The present disclosure provides a sealed reservoir cap comprising:

a first hollow part capped at one end and uncapped at another end thereof and formed with a protrusion on an outer surface of the first hollow part, wherein said protrusion comprises a ring;

a second hollow part having a hollow interior and a punchable seal closing one end thereof and slidably receiving the first hollow part into the hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

the second hollow part comprising:

an inner surface and a recess to receive the protrusion therein, the first and second hollow parts defining a first annular space therebetween sealed by engagement of the protrusion against the recess ;

a notched groove positioned on a wall of the recess and arranged in said inner surface to receive said ring when the first hollow part is pressed into the hollow interior of the second hollow part and through the punchable seal; and

an annular part disposed around and securely attached to an outside surface of the second hollow part to define a second annular space between the annular part and the second hollow part, the annular part formed with threads extending around an inner surface of the annular part to threadably engage a bottleneck in the second annular space wherein the punchable seal is disposed within the bottle when the threads threadably engage the bottleneck; and

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the hollow interior of the second hollow part for the first protrusion to be received in the second recess and the uncapped end of the first hollow part to dislodge the punchable seal.

The present disclosure further provides a sealed reservoir cap comprising:

a first hollow part capped at one end and uncapped at another end thereof;

a second hollow part having a hollow interior and a punchable seal closing one end thereof and slidably receiving the first hollow part into the hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween, the second hollow part comprising an annular part;

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the hollow interior of the second hollow part allowing for engagement of a locking means and the uncapped end of the first hollow part to dislodge the punchable seal, and an annular part disposed around an outside surface of the second hollow part to define a first annular space between the annular part and the outside surface of the second hollow part, the annular part formed with threads extending around an inner surface of the annular part to threadably engage a bottleneck in the first annular space wherein the punchable seal is disposed within the bottle when the threads threadably engage the bottleneck;

a ring portion attached to the annular part, said ring portion having a groove; and

a notch set on an exterior portion of the first hollow part and positioned such that the notch interfaces with the groove of the ring portion when the first hollow part is pressed into the hollow interior of the second hollow part and through the punchable seal.

The present disclosure still further provides a sealed reservoir cap comprising:

a first hollow part capped at one end and uncapped at another end thereof and comprising a protrusion and a recess around an outer surface of the first hollow part, wherein said protrusion comprises a ring;

a second hollow part having a hollow interior and a punchable seal closing one end thereof and slidably receiving the first hollow part into the hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

the second hollow part formed with a barrier surface around an inner surface of the second hollow part and a notched groove arranged in said inner surface of the second hollow part to receive said ring when the first hollow part is pushed into the hollow interior of the second hollow part and through the punchable seal, the two hollow parts defining a first annular space therebetween sealed by engagement of the barrier surface against the recess on the outer surface of the first hollow part;

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the hollow interior of the second hollow part for the uncapped end of the first hollow part to dislodge the punchable seal, and

an annular part disposed around and securely attached to an outside surface of the second hollow part to define a second annular space between the annular part and the outside surface of the second hollow part, the annular part formed with threads extending around an inner surface of the annular part to threadably engage a bottleneck in the second annular space wherein the punchable seal is disposed within the bottle when the threads threadably engage the bottleneck.

Also disclosed is a method for forming a sealed reservoir cap comprising the steps of:

forming a first hollow part capped at one end and uncapped at another end thereof with a first protrusion, wherein said first protrusion comprises a ring;

forming a second hollow part having a hollow interior and a punchable seal closing one end thereof and capable of slidably receiving the first hollow part into the hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

forming a barrier surface around an inner surface of the second hollow part;

forming a notched groove arranged in said inner surface to, when the first hollow part is pushed into the hollow interior of the second hollow part and through the punchable seal, receive said ring;

forming a recess to receive the first protrusion therein;

forming a first annular space between the two hollow parts;

sealing said first annular space by engagement of the barrier surface with the first hollow part;

forming a removable annular seal disposed to hold the two hollow parts in an axially fixed spaced apart relationship;

allowing the first hollow part to be pushed into the hollow interior of the second hollow part for the first protrusion to be received in the recess and the uncapped end of the first hollow part to dislodge the punchable seal by removing the removable seal;

forming an annular part disposed around an outside surface of the second hollow part to define a second annular space between the annular part and the outside surface of the second hollow part; and

forming threads extending around the inner surface of the annular part to engage a bottleneck in the second annular space wherein the punchable seal is disposed within the bottle when the threads engage the bottleneck.

Yet further disclosed is a method of providing a powder or liquid to a bottle using a sealed reservoir cap formed by the above method, comprising the steps of one selected from the group of sterilizing, filtering, pasteurizing and combinations thereof the contents of the bottle container prior to providing the sealed reservoir cap to the bottle.

LISTING OF CLAIMS

1. A sealed reservoir cap comprising:

a first hollow part capped at one end thereof and formed with a first protrusion on its outer diameter and a first recess;

a second hollow part having a punchable seal closing one end thereof and slidably receiving the first hollow part therein with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

the second hollow part further formed with a second protrusion around its inner diameter and a second recess to receive the first protrusion therein, the two hollow parts defining a first annular space therebetween sealed by engagement of the second protrusion against the first recess on the outer diameter of the first hollow part, and

an annular part disposed around and securely attached to the outside of the second hollow part to define a second annular space therebetween, the annular part formed with threads extending around its inner diameter to threadably engage a bottleneck in the second annular space and dispose the punchable seal within the bottle.

2. The sealed reservoir cap of claim 1, wherein the punchable seal has a scored line of weakness such that the uncapped end dislodges a portion of the punchable seal.

3. The sealed reservoir cap of claim 1, wherein the uncapped edge is defined by an oval.

4. The sealed reservoir cap of claim 1 fabricated from materials selected to prevent degradation of contents within the enclosed reservoir.

5. The sealed reservoir cap of claim 1, wherein the enclosed reservoir contains dry or liquid contents.

6. The sealed reservoir cap of claim 5, wherein the contents of the enclosed reservoir are released upon dislodging the punchable seal.

7. The sealed reservoir cap of claim 1, wherein the first and second hollow parts and the annular part are one continuous piece of material.

8. The sealed reservoir cap of claim 1, wherein the wherein the first and second hollow parts and the annular part are more than one piece of material.

9. The sealed reservoir cap of claim 1, wherein more than one enclosed reservoir lies within the first and second hollow parts.

10. A sealed reservoir cap comprising:

a first hollow part capped at one end thereof;

a second hollow part having a punchable seal closing one end thereof and slidably receiving the first hollow part therein with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the second hollow part allowing for engagement of a locking means and the uncapped end of the first hollow part to dislodge the punchable seal, and

an annular part disposed around and securely attached to the outside of the second hollow part to define a first annular space therebetween, the annular part formed with threads extending around its inner diameter to threadably engage a bottleneck in the second annular space and dispose the punchable seal within the bottle.

11. The sealed reservoir cap of claim 10, wherein the first hollow part further comprises a first protrusion on its outer diameter and the second hollow part further comprises a second recess to receive the first protrusion wherein when the first hollow part is pushed into the second hollow part, the first protrusion is engaged to the second recess thereby forming the locking means.

12. The sealed reservoir cap of claims 10 or 11, further comprising an annular seal wherein the first hollow part is formed with a first recess around its outer diameter and second hollow part is formed with a second protrusion around its inner diameter and the two hollow parts define a second annular space therebetween sealed by engagement of the second protrusion into the first recess.

13. A sealed reservoir cap comprising:

a first hollow part capped at one end thereof and formed with a first recess around its outer diameter;

a second hollow part having a punchable seal closing one end thereof and slidably receiving the first hollow part therein with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

the second hollow part further formed with a second protrusion around its inner diameter, the two hollow parts defining a first annular space therebetween sealed by engagement of the second protrusion against the first recess on the outer diameter of the first hollow part;

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the second hollow part for the uncapped end of the first hollow part to dislodge the punchable seal, and

an annular part disposed around and securely attached to the outside of the second hollow part to define a second annular space therebetween, the annular part formed with threads extending around its inner diameter to threadably engage a bottleneck in the second annular space and dispose the punchable seal within the bottle.

14. The sealed reservoir cap of claim 13, wherein the first hollow part further comprises a first protrusion on its outer diameter and the second hollow part further comprises a second recess to receive the first protrusion wherein when the first hollow part is pushed into the second hollow part, the first protrusion is engaged to the second recess thereby forming a locking means.

15. A method for forming a sealed reservoir cap comprising the steps of:

forming a first hollow part capped at one end thereof with a first protrusion and a first recess on its outer diameter;

forming a second hollow part having a punchable seal closing one end thereof and capable of slidably receiving the first hollow part therein with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

forming a second protrusion around the inner diameter of the second hollow part;

forming a second recess to receive the first protrusion therein;

forming a first annular space between the two hollow parts;

sealing said first annular space by engagement of the second protrusion with the first recess;

forming a removable annular seal disposed to hold the two hollow parts in an axially fixed spaced apart relationship;

allowing the first hollow part to be pushed into the second hollow part for the first protrusion to be received in the second recess and the uncapped end of the first annular part to dislodge the punchable seal by removing the removable seal;

forming an annular part disposed around and securely attached to the outside of the second hollow part to define a second annular space therebetween;

forming threads extending around the inner diameter of the third annular part to engage a bottleneck in the second annular space and dispose the punchable within the bottle.

16. The method of claim 15, further comprising the step of scoring a line of weakness such that the uncapped end dislodges only a portion of the punchable seal.

17. The method of claim 15, further comprising the step of forming the uncapped end in an oval shape.

18. The method of claim 15, further comprising the step of forming the sealed reservoir cap from materials selected to prevent degradation of contents within the enclosed reservoir.

19. The method of claim 15, wherein the first and second hollow parts and the annular part are one piece of material.

20. The method of claim 15, wherein the first and second hollow parts and the annular part are more than one piece of material.

21. The method of claim 15, further comprising the step of forming more than one enclosed reservoir defined by the first and second hollow parts.

22. The method of claim providing a powder or liquid to a bottle using the sealed reservoir cap of claim 15, comprising the steps of one selected from the group of sterilizing, filtering, pasteurizing and combinations thereof the contents of the bottle container prior to providing the sealed reservoir cap to the bottle.

23. The method of claim 22, comprising the step of mixing the released reservoir contents with the contents of the bottle.

24. The method of claim 22, comprising the steps of removing the sealed reservoir cap from the bottle and heating the contents of the bottle container prior to removal of the removable seal.

25. The sealed reservoir cap of claim 1, further comprising a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the second hollow part for the first protrusion to be received in the second recess and the uncapped end of the first hollow part to dislodge the punchable seal.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A sealed reservoir cap comprising:

a first hollow part capped at one end and uncapped at another end thereof and formed with a protrusion on an outer surface of the first hollow part, wherein said protrusion comprises a ring;

a second hollow part having a hollow interior and a punchable seal closing one end thereof and slidably receiving the first hollow part into the hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

the second hollow part comprising:

an inner surface and a recess to receive the protrusion therein, the first and second hollow parts defining a first annular space therebetween sealed by engagement of the protrusion against the recess ;

a notched groove positioned on a wall of the recess and arranged in said inner surface to receive said ring when the first hollow part is pressed into the hollow interior of the second hollow part and through the punchable seal; and

an annular part disposed around and securely attached to an outside surface of the second hollow part to define a second annular space between the annular part and the second hollow part, the annular part formed with threads extending around an inner surface of the annular part to threadably engage a bottleneck in the second annular space wherein the punchable seal is disposed within the bottle when the threads threadably engage the bottleneck; and

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the hollow interior of the second hollow part for the first protrusion to be received in the second recess and the uncapped end of the first hollow part to dislodge the punchable seal.

2. The sealed reservoir cap of claim 1, wherein the punchable seal has a scored line of weakness such that the uncapped end dislodges a portion of the punchable seal.

3. The sealed reservoir cap of claim 1 or 2, wherein an edge of the uncapped end is defined by an oval.

4. The sealed reservoir cap of any one of claims 1 to 3, fabricated from oxidation, moisture, light, air and/or heat resistant materials.

5. The sealed reservoir cap of any one of claims 1 to 4, wherein the enclosed reservoir contains dry or liquid contents.

6. The sealed reservoir cap of claim 5, wherein the contents of the enclosed reservoir are released upon dislodging the punchable seal.

7. The sealed reservoir cap of any one of claims 1 to 6, wherein the first and second hollow parts and the annular part are one continuous piece of material.

8. The sealed reservoir cap of any one of claims 1 to 7, wherein more than one enclosed reservoir lies within the first and second hollow parts.

9. The sealed reservoir cap of any one of claims 1 to 8, further comprising a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the second hollow part for the protrusion to be received in the recess and the uncapped end of the first hollow part to dislodge the punchable seal.

10. A sealed reservoir cap comprising:

a first hollow part capped at one end and uncapped at another end thereof;

a second hollow part having a hollow interior and a punchable seal closing one end thereof and slidably receiving the first hollow part into the hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween, the second hollow part comprising an annular part;

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the hollow interior of the second hollow part allowing for engagement of a locking means and the uncapped end of the first hollow part to dislodge the punchable seal, and an annular part disposed around an outside surface of the second hollow part to define a first annular space between the annular part and the outside surface of the second hollow part, the annular part formed with threads extending around an inner surface of the annular part to threadably engage a bottleneck in the first annular space wherein the punchable seal is disposed within the bottle when the threads threadably engage the bottleneck;

a ring portion attached to the annular part, said ring portion having a groove; and

a notch set on an exterior portion of the first hollow part and positioned such that the notch interfaces with the groove of the ring portion when the first hollow part is pressed into the hollow interior of the second hollow part and through the punchable seal.

11. The sealed reservoir cap of claim 10, wherein the first hollow part further comprises a first protrusion on its outer surface and the second hollow part further comprises a second recess to receive the first protrusion wherein when the first hollow part is pushed into the second hollow part, the first protrusion is engaged to the second recess thereby forming the locking means.

12. The sealed reservoir cap of claim 10 or 11, wherein the first hollow part is formed with a recess around an outer surface of the first hollow part and the second hollow part is formed with a second protrusion around an inner surface of the second hollow part and the two hollow parts define a second annular space therebetween sealed by engagement of the protrusion of the second hollow part into the recess of the first hollow part.

13. A sealed reservoir cap comprising:

a first hollow part capped at one end and uncapped at another end thereof and comprising a protrusion and a recess around an outer surface of the first hollow part, wherein said protrusion comprises a ring;

a second hollow part having a hollow interior and a punchable seal closing one end thereof and slidably receiving the first hollow part into the hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

the second hollow part formed with a barrier surface around an inner surface of the second hollow part and a notched groove arranged in said inner surface of the second hollow part to receive said ring when the first hollow part is pushed into the hollow interior of the second hollow part and through the punchable seal, the two hollow parts defining a first annular space therebetween sealed by engagement of the barrier surface against the recess on the outer surface of the first hollow part;

a removable annular seal holding the two hollow parts in an axially fixed, spaced apart relationship and, upon removal of the removable annular seal, allowing the first hollow part to be pushed into the hollow interior of the second hollow part for the uncapped end of the first hollow part to dislodge the punchable seal, and

an annular part disposed around and securely attached to an outside surface of the second hollow part to define a second annular space between the annular part and the outside surface of the second hollow part, the annular part formed with threads extending around an inner surface of the annular part to threadably engage a bottleneck in the second annular space wherein the punchable seal is disposed within the bottle when the threads threadably engage the bottleneck.

14. The sealed reservoir cap of claim 13, wherein the second hollow part further comprises a second recess to receive the protrusion wherein when the first hollow part is pushed into the second hollow part, the first protrusion is engaged to the second recess thereby forming a locking means.

15. A method for forming a sealed reservoir cap comprising the steps of:

forming a first hollow part capped at one end and uncapped at another end thereof with a first protrusion, wherein said first protrusion comprises a ring;

forming a second hollow part having a hollow interior and a punchable seal closing one end thereof and capable of slidably receiving the first hollow part into the

hollow interior with the punchable seal axially opposite from the capped end to define an enclosed reservoir therebetween;

forming a barrier surface around an inner surface of the second hollow part;

forming a notched groove arranged in said inner surface to, when the first hollow part is pushed into the hollow interior of the second hollow part and through the punchable seal, receive said ring;

forming a recess to receive the first protrusion therein;

forming a first annular space between the two hollow parts;

sealing said first annular space by engagement of the barrier surface with the first hollow part;

forming a removable annular seal disposed to hold the two hollow parts in an axially fixed spaced apart relationship;

allowing the first hollow part to be pushed into the hollow interior of the second hollow part for the first protrusion to be received in the recess and the uncapped end of the first hollow part to dislodge the punchable seal by removing the removable seal;

forming an annular part disposed around an outside surface of the second hollow part to define a second annular space between the annular part and the outside surface of the second hollow part; and

forming threads extending around the inner surface of the annular part to engage a bottleneck in the second annular space wherein the punchable seal is disposed within the bottle when the threads engage the bottleneck.

16. The method of claim 15, further comprising the step of scoring a line of weakness such that the uncapped end dislodges only a portion of the punchable seal.

17. The method of claim 15 or 16, further comprising the step of forming the uncapped end in an oval shape.

18. The method of claim 16 or 17, further comprising the step of forming the sealed reservoir cap from materials selected to prevent degradation of contents within the enclosed reservoir.

19. The method of any one of claims 15 to 18, wherein the first and second hollow parts and the annular part are one piece of material.

20. The method of any one of claims 15 to 18, wherein the first and second hollow parts and the annular part are more than one piece of material.

21. The method of any one of claims 15 to 20, further comprising the step of forming more than one enclosed reservoir defined by the first and second hollow parts.

22. A method of providing a powder or liquid to a bottle using a sealed reservoir cap formed by the method defined in any one of claims 15 to 21, comprising the steps of one selected from the group of sterilizing, filtering, pasteurizing and combinations thereof the contents of the bottle container prior to providing the sealed reservoir cap to the bottle.

23. The method of claim 22, comprising the step of mixing the released reservoir contents with the contents of the bottle.

24. The method of claim 22 or 23, comprising the steps of removing the sealed reservoir cap from the bottle and heating the contents of the bottle container prior to removal of the removable seal.