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Apparatus for securing a container to a beverage machine

Abstract

The present disclosure describes a beverage machine for dispensing liquids from a container and an apparatus for securing said container to the beverage machine. The container is removably received by a resilient sealing ring which can be tightened around the container using a rotatable bracket. Through a system of interlocking teeth, a plurality of resilient sealing rings may be operated by a single actuator so that multiple containers can be secured to the machine more or less simultaneously.

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Background/Summary

BACKGROUND

(1) Various machines have been developed in recent years that enable consumers to quickly prepare a single serving of a hot beverage, such as coffee, tea, soup, or hot chocolate. When preparing a single cup of a hot beverage, these machines provide a stream of heated liquid to a capsule containing the dry crystallized ingredients. Conventional beverage machines and capsules are generally not suitable for preparing a single serving of a mixed beverage (e.g. a single serving of a mixed drink comprising alcohol, or juices and water) because conventional machines are generally configured to provide a single liquid, typically water.

(2) Cocktail beverage machines, such as WO2017149479A1, prepare beverages from one or more sources including removable spirit bottles. The spirit bottles are inserted into a spirit bottle holder and snapped into place. To remove, the bottle is tipped slightly and slowly pulled up.

SUMMARY

(3) An aspect of the specification provides an apparatus for securing a container to a beverage machine that includes a resilient sealing ring disposed on the beverage machine and a bracket surrounding the resilient sealing ring. The resilient sealing ring has an opening for receiving a container such that the inner surface of the resilient ring faces the container. On the outer surface of the resilient sealing ring, there is a recess. The inner surface of the bracket faces the sealing ring and includes a protrusion for cooperating with the outer surface of the resilient sealing ring. The bracket can be rotated between an unlocked orientation characterized in that the protrusion is aligned with the recess and a locked orientation characterized in that the protrusion is aligned with

a non-recessed portion of the resilient sealing ring. In the locked orientation, the protrusion presses on the resilient sealing ring which secures the resilient sealing ring to the container.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) Embodiments are described with reference to the following figures.

(2) FIG. **1** is a perspective view of a beverage machine with containers.

(3) FIG. **2** is another perspective view of the beverage machine of FIG. **1**.

(4) FIG. **3** is a perspective view of the beverage machine of FIG. **1** showing a socket for receiving a container.

(5) FIG. **4** is a perspective view of a container securing apparatus with containers, a resilient sealing ring, an upper bracket, a fixing ring, and a lower bracket.

(6) FIG. **5** is a perspective view of the container securing apparatus of FIG. **4** without containers.

(7) FIG. **6**A is a top view of the container securing apparatus of FIG. **5**, in an unlocked orientation.

(8) FIG. **6**B is a top view of the container securing apparatus of FIG. **5**, in a locked orientation.

(9) FIG. **7** is a perspective view of the resilient sealing ring of FIG. **5**.

(10) FIG. **8** is a perspective view of the lower bracket of FIG. **5**.

(11) FIG. **9** is a perspective view of the upper bracket of FIG. **5**.

(12) FIG. **10** is a perspective view of the socket of FIG. **3**.

(13) FIG. **11** is an exploded view of the socket of FIG. **3**.

(14) FIG. **12** is a sectional perspective view the socket of FIG. **3**, including a container.

DETAILED DESCRIPTION

(15) The present disclosure provides a beverage machine and an apparatus for securing containers to the beverage machine. The containers are for storing liquids to be dispensed through the beverage machine, and the apparatus is configured to secure two or more containers substantially simultaneously. Each container is removably received by a resilient sealing ring which can be tightened around the container to secure the container. Through a system of interlocking teeth, each of the resilient sealing rings may be operated by a single actuator so that multiple containers can be secured to the machine more or less simultaneously.

(16) A beverage machine is indicated generally at **100** in FIG. **1**. Beverage machine **100** includes a capsule receiver **104** for receiving a capsule **106** containing one or more ingredients for preparing a beverage. Examples of ingredients include liquids and/or solids, such as juice concentrates, spices, extracts, and the like.

(17) Beverage machine **100** may further include one or more sources of liquid (e.g. water, juices, spirits, and the like) for dispensing through capsule **106**. One example (not shown) of a source of water is a connection to a faucet for providing tap water to the capsule **106**. The sources of liquid may include one of more reservoirs **107** for storing a liquid. Reservoir **107** may be fixed to a base **108** for supporting reservoir **107** and supporting an apparatus (shown later in FIG. **4**) for securing containers. In some examples, reservoir **107** is used to store water.

(18) For further versatility, and to increase the variety of beverages that can be prepared, beverage machine **100** includes at least one removable container **112**, **116** (e.g., a bottle or other suitable container, fabricated from any suitable combination of impermeable materials) for storing a liquid to be dispensed through capsule **106**. In the example shown in FIG. **1**, beverage machine **100** includes 4 removable containers for dispensing liquid—two lower containers **112** and two upper containers **116**—however the number of containers is not particularly limited. In the example shown in FIG. **1**, lower containers **112** and upper containers **116** are vertically offset due to the shape of base **108**, which includes a lower surface **124** for supporting lower containers **112** and an upper surface **128** for supporting upper containers **116**. This arrangement may allow a user to see

upper containers **116** which are positioned behind lower containers **112**, when viewed from the front of beverage machine **100**. However, containers **112**, **116** need not be positioned as illustrated, and other arrangements are contemplated. In another example, all containers **112**, **116** are arranged in the same plane. In a further example, the containers **112** at the front of the machine **100** are not directly in front of the containers **116** as illustrated, but are instead closer together or further apart than the containers **116**. In yet a further example, the containers **112** in the front of the machine **100** are raised relative to the containers **116** in the rear.

(19) Containers **112**, **116** are removably secured to base **108** using an actuator **120**. The machine **100** includes an apparatus (described in greater detail below) for locking the containers **112**, **116**. The apparatus has a locked orientation in which the containers **112**, **116** are secured to the machine **100** and an unlocked orientation in which the containers **112**, **116** are released from the machine **100**. The apparatus is switched between the locked and unlocked orientations via movement of the actuator **120**. When actuator **120** is in a first position, the apparatus is set in the locked configuration and at least two of containers **112**, **116** are locked to beverage machine **100**. When actuator **120** is in a second position (as shown in FIG. **1**) the apparatus is set in the unlocked configuration and at least two of containers **112**, **116** are unlocked from beverage machine **100**. Actuator **120** comprises a lever arm in the illustrated example. For aesthetic reasons, and to prevent accidental engagement or disengagement, actuator **120** may be flush with an exterior surface of base **108** when the actuator is in the first position, as shown in FIG. **2**. Actuator **120** may further include a recessed handle **130**, allowing user to better grip actuator **120**.

(20) As shown in FIG. **3**, the above-mentioned apparatus for securing the containers **112**, **116** includes one or more sockets **132-1**, **132-4**, **132-3**, **132-4** (not visible in FIG. **3**) (generically referred to herein as "socket **132**" or collectively as "sockets **132**". This nomenclature is used throughout) for receiving containers **112**, **116**. Sockets **132** may be configured to receive the containers **112**, **116** when actuator **120** is in the second position, as depicted in FIG. **3**. After one or more containers **112**, **116** are inserted into one or more sockets **132**, actuator **120** is moved from the second position to the first position. In the first position, sockets **132** secure the containers **112**, **116** to beverage machine **100**. When actuator **120** is moved back into second position, containers **112**, **116** can be removed from sockets **132**.

(21) FIG. **4** shows the afore-mentioned apparatus at **400** for securing containers **112**, **116** to beverage machine **100**. Apparatus **400** is operated by actuator **120**, which controls apparatus **400** to lock and unlock containers **112**, **116** to and from beverage machine **100**. In FIG. **4**, actuator is shown in first position so containers **112**, **116** are secured to beverage machine **100**. Apparatus **400** includes sockets **132** mentioned in connection with FIG. **3** for each container **112**, **116** to be secured to beverage machine **100**.

(22) Apparatus **400** is shown in greater detail in FIG. **5**. In this view, apparatus **400** is depicted without containers **112**, **116**. Socket **132-1** includes sealing ring **504-1** for receiving container **112**, bracket **508-1** surrounding resilient sealing ring **504-1**, fixing ring **512-1** for securing socket **132-1** to beverage machine **100**, and cover **514-1** for securing resilient sealing ring **504-1** to beverage machine **100**. Socket **132-2** includes sealing ring **504-2** for receiving container **112**, bracket **508-2** surrounding resilient sealing ring **504-2**, fixing ring **512-2** for securing socket **132-2** to beverage machine **100**, and cover **514-2** for securing resilient sealing ring **504-2** to beverage machine **100**. Socket **132-3** includes sealing ring **504-3** for receiving container **116**, bracket **510-1** surrounding resilient sealing ring **504-3**, fixing ring **512-3** for securing socket **132-3** to beverage machine **100**, and cover **514-3** for securing resilient sealing ring **504-3** to beverage machine **100**. Socket **132-4** includes sealing ring **504-4** for receiving container **116**, bracket **510-2** surrounding resilient sealing ring **504-4**, fixing ring **512-4** for securing socket **132-3** to beverage machine **100**, and cover **514-4** for securing resilient sealing ring **504-4** to beverage machine **100**.

(23) To secure containers **112**, **116** to beverage machine **100**, bracket **508-1** is rotated around resilient sealing ring **504-1**, bracket **508-2** is rotated around resilient sealing ring **504-2**, bracket

510-1 is rotated around resilient sealing ring **504-3**, and bracket **510-2** is rotated around resilient sealing ring **504-4**. In this example, manipulation of the actuator **120** causes the rotation of all four brackets **508-1**, **508-2**, **510-1**, **510-2** substantially simultaneously. Actuator **120** is connected to each of the brackets **508**, **510** via an arm **516**. In this example, actuator **120** is pivotally connected to beverage machine **100** at an end **518** and further connected to arm **516** at a portion **519** spaced from end **518**. Arm **516** is connected to actuator **120** in such a way that arm **516** can move relative to actuator **120** via the connection. In the example shown, arm **516** is pivotally connected to actuator **120**. Thus, when actuator **120** pivots around end **518**, arm **516** moves linearly between a first position and a second position. As arm **516** moves between the first position and the second position, brackets **508**, **510** rotate by virtue of their direct or indirect (in the case of the brackets **510**) engagement with teeth **520** disposed on arm **516**.

(24) In the example shown in the figures, actuator **120** is depicted as a lever arm, however actuator **120** is not particularly limited. In other examples, actuator **120** may be a motor, a push-button, turn-crank, or other mechanism for driving arm **516**. In further examples, apparatus **400** does not include an actuator and arm **516** can be directly driven by a user. The examples show that actuator **120** (or arm **516**, in examples without an actuator) is accessible from the exterior of beverage machine **100**, however actuator is not particularly limited. In other examples, actuator **120** includes a motor and a receiver. The motor drives arm **516** in response to receiving an input signal at the receiver.

(25) At least one of the brackets **508-1** and **510-1** engage directly with the arm **516**. The other of the brackets **508-1** and **510-1** can engage with the arm **516** directly, or indirectly, via the directly-engaged bracket. Similarly, at least one of the brackets **508-2** and **510-2** engage directly with the arm **516**, while the other of the brackets **508-2** and **510-2** can engage with the arm **516** directly, or indirectly via the directly-engaged bracket.

(26) In the illustrated example brackets **510-1**, **510-2** engage indirectly with teeth **520** on arm **516**. As shown in FIG. **5**, sockets **132-1** and **132-2** are lower than sockets **132-3** and **132-4**. Sockets **132-1** and **132-2** include lower brackets **508-1** and **508-2** respectively which directly engage with teeth **520-1**, **520-2** on arm **516** via teeth **524-1**, **524-2**. Sockets **132-3** and **132-4** include upper brackets **510-1** and **510-2** which engage with teeth **524-1**, **524-2** on lower brackets **508-1**, **508-2** via teeth **528-1**, **528-2**. Both teeth **520-1** (disposed on arm **516**) and teeth **528-1** (disposed on upper bracket **510-1**) engage with teeth **524-1** on lower bracket **508-1**. Similarly, teeth **520-2** (disposed on arm **516**) and teeth **528-2** (disposed on upper bracket **510-2**) engage with teeth **524-2** on lower bracket **508-2**. In this configuration, sockets **132-1** and **132-2** may be positioned in a horizontal plane that is above or below a horizontal plane in which sockets **132-3** and **132-4** are positioned, however sockets **132** are not particularly limited. An advantage of this configuration is that it is more compact than the configuration described above in which teeth **528** directly engage with teeth on arm **516**. Since teeth **528** instead engage with teeth **524**, socket **132-1** is proximal to socket **132-3**, and socket **132-2** is proximal to socket **132-4**. This may result in a beverage machine **100** that is smaller than a machine **100** in which teeth **528** engage with teeth on arm **516**.

(27) In some examples, each of brackets **508**, **510** engage directly with arm **516**. Brackets **508**, **510** include teeth **524**, **528** which can interlock with teeth on arm **516**. Bracket **508-1** includes teeth **524-1** which interlock with teeth **520-1** on arm **516**. Bracket **508-2** includes teeth **524-3** which interlock with teeth **520-2** on arm **516**. Bracket **510-1** includes teeth **528-1** which interlock with another set of teeth (not shown) on arm **516**. Bracket **510-2** includes teeth **528-2** which interlock with another set of teeth (not shown) on arm **516**. The another set of teeth may be disposed on a side of bracket **508** opposite or adjacent to teeth **524**. The interlocking engagement between teeth **524**, **528**, **520** causes brackets **508**, **510** to rotate when arm **516** moves between the above-mentioned first and second positions. In this configuration, sockets **132** may be positioned in the same horizontal plane, however sockets **132** are not particularly limited.

(28) Each of sockets **132-1**, **132-2**, **132-3**, **132-4** further includes cover **514**. Cover **514** surrounds

resilient sealing ring **504**. Cover **514** is further surrounded by bracket **508** (in sockets **132-1** and **132-2**) or bracket **510** (in sockets **132-3** and **132-4**) which is configured to rotate around cover **514**. Cover **514** secures resilient sealing ring **504** to beverage machine **100**.

(29) FIG. **6**A shows a top view of apparatus **400** in the unlocked orientation. This view depicts the directions in which arm **516**, and brackets **508**, **510** may move in response to movement of the actuator **120**. In FIG. **6**A, actuator **120** is in the second position and is configured to rotate around end **518** in direction A until it reaches the first position. One end **604** of arm **516** is pivotally attached to portion **519** of actuator **120** which is spaced from end **518**. As a result of this connection, arm **516** is driven in direction B in response to actuator **120** rotating in direction A. Due to the engagement of teeth **520** on arm **516** with teeth **524** on brackets **508-1**, **508-2**, brackets **508-1**, **508-2** rotate in direction C when arm **516** is driven in direction B. Due to the engagement of teeth **524** on brackets **508-1**, **508-2** with teeth **528** on brackets **510-1**, **510-2**, brackets **510-1**, **510-2** rotate in direction D when brackets **508-1**, **508-2** rotate in direction C. This process reconfigures apparatus **400** to the locked orientation as shown in FIG. **6**B wherein the actuator **120** is in the first position.

(30) When actuator **120** is manipulated to pivot in a direction opposite to A (as indicated at E), actuator **120** moves from the first position to the second position, arm **516** slides in a direction opposite to B (as indicated at F), brackets **508** rotate in a direction opposite to C (as indicated at G), and brackets **510** rotate in a direction opposite to D (as indicated at H). These motions cause apparatus **400** to return to the unlocked orientation shown in FIG. **6**A.

(31) Further details of resilient sealing ring **504** are shown in FIG. **7**. Sealing ring **504** has an inner surface **700** that faces removable containers **112** or **116** and an outer surface **702** opposite inner surface **700**. Resilient sealing ring **504** comprises a resilient material, e.g., a rubber or other suitable material. Due to the resilience of resilient sealing ring **504**, resilient sealing ring **504** can be compressed between bracket **508**, **510** and container **112**, **116**, securing container **112**, **116** to beverage machine **100**.

(32) Compression of resilient sealing ring **504** results from the rotation of brackets **508**, **510**, which engage features on outer surface **702**. Outer surface **702** is variable and may include one or more lobes, recesses, protrusions, or other features which vary the radius of outer surface **702** relative to a central axis of sealing ring **504**. In the example shown in FIG. **7**, outer surface **702** includes an outer protrusion **704** which extends outwardly from resilient sealing ring **504**, and a recess **708** which extends inwardly. Outer protrusion **704** increases the radius of outer surface **702** relative to central axis J, as shown at K, while recess **708** decreases the radius of outer surface **702** relative to central axis J, as shown at L. In this example, outer protrusion **704** is adjacent to recess **708**, however in other examples, outer protrusion **704** is spaced from recess **708**. In the example shown, the resilient sealing ring **504** includes three protrusions **704** and three recesses **708** distributed around the outer surface **702**. In another example, resilient sealing ring **504** may include two protrusions **704** and two recesses **708** distributed around the outer surface **702**. In a further example, the resilient sealing ring **504** may include four protrusions **704** and four recesses **708** distributed around the outer surface **702**. The number of protrusions and recess is not particularly limited, and in fact, resilient sealing ring **504** may have an unequal number of protrusions **704** and recesses **708**. In other examples, resilient sealing ring **504** may include only protrusions **704** or only recesses **708**.

(33) Containers **112**, **116** may be inserted into resilient sealing ring **504** such that an open neck of container **112**, **116** is received by resilient sealing ring **504**. In order to direct and control the flow of liquid through resilient sealing ring **504**, resilient sealing ring **504** may include an enclosed base **718**. The enclosed base **718** may further include an inlet **720** in fluid connection with the open neck of container **112**, **116** and an outlet **724**. Outlet **724** may be in fluid connection with channels in beverage machine **100** for directing fluids from container **112**, **116** to capsule **106**.

(34) The sealing qualities of resilient sealing ring **504** may be enhanced with one or more

protrusions disposed on inner surface **700**. Ridges or protrusions **728** may be disposed on the enclosed base **718**, extending upwardly towards container **112**, **116**. Ridges or protrusions **716** may further be disposed on inner surface **700**, extending inwardly towards container **112**, **116**. Protrusions **716** may increase the frictional forces between sealing ring **504** and containers **112**, **116**. In some examples, such as the example shown in FIG. **7**, protrusions **716** are disposed opposite protrusions **704** so that when pressure is applied to protrusions **704**, protrusions **716** grip container **112**, **116**. In further examples, containers **112**, **116** include one or more recessions disposed on an outer surface for receiving protrusions **716**.

(35) Resilient sealing ring **504** may be secured to beverage machine **100** so that resilient sealing ring **504** does not rotate when the surrounding bracket **508**, **510** rotates. For example, resilient sealing ring **504** may be fixed with an adhesive, a fastener, or an interlocking tab. In FIG. **7**, resilient sealing **504** includes one or more tabs **732** for interlocking engagement with cover **514**. Tabs **732** will be explained in greater detail with respect to FIG. **11**.

(36) FIG. **8** shows lower bracket **508** in greater detail. Similarly, FIG. **9** shows an upper bracket **510** in greater detail. Lower bracket **508** and upper bracket **510** are sized and dimensioned to fit around the outer surface **702** of resilient sealing ring **504**. When apparatus **400** is assembled, brackets **508**, **510** each surround one of the resilient sealing rings **504**. Unlike resilient sealing ring **504**, brackets **508**, **510** are rotatable. As described above with respect to FIGS. **6**A and **6**B, brackets **508**, **510** rotate between the unlocked orientation and the locked orientation due to interlocking engagement between teeth **520** and teeth **524** or **528**.

(37) Teeth **524** may include a lower portion **816** and an upper portion **820**, as shown in FIG. **8**. In this example, lower portion **816** is for engaging teeth **520** on arm **516**, while upper portion **820** is for engaging teeth **528** on upper bracket **510**, however other arrangements are contemplated. In another arrangement, upper portion **820** is for engaging teeth **520** while lower portion **816** is for engaging teeth **528**. In a further example, teeth **528** engage another set of teeth on lower bracket **508**. The another set of teeth may be disposed on a side of bracket **508** opposite or adjacent to teeth **524**.

(38) Teeth **528** do not necessarily require an upper portion and a lower portion because teeth **528** are configured to interlock with only one other set of teeth (either teeth **524** on bracket **508** or a set of teeth on arm **516**). In the example shown in FIG. **9**, teeth **528** protrude down from bracket **510** to engage an upper portion of teeth **524**. This configuration increases the degree to which brackets **510-1** and **510-2** are raised above brackets **508-1** and **508-2**, enhancing the stepped shape of beverage machine **100**. In another example, where teeth **528** engage with lower portion **816** of teeth **524**, teeth **528** may protrude up from bracket **510**. This configuration would increase the degree to which brackets **510-1** and **510-2** are lowered below brackets **508-1** and **508-2**.

(39) Brackets **508**, **510** further comprise one or more protrusions **804** which extend inwardly from an inner surface **806**. When brackets **508**, **510** are in the unlocked orientation, protrusion **804** aligns with recess **708**. In the unlocked orientation, protrusion **804** does not apply pressure to resilient sealing ring **504**, and therefore container **112**, **116** is not secured to beverage machine **100**. When brackets **508**, **510** are in the locked orientation, protrusion **804** instead aligns with a non-recessed portion of outer surface **702**. The non-recessed portion may be protrusion **704** or any other portion of outer surface **702** that extends out further than recess **708**. Therefore, protrusion **804** engages outer surface **702** and presses resilient sealing ring **504** against container **112**, **116**. In the locked orientation, container **112**, **116** is secured to beverage machine **100**. In examples where resilient sealing ring **504** includes protrusion **704**, protrusion **804** aligns with protrusion **704** when brackets **508**, **510** are in the locked orientation.

(40) One example of a protrusion **804** is a wheel, as shown in FIGS. **8** and **9**. Protrusion **804** comprises a wheel which rotates about an axis **824** connected to bracket **508**, **510**. Axis **824** may be parallel to the axis of rotation for bracket **508** which is indicated at M in FIG. **8**. Axis **824** may similarly be parallel to the axis of rotation for bracket **510** which is indicated at N in FIG. **9**. The

rotation of protrusion **804** may decrease resistance between resilient sealing ring **504** and protrusion **804**, which may facilitate the rotation of brackets **508**, **510** about resilient sealing ring **504**. In this example, protrusion **804** is disposed within an opening **808** of bracket **508**, **510**, however, protrusion **804** is not particularly limited. In other examples, protrusion **804** could be secured within a recess disposed on inner surface **806**.

(41) Inner surface **806** may further include an aperture or recess sized and dimensioned to accommodate protrusion **704** on bracket **508**. FIGS. **8** and **9** show a recess at **812**, which is positioned to align with protrusion **704** when bracket **508** is in the unlocked orientation. This may reduce the likelihood of bracket **508** applying pressure to protrusion **704** when bracket **508** is in the unlocked orientation.

(42) FIG. **10** shows an assembled socket **132** including lower bracket **508**, resilient sealing ring **504**, fixing ring **512**, and cover **514**. Although lower bracket **508** is depicted in this assembly, upper bracket **510** may be similarly assembled. When socket **132** is assembled, bracket **508** surrounds resilient sealing ring **504** and is configured to rotate around resilient sealing ring **504**. Resilient sealing ring **504** is secured to beverage machine **100** with cover **514**. Cover **514** surrounds and supports resilient sealing ring **504**. Cover **514** may be secured to resilient sealing ring **504** in order to inhibit movement of resilient sealing ring **504**. Fixing ring **512** supports cover **514** and bracket **508**. In order to prevent the rotation of fixing ring **512**, fixing ring **512** may be further fixed to beverage machine **100**. A number of fixing means are contemplated including interlocking engagement, adhesives, fasteners, heat bonding, the like, and combinations thereof. In the example shown, fixing ring **512** includes an aperture **1004** for receiving a fastener. The fastener is received by aperture **1004** and further received by an aperture disposed on beverage machine **100** (not shown) such that fixing ring **512** is secured to beverage machine **100** when the fastener is inserted through both apertures. Socket **132** may further include cover **514** for surrounding resilient sealing ring **504**.

(43) FIG. **11** shows an exploded view of socket **132**, including resilient sealing ring **504**, cover **514**, bracket **508**, and fixing ring **512**. FIG. **11** depicts socket **132-1** or **132-2**, however the same configuration may be applied to socket **132-3** or **132-4** by replacing bracket **508** with bracket **510**. The description of bracket **508** thus applies equally to bracket **510**.

(44) Cover **514** may include one or more apertures **1112**, allowing access to outer surface **702** of resilient sealing ring **504**, and in particular, recess **708** and protrusion **704**. Apertures **1112** allow recess **708** and protrusion **704** to engage with protrusion **804** as necessary. Cover **514** may be secured to resilient sealing ring **504** with any suitable means including interlocking engagement, adhesives, fasteners, heat bonding, the like, and combinations thereof. In the example shown, resilient sealing ring **504** is secured to cover **514** with one or more tabs **732**. Tabs **732** may be positioned on the sides or bottom of the outer surface of the resilient sealing ring **504** and extend outwardly. Tabs **732** are sized and dimensioned to be received by one or more apertures **1108** in cover **514**. Apertures are positioned to received tabs **732**. In other examples, tabs **732** are configured to be received by recesses in cover **514**. The interlocking engagement between sealing ring **504** and cover **514** inhibits sealing ring from rotating relative to cover **514**. In the example shown in FIG. **11**, tab **732** includes a portion **1104** with a diameter wider than the diameter of aperture **1108**. In this example, tab **732** comprises a resilient material so that portion **1104** can be forced through aperture **1108**, but the portion **1104** inhibits tab **732** from being removed from aperture **1008** after insertion. To further ensure that resilient sealing ring **504** remains secured in socket **132**, a portion of the base **108** may engage an upper surface **1106** of resilient sealing ring.

(45) Turning now to cover **514**, cover **514** is inhibited from rotating by notch **1116**. Notch **1116** is sized and dimensioned to engage with the base **108**. Thus, when bracket **508**, **510** is rotated around its axis of rotation, neither cover **514** nor resilient sealing ring **504** rotates.

(46) FIG. **11** further shows an exploded view of bracket **508** including axis **824** and protrusion **804**. In embodiments where protrusion **804** is a wheel, axis **824** is a wheel shaft that connects protrusion

804 to bracket **508**. Protrusion **804** is rotatable around axis **824**.
(47) Bracket **508** is supported by fixing ring **512** which includes a surface **1120** for supporting bracket **508**. Surface **1120** engages with a bottom surface of bracket **508** to support bracket **508** from below. Fixing ring **512** may be supported by engagement with beverage machine **100** via fasteners received by apertures **1004**. Fixing ring **512** may be further supported by engagement with beverage machine **100** via one or more tabs **1124** which protrude outwardly from fixing ring **512**. Fixing ring **512** is further configured to support cover **514**. Fixing ring **512** may include one or more surfaces **1128**, **1120** for engaging a bottom surface of cover **514**.
(48) Turning now to FIG. **12**, a sectional view of socket **132-1** is shown including container **112**. Although socket **132-1** is depicted, sockets **132-2**, **132-3**, and **132-4** may be similarly configured. In this view, bracket **508** is in the unlocked orientation such that protrusion **804** is aligned with recess **708** on resilient sealing ring **504**. Since resilient sealing ring **504** is not compressed by protrusion **804**, container **112** is removable from socket **132**.
(49) Resilient sealing ring **504** need not engage container **112** directly when in locked position. In this example, container **112** includes a lid **1204** for directing fluid from container **112** through inlet **720**. Lid **1204** is secured to an open end of container **112** with a ring **1208**. Resilient sealing ring **504** receives ring **1208** and is configured to engage ring **1208** when bracket **508** is in the locked orientation. To ensure that the connection between lid **1204** and ring **1208** is impermeable to liquid, an O-ring **1212** may be included between lid **1204** and ring **1208**. O-ring **1212** may comprise a resilient material for sealing lid **1204** to ring **1208**. In this example, O-ring **1212** is positioned to engage a vertical surface of lid **1204**, however in other examples, O-ring **1212** is positioned to engage a horizontal surface of lid **1204**. Because various components of socket **132** are stacked vertically in this example, it may be desirable to position O-ring **1212** to engage with a vertical surface, in order to reduce vertical play. This placement may ensure that lid **1204** remains sealed to ring **1208** even if there is vertical displacement of any components of container **112**.
(50) A number of advantages will now be clear to a person of skill in the art. Firstly, the present disclosure provides an apparatus for securing and releasing multiple containers with a single action, specifically by engaging the actuator **120** or otherwise driving the arm **516**. In the prior art beverage machines, each container needed to be individually secured to the machine. While this option is suitable for beverage machines that draw on a single liquid source, such as water, it becomes cumbersome for a machine that draws on multiple liquid sources. Since some recipes, such as cocktail recipes, require multiple liquids to prepare a beverage, securing multiple containers simultaneously can save time and simplify the process of installing or exchanging containers at the beverage machine. This is particularly useful when preparing a series of beverages that require different liquids. Multiple containers can be rapidly removed after preparing a first beverage and replaced with containers storing different liquids before preparing a second beverage.
(51) Secondly, the present disclosure provides an apparatus for securing and releasing containers using an actuator that is accessible from the exterior of the beverage machine. In prior art beverage machines, containers are attached to the machine my manipulating the container itself. This method can increase the likelihood of damaging the container and can be frustrating for users since the locking mechanism is invisible to the user during and after installation. In contrast, the actuator of the present disclosure may be visible from the outside of the machine so that the user can clearly see whether the apparatus is locked or unlocked. The user does not need to handle the containers while engaging or disengaging the actuator, so the risk of damaging a container is lowered as compared to the prior art.
(52) Thirdly, the present disclosure provides an apparatus that allows the containers to be arranged in a variety of positions. Due to the length of the arm and the alignment of teeth on the upper and lower brackets, sockets for installing containers can be both vertically and horizontally spaced. This flexibility allows containers to be positioned so as to improve visibility and to create a visually interesting arrangement.

(53) The many features and advantages of the invention are apparent from the detailed specification and, thus, it is intended by the appended claims to cover all such features and advantages of the invention that fall within the true spirit and scope of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation illustrated and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

Claims

1. An apparatus for securing a container to a beverage machine, the apparatus comprising: a resilient sealing ring disposed on the beverage machine, the resilient sealing ring having: an opening for receiving a container; an inner surface facing the container; and an outer surface opposite the inner surface, the outer surface comprising a recess; and a bracket comprising a protrusion extending inwardly from an inner surface of the bracket, the protrusion on the inner surface of the bracket comprising a wheel configured to rotate around an axis parallel to an axis of the bracket, and the bracket surrounding the resilient sealing ring and rotatable between (i) an unlocked orientation aligning the protrusion with the recess of the resilient sealing ring, and (ii) a locked orientation aligning the protrusion with a non-recessed portion of the resilient sealing ring and compressing the resilient sealing ring between the bracket and the container.
2. The apparatus of claim 1, the outer surface of the resilient sealing ring further comprising a protrusion extending outwardly, wherein, when the bracket is in the locked orientation, the protrusion of the bracket aligns with the protrusion of the resilient sealing ring.
3. The apparatus of claim 2 wherein: the outer surface of the resilient sealing ring comprises a plurality of recesses and protrusions extending outwardly; the inner surface of the bracket comprises a plurality of protrusions extending inwardly; and when the bracket is in the locked orientation, the plurality of protrusions on the resilient sealing ring engages the plurality of protrusions of the bracket.
4. The apparatus of claim 2 wherein the inner surface of the resilient sealing ring comprises a plurality of protrusions for engaging the container.
5. The apparatus of claim 1 further comprising: a first set of teeth disposed on an outer surface of the bracket; and an arm movable between a first position and a second position, the arm comprising a second set of teeth for engaging the first set of teeth on the bracket, the engagement causing the bracket to rotate from the unlocked orientation to the locked orientation in response to the arm moving from the first position to the second position.
6. The apparatus of claim 5 further comprising an actuator for moving the arm between the first position and the second position.
7. The apparatus of claim 6 wherein the actuator is accessible from an exterior of the beverage machine.
8. The apparatus of claim 6 wherein an end of the actuator is pivotally attached to the beverage machine, and the arm is pivotally attached to a portion of the actuator spaced from the end of the actuator, and wherein the arm moves between the first position and the second position in response to the rotation of the actuator around the end.
9. The apparatus of claim 8 wherein rotation of the actuator around the end causes the arm to move linearly between the first position and the second position.
10. The apparatus of claim 5 further comprising: a second resilient sealing ring disposed on the beverage machine for receiving a second container; and a second bracket rotatable around the second resilient sealing ring between an unlocked orientation and a locked orientation, the second bracket comprising a third set of teeth for engaging the first set of teeth on the bracket, the engagement causing the second bracket to rotate from the unlocked orientation to the locked orientation in response to the bracket rotating from the unlocked orientation to the locked

orientation.

11. The apparatus of claim 10 wherein the third set of teeth is positioned to engage an upper portion of the first set of teeth and the second set of teeth is positioned to engage a lower portion of the first set of teeth.

12. The apparatus of claim 5 further comprising: a second resilient sealing ring disposed on the beverage machine for receiving a second container; and a second bracket rotatable around the second resilient sealing ring between an unlocked orientation and a locked orientation, the second bracket comprising a third set of teeth for engaging a fourth set of teeth on the arm, the engagement causing the second bracket to rotate from the unlocked orientation to the locked orientation in response to the arm moving from the first position to the second position.