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(54) **BEVERAGE FILTRATION AND DRINKING APPARATUS**

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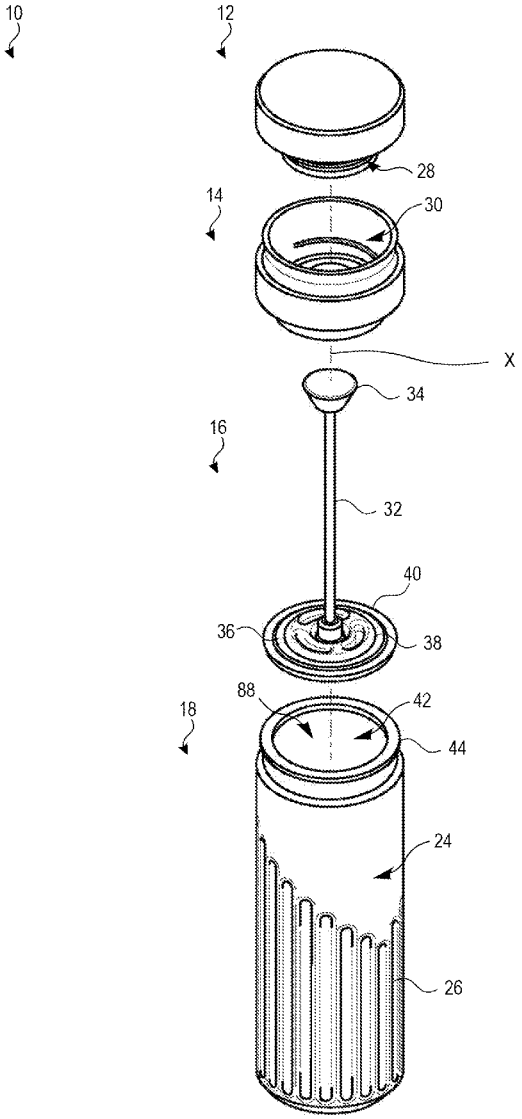
(57) **ABSTRACT**

The disclosed beverage apparatus is configured to allow a user to add a beverage precursor and liquid to a container, separate the liquid from the precursor with a plunger, and consume the separated liquid directly from the same container. In certain implementations, the beverage apparatus includes a screen or filter configured to separate the particulates from the prepared liquid beverage. The beverage apparatus also may include a plunger having one or more valves that are configured to provide a first flow path for the prepared liquid beverage when the plunger is sliding in a first direction and that are further configured to seal to prevent prepared liquid beverage from remaining in contact with the filtered-out particulates. The valves may be additionally configured to provide a second flow path that enables easy removal of the plunger from the container.



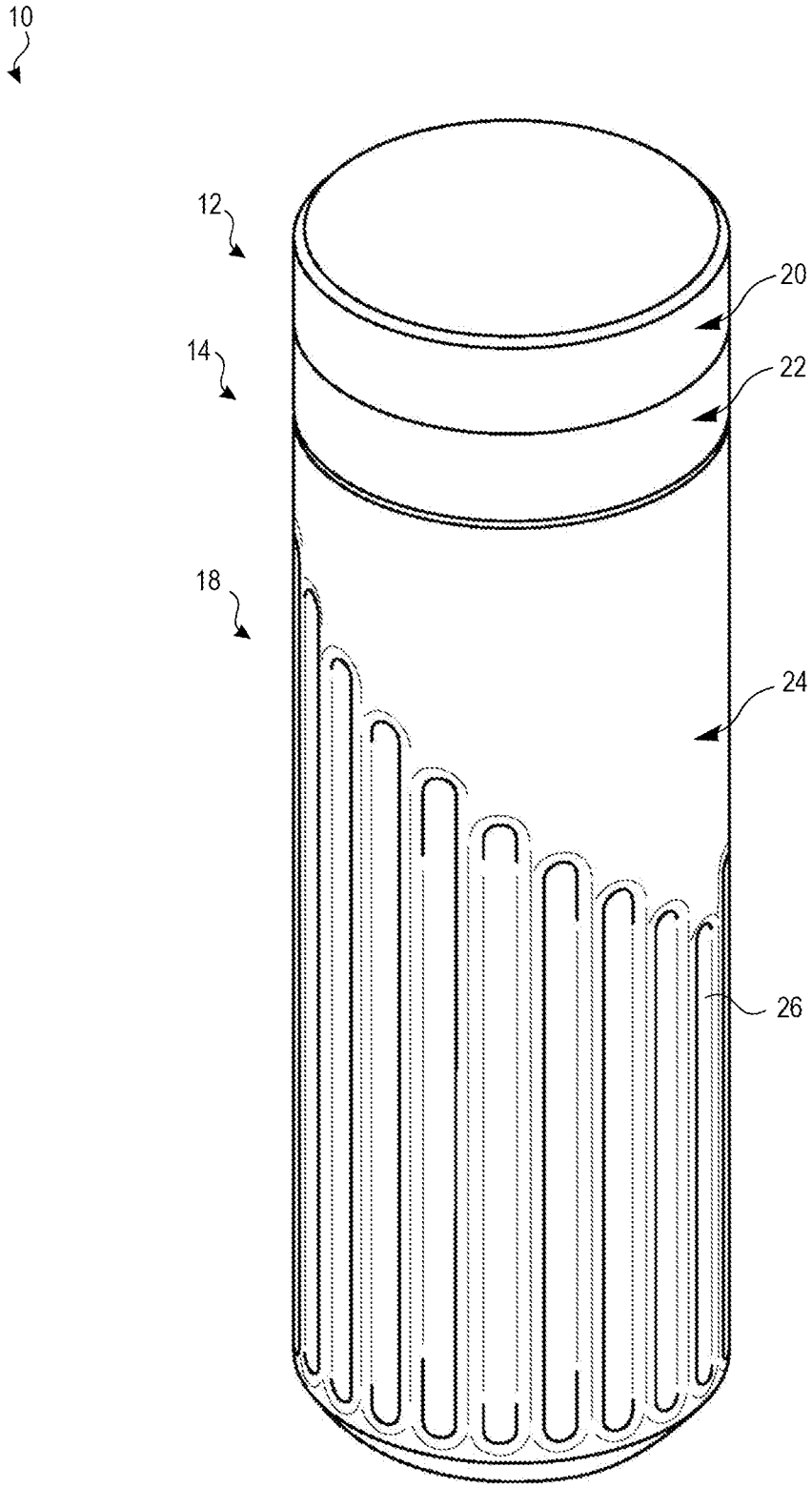


FIG.1

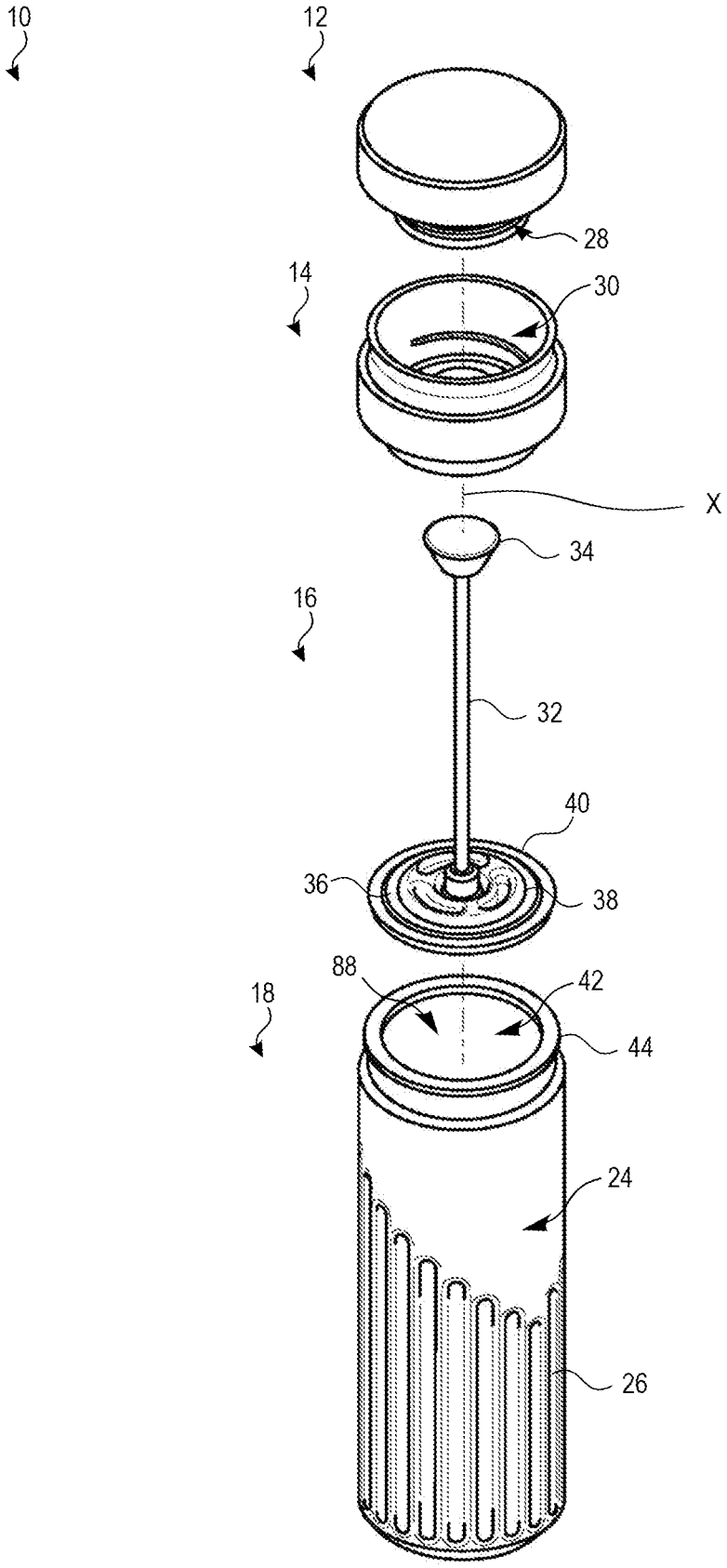


FIG.2

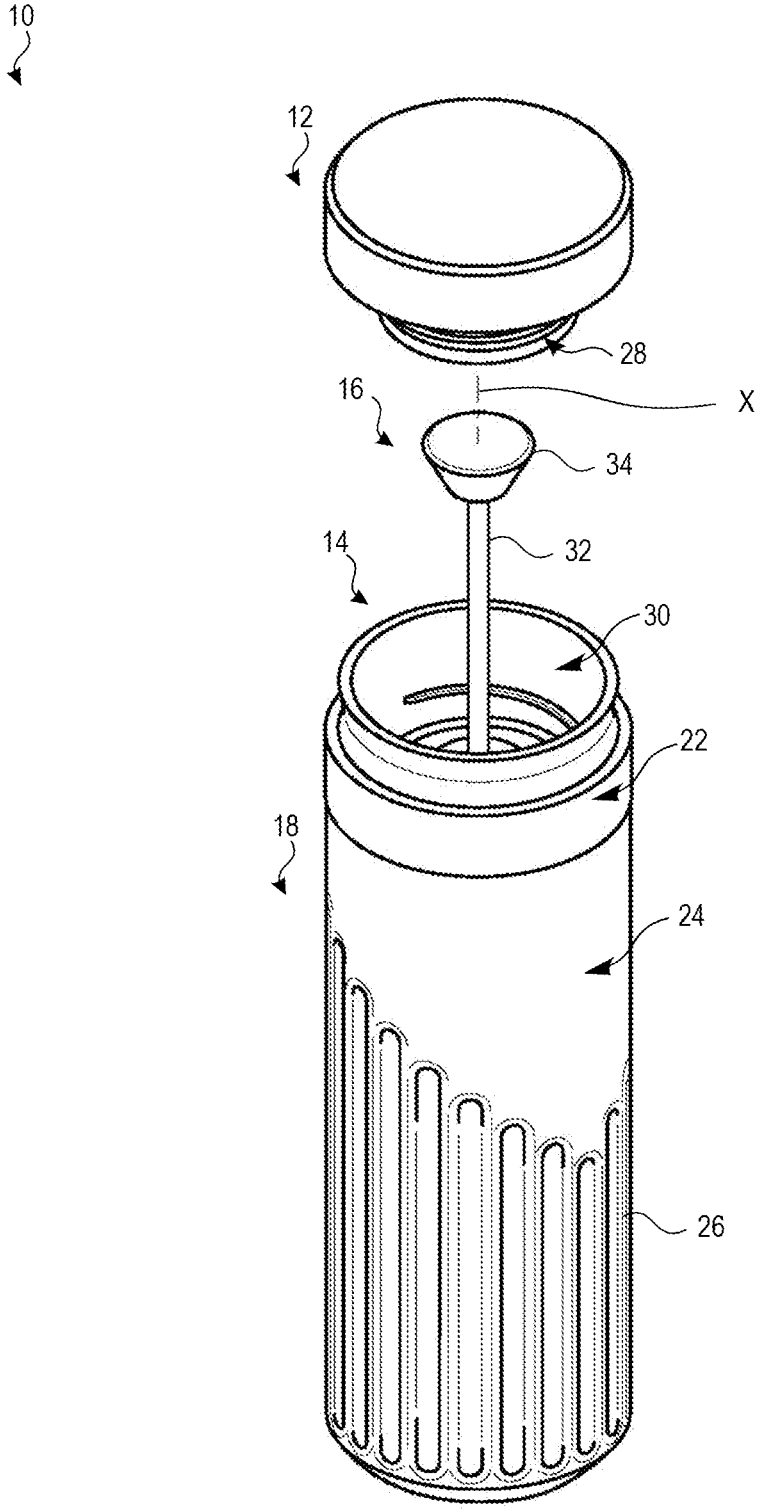


FIG.3

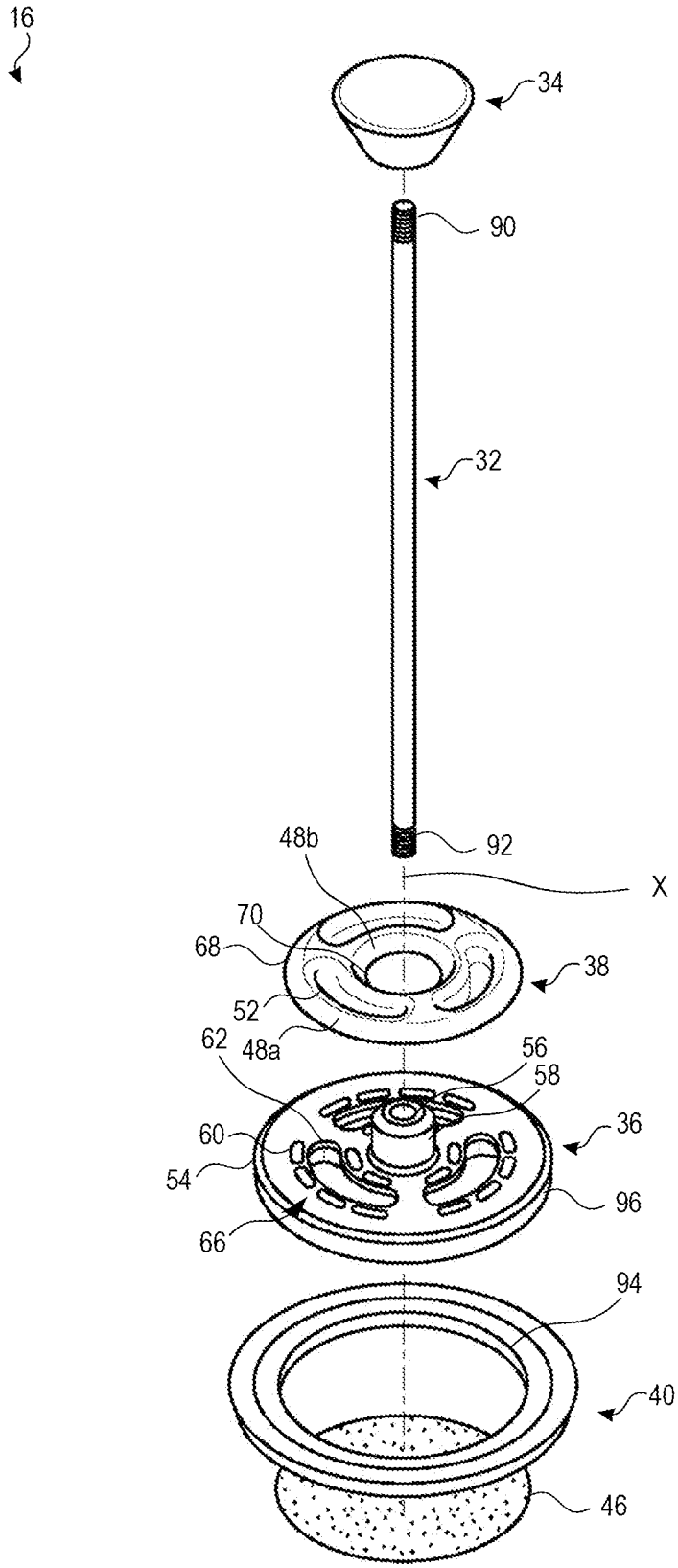


FIG.4

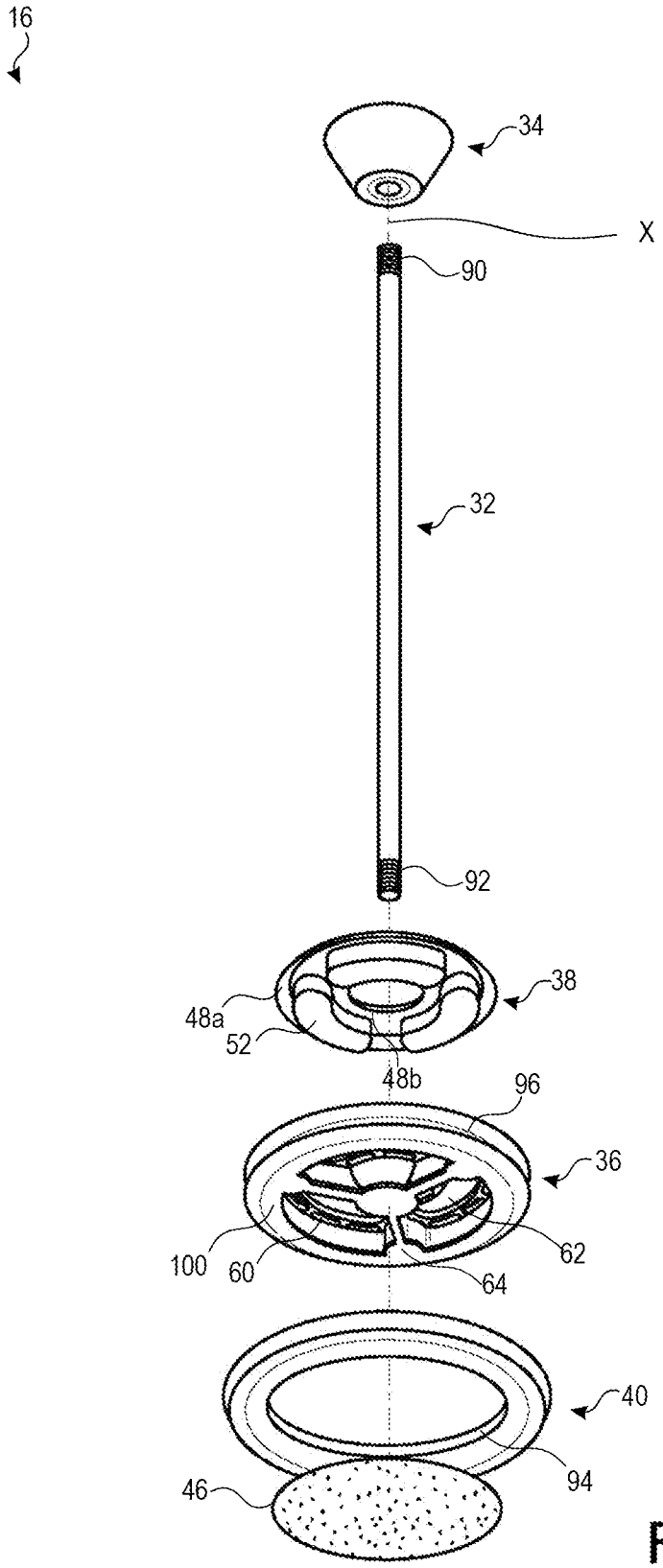


FIG.5

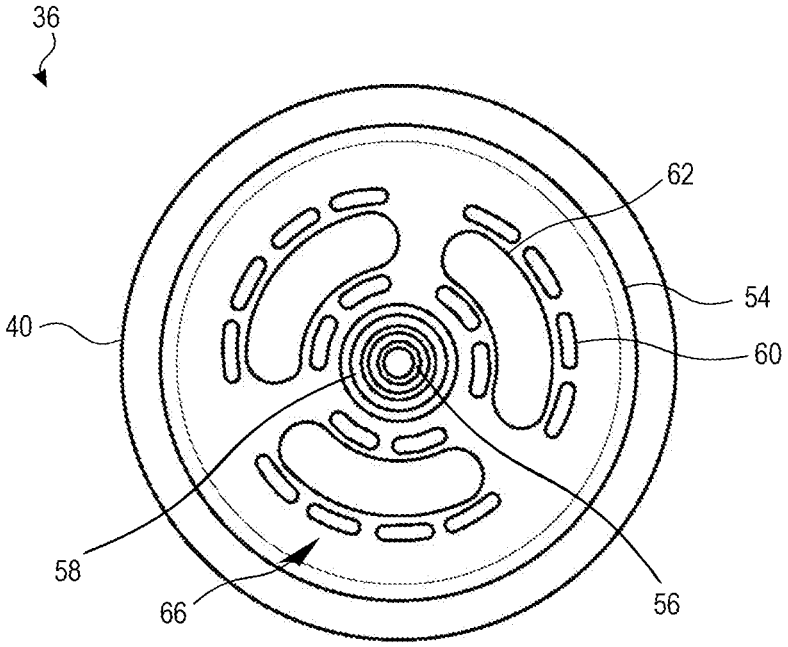


FIG.6

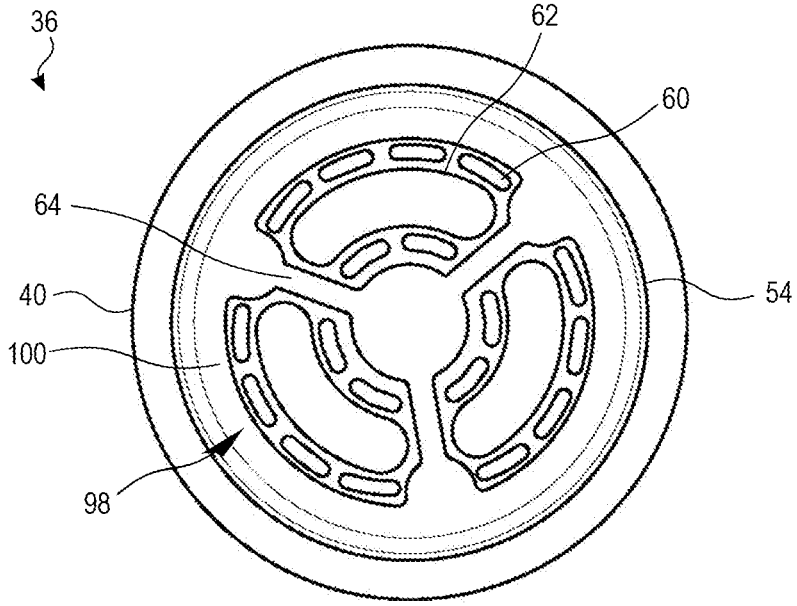


FIG.7

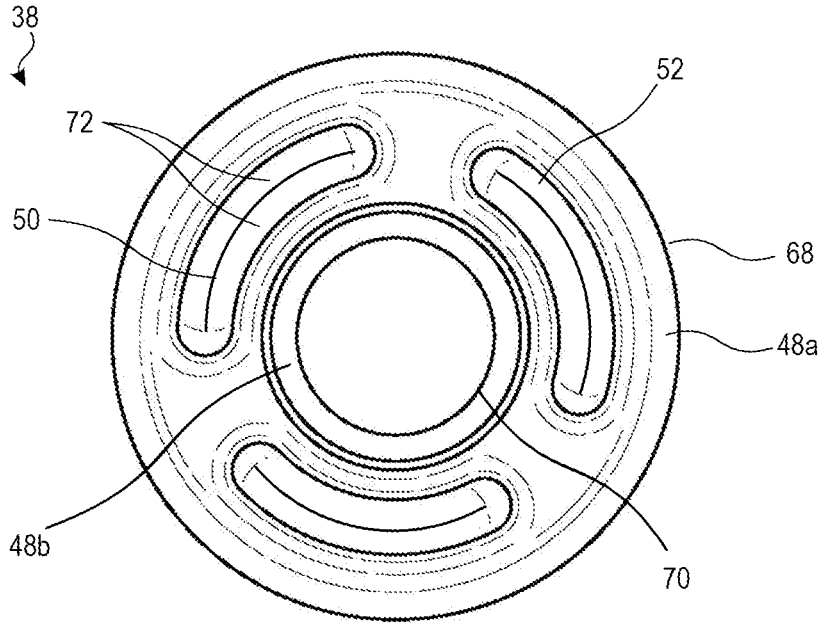


FIG.8

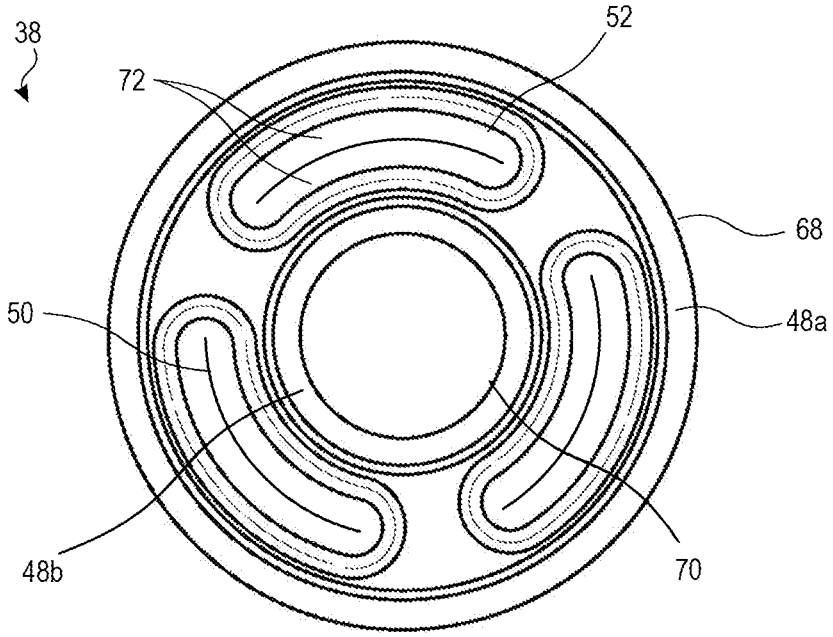


FIG.9

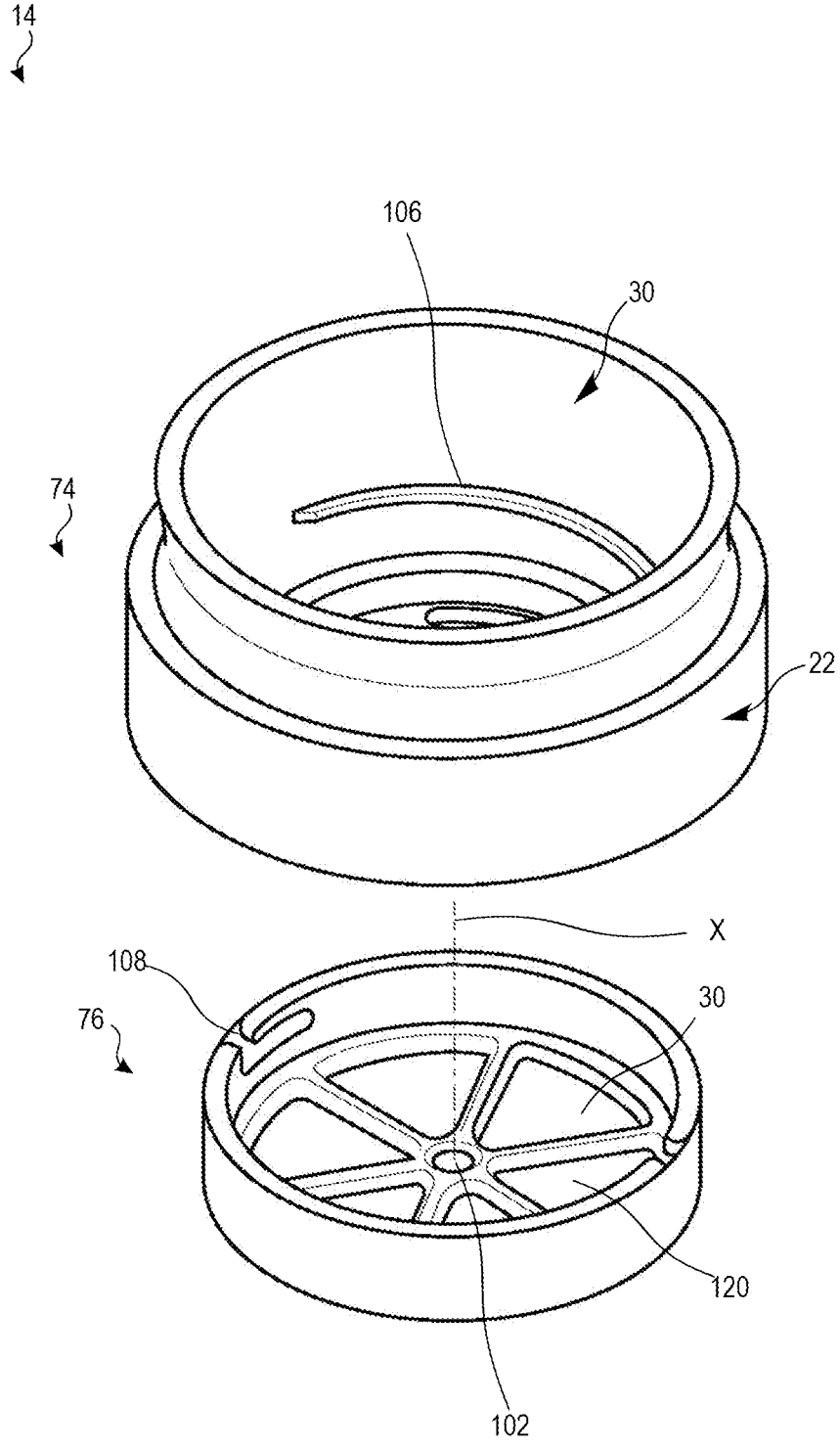


FIG.10

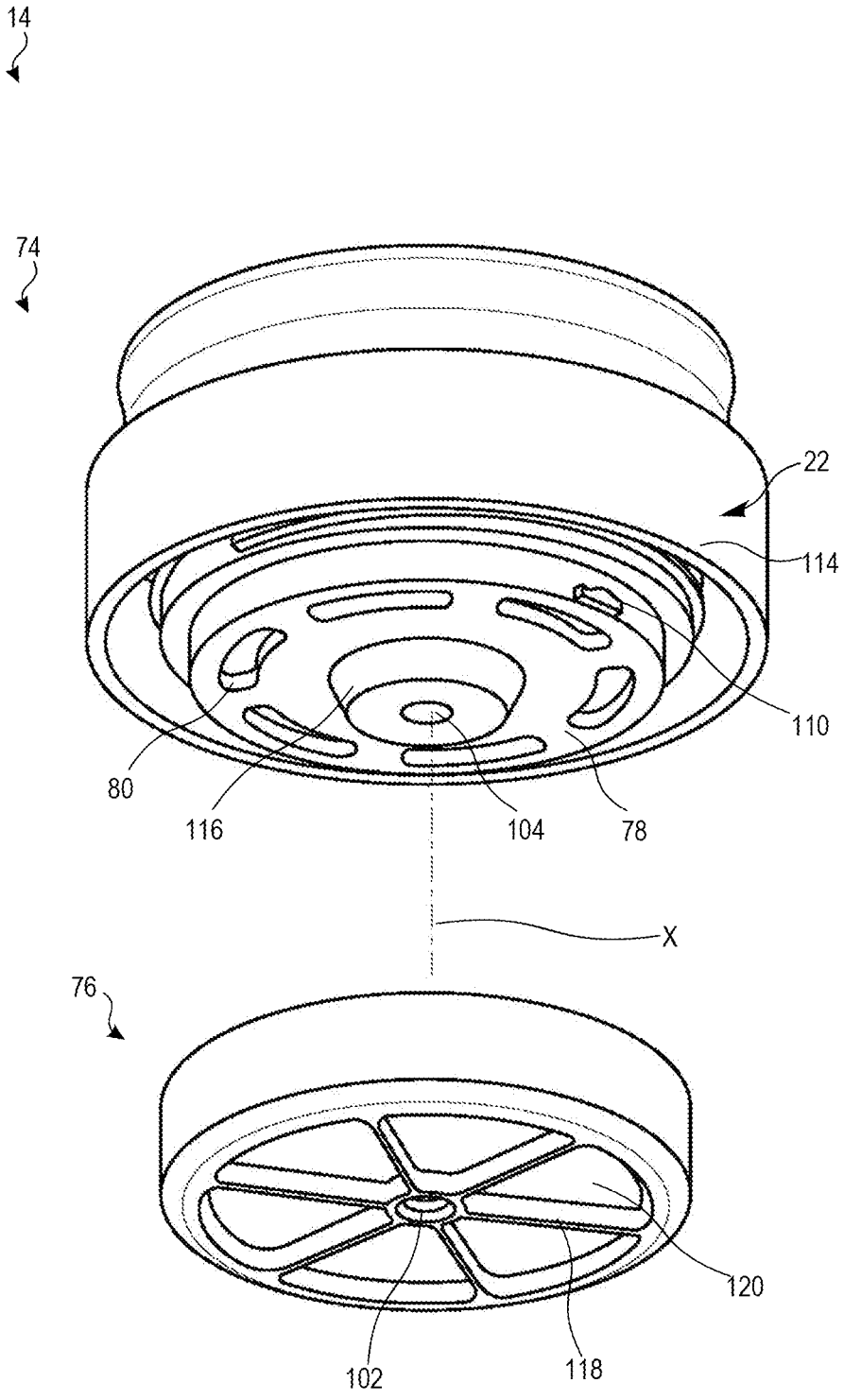


FIG.11

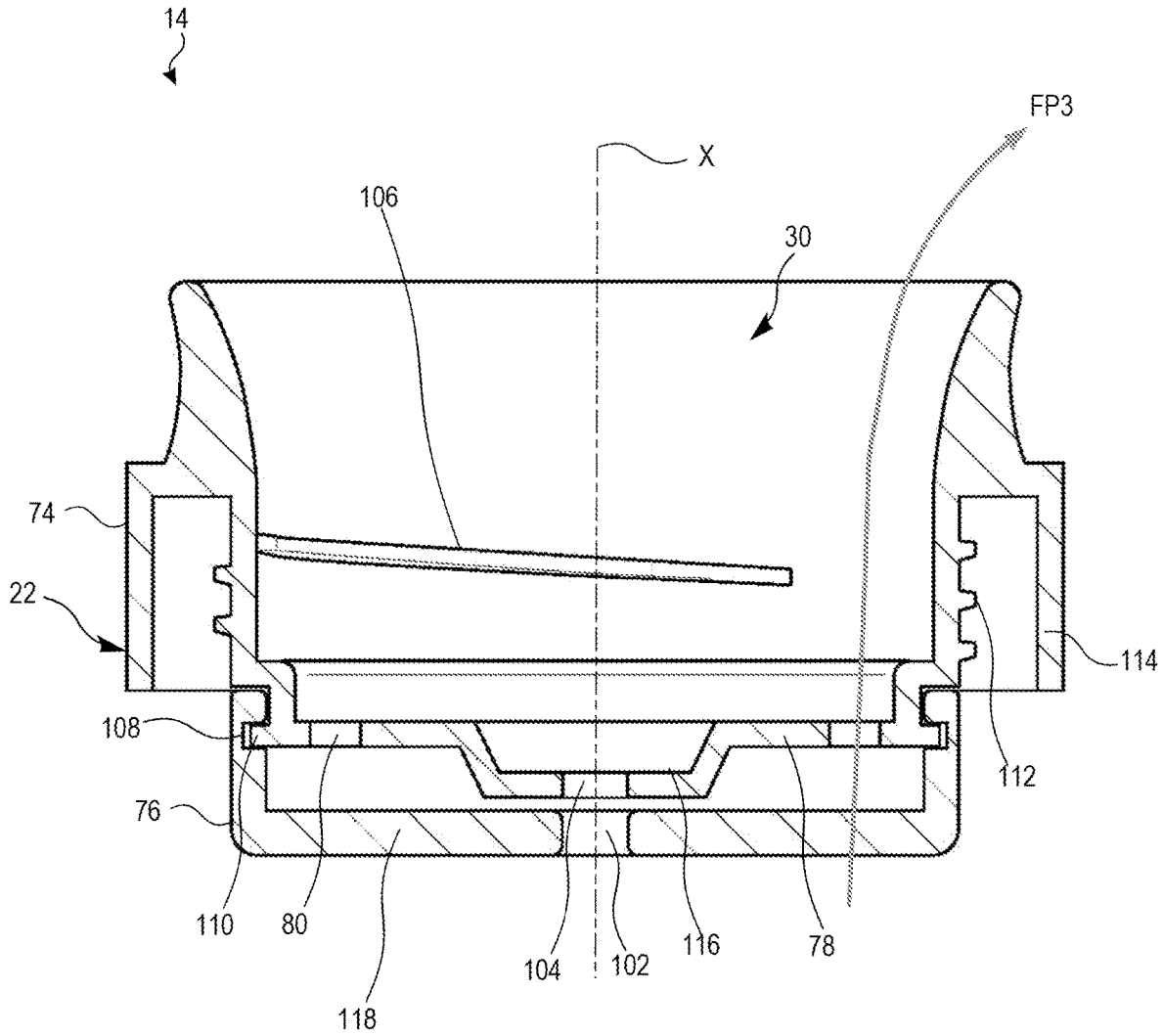


FIG.12

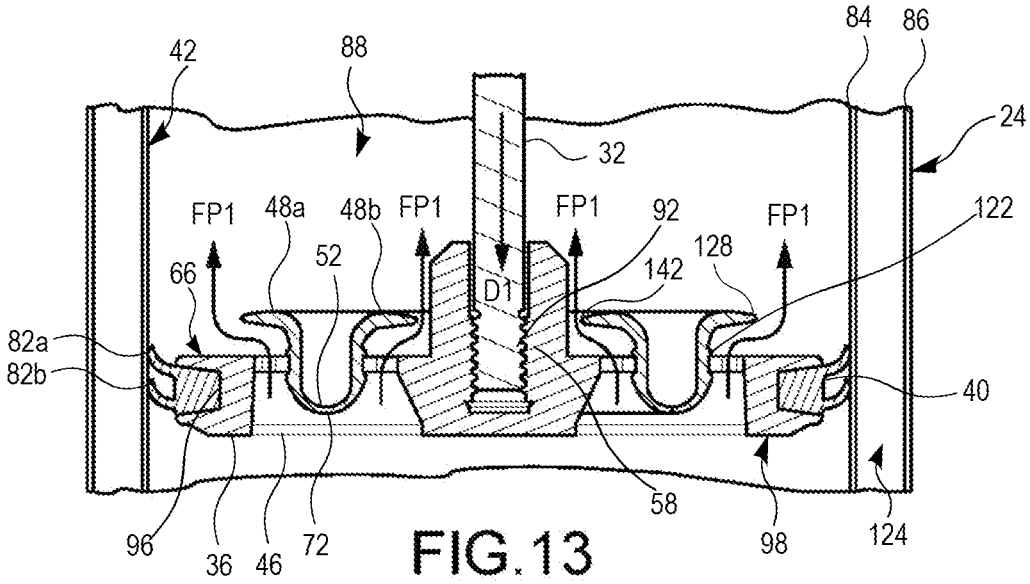


FIG.13

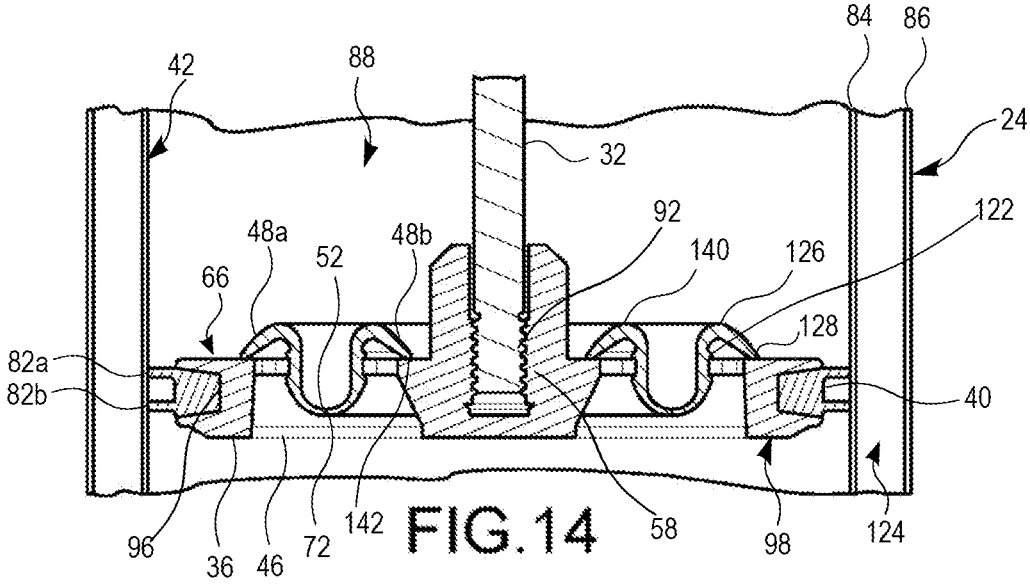


FIG.14

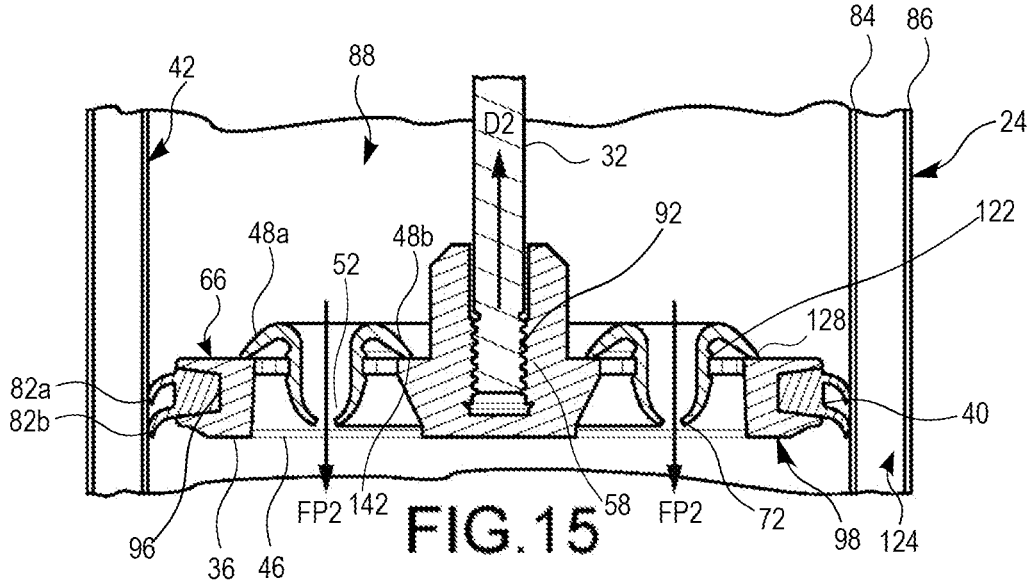


FIG.15

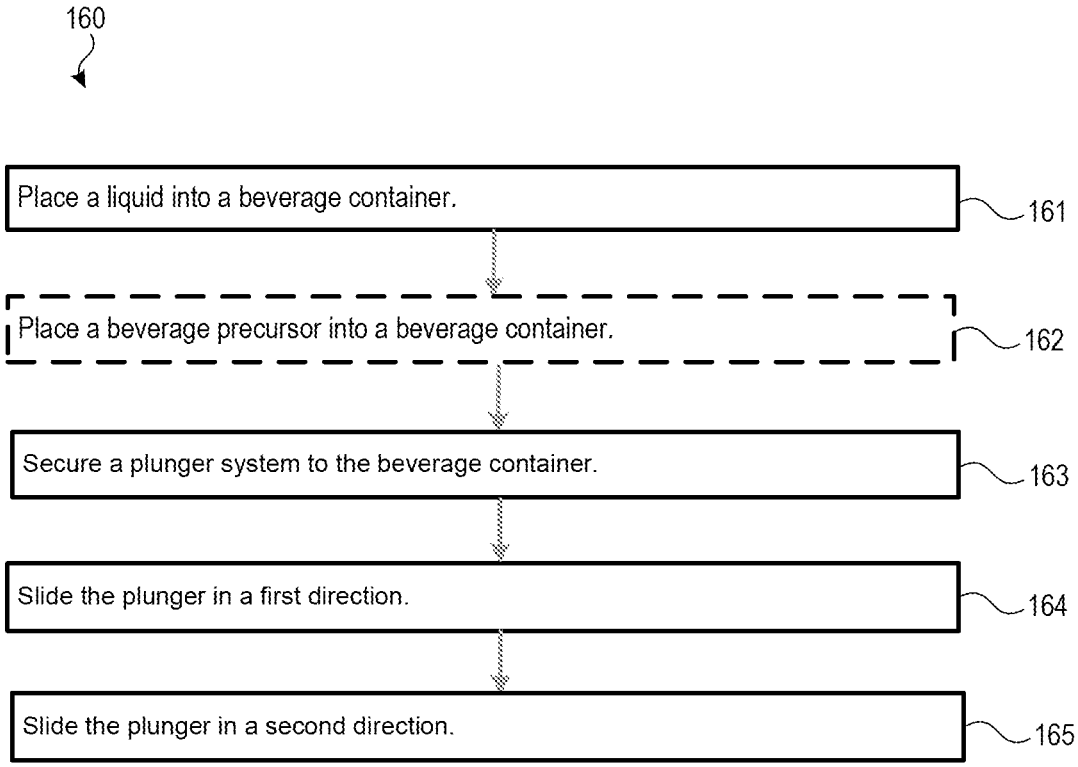

160
Place a liquid into a beverage container.
161
Place a beverage precursor into a beverage container.
162
Secure a plunger system to the beverage container.
163
Slide the plunger in a first direction.
164
Slide the plunger in a second direction.
165

FIG.16

BEVERAGE FILTRATION AND DRINKING APPARATUS

BACKGROUND

[0001] A so-called "French press" is used to prepare coffee by separation of the coffee grounds from the prepared coffee liquid during brewing. Liquid that remains in contact with the coffee grounds for too long may cause undesirable flavor characteristics (for example, bitterness from over-brewed coffee). As such, it may be desirable to pour the coffee from the press soon after the brewing process ends.

SUMMARY

[0002] The present disclosure relates to a beverage apparatus that allows a user to separate a particulate matter from a liquid (for example, coffee grounds, loose leaf tea/herbal tincture, or other undesirable particulates) in a beverage container and drink the resulting liquid from the beverage container. The disclosed beverage container includes, in some examples, one or more valves and gaskets that may minimize or prevent the resulting liquid from coming into further contact with the particulates. In some examples, the one or more valves provide flow pathways for the liquid to move through, to facilitate the separation of the particulates and to facilitate disassembly of the beverage container.

[0003] In accordance with aspects of the disclosure, a plunger for a beverage container, includes: a base defining a flow passage; a rod connected to the base; gasket disposed about a perimeter of the base; and a valve system connected to the base and disposed at least partially within the flow passage, wherein the valve system includes: a first valve comprising a first flexible portion selectively deflectable away from the base, from a first valve flow-closed condition to a first valve flow-open condition; and a second valve comprising a second flexible portion, wherein the second flexible portion is selectively openable from a second valve flow-closed condition to a second valve flow-open condition.

[0004] In an aspect, the plunger additionally includes a screen disposed adjacent the base.

[0005] In an aspect, the valve system is removably connected to the base.

[0006] In an aspect, the valve system further includes a detent for removably connecting the valve system to the base.

[0007] In an aspect, the first valve forms a seal against the base when the first flexible portion is in the first valve flow-closed position.

[0008] In an aspect, the base is circular, and at least a portion of the first valve defines an edge at least partially concentric with the perimeter of the base.

[0009] In an aspect, the second valve further includes a pair of centrally-disposed flexible lips.

[0010] In an aspect, the valve system includes a single first valve and a plurality of second valves.

[0011] In an aspect, the first valve and the second valve comprise a unitary part.

[0012] In an aspect, the first flexible portion includes at least one flexible flap, wherein the at least one flexible flap circumscribes the valve receiver, and wherein the base includes a plurality of flow-through openings disposed below the at least one flexible flap.

[0013] In accordance with aspects of the disclosure, an apparatus includes: a beverage container comprising a sidewall comprising an inner surface at least partially defining an interior container volume; and a plunger slidingly disposed in the interior container volume, comprising: a base defining a flow passage; a rod connected to the base; a gasket disposed about a perimeter of the base, the gasket forming a seal against an inner surface of the sidewall; and a valve system connected to the base and disposed at least partially within the flow passage, wherein the valve system includes: a first valve comprising a first flexible portion selectively deflectable away from the base, from a first valve flow-closed condition to a first valve flow-open condition; and a second valve comprising a second flexible portion, wherein the second flexible portion is selectively openable from a second valve flow-closed condition to a second valve flow-open condition.

[0014] In an aspect, the beverage container further includes an outer surface, the outer surface and inner surface defining an insulating volume therebetween.

[0015] In an aspect, the gasket includes a pair of flexible protrusions in slidable contact with the inner surface of the sidewall.

[0016] In an aspect, the apparatus additionally includes a perforated plate having a first opening configured to allow passage of the rod, the perforated plate being removably connected to an upper end of the beverage container; and a filter supported by the perforated plate.

[0017] In an aspect, the perforated plate is configured to slidably receive the rod and is further configured to center the rod within the beverage container, and wherein the perforated includes a plurality of second openings configured to allow the passage of fluid.

[0018] In an aspect, during a first sliding movement of the plunger, the first flexible portion of the first valve is deposed in the first valve flow-open position, and the second flexible portion of the second valve is disposed in the second valve flow-closed position, wherein during a second sliding movement of the plunger, the second flexible portion of the second valve opens into the second valve flow-open position, and the first flexible portion of the first valve is deposed in the first valve flow-closed position, and wherein during a still position of the plunger, the first flexible portion of the first valve remains in the first valve flow-closed position, and the second flexible portion of the second valve remains in the second valve flow-closed position.

[0019] In an aspect, the first flexible portion of the first valve deflects away from the base when the first flexible portion of the first valve is deposed in the first valve flow-open position.

[0020] In an aspect, the second flexible portion includes a pair of lips, and wherein the pair of lips form a seal when the second flexible portion is deposed in the second valve flow-closed position.

[0021] In an aspect, the wherein the second flexible portion includes a pair of lips, and wherein the pair of lips deflect away from each other when the second flexible portion is in the second valve flow-open position.

[0022] In an aspect, the first flexible portion of the first valve forms a seal against the base when the first flexible portion of the first valve is deposed in the first valve flow-closed position.

[0023] In an aspect, the apparatus additionally includes a cap, wherein the cap is removably connected to an upper end

of the beverage container, and wherein the cap forms a leak-proof seal around a perimeter of the sidewall.

[0024] In accordance with aspects of the disclosure, a method includes: placing a liquid into a beverage container; securing a plunger system to the beverage container; sliding the plunger in a first direction, causing: a first flexible portion of a first valve to deflect away from a base into a first valve flow-open position, and a second flexible portion of a second valve to be deposed in a second valve flow-closed position, the second flexible portion comprising a pair of lips, wherein the pair of lips form a first seal when the second flexible portion is in the second valve flow-closed position; and sliding the plunger in a second direction, causing: the second flexible portion of the second valve to open into a second valve flow-open position, wherein the pair of lips deflect away from each other when the second flexible portion is in the second valve flow-open position, and the first flexible portion of the first valve to form a second seal against the base into a first valve flow-closed position.

[0025] In an aspect of the method, the first flexible portion and the second flexible portions, when in their respective first valve flow-open position and second valve flow open position, are configured to allow the passage of liquid.

[0026] In an aspect, the method additionally includes prior to securing the plunger system to the beverage container, placing a beverage precursor into the beverage container.

[0027] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Non-limiting and non-exhaustive examples are described with reference to the following Figures.

[0029] FIG. **1** illustrates a top perspective view of a beverage filter apparatus, according to an example.

[0030] FIG. **2** illustrates a top perspective exploded view of components of the beverage filter apparatus of FIG. **1**, according to an example.

[0031] FIG. **3** illustrates a top perspective view of the beverage filter apparatus of FIG. **1**, showing a plunger partially inserted into a container, according to an example.

[0032] FIG. **4** illustrates a top perspective exploded view of a plunger, according to an example.

[0033] FIG. **5** illustrates a bottom perspective exploded view of a plunger, according to an example.

[0034] FIG. **6** illustrates a top view of an example plunger base, according to an example.

[0035] FIG. **7** illustrates a bottom view of an example plunger base, according to an example.

[0036] FIG. **8** illustrates a top view of an example valve system, according to an example.

[0037] FIG. **9** illustrates a bottom view of an example valve system, according to an example.

[0038] FIG. **10** illustrates a top perspective view of a drinking assembly, according to an example.

[0039] FIG. **11** illustrates a bottom perspective view of a drinking assembly, according to an example.

[0040] FIG. **12** illustrates a cross-sectional view of the drinking assembly, according to an example.

[0041] FIG. **13** illustrates a cross-sectional view of the plunger inserted into the beverage container, showing the plunger moving in a downward direction and showing first valves in an open position and second valves in a closed position, according to an example.

[0042] FIG. **14** illustrates a cross-sectional view of the plunger inserted into the beverage container, showing the plunger in a stationary position and showing the first valves in a closed position and the second valves in a closed position, according to an example.

[0043] FIG. **15** illustrates a cross-sectional view of the plunger inserted into the beverage container, showing the plunger moving in an upward direction and showing the first valves in a closed position and the second valves in an open position, according to an example.

[0044] FIG. **16** illustrates a method for separating particulate matter from a liquid, according to an example.

DETAILED DESCRIPTION

[0045] In the following detailed description, references are made to the accompanying drawings that form a part hereof, and in which are shown by way of illustrations specific embodiments or examples. These aspects may be combined, other aspects may be utilized, and structural changes may be made without departing from the present disclosure. Examples may be practiced as methods, systems, or devices. The following detailed description is therefore not to be taken in a limiting sense, and the scope of the present disclosure is defined by the appended claims and their equivalents.

[0046] A user may have a desire to prepare a beverage that requires that a particulate be separated from a liquid. For example, preparation of coffee may require separation of the coffee grounds from the prepared coffee liquid after brewing (for example, as in a French press). In another example, preparation of tea or an herbal tincture may require separation of tea leaves/herbal particulates from the prepared tea/tincture liquid after steeping. In another example, purification or filtration of a beverage such as water may require the separation of undesired particulates from the liquid. Further examples of other liquids and particulates are contemplated.

[0047] The user may also wish to drink their prepared beverage on-the-go, without needing to pour the prepared beverage into a different drinking container. In certain examples, the disclosed beverage apparatus is configured to allow a user to add a beverage precursor (particulate) and liquid to the container, separate the liquid from the precursor with a plunger, and consume the separated liquid directly from the same container.

[0048] In certain implementations, the beverage apparatus may include a screen or filter, configured to separate the particulates from the prepared liquid beverage. In certain implementations, the beverage apparatus (in some examples, a plunger of the apparatus) includes one or more valves that are configured, at least in part, to provide a first flow path for the prepared liquid beverage when the plunger is sliding in a first direction. The one or more valves form a seal to prevent prepared liquid beverage from remaining in contact with the filtered-out particulates (for example, through the perforated surface of the screen). Further, this allows the user to drink from the container over time, without the beverage therein acquiring such undesirable characteristics. The valves may also be configured to pro-

vide a second flow path that enables easy removal of the plunger from the container (e.g., moving the plunger in a second direction).

[0049] FIG. **1** illustrates a top perspective view of an example beverage apparatus **10**. Beverage apparatus **10** may include a cap **12**, a drinking assembly **14**, and a beverage container **18**. Beverage container **18** may include an external surface **24** that may be smooth or textured in whole or in part. In some examples, external surface **24** includes a texture, pattern, ribs, indents, or other surface feature **26** that may improve friction so as to make the beverage container easy to grip. In some examples, beverage container **18** is cylindrical with a round cross-sectional profile, but other cross-sectional profile shapes are contemplated, such as oval, square, squircle, etc. The drinking assembly **14** is disposed adjacent the container **18** and may include an external surface **22** that may be visible when the drinking assembly **14** is attached to the beverage container **18**. In another example, the external surface **22** of the drinking assembly may be partially or completely obscured by the beverage container or cap (described below). In such configurations, the drinking assembly **14** may be recessed in either or both of the container and/or cap, which may improve aesthetics, cleanliness, etc. The cap **12** may be configured to be removably attached to the drinking assembly **14**. In alternative examples, the cap **12** may be configured to be removably attached to the beverage container **18**, and such a configuration may obscure or otherwise cover the drinking assembly **14**, as described above. The cap **12** may have an outer surface **12** that is visible when the cap **12** is attached and may also include surface features or textures to enhance removability.

[0050] FIG. **2** illustrates a top perspective exploded view of the beverage apparatus **10**, which is exploded along an axis X. FIG. **3** illustrates a top perspective exploded view of components of the beverage apparatus **10**, showing the drinking assembly **14** connected to an upper end of the beverage container **18**, with the cap **12** exploded away from the drinking assembly **14**, and a plunger **16** partially inserted into a container. FIGS. **2** and **3** are described concurrently and not all components described are visible in both FIG. **2** and FIG. **3**.

[0051] Beverage container **18** may include a sidewall **84** having an inner surface **42**, the inner surface **42** least partially defining an interior container volume **88**. Interior container volume **88** may be configured to hold a liquid and particulates. Beverage container **18** may include a connection portion **44** (e.g., a threaded connection, a press-fit connection, a bayonet-slot connection, etc.) that is configured to removably attach the beverage container **18** to the drinking assembly **14**. Drinking assembly **14** may include an inner wall **30** that is configured to removably connect to a cap **12**. Cap **12** may be configured to form a seal with the drinking assembly **14** when connected, and to prevent liquid from leaking or spilling out of the beverage apparatus **10**. In some examples, drinking assembly **14** and cap **12** may be removably connected by threaded connections (for example, on inner wall **30**), snap-fit connections, press-fit connections, or other suitable sealable connections. In examples, the type of connection utilized between the cap **12** and drinking assembly **14** and the drinking assembly **14** and beverage container **18** may be of the same type or of different types. In other examples, engagement of the two connections may be in opposite directions (e.g., a counter-clockwise thread between the cap **12** and drinking assembly **14** and a clockwise thread between the drinking assembly **14** and beverage container **18**). Plunger **16** may be configured to be slid into and out of the interior container volume **88** (is slidingly disposed within container volume **88**) along axis X. In some examples, plunger **16** can be removed entirely from the beverage container **18**, e.g., for cleaning purposes. Plunger **16** may be actuated by a user gripping a handle **34** so as to move a rod **32**. In some examples, rod **32** may be cylindrical, rectangular, square, hexagonal, or other suitable geometry in cross-section. The handle **34** may be removable or separable from the rod **32** at an end thereof. A user may utilize handle **34** to move the plunger **16** into, out of, and up within, and/or down within the interior container volume **88**. In some examples, handle **34** may be cylindrical, frusto-conical, conical, or other suitable shape. Disposed opposite the handle **34** is a plunger base **36**. Base **36** may be connected to a second end (for example, a lower end) of rod **32**. Base **36** may define one or more flow passages, e.g., openings within the base **36**. Base **36** may be circular, and/or its shape may be the same shape as the cross-section of beverage container **18**.

[0052] When the drinking assembly **14** is connected to an upper end of the beverage container **18** as shown in FIG. **3**, the handle **34** attached to rod **32** may be configured to extend at least partially above the drinking assembly **14**, while the base **36** is positioned below drinking assembly **14**. A user may push the plunger **16** downward within the interior container volume **88** (for example, via handle **34**) and pull the plunger **16** upward within the interior container volume **88** (for example, via handle **34**).A valve system **38** is configured to fit within the one or more flow passages defined in the base **36**. All or part of the valve system **38** may be disposed at least partially within the one or more flow passages defined by the base **36**. Valve system **38** may be removably connected to the base **36**.

[0053] FIG. **4** illustrates a top perspective exploded view of an example plunger **16**. FIG. **5** illustrates a bottom perspective exploded view (exploded along axis X) of an example plunger **16**. FIGS. **4** and **5** are described concurrently and not all components described are visible in both FIG. **4** and FIG. **5**. Rod **32** may be connected at a first end to handle **34**. Handle **34** and rod **32** may include features to facilitate a removable connection with rod **32**, such as mating threads **90**. Rod **32** may be connected at a second end to base **36** at a rod-to-base connection feature **58** that in examples, may be a female threaded connection. Rod-to-base connection feature **58** and rod **32** may include features such as threads **92** to facilitate a removable connection with rod **32**.

[0054] Base **36** may define one or more first flow passages, including flow through openings **60** and valve receiver **62**. Valve system **38** may be carried with base **36**, such that an outer perimeter **68** of the valve system **38** is concentric with the outer perimeter **54** of the base **36**. Inner perimeter **70** of valve system **38** may be configured as an opening to surround rod-to-base connection feature **58**, and to allow rod **32** to pass therethrough. Valve system **38** may include one or more valves, including one or more first valves **48** and one or more second valves **52**. First valve(s) **48** and the second valve(s) **52** may be formed of a unitary part, for example, the valve system **38**.

[0055] In various examples, the first valve **48** may define one or two flexible portions that at least partially form a

flow-through path when open. The depicted example includes two such portions (outer portion **48***a* and inner portion **48***b*). Outer portion **48***a* of first valve **48** may include a substantially circular, flexible flap that at least partially circumscribes the outer perimeter **68** of the valve system **38** (and also at least partially circumscribes the one or more vale receiver(s) **62**). Outer portion **48***a* of first valve **48** may sit above flow through openings **60**. Inner portion **48***b* of first valve **48** may include a substantially circular, flexible flap that at least partially circumscribes the inner perimeter **70** of the valve system **38**. Inner portion **48***b* of first valve **48** may sit above flow through openings **60**. Each of the one or more second valves **52** may fit within and be the same shape as each of the valve receivers **62**. Gasket **40** may be carried with base **36** and may include an inner portion **94** that engages with and is concentric with a gasket receiving groove **96** of base **36**, where the gasket receiving groove **96** circumscribes the outer edge of base **36**. Gasket **40** may comprise a flexible material such as silicone, rubber, or other suitable material or combination of materials.

[0056] Screen **46** may be carried with base **36**. In some examples, screen **46** may comprise a woven or perforated plate or disc comprising a metal, polymer, or other suitable material. In other examples, screen **46** may comprise a porous material such as a polymer filter or paper filter. The openings or perforations of screen **46** may be configured so as to allow a suitable flow of liquid to pass therethrough, while preventing passage of coffee grounds or other beverage precursors or particulates. Screen **46** may be disc-shaped and have a smaller circumference than that of base **36**. Screen **46** may be supported by one or more radial spokes **64** on a bottom surface of base **36** (a surface opposite the upper surface of base **36** that carries valve system **38**).

[0057] FIG. **6** illustrates a top view of an example plunger base **36**, while FIG. **7** illustrates a bottom view thereof. FIGS. **6** and **7** are described concurrently and not all components described are visible in both FIG. **6** and FIG. **7**. In the particular example shown, base **36** defines three valve receivers **62**, that are a curved stadium-shape with the sides of the stadium shapes are concentric with an outer perimeter of base **36**. In other examples, greater or fewer than three valve receivers **62** may be defined in the base **36**, and other shapes thereof are contemplated. In the particular example shown, base **36** defines four flow-through openings **60** between an outer edge of each valve receiver **62** and the outer perimeter **54** of base **36**, and two flow through openings **60** between an inner edge of each valve receiver **62** and an inner perimeter **56** of base **36**. The flow through openings **60** as shown are a curved stadium-shape, similar to the valve receivers **62**. In other examples, a greater or fewer number of flow-through openings **60** may be utilized, along with flow-though openings having different shapes. In the particular example shown, three radial spokes **64** extend from a center of bottom surface **98** toward the outer perimeter **54** (perpendicular to axis X) of base **36**. In other examples, a greater or fewer number of radial spokes **64** may be present. Radial spokes **64** may terminate at an outer end at a screen support ring **100** that may be a ring around the outer perimeter **54** of base **36** on the bottom surface **98**. Radial spokes **64** may be spaced and located such that the openings between them align with the flow passages defined by base **36** (flow through openings **60** and valve receivers **62**) and do not impede the flow paths created by the flow passages.

[0058] FIG. **8** illustrates a top view of an example valve system **38**, while FIG. **9** illustrates a bottom view thereof. FIGS. **8** and **9** are described concurrently and not all components described are visible in both FIG. **8** and FIG. **9**. Outer perimeter **68** of valve system **38** may be circular and concentric with an inner perimeter **70** of the valve system **38**. Outer portion **48***a* of first valve **48** may circumscribe valve system **38** along outer perimeter **68**. Inner portion **48***b* of first valve **48** may circumscribe valve system **38** along inner perimeter **70**. Outer portion **48***a* of first valve **48** and inner portion **48***b* of first valve **48** may comprise selectively deflectable, flexible flaps that allow flowthrough the respective valves when the flexible flaps are open.

[0059] In the particular example shown, valve system **38** includes three second valves **52** that are a curved stadium-shape, similar to the valve receivers **62**. In other examples, greater or fewer number of second valves **52** may be utilized, along with second valves different shapes. Each of the second valves **52** may include a second valve opening **50** including an arc-shaped slit through the material of the second valve **52**, in a central, lower portion of the second valve **52**. The slit forming the second valve opening **50** may create a pair of flexible lips **72** that define a flow path through the second valve **52** when the pair of flexible lips **72** are open. Valve system **38** may comprise a flexible material. In some examples, valve system **38** includes silicone, rubber, or other suitable flexible material or combination of materials.

[0060] FIGS. **10** and **11** illustrate top and bottom exploded perspective views, respectively, of a drinking assembly **14**, while FIG. **12** illustrates a cross-sectional view thereof. FIGS. **10**, **11**, and **12** are described concurrently and not all components described are visible in every one of those figures. Drinking assembly **14** may include a spout portion (an upper drinking portion) **74** removably attached to a filter portion **76**. Spout portion **74** may include one or more projections **110** that are configured to engage with slots **108** on the filter portion **76**. For example, projections **110** may be inserted into slot **108** and then twisted to lock into place, or may utilize a snap-fit or press-fit connection.

[0061] Spout portion **74** may be configured to removably attach to beverage container **18**, for example, via a connection feature **112** such as a threaded connection that engages with connection portion **44** of beverage container **18**, as depicted in FIGS. **1-3**. Spout portion **74** may include threads **106** or other connection features for removable connection with cap mating surface **28** of cap **12**, as depicted in FIGS. **1-3**. Spout portion **74** may include an outer wall projection **114**, the external surface **22** of which may align with external surface **24** of beverage container **18** and/or external surface **20** of cap **22**. Spout portion **74** may include a round perforated plate **78** centered on axis X. Perforated plate **78** may define one or more fluid passage openings **80** that have a curved stadium-shape; here, six are depicted. In other examples, a greater or fewer number of fluid passage openings **80** may be utilized, and other shapes are contemplated. Perforated plate **78** may define a recess **116** that may be aligned with the axis X. Recess **116** may project below the surface of perforated plate **78** and is configured to receive at least a portion of handle **34**. Recess **116** may have a same shape as handle **34**. In some examples, recess **116** may be cylindrical, frustoconical, conical, or other suitable shape. Spout portion **74** may include an inner wall **30** that flares outward toward the top and is substantially vertical at its

bottom where it intersects perforated plate **78**. Aligned center opening **104** and center opening **102**, in the perforated plate **78** and filter portion **76**, respectively, are configured such that the rod **32** may pass or slide therethrough and such that the rod **32** is centered within the beverage container **18** on the axis X.

[0062] Filter portion **76** includes a filter **120** in the form of a screen, or a woven or perforated plate or disc that may be manufactured of a metal, polymer, or other suitable material. In other examples, filter **120** may comprise a porous material such as a polymer filter or paper filter. The openings or perforations of filter **120** may be configured so as to allow a suitable flow of liquid to pass through, and to prevent coffee grounds or other beverage precursors or particulates from passing through. Filter **120** may be disc-shaped and have a smaller circumference than that of filter portion **76** and may have an opening at its center aligned with center opening **102** such that the rod **32** may pass or slide therethrough and such that the rod **32** is centered within the beverage container **18** on the axis X. Filter **120** may be supported by one or more radial filter support spokes **118** of filter portion **76**. In the particular example shown, six radial filter support spokes **118** extend radially from center opening **102** toward the outer perimeter of filter portion **76** (perpendicular to axis X). In other examples, greater or fewer than six filter support spokes **118** may be present. Filter support spokes **118** may be spaced and located such that the openings between them expose enough of filter **120** to allow for satisfactory flow of liquids through filter **120**. Referring to FIG. **12**, liquid exits the beverage container via a flow path FP**3** formed by the spout portion **74** (e.g., through fluid passage openings **80**) and the filter portion **76** (e.g., through filter **120**).

[0063] FIG. **13** illustrates a cross-sectional view of the plunger **16** inserted into the beverage container **18**, showing the plunger **16** moving in a downward direction and showing outer portion **48***a* and inner portion **48***b* of first valve **48** in an open position and second valves **52** in a closed position. FIG. **14** illustrates a cross-sectional view of the plunger **16** inserted into the beverage container **18**, showing the plunger **16** in a stationary position and showing the outer portion **48***a* and inner portion **48***b* of first valve **48** in a closed position and the second valves **52** in a closed position. FIG. **15** illustrates a cross-sectional view of the plunger **16** inserted into the beverage container **18**, showing the plunger **16** moving in an upward direction and showing the outer portion **48***a* and inner portion **48***b* of first valve **48** in a closed position and the second valves **52** in an open position. FIGS. **13**, **14**, and **15** are described concurrently and not all components described are visible in every one of those figures.

[0064] A liquid (for example, hot water) may be placed into the beverage container **18**. A beverage precursor (for example, coffee grounds or tea leaves) may be placed into the beverage container before or after the liquid. A plunger system **16** is secured to the beverage container **18**. Referring to FIG. **13**, the plunger **16** is slid in a first direction D**1** (for example, downwards along axis X toward the bottom of the beverage container **18**). In some examples, a user may wait a period of time after placement of the liquid and/or beverage precursor to allow the beverage to be prepared (e.g., to steep or infuse). As the plunger **16** is moved in the first direction D**1**, the gasket **40** may seal against the inner sidewall **84** of the beverage container **18** to prevent liquid or beverage precursor from passing between the gasket **40** and the inner sidewall **84**. The gasket **40** may include a pair of flexible protrusions **82***a*, **82***b* in slidable contact with the inner surface **42** of the inner sidewall **84** that deflect upward against the inner sidewall **84** as the plunger **16** is moved in the first direction D**1**.

[0065] Movement of the plunger **16** in the first direction D**1** causes the flexible inner **48***b* and outer **48***a* portions of the first valve **48** to deflect away from the base **36** into a first valve flow-open position. In this first valve flow-open position, the bottom edge **128** of the outer portion **48***a* of the first valve **48** and the bottom edge **142** of the inner portion **48***b* of the first valve **48** are deflected away from an upper surface **66** of the base **36**. Liquid (for example, prepared beverage) may flow upwards through screen **46** and along a first flow path FP**1**, through the flow through openings **60** of base **36**, as allowed by the flow-open position of the outer portion **48***a* and inner portion **48***b* of first valve **48**. During movement of the plunger **16** in the first direction D**1**, the flexible lips **72** of the second valve(s) **52** may be deposed in a second valve flow-closed position, to form a seal between the flexible lips **72**.

[0066] In FIG. **14**, the plunger **16** is stationary. The gasket **40** may seal against the inner sidewall **84** of beverage container **18**. The pair of flexible protrusions **82***a*, **82***b* may be deflected upward, deflected downward, or may be substantially undeflected (horizontal with relation to axis X). While plunger **16** is stationary, the bottom edge **128** of the outer portion **48***a* of the first valve **48** and the bottom edge **142** of the inner portion **48***b* of the first valve **48** seal against upper surface **66** of the base **36** in a first valve flow-closed position. While plunger **16** is stationary, the flexible lips **72** of the second valve(s) **52** may also be deposed in a second valve flow-closed position, to form a seal between the flexible lips **72**. Because both the first valve **48** (outer portion **48***a* and inner portion **48***b*) and the second valve **52** are deposed in their closed positions, there are no open flow paths for liquid to flow through the plunger **16**. This prevents the liquid above the plunger **16** from coming into contact with liquid and/or solids below the plunger **16** (for example, to prevent over-brewed coffee or over-steeped tea). These seals may remain in place regardless of the position of the beverage apparatus **10** (for example, if a user tilts/tips the beverage apparatus **10** to drink the prepared liquid, the seals may allow only the liquid sealed above the plunger **16** to exit via FP**3**).

[0067] The plunger **16** may be slid in a second direction D**2** (for example, upward along axis X, as a user would move the plunger **16** to remove it from the beverage container **18**). Refer to FIG. **15**, as the plunger **16** is moved in the second direction D**2**, the gasket **40** may seal against the inner sidewall **84** of the beverage container **18**. The pair of flexible protrusions **82***a*, **82***b* may deflect downward against the inner sidewall **84** as the plunger **16** is moved in the second direction D**2**. Movement of the plunger **16** in the second direction D**2** causes the flexible lips **72** of the second valve **52** to deflect away from each other to open into a second valve flow-open position. Liquid (for example, prepared beverage) may flow along a second flow path FP**2**, through the second valve flow-open position of the flexible lips **72** of the second valve **52**, and then downwards through screen **46**. During movement of the plunger **16** in the second direction D**2**, the bottom edge **128** of the outer portion **48***a* of the first valve **48** and the bottom edge **142** of the inner

portion **48***b* of the first valve **48** seal against upper surface **66** of the base **36** in a first valve flow-closed position.

[0068] FIGS. **13-15** further illustrate additional features of the beverage apparatus **10**. The flexible flap of the outer portion **48***a* of first valve **48** connects at a top edge **126** to valve system **38**, ends at a bottom edge **128** along the outer perimeter **68** of the valve system **38**, and contacts valve system **38** along bottom edge **128**. The flexible flap of inner portion **48***b* of first valve **48** connects at a top edge **140** to valve system **38**, ends at a bottom edge **142** along the inner perimeter **70** of the valve system **38**, and contacts valve system **38** along its bottom edge **142**. In some examples, the base **36** is circular, and bottom edge **128** and/or bottom edge **142** are at least partially concentric with the perimeter of the base **54**. The one or more second valves **52** may be U-shaped in cross-section and may protrude downward from the valve system **38**.

[0069] Inner sidewall **84** of beverage container **18** may be separated from an outer sidewall **86** of beverage container **18**, forming a void volume **124** therebetween. The void volume **124** may be air-filled, under a vacuum, or may contain an insulative material. The void volume **124** may insulate the beverage container **18** so that a hot liquid will retain heat and a cold liquid will remain cold and may maintain the external surface **24** of the beverage container **18** at a temperature comfortable for a user to handle. Each of the one or more second valves **52** of the valve system **38** fits within each of the valve receivers **62** and may be removably connected to the base **36** by one or more detents **122** around the outer perimeter of each second valve **52**.

[0070] FIG. **16** illustrates a method **160** for separating particulate matter from a liquid. At operation **161**, a liquid is placed into a beverage container. At optional operation **162**, a beverage precursor may be placed into the beverage container. Optional operation **162** may occur before or after operation **161**, but before operation **163**. A plunger system is secured to the beverage container in operation **163**. At operation **164**, the plunger is slid in a first direction, causing a first flexible portion of a first valve to deflect away from a base into a first valve flow-open position, and a second flexible portion of a second valve to be deposed in a second valve flow-closed position, the second flexible portion comprising a pair of lips, wherein the pair of lips form a first seal when the second flexible portion is in the second valve flow-closed position. At operation **165**, the plunger is slid in a second direction, causing the second flexible portion of the second valve to open into a second valve flow-open position, wherein the pair of lips deflect away from each other when the second flexible portion is in the second valve flow-open position, and the first flexible portion of the first valve to form a second seal against the base into a first valve flow-closed position. The first flexible portion and the second flexible portions, when positioned in their respective first valve flow-open position (operation **164**) and second valve flow open position (operation **165**), are configured to allow the passage of liquid.

[0071] In accordance with principles of this disclosure, materials of construction for the beverage apparatus **10** and its components as described herein include materials that are compatible with the environment, beverages, cleaning and sanitizing considerations, and use of beverage apparatus **10**.

[0072] For the purposes of this application, terms such as "upper," "lower," "upward," and "downward" are intended to be descriptive with reference to and in relation to the orientation shown in the Figures for clarity, but the examples as practiced and included in the scope of the claims may include examples where the systems and devices are in a different orientation.

[0073] While particular uses of the technology have been illustrated and discussed above, the disclosed technology can be used with a variety of environments in accordance with many examples of the technology. The above discussion is not meant to suggest that the disclosed technology is only suitable for implementation within the environments shown and described above. For examples, while certain technologies described herein were primarily described in the context of drinkable beverages, technologies disclosed herein may be applicable to filtration, separation, or purification generally.

[0074] This disclosure described some aspects of the present technology with reference to the accompanying drawings, in which only some of the possible aspects were shown. Other aspects can, however, be embodied in many different forms and should not be construed as limited to the aspects set forth herein. Rather, these aspects were provided so that this disclosure was thorough and complete and fully conveyed the scope of the possible aspects to those skilled in the art.

[0075] As should be appreciated, the various aspects described with respect to the figures herein are not intended to limit the technology to the particular aspects described. Accordingly, additional configurations can be used to practice the technology herein and/or some aspects described can be excluded without departing from the methods and systems disclosed herein.

[0076] Similarly, where operations of a process are disclosed, those operations are described for purposes of illustrating the present technology and are not intended to limit the disclosure to a particular sequence of operations. For example, the operations can be performed in differing order, two or more operations can be performed concurrently, additional operations can be performed, and disclosed operations can be excluded without departing from the present disclosure. Further, each operation can be accomplished via one or more sub-operations. The disclosed processes can be repeated.

[0077] Although specific aspects were described herein, the scope of the technology is not limited to those specific aspects. One skilled in the art will recognize other aspects or improvements that are within the scope of the present technology. Therefore, the specific structure, acts, or operations are disclosed only as illustrative aspects. The scope of the technology is defined by the following claims and any equivalents therein.

What is claimed is:

1. A plunger for a beverage container, the plunger comprising:

a base defining a flow passage;

a rod connected to the base;

gasket disposed about a perimeter of the base; and

a valve system connected to the base and disposed at least partially within the flow passage, wherein the valve system comprises:

a first valve comprising a first flexible portion selectively deflectable away from the base, from a first valve flow-closed condition to a first valve flow-open condition; and

a second valve comprising a second flexible portion, wherein the second flexible portion is selectively openable from a second valve flow-closed condition to a second valve flow-open condition.

2. The plunger of claim **1**, further comprising a screen disposed adjacent the base.

3. The plunger of claim **1**, wherein the valve system is removably connected to the base.

4. The plunger of claim **3**, wherein the valve system further comprises a detent for removably connecting the valve system to the base.

5. The plunger of claim **1**, wherein the first valve forms a seal against the base when the first flexible portion is in the first valve flow-closed position.

6. The plunger of claim **1**, wherein the base is circular, and at least a portion of the first valve defines an edge at least partially concentric with the perimeter of the base.

7. The plunger of claim **1**, wherein the second valve further comprises a pair of centrally-disposed flexible lips.

8. The plunger of claim **1**, wherein the valve system comprises a single first valve and a plurality of second valves.

9. The plunger of claim **1**, wherein the first valve and the second valve comprise a unitary part.

10. The plunger of claim **1**, wherein the first flexible portion comprises at least one flexible flap, wherein the at least one flexible flap circumscribes the valve receiver, and wherein the base comprises a plurality of flow-through openings disposed below the at least one flexible flap.

11. An apparatus comprising:

a beverage container comprising a sidewall comprising an inner surface at least partially defining an interior container volume; and

a plunger slidingly disposed in the interior container volume, comprising:

a base defining a flow passage;

a rod connected to the base;

a gasket disposed about a perimeter of the base, the gasket forming a seal against an inner surface of the sidewall; and

a valve system connected to the base and disposed at least partially within the flow passage, wherein the valve system comprises:

a first valve comprising a first flexible portion selectively deflectable away from the base, from a first valve flow-closed condition to a first valve flow-open condition; and

a second valve comprising a second flexible portion, wherein the second flexible portion is selectively openable from a second valve flow-closed condition to a second valve flow-open condition.

12. The apparatus of claim **11**, wherein the beverage container further comprises an outer surface, the outer surface and inner surface defining an insulating volume therebetween.

13. The apparatus of claim **11**, wherein the gasket comprises a pair of flexible protrusions in slidable contact with the inner surface of the sidewall.

14. The apparatus of claim **11**, further comprising:

a perforated plate having a first opening configured to allow passage of the rod, the perforated plate being removably connected to an upper end of the beverage container; and

a filter supported by the perforated plate.

15. The apparatus of claim **14**, wherein the perforated plate is configured to slidably receive the rod and is further configured to center the rod within the beverage container, and wherein the perforated comprises a plurality of second openings configured to allow the passage of fluid.

16. The apparatus of claim **11**,

wherein during a first sliding movement of the plunger, the first flexible portion of the first valve is deposed in the first valve flow-open position, and the second flexible portion of the second valve is disposed in the second valve flow-closed position,

wherein during a second sliding movement of the plunger, the second flexible portion of the second valve opens into the second valve flow-open position, and the first flexible portion of the first valve is deposed in the first valve flow-closed position, and

wherein during a still position of the plunger, the first flexible portion of the first valve remains in the first valve flow-closed position, and the second flexible portion of the second valve remains in the second valve flow-closed position.

17. The apparatus of claim **16**, wherein the first flexible portion of the first valve deflects away from the base when the first flexible portion of the first valve is deposed in the first valve flow-open position.

18. The apparatus of claim **16**, wherein the second flexible portion comprises a pair of lips, and wherein the pair of lips form a seal when the second flexible portion is deposed in the second valve flow-closed position.

19. The apparatus of claim **16**, wherein the wherein the second flexible portion comprises a pair of lips, and wherein the pair of lips deflect away from each other when the second flexible portion is in the second valve flow-open position.

20. The apparatus of claim **16**, wherein the first flexible portion of the first valve forms a seal against the base when the first flexible portion of the first valve is deposed in the first valve flow-closed position.

21. The apparatus of claim **11**, further comprising a cap,

wherein the cap is removably connected to an upper end of the beverage container, and

wherein the cap forms a leak-proof seal around a perimeter of the sidewall.

22. A method, comprising:

placing a liquid into a beverage container;

securing a plunger system to the beverage container;

sliding the plunger in a first direction, causing:

a first flexible portion of a first valve to deflect away from a base into a first valve flow-open position, and

a second flexible portion of a second valve to be deposed in a second valve flow-closed position, the second flexible portion comprising a pair of lips, wherein the pair of lips form a first seal when the second flexible portion is in the second valve flow-closed position; and

sliding the plunger in a second direction, causing:

the second flexible portion of the second valve to open into a second valve flow-open position, wherein the pair of lips deflect away from each other when the second flexible portion is in the second valve flow-open position, and

the first flexible portion of the first valve to form a second seal against the base into a first valve flow-closed position.

23. The method of claim **22**, wherein the first flexible portion and the second flexible portions, when in their respective first valve flow-open position and second valve flow open position, are configured to allow the passage of liquid.

24. The method of claim **22**, further comprising:

prior to securing the plunger system to the beverage container, placing a beverage precursor into the beverage container.

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