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Maekawa et al.

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[54] **COMPARTMENTALIZED CONTAINER**

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[52] **U.S. Cl.**..... **206/221,** 128/272, 215/DIG. 8, 222/142.5, 259/48

[51] **Int. Cl.**..... **B65d 25/02,** B01f 13/00, A61j 1/00

[58] **Field of Search** 206/219, 221; 215/DIG. 8, 215/6; 222/142.5; 128/272; 259/48, 60, 72

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[57] **ABSTRACT**

A compartmentalized container for storing, mixing and dispensing a plurality of incompatible liquids which must be segregated prior to use, which container includes in combination; an outer and an inner cylindrical side wall components, a bottom plug and a closure cap means with a sealing member.

Each of said outer and inner side wall components has an open bottom end and is, when combined, concentrical with respect to the other, and the both of said open ends being substantially in a plane to be stopped with the bottom plug in common.

Said outer side wall component has a mouth at its top with a fastening screw and said inner side wall component has a closed top end with a fastening screw extending therearound, the threading-in direction of which screw is in reverse to that of the first-mentioned screw.

Said closure cap means has a fastening screw engageable with that of the mouth of the outer side wall component and another fastening screw engageable with that of the closed top end of the inner side wall component.

6 Claims, 4 Drawing Figures

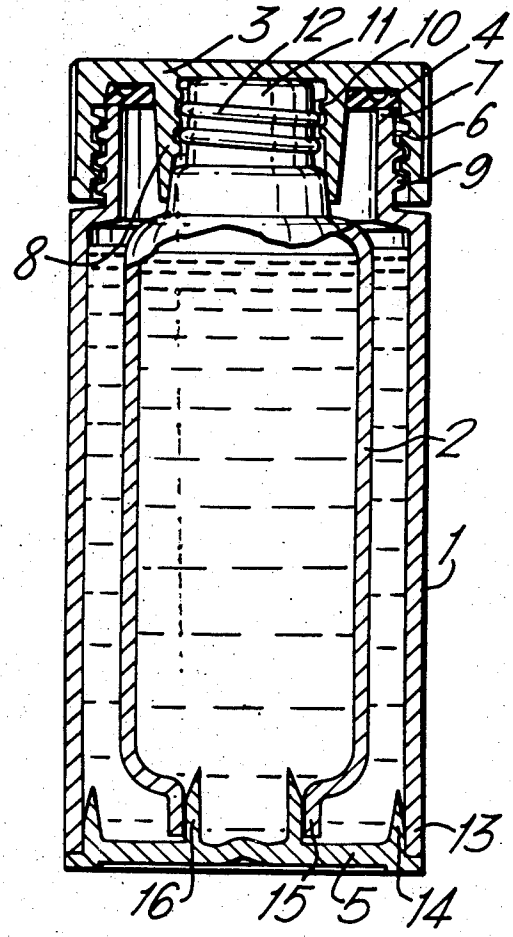


FIG. 1.

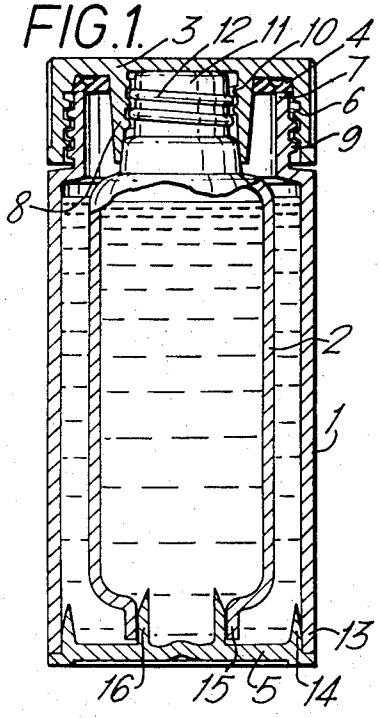


FIG. 2.

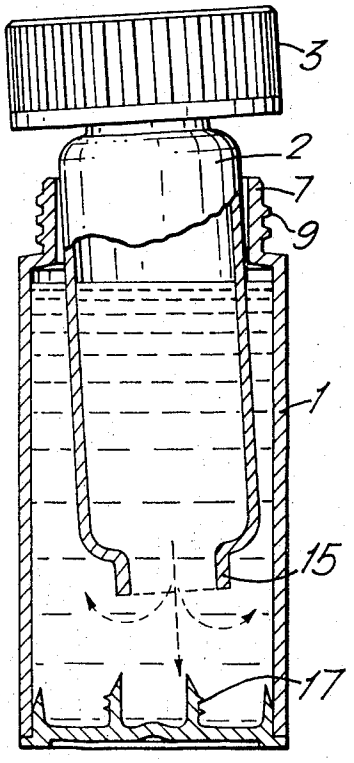


FIG. 3.

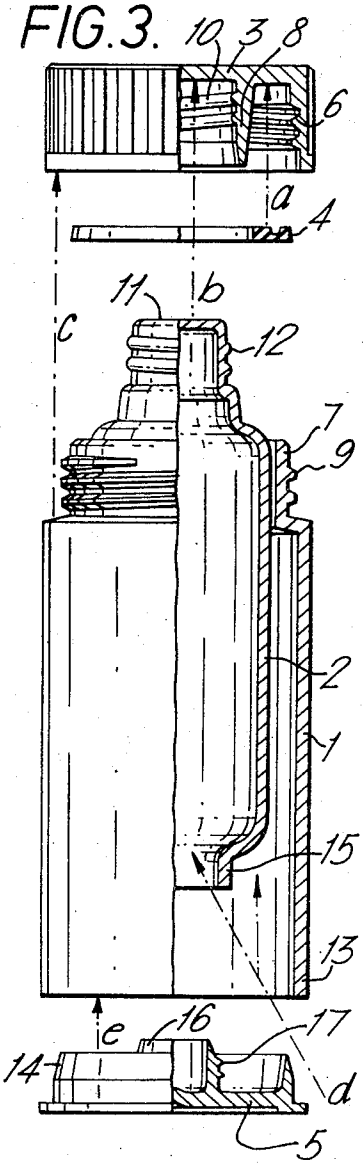
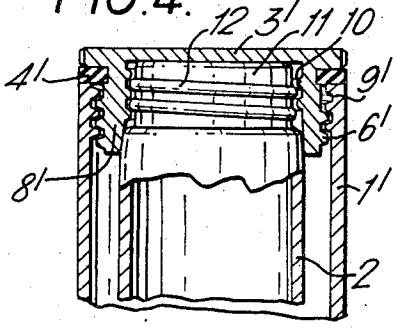


FIG. 4.



COMPARTMENTALIZED CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a compartmentalized container. More specifically, it is concerned with a compartmentalized container capable of mixing and dispensing a plurality of ingredients of a multi-component system one of which has been stored in the container being segregated with respect to the other prior to the actual use.

2. Description of the Prior Art

A variety of medicinal or chemical compositions such as liquid multivitamines preparations or liquid photographic developers are unstable and must be used within a short time after mixing of the ingredients, making it impossible to package and distribute the composition in the usual manner through trade channels because of the relatively long period of time, usually weeks or months, between packaging and use by the ultimate consumer. In most cases this difficulty can be met by maintaining certain active ingredients separate from the remainder of the composition and instructing the ultimate consumer to carry out the final mixing step immediately before use. For fulfilling these requirements, the package must maintain the ingredients distinct during shipment and in storage prior to sale, and yet allow the ingredients to be brought together in a convenient manner when their use is desired. Moreover, the facility required in the filling or charging operation is also a problem to be solved.

SUMMARY OF THE INVENTION

It is therefore the primary object of the present invention to provide a device for storing, mixing and dispensing a plurality of incompatible liquids which must be segregated prior to use in a simple, reliable and inexpensive manner.

It is another object of the present invention to provide an improved compartmentalized container which obviates the various drawbacks inherent to the articles of the prior art and simultaneously fulfils or solves the aforedescribed various requirements and problems.

These and other object of the present invention and attendant advantages thereof will become more apparent from the examination of the drawings, the following detailed description, and the appended claims.

According to the present invention, there is provided a compartmentalized container for storing, mixing and dispensing liquids which must be segregated prior to use, which comprises in combination; an outer and inner cylindrical side wall components each having an open bottom end disposed concentrically with respect to the other such that both of said open bottom ends are substantially in a plane, said outer side wall component having a mouth at its top with a fastening screw and said inner side wall component having a closed top end with a fastening screw extending therearound, the threading-in direction of which screw being in reverse to that of the first-mentioned screw, a bottom plug stopping said open bottom ends in common, a closure cap means having a fastening means engageable with the fastening screw of said mouth of the outer side wall component and another fastening means engageable with the fastening screw of said closed top end of the inner side wall component, and an annular sealing

member being placed between the closure cap means and the mouth of the outer cylindrical side wall component.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In describing the preferred embodiment, reference will be made to the accompanying drawings in which:

FIG. 1 is a side sectional view of a preferred embodiment of the present invention in a state wherein all components are combined together to store the contents;

FIG. 2 is a partly sectional side view of the embodiment shown in FIG. 1 indicating an operation for mixing the contents to dispense them;

FIG. 3 is an exploded and partly sectional side view of the embodiment shown in FIG. 1 indicating orders of combining respective components and manner of filling the contens; and

FIG. 4 is a partly sectional side view which indicate a variation made at the essential portion of the embodiment shown in FIG. 1.

With reference to the drawings, there is shown in FIG. 1 a container comprising an outer and an inner cylindrical side wall components **1** and **2**, a closure cap **3** with a sealing member **4** and a bottom plug **5**.

These components are usually made of a synthetic resin, preferably one selected from polyolefines except for the sealing member **4** which is required to be more soft and plastic to ensure the sealing or liquid-tight property between the closure cap **3** and the cylindrical side wall component **1**, and is usually made of preferably rubber or the like elastic materials.

The outer cylindrical component **1** has a construction which, by no means is different from any known conventional container having a mouth **7** with a fastening means **9** extending therearound usually of a screw, with an exception that its open bottom end **13** can remain to open until the filling operation through this open end **13** is completed and then be stopped with the bottom plug **5** which may subsequently be secured to the bottom end **13** around its periphery by means of, for instance, ultrasonic welding.

The bottom plug **5** has two concentrical circular kilts **14** and **16**, an outer one **14** is designed to fit the interior of the open bottom end **13** of the outer cylindrical component **1** and the other **16** is designed to fit that of an open bottom end **15** of the inner cylindrical component **2**.

Ridges or fillets **17** are provided around the exterior of the latter kilt **16**. The shape and size of the ridges **17** are such that they can easily be pressed to deform and serve for the sealing against the interior of the open bottom end **15**, when the latter is stopped with the kilt **16** by forced insertion. Although a preferred structure of the bottom plug **5** has thus been described, any other plugs may be employed as far as they can stop the both open ends in common.

The mouth **7** of the outer cylindrical component **1** can be closed with the closure cap **3** of any known conventional outer shape having an interior screw **6** threadable into the exterior screw **9** of the outer component **1**. The annular sealing member **4** is used to keep the clearance between the cealing of the closure cap **3** and the top of the mouth **7** liquid-tight.

The inner cylindrical side wall component **2** has substantially the same length as the outer one **1** and a closed top end **11** having a fastening screw **12** extending therearound and the open bottom end **15** which, when combined with the other components, is in a plane substantially the same with that of the open bottom end **13** of the outer cylindrical component **1.**

The closure cap **3** also has an inner circular kilt **8** which holds the inner cylindrical component **2** with the threading engagement between an interior screw **10** and the fastening screw **12** of the inner cylindrical component **2.**

Since a turning direction which effects the threading engagement between the interior screw **10** and the fastening means **12** being designed to be in reverse to that between the screw **6** and the fastening means **9,** an unfastening action exerted to the closure cap **3** will not cause to loosen the holding action of the closure cap **3** against the inner cylindrical component **2.** Instead, it enhances the holding action.

Therefore, when the closure cap **3** is unfastened and lifted up, it will acccompany the inner cylindrical component **2** with its bottom end **15** being separated from the bottom plug **5** to effect the mixing of the contents as indicated in FIG. **2.**

After being lifted up from the outer cylindrical component **1,** accompanied by the closure cap **3,** the inner cylindrical component **2** is usually detached from the closure cap **3** by unfastening (in a reverse direction) the threading engagement between the inside screw **10** and the fastening means **12** to be discarded and to make the closure cap **3** free for the replacement on the mouth **7** until a subsequent dispensing operation.

Optionally, any known conventional closure cap with a dispensing spout or a squirt may then be substituted for the original closure cap **3.**

Assembling of these components and filling operation of the contents into the assembled container will be performed generally in the following manner as illustrated in FIG. **3** wherein, orders of the operation are indicated by the characters *a*, *b*, *c*, *d* and *e*.

a. The annular sealing member **4** is placed around the inner kilt **8** of the closure cap **3.**

b. The inner cylindrical component **2** is rotatably mounted on the closure cap **3,** by threading the closed top end **11** into the kilts **8.**

c. The closure cap **3** with the inner cylindrical component **2** and the sealing member **4** is rotatably mounted on the outer cylindrical component **1** by threading the screw **6** of the closure cap **3** into the fastening means **9** of the outer cylindrical component **1.**

d. After being inverted the assembled components, one of the ingredients to be packaged in this container is poured into through the open bottom end **15** and the other (remainder) is poured into through an annular opening formed between the both openings **13** and **15.**

e. Finally, the open bottom ends are stopped in common with the plug **5** which is subsequently secured around the periphery of the open bottom end **13** by means of ultrasonic welding.

Although it may easily be conceivable by those who are skilled in the art, FIG. **4** illustrates a variation of the embodiment, wherein a closure cap **3'** has a kilt **8'** with an exterior screw **6'** threadably engageable with an interior screw **9'** of an outer component **1'** but no change is made with the inner container **2,** its closed top **11** with the exterior screw **12** engageable with the interior screw **10** of the kilt **8'** and the annular sealing member **4.**

The invention being thus described, it will be obvious that the same may be practiced in many ways besides the above-mentioned variation. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications are intended to be included within the scope of the following claims.

What is claimed is:

1. A compartmentalized container for storing, mixing and dispensing liquids which must be segregated prior to use, which comprises in combination;

an outer and an inner cylindrical side wall components each having an open bottom end disposed concentrically with respect to the other such that both of said open bottom ends are substantially in a plane, said outer side wall component having a mouth at its top with a fastening screw and said inner side wall component having a closed top end with a fastening screw extending therearound, the threading-in direction of which screw being in reverse to that of the first-mentioned screw,

a bottom plug stopping said open bottom ends in common,

a closure cap means having a fastening means engageable with the fastening screw of said mouth of the outer side wall component and another fastening means engageable with the fastening screw of said closed top end of the inner side wall component, and

an annular sealing member being placed between the closure cap means and the mouth of the outer cylindrical side wall component.

2. A compartmentalized container as claimed in claim **1,** wherein the fastening screw of the mouth of the outer cylindrical side wall component extends around the exterior thereof and engages with an interior fastening means of the closure cap.

3. A compartmentalized container as claimed in claim **1,** wherein the fastening screw of the mouth of the outer cylindrical side wall component extends around the interior thereof and engages with an exterior fastening means of the closure cap.

4. A compartmentalized container as claimed in claim **1,** wherein said bottom plug has an outer circular kilt being fitted the open bottom end of the outer cylindrical side wall component and an inner circular kilt being fitted the open bottom end of the inner cylindrical side wall component.

5. A compartmentalized container as claimed in claim **4,** wherein ridges or fillets are provided around the inner circular kilt which ridges or fillets can easily be pressed to deform and serve for the sealing against the interior of the bottom end when the latter is stopped with th kilt by forced insertion

6. A compartmentalized container as claimed in claim **1,** wherein the bottom plug is welded around the periphery of the open bottom end of the outer cylindrical component.

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