United States Patent

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[54] **MIXING CONTAINER STRUCTURE**
10 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **222/129,** 215/6
[51] **Int. Cl.** **B67d 5/56**
[50] **Field of Search** 222/129, 541, 145, 528, 536; 215/6

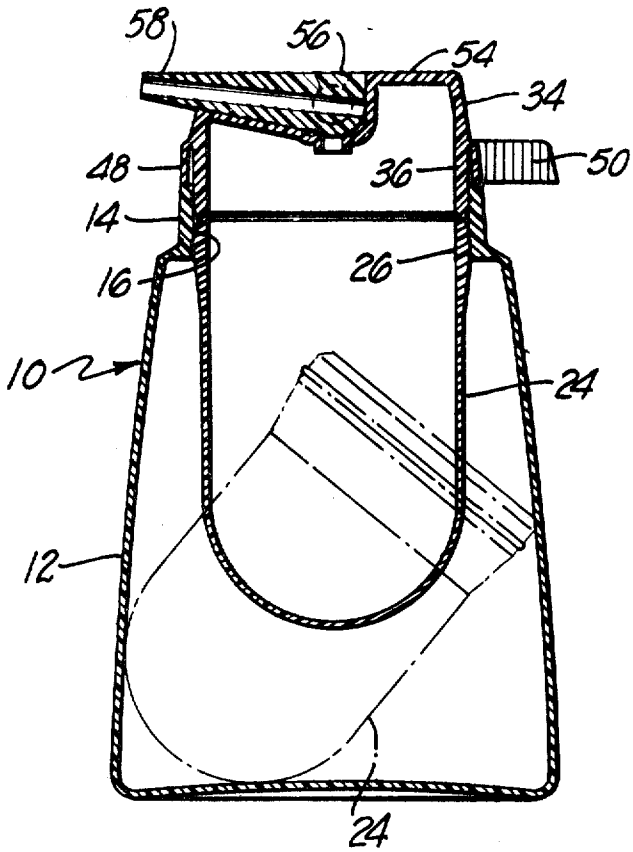
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ABSTRACT: A mixing container structure is disclosed for use in shipping two materials such as two fluids so that these two materials are separated from one another. This structure includes an outer container for one of these materials and an inner container for the other of these materials located within the outer container. The top of the inner container fits closely within so as to form a seal with the interior of the neck of the outer container. A closure member is located on the outer container so that the skirt on this closure member fits closely within and forms a seal against the interior of the neck on the outer container. The closure member is capable of being moved so that this skirt forces the inner container into the interior of the outer container so that the materials within these containers can mix.



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FIG. 1.

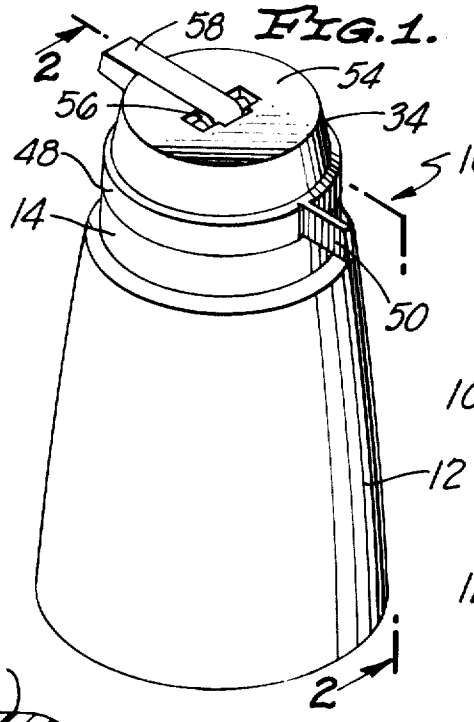


FIG. 2.

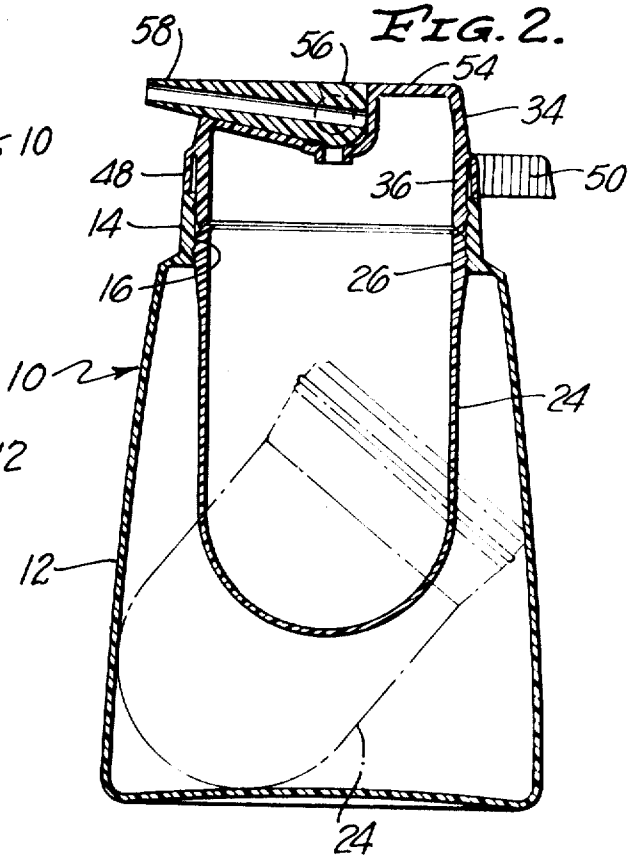


FIG. 3.

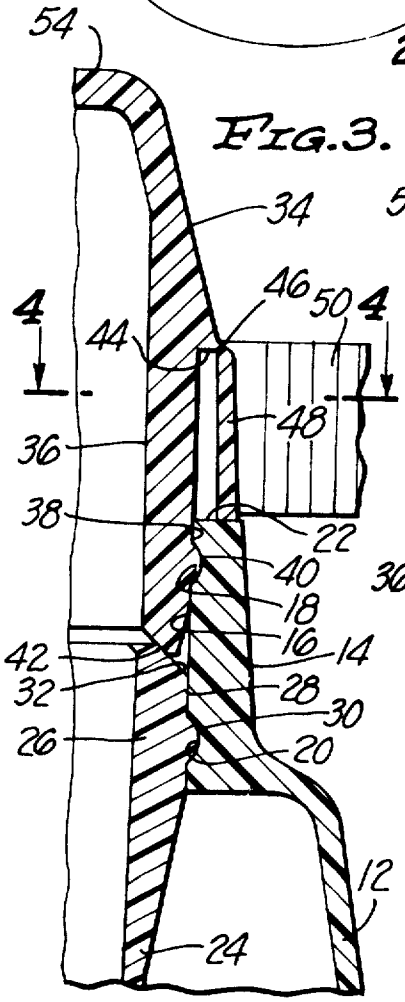


FIG. 5.

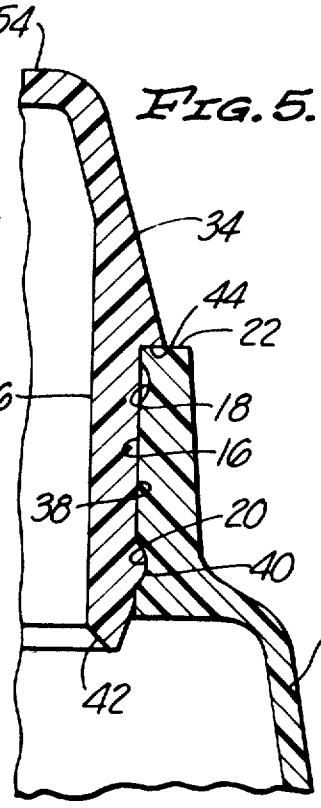
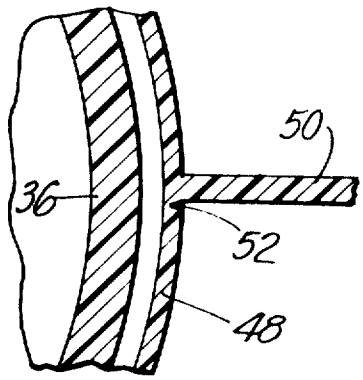


FIG. 4.



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MIXING CONTAINER STRUCTURE

BACKGROUND OF THE INVENTION

It is frequently desired to package two different materials in a common package so that they are separated until it becomes desirable to use these two materials. As an example of this, certain hair treatment preparations are normally supplied as two different compositions which are mixed immediately prior to being used. In some fields such as the fire extinguisher field it is common to package a primary composition such as a chemical solution of one type with another composition which when mixed with the first will cause a reaction useful in developing pressure and/or a foam capable of putting out a fire. On occasion an adhesive and a catalyst for the adhesive are sold separated in a package and are mixed together prior to being used.

Many different types of mixing container structures have been developed for use in packaging in a common package two different materials of various types as indicated by the preceding. An understanding of this invention does not require a detailed analysis of such prior packages. Many of such prior packages have suffered from various limitations which are considered to limit their widespread application for use in packaging different types of materials. Frequently such prior packages have been relatively expensive and/or relatively difficult to utilize.

SUMMARY OF THE INVENTION

An objective of the present invention is to provide new and improved mixing container structures for use in packaging two different materials in such a manner that these materials are segregated and sealed with one another until they are ready for use. Related objectives of this invention are to provide mixing container structures of the type indicated which can be manufactured and assembled at a comparatively nominal cost, which may be easily used, which can be used to package two different materials so that these materials are effectively sealed from one another, and which may be utilized in easily and conveniently dispensing the container contents once these contents have been mixed with one another.

In accordance with this invention these objectives are achieved within mixing container structures, each of which has an outer container provided with an internal tubular neck, an inner container with an external tubular top and a closure member having a dependent tubular skirt. The inner container and the closure member are mounted on the interior of the neck of the outer container in such a manner that the interior of the outer container is sealed by contact between the top of the inner container and the neck of the outer container and in such a manner that the interior of the inner container is sealed by contact of the skirt of the closure member against the interior of the neck of the outer container.

A mixing container structure of the present invention preferably includes many features which are not indicated in this summary. Such a structure preferably includes a dispensing closure located on the closure member, effective cooperative, sealing and positioning means within the neck of the outer container, on the exterior of the top of the inner container and on the exterior of the skirt of the closure member. A mixing container structure of this invention also preferably includes means for restricting the movement of the closure member with respect to the outer container. Preferably a structure of this invention also includes a spacer means for preventing undesired movement between the closure member and the inner and outer containers.

BRIEF DESCRIPTION OF THE DRAWING

Further details of a mixing container structure of this invention as well as many advantages of such a structure will be apparent from a consideration of the appended drawing in which:

FIG. 1 is an isometric view of a presently preferred embodiment or form of a mixing container structure of this invention;

FIG. 2 is a cross-sectional view taken at line 2–2 of FIG. 1;

FIG. 3 is an enlarged partial cross-sectional view corresponding to a part of FIG. 2;

FIG. 4 is a partial cross-sectional view taken at line 4–4 of FIG. 3; and

FIG. 5 is a partial cross-sectional view similar to FIG. 3 showing the position of various parts after the use of the mixing container structure illustrated.

The accompanying drawing is primarily intended to clearly illustrate for explanatory purposes the nature of a presently preferred embodiment or form of the present invention. It will be realized that the novel features of this invention set forth in the appended claims may be incorporated within other differently appearing structures through the exercise of routine engineering skill.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings there is shown a mixing container structure **10** which includes an outer bottlelike container **12** having a neck **14**. The internal surface **16** of this neck **14** is tubular, and is preferably cylindrical. It may be provided with two identical annular grooves **18** and **20** of a rounded bottom character which extend completely around the surface **16** in planes perpendicular to the axis of the surface **16**. The neck **14** also includes a generally flat end **22**.

The structure **10** also includes an inner container **24** which has a top **26** provided with an external tubular surface **28** for such a dimension as to fit closely against the interior of the surface **16**. This surface **28** preferably includes an annular projection **30** of a shape which is complimentary to the shape of the groove **20** and which fits within the groove **20** so as to form a seal therewith The top **26** preferably terminates in a conical surface **32**. It will be noted that this conical surface is directed towards an apex along the axis of the surface **16**. The surface **32** flares downwardly and outwardly towards the interior of the surface **16** of the neck **14**.

The complete mixing container structure **10** includes a closure member **34** appearing much as inverted cup. This closure member **34** includes a dependent skirt **36** having an exterior surface **38** of the same dimension as the surface **28** of the inner container **24**. It will be realized from this that the surface **28** and **38** are complimentary to the surface **16** and that these surfaces **28** and **38** are both intended to fit closely against the interior of the surface **16** to form a seal therewith. This surface **38** preferably holds a projection **40** corresponding to the projection **30** in dimension. This projection **40** normally fits in the groove **18**. The skirt **36** also includes a conical surface **42** which is complimentary to the surface **32** and which fits against the surface **32** when the closure member **34** is in place on the complete structure **10**.

The closure member **34** includes a projecting annular flange **44** on the uppermost extremity of the skirt **36**. This flange **44** carries a small, thin web or membrane **46** which in turn supports a spacer band **48**. This spacer band **48** extends between the flange **44** so as to abut against the end **22** of the neck **14**. Preferably this band **48** includes a projecting tab **50** and a small web **52** of a similar character to the web **46** appearing as a strip of reduced cross section extending completely across the width of the band **48** adjacent to the tab **50**.

Preferably the complete mixing container structure **10** includes at its top **54** a dispensing closure structure **56** having a spout **58** capable of being rotated from a closed position as shown in FIGS. 1 and 2 of the drawing to an open position in which the spout **58** extends vertically. The particular dispensing closure **56** illustrated is a dispensing closure as set forth in the Wilson et al. U.S. Pat No. 2,793,795. Other related dispensing closures can be used instead of the precise structure **56** illustrated.

Preferably all parts of the complete mixing container structure **10** are formed out of a somewhat resilient material such

as a common polyolefin. Common grades of polyethylene are considered to be suitable for use in manufacturing the various parts of this structure **10**. It will be realized, however, that other materials can be utilized in the manufacture of this structure **10**. Common polyolefins are considered preferably since such materials can be made so as to fit against one another in order to form effective seals and since closely fitting parts of such materials can be readily moved with respect to one another.

During the assembly of the complete container structure **10** of this invention, a first material to be packages is located within the outer container **12**. Then, the inner container **24** may be pressed into the neck **14** of the outer container **12** so that the surface **28** fits closely against the surface **16** so as to form a seal therewith. When the projection **30** is utilized such a projection **30** fits within the groove **20** so as to properly position the inner container **24** and so as to also form a seal between the inner and the outer containers **24** and **12** respectively.

Next, a material to be packaged may be located within the inner container **24**. At this point the skirt **36** of the closure member **34** may be pressed into a position as shown so that the surface **38** fits against the surface **16** so as to form a seal therewith. When the projection **40** is used, it fits tightly within the groove **18** so as to also form a seal and so as to insure proper positioning of the closure member **34**. In a proper position of this closure member, the band **48** abuts against the end **22** of the neck **14** of the outer container **12**. When so assembled, the structure **10** may be handled and shipped without danger of commingling the contents of the containers **12** and **24**.

When it is desired to mix these contents so that they can be used, the tab **50** may be manually engaged and pulled so as to sever the webs **46** and **52** so as to remove the band **48**. Prior to such severance the physical position of the band **48** serves to prevent movement of the closure member **34** generally towards the outer container **12**. However, after it is severed this closure member **34** may be pushed generally towards the outer container **12**. As this occurs the surfaces **42** and **32** will abut against one another in such a manner as to cause a tendency for the top **26** of the inner container **24** to be deflected inwardly away from the surface **16**. This will tend to make it easier for the movement of the closure member **34** to cause the inner container **24** to be pushed out of engagement with the surface **16**.

When this occurs the inner container **24** will assume a position as indicated in phantom in FIG. **2** of the drawing. Also, when this occurs the closure member **34** will assume a position as indicated in FIG. **5** with the flange **44** abutting against the end **22** to limit further movement of this closure member and with the projection **40** fitting with and forming a seal with the groove **20**. In this position a seal will, of course, be created between the skirt **36** and the surface **16**.

When the inner container **24** has been disengaged, the contents of the two containers will frequently be commingled to a sufficient extent so that the resultant mixture of the two materials may be used. However, if desired the complete structure **10** may be shaken at this point so as to cause further mixing. After such mixing the contents of the outer container **12** may be exhausted through the spout **58** of the dispensing closure **56**. If such a dispensing closure structure has not been utilized in the complete structure **10**, the closure member **34** can be removed so as to gain access to the contents of the outer container **12**. Because of the convenience and ease of use it is considered to be always preferable to utilize the closure structure **56**.

I claim:

1. A mixing container structure which includes:
- an outer container having an internally tubular neck;
- an inner container having an externally tubular top;
- said inner container fitting within said outer container and said top fitting within said neck so that a seal is formed between said top and said neck;
- a closure member having a dependent tubular skirt;
- said closure member being located on said outer container with said skirt fitting within said tubular neck so as to form a seal therewith;
- said closure member being capable of being moved without being disassembled from said outer container so that said skirt abuts against said top of said inner container so as to force said top out of engagement with said neck of said outer container so as to release said inner container from said outer container within the interior of said outer container.

2. A mixing container structure as claimed in claim **1** including:
- a dispensing closure having a spout capable of being rotated between open and closed positions, said closure being located on said closure member.

3. A mixing container structure as claimed in claim **1** including:
- cooperating sealing means and positioning means located on the exteriors of said top and said skirt and on the interior of said neck.

4. A mixing container structure as claimed in claim **3** wherein:
- said cooperating sealing means comprise external annular projections located on the exterior of said top and the exterior of said neck and annular grooves located on the interior of said neck, said projections normally fitting within said groove, said projection on said skirt capable of fitting within the groove normally occupied by said projection on said top when said closure member has been moved so as to force said inner container top out of engagement with said neck and said outer container.

5. A mixing container structure as claimed in claim **1** including means on said closure member for limiting movement of said closure member towards said outer container.

6. A mixing container structure as claimed in claim **5** wherein:
- said means is an annular flange located on said closure member.

7. A mixing container structure as claimed in claim **1** including:
- spacer means located between said neck of said outer container and said closure member for preventing accidental movement of said closure member towards said outer container.

8. A mixing container structure as claimed in claim **7** wherein:
- said spacer means is a spacer member and is capable of being removed from said container structure.

9. A mixing container structure as claimed in claim **8** wherein:
- said spacer member is a band formed integrally with said closure member;
- said band including a tab projecting from said closure member and being attached to said closure member by an annular web of material which is sufficiently thin so as to be capable of being easily broken;
- said closure member also including a strip of reduced cross section which is sufficiently thin to be broken extending completely across said closure member adjacent to said tab.

10. A mixing container structure as claimed in claim **1** including:
- a dispensing closure having a spout capable of being rotated between open and closed positions, said closure being located on said closure member;
- cooperating sealing means and positioning means located on the exteriors of said top and said skirt and on the interior of said neck;
- said cooperating sealing means comprise external annular projections located on the exterior of said top and the exterior of said neck and annular grooves located on the interior of said neck, said projections normally fitting within said groove, said projection on said skirt capable of fitting within the groove normally occupied by said pro-

jection on said top when said closure member has been moved so as to force said inner container top out of engagement with said neck and said outer container;

means on said closure member for limiting movement of said closure member towards said outer container;

said means is an annular flange located on said closure member;

spacer means located between said neck of said outer container and said closure member for preventing accidental movement of said closure member towards said outer container;

said spacer member is a band formed integrally with said closure member;

said band including a tab projecting from said closure member and being attached to said closure member by an annular web of material which is sufficiently thin so as to be capable of being easily broken;

said closure member also including a strip of reduced cross section which is sufficiently thin to be broken extending completely across said closure member adjacent to said tab.