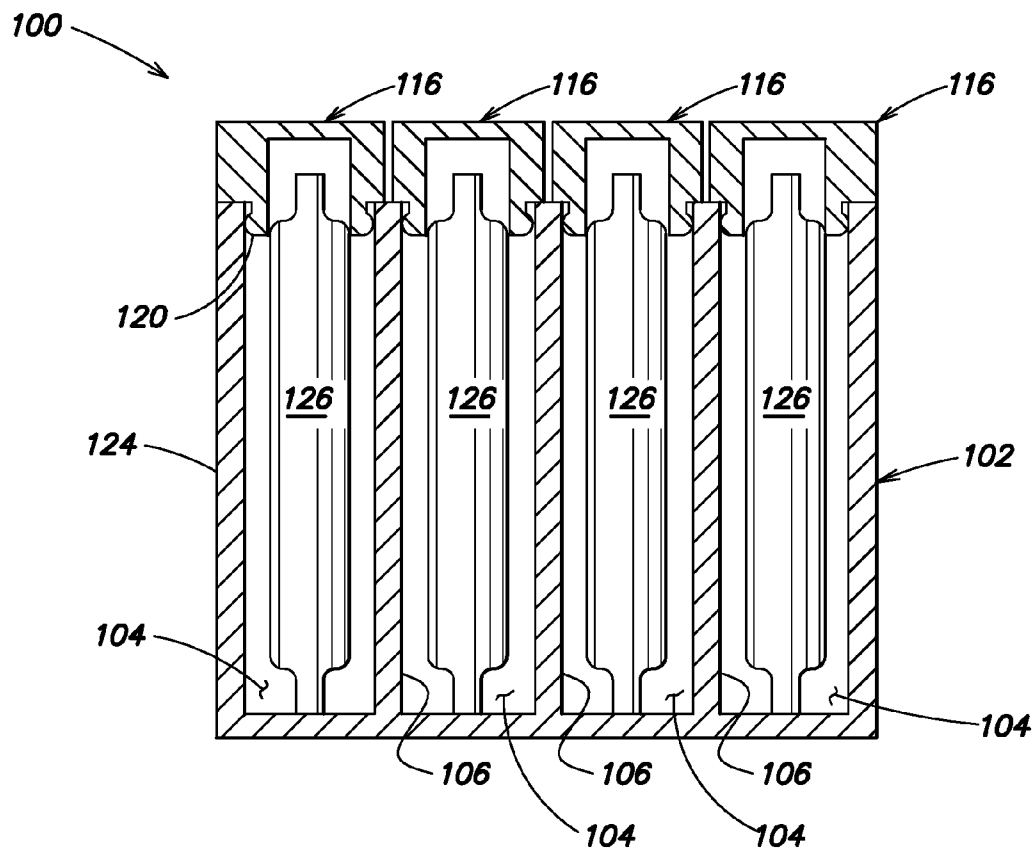
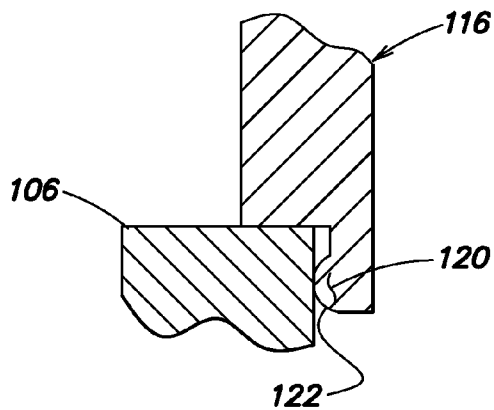


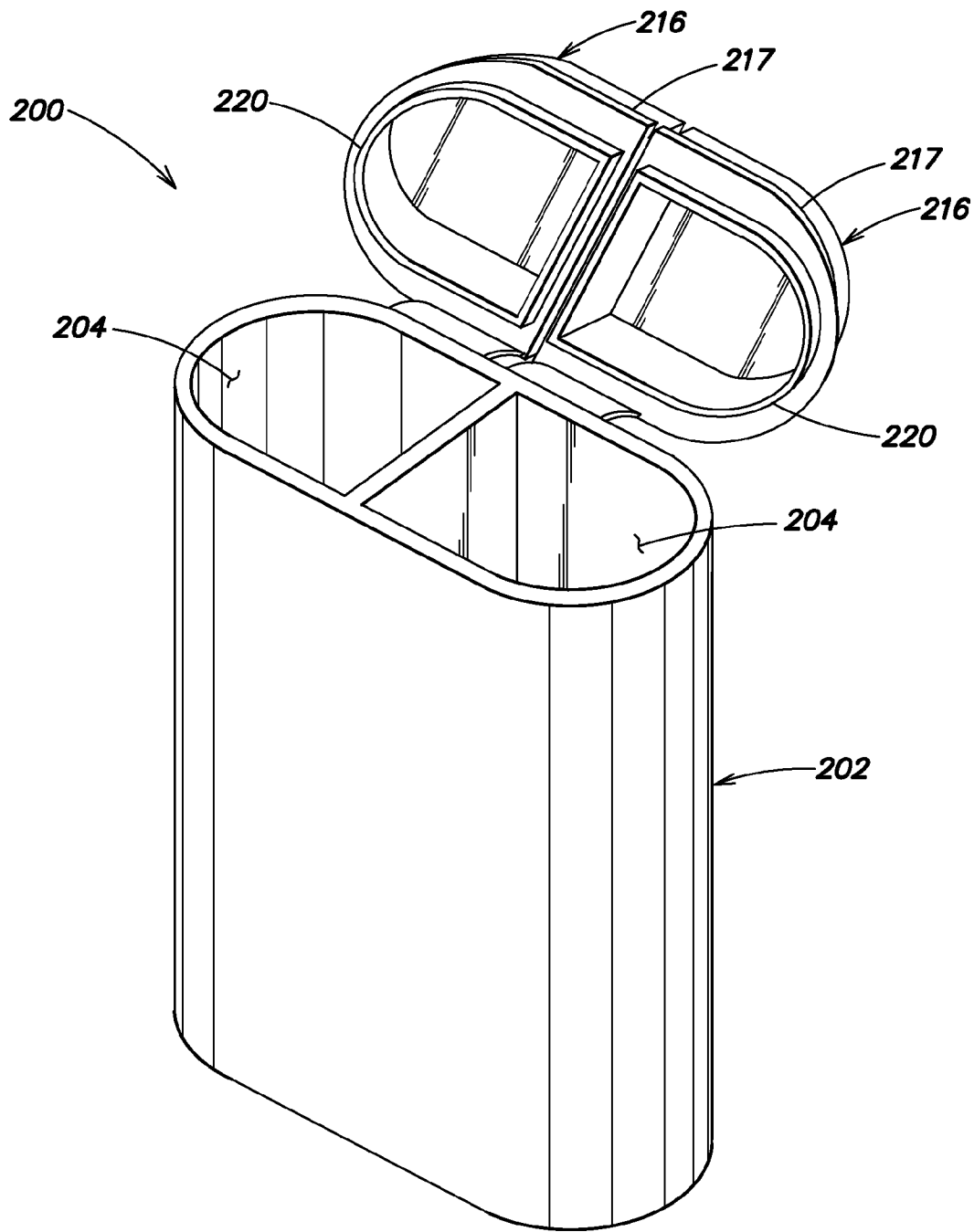
FIG. 1A



**FIG. 1B**



**FIG. 1C**



**FIG. 2**

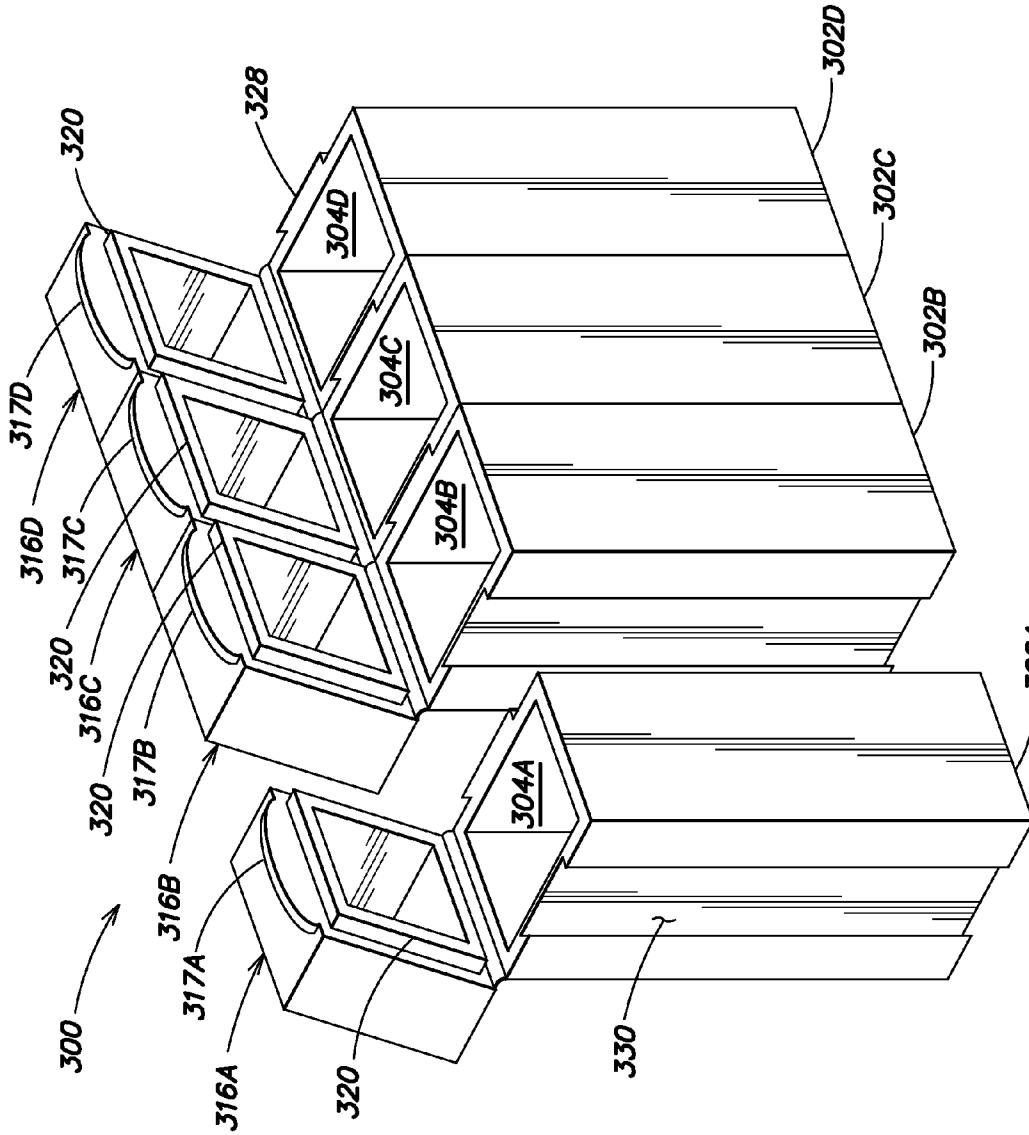


FIG. 3

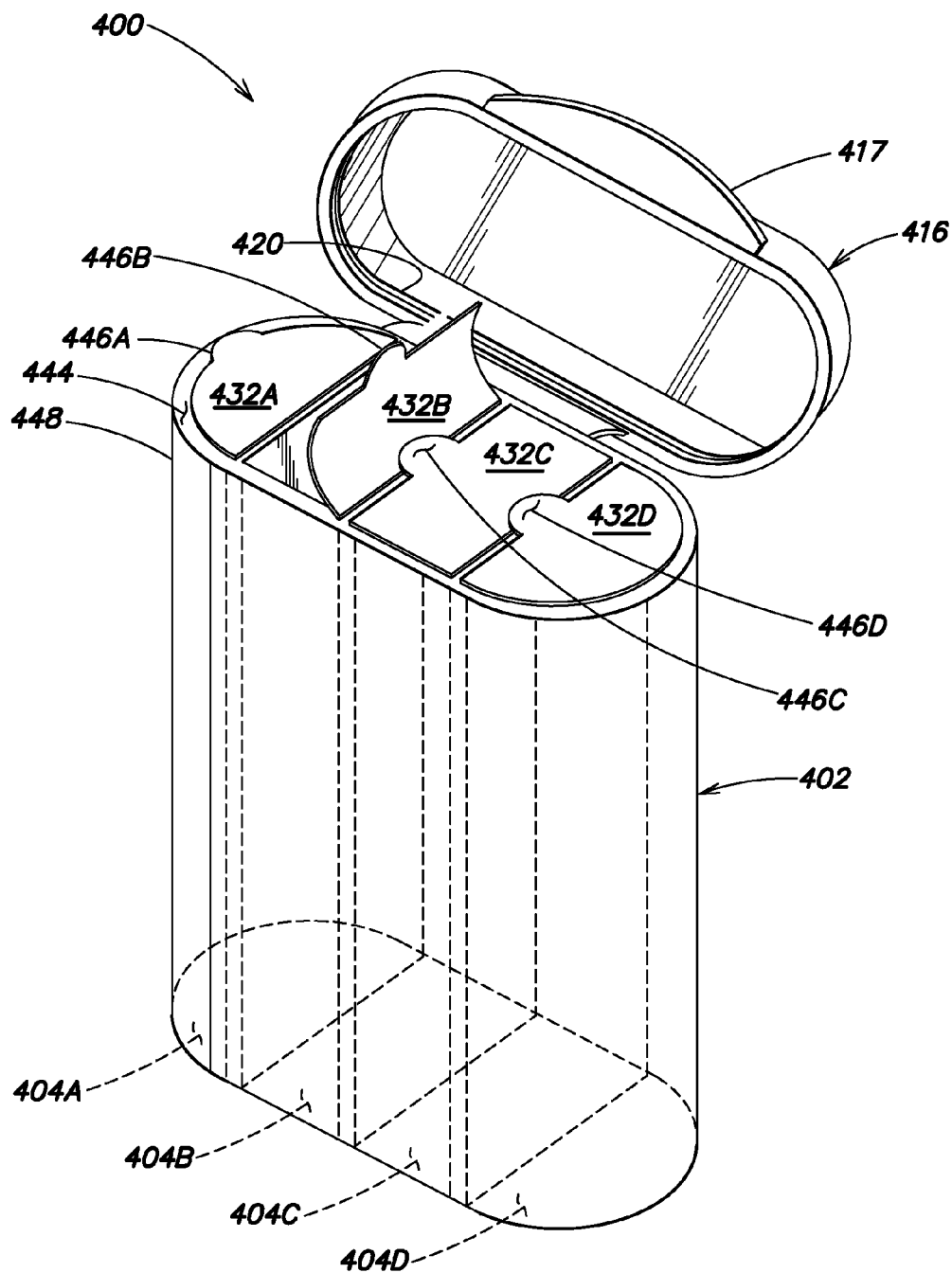


FIG. 4

## SEALED ANALYTE SENSOR CONTAINER SYSTEMS AND STORAGE METHODS

**[0001]** The present application claims priority to U.S. Provisional Patent Application No. 61/119,351 filed Dec. 2, 2008, and entitled "SEALED ANALYTE SENSOR CONTAINER SYSTEMS AND STORAGE METHODS" (Attorney Docket No. BHDD-004/L) which is hereby incorporated herein by reference in its entirety for all purposes.

### FIELD OF THE INVENTION

**[0002]** The present invention relates to systems and methods for packaging of analyte sensors that may be used to detect an analyte concentration level in a bio-fluid sample taken from a patient.

### BACKGROUND OF THE INVENTION

**[0003]** The monitoring of an analyte concentration level in a bio-fluid may be an important part of health diagnostics. For example, an electrochemical analyte sensor may be employed for monitoring of a patient's blood glucose level as part of diabetes treatment and care. Furthermore, analyte sensors may be used for testing of other analytes such as total cholesterol, uric acid, lipids, triglycerides, high-density lipoprotein (HDL), low-density lipoprotein (LDL), etc.

**[0004]** In analyte monitoring, after a bio-fluid sample (e.g., blood) has been obtained from the patient, such as by the use of a lancet, the bio-fluid sample may then be transferred to a medium (e.g., an analyte sensor strip) for measurement of the sample's analyte concentration level. The analyte sensor test strip may be received in a testing meter and a display of a measured analyte level may be provided. In the case of blood glucose monitoring, the meter may sometimes be referred to as a "glucose meter."

**[0005]** Accurate measurement of an analyte concentration level in a bio-fluid sample may be important. It therefore would be beneficial to provide systems and methods, which may aid in an accuracy of measurements made by analyte sensors.

### SUMMARY OF THE INVENTION

**[0006]** In a first aspect, the present invention provides an analyte sensor container system including a container body including a plurality of compartments, each of the plurality of compartments containing at least one analyte sensor, and a sealing member individually sealing each of the plurality of compartments.

**[0007]** In another aspect, the present invention provides an analyte sensor container system including a container body including a plurality of compartments, each of the plurality of compartments containing at least one analyte sensor, and a plurality of lids operative with the container body and adapted to individually seal each of the plurality of compartments.

**[0008]** In a further aspect, the present invention provides an analyte sensor container system including an analyte sensor container including a container body and a plurality of compartments, each of the plurality of compartments containing at least one analyte sensor; at least one lid hinged to the container body, and at least one peelable sheet adhered to an open end of the plurality of compartments.

**[0009]** In yet another aspect, the present invention provides an analyte sensor container system including a container

body including a plurality of connected sub-bodies, each of the plurality of connected sub-bodies including at least one compartment containing at least one analyte sensor, and at least one lid hinged to each of the plurality of connected sub-bodies to seal the at least one compartment.

**[0010]** In a method aspect, the present invention provides a method of storing analyte sensors including the steps of providing a container having a plurality of compartments; inserting at least one analyte sensor in each of the plurality of compartments; and individually sealing each of the plurality of compartments.

**[0011]** Other features and aspects of the present invention will become more fully apparent from the following detailed description, the appended claims and the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0012]** FIG. 1A is a perspective view of an exemplary embodiment of an analyte sensor container system provided according to the present invention.

**[0013]** FIG. 1B is a cross-sectioned front view of an exemplary analyte sensor container system of FIG. 1 according to the present invention.

**[0014]** FIG. 1C is an enlarged partial cross-sectioned view of a seal of an exemplary analyte sensor container system of FIG. 1B.

**[0015]** FIG. 2 is a perspective view of another exemplary embodiment of an analyte sensor container system according to the present invention.

**[0016]** FIG. 3 is a perspective view of another exemplary embodiment of an analyte sensor container system according to the present invention.

**[0017]** FIG. 4 is a perspective view of another exemplary embodiment of an analyte sensor container system according to the present invention.

### DETAILED DESCRIPTION

**[0018]** In the measurement of analyte concentration levels, an accuracy of an analyte sensor (e.g., an analyte sensor test strip) may be important. As such, the analyte sensor test strips may be provided in sealed foil packages or pouches in an attempt to protect them from environmental exposure, at least until opening. However, the packages may contain 10 or more analyte sensor strips, for example. Once the foil package is opened, the individual sensor strips contained therein may be exposed to the environment. The length of time a particular test strip is exposed may vary, depending on the testing level of the user, and other factors. However, in some instances, extended environmental exposure may affect certain properties of the analyte sensors. In particular, the analyte sensor reading may be affected by high or low humidity levels, or exposure to relatively large temperature variations, for example.

**[0019]** Moreover, once opened, the analyte sensors may be misplaced for a time or even mixed with other sensor test strips from other opened packages, possibly exacerbating a length of time and amount of environmental exposure. As such, the present invention may help with organization and packaging of the sensors, and may limit a length of time and amount of exposure of the analyte sensors to the environment.

**[0020]** Therefore, according to an aspect of the present invention, an analyte sensor container system is provided. The analyte sensor container system includes a container

body having a plurality of compartments wherein each of the plurality of compartments contains at least one analyte sensor, and a sealing member is provided which individually seals each of the plurality of compartments. The sealing member may be a lid including a sealing lip, which individually seals each of the compartments, or individual peelable sheets adhered to an open end of each of the plurality of compartments. In this way, each of the compartments may be individually accessed to provide user access to one or a few sensors, and the remainder of the unused sensors may remain sealed in the other sealed compartment(s).

[0021] These and other embodiments are described below with reference to FIGS. 1A-4.

[0022] FIG. 1A is a perspective view of an exemplary embodiment of an analyte sensor container system 100 provided according to the present invention. The analyte sensor container system 100 may include a container body 102, which may have an oval shape in a top plan view. Other shapes may be used, such as square, rectangular, hexagonal, octagonal, elliptical, etc. The body 102 may include a plurality of compartments 104, which may have a depth dimension greater than a width dimension and which may be separated by partition walls 106. The partition walls 106 may extend in a straight line from a front 108 to a back 110 of the container body 102, and in a straight line from a top 112 to a bottom 114 of the container body 102. Optionally, the walls 106 may include a curvature. The walls provide a sealed barrier between the compartments 104.

[0023] A plurality of lids 116 may be attached to the container body 102, such by flexible hinges 118. Each of the lids 116 may be of approximately a same size and shape as the adjacent compartment 104 to which it engages and individually seals. A lip 120 (see FIGS. 1B and 1C) formed of each lid 116 may be adapted to be received in each respective compartment 104 and seal against the walls, such as against the inner walls thereof. Accordingly, each lid 116 is separately operable so that each respective compartment 104 may be individually sealed. As best shown in FIG. 1C, the lips 120 may extend a short distance from a bottom portion of the lid 116 and may include a sealing edge 122, which may include a radius, and which may contact and seal against the inner surfaces of the outer walls 124 as well as against the partition walls 106 of the compartments 104. Each of the lids 116 may include a tab 117 adapted to aid in opening the individual lids 116. The container body 102, lids 116, and hinges 118 may be formed of any suitable injection-molded plastic, for example, a thermoplastic material such as polyolefin, polycarbonate, or polyamide. Other suitable materials may be used.

[0024] Accordingly, each separate pair of compartments 104 and lids 116 may cooperate and engage each other to form individually-resealable chambers 104, which may be substantially airtight. Received with each of the individually-resealable chambers 104 may be one or more analyte sensors (sometimes referred to as "test strips"). In cases where more than one analyte sensor is provided within an individually-resealable chamber 104, the analyte sensors may be suitable stacked or provided in a sensor package (or pouch) 126. Each package 126 may contain several analyte sensors (e.g., five or more, or ten or more, for example) sealed in a foil package or pouch member, for example. Optionally, the analyte sensors may be stacked with a length (longer) dimension aligned along the length (depth) dimension of the compartment 104. In use, once the user has opened the package 126 to remove a single sensor for testing, the user may reseal the chamber

thereby limiting environmental exposure of the remaining unused (loose) sensors. As will be described more fully below, each individually-resealable chamber 104 may include a desiccant material for further limiting exposure of the loose sensors to the environment (e.g., humidity).

[0025] FIG. 2 illustrates another exemplary embodiment of an analyte sensor container system 200 provided according to the present invention. The analyte sensors are not shown for clarity. The analyte sensor container system 200 may include a container body 202 having two compartments 204 each being individually resealable by independently pivotable lids 216 having sealing lips 220 formed thereon which seal against an inner surface of the compartments 204. Each of the lids 216 may include a tab 217 adapted to aid in opening the individual lids 216. One or more analyte sensors, and in some embodiments, a foil package of sensors, are received in each re-sealable compartment 204. Again, each individually resealable chamber 204 may include a desiccant material for further limiting exposure of the loose sensors to the environment.

[0026] FIG. 3 illustrates another exemplary embodiment of an analyte sensor container system 300 provided according to the present invention. Again, the analyte sensors are not shown for clarity, but one or more analyte sensors is received in each re-sealable compartment 304A-304D. The analyte sensor container system 300 may be made up of a plurality of connected container sub-bodies 302A-302D, each of which contain at least one compartment 304A-304D. Lids 316A-316D may operatively hinge relative to the bodies 302A-302D, and may each include sealing lips 320 which engage respective inner walls of the compartments 304A-304D upon lid closure thereby forming an individually-resealable chambers 304A-304D for housing analyte sensors. Each of the lids 316A-316D may include a tab 317A-317D adapted to aid in opening the individual lids. The plurality of connected sub-bodies 304A-304D may be connected to each other by a suitable detachable connection. For example, the detachable connection may include a tongue 328 and groove 330, for example. Each sub-body 302A-302D may include one tongue 328 and one groove 330 provided on opposite side of the bodies, for example. The tongue 328 and groove 330 may interface and couple the adjacent bodies 302A-302D. Any other suitable means for connecting together the bodies 302A-302D may be used, such as T's and T-slots, detent pins, or a locking mechanism. In this way, the sensors may be detachable from one another.

[0027] FIG. 4 illustrates another exemplary embodiment of an analyte sensor container system 400 provided according to the present invention. Again, the analyte sensors are not shown for clarity. The analyte sensor container system 400 may include the components listed before, namely, the body 402, compartments 404A-404D, lid 416 hinged to the body 402, and tab 417. However, in this embodiment, the sealing member is formed by an individually peelable sheet of material. Individual sheets 432A-432D may be adhesively bonded to respective open end surfaces 444 of the container body 402 surrounding an opening to each compartment 404A-404D. Any suitable adhesive may be used, such as a pressure sensitive adhesive or a laminating adhesive. In the depicted embodiment, four compartments are shown, and an individually-peelable sheet 432A-432D may be provided for each compartment 404A-404D. The size of each sheet 432A-432D may be such that it individually seals its respective compartment 404A-404D. The sheets 432A-432D may include pull



tabs 446A-446D for ease of removal of the sheets. The sheets 432A-432D may slightly overlap each other or optionally may abut each other at the walls between the compartments 404A-404D. Once an individual sealing sheet for an individual compartment is removed by a user, the compartment may still be sealed by the lid 416. The lid 416 including a sealing lip 420, which may engage, and seal against an outside wall surface 448 of the container body 402.

[0028] Each of the aforementioned system embodiments may include a desiccant or hydrophilic material. For example, the desiccant material may be provided under the lid in communication with each re-sealable compartment. Optionally, the desiccant material may be provided within the compartments themselves. For example, the desiccant material may be provided at a bottom of the compartment or provided as part of the wall of the compartment. The desiccant material may be a silica gel, clay, or molecular sieve material, for example. In some embodiments, the desiccant material may be a desiccant plastic molded into the walls of the compartment or lid, for example. Plastic desiccants are described in U.S. Pat. Nos. 5,911,937; 6,080,350; 6,124,006 and 6,130,263, for example. The desiccant may help in further limiting environment exposure to any loose sensors within the compartments.

[0029] The foregoing description discloses only exemplary embodiments of the invention. Modifications of the above disclosed analyte sensor container systems, which fall within the scope of the invention, will be readily apparent to those of ordinary skill in the art.

[0030] Accordingly, while the present invention has been disclosed in connection with exemplary embodiments thereof, it should be understood that other embodiments may fall within the spirit and scope of the invention, as defined by the following claims.

The invention claimed is:

- 1. An analyte sensor container system, comprising:
  - a container body including a plurality of compartments, each of the plurality of compartments containing at least one analyte sensor; and
  - a sealing member individually sealing each of the plurality of compartments.
- 2. The analyte sensor container of claim 1 wherein the container body has an oval shape in transverse cross section.
- 3. The analyte sensor container of claim 1 wherein the container body is made up of a plurality of connected sub-bodies each containing at least one compartment.
- 4. The analyte sensor container of claim 3 wherein the plurality of connected sub-bodies are connected by a detachable connection.
- 5. The analyte sensor container of claim 4 wherein the detachable connection is a tongue and groove connection.
- 6. The analyte sensor container of claim 1 wherein the sealing member comprises a lid.
- 7. The analyte sensor container of claim 1 wherein the sealing member comprises a separately operable lid adapted to seal an individual one of the plurality of compartments.
- 8. The analyte sensor container of claim 1, comprising at least two lids operatively hinged to the container body.

9. The analyte sensor container of claim 7, comprising a tab extending from the at least two lids.

10. The analyte sensor container of claim 1 wherein the sealing member comprises an individually peelable sheet adhered to an open end of at least some of the plurality of compartments.

11. The analyte sensor container of claim 1 wherein each of the plurality of compartments contains at least two analyte sensors.

12. The analyte sensor container of claim 1 wherein each of the plurality of compartments contains at least one package of analyte sensors.

13. The analyte sensor container of claim 1 wherein a compartment or a lid cooperating with a compartment contains a desiccant.

14. An analyte sensor container system, comprising:

- a container body including a plurality of compartments, each of the plurality of compartments containing at least one analyte sensor; and
- a plurality of lids operative with the container body and adapted to individually seal each of the plurality of compartments.

15. An analyte sensor container system, comprising:

- a container body including a plurality of compartments, each of the plurality of compartments containing at least one analyte sensor;
- at least one lid hinged to the container body; and
- at least one individually peelable sheet adhered to an open end of at least one of the plurality of compartments.

16. An analyte sensor container system, comprising:

- a container body including a plurality of detachably connected sub-bodies, each including at least one compartment containing at least one analyte sensor; and
- at least one lid hinged to each of the sub-bodies to individually seal the at least one compartment.

17. A method of storing analyte sensors, comprising the steps of:

- providing a container having a plurality of compartments;
- inserting at least one analyte sensor in each of the plurality of compartments; and
- individually sealing each of the plurality of compartments.

18. The method of claim 17 wherein the step of individually sealing includes adhering an individually peelable sheet to an open end of at least one of the plurality of compartments.

19. The method of claim 18 wherein the step of individually sealing includes adhering a separate individually peelable sheet to an open end of each of the plurality of compartments.

20. The method of claim 17 wherein the step of individually sealing includes providing a separately operable lid adapted to individually seal each of the plurality of compartments.

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