



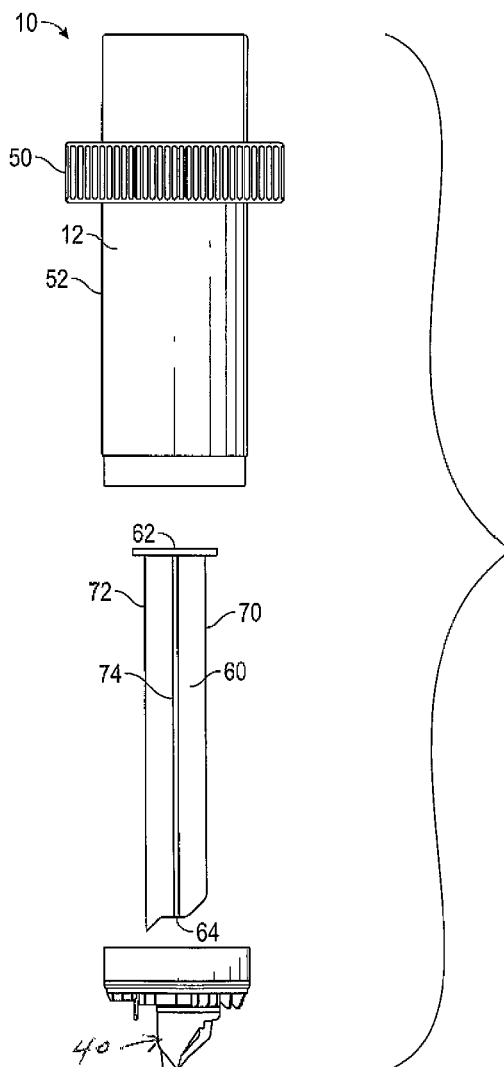
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(19) **United States**(12) **Patent Application Publication**
HAMWAY et al.(10) **Pub. No.: US 2017/0107029 A1**(43) **Pub. Date: Apr. 20, 2017**(54) **DISPENSING CAP FOR ATTACHING TO A CONTAINER**(52) **U.S. Cl.**CPC **B65D 51/2835** (2013.01); **B65D 81/3211** (2013.01); **B65D 41/04** (2013.01)(71) Applicants: **Ezra HAMWAY**, New York, NY (US);
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(57)

ABSTRACT(72) Inventors: **Ezra HAMWAY**, New York, NY (US);
Clay HOWSER, Geneva, IL (US)(73) Assignee: **Ezra HAMWAY**, New York, NY (US)(21) Appl. No.: **14/886,689**(22) Filed: **Oct. 19, 2015****Publication Classification**(51) **Int. Cl.****B65D 51/28** (2006.01)**B65D 41/04** (2006.01)**B65D 81/32** (2006.01)

The present invention provides a dispensing cap for attaching to a container, which includes a dispensing chamber having an interior compartment for holding an ingredient to be dispensed into the container. The top end of the dispensing chamber has a flexible diaphragm and an actuator button and the lower end of the dispensing chamber is connected to a frangible membrane. The dispensing chamber includes a threaded bottle cap for attaching the container to the dispensing cap. A piercing shaft includes a piercing tip and an inclined bottom edge which engages and pierces the frangible membrane at the bottom of the dispensing chamber. This causes the frangible membrane to rupture and thereby form an opening in the bottom of the interior compartment of the dispensing chamber so that the ingredient housed within the compartment freely passes through the dispensing opening and into the container.



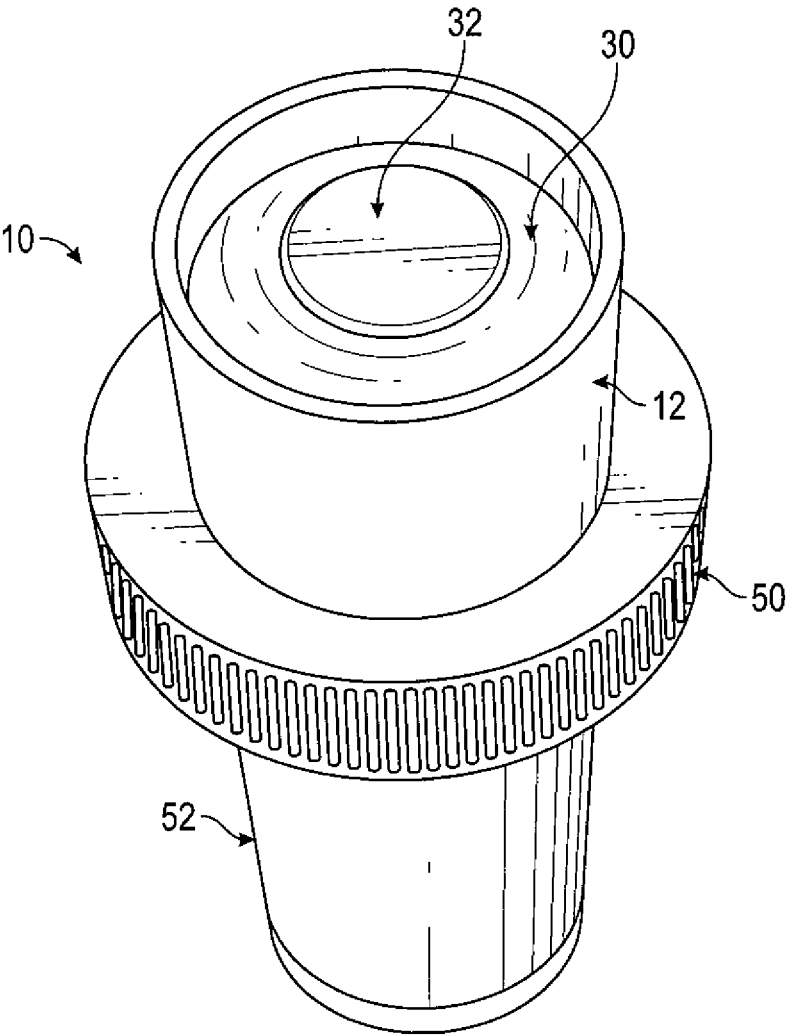


FIG. 1

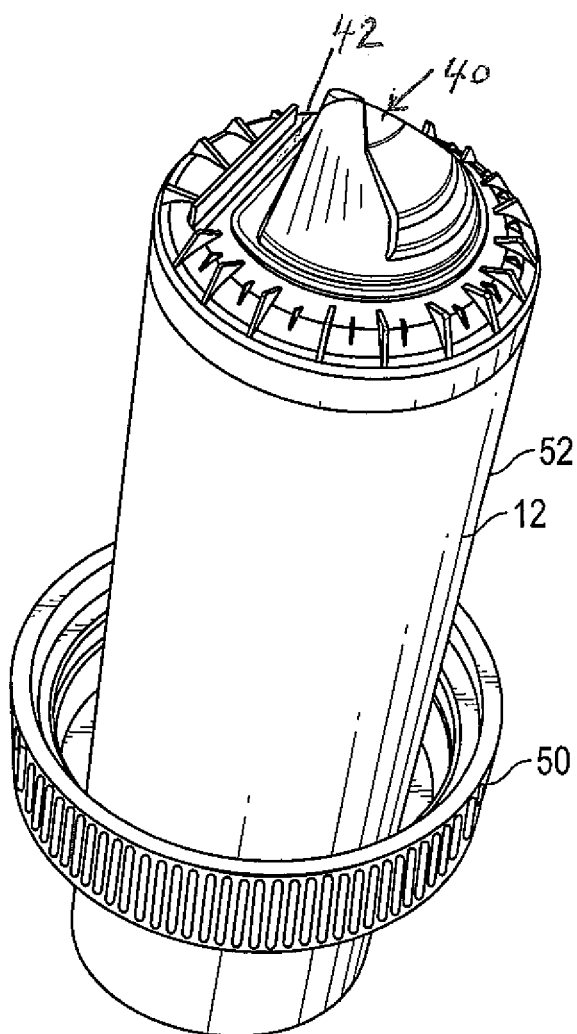


FIG. 2

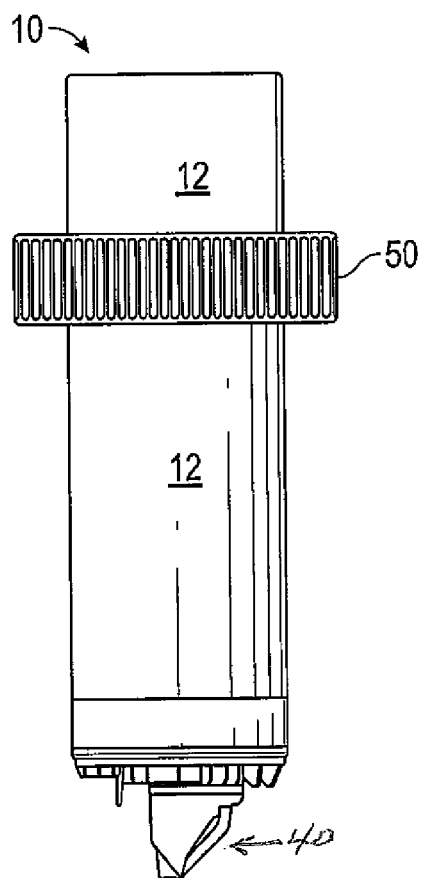


FIG. 3

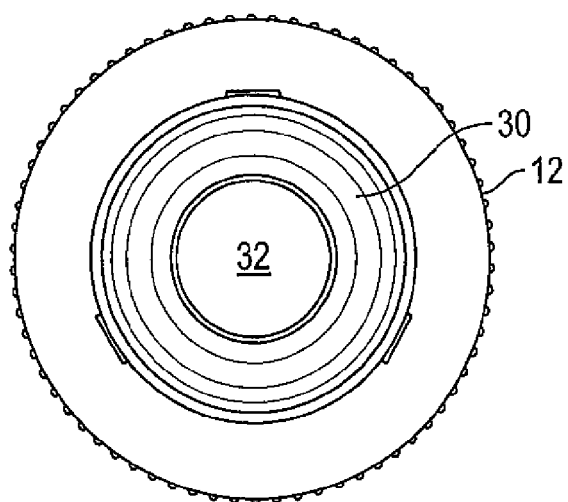


FIG. 4

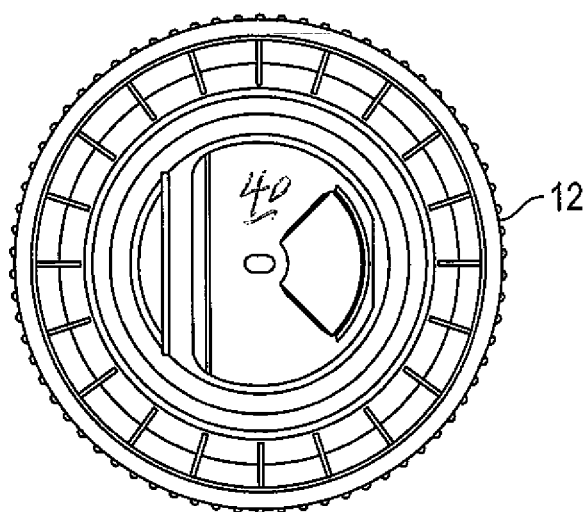
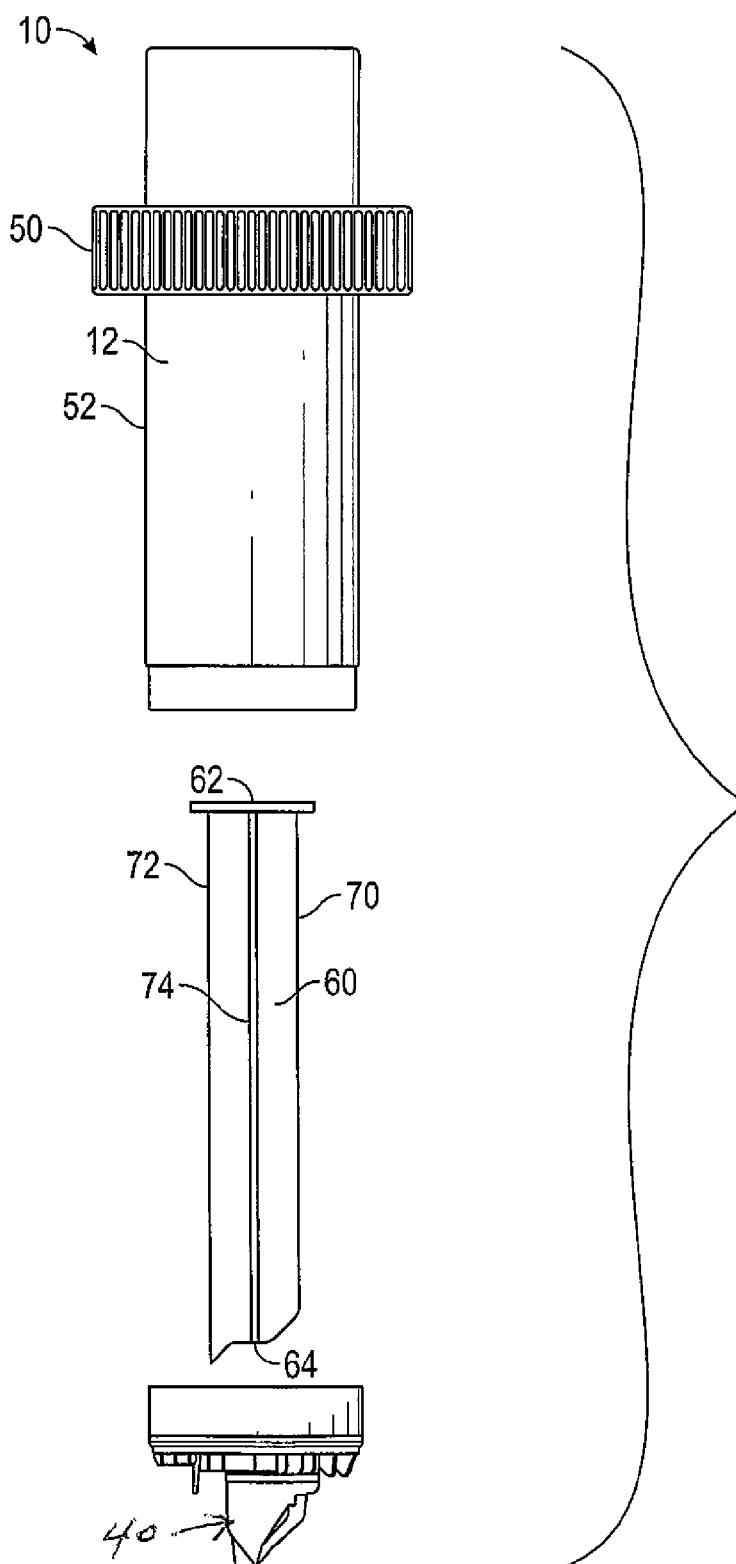


FIG. 5



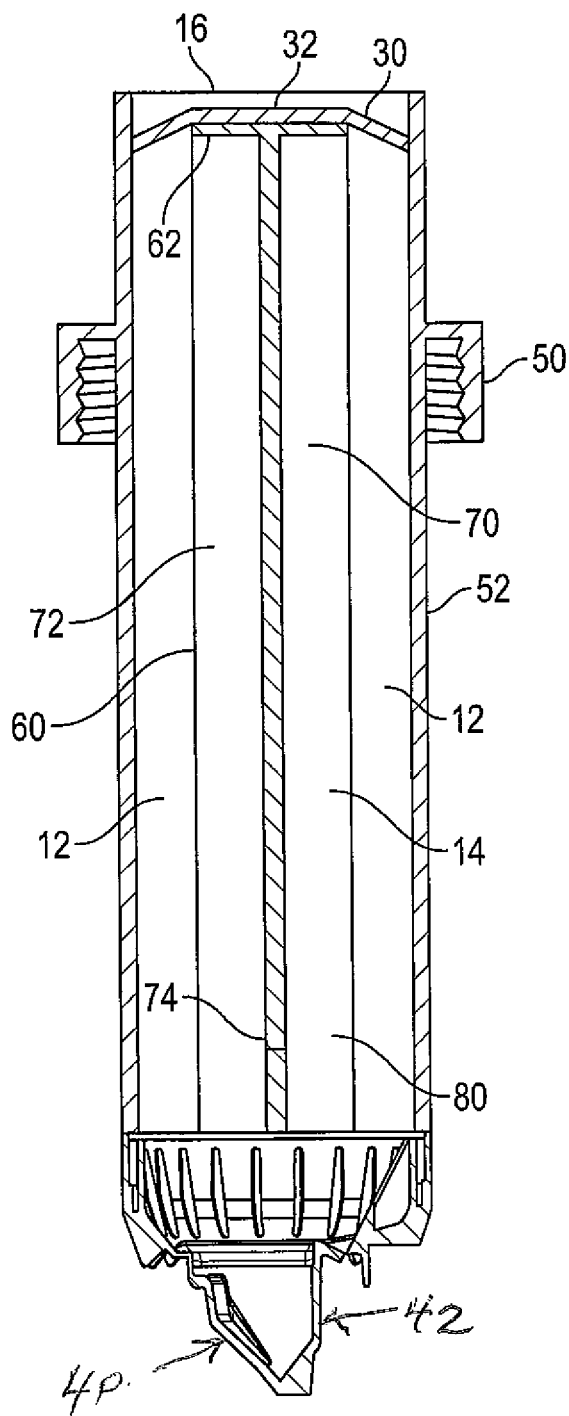


FIG. 7

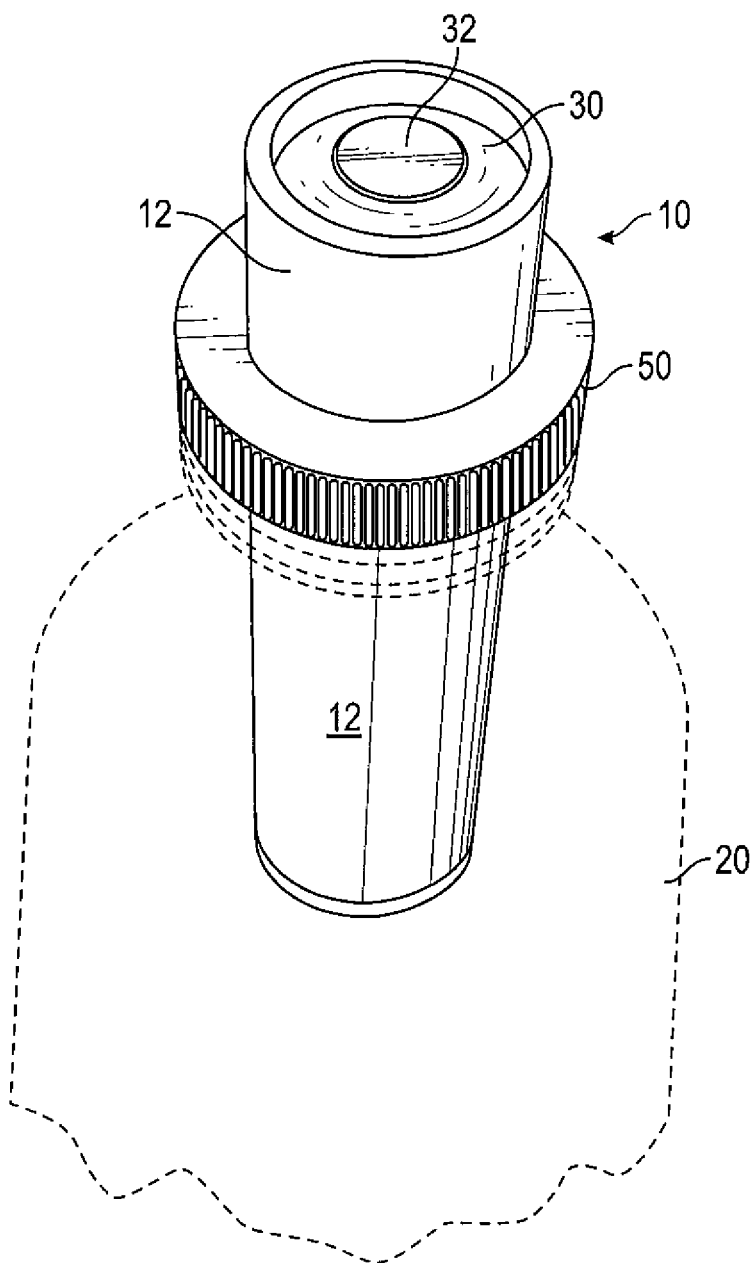


FIG. 8

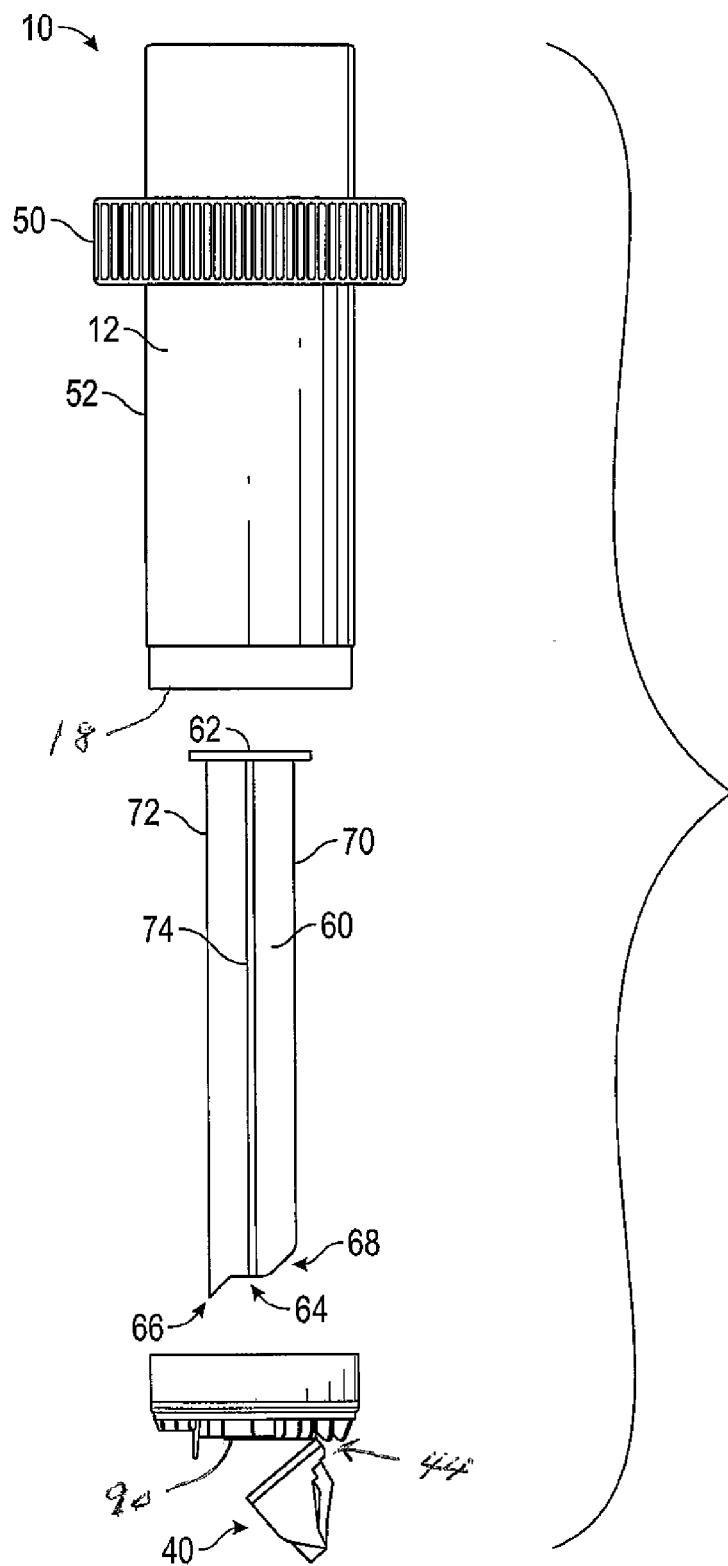


FIG. 9

DISPENSING CAP FOR ATTACHING TO A CONTAINER

RELATED APPLICATIONS

[0001] This is a continuation-in-part of application Ser. No. 14/219,678, filed on Mar. 14, 2014, now U.S. Pat. No. 9,090,387, which is a continuation-in-part of application Ser. No. 14/089,247 filed on Nov. 25, 2013, now U.S. Pat. No. 9,162,804.

FIELD OF THE INVENTION

[0002] The present invention relates to a delivery system having a dispensing cap for attaching to a container. The dispensing cap includes a dispensing chamber having an interior compartment for holding the ingredient to be dispensed into the container, wherein the dispensing chamber includes a flexible diaphragm and an actuator button at the top thereof, and includes an improved piercing tip at the lower end to minimize the required piercing force.

BACKGROUND OF THE INVENTION

[0003] Dispensers are used to dispense and add powders or other ingredients, such as a liquid, to water or other solutions in a container. Typically, a dispensing chamber having an ingredient therein is attached to a bottle or container having the water or other solution therein. The dispensing chamber holds the ingredient or powder and when activated, it is dispensed through a dispensing opening at the bottom of the dispensing chamber as an additive to mix with the water or solution in the container below.

[0004] Typically, the dispenser is used for sports drinks or beverages where the active ingredient, for example is an electrolyte, which is kept separate from the solution in the container until it is ready to be mixed, thus maintaining the full efficacy of the mixture.

[0005] Typical dispensers include a sealed compartment to hold the ingredient to be dispensed (the additive) which is sealed on one side of a breakable membrane. In the present invention, a novel shaped piercing tip is provided, which is activated by depression of a flexible diaphragm and a piercing shaft, which causes the novel piercing tip to pierce the membrane with a minimum piercing force. This enables mixing of the contents of the dispensing chamber with those of the container to which it is attached.

OBJECTS OF THE INVENTION

[0006] Therefore, it is an object of the present invention to provide a dispensing unit that may be detachably mounted on a liquid-containing bottle so the contents in the dispensing unit are completely mixed with the solution or liquid in the bottle.

[0007] It is another object of the present invention to provide a dispensing chamber which extends at least two-thirds of its length into the container or bottle below, in order to improve the effectiveness of mixing the dispensed ingredients with the solution in the container.

[0008] It is another object of the present invention to provide an enlarged dispensing chamber to hold and dispense more ingredients.

[0009] It is another object of the present invention to provide an improved piercing tip, which ruptures the membrane with a minimum piercing force, so as to insure that the dispensed ingredients are completely transferred from the

dispensing chamber into the container below, and are completely mixed with the contents of the container.

[0010] It is another object of the present invention to provide an improved piercing tip having a unique structure and shape, which includes a novel pointed tip to provide a more effective piercing shaft to pierce and rupture the membrane with a minimum of pressure and breaking force.

[0011] It is another object of the present invention to provide a piercing shaft that moves downwardly in a perpendicular direction relative to the frangible membrane, so that the pointed tip of the piercing tip engages and breaks the frangible membrane, which first engages the outer edge of the membrane, and then moves inwardly toward the center of the membrane to engage and break it.

SUMMARY OF THE INVENTION

[0012] The present invention provides a dispensing cap for attaching to a container, which includes a dispensing chamber having an interior compartment for holding an ingredient to be dispensed into the container and having a top end and a lower end, wherein the top end of the dispensing chamber has a flexible diaphragm and an actuator button concentrically disposed on the flexible diaphragm, and wherein the lower end of the dispensing chamber is connected to the flexible diaphragm.

[0013] An improved piercing shaft with a novel shape is also provided. The piercing shaft has a novel piercing point at the tip to minimize the break force or piercing force to pierce and rupture the membrane. The piercing point first engages the outer edge of the membrane, and then moves toward the center of the membrane to minimize the required breaking force.

[0014] The flexible diaphragm is movable downwardly to an ingredient dispensing position by pushing the actuator button and the piercing shaft toward the frangible membrane which thereby causes the piercing shaft which has a piercing point tip to apply a minimum of pressure to the frangible membrane to pierce and rupture it. This causes the frangible membrane to rupture and thereby form a dispensing opening in the bottom of the interior compartment of the dispensing chamber so that the ingredient housed within the compartment freely passes through the dispensing opening into the container.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is a perspective view of the front and top of the dispensing cap 10 of the present invention;

[0016] FIG. 2 is a perspective view of the front and bottom of the dispensing cap 10 of the present invention;

[0017] FIG. 3 is a front view of the dispensing cap 10 of the present invention;

[0018] FIG. 4 is a top view of the actuator button 32 and the diaphragm 30 of the present invention;

[0019] FIG. 5 is a bottom view of the frangible membrane 40, which has a partial cone shape having a vertical flat surface on one side of the cone shape;

[0020] FIG. 6 is an exploded elevational view of the dispensing cap 10, the piercing shaft 60, and the frangible membrane 40;

[0021] FIG. 7 is a cross-sectional view of the dispensing chamber 12, the piercing shaft 60, the actuator button 32, and the frangible membrane 40;

[0022] FIG. 8 is a perspective view of the dispensing cap 10 of the present invention showing it positioned on a container 20 for receiving the ingredients from the dispensing cap 10, wherein the dispensing chamber extends at least two-thirds of its length into the container; and

[0023] FIG. 9 is an exploded elevational view of the piercing shaft 60, and the cone-shaped frangible membrane 40 in its open position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] The present invention provides a delivery system having a dispensing cap 10 for attaching to a container 20. The dispensing cap 10 includes a dispensing chamber 12 having an interior compartment 14 for holding an ingredient to be dispensed into the container 20. Dispensing cap 10 has a top end 16 and a lower end 18, wherein the top end 16 of the dispensing chamber 12 has a flexible diaphragm 30 and a center actuator button 32 concentrically disposed on the flexible diaphragm 30. The lower end 18 of the dispensing chamber 12 is connected to a frangible or breakable partial cone shaped membrane 40, which has a dispensing opening 90.

[0025] The dispensing chamber 12 includes a threaded bottle cap 50 for attaching the dispensing cap 10 to the container 20. The threaded bottle cap 50 is concentrically disposed around the outer wall 52 of the dispensing chamber 12 so that at least two thirds of the length of the dispensing chamber 12 is disposed below the threaded bottle cap 50 and is positioned inside the container 20.

[0026] A piercing shaft 60 is also provided having a top end 62 fixedly attached to the diaphragm 30, and has a bottom piercing tip 64 at the bottom end of the piercing shaft 60. The piercing tip 64 also includes a pointed tip 66 and an adjacent inclined bottom edge 68 to engage, pierce, and break the frangible cone-shaped membrane 40 with a minimum breaking force and pressure.

[0027] The flexible diaphragm 30 is movable downwardly to an ingredient dispensing position by pushing both the actuator button 32 and the piercing shaft 60 downwardly toward the frangible membrane 40 which thereby causes the piercing tip 64 having the pointed tip 66 and the adjacent inclined bottom edge 68 at the bottom tip of the piercing shaft 60 to apply pressure to the interior of cone-shaped membrane 40 and to pierce it and break it. This causes the cone-shaped membrane 40 to rupture and to pivot about hinge 44 from a closed position to an open position, as shown in FIG. 9. This forms a dispensing opening 90 at the bottom of the interior compartment 14 of the dispensing chamber 12 so that the ingredient housed within the compartment 14 freely passes through the dispensing opening 90 and into the container 20.

[0028] The interior compartment 14 of the dispensing chamber 12 extends from the top end thereof to the lower end thereof; and the actuator button 32 is concentrically disposed on the flexible diaphragm 30. Piercing shaft 60 has four (4) vanes 70, 72, 74, and 76 (not shown) disposed 90 degrees apart from each other about the circumference of the piercing shaft 60.

[0029] The structure and shape of piercing tip 64, 66, and 68 minimizes the amount of breaking force required to pierce the cone-shaped membrane 40, so it is subject to rupturing under a minimum of pressure and breaking force. The piercing point 66 of the piercing tip 64 first engages and

breaks the outer edge of the frangible membrane 40 and then moves toward the center of the membrane 40 to break it, so that the membrane 40 ruptures from the outer edge first and then toward the center to more effectively rupture membrane 40.

[0030] Also, the frangible membrane 40 has a partial cone shaped configuration having a vertical flat surface 42 on one side of the cone shape 40.

Operation of the Present Invention

[0031] In operation, the user pushes down on the actuator button 32 which moves the flexible diaphragm 30 downwardly to an ingredient dispensing position. As a result, the piercing shaft 60 moves downwardly to first engage the outer edge of the frangible membrane 40. This causes the piercing tip 64 at the bottom tip of the piercing shaft 60 to apply pressure to first engage the outer edge of the frangible membrane 40. This causes the frangible membrane 40 to rupture and to pivot about hinge 44 from a closed position to an open position, as shown in FIG. 9. This forms a dispensing opening 90 in the bottom of the interior compartment 14 of the dispensing chamber 12. As a result, the ingredient housed within the compartment 14 then freely passes through the dispensing opening 90 and into the container to mix with the contents in container 20.

Advantages of the Present Invention

[0032] The present invention has provided a unique dispensing cap 10 for attaching to a container 20, which includes a dispensing chamber 12 having an interior compartment 14 for holding and dispensing an ingredient, such as a powder or liquid, into the container, wherein the top of the dispensing chamber 12 has a flexible diaphragm 30 and an actuator button 32 to move the piercing shaft 60 downwardly to rupture the frangible membrane 40 at the lower end of the dispensing chamber 12.

[0033] The present invention has provided the advantage of a dispensing unit that may be detachably mounted on a liquid-containing bottle so the contents in the dispensing unit are completely mixed with the solution or liquid in the bottle.

[0034] The present invention has provided the advantage of a dispensing chamber which extends at least two-thirds of its length into the container or bottle below, in order to improve the effectiveness of mixing the dispensed ingredients with the solution in the container.

[0035] The present invention has provided the advantage of an enlarged dispensing chamber to hold and dispense more ingredients.

[0036] The present invention has provided the advantage of an improved piercing tip, which ruptures the membrane with a minimum piercing force, so as to insure that the dispensed ingredients are completely transferred from the dispensing chamber into the container below, and are completely mixed with the contents of the container.

[0037] The present invention has provided the advantage of an improved piercing tip having a unique structure, which includes a novel pointed tip to provide a more effective piercing shaft to pierce and rupture the frangible membrane with a minimum of pressure and breaking force.

[0038] The present invention has provided the advantage of a piercing shaft that moves downwardly in a perpendicular direction relative to the frangible membrane, so that the

pointed tip of the piercing tip at the bottom of the piercing shaft engages and breaks the frangible membrane, which first engages the outer edge of the membrane and then moves inwardly toward the center of the membrane to engage it.

[0039] A latitude of modification, change and substitution is intended in the foregoing disclosure, and in some instances, some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What is claimed is:

1) A delivery system having a dispensing cap for attaching to a container, said dispensing cap comprising:

- (a) a dispensing chamber having an interior compartment for holding an ingredient to be dispensed into the container and having a top end and a lower end, wherein the top end of said dispensing chamber has a flexible diaphragm and an actuator button disposed on said flexible diaphragm; and wherein the lower end of said dispensing chamber is connected to a frangible cone-shaped membrane;
- (b) said dispensing chamber including a threaded bottle cap for attaching said dispensing cap to the container, said threaded bottle cap being disposed around the outer wall of said dispensing chamber and in the container;
- (c) a piercing shaft having a top end fixedly attached to said diaphragm and a bottom piercing tip at the bottom end of said piercing shaft, said piercing tip including a pointed tip and an adjacent inclined bottom edge for engaging and piercing the frangible membrane; and
- (d) said flexible diaphragm being movable downwardly from an ingredient housing position to an ingredient dispensing position by pushing both of said actuator button and said piercing shaft downwardly towards the

frangible membrane which thereby causes said piercing tip and said inclined edge of said piercing shaft to apply pressure to the interior of said cone-shaped frangible membrane to pierce it, and thereby causing said cone-shaped membrane to rupture, and to pivot about a hinge member from a closed position to an open position, to thereby form a dispensing opening in the interior compartment of said dispensing chamber so that the ingredient housed within the compartment of said dispensing chamber freely passes through said dispensing opening and into the container.

2) A dispensing cap for attaching to a container in accordance with claim 1, wherein the interior compartment of said dispensing chamber extends from the top end thereof to the lower end thereof.

3) A dispensing cap for attaching to a container in accordance with claim 1, wherein said actuator button is concentrically disposed on said flexible diaphragm.

4) A dispensing cap for attaching to a container in accordance with claim 1, wherein said piercing shaft engages and ruptures said frangible membrane which is subject to rupturing under less pressure as a result of the shape of said piercing tip.

5) A dispensing cap for attaching to a container in accordance with claim 1, wherein said piercing tip of said piercing shaft first engages the outer edge of the frangible membrane and then moves inwardly toward the center, so that the membrane ruptures first from the outer edge and then toward the center to more effectively rupture said membrane with less breaking force.

6) A dispensing cap for attaching to a container in accordance with claim 1, wherein said frangible membrane has a partial v-shaped configuration, and has a cap connected to the top of said membrane.

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