

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 June 2008 (12.06.2008)

PCT

(10) International Publication Number
WO 2008/068643 A2

(51) International Patent Classification: **Not classified**

(21) International Application Number:
PCT/IB2007/004435

(22) International Filing Date:
30 November 2007 (30.11.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/607,588 1 December 2006 (01.12.2006) US

(71) Applicant (for all designated States except US): **CELDO LTD.** [GB/GB]; 25 Grove Road, London SW13 0HH (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **DOVEY, Zach, Seth** [GB/GB]; 25 Grove Road, London SW13 0HH (GB). **DOVEY, Heather** [GB/ZA]; 1 Streamside, Main Street, Newlands, 7700 Cape Town (ZA).

(74) Agent: **BRIFFA**; Business Design Centre, Islington, London N1 0QH (GB).

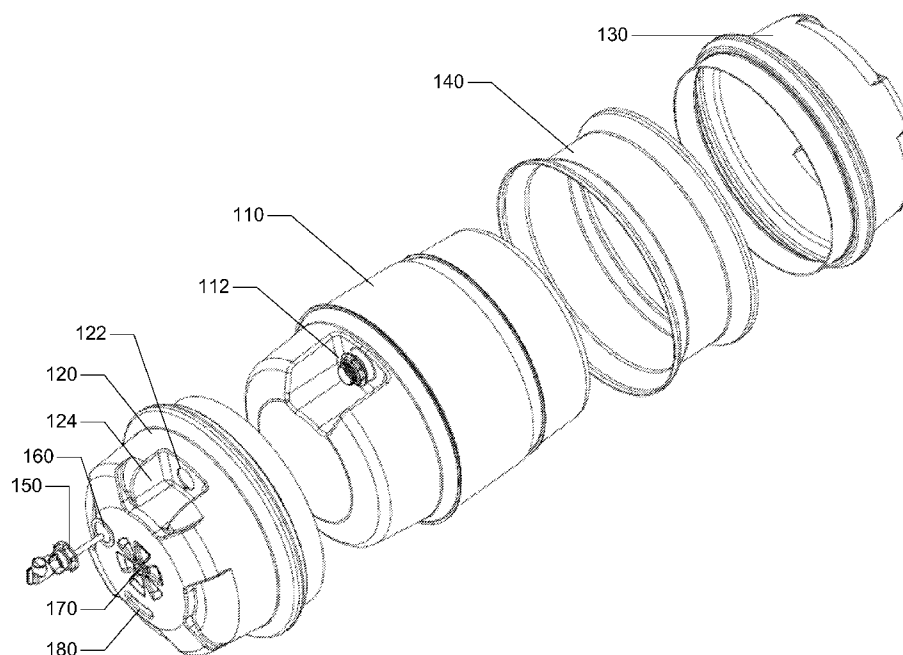
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

(54) Title: KNOCKDOWN STORAGE VESSEL



(57) Abstract: A knockdown storage vessel has an internal bladder and external barrel sections. The ends of two barrel sections include a centrally-located bush that can be engaged by a handle so as to secure the barrel sections and allow for rolling transport of the vessel. The vessel barrel sections are dimensioned so as to nest within one another for compact storage.

WO 2008/068643 A2

SPECIFICATION

TITLE: KNOCKDOWN STORAGE VESSEL

INVENTORS: HEATHER DOVEY AND ZACH DOVEY

BACKGROUND OF THE INVENTION

- [01] The present invention relates to a knockdown storage vessel for liquids and dry goods. As used herein, the term “knockdown” refers to being constructed in separate parts that can readily be taken apart for easy storage, shipping, etc.
- [02] A prior art “Collapsible Vessel for Liquids” is disclosed in GB Pat. No. 1,476,638 and includes a three-piece reinforced plastic vessel in which the vessel is held together and sealed with axial pressure applied by a handle frame. This vessel is shaped so as to be rolled by a user. This system relies upon multiple O-ring seals to form the water-tight vessel and uses a conventional bung or plug for filling and discharging water.
- [03] It would be desirable to have a knockdown vessel for liquids and/or dry goods that that can be used to transport an amount of materials too heavy for an ordinary user to carry, and that is suited for carrying multiple different types of liquid and dry goods without requiring cleaning of the major structural components.

BRIEF SUMMARY OF THE INVENTION

- [04] The present invention provides a knockdown storage vessel for liquids and/or dry goods that allows for easy transport by a user. The liquids and/or dry goods are stored in a bladder that is encased in a rigid barrel formed from multiple nesting sections. The barrel sections are held together by a handle that allows the user to roll the vessel and thus transport larger quantities than can be lifted.
- [05] The disclosed storage vessel can be disassembled into a compact configuration for storage due to the nesting of the barrel sections and flexibility of the bladder.
- [06] The bladder of the disclosed storage vessel provides water-tight storage to retain

liquids and/or protect dry goods.

- [07] The use of different bladders for the storage of different material allows the knockdown storage vessel to be used for storage and transport of different materials without the need for cleaning of the barrel sections.
- [08] In an embodiment, an end section of the barrel includes a hole and the bladder includes a gland so as to allow filling and dispensing of material from the vessel. A tap assembly is further disclosed for dispensing of liquids.
- [09] In an embodiment, the barrel of the storage vessel includes one or more raised circumferential portions that contact the ground and lower the rolling resistance of the vessel assembly.
- [10] In another embodiment, the handle of the storage vessel converts into a frame to support the vessel in a manner to aid in dispensing liquids from the tap assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

- [11] **Figure 1** illustrates an exploded view of an embodiment of the storage vessel of the present invention;
- [12] **Figure 2** illustrates details of the edges of an embodiment of the barrel end sections of the present invention.
- [13] **Figure 3** illustrates a cross-section view of a collapsed embodiment of the storage vessel of the present invention;
- [14] **Figures 4A** and **4B** illustrate assembled views of an embodiment of the storage vessel of the present invention combined with a handle frame; **Figure 4C** illustrates an alternate embodiment of the storage vessel of the present invention combined with a handle frame;
- [15] **Figures 5A** and **5B** illustrate a cross-section of an embodiment of the bladder of the present invention and details of the an embodiment of the gland used therein; and

- [16] **Figure 6** illustrates a cross-section of an embodiment of a tap assembly in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

- [17] An embodiment of the knockdown vessel is shown in **figure 1** and comprises a substantially cylindrical bag or bladder **110** (hereinafter, bladder) formed of a suitably impervious flexible material and an outer barrel comprising substantially cylindrical hollow end sections **120** and **130**, and a central section **140**. The barrel sections **120**, **130**, and **140** can be made of any suitably rigid and durable material and are preferably made of a rigid plastic material, which may optionally be reinforced. The bladder **110** includes a gland assembly **112** for filling and dispensing material from the bladder **110**. Hollow end section **120** includes a hole **122** through which a neck portion of the gland assembly **112** can extend through and be secured with a tap assembly **150** and washer **160** or a washer, lock-ring and cap (not shown). In a preferred embodiment, the hole **122** is located within a recessed area **124** sized to accommodate the tap assembly **150** so as to protect the tap assembly during transport and use.
- [18] As illustrated in **figures 1** and **2**, in one embodiment of the invention, the rim portions **124** and **134** of each end section **120** and **130** have a cylindrical leading edge **210** followed by a raised circumferential portion formed generally from opposing inner frusto-conical surface **220** and outer frusto-conical surface **240** joined by a small, generally cylindrical surface **230**. As illustrated in **figure 1**, each edge **144** of central section **140** also has substantially matching frusto-conical surface that encompass and bear on the inner frusto-conical surfaces **220** of rim portions **124** and **134** of end sections **120** and **130**, respectively, when in an assembled state. In this manner, the assembled vessel will contact the ground on the raised circumferential structures formed by the frusto-conical surfaces. The overlapping of the frusti-conical surfaces provides reinforcement to the structure at the load-carrying contact points. In this particular configuration, the outer edges of central section **140** are subject to wear from rolling. While these surfaces of the invention will typically formed from a highly wear-resistant material such as PTFE, various options exist to address this wear if needed, including but

not limited to: having the central sections be separately replaceable; forming the central section or edge thereof from more wear-resistant material; forming the edges for the central section with a thicker layer of material; and adding a flexible wear-resistant tread to the outer portion of the edges of the central section.

- [19] Each end section further includes a central bush **170** to which a handle frame (illustrated in **figures 4A** and **4B**) is attached with lugs. As depicted in the illustrated embodiment, the area adjacent the bush can be contoured to increase stiffness and strength to this contact area. The bush **170** is preferably formed or lined with a durable low friction material such as nylon or PTFE. In one embodiment, the lugs that interact with the bushes adjustably screw into the bushes so as to be easily separable. The handle frame prevents the barrel sections from separating along a longitudinal axis and allows the user to roll the knockdown vessel. The end sections can further include recessed, molded-in handles **180** to assist in manipulating the vessel. Ribs and other such structures can be molded into the barrel sections to provide stiffening.
- [20] As shown in **figure 3**, the three barrel sections may be stacked together by inserting end section **130** within end section **120**, and inserting said end section **120** within the central section **140**. For this purpose, the substantially cylindrical portion end section **130** is formed with an outside diameter substantially equal to the inside diameter of the substantially cylindrical portion of end section **120**, and in turn the outside diameter of the substantially cylindrical portion of end section **120** is substantially equal to the inside diameter of the central section **140**. In this way, the barrel sections can be nested for storage when collapsed. To aid in this, the two end sections **120** and **130** can be slightly tapered towards their closed ends.
- [21] In an embodiment of the invention illustrated in **figures 4A** and **4B**, the knockdown vessel is shown in an assembled state, wherein the handle frame **420** holds the sections of barrel **410** together. **Figure 4A** illustrates the handle frame **420** in a configuration for a user to push or pull the barrel **410**. **Figure 4B** illustrates the handle frame **42** converted to a support configuration useful for dispensing of liquids. The handle frame **420** can be converted in any suitable manner, including but not limited to pivoting and interlocking

upper and lower frames. The folding or disassembly of the handle frame **420** further adds to the knockdown nature of the apparatus and allows it to be stored in a smaller area.

Figure 4C illustrates the knockdown vessel in an assembled state with another embodiment of the handle frame **420**.

[22] **Figure 5A** illustrates cross-section of an embodiment of the bladder **510**. The outer wall **520** tapers towards the ends the bladder **510** to ease assembly of the vessel and generally match the contours of the barrel sections. In this embodiment, gland assembly **512** is located in a recess **524** that generally matches recess **124**. **Figure 5B** illustrates further details of a cross section of gland assembly **512**.

[23] An embodiment of the invention can use a tap assembly **610** for the dispensing of liquids, as illustrated in **figure 6**. As shown in the cross-section, the tap assembly includes a body **620**, an air tube **630**, a collar **640**, and an actuator **650**. In use, the collar **640** attaches to the gland of the bladder with a first set of threads and uses a pliable washer to seal the assembly. The body **620** of the tap assembly is threaded into a second set of threads on collar **640** and tightened by hand using bosses on the body **620**. The body **620** has a liquid passage and an air passage that can be alternately opened and closed via rotation of actuator **650**. Air tube **630** is connected to the air passage to extend the conduit further into the vessel.

[24] While disclosed with respect to certain embodiments, the invention is not meant to be limited to any particular embodiment. In one embodiment, a system for transporting liquids or dry goods comprises vessel components comprised of at least an internal bladder and at least two external barrel sections. This system includes a handle that retains the barrel sections along a central axis thereof and allows rotation of the vessel about the central axis. The internal bladder includes a gland that extends through an external barrel section and the gland is sealed by any known means. At least two vessel components of the system are storable in a nested manner when disassembled. In a variation of this system, the gland can be sealed with a tap assembly or a cap. In another variation, the storable vessel components comprises a first end barrel section dimensioned to nest in a central barrel section and a second end barrel section

dimensioned to nest in the first end barrel section.

- [25] Another embodiment is to a method of transporting liquids or dry goods that comprises storing at least two knockdown vessel components in a nested manner; assembling vessel components comprised of at least an internal bladder and at least two external barrel sections; retaining the barrel sections along a central axis thereof with a handle that allows rotation of the vessel about the central axis; filling the internal bladder with liquids or dry goods via a gland; sealing the gland; and transporting the liquids or dry goods by applying force to the handle to roll the vessel. Variations of the method include sealing the gland by insertion of a tap assembly or attachment of a cap. Another variation includes nesting a first end barrel section in a central barrel section and nesting a second end barrel section in the first end barrel section.
- [26] A further embodiment is to a knockdown vessel that comprises a bladder having a first end including a gland, a center portion, and a second closed end. A rigid center section with a circular cross-section, a first frusti-conical edge, and a second frusti-conical edge, is sized to encompass the center section of the bladder. Similarly, a rigid first end section has an end wall, is sized at an opposing end to longitudinally mate to the first frusti-conical edge of the rigid center section, and is dimensioned to encompass the first end of the bladder, and a rigid second end section has an end wall, is sized at an opposing end to longitudinally mate to the second frusti-conical edge of the rigid center section, and dimensioned to encompass the second end of the bladder.
- [27] In a variation on this embodiment, the rigid first end section is sized to nest within the rigid center section and the rigid second end section is sized to nest within the rigid first end section when in a collapsed state. In other variations, the rigid first end section further includes a centrally-located bush in the end wall and a recessed portion with an opening for the gland and the rigid second end section further includes a centrally-located bush in the end wall such that a handle frame including lugs can interact with the bushes and prevent the sections from separating along a longitudinal axis.
- [28] In another embodiment, the handle frame includes means, such as a pivot or a series of differently-positioned lugs, to convert the handle frame into a support for the vessel.

Optionally, the lugs can adjustably screw longitudinally into and out of the bushes so as to be easily separable. As an aid to the nesting of the components, in an embodiment, the rigid first and second end section can be tapered in a direction towards the end wall of each end section. In another embodiment, the rigid first end section can further include a recessed portion with an opening for the gland. This embodiment can optionally include a tap assembly for engaging the gland through the opening.

Example 1

[29] In one embodiment, a knockdown vessel is provided for use by campers, recreational vehicle (RV) users and the like when transporting a large quantity of water which is too heavy for normal lifting. Typically, campers and RV users require large quantities of water from an external supply for washing and drinking. In camping and RV sites, the water supply is often some distance from the tent or RV emplacements, and it is thus desirable to have a vessel which may contain a large quantity of water, yet which may easily be transported from the water supply to the emplacement. At the same time the vessel should not take up an unreasonable amount of space when not in use.

[30] In the prior art, campers and RV users have purchased drinking water in 1-3 gallon expendable plastic containers or purchased a reusable plastic container in the form of collapsible 2-10 liter bags or rigid/collapsible 3-7 gallon containers made of polyethylene. The sizes of these containers have been limited by the weight that a typical user can carry. For example, water weighs approximately 8.34 pounds per gallon or 2.2 pounds (1kg) per liter, so a seven gallon container of water weighs over 58 pounds. Indeed, for this reason, many standard liquid containers are limited to the 5 gallon/20 liter size, such as “gerry can” type containers.

[31] However, by use of an embodiment of the presently-disclosed knockdown container, a 45 liter (11.89 gallon) vessel, weighing 45 kilograms (99 pounds) when filled with water, can be transported by a single person.

Example 2

[32] Embodiments of the knockdown vessel have further utility for liquid and dry good

storage and transport for emergency purposes and/or for use in remote or third-world locations, such as for water, fuel, rice, flour, powdered milk, etc. Embodiments allow reuse of the vessel for diverse purposes without requiring cleaning by merely replacing the bladder.

[33] Containers typically used for emergency purposes and/or in remote or third-world locations are not necessarily limited to sizes that a user can carry. 55 and 30 gallon drums are commonly used for these purposes, but the drums take up significant storage space when empty and weigh an unwieldy 462 and 253 pounds, respectively, when full of water. These drums also usually require a bung wrench to access the container and a siphon pump to remove the liquid therefrom. Less-commonly used is a 15 gallon drum that can weigh nearly 130 pounds when full of water. These 15 gallon drums include a pair of handles on the top end so that they can be carried by two people.

[34] Use of a 45 liter embodiment of the knockdown storage vessel allows a single user to transport nearly as much as two users of prior art devices. A tap assembly recessed into one end of the vessel allows convenient filling and dispensing of the liquids from the vessel.

Example 3

[35] With respect to dry goods, such as grain, powdered food, cement, etc., the prior art typically uses sacks to store and transport the goods. Again, users in remote areas are often limited by the weight of goods they can carry and the sacks are sized accordingly. Sometimes, however, the sacks are very large and must be opened and the goods transferred to a smaller vessel for users to carry away. In many instances, the sacks and/or smaller vessels are not liquid-tight and the materials can be subject to spoilage.

[36] An embodiment of the knockdown vessel allows filling of the bladder with fluent dry goods (rice, wheat, dry milk, dry cereal, cement, pharmaceuticals, etc.) through the gland assembly. The vessel is sealed with a cap on the gland assembly, and rolled to transport and store the dry goods in a sealed, water-tight manner to prevent spoilage.

Example 4

- [37] For dry goods stored in manageably-sized sacks, an embodiment of the invention can use a wide-opening bladder to encompass and seal the dry goods within the sack. Such a bladder can use a press and lock, zipper-like seal (i.e., Zip-Loc®) to close and seal the bladder. The barrel of the vessel is then assembled around the bladder and used to transport the dry goods by rolling.

Example 5

- [38] The knockdown vessel can be easily used to store and transport different materials, especially liquids, without the need to clean the barrel components by merely switching bladders. Because of this, the invention has utility in the beverage industry, including wine, beer, and spirits. Presently, kegs used for beer must be returned and cleaned for reuse. The empty kegs are heavy and take up as much space during transport as a full keg. The present invention allows disposal of used bladders and transport of the (knocked down) nested barrel components, which are lighter and more compact, to a location to be refilled.
- [39] In the beer, wine, and spirits industries, the beverages (i.e., stout beer, chardonnay wine, whiskey) are often aged or matured in oak casks or metal tanks with oak chips. However, the oak casks are expensive and not always easily reusable, and the metal tanks must be cleaned between batches. By use of the present invention, beer, wine, and spirits can be matured in a vessel of the present invention using a bladder containing oak chips and the vessels easily reused by simple replacement of the bladder. Furthermore, the use of the bladder also allows such beverages to be dispensed without being subject to spoilage/oxidation due to contact with air (as presently done with a box wine/wine cask/goonbag).
- [40] A knockdown vessel and a system and method for transporting liquids and dry goods have been described. It will be understood by those skilled in the art that the present invention may be embodied in other specific forms without departing from the scope of the invention disclosed and that the examples and embodiments described herein are in all respects illustrative and not restrictive. Those skilled in the art of the present invention will recognize that other embodiments using the concepts described herein are

also possible. Further, any reference to claim elements in the singular, for example, using the articles "a," "an," or "the" is not to be construed as limiting the element to the singular.

WHAT IS CLAIMED IS:

1. A knockdown vessel, comprising:
 - a bladder having a first end including a gland, a center portion, and a second closed end;
 - a rigid center section having a circular cross-section, a first frusti-conical edge, and a second frusti-conical edge, the rigid center section being sized to encompass the center section of the bladder;
 - a rigid first end section having an end wall and sized at an opposing end to longitudinally mate to the first frusti-conical edge of the rigid center section and dimensioned to encompass the first end of the bladder;
 - a rigid second end section having an end wall and sized at an opposing end to longitudinally mate to the second frusti-conical edge of the rigid center section and dimensioned to encompass the second end of the bladder.
2. The knockdown vessel of claim 1, wherein the rigid first end section is sized to nest within the rigid center section and the rigid second end section is sized to nest within the rigid first end section when in a collapsed state
3. The knockdown vessel of claim 1, the rigid first end section further includes a centrally-located bush in the end wall and a recessed portion with an opening for the gland.
4. The knockdown vessel of claim 3, the rigid second end section further includes a centrally-located bush in the end wall.
5. The knockdown vessel of claim 4, further comprising:
 - a handle frame including lugs that interact with the bushes and prevents the sections from separating along a longitudinal axis.
6. The knockdown vessel of claim 5, wherein the handle frame includes means to convert the handle frame into a support for the vessel.

7. The knockdown vessel of claim 5, wherein the lugs adjustably screw longitudinally into the bushes so as to be easily separable.
8. The knockdown vessel of claim 2, wherein the rigid first and second end section are tapered in a direction towards the end wall of each end section.
9. The knockdown vessel of claim 1, the rigid first end section further includes a recessed portion with an opening for the gland.
10. The knockdown vessel of claim 9, further comprising a tap assembly for engaging the gland through the opening.
11. A method of transporting liquids or dry goods, comprising:
 - storing at least two knockdown vessel components in a nested manner;
 - assembling vessel components comprised of at least an internal bladder and at least two external barrel sections;
 - retaining the barrel sections along a central axis thereof with a handle that allows rotation of the vessel about the central axis;
 - filling the internal bladder with liquids or dry goods via a gland;
 - sealing the gland; and
 - transporting the liquids or dry goods by applying force to the handle to roll the vessel.
12. The method of claim 11, wherein sealing the gland is accomplished by insertion of a tap assembly or attachment of a cap.
13. The method of claim 11, wherein storing vessel components in a nested manner comprises nesting a first end barrel section in a central barrel section and nesting a second end barrel section in the first end barrel section.

14. The method of claim 11, wherein filling the internal bladder comprises filling of the bladder with a liquid selected from the group of beer, wine, and spirits.
15. The method of claim 14, wherein filling the internal bladder further comprises insertion of oak chips into the bladder.
16. A system for transporting liquids or dry goods, comprising:
vessel components comprised of at least:
 an internal bladder; and
 at least two external barrel sections;
a handle including means for retaining the barrel sections along a central axis thereof that allows rotation of the vessel about the central axis;
the internal bladder including a gland that extends through an external barrel section;
and
 means for sealing the gland;
wherein at least two vessel components are storable when disassembled in a nested manner.
17. The system of claim 16, wherein the means for sealing the gland is a tap assembly or a cap.
18. The system of claim 16, wherein the storable vessel components comprises a first end barrel section dimensioned to nest in a central barrel section and a second end barrel section dimensioned to nest in the first end barrel section.

1/6

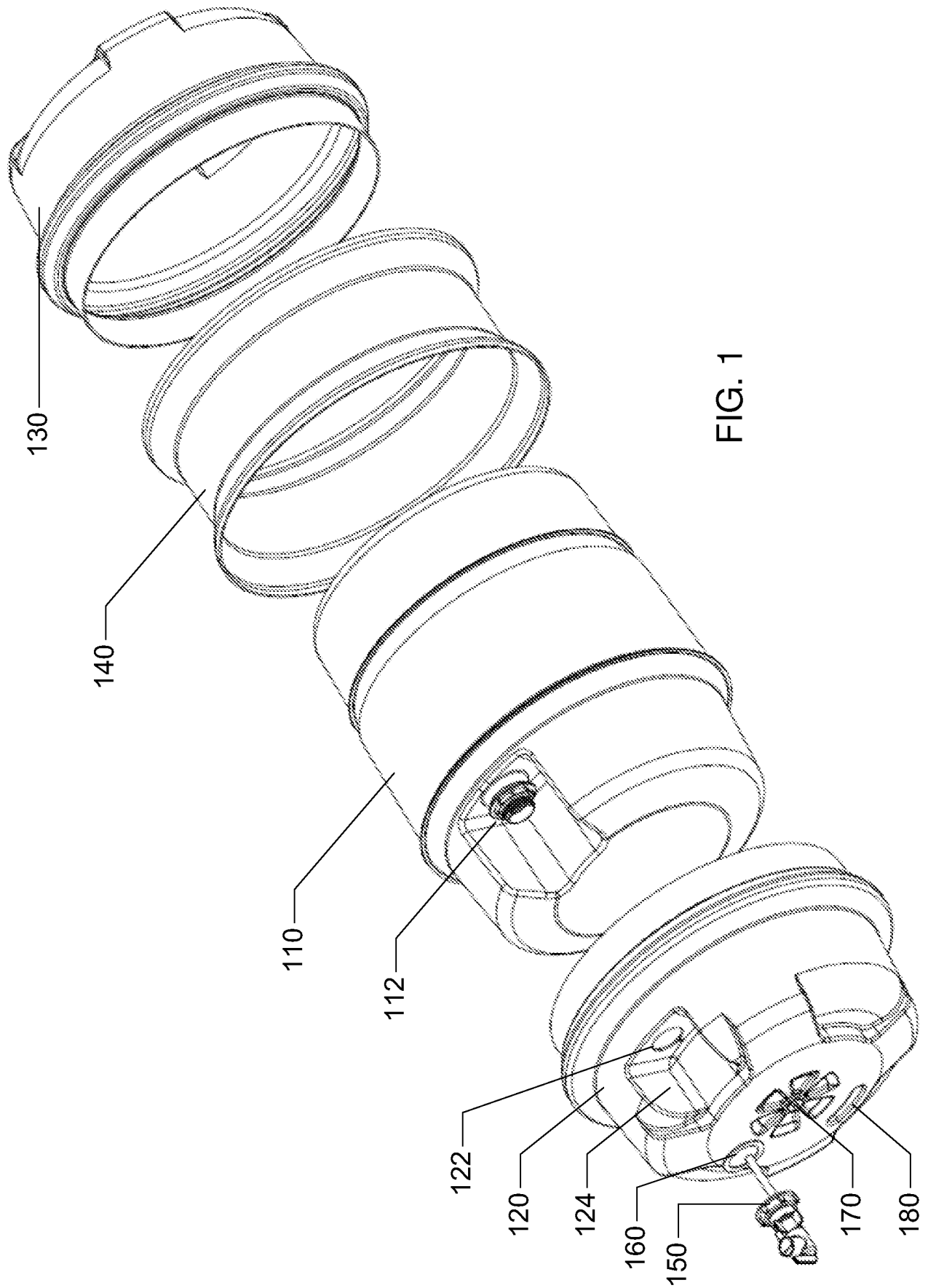


FIG. 1

2/6

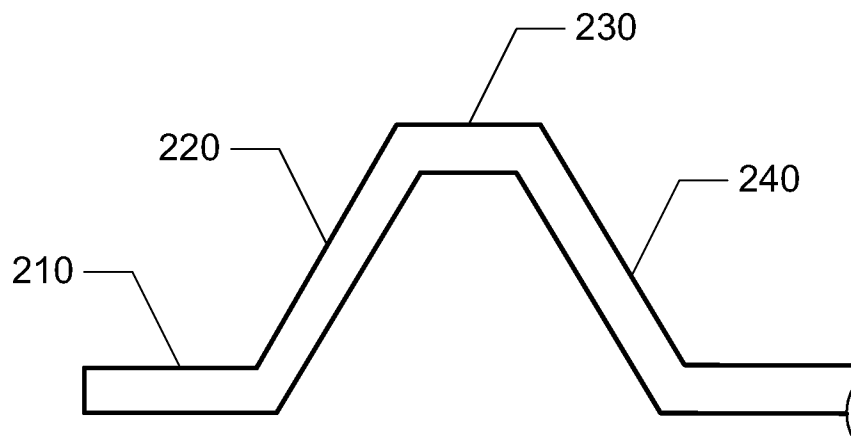


FIG. 2

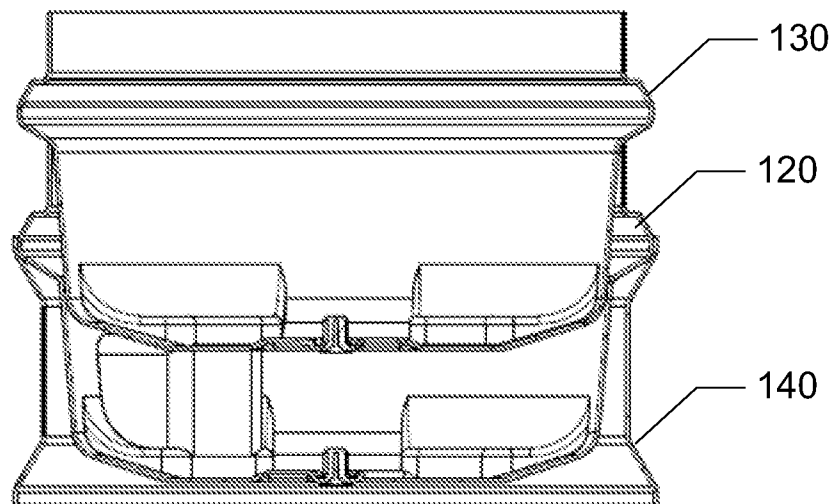


FIG. 3

3/6

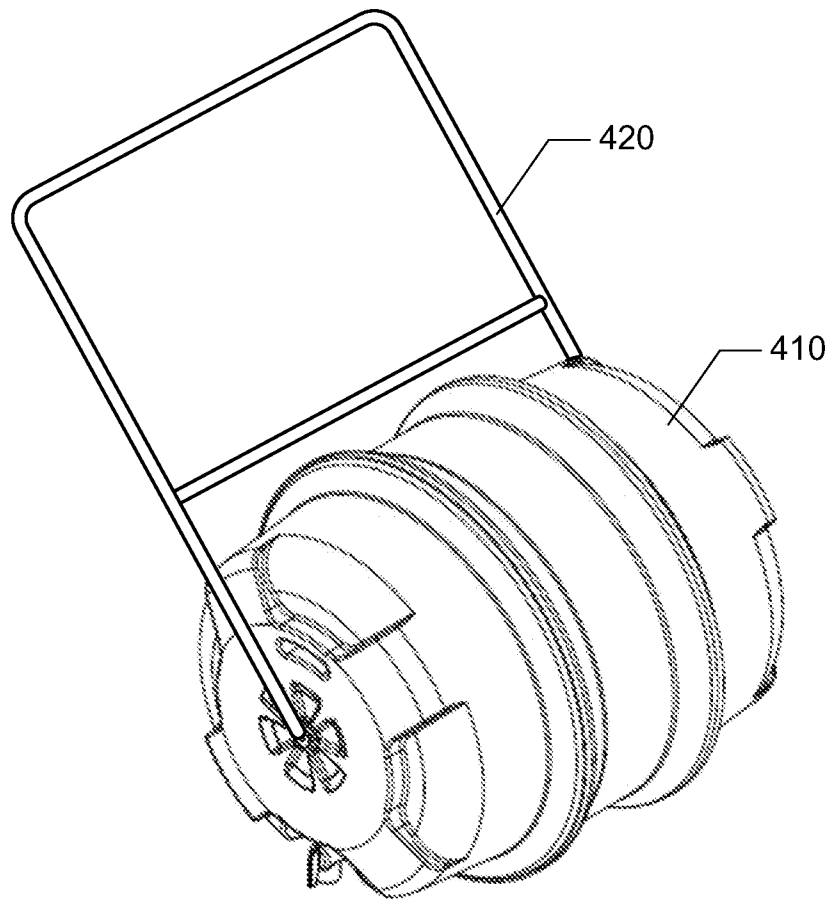


FIG. 4A

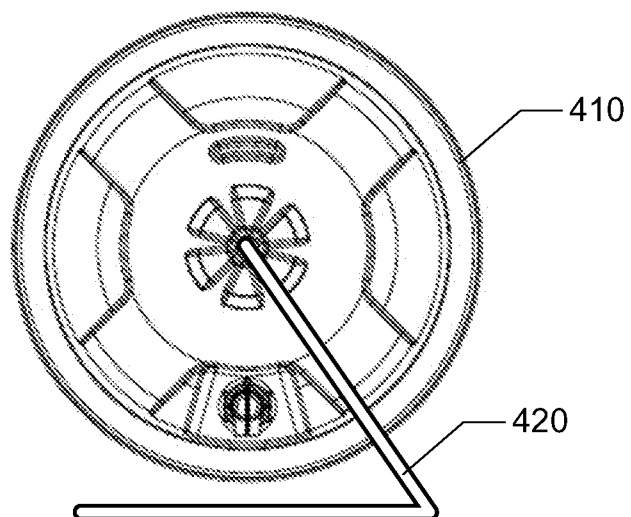


FIG. 4B

4/6

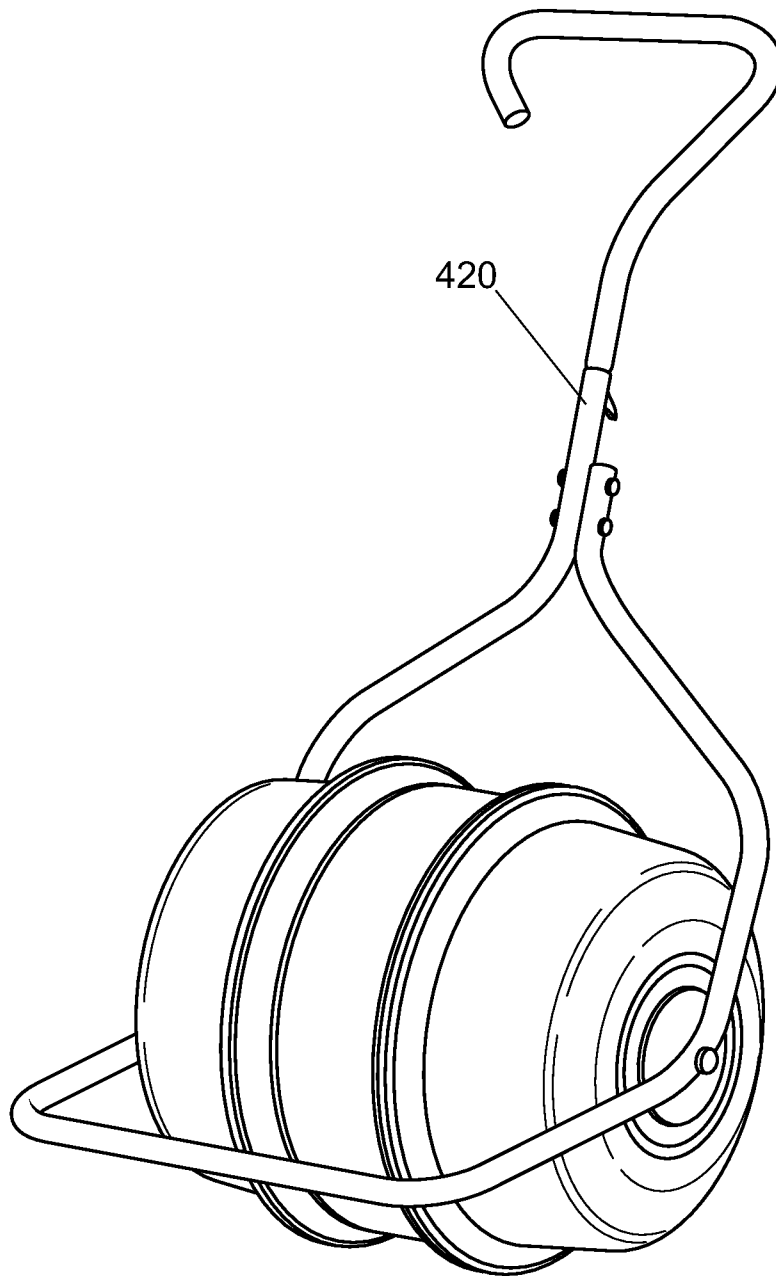


FIG. 4C

5/6

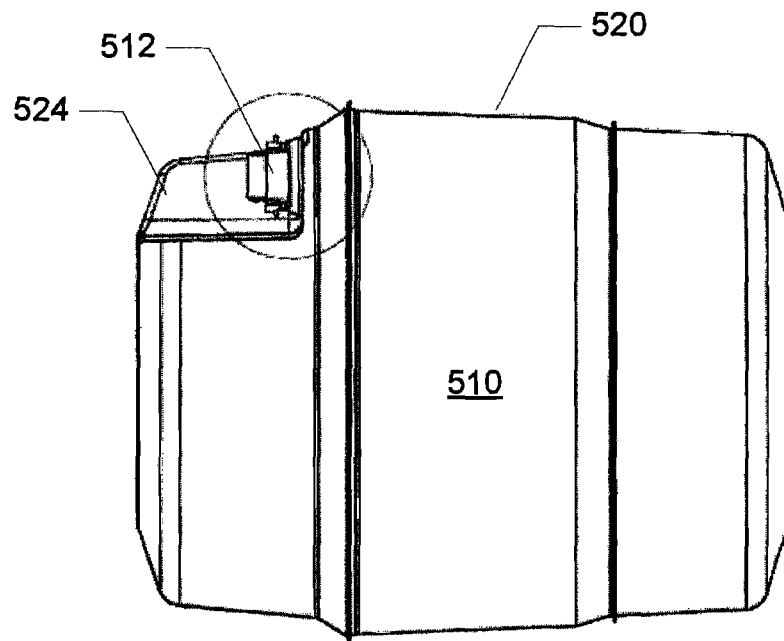


FIG. 5A

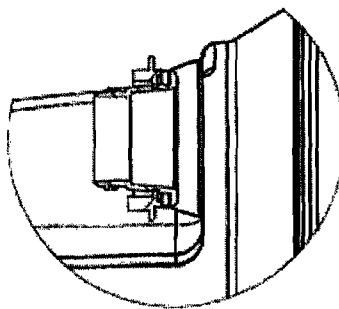


FIG. 5B

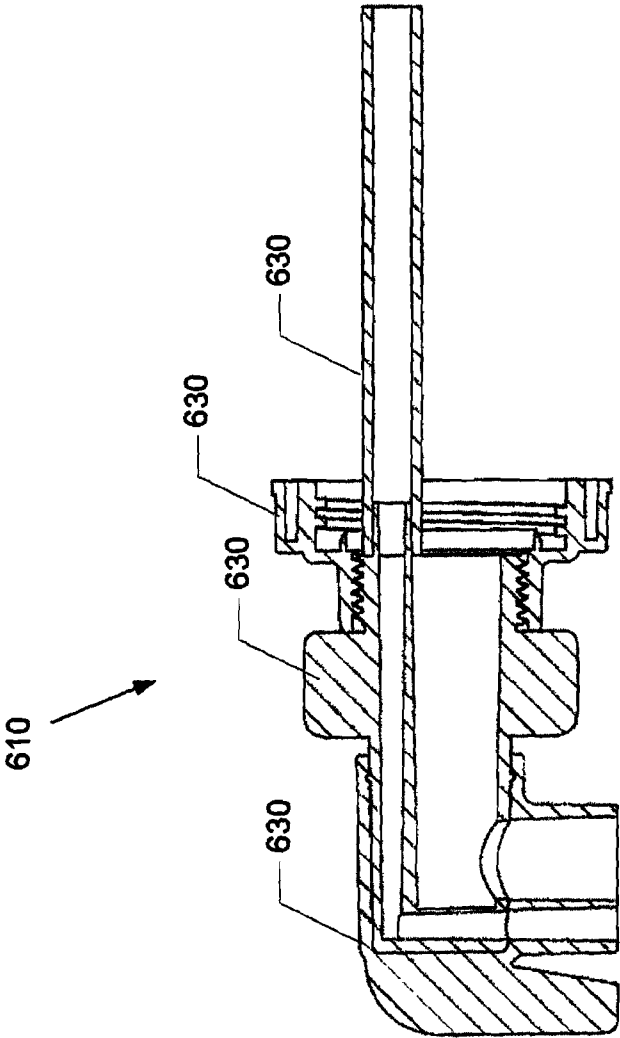


FIG. 6