Claims

1.

A tamper-evident component 60, 260 for an anti-refill dispensing fitment to render a container tamper-evident, the component including:

a coupling 62, 259;

a radially expandable element 66 extending radially from the coupling; and

a container detent engagement element 64 extending axially and radially from the coupling.

2.

The component set forth in claim 1, wherein the detent engagement element includes a plurality of circumferentially spaced leaves 65 that are resiliently displaceable in a radial direction and that are incurvately shaped.

3.

The component set forth in claim 1, wherein the radially expandable element includes a plurality of arcuately shaped arms 68.

4.

An anti-refill dispensing fitment 14, 114, 214 including the component set forth in claim 1 as a detachable portion of the fitment, and also including a dispensing portion of the fitment that is coupled to the detachable portion and that includes an extension 56 and a coupling 58 on the extension for coupling to the detachable portion coupling.

5.

An assembly including the fitment set forth in claim 4, and a closure 13 in which the radially expandable element is contained.

6.

A product including the fitment set forth in claim 4 and also including a container 12 that includes:

a body 16; and

a neck 24 extending in a direction axially from the body and including a neck finish 26, an interior surface 33, and a detent 27, wherein the anti-refill dispensing fitment is positioned in the neck,

wherein, if the fitment is displaced in an axial direction away from the container base of the container, then the detent engagement element engages the detent such that continued displacement of the fitment away from the base results in detachment of the detachable portion wherein the detachable portion falls into the container body and thereby renders the product tamper-evident.

7.

The product set forth in claim 6, wherein the anti-refill dispensing fitment includes a check valve including:

a valve retainer 34 positioned in the container neck and having a radially inner surface 42, and a radially outer surface 44 in contact with the interior surface of the container neck, wherein the detachable portion is coupled to the valve retainer,

a plug 36 positioned in the container neck and in contact with the inner surface of the retainer, and

a valve element 38, 138 positioned in the container neck between the valve retainer and the plug.

8.

The product set forth in claim 7, wherein the valve retainer includes an extension 56, 256 and a frangible integral connection between the extension and the detachable portion.

9.

The product set forth in claim 7, wherein the valve retainer includes an extension 56, 256, and a first coupling 58 on the extension, and wherein the detachable portion includes a second coupling 62 coupled to the first coupling, wherein the first and second couplings include a ball-and-socket coupling arrangement.

10.

A method of producing a product 10, 110, 210 that includes:

(a) flowing liquid into a container 12 including a base 18, a body 16 extending in a direction axially away from the base, and a neck 24 extending in a direction axially away from the body and including a neck finish 26, an interior surface 33, and a detent 27; and

(b) assembling an anti-refill fitment 14, 114, 214 into the neck of the container so that a detent engagement element 64 of a detachable portion of the fitment snaps past and engages the container detent and so that a radially expandable element 66 of the fitment is located within the container neck.

11.

The method of claim 10, wherein the assembling step (b) includes pre-compressing the radially expandable element prior to insertion into the container.

12.

A product produced by the method of claim 10.

13.

A package that includes:

a bottle having a body and a neck with an open end,

a closure coupled to said open end of said neck,

a fitment configured to be received into said open end of said neck, and

a radially expandable element detachably coupled to said fitment,

said radially expandable element being disposed to engage a detent in said neck and detach from said fitment when said fitment is removed from said neck,

such that said radially expandable element falls into said body and expands, preventing removal into and through said neck.

14.

The package set forth in claim 13 wherein said radially expandable element includes arcuate arms that are compressed when disposed in said neck but expand radially when said element falls from said neck into said body.

Claims

1.

An anti-refill product that includes:

a container including a base, a body extending in a direction axially away from the base, a shoulder extending in a direction axially away from the body, and a neck extending in a direction axially away from the shoulder and including a neck finish and an interior surface, and a detent; and

an anti-refill dispensing fitment positioned in the neck of the container, and including a detachable portion having a radially expandable element that is radially compressed when disposed in the container neck and a detent engagement element to engage the container detent,

wherein, if the fitment is displaced in an axial direction away from the container base, then the detent engagement element engages the detent such that continued displacement of the fitment away from the base results in detachment of the detachable portion such that the detachable portion falls into the container body and the radially expandable element expands and thereby renders the product tamper-evident.

2.

The product set forth in claim 1, wherein the anti-refill dispensing fitment includes a check valve including:

a valve retainer positioned in the neck of the container and having a radially inner surface, and a radially outer surface in contact with the interior surface of the container, wherein the detachable portion is coupled to the valve retainer,

a plug positioned in the neck of the container and in contact with the inner surface of the retainer, and

a valve ball positioned between the valve retainer and the plug.

3.

The product set forth in claim 2, wherein the valve retainer includes a conical portion, an extension extending axially from the conical portion, and a first coupling on the extension, and wherein the detachable portion includes a second coupling coupled to the first coupling.

4.

The product set forth in claim 3, wherein the first and second couplings include a ball-and-socket coupling arrangement.

5.

The product set forth in claim 2, wherein the valve retainer includes a conical portion, an extension extending axially from the conical portion, and a frangible integral connection between the extension and the detachable portion.

6.

The product set forth in claim 5, wherein frangible integral connection includes perforations between the extension and the detachable portion.

7.

The product set forth in claim 1, wherein the detent engagement element includes a plurality of circumferentially spaced leaves that are resiliently displaceable in a radial direction and that are incurvately shaped.

8.

The product set forth in claim 1, wherein the radially expandable element includes a plurality of arcuately shaped arms.

9.

An anti-refill product that includes:

a container including a base, a body extending in a direction axially away from the base, a shoulder extending in a direction axially away from the body, and a neck extending in a direction axially away from the shoulder and including a neck finish and an interior surface, and a detent; and

an anti-refill dispensing fitment positioned in the neck of the container, and including a detachable portion having a radially expandable element and a detent engagement element to engage the container detent,

wherein, if the fitment is displaced in an axial direction away from the container base, then the detent engagement element engages the detent such that continued displacement of the fitment away from the base results in detachment of the detachable portion such that the detachable portion falls into the container body and thereby renders the product tamper-evident, wherein the arms are spiral shaped.

10.

A method of producing a product that includes:

(a) flowing liquid into a container including a base, a body extending in a direction axially away from the base, a shoulder extending in a direction axially away from the body,

and a neck extending in a direction axially away from the shoulder and including a neck finish, an interior surface, and a detent; and

(b) assembling an anti-refill fitment into the neck of the container so that a detent engagement element of a detachable portion of the fitment snaps past and engages the container detent and so that a radially expandable element of the detachable portion of the fitment is located within the container neck and is radially compressed when disposed in the container neck, whereafter, if the fitment is displaced in an axial direction away from the container base, then the detent engagement element engages the detent such that continued displacement of the fitment away from the base results in detachment of the detachable portion such that the detachable portion falls into the container body and the radially expandable element expands and thereby renders the product tamper-evident.

11.

The method of claim 10, wherein the assembling step (b) includes pre-compressing the radially expandable element prior to insertion into the container.

12.

A product produced by the method of claim 10.

13.

A package that includes:

a bottle having a base, a body extending in a direction axially away from the base, a shoulder extending in a direction axially away from the body, and a neck extending in a direction axially away from the shoulder and including a neck finish with an open end, an interior surface, and a detent,

a closure coupled to said open end of said neck,

a fitment configured to be received into said open end of said neck, and

a detachable portion detachably coupled to said fitment and having a radially expandable element and a detent engagement element to engage said detent in said neck and said radially expandable element being radially compressed when disposed in the container neck,

wherein, if the fitment is displaced in an axial direction away from the container base, then the detent engagement element engages the detent such that continued displacement of the fitment away from the base results in detachment of the detachable portion such that the detachable portion falls into the container body and the radially expandable element expands and thereby renders the package tamper-evident.

14.

The package set forth in claim 13 wherein said radially expandable element includes arcuate arms that are compressed when disposed in said neck but expand radially when said element falls from said neck into said body.

15.

A tamper-evident component for an anti-refill dispensing fitment to render a container tamper-evident, the component including:

a coupling;

a radially expandable element extending radially from the coupling, and including a plurality of arcuately shaped arms; and

a container detent engagement element extending axially and radially from the coupling, and including a plurality of circumferentially spaced leaves that are resiliently displaceable in a radial direction.

16.

The component set forth in claim 15, wherein the leaves are incurvately shaped.

17.

An assembly including an anti-refill dispensing fitment including:

a tamper-evident component as a detachable portion of the fitment to render a container tamper-evident and including,

a coupling,

a radially expandable element extending radially from the coupling, and

a container detent engagement element extending axially and radially from the coupling;

a dispensing portion of the fitment coupled to the detachable portion and including an extension and a coupling on the extension for coupling to the detachable portion coupling; and

a closure in which the radially expandable element is contained.