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(54) **WATER BOTTLE WITH SELECTIVELY ACCESSIBLE COMPARTMENT FOR STORING AND MIXING POWDERS**

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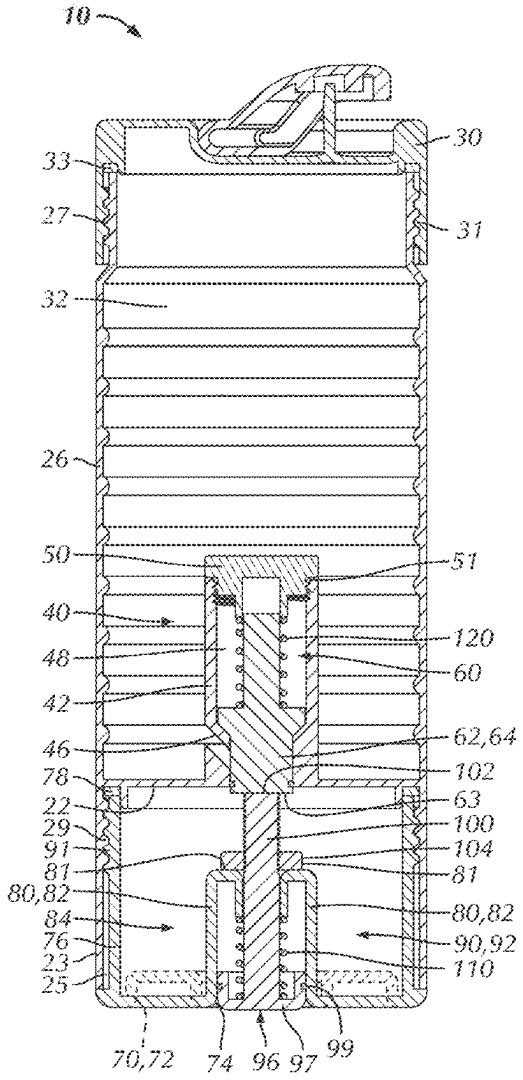
(57) **ABSTRACT**

A bottle provides for separately storing a powder and a liquid and selectively mixing the powder into the liquid. The bottle includes a main body having a bottom wall with a transfer passage, a perimeter wall attached to the bottom wall, and a main-body cap sealingly attachable to the perimeter wall. A main-body projection is sealingly attached to the bottom wall and forms a conduit with an outlet. A sealing body in the conduit has resting and activated positions, is biased toward the resting position, and is displaceable to unblock the outlet. A secondary body is sealingly attachable to the main body and has a bottom wall with an access passage and a secondary-body projection containing an activation body. The activation body is configured to displace the sealing plug when the activation body is in an activated position.



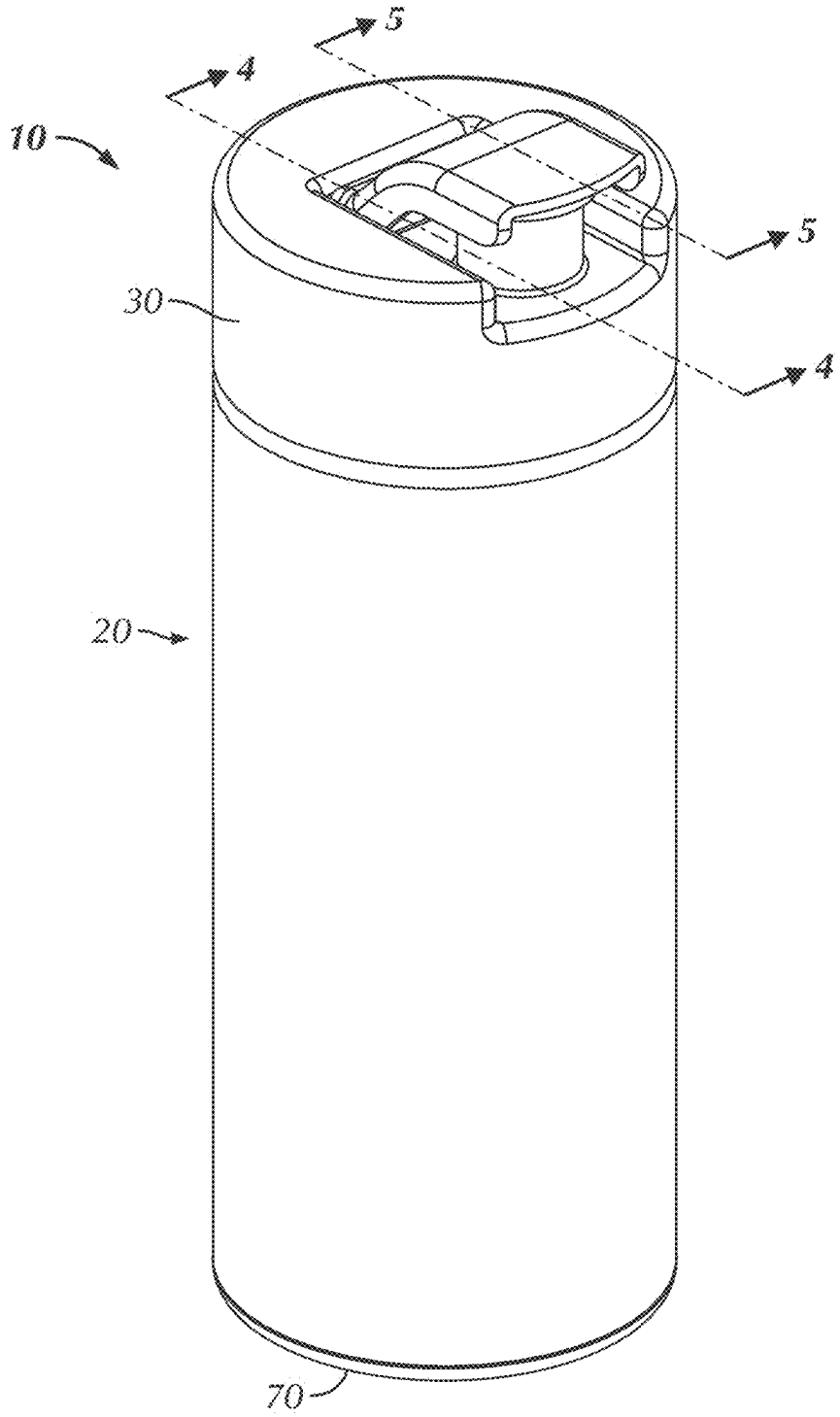


FIG. 1

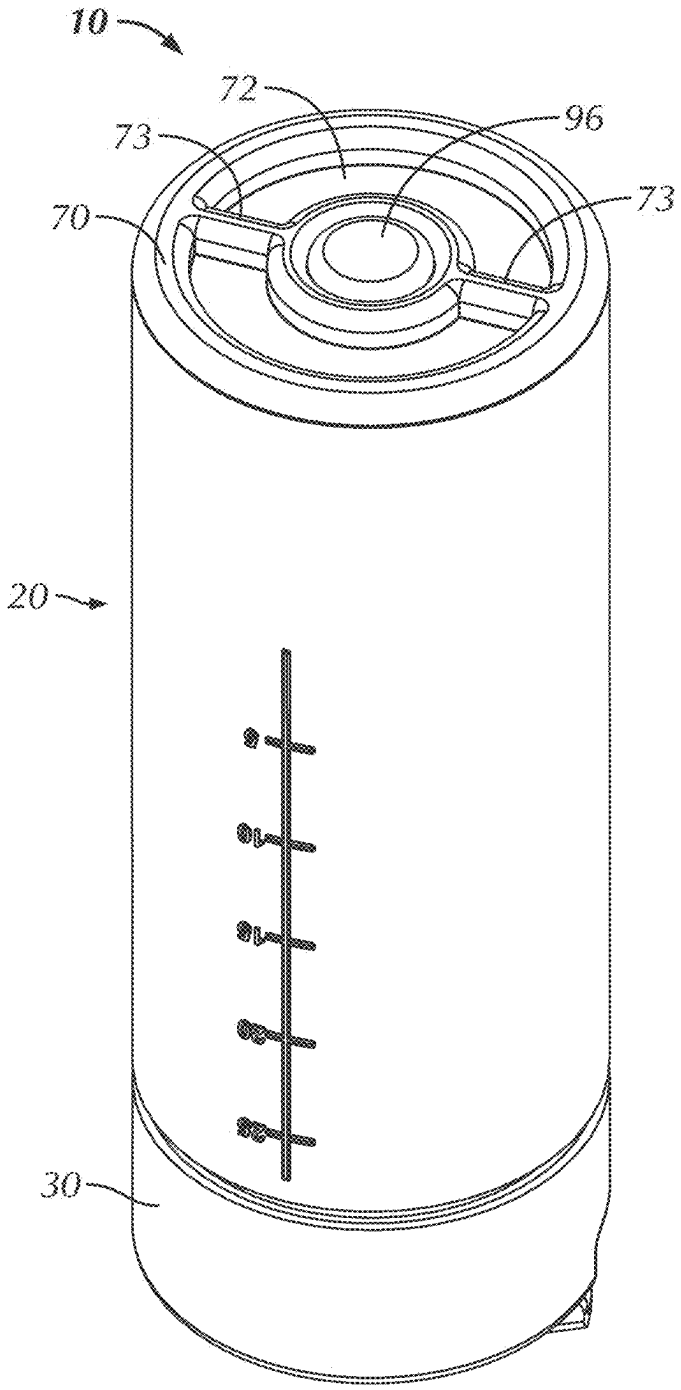


FIG. 2

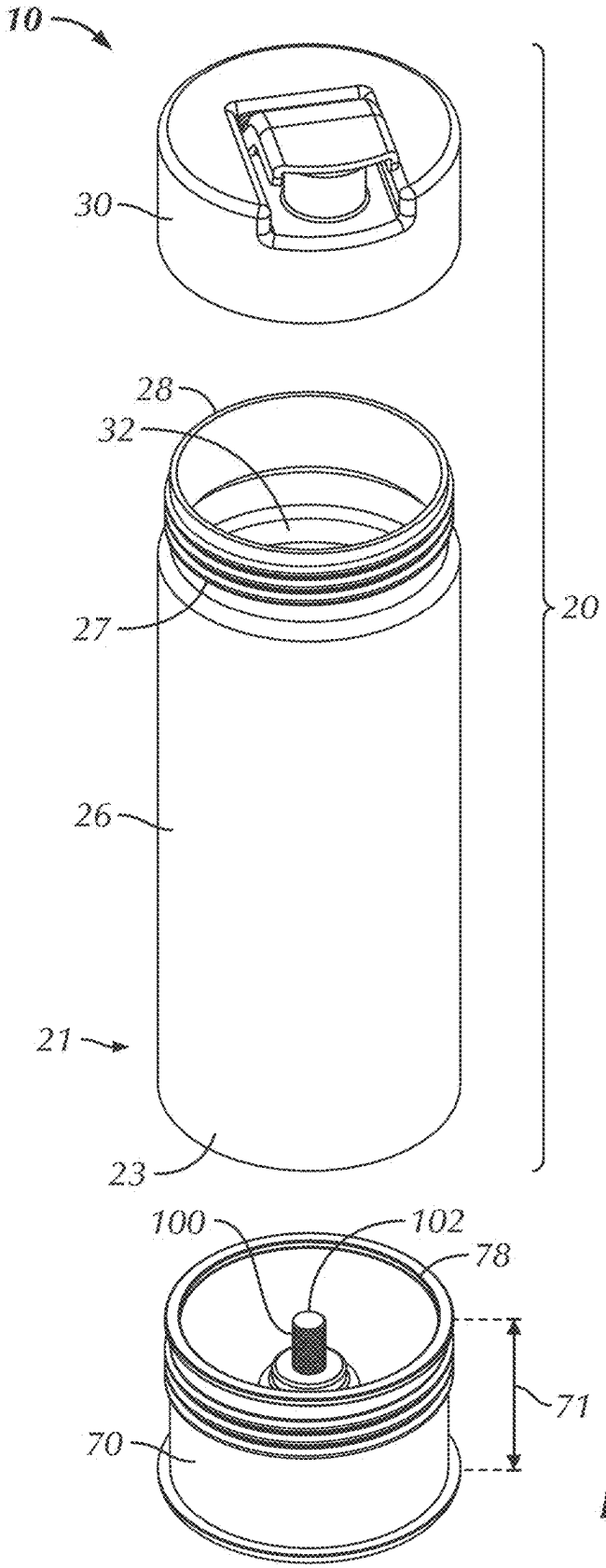


FIG. 3

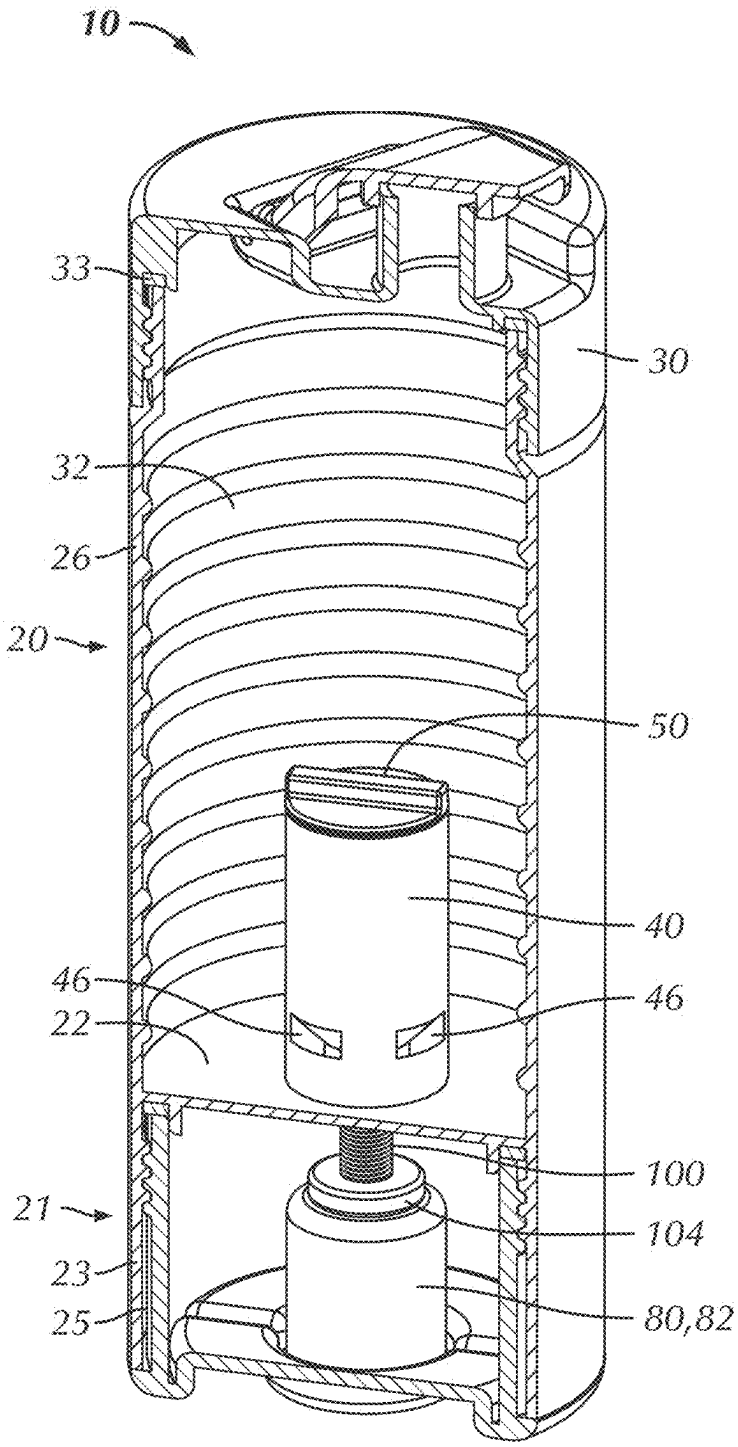


FIG. 4

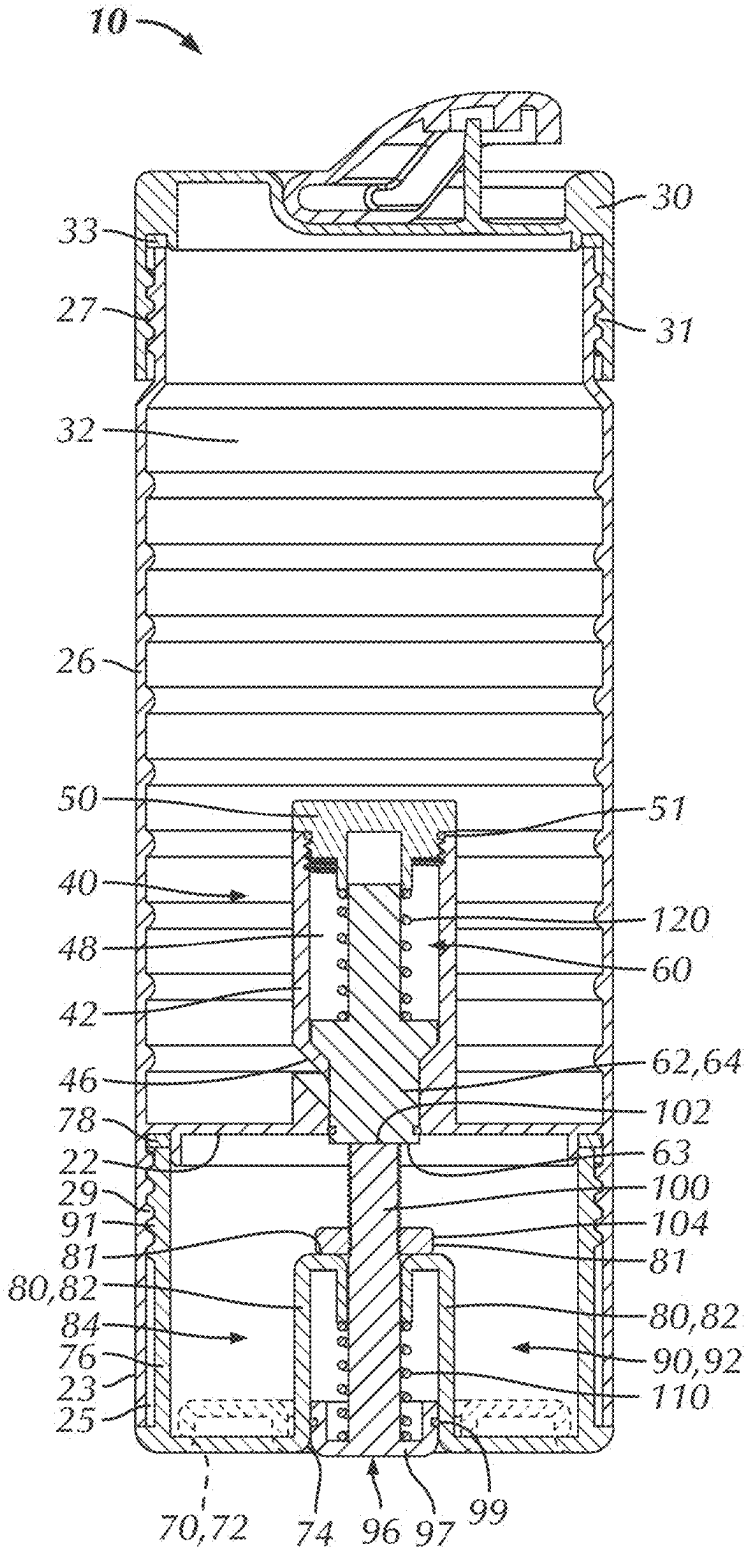

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FIG. 5

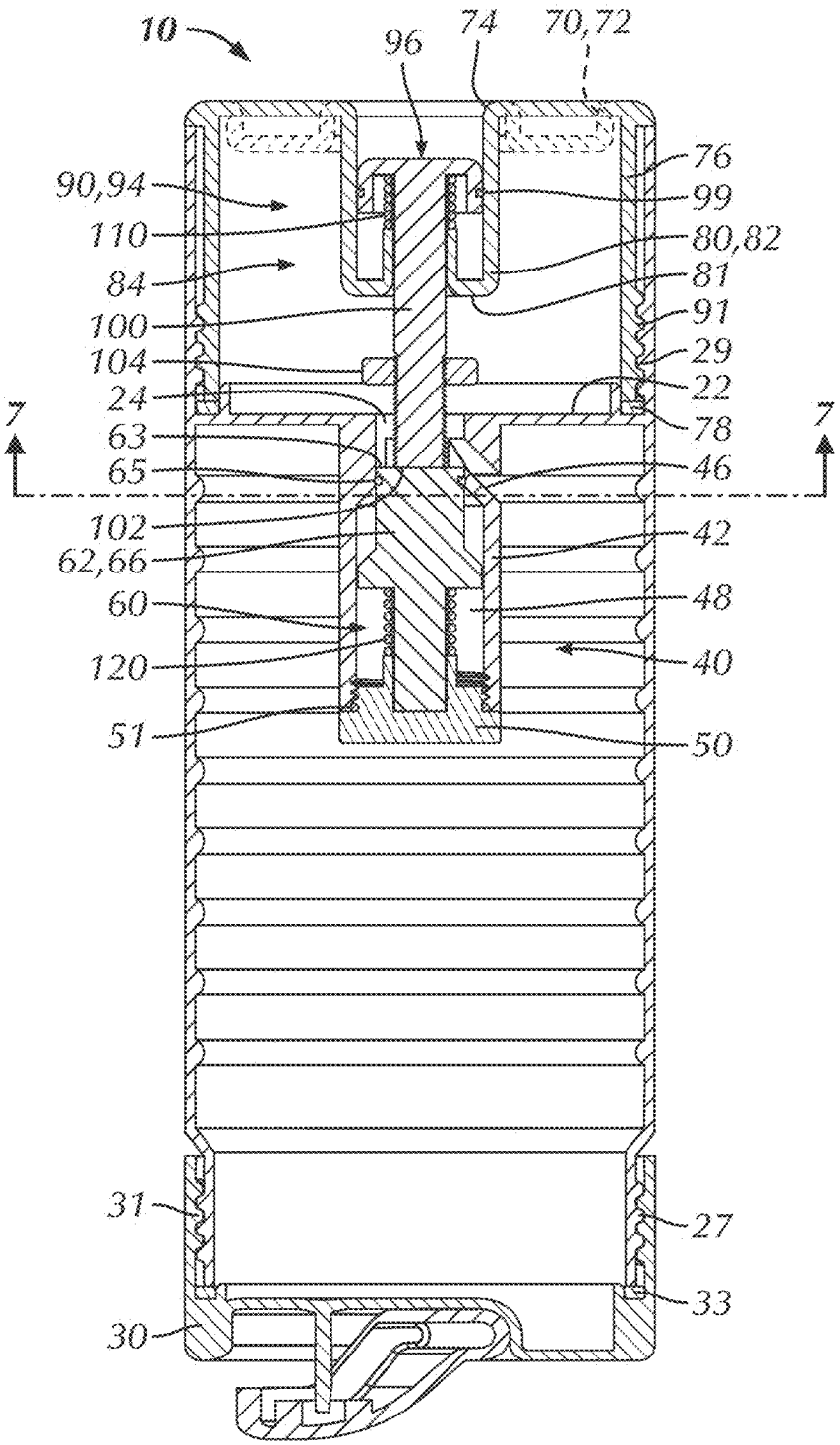
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FIG. 6

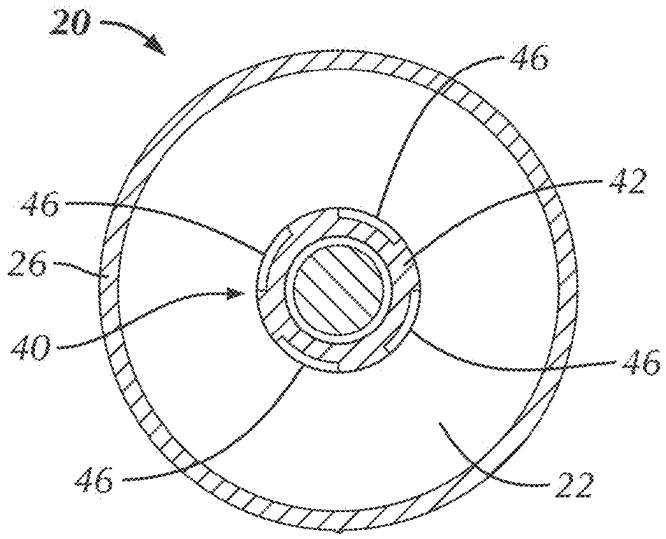

FIG. 7

WATER BOTTLE WITH SELECTIVELY ACCESSIBLE COMPARTMENT FOR STORING AND MIXING POWDERS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. Provisional Patent Application No. 63/552,488 filed on Feb. 12, 2024 and No. 63/552,872 filed on Feb. 13, 2024. The applications cited in this paragraph are hereby incorporated into the present application by reference.

BACKGROUND OF THE INVENTION

[0002] The practice of employing reusable bottles for the storage, transportation, and consumption of water and other drinks has become common. Bottle users often wish to employ a reusable bottle for drinks other than water, including drinks made from a combination of a powder and a liquid. For example, bottle users, especially those interested in fitness, may wish to use a water bottle to prepare a drink from a combination of a powder and a liquid. Powders that may be combined into a liquid to make a drink include protein powders, powdered energy drinks, powdered electrolyte replacements, and other powders prepared for mixing into water or another liquid.

[0003] Certain kinds of drinks made from powders are best prepared close to the time of consumption, rather than being prepared in advance, due to refrigeration requirements, the potential for spoilage (especially without refrigeration), convenience of transportation, or other concerns. As a result, bottle users may wish to measure out a dry powder at one location and time—for example, in a home kitchen—and mix the powder with a liquid at a later time for consumption as a drink. The present disclosure relates to a bottle allowing for the separate storage of a powder and a liquid and for subsequently mixing the powder and the liquid.

SUMMARY OF THE INVENTION

[0004] Briefly stated, a bottle is disclosed for separately storing a powder and a liquid and for selectively mixing the powder into the liquid. The bottle comprises a main body. The main body has a main-body bottom wall having a transfer passage extending therethrough. A main-body perimeter wall is sealingly attached to the main-body bottom wall and forms a main-body upper opening. A main-body cap is sealingly attachable to the main-body perimeter wall to seal the main-body upper opening. The main-body bottom wall, the main-body perimeter wall, and the main-body cap together enclose a main-body volume. The transfer passage is in fluid communication from the main-body volume outside of the main body. A main-body projection is sealingly attached to the main-body bottom wall. The main-body projection includes a main-body-projection perimeter wall surrounding the transfer passage and sealingly attached to the main-body bottom wall. The main-body-projection perimeter wall forms a main-body projection conduit. The main-body-projection perimeter wall comprises an outlet linking an interior space of the projection conduit to the main-body volume. A main-body-projection cap is sealingly attachable to the main-body-projection perimeter wall. A sealing body comprises a sealing plug disposed for movement with respect to the outlet. The sealing plug is biased to a closed position blocking the outlet and is displaceable to an open position un-blocking the outlet. A secondary body is configured to be sealingly attachable to the main body to engage a lower portion of the main body. The secondary body has a secondary-body bottom wall having an access passage extending therethrough. A secondary-body perimeter wall is sealingly attached to the secondary-body bottom wall and forms a secondary-body upper opening. A secondary-body projection is sealingly attached to the secondary-body bottom wall. The secondary-body projection includes a secondary-body-projection perimeter wall surrounding the access passage and sealingly attached to the secondary-body bottom wall. The secondary-body-projection perimeter wall forms a secondary-body access conduit. An activation body is slidably disposed in the secondary-body access conduit and has a resting position and an activated position. The activation body is biased toward the resting position from the activated position. The activation body has an activation projection extending therefrom toward the main body. The activation projection is configured to displace the sealing plug into the open position when activation body is in the activated position. In the illustrated embodiment, an inner end of the activation projection abuts a lower end surface of the sealing plug to urge the sealing plug into the open position.

[0005] In certain embodiments of the bottle, the main-body cap may be configured with threads to threadedly engage the main-body perimeter wall.

[0006] In certain embodiments of the bottle, the bottle may comprise a lower skirt extending downwardly and forming the lower portion of the main body below the main-body bottom wall, the lower skirt forming a main-body recess sealingly engageable with the secondary body, the main-body recess accepting at least 90 percent of a height of the secondary body when the secondary body is engaged with the lower skirt.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] The following detailed description will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the disclosed matter, there are shown in the drawings various embodiments, including embodiments which may be presently preferred. It should be understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown. In the drawings:

[0008] FIG. **1** is a right upper perspective view of an example of a bottle according to the present disclosure;

[0009] FIG. **2** is an upper perspective view of an example the bottle of FIG. **1**, with the bottle depicted in an inverted position;

[0010] FIG. **3** is an exploded front upper perspective view of the bottle of FIG. **1**;

[0011] FIG. **4** is right upper perspective sectional view of the bottle of FIG. **1**, taken along the line **4-4** in FIG. **1**;

[0012] FIG. **5** is a sectional view of the bottle of FIG. **1** taken along the line **5-5** of FIG. **1**, with the bottle shown in a pre-activation configuration and an upright orientation;

[0013] FIG. **6** is a sectional view of the bottle of FIG. **1** taken along the line **5-5** of FIG. **1**, with the bottle shown in an activated configuration and an inverted orientation; and

[0014] FIG. **7** is a partial sectional view of the bottle of FIG. **1** taken along the line **7-7** in FIG. **6**.

DETAILED DESCRIPTION

[0015] Certain terminology is used in the following description for convenience only and is not limiting. The words "right," "left," "lower," and "upper" designate directions in the drawings to which reference is made. The words "inner" and "outer" refer to directions toward and away from, respectively, the geometric center of the bottle and designated parts thereof. Unless specifically set forth herein, the terms "a," "an," and "the" are not limited to one element but instead should be read as meaning "at least one." As used herein, the terms "proximal" and "distal" are relative terms referring to locations or elements that are closer to (proximal) or farther from (distal) with respect to other elements. Throughout the application, two volumes or locations in "fluid communication" are volumes or locations that are connected such that a fluid may pass from one of the volumes or locations to the other. Although a powder is not a fluid, in the disclosed bottle, certain elements in "fluid communication" with one another may be used to allow movement of powder from one location to another in a manner analogous to the movement of a fluid and in particular in a manner analogous to a liquid.

[0016] The terminology defined herein includes the words noted above, derivatives thereof, and words of similar import.

[0017] In one aspect, FIG. **1** is a right upper perspective view of a bottle **10** according to the present disclosure; and FIG. **2** is an upper perspective view of the bottle **10** depicted in an inverted position. The bottle **10** is suitable for separately storing a powder and a liquid and for selectively mixing the powder into the liquid. FIG. **3** is an exploded front upper perspective view of the bottle **10**; and FIG. **4** is a right upper perspective sectional view of the bottle **10**. FIGS. **5** and **6** are sectional views of the bottle **10** taken along the line **5-5** of FIG. **1**, with FIG. **5** showing the bottle in a pre-activation configuration and an upright orientation, while FIG. **6** shows the bottle in an activated configuration in an inverted orientation. FIG. **7** is a sectional view as described further below.

[0018] Referring to FIGS. **1** through **6**, the bottle **10** comprises a main body **20**. A main-body cap **30** is sealingly attachable to the main-body perimeter wall **26** to seal the main-body upper opening **28**. The main body **20** may serve as a liquid storage compartment. The main-body cap **30** may include a conventional flip-top and spout, or another opening and closure mechanism. Thus the main body **20** may be filled with liquid via the main-body upper opening **28**, and then the main-body upper opening **28** may be sealed using the main-body cap **30**. The main body **20** has a main-body bottom wall **22** having a transfer passage **24** in the form of an opening extending therethrough. A main-body perimeter wall **26** is sealingly attached to the main-body bottom wall **22** and forms a main-body upper opening **28**, so that the main-body bottom wall **22** and the main-body perimeter wall **26** together form an open-topped but otherwise liquid-tight bottle or vessel. The main-body bottom wall **22** and the main-body perimeter wall **26** may be sealingly attached by being integrally or monolithically formed. The main-body bottom wall **22**, the main-body perimeter wall **26**, and the main-body cap **30** together enclose a main-body volume **32**. The transfer passage **24** links the main-body volume **32** to outside of the main body **20** and is in fluid communication between the main-body volume **32** and the space outside the main body **20**, or in fluid communication with the secondary body **70** when in place, as discussed below. As noted above, two volumes or locations in "fluid communication" are volumes or locations that are connected such that a fluid may pass from one of the volumes or locations to the other. Although a powder may or may not be strictly considered a fluid, in the disclosed bottle, elements in "fluid communication" with one another may be used to allow movement of powder from one location to another, and in particular from the secondary body **70** into the main-body volume **32** when the bottle in in an activated configuration.

[0019] A main-body projection **40** is sealingly attached to the main-body bottom wall **22**. The main-body projection **40** includes a main-body-projection perimeter wall **42** surrounding the transfer passage **24** and sealingly attached to the main-body bottom wall **22**. The main-body-projection perimeter wall **42** and the transfer passage **24** together form a main-body-projection conduit. The main-body-projection perimeter wall **42** comprises an outlet **46** linking an interior space **48** of the main-body-projection conduit to the main-body volume **32**. A main-body-projection cap **50** is sealingly attachable to the main-body-projection perimeter wall **42**. A seal such as an O-ring **51** (FIG. **5**) may be provided to aid sealing between the main-body-projection cap **50** and the main-body-projection perimeter wall **42**. A sealing body **60** comprises a sealing plug **62** disposed for movement with respect to the outlet **46**. The sealing plug **62** is biased to a closed position **64** (FIG. **5**) blocking the outlet **46** and is displaceable to an open position **66** (FIG. **6**) un-blocking the outlet **46**.

[0020] The secondary body **70** is configured to be sealingly attachable to the main body **20** to engage a lower portion **21** of the main body **20**. The secondary body **70** has a secondary-body bottom wall **72** having an access passage **74** extending therethrough. A secondary-body perimeter wall **76** is sealingly attached to the secondary-body bottom wall **72** and forms a secondary-body upper opening **78**. A secondary-body projection **80** (FIGS. **4** through **6**) is sealingly attached to the secondary-body bottom wall **72**. The secondary-body projection **80** includes a secondary-body-projection perimeter wall **82** surrounding the access passage **74** and sealingly attached to the secondary-body bottom wall **72**. The secondary-body-projection perimeter wall **82** forms a secondary-body access conduit **84**. Referring to FIGS. **5** and **6**, an activation body **90** is slidably disposed in the secondary-body access conduit **84** and has a resting position **92** and an activated position **94**. The activation body **90** is biased toward the resting position **92** from the activated position **94**. The activation body **90** has an activation projection **100** extending therefrom toward the main body **20**. The activation projection **100** is configured to displace the sealing plug **62** into the open position when activation body is in the activated position. The activation body **90** has an activation surface **96**, which may be a surface of an activation button **97**, which the user may urge inwardly to place the water bottle in the activated configuration. The activation button **97** may extend inwardly and may include a seal such as an O-ring **99** to aid sealing between the activation button **97** and the secondary-body access conduit **84**.

[0021] An outer surface of the secondary-body bottom wall **72** may have projections **73** to aid the user in tightening the loosening the secondary body **70** in the main-body recess **25**. In the illustrated embodiment, referring to FIG. **5**, a coil spring **120** is held in compression between the main-body-projection cap **50** and the sealing plug **62** in the pre-

activation configuration of the bottle **10**, with the coil spring **120** exerting a restorative force urging the sealing plug **62** into the closed position **64**. A coil spring **110** is held in compression between an inner surface of the secondary-body projection **80** and an inner surface of the activation body **90** in the pre-activation configuration of the bottle **10**, with the coil spring **110** exerting a restorative force urging the activation body **90** into the pre-activation position. In the illustrated embodiment, referring to FIG. **6**, the coil spring **120** is held in further compression between the main-body-projection cap **50** and the sealing plug **62** in the activated configuration of the bottle **10**, with the coil spring **120** exerting a restorative force urging the sealing plug **62** from the open position **66**, which is reached due to force exerted by the user on the into the closed position **64**. Similarly, the coil spring **110** is held in further compression between the inner surface of the secondary-body projection **80** and the inner surface of the activation body **90** in activated n configuration of the bottle **10**, with the coil spring **120** exerting a restorative force urging the activation body **90** to return to the pre-activation position.

[0022] An axial stop—for example, a nut **104** as seen in FIGS. **4** through **6**—may be axially secured to the activation projection **100** (and thus secured to the activation body **90**). In the pre-activation configuration of the bottle **10**, the nut **104** (or other axial stop such as a pin or other transversely extending body) may engage a surface such as an inner surface **81** of the secondary-body projection **80** to halt an outward axial motion of the activation body **90** caused by the coil spring **110**, so that the activation surface **96** and the activation button **97** (where present) are placed in the desired location in the pre-activation configuration of the bottle **10**.

[0023] The main-body cap **30** may be removable. The main-body cap **30** may be configured with threads **31** to threadedly engage threads **27** of the main-body perimeter wall **26**. A seal such as an O-ring **33** may be provided to aid sealing between the main-body cap **30** and the main body **20**.

[0024] In certain embodiments of the bottle **10**, the bottle may comprise a lower skirt **23** extending downwardly and forming the lower portion **21** of the main body **20** below the main-body bottom wall **22**, the lower skirt **23** forming a main-body recess **25** sealingly engageable with the secondary body **70**, the main-body recess **25** accepting at least 90 percent of a height **71** (FIG. **3**) of the secondary body **70** when the secondary body **70** is engaged with the lower skirt **23**. The main-body recess **25** may include threads **29** for engaging compatible threads of the secondary body **70**.

[0025] The components of the bottle **10** may be formed from suitable materials such as plastics and metal. The main body **20** and the secondary body **70** may be formed, for example, from injection-molded, extrusion blow-molded, otherwise molded, or machined plastics, or by metals, glasses, composites, or any other container forming materials known in the art, processed as noted in the art. The activation body **90** and the thereof may be formed from suitable materials such as those disclosed above, with the activation body **90** being formed of material of sufficient strength and stiffness to tolerate the loads experienced as the activation body **90** is advanced by the user against the force provided by the compression springs in the form of coil springs **110** and **120**. The compression springs in the form of coil springs **110**, **120** may be formed from metal or other materials having strength, elasticity, and other properties appropriate to the application. The various O-rings **33**, **51**, **99** identified herein may be made from suitable materials, as may be known in the art, such as silicone rubber, neoprene, polyurethane, and the like. The main body **20**, the secondary body **70**, the O-rings **33**, **51**, **99**, the main-body projection **40**, the secondary-body projection **80**, and any the other part of the bottle **10** coming in contact with the protein or the liquid may preferably be made from food-safe materials.

[0026] In use, the bottle **10** may be employed as follows. The secondary body **70** may be detached from the main body **20** and placed in an upright position, as shown in FIGS. **3** and **5**. A powder for mixing into a liquid to form a drink may be introduced into the secondary body **70**. The secondary body **70** may then be sealingly attached to the main body **20**; in the case of the illustrated embodiment, this is accomplished by screwing the secondary body **70** to secure it to the lower portion **21** of the main body **20**, within the main-body recess **25** thereof. The bottle **10** may then be transported or stored while containing only the protein powder for later combination with a liquid. When the user is ready to introduce liquid into the bottle **10**, the liquid may be introduced into the main-body volume **32** of the main body **20** by removing the main-body cap **30**—for example, by unscrewing and removing the main-body cap **30**. When the user is ready to combine the powder with the liquid to form a drink, the bottle **10** may be inverted into the inverted orientation, as shown in FIG. **6**. The activation body **90** may be urged inwardly from the resting position **92** shown in FIG. **5** into the activated position **94** shown in FIG. **6**. The activation projection **100** of the activation body **90**, and in particular the inner end **102** thereof, abuts the lower end surface **63** of the sealing plug **62** and urges the sealing plug **62** into the open position **66**. In the open position **66**, the outlets **46** are unblocked, linking the interior space **48** that the projection conduit to the main-body volume **32**. A seal such as an O-ring **65** may be provided to aid sealing between the sealing plug **62** and conduit formed by main-body-projection perimeter wall **42** and the transfer passage **24**. This arrangement allows the protein powder to pass from the secondary body **70** into the main-body volume **32** the main body **20**. Movement of the protein through the outlet or outlets **46** may be aided or encouraged by the user shaking the bottle **10**; this may also aid mixing of the protein powder with the liquid.

[0027] It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular embodiment disclosed, but it is intended to cover modifications within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. A bottle for separately storing a powder and a liquid and for selectively mixing the powder into the liquid, the bottle comprising:

a main body having:

a main-body bottom wall having a transfer passage extending therethrough;

a main-body perimeter wall sealingly attached to the main-body bottom wall and forming a main-body upper opening;

a main-body cap sealingly attachable to the main-body perimeter wall to seal the main-body upper opening,

wherein the main-body bottom wall, the main-body perimeter wall, and the main-body cap together enclose a main-body volume, and

wherein the transfer passage is in fluid communication from the main-body volume outside of the main body;

a main-body projection sealingly attached to the main-body bottom wall, the main-body projection including:

a main-body-projection perimeter wall surrounding the transfer passage and sealingly attached to the main-body bottom wall, the main-body-projection perimeter wall forming a main-body projection conduit, wherein the main-body-projection perimeter wall comprises an outlet linking an interior space of the main-body projection conduit to the main-body volume;

a main-body-projection cap sealingly attachable to the main-body-projection perimeter wall;

a sealing body comprising a sealing plug disposed for movement with respect to the outlet, the sealing plug being biased to a closed position blocking the outlet and being displaceable to an open position un-blocking the outlet;

a secondary body configured to be sealingly attachable to the main body to engage a lower portion of the main body, the secondary body having:

a secondary-body bottom wall having an access passage extending therethrough;

a secondary-body perimeter wall sealingly attached to the secondary-body bottom wall and forming a secondary-body upper opening; and

a secondary-body projection sealingly attached to the secondary-body bottom wall, the secondary-body projection including:

a secondary-body-projection perimeter wall surrounding the access passage and sealingly attached to the secondary-body bottom wall, the secondary-body-projection perimeter wall forming a secondary-body access conduit; and

an activation body slidably disposed in the secondary-body access conduit and having a resting position and an activated position, the activation body being biased toward the resting position from the activated position,

the activation body having an activation projection extending therefrom toward the main body, the activation projection being configured to displace the sealing plug into the open position when activation body is in the activated position.

2. The bottle of claim **1**, wherein the main-body cap is configured to threadedly engage the main-body perimeter wall.

3. The bottle of claim **1**, further comprising a lower skirt extending downwardly and forming the lower portion of the main body below the main-body bottom wall, the lower skirt forming a main-body recess sealingly engageable with the secondary body, with the main-body recess accepting at least a portion of a height of the secondary body when the secondary body is engaged with the lower skirt.

4. The bottle of claim **3**, wherein the main-body recess accepts at least 90 percent of the height of the secondary body when the secondary body is engaged with the lower skirt.

* * * * *