FLOW RATE ENHANCEMENT DEVICE AND METHOD OF USE THEREOF

Applicant: Dillon George, Ooltewah, TN (US)

Inventor: Dillon George, Ooltewah, TN (US)

Appl. No.: 13/894,006

Filed: May 14, 2013

Related U.S. Application Data

Continuation-in-part of application No. 13/340,831, filed on Dec. 30, 2011, Continuation-in-part of application No. 29/443,663, filed on Jan. 21, 2013.

Provisional application No. 61/688,430, filed on May 14, 2012.

ABSTRACT

A flow rate enhancement device that comprises a tube and a band, the tube allowing for air communication from outside of a container to the floor of the container, thus preventing negative pressure from building within the container as it is emptied, and the band helps secure the device to the container's opening.
FLOW RATE ENHANCEMENT DEVICE AND METHOD OF USE THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] To the full extent permitted by law, the present application claims priority to and the full benefit from Patent Application No. 61/688,430, Container with Stem, filed May 14, 2012, the contents of which are incorporated herein by reference in its entirety, and this application also claims priority to and the full benefit from Patent Application Ser. No. 13/340,831, Liquid Container with Enhanced Fluid Flow, filed Dec. 30, 2011, the contents of which are incorporated herein by reference in its entirety, and this application also claims priority from Patent Application Ser. No. 29/443,665, Flow Rate Enhancement Device, filed Jan. 21, 2013, the contents of which are incorporated herein by reference in its entirety.

FEDERALEY SPONSORED RESEARCH OR DEVELOPMENT

None

PARTIES TO A JOINT RESEARCH AGREEMENT

None

REFERENCE TO A SEQUENCE LISTING

None

BACKGROUND OF THE INVENTION

[0002] 1. Technical Field of the Invention
[0003] The disclosure generally relates to pouring liquids out of containers, and more specifically to a flow rate enhancement device for doing the same.
[0004] 2. Description of Related Art
[0005] The disclosure relates generally to a flow rate enhancement device and a method of using the same.
[0006] When pouring liquids out of containers, it is common for the liquid to completely occlude the opening of the container. This temporarily prevents air from entering the container, creating reduced (negative) pressure inside the container. This slows down the outward flow of liquid, until finally a pocket of air pushes the liquid aside to get inside the area of reduced (negative) pressure. When this happens, the flow of the liquid is interrupted.
[0007] Therefore, it is readily apparent that there is a recognizable unmet need for a flow enhancement device that is easy to use, easy to produce, and allows liquids to be poured from containers more efficiently.

SUMMARY

[0008] Briefly described, in a preferred embodiment, the present apparatus and method overcomes the above-mentioned disadvantages and meets the recognized need for such a device by providing a flow rate enhancement device that is easy to use, simple to manufacture, and allows for easier use of containers with liquids.
[0009] The present apparatus and method includes a flow rate enhancement device that includes a tube and a band. The tube allows air communication from outside of a container to the floor of the container, thus preventing negative pressure from building within the container as it is emptied. The band can be used to secure the device to the container’s opening.
[0010] According to its major aspects and broadly stated, the present disclosure describes a flow rate enhancement device, the flow rate enhancement device comprising a tube. The tube is placed in a container that has an opening and a floor, the opening of the container having an interior wall. The tube partially occludes the container’s opening, and the tube provides fluid communication, of air, between the opening and near the container’s floor.
[0011] The tube has a top, a bottom, and a channel through which the air flows. The bottom of the tube is placed near the container’s floor, and the top of the tube is near the container’s opening.
[0012] The flow rate enhancement device also has a band, and the band has an outer wall that is proximate, or even in contact with, container’s opening’s interior wall. The band’s upper edge is near to the container’s opening.
[0013] In some embodiments, the tube’s bottom is nonlinear, thus preventing the bottom from forming a seal with the container’s floor. Alternatively, tube may not be long enough to reach all the way to container’s floor.
[0014] The flow rate enhancement device may be adhesively secured to the container, or it may be fixedly secured to container, or it may be manufactured as part of the container or the band alone may be manufactured as part of the container.
[0015] In use, the flow rate enhancement device is inserted into a container that has a floor and an opening, and the tube provides air flow from the container’s opening to the container’s floor. Whatever the container holds, such as a liquid or liquid-like substance, is poured out of the container, and air flow concurrently flows through the tube, such air flow may result from a vacuum created in the container by liquid exiting the container when tipped upside down.
[0016] More specifically, the present disclosure of a preferred embodiment is a flow rate enhancement device, the flow rate enhancement device having a tube and a band. The tube has a top, a channel, a bottom, and an air opening. The band has an inner wall, an outer wall, an upper edge, a lower edge, and a liquid opening and/or an air opening; such liquid opening may include the container opening. The flow rate enhancement device is placed in the container opening or the tube is placed in the container opening having an air opening, and the container has an opening, an interior wall, and a floor.
[0017] The air opening lies within the channel near the top of the tube. The liquid opening lies within the interior of the inner wall of the band.
[0018] The channel lies within the tube, and fluidly communicates the tube’s top with the tube’s bottom. The band’s outer wall lies on the exterior periphery of the band, and the band’s inner wall lies in the interior periphery of the band. The band’s upper edge is near the tube’s top. The band’s lower edge may be approximately ¼" below upper edge, although it will be recognized that the lower edge may be any distance from upper edge or even therewith. The air flows into the tube’s channel as liquid flows through the band and out of the container.
[0019] In use, the flow rate enhancement device is inserted into a container via the opening, by first inserting the tube’s bottom into the container. The tube’s bottom may be nonlinear, thus preventing the bottom from forming a seal with the container’s floor. For exemplary purposes only, the tube’s bottom may be a jagged edge, or the bottom may be angled or
the bottom may comprise a slit partly up the tube that provides fluid communication between the channel and near, but not directly against, the container’s floor. Also, tube may not be long enough to reach the container’s floor.

[0020] When the flow rate enhancement device is fully inserted in the container, the bottom is near the container’s floor. Further, the top and the band are near and within the container’s opening. The outer wall is in contact with the container’s interior wall, and friction between the outer wall and the interior wall prevents flow rate enhancement device from falling fully into the container.

[0021] Rather than being secured via friction to the container, the device may also be secured via an adhesive such as glue, it may also be manufactured into the container such that the device is fixedly secured to the container, and the flow rate enhancement device may be manufactured as part of the container such that the container’s interior wall includes the band of the flow rate enhancement device.

[0022] Accordingly, a feature of the flow rate enhancement device is its ability to be easy to install and use.

[0023] Another feature of the flow rate enhancement device is its ability to be inexpensive to manufacture.

[0024] Yet another feature and advantage of the flow rate enhancement device is its ability to be used in many different types of containers with many different types of liquids.

[0025] Yet another feature and advantage of the flow rate enhancement device is its ability to be manufactured directly into the containers.

[0026] Yet another feature and advantage of the flow rate enhancement device is its ability to be transferable from one container to another.

[0027] Yet another feature and advantage of the flow rate enhancement device is its ability to be easily cleaned.

[0028] These and other features of the flow rate enhancement device will become more apparent to one skilled in the art from the prior Summary, and following Brief Description of the Drawings, Detailed Description, and claims when read in light of the accompanying Detailed Drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] The present flow rate enhancement device will be better understood by reading the Detailed Description with reference to the accompanying drawings, which are not necessarily drawn to scale, and in which like reference numerals denote similar structure and refer to like elements throughout, and in which:

[0030] FIG. 1A is a perspective view of an exemplary embodiment;

[0031] FIG. 1B is a top cross-sectional view of the exemplary embodiment of FIG. 1A;

[0032] FIG. 2 is another perspective view of the exemplary embodiment of FIG. 1A;

[0033] FIG. 3 is a perspective view of the top of the exemplary embodiment of FIG. 1A, in dotted line form so as to more easily see depth;

[0034] FIG. 4 is a perspective view of the exemplary embodiment of FIG. 1A, shown partially inserted into a bottle;

[0035] FIG. 5 is a perspective view of the exemplary embodiment of FIG. 1A, shown fully inserted into a bottle;

[0036] FIG. 6 is a perspective cut-away view of the exemplary embodiment of FIG. 1A, shown inserted in a bottle and the bottle tipped;

[0037] FIG. 7 is a perspective view of a container the exemplary embodiment of FIG. 1A may be used with;

[0038] FIG. 8 is a perspective view of a container the exemplary embodiment of FIG. 1A may be used with;

[0039] FIG. 9 is a perspective view of a container the exemplary embodiment of FIG. 1A may be used with; and

[0040] FIG. 10 is another exemplary embodiment wherein the band is split;

[0041] FIG. 11 is another exemplary embodiment wherein the band and the tube are separate;

[0042] FIG. 12 is another disposition of the exemplary embodiment of FIG. 11, shown assembled; and

[0043] FIG. 13 is a blow-up perspective view of the exemplary embodiment of FIG. 11, shown affixed to a container.

[0044] It is to be noted that the drawings presented are intended solely for the purpose of illustration and that they are, therefore, neither desired nor intended to limit the disclosure to any or all of the exact details of construction shown, except insofar as they may be deemed essential to the claimed invention.

DETAILED DESCRIPTION

[0045] In describing the exemplary embodiments of the present disclosure, as illustrated in FIGS. 1-13, specific terminology is employed for the sake of clarity. The present disclosure, however, is not intended to be limited to the specific terminology so selected, and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner to accomplish similar functions. Embodiments of the claims may, however, be embodied in many different forms and should not be construed to be limited to the embodiments set forth herein. The examples set forth herein are not-limiting examples, and are merely examples among other possible examples.

[0046] Referring now to FIGS. 1-9 by way of example, and not limitation, therein is illustrated an example embodiment flow rate enhancement device 100, wherein flow rate enhancement device 100 comprises tube 200 and a fitting, such as band 300. Tube 200 comprises top 210, channel 220, bottom 230, and air opening AO. Band 300 comprises inner wall 310, outer wall 320, upper edge 330, lower edge 340, and liquid opening LO. Flow rate enhancement device 100 is placed in container C wherein container C comprises opening O, interior wall IW, and floor F.

[0047] Turning now to FIG. 1B, air opening AO lies within channel 220 proximate top 210 of tube 200. Liquid opening LO lies within interior of inner wall 310 of band 300.

[0048] Turning now to FIG. 2, channel 220 lies within tube 200, and fluidly communicates top 210 of tube 200 with bottom 230 of tube 200 to enable air flow from top 210 to bottom 230. Outer wall 320 of band 300 lies on the exterior periphery of band 300, and inner wall 310 lies in the interior periphery of band 300. Upper edge 330 of band 300 is proximate top 210 of tube 200. Lower edge 340 of band 300 is approximately ½" below upper edge 330 in this embodiment, although it will be recognized by those skilled in the art that lower edge 340 may be any distance from upper edge 330.

[0049] Turning now to FIG. 3, in use, air flow AF flows into channel 220 of tube 200, wherein air flow AF enters channel 220 proximate to top 210, and air flow AF exits channel 220 proximate to bottom 230. Liquid flow LF enters liquid opening LO of band 300 proximate lower edge 340, and liquid flow LF exits liquid opening LO of band proximate upper edge 330.
[0050] Turning now to FIG. 4, in use, flow rate enhancement device 100 is inserted into container C via opening O of container C, wherein bottom 230 is inserted into container C first. Bottom 230 of tube 200 is non-linear, thus preventing bottom 230 from forming a seal with floor F of container C, wherein such a seal would prevent or inhibit air flow AF via tube 200. For exemplary purposes only, bottom 230 of tube 200 may be a jagged edge, or angled, or bottom 230 may comprise a slit (not shown) partly up tube 200 that provides fluid communication between channel 220 and proximate near floor F of container C. It is also contemplated herein that tube 200 may not be long enough to reach floor F of container C.

[0051] Turning now to FIG. 5, when flow rate enhancement device 100 is fully inserted in container C, bottom 230 of tube 200 is proximate floor F of container C. Further, top 210 of tube 200 and band 300 are proximate and within opening O of container C. In the embodiment shown in FIG. 5, outer wall 320 is in contact with interior wall 310 of container C, wherein friction between outer wall 320 and interior wall 310 prevents flow rate enhancement device from falling fully into or out of container C.

[0052] It is contemplated herein that flow rate enhancement device 100, in addition to being secured via friction to container C, may also be secured via an adhesive such as glue, it may also be manufactured into container C such that flow rate enhancement device 100 is fixedly secured to container C, and flow rate enhancement device 100 may be manufactured as part of container C such that interior wall 310 of container C comprises band 300 of flow rate enhancement device 100.

[0053] Turning now to FIG. 6, in use, when container is tipped over, air flow AF enters channel 220 of tube 200 proximate top 210, and concurrently liquid flow LF exits band 300 proximate upper edge 330. Thus, air flow AF enters container C and counteracts the lost volume from liquid flow LF exiting container C to prevent a vacuum from forming inside container C.

[0054] Turning now to FIGS. 7, 8, and 9, shown herein are sample containers that flow rate enhancement device 100 may be used with. However, it is contemplated herein that flow rate enhancement device 100 may be used with any liquid container, or indeed any container with a substance that needs to be extracted, such as a gas.

[0055] In an alternate embodiment (not shown), flow rate enhancement device 100 may comprises tube 200 but not band 300. In this embodiment, tube 200 still provides air flow AF from container C opening O and container C floor F, and tube may be secured to container’s opening via adhesives or being manufactured therewithout container C.

[0056] Turning now to FIG. 10, displayed therein is an exemplary embodiment wherein band 300 is split, thus creating first end 320A and second end 320B. This embodiment is made of a material, such as plastic, that allows band 300 to be bent inward and outward. This embodiment of flow rate enhancement device 100 has band 300 that naturally takes a shape larger than interior wall 310 of container C. When this embodiment of flow rate enhancement device 100 is placed in container C, band 300 needs to be forced slightly inward to insert therein. Thus, band 300 presses outward against interior wall 310 of container C, which provides additional friction between flow rate enhancement device 100 and container C, which thus better secures flow rate enhancement device 100 in opening O of container C. Another advantage of this embodiment is that if container C is made of a bendable material, such as plastic, this embodiment better allows flow are enhancement device 100 to also bend with container C, thus reducing the chance of band 300 breaking or being permanently deformed.

[0057] Turning now to FIGS. 11, 12, and 13, illustrated therein is another embodiment of flow rate enhancement device 100. In this embodiment, band 300 further comprises band top 350 and band opening 360, wherein band opening 360 is disposed within band top 350. Band top 350 is disposed proximate upper edge 330, and in use tube 200 is placed through band opening 360, as shown in FIG. 12. Turning more particularly to FIG. 13, band 300 is shown as being manufactured as part of container C, at container C’s opening O. After band 300 is exposed, tube 200 is inserted through band opening 360. Moreover, tube 200 may be sealed in a sealed pouch and affixed thereto container C.

[0058] It is contemplated herein that band opening 360 or channel 220 may be configured otherwise, such as a mouth having pointed or arced ends, a bent kidney bean having curved ends, or other the openings or passageways known to one of ordinary skill in the art.

[0059] The foregoing description and drawings comprise illustrative embodiments. Having thus described exemplary embodiments, it should be noted by those skilled in the art that the within disclosures are exemplary only, and that various other alternatives, adaptations, and modifications may be made within the scope of the present disclosure. Merely listing or numbering the steps of a method in a certain order does not constitute any limitation on the order of the steps of that method. Many modifications and other embodiments will come to mind to one skilled in the art to which this disclosure pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Although specific terms may be employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation. Accordingly, the present disclosure is not limited to the specific embodiments illustrated herein, but is limited only by the following claims.

What is claimed is:
1. A flow rate enhancement device for a container having an opening, an interior wall, and a floor, wherein said flow rate enhancement device comprises:
   a tube, wherein said tube is placed in the container having
   the opening and the floor, and wherein said tube partially
   occludes the opening, and wherein said tube provides
   fluid communication between the opening and proxim-2
   itely near the floor of the container.
2. The flow rate enhancement device of claim 1, wherein
   said tube comprises a top and a bottom, and wherein said
   bottom is proximate the floor of the container.
3. The flow rate enhancement device of claim 2, wherein
   said top of said tube is proximate the opening of the container.
4. The flow rate enhancement device of claim 3, wherein
   said tube comprises a channel, and wherein said channel
   provides fluid communication from between the opening
   and the floor of the container.
5. The flow rate enhancement device of claim 4, wherein
   said flow rate enhancement device further comprises a band,
   and wherein said band comprises an outer wall.
6. The flow rate enhancement device of claim 5, wherein
   said outer wall of said band is in contact with the interior wall
   of the container.
7. The flow rate enhancement device of claim 6, wherein said band comprises an upper edge, and said upper edge is proximate the opening of the container.

8. The flow rate enhancement device of claim 7, wherein said bottom of said tube is non-linear, thus preventing said bottom from forming a seal with the floor of the container.

9. The flow rate enhancement device of claim 5, wherein said band is split, having a first end and a second end of said band.

10. The flow rate enhancement device of claim 6, wherein said band is adhesively secured to the interior wall of the container.

11. The flow rate enhancement device of claim 6, wherein said band is fixedly secured to interior wall of the container.

12. The flow rate enhancement device of claim 6, wherein said flow rate enhancement device is manufactured as part of the interior wall of the container.

13. A method of using a flow rate enhancement device for a container having an opening, an interior wall, and a floor, said method comprising the step of:

   inserting said flow rate enhancement device into the container having an opening, an interior wall, and a floor, wherein said flow rate enhancement devices comprises a tube and a band, and wherein said tube provides air flow communication between the opening and the floor of the container.

14. The method of claim 13, wherein the container contains a liquid-like substance, said method further comprising the step of:

   pouring the liquid-like substance out of the container, wherein air flow concurrently flows through said tube into the container.

15. The method of claim 14, wherein said tube comprises a top and a bottom, and wherein air flow concurrently flowing through said tube comprises air flow entering said tube proximate said top and air flow exiting said tube proximate said bottom.

16. The method of claim 15, wherein said band comprises an outer wall, and wherein the container’s opening comprises an interior wall, wherein inserting said flow rate enhancement device into a container comprises placing said band’s outer wall and the container’s interior wall in contact with each other.

17. A flow rate enhancement device for a container having an opening and a floor, wherein said flow rate enhancement device comprises:

   a tube, wherein said tube is placed in the container having the opening and the floor; and

   a band, wherein said band comprises an air opening and a liquid opening.

18. The flow rate enhancement device of claim 17, wherein said band is secured to the container’s opening.

19. The flow rate enhancement device of claim 18, wherein said tube comprises a channel and a bottom, and wherein said tube’s bottom is proximate the container’s floor.

20. The flow rate enhancement device of claim 19, wherein said liquid opening of said band enables liquid flows through said liquid opening.

21. The flow rate enhancement device of claim 19, wherein said air opening of said band enables air flow through said air opening.

22. The flow rate enhancement device of claim 19, wherein said band is separate from said tube, and said tube is inserted into said air opening of said band.

* * * * *