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(19) **United States**(12) **Patent Application Publication****Rosiello**(10) **Pub. No.: US 2005/0121458 A1**(43) **Pub. Date: Jun. 9, 2005**(54) **APPARATUS AND METHOD FOR
DISPENSING LIQUID****Publication Classification**(76) Inventor: **Keith M. Rosiello**, Shrewsbury, MA
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222/464.1; 222/478**

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BOSTON, MA 02110 (US)**(57) **ABSTRACT**(21) Appl. No.: **10/953,914**(22) Filed: **Sep. 29, 2004****Related U.S. Application Data**(60) Provisional application No. 60/507,841, filed on Oct.
1, 2003.

The disclosed invention provides an apparatus for dispensing liquids held by containers that are located at positions distal to the dispenser. The disclosed invention includes a dispenser, container, universal cap, and conduit assembly with coupling device. The coupling device provides the ability to attach the conduit to typical dispenser inlets. The universal cap provides the ability for a wide variety of containers to be connected to the dispenser.

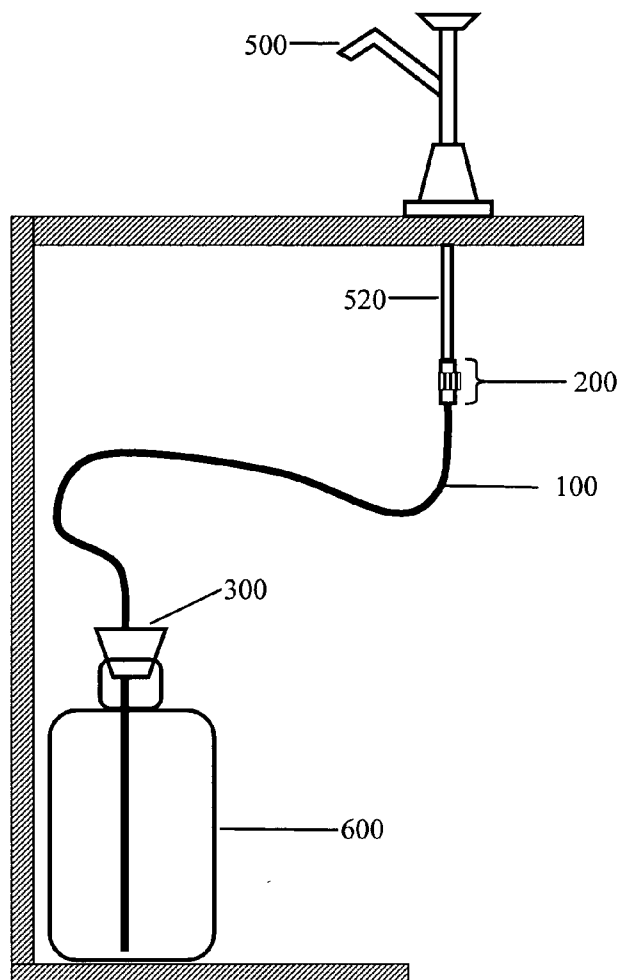
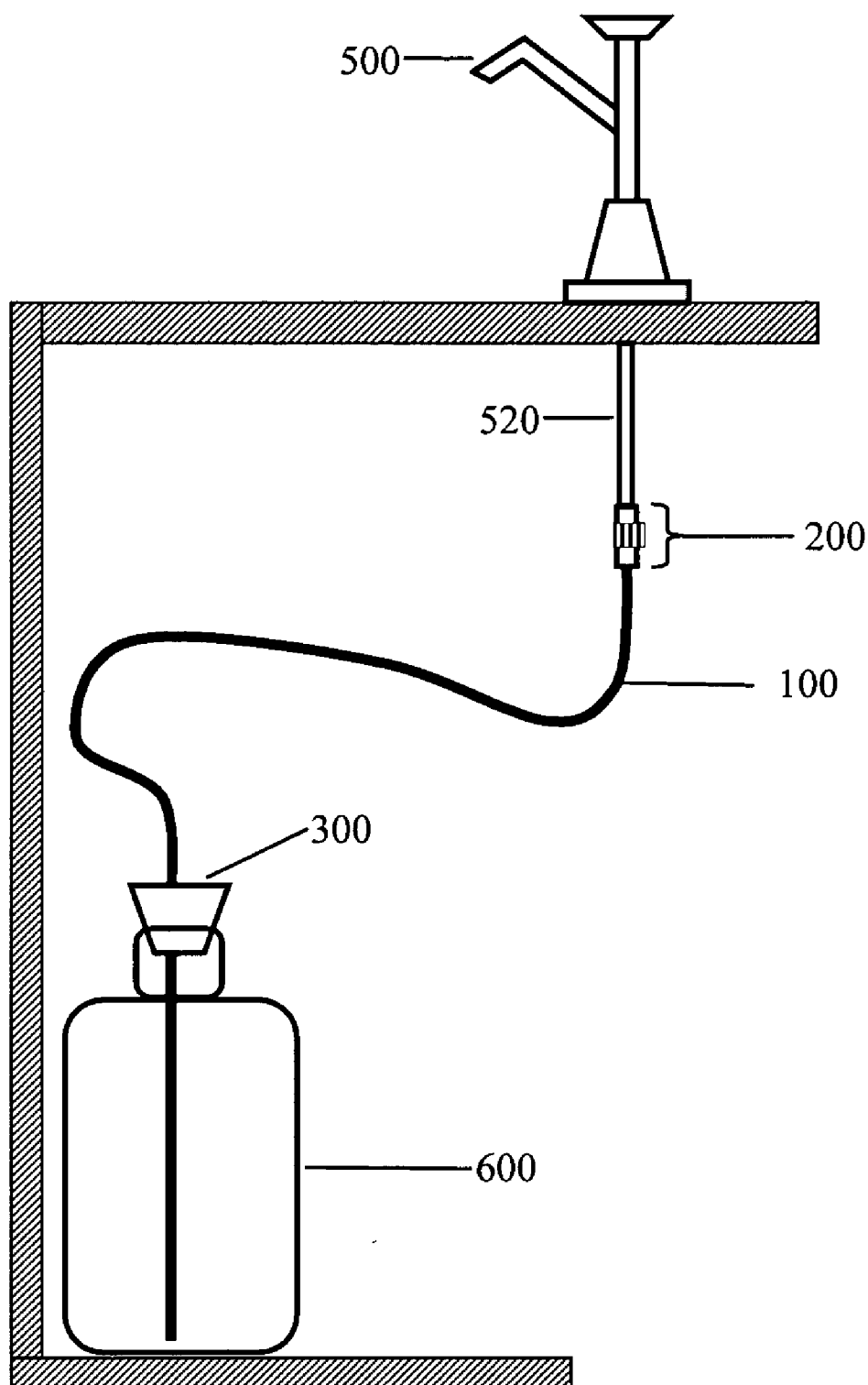


FIG. 1



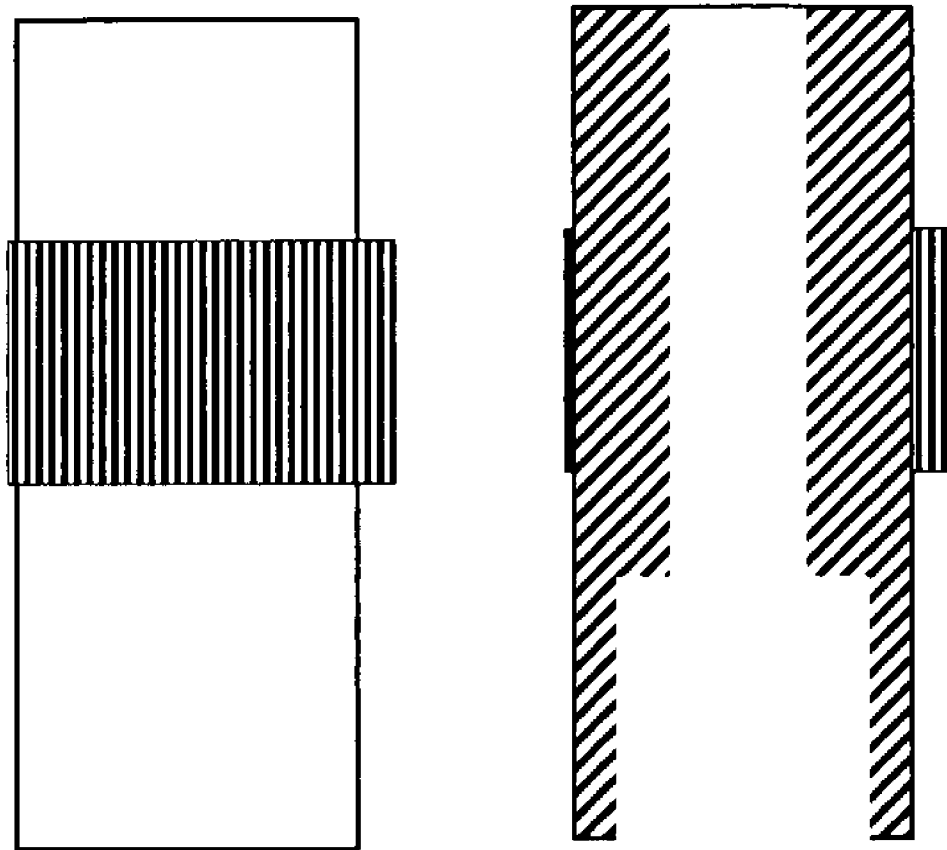


FIG. 2



FIG. 3A: Internal Container Adapter Cap

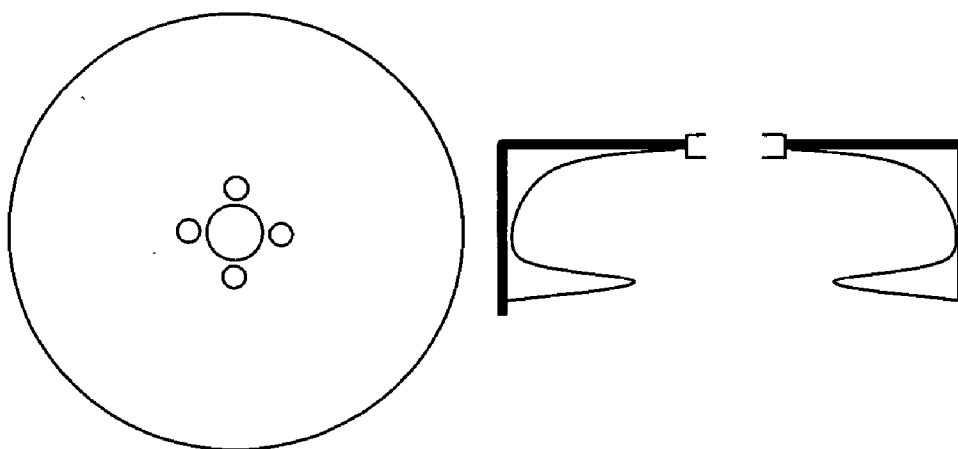


FIG 3B: External Container Adapter Cap

APPARATUS AND METHOD FOR DISPENSING LIQUID

RELATED APPLICATIONS

[0001] This application claims priority from U.S. Ser. No. 60/507,841, filed Oct. 1, 2003, which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to liquid dispensers and, more particularly, to conduits connecting dispensers to liquid containers.

BACKGROUND OF THE INVENTION

[0003] Liquid dispensers have several functional forms depending upon the specific application. Traditional commercial soap dispensers used in high-capacity, public lavatories are hand-operable. This self-contained style of dispenser allows for a quantity of soap to be stored within the housing and dispenses the soap using gravity, or by a pump mechanism that dispenses soap in response to manipulation of the mechanism. These devices are specialized in that they are designed for certain spaces such as wall-mount dispensers or counter mount dispensers. Access for refill or maintenance of these dispensers is often difficult, and they typically utilize components that are not interchangeable. What is needed is an improved dispensing apparatus.

SUMMARY OF THE INVENTION

[0004] In one aspect, the invention provides an apparatus for dispensing liquids. The invention includes a dispenser. The dispenser has an inlet and an outlet for discharging a liquid. In one embodiment, the dispenser is a common soap pump. In another embodiment the dispenser is a large pump. The invention also includes a container. The container has an inlet where liquids are introduced and dispersed therefrom. In one embodiment, the container is rigid, for example manufactured from metal. In another embodiment, the container is substantially rigid, for example, manufactured from plastic such as polyethylene or polypropylene. In yet another embodiment, the container may be semi-rigid or collapsible. The container has a lumen capable of housing a supply of the liquid to be dispensed.

[0005] The apparatus includes a conduit extending into the lumen of the container. In one embodiment the conduit is a flexible, non-porous polymer material. In another embodiment the conduit is substantially rigid. One terminus of the conduit extends into the lumen of the container and the other terminus is adapted to a coupling device which engages the inlet of the dispenser. In one embodiment the coupling device is secured to the conduit. In another embodiment the coupling device is of the same material as the conduit, and is a natural extension of the conduit itself. The coupling device has a stepped internal diameter according to one embodiment. In another embodiment, the coupling device is smooth with the interior diameter progressively expanding toward the conduit insertion terminus. The coupling device is secured using a common clamp in one embodiment. In another embodiment the coupling device is secured using a wrap-type fastener. In another embodiment the coupling device is secured using a screw-type fastener. In yet another embodiment the coupling device is secured by using a

bonding agent. In still another embodiment, the coupling device is not secured, as the frictional seal it creates when in contact with the dispenser inlet keeps it attached.

[0006] The apparatus also includes a cap capable of engaging the container. The cap is a cork or any kind of sealing means. The cap has one or more apertures. The conduit extends through the first aperture. The second aperture acts as an air vent. In one embodiment, the first aperture snugly holds the conduit. In another embodiment, the conduit extends loosely through the first aperture. In one embodiment, the second aperture has a valve capable of equalizing pressure.

[0007] These and other objects of the present invention will become apparent to those skilled in the art as the description thereof proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention will be described with greater specificity and clarity with reference to the following drawings, in which:

[0009] **FIG. 1** is a side view of the disclosed invention in its preferred embodiment installed for use with typical counter-mounted dispenser and commercial liquid products container.

[0010] **FIG. 2** illustrates a detail cross-section of a pump to conduit coupling device with a fastener.

[0011] **FIG. 3A** is a side view and cross-section view of an internal container adapter cap.

[0012] **FIG. 3B** is a top view and cross-section view of an external container adapter cap.

DETAILED DESCRIPTION

[0013] The present invention provides an apparatus for dispensing liquids, for example, soaps or lotions. Unlike traditional liquid dispensers, the apparatus is universal, in that it is adaptable to numerous types of containers and dispensers through a universal conduit system. Additionally, the universal conduit system permits the user-operated elements of the dispenser apparatus to be located distal to the liquid supply elements. This design provides several advantages, in particular, the liquid supply container is more accessible for refill or maintenance and the liquid supply container may be universally interchanged or replaced.

[0014] Low-capacity public lavatories typically use a solid-mounted pump dispenser, which places the pump mechanism atop a counter surface and the soap reservoir below the counter surface. The pump and reservoir are connected via a through-hole in the counter or basin. Refilling the soap from a larger container requires removal of either the reservoir or the pump mechanism. A problem with removing the pump mechanism for above the counter filling is that the hole to the reservoir is small and it takes a long time to fill the reservoir. Furthermore, the bulk soap containers are not well suited for pouring into small holes; usually a siphon or smaller secondary container must be used to avoid spillage. Another problem is that there is no way to determine when the reservoir is full. A lack of accessibility creates a problem with removing the reservoir for below the counter filling. The reservoir is usually located in the back upper corner of the under-counter space, and an

individual needs to bend down to below sink height, reach back and around the sink basin, and up to near the underside of the counter to reach the reservoir. The present invention solves these problems by allowing the liquid container to be placed in any more convenient location.

[0015] The apparatus uses the force created by a dispenser or pump mechanism to deliver the liquid from the liquid container to the dispenser on the demand of the user. Various embodiments include dispensers that draw liquids through forces created by gravity, by a vacuum, and any other methods known in the art. One source of vacuum is negative air pressure generated by spring assisted return of a dispenser handle after mechanical actuation, where the liquid is drawn through the dispenser handle. The output force of the spring, or other vacuum generating mechanism, is increased to accommodate varying vacuum requirements of differing applications, such as fluid viscosity, conduit length and conduit location relative to the liquid container, etc. Other embodiments include a dispenser or pump mechanism, which include components, such as reducers, aerators or the like, that manipulate or alter the liquid before it reaches the outlet.

[0016] Turning to **FIG. 1**, a liquid container **600** is provided, having a cap **300**, which container is capable of holding any kind of liquid, such as soap, detergent, shampoo, hair conditioner, moisturizer, shaving gel, shaving cream, cologne, perfume, oil, or syrup. The type of liquid is not material to the invention. The container is placed at any convenient location distal to a dispensing apparatus, for instance, it could be mounted upon shelf above the dispenser to permit flow of liquid to the dispenser in response to the force of gravity, or it could be placed in a cabinet such as a lavatory cabinet, below the dispenser. The container may be rigid, for example manufactured from metal, or substantially rigid, for example manufactured from plastic such as polyethylene or polypropylene. The container may also be the original bulk liquid container. The size, depth and shape of the container is not material to the invention, but it is preferred that the container be impervious and chemically resistant to the liquids it is intended to hold, for example, be impervious or resistant to rust.

[0017] A conduit **100** is provided, having two ends. The first end is inserted into the container that holds liquids. The second end of the conduit is formed such that it can be adapted to the internal diameter of a coupling device **200**, which in turn is adapted to a dispenser assembly **500**. The coupling device may be an extension of the conduit, made out of the same material. Accordingly, the conduit provides a means for communicating fluid from the container to the dispenser, and the coupling device provides for universal communication between the dispenser assembly and the conduit, thereby allowing distal placement of the container from the dispenser.

[0018] The conduit is a flexible, non-porous polymer material with a substantially cylindrical shape such as that of a tube, with a nominal wall thickness, although different embodiments are possible, including manufacturing a thicker wall to make dispensing an extremely viscous liquid possible using a strong vacuum, or manufacturing using a more rigid plastic, making the wall less flexible. In one embodiment, the axial length of the conduit is sized to accommodate the distance between under-counter shelving

and standard residential counter-top heights. In other embodiments requiring a greater or lesser distance between the dispenser and the container, longer and shorter embodiments are envisioned. Possible examples of extensible or longer conduits are those applications that require the conduit extend from a dispenser to a container that is located in another room, such as a supply closet in a residential house or restaurant, or another bay in a car mechanic garage, for example. Optionally, a check valve may be added in or adapted to the conduit, to maintain directional liquid flow. The check valve may be a conventional one-way valve having a ball element disposed within a cavity, where the ball will close an orifice or passageway through the conduit in response to a reverse flow of liquid into the container. Gravity may be used to bias the ball toward the orifice or a spring may be used for this purpose. An example of such a check valve can be found in U.S. Pat. No. 5,791,519, incorporated herein by reference.

[0019] Counter-mounted dispensers are typically supplied with a liquid reservoir component, which is removed to expose one terminus of the dispenser, which is the dispenser inlet **520**. The dispenser inlet is adapted to the coupling device **200**. **FIG. 2** shows detailed views of the coupling device with an associated fastener. The coupling device is generally tubular in shape and constructed from one of many commonly known polymer materials. The coupling device has a stepped internal diameter to provide differing diameters at each open end, although in other embodiments the internal diameter is not stepped, but is sloped or slanted. The coupling device is secured around the dispenser inlet using a common clamp, or a wrap-type fastener, although a variety of securing means including latches, clips, and screw-type devices are acceptable. The securing device is manufactured out of plastic, metal, rubber or any other material commonly known by those skilled in the art that has the requisite mechanical strength and flexibility to join the coupling device to the dispenser inlet. In a preferred embodiment, the securing device is not affected by the liquids dispensed through the coupling device, i.e., it is impervious to liquids and resistant to rusting. Alternatively, the coupling device is secured to the dispenser inlet by friction, i.e., the stepped nature of the interior of the coupling device could create such a strong seal with the dispenser inlet that an external securing device would not be necessary.

[0020] The free end of the conduit is inserted into the liquid container through a passage in the cap **300**. The cap can be a cork, a screw cap, a stopper or any other type of sealing means. The cap is constructed of any one of many readily available natural or synthetic materials that provide durability and is impervious or resistant to the liquid held in the container. The cap accommodates connection to any liquid container and in one embodiment, can replace the sealing means supplied with a refill liquid container. **FIG. 3A** shows detailed views of the container cap in the preferred, internal cap/cork, embodiment. The internal cap is constructed of any one of many readily available natural or synthetic materials that provide flexibility and durability. In one embodiment, the cap is formed into a conical shape, and when inserted into the aperture of a container, will seal the container by friction. As shown in sectional views, the cap has first and second apertures for the main conduit and an air vent. Alternatively, the cap could include a valve in or connected to one aperture to allow air to vent as liquid is dispensed. The first aperture is sized so that the exterior

surface of the conduit fits snugly against the inside diameter of the aperture, creating a seal and holding the conduit in place such that the end of the conduit can reach and stay in contact with the bottom of the container. The conduit does not have to fit snugly in the aperture, however. Where the conduit loosely passes through the aperture, a second aperture is not needed for pressure equalization. In another embodiment the conduit exterior is attached to the cap itself. **FIG. 3B** shows detailed views of the external cap. This embodiment provides a first aperture for the conduit and four apertures that serve as air vents. However, this embodiment does not require four vent apertures. One of many number of vent apertures may be used. The view in section shows that, in this embodiment, the external cap connects over the outside of the container neck, creating a seal. The external cap is constructed from one of many natural or synthetic semi-rigid materials, such as plastic or rubber. The material flexibility allows the lower aperture to accommodate containers with varying neck sizes.

EQUIVALENTS

[0021] From the foregoing detailed description of the invention, it should be apparent that a unique apparatus for dispensing liquids has been described. Although particular embodiments have been disclosed herein in detail, this has been done by way of example for purposes of illustration only, and is not intended to be limiting with respect to the scope of the appended claims which follow. In particular, it is contemplated by the inventor that substitutions, alterations, and modifications may be made to the invention without departing from the spirit and scope of the invention as defined by the claims. For instance, the choice of liquids dispensed, or the choice of materials, or the choice of conduit length is believed to be matter of routine for a person of ordinary skill in the art with knowledge of the embodiments described herein.

What is claimed is:

1. An apparatus comprising:
 - (a) a dispenser having an inlet and an outlet for discharging a liquid;
 - (b) a container having a lumen capable of housing a supply of the liquid to be dispensed, located distal to the dispenser;
 - (c) a conduit extending into the lumen of the container;
 - (d) a coupling device capable of adapting the conduit to the dispenser inlet;
 - (e) a cap capable of engaging the container, the cap having a first aperture and a second aperture, wherein the conduit extends through the first aperture, and wherein the second aperture permits pressure equalization.
2. The apparatus as set forth in claim 1 wherein said second aperture includes a valve.
3. The apparatus as set forth in claim 1 wherein said dispenser is a pump.
4. The apparatus as set forth in claim 1 wherein said dispenser is a counter-mounted pump mechanism.
5. The apparatus as set forth in claim 1 wherein said dispenser is a pump utilizing vacuum to propel the liquid out of the dispenser outlet.

6. The apparatus as set forth in claim 1 wherein said dispenser is a pump utilizing an increased output-force return mechanism to increase the vacuum generated for each user input action.

7. The apparatus as set forth in claim 1 wherein said dispenser is a pump including components specifically intended to alter the fluid's physical properties by means of mechanical manipulation or alteration, including the introduction of a secondary fluid, such as ambient air.

8. The apparatus as set forth in claim 1 wherein said container houses a liquid from the group consisting of soap, shampoo, hair conditioner, moisturizer, shaving gel, shaving cream, cologne, perfume, oil, and syrup.

9. The apparatus as set forth in claim 1 wherein said conduit is a flexible, non-porous polymer material of nominal wall thickness.

10. The apparatus as set forth in claim 1 wherein said conduit has such axial length as necessary to accommodate standard residential counter-top heights.

11. The apparatus as set forth in claim 1 wherein said coupling device is secured using a common clamp.

12. The apparatus as set forth in claim 1 wherein said coupling device is secured using a wrap-type fastener.

13. The apparatus as set forth in claim 1 wherein said coupling device is a common polymer.

14. The apparatus as set forth in claim 1 wherein said coupling device has a stepped internal diameter.

15. The apparatus as set forth in claim 1 wherein said conduit is bonded to the internal diameter of the coupling device.

16. The apparatus as set forth in claim 1 wherein said cap is capable of engaging any commercially available product container.

17. The apparatus as set forth in claim 1 wherein said cap is capable of replacing a cap supplied with a commercially available product container.

18. The apparatus as set forth in claim 1 wherein said cap creates a seal when inserted into the container.

19. The apparatus as set forth in claim 1 wherein said cap is made of natural or synthetic material and is flexible and durable.

20. The apparatus as set forth in claim 16 wherein said cap is conical.

21. The apparatus as set forth in claim 16 wherein said cap is secured over the outside of container neck.

22. The apparatus as set forth in claim 1 wherein said conduit is held snugly by the first aperture.

23. The apparatus as set forth in claim 1 including a check valve for limiting flow through said conduit to one direction.

24. The apparatus as set forth in claim 1 including means for locating said container relative to said outlet to have the force of gravity cause the liquid to be evacuated from said container and discharged through said outlet.

25. The apparatus as set forth in claim 1 wherein said conduit has extended axial length to accommodate remote location of the liquid container.

26. The apparatus as set forth in claim 1 wherein said coupling device has a sloped internal diameter.

27. The apparatus as set forth in claim 1 wherein said coupling device is secured using frictional force between the internal diameter of the coupling device and the outer diameter of the dispenser inlet.

28. The apparatus as set forth in claim 1 wherein said conduit fits loosely in the first aperture, eliminating the second vent aperture.

29. A method for dispensing liquid from a container distal to the dispenser, said method comprising the steps of:

- (a) providing a user-operated liquid dispensing apparatus, wherein the liquid dispensing apparatus comprises a dispenser having an inlet and an outlet for discharging a liquid, a container having a lumen capable of housing a supply of the liquid to be dispensed, located distal to the dispenser, a conduit extending into the lumen of the container, a coupling device capable of adapting the conduit to the dispenser inlet, a cap capable of engaging the container, the cap having a first aperture and a second aperture, wherein the conduit extends through the first aperture, and wherein the second aperture permits pressure equalization; and

- (b) dispensing liquid therefrom.

30. A method of using a liquid dispensing apparatus comprising the steps of:

- (a) obtaining a liquid dispensing apparatus, wherein the liquid dispensing apparatus comprises a dispenser having an inlet and an outlet for discharging a liquid, a container having a lumen capable of housing a supply of the liquid to be dispensed, located distal to the dispenser, a conduit extending into the lumen of the container, a coupling device capable of adapting the conduit to the dispenser inlet, a cap capable of engaging the container, the cap having a first aperture and a second aperture, wherein the conduit extends through the first aperture, and wherein the second aperture permits pressure equalization; and

- (b) dispensing liquid therefrom.

31. An apparatus comprising:

- (a) a counter-mounted pump mechanism having an inlet and an outlet for discharging a liquid and utilizing vacuum to propel the liquid out of the counter-mounted pump mechanism outlet;
- (b) a container having a lumen capable of housing a supply of the liquid to be dispensed, located distal to the counter-mounted pump mechanism;
- (c) a flexible, non-porous polymer material of nominal wall thickness extending into the lumen of said container, which serves as a conduit, and has such axial length as necessary to accommodate standard residential counter-top heights;
- (d) a coupling device capable of adapting said conduit to the dispenser inlet which is made of a common polymer and has a stepped internal diameter;
- (e) a conical cap made of flexible, durable material and capable of engaging any commercially available product container, the cap having a first aperture which snugly holds said conduit and which includes a check valve for limiting flow through said conduit to one direction and a second aperture, wherein the conduit extends through the first aperture, and wherein the second aperture permits pressure equalization.

32. The apparatus as set forth in claim 31 wherein said container houses a liquid from the group consisting of: soap, shampoo, hair conditioner, moisturizer, shaving gel, shaving cream, cologne, perfume, oil, and syrup.

33. The apparatus as set forth in claim 31 wherein said coupling device is selected from the group consisting of: a common clamp and a wrap-type fastener.

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