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LaFlamme et al.

(54) **BOTTLE FOR CONTAINING AND DISPENSING LIQUIDS**

(75) Inventors: **Roger J. LaFlamme**, Enfield, CT (US); **Jim F. Warner**, Westfield, NJ (US)

Correspondence Address:
BARLOW, JOSEPHS & HOLMES, LTD.
101 DYER STREET, 5TH FLOOR
PROVIDENCE, RI 02903 (US)

(73) Assignee: **POLY-D, LLC**, Torrington, CT (US)

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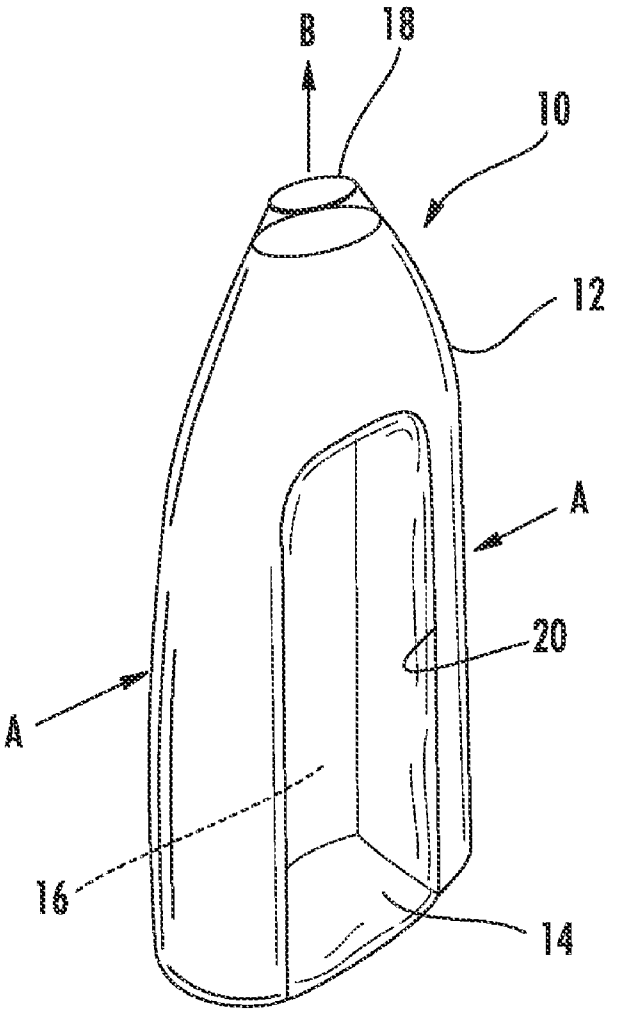
(57) **ABSTRACT**

The present invention is a fluid dispensing device that includes a flexible and compressible outer housing that defines a bladder-receiving region. An independently deformable bladder, that contains media to be dispensed therein, resides in the bladder-receiving region. Compression of the outer housing exoskeleton causes the inner bladder to collapse and urge liquid, contained therein, to exit through the nozzle dispensing. A pump, which is accessible from the outside of the housing by a user, may be installed in fluid communication with the bladder to assist in dispensing media from the bladder for use.



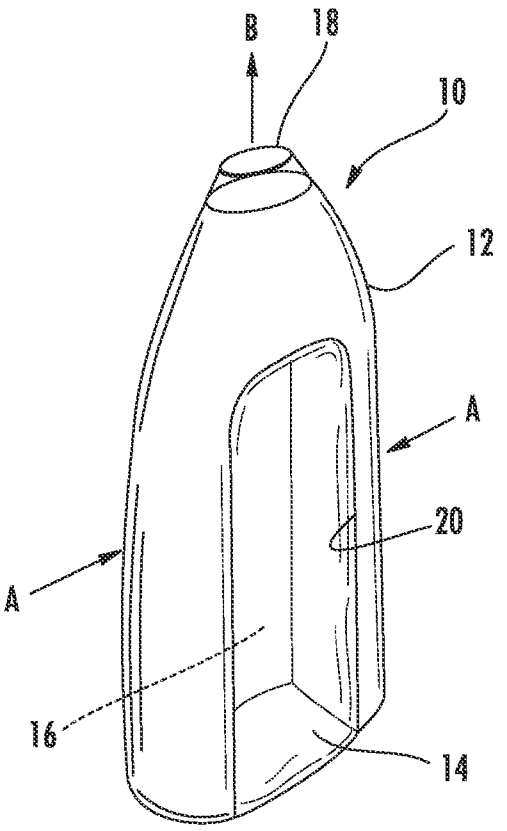


FIG. 1

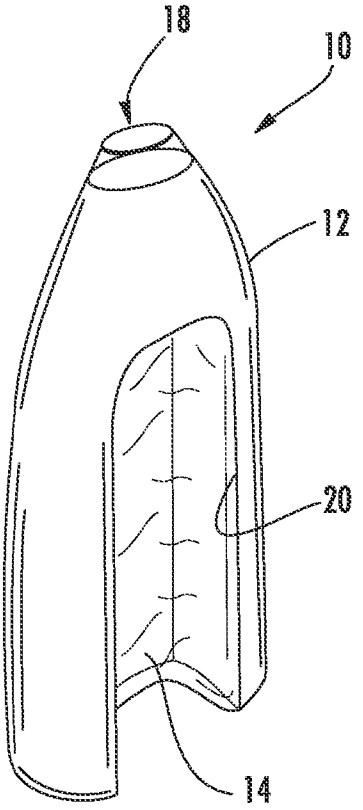


FIG. 2

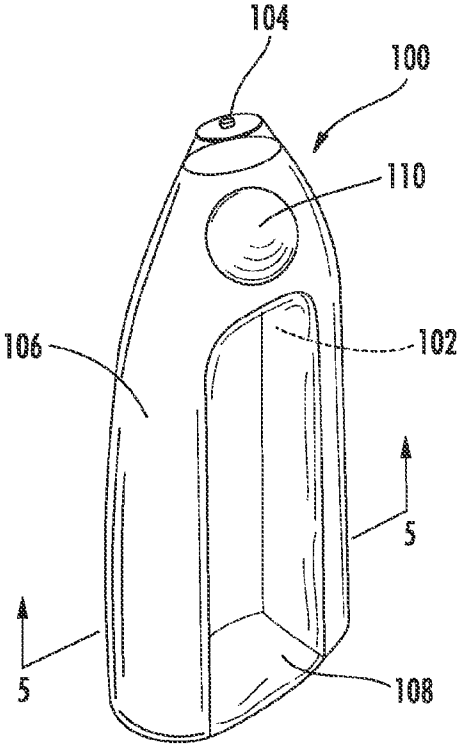


FIG. 3

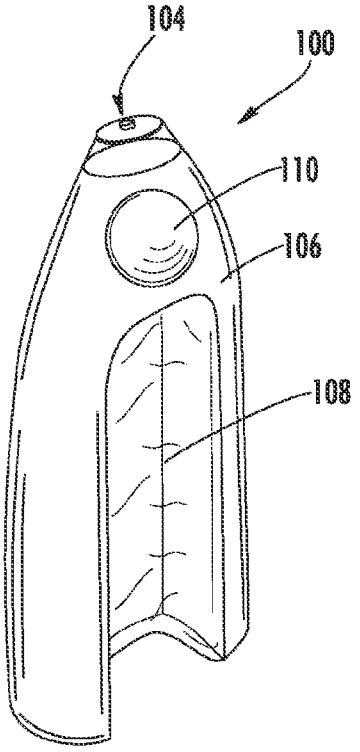


FIG. 4

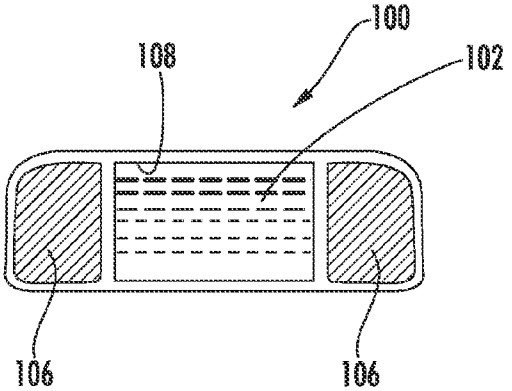


FIG. 5

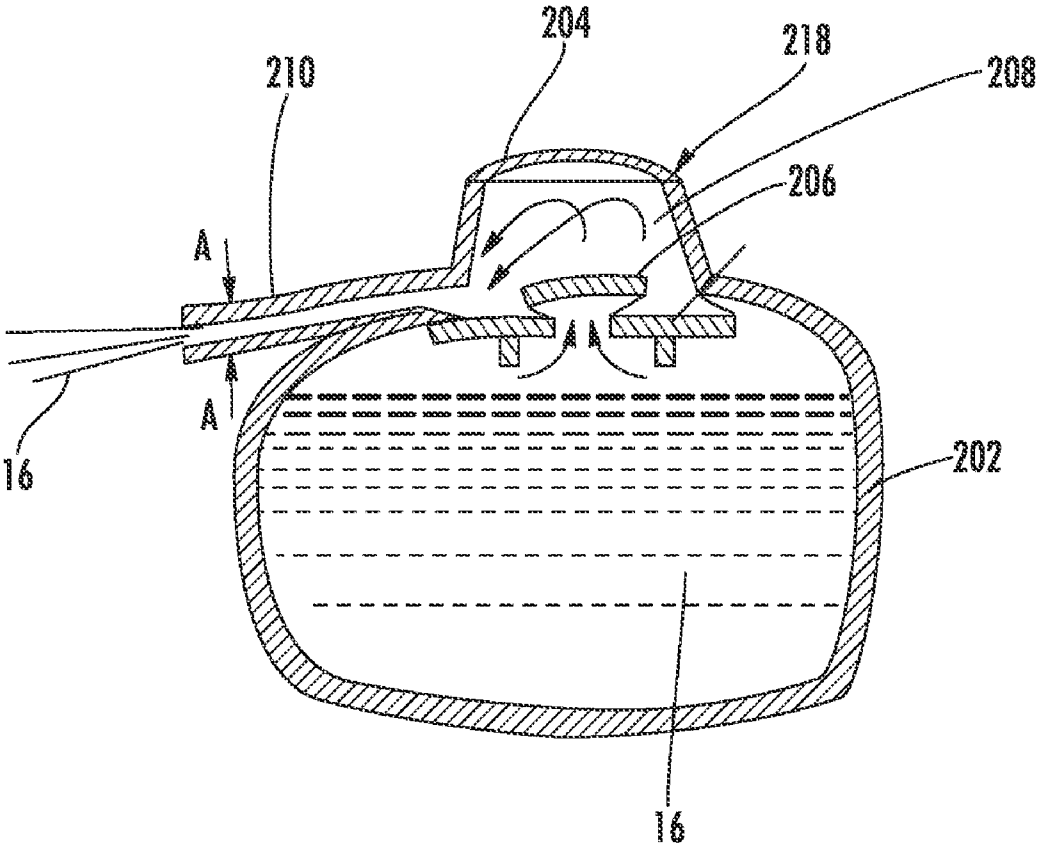


FIG. 6

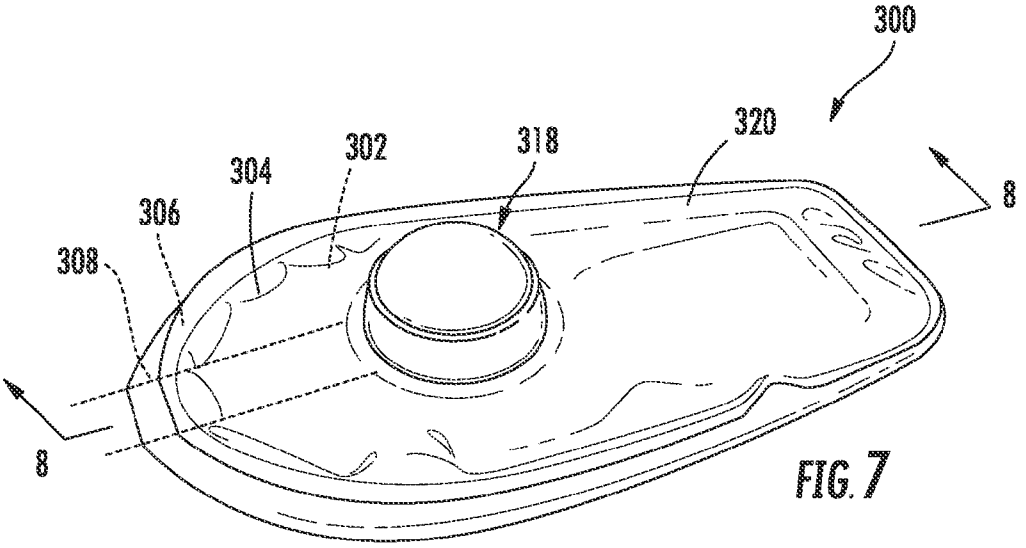


FIG. 7

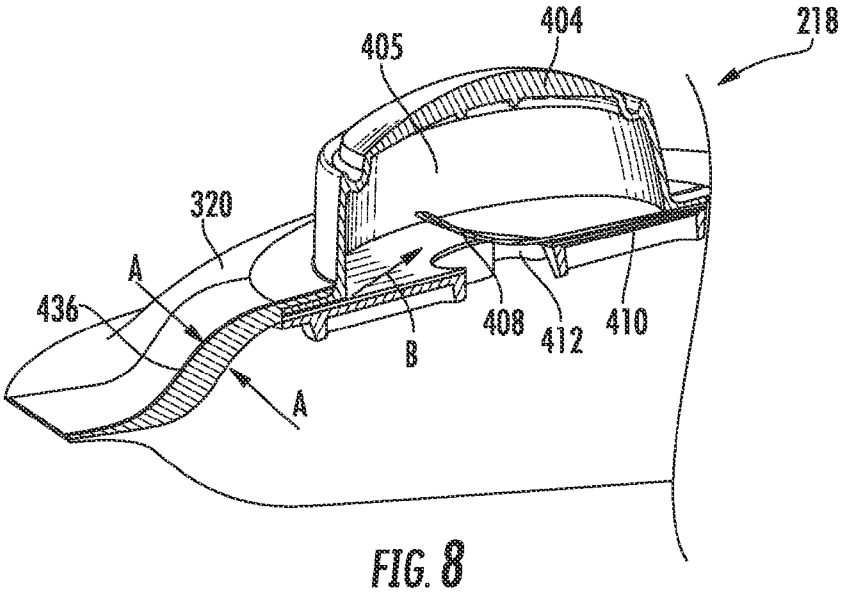


FIG. 8

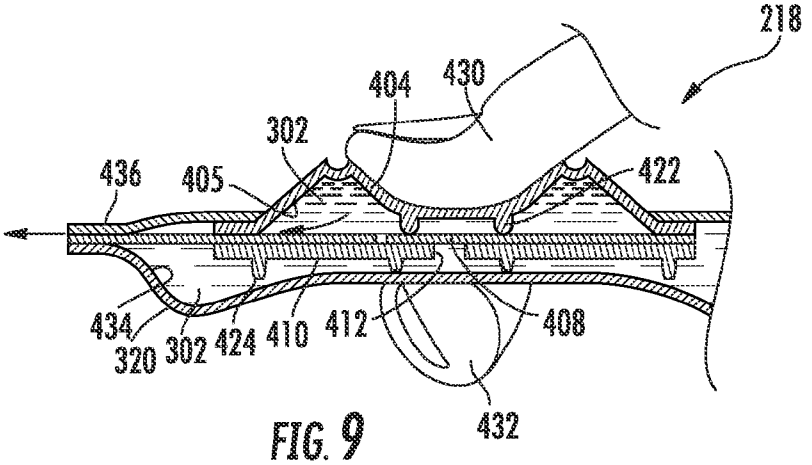


FIG. 9

BOTTLE FOR CONTAINING AND DISPENSING LIQUIDS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from prior U.S. Provisional Application Ser. No. 60/891,316 filed on Feb. 23, 2007.

BACKGROUND OF THE INVENTION

[0002] This invention relates generally to dispensing devices and packages. More specifically, the present invention relates to metering devices that can controllably dispense fluid media from a source of fluid media while providing an overall package configuration that remains substantially the same throughout the life of the use of the container even though the volume of the supply of media to be dispensed is being depleted.

[0003] Various types of fluid material and media are employed for different purposes through commerce and industry. For example, there are various products in the personal care, home care, air care, transportation care, and food industries that require some type of dispensing of a fluid material from a source of such material. When this material is sold in commerce, it must be contained and stored in some type of container. When that product is used, it must be dispensed from its storage container to a location for use.

[0004] In the prior art, there are many different types of dispensers for delivering fluid material. For example, a flexible container body with a nozzle tip is commonly provided for such a purpose. An application of such use is for the dispensing of ketchup where the container body is squeezed by the user to urge the fluid material out from the nozzle tip and accurately to a desired location. The amount of fluid delivered is determined by the how much the user squeezed the container body. However, this yields erratic results where more or less fluid material is delivered on each successive squeeze of the container body. Also, the container must be held upright to avoid leakage because no valves are employed. Therefore, there is a need for a dispensing package that can deliver the media contained therein a controlled and metered fashion.

[0005] To meet this need, a flexible container holds a volume of fluid material to be delivered. A single one-way check valve is provided as an exit port from the flexible container. When the flexible body is squeezed, the material is urged out under pressure through the valve. In commonly owned Ser. No. 11/074,817, filed on Mar. 8, 2005, and U.S. Ser. No. 11/951,351, filed on Dec. 6, 2007 a dual valve construction is employed to provide for controlled metered dispensing of media from a package. However, these known devices require that the entire package be disposed of when the supply of media to be dispensed has been depleted.

[0006] In the prior art, there are durable containers such as liquid soap dispensers available now that contain a rigid plastic pumping mechanism as part of the container. The exterior of these types of containers can be made to have a pleasing appearance out of crystal or metal. These products do not work well for a variety of reasons. For one thing, they do not fully dispense the liquid soap, but usually cease to pump as the liquid soap level gets low. Secondly, they require the user to fill the container with liquid when it gets low. This is inconvenient. Thirdly, the user has no real method of knowing when the container is getting low on fluid. Finally, the pumping mechanism is built into the outside container, and when it breaks, the container is no longer useful.

[0007] In view of the foregoing, the fluid dispensing and devices of the prior art suffer from various disadvantages that make them difficult and awkward to use with unexpected results. Therefore, there is a need for a fluid dispenser to be easy to operate. There is a further need for the option for a fluid dispenser to be capable of delivering a metered dose of fluid upon each dispensing operation for expected flow for better application of the fluid material. There is also a need for such a dispenser to be less wasteful than prior art dispensers. There is also a need for a bottle that is capable of containing and dispensing liquid that is simple and intuitive for the user to operate.

SUMMARY OF THE INVENTION

[0008] The present invention preserves the advantages of prior art dispensing devices. In addition, it provides new advantages not found in currently available devices and overcomes many disadvantages of such currently available devices.

[0009] The invention is generally directed to a novel and unique container that is capable of storing and dispensing liquid. The invention is also directed to a container that optionally can deliver a substantially equal metered dose of media fluid material upon each dispensing operation while not requiring that the entire dispenser be replaced when the media is depleted.

[0010] The fluid dispensing device includes a container with an independently deformable bladder therein. A nozzle is in fluid communication with the bladder that contains a volume of liquid for dispensing. A flexible and/or compressible outer exoskeleton is preferably provided that maintains the bladder and the overall structure of the device in an upright or desired position an configuration. When the outer flexible and/or compressible exoskeleton is squeezed, the bladder container or retained therein is compressed thereby urging liquid from the storage bladder and out through the nozzle for dispensing. The nozzle may be of any configuration, such as a pin hole tip, slit, atomizer, or the like to suit the desired application at hand.

[0011] The bladder includes a pump and dispensing system that can deliver the media in a dosed and metered fashion. The container provides a outer exoskeleton that is preferably rigid but may also be semi-rigid to receive the internal dispensing bladder. When the internal bladder is depleted of media for dispensing, it may be simply removed and replaced with a new bladder while leaving the outer rigid exoskeleton container housing for re-use. This substantially saves on cost in that the outer housing need not be replaced entirely each time when the supply bladder is empty. The internal bladder and outer housing may be in any form or configuration to suit the dispensing application at hand.

[0012] It is also possible that the a pump and valve configuration may be employed to assist in moving liquid from the storage bladder and through the nozzle. For example, it is preferred that a flexible metering housing be disposed in fluid communication with the fluid storage region of the internal bladder with a first one-way valve disposed between the container and the flexible metering housing. One way flow from the interior fluid storage region of the container fills the predetermined volume of the metering chamber with fluid by vacuum action when the flexible metering housing is

depressed and then released. A second valve is in fluid communication with the metering housing output port and permits one-way fluid flow from the metering chamber to the exterior outer region of the container to a desired position when the metering housing is depressed again. Each time the metering housing is depressed a substantially equal volume of fluid is dispensed from the container. Optionally, an additional applicator layer on the outside of container, such as foam, facilitates dispersion and delivery of the fluid.

[0013] The internal deformable bladder of the present invention may reside in the outer exoskeleton housing in many different ways with the pump dispensing mechanism exposed for manipulation by a user. For example, it may snap into the housing where the door of the housing secures the internal bladder in place during the use. The door may be easily opened to remove the bladder when it is empty and replace it with a new full bladder.

[0014] Therefore, it is an object of the present invention to provide a bottle that is capable of storing and dispensing liquid in a controlled fashion.

[0015] Another object of the present invention is to provide a bottle that can be squeezed to dispense the liquid while maintaining a consistent and aesthetically pleasing appearance at all times during use of the bottle.

[0016] It is also an object of the present invention to provide a fluid dispensing device that can deliver a substantially equal volume of fluid material from each dispensing operation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The novel features which are characteristic of the present invention are set forth in the appended claims. However, the invention's preferred embodiments, together with further objects and attendant advantages, will be best understood by reference to the following detailed description taken in connection with the accompanying drawings in which:

[0018] FIG. **1** is a perspective view of the bottle for containing and dispensing liquids of the present invention when in a full condition;

[0019] FIG. **2** is a perspective view of the bottle for containing and dispensing liquids of the present invention when in a substantially depleted condition;

[0020] FIG. **3** is a perspective view of an alternative embodiment of the present invention, in a full condition, using a metering pump to assist in dispensing of the liquid;

[0021] FIG. **4** is a perspective view of the alternative embodiment of the present invention of FIG. **3**, in a substantially depleted condition, using a metering pump to assist in dispensing of the liquid;

[0022] FIG. **5** is a cross-section view through the line **5-5** of FIG. **1**;

[0023] FIG. **6** is a cross-sectional view of a metering dispensing pump mechanism that can be employed to pull media from an internal deformable of the present invention;

[0024] FIG. **7** is a front perspective view of another embodiment of the bladder and pump construction in accordance with the present invention;

[0025] FIG. **8** is a cross-sectional view through the line **8-8** of FIG. **7**; and

[0026] FIG. **9** is a cross-sectional view through the line **8-8** of FIG. **7** showing the pump and bladder in the process of dispensing fluid.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0027] In general, the novel features of the present invention relate to a metered dosing/dispensing container wherein there is an outer shape and an inner bladder, and where the inner bladder can contract independently of the outer container housing. Optionally, the inner bladder can replaced, when empty, independently of the outer housing. The outer housing can be rigid or semi-rigid, allowing it to maintain a form independent or partially independent from the shape of the inner bladder configuration. The outer housing or exoskeleton is preferably made of a resilient foam that can return to its original shape after it is compressed or otherwise manipulated by a user.

[0028] Referring first to FIGS. **1** and **2**, a preferred embodiment **10** of the present invention is shown in detail. A bottle for containing and dispensing liquid is shown. In this embodiment **10**, as above, the container **10** of the present invention is in the form of a bottle, such as a shampoo bottle, that has an internal yet visible rectangular-shaped bladder **14** that contains the liquid **16** to be dispensed. It should be understood that any type of bottle **10** for any purpose may use the present invention. Surrounding the rectangular housing **12** is a semi-rigid foamed exoskeleton providing for a stand-up structure and aesthetics. The exoskeleton housing **12** is flexible and be easily compressed to, in turn, compress and collapse the bladder **14**.

[0029] The exoskeleton **12** is squeezed in the general direction indicated by arrows A to, in turn, collapse the bladder **14** gradually thereby urging liquid **16** contained in the bladder **14** out through the nozzle **18**. Since the exoskeleton **12** is made of a resilient material, such as foam, it quickly returns to its original shape, as seen in FIG. **1** even though the bladder **14**, that is carrying and retaining it, is being depleted of liquid **16**. As the exoskeleton housing **12** is repeatedly squeezed for each successive use, the bladder **14** becomes more and more collapsed in shape until it becomes completely or substantially empty of liquid **16**. FIG. **2** shows the container **10** in an empty condition. It should be particularly noticed that the overall shape of the container **10** remains essentially the same even though the bladder **14** is completely empty. This is important as this unique construction of the present invention enables the bottle container **10** to remain aesthetically pleasing over the use and depletion of the device from liquid **16**.

[0030] In general, the bladder **14** can be either respectively integrated into the exoskeleton **12** or separable so that it can be easily replaced, as discussed above. Because one surface of the rectangular bladder **14** is visible to the user, the volume of remaining fluid can be judged. Essentially, the housing exoskeleton **12**, in the example of the preferred embodiment of FIGS. **1** and **2**, has one large cut-way **20** to serve as a window to view the bladder **14**. Because the exoskeleton **12** is preferably compressible foam, or similar material, most or all of the internal liquid **16** can be dispensed. In fact, the device **10** can even be "wrung out" like a towel to urge virtually all of the liquid **16** from the bladder **14** for use. Even after this, due to the resilient nature of the exoskeleton **12**, the overall shape of the device **10** will return to its original condition even though the bladder **14** is depleted of liquid **16**.

[0031] Still further it is envisioned, as an alternative embodiment, that the internal bladder **14** can be constructed to specifically allow for expansion in a number of ways. In one embodiment of the invention, the internal bladder **14** is formed from an elastic or balloon like material which expands when filled, but contracts when empty. The elasticity of the bladder **14** system can actually assist in the pumping of the liquid **16**. In another embodiment of the invention, the bladder **14** can be surrounded wholly or partially with an elastic material providing for the contraction. In such an embodiment, the internal bladder **14** can be elastic or non-elastic, with the elasticity of the external wrapping of the bladder **14** providing for additional force in contracting the shape of the bladder **14**.

[0032] In still another embodiment of the invention, the bladder **14** can be designed with pleats or other folded geometries allowing for it to expand and contract in a predetermined geometry. An example of such an embodiment would be a bladder **14** formed in an accordion or bellows-like structure allowing for the bladder **14** to expand or contract in length, as seen in FIGS. **1** and **2**. An accordion or otherwise pleated bladder **14** can contract into a very small shape when evacuated, but expand into a cylindrical or rectangular shape as the accordion structure expands.

[0033] In accordance with the present invention, the bladder **14** could be of any shape to provide an aesthetically pleasing appearance whether in a full condition, empty condition or any condition therebetween. In such a case, the exoskeleton **12** can be transparent, translucent or opaque with windows **20** to enhance the visual appeal of the product. The bladder **14** itself can be a configuration that contracts in the X, Y or Z direction or any combination thereof. For example, the bladder may be a pleated balloon that collapses in the X, Y and Z directions at the same time to provide a unique visual effect as the media is depleted from the dispenser over time. It is also possible that the bladder **14** twists or rotates as it is depleted of dispensed media. As stated above, the device of FIGS. **1** and **2** is compressed in the general direction indicated by arrows A to urge liquid upward through the nozzle in the direction indicated by arrow B. However, these are only examples and any suitable configuration can be used.

[0034] The rigid or semi-rigid housing exoskeleton **12** could be designed to have openings or holes **20**, as mentioned above, of any kind to serve as a window to allow visibility of the internal bladder structure **14**. In FIGS. **1** and **2**, the openings is shown as one large U-shaped cut-out of open space but the housing exoskeleton **12** could be fabricated to have small windows or cut-out through which the use can monitor the volume of liquid **16** remaining the bladder **14**.

[0035] Turning now to FIGS. **3-5**, if the dispenser **100** is for dispensing shampoo **102**, in similar fashion to the bottle of FIGS. **1** an **2**, however this embodiment employs a metering dispensing pump to assist in delivering the liquid through the nozzle. As with the embodiment of FIGS. **1** and **2**, it is desirable to have the liquid shampoo exit at the top of the dispenser **100** via exit port **104**. In this upright container example, an outer exoskeleton **106** contains and provides support for a bladder **108** that contains liquid **102**, such as shampoo. Metering dispensing pump **110** resides between and is in fluid communication between the bladder **108** and the exit port **104**. FIG. **3** shows the bladder **108** substantially full of liquid **102**. When the pump **110** is actuated, it draws liquid **102** from the bladder **108** to dispense it through exit port **104** for use. FIG. **4** shows the bladder **108** in a substantially empty state as virtually all of the liquid **102** has been dispensed. It should be particularly noted that the shampoo container **100** remains upright and still substantially in its original shape and configuration even though the bladder **108** has been emptied.

[0036] If a metering pump is used, then the outer exoskeleton **106** need not be made of a compressible material as in the preferred embodiment of FIGS. **1** and **2** because the metering pump **110** is used to draw liquid **102** from the bladder **108** rather than by forcing it out through the nozzle **104** by squeezing the sides of the flexible exoskeleton outer housing **106**.

[0037] For ease of discussion, the construction of the bladder **14** will be discussed in detail in connection with the embodiment of FIGS. **1** and **2**. However, it should be understood that the bladder of the embodiment of FIGS. **3-5** may be made in the same way. The bladder **14** can be formed from bonding two sheets of thermoplastic films into a flat shape or a fixed geometry such as a rectangle or any other outlined form, and the expansion and contraction can take place within that welded flat shape. In such a case, the bladder **14** will expand or contract by becoming thicker or thinner, but the basic 2-dimensinal outline shape of the sealed bladder **14** will remain the same.

[0038] Alternatively, the inner bladder **14** can be constructed into a simple shape, but be made with sidewalls so it has some three dimensional geometry. An example of a rectangular bladder with sidewalls can be seen in FIGS. **3-5**. In this embodiment **100**, as above, the container of the present invention is in the form of a bottle that has an internal yet visible rectangular-shaped bladder **108** that contains the liquid **102** to be dispensed. Surrounding the rectangular bottle is a semi-rigid foamed exoskeleton **106** providing for a stand-up structure and aesthetics. As the internal liquid **102** is dispensed using the metered dosing pump **110**, the rectangular bladder **102** collapses gradually. FIG. **4** shows the container in an empty condition. In general, the bladder **14**, **108** can be either respectively integrated into the exoskeleton **12**, **106** or separable so that it can be easily replaced, as discussed above. Because one surface of the rectangular bladder **108** is visible to the user, the volume of remaining fluid **102** can be judged. Essentially, the housing exoskeleton **106**, in this example, has one large cut-way to serve as a window to view the bladder **108**. Because the system is preferably vacuum driven, most or all of the internal liquid **102** can be dispensed without having to turn the bottle **100** in an alternate orientation.

[0039] FIG. **5** shows a cross-sectional view through the line **5-5** of FIG. **3** to illustrate the general construction of the housing exoskeleton **106** and the bladder **102**. As can be seen the bladder **108**, containing liquid **102**, resides between walls of the housing **106**. The housing **106** retains its shape even thought the bladder **108** is gradually collapsing over time as liquid **102** is depleted from the bladder **108**. The container **10** of FIGS. **1** and **2** is preferably made using the same construction.

[0040] FIG. **6** shows a first embodiment of a mechanism that can be used a metering dispensing pump, referred to as **218** for dispensing the liquid **16** in a device of the present invention of FIGS. **3-5** that uses a metering dispensing pump to assist in delivering the liquid. Bladder **202** contains liquid **16**. When released, a flexible dome **204** pulls liquid **16** upwardly through first valve **206** to fill metering chamber **208**. When the dome **204** is depressed, the first valve closes and liquid **16** is urged out through exit port **210**. The exit port **210** acts as a second valve and, when liquid is not being

pumped, the distance A is substantially reduced so that opposing sides of the exit port seal the dispenser to prevent accident dispensing. When dispensing is desired, the dome **204** is pressed and liquid **16** is urged out through the exit port **210** to expand it temporarily to permit outflow of liquid **16**, as desired.

[0041] Another embodiment of the metering dispensing pump is shown in FIGS. **7-9**. In FIG. **7**, a perspective view of a metering dispenser **300** that employs the improved valving in accordance with the present invention. An outer storage bladder **320** is provided that may be formed of two sheets of material **304**, **306** secured together, such as by welding, or a tube of material. A metering pump, generally referred to as **326**, pulls liquid **302** from the bladder **320**, meters it, and then dispenses it via an exit port **308**.

[0042] Referring to FIGS. **8** and **9**, the dispending of liquid **302** is shown. When it is desired to actually dispense the liquid product **302**, the user's thumb **430** can depress the flexible dome **404** and the user's index finger **432** can invert the base plate **410** from convex to concave, by application of force against the stand-off legs **424**, such that flexible dome **404**, with the assistance of the stand-off legs **422** under the flexible dome, securely seals and provides a positive lock of the flapper valve **408** over and about the aperture **412** thereby closing the liquid flow passage back into the reservoir **434** of the storage container **320**. It is also possible that the base plate **410** is concave and then is inverted to a convex configuration. Other fingers of the user may be used to carry out this operation. Thus, the only path for the liquid **302** contained within the cavity **405** of dome **404** is to exit through the one-way outlet valve **436** for intended dispensing of the product, as indicated by the arrows in FIG. **14**.

[0043] It should be understood that the stand-off legs **422** on the bottom of the flexible dome housing **404** and the stand-off legs **424** on the bottom of the base plate **410** can be modified in size, length and configuration to adjust the amount of squeezing necessary by the user's fingers **430**, **432** to effectuate sealing of the flapper valve **408**. For example, preferably four stand-off legs **422** are provided on the bottom of the flexible dome housing **404** in a 2×2 array and can be 1/32 of an inch in length. It is also possible that these stand-off legs **422** can be a single downwardly depending wall, such as in the shape of a circle or square. Such an array is configured to downwardly press against the one-way flapper valve **408** outside of the diameter of the aperture **412** through the base plate **410** to provide a good seal of the flapper valve **408** to the base plate **410**.

[0044] FIG. **8** illustrates further structure to prevent unwanted dispensing of liquid. In addition to the improved valving, as above, automatic shut-off of the exit port passageway **436**, when pressure is exerted on the exterior of the storage container **320**, serves to prevent leakage. In FIG. **8**, when pressured is applied to the outside of the storage container or pouch **320**, as indicated by arrows referenced A, the exit port passageway **436** tends to collapse, flatten and squeeze closed. As a result, any material residing in the passageway is urged back into the cavity **405** of the flexible dome housing **404**, as indicated by arrow referenced B. As a result, unwanted leakage is prevented when accidental or unintentional pressure is placed on the storage container **320**.

[0045] The embodiment shown in FIG. **6** is generally shown as a vertically oriented bladder and pump construction while the construction **300** in FIGS. **7-9** shows a lateral design which may be more suitable in certain dispensing environments. The design in FIGS. **7-9** also show a certain configuration of the metering capability of a pump using in the present invention.

[0046] It can be easily seen how this basic concept can be used to improve many products. The housing exoskeleton can be designed to provide many features including aesthetics and graphics, stand-up structure, hanging or positioning or attachments features etc. Since the housing exoskeleton remains upright, assembled and in its form as originally purchased, the outer appearance of the product will not degrade over time as the media therein is depleted. Also, an indicia thereon, such as product information and logos can remain prominently displayed throughout the life of the product.

[0047] In all of the above embodiments, the bladder **14**, **108** is able to expand and contract independently from the exoskeleton **12**, **106** of the container, and the exoskeleton **12**, **106** provides for external shape or appearance. The exoskeleton **12**, **106** of the container **10**, **100** can be constructed from any materials that are commonly used for this purpose, including plastic such as polypropylenes, polyethylenes, polyesters, ABS, polystyrene, vinyl, metal, wood, rubber, or any other suitable material. It can also be made of more expensive durable materials such as glass, crystal, gold, silver or other metals, wood, epoxies or other materials that can be crafted into desirable shapes.

[0048] Referring back to FIGS. **1** and **2**, as to use of windows through the housing exoskeleton **12** to view the bladder **14**, it is envisioned that the exoskeleton **12** of the container **10** may have apertures **20** or openings that allow the user to see through the exoskeleton **12** into the internal bladder **14**, or may even be made of a very fine structure where most of the bladder **14** is openly visible. In other embodiments, the exoskeleton **12** may be made of fully transparent or partially transparent materials allowing the user to see the state of the inner bladder **14**. In still other embodiments of the invention, the exoskeleton **12** may be completely opaque or partially opaque. In cases where the exoskeleton **12** is opaque and the user cannot see the internal bladder **14** it may be beneficial to have a visual indicator or gauge visible on the exoskeleton **12** that can show the approximate level of fluid **16** remaining in the internal bladder **14** or the size of the internal bladder **14**.

[0049] It is also possible that the inner bladder **14** (and dosing pump **110** in FIGS. **3-5**) are easily removable or replaceable individually or as a unit, so that the exoskeleton **14** can be refilled on an ongoing basis, as needed. The exoskeleton **14** can be made using injection molding, blow molding, casting, milling, or any other forming or fabrication techniques, and can be made from both solid materials or foamed materials or combinations thereof. A door or other containment structure is preferably used to retain the internal bladder **14** in place in the housing exoskeleton **12** during use.

[0050] More specifically, relating to the alternative embodiment of FIGS. **3-5**, it is envisioned that the internal bladder **108** system with metered dosing pump **110** may be removable and replaceable within the same exoskeleton **106** so that the housing exoskeleton **106** can be re-used. In cases where the exoskeleton **106** is made from more expensive or higher-grade materials, this may be highly desirable. It may also be desirable, for ecological reasons, to have the bladder **108** and pump component **110** replaceable even when the exoskeleton **106** is made from relatively less expensive materials. In such cases, the internal bladder **108** will take up less packaging and shipping materials, and can be easily made to be fully recyclable. The user can purchase a completely sealed inner bladder **108** with metered dosing pump component **110** in the form of a cartridge-like unit, and replace the unit within the exoskeleton **106** when the bladder **108** is empty. The fact that the exoskeleton **106** could be made from higher end materials such as glass or crystal or gold etc, would

allow for the user to have much more attractive containers with easily refillable internal components.

[0051] Still further, it is possible, for example, that the exoskeleton **106** could be formed from glass or crystal allowing for a highly decorative container with the inner bladder being replaceable or refillable. Even in cases where the exoskeleton **106** is made from less expensive materials, it may still be desirable to allow for replacement or refilling of the internal bladder **108** and pump component **110** as a unit, as this method of packaging liquids may be more environmentally friendly than current methods, since the exoskeleton **106** shape will be retained and not sent to a landfill.

[0052] It is also possible, although not preferred, to provide a housing exoskeleton **106** and pump mechanism **110** that are permanently attached to one another where the bladder **108** alone is replaced when empty. In this example, the bladder **108** is received in the exoskeleton housing **106** for interface by the pump **110** for dispensing, such as by piercing and the like.

[0053] The present invention addresses the concerns found in the prior art. It can dispense almost all of the liquid **16** in the bladder **14**, since it can be "wrung out", as in FIGS. **1** and **2** or by vacuum pump as in FIGS. **3-5** using the pumps in FIGS. **6-9**. The user can conveniently refill the unit, by simply dropping in a pre-packaged filled bladder **14**. It can be designed to allow the user to see the level of fluid **16** remaining through transparency or openings in the exoskeleton **12**. Finally, the metered dosing pump **18** can be part of the bladder assembly **14** itself, so it gets replaced with each refill of the product.

[0054] In still other embodiments of the invention, the exoskeleton **12** is preferably made from semi-rigid material such as a foamed plastic or a laminate of plastic films or foams. In such cases, the exoskeleton **12** still provides sufficient structure to maintain its shape despite the change in shape of the internal bladder **14**. The exoskeleton **12** itself can be a fluid bladder for containing liquid and dispensing liquid therefrom. Also, the exoskeleton **12** can be designed to change shape as well, but the internal bladder **14** is free to move either completely independently or partially independently of the external shape. In the preferred embodiment, the exoskeleton is preferably easily compressible so that it can be manipulated from the outside by a user to, in turn, collapse the bladder for liquid dispensing while still being rigid enough to maintain the desired resting shape of the container. In the alternative embodiment of FIGS. **3-5**, a compressible, rigid or semi-rigid exoskeleton can be used.

[0055] As can be seen from the several embodiments enumerated above, the present invention can be used in a variety of configurations. In many cases it would be constructed as a single use disposable consumer package, but in other cases it could be a refillable product with either a low end or high end exoskeleton package that it could be placed into.

[0056] There are numerous advantages to the present invention over prior art. The present invention may be more environmentally friendly allowing for the user to maintain the external structure while replacing the internal bladder only. Another advantage is that in the present invention the user may be able to see specifically the quantity of fluid left in the dispensing device, since the bladder **14** may be visible through openings **20** or the transparency of the exoskeleton **12**. In addition, in cases where the bladder **14** is made from an elastic material or surrounded by an elastic material, the force of the contracting elasticity on the bladder assist in the evacuation of the liquid in the pumping process. Additionally, the present invention allows for a constant pleasing shape of the external container **10** as the inner chamber is evacuated, but does allow for full evacuation of the internal liquids **16**. By allowing the independent movement of the internal bladder **14** in the meter dosing device, the overall shape of the device **10** does not have to change as the liquid **16** is depleted. The present invention also allows for a package **10** wherein most or all of the fluid **16** can be effectively pumped from the container without changing the orientation.

[0057] Still further, a more abrasive material (not shown) can be provided on one side of the device **10** for more aggressive cleaning, for example, while the opposing side has a polishing type surface.

[0058] In summary, a new and novel dispenser with an independently deformable internal bladder **14** is provided that can deliver consistent metered dosages of such fluid **16** media material while being replaceable when empty.

[0059] It would be appreciated by those skilled in the art that various changes and modifications can be made to the illustrated embodiments without departing from the spirit of the present invention. All such modifications and changes are intended to be covered by the appended claims.

What is claimed is:

1. A fluid dispensing device, comprising:

a compressible housing defining a bladder-receiving region;

a fluid bladder residing in the bladder-receiving region; media to be dispensed residing in the fluid bladder; the fluid bladder defining an exit port; and

the compressible housing being configured and arranged to urge media from the fluid bladder and through the exit port for dispensing.

2. The fluid dispensing device of FIG. **1**, further comprising:

a nozzle in fluid communication with the exit port of the fluid bladder.

3. The fluid dispensing device of FIG. **1**, further comprising:

a pump in fluid communication with the fluid bladder; the pump configured and arranged to deliver media through the exit port of the fluid bladder.

4. The fluid dispensing device of claim **1**, wherein the housing further defines at least one aperture therethrough to enable the fluid bladder to be viewed.

5. The fluid dispensing device of claim **1**, further comprising:

means for retaining the fluid bladder in the bladder-receiving region.

6. The fluid dispensing device of claim **3**, wherein the pump is a metering pump.

7. The fluid dispensing device of claim **1**, wherein the housing is resiliently compressible and capable of returning to its original condition after being compressed.

8. The fluid dispensing device of claim **1**, wherein the housing is semi-rigid.

9. The fluid dispensing device of claim **1**, wherein the pump and fluid bladder are permanently connected to one another.

10. The fluid dispensing device of claim **1**, wherein the fluid dispensing device has an outer appearance that remains substantially unchanged during dispensing of media from the fluid bladder during use.

11. The fluid dispensing device of claim **1**, wherein the outer housing is a bladder configured and arranged to contain liquid.

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