CONTAINER FOR SEPARATELY HOLDING A MATERIAL AND DESICCANT

An outer container (10) having a container insert (12) therein for holding a predetermined volume of material. The outer container includes a container bottom (14) having a periphery (16) and a container wall (18) extending generally upwardly to define an interior container portion (20) of predetermined volume sized to accommodate the container insert. The container wall includes a neck portion (22) complementarily sized to accommodate the exterior surface of the container insert. The container insert includes a bottom (34) having a periphery and a wall (38) extending generally upwardly to define an interior portion (40) of predetermined volume for holding the material. The insert wall includes a vent (64) which allows a fluid to pass between the interior container portion and the interior portion of the insert when the insert is positioned therein. A desiccant (62) is positioned within the interior container portion between the insert and outer container such that when a cap is positioned over the neck portion, the desiccant absorbs moisture from within the interior portion of the insert.
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CONTAINER FOR SEPARATELY HOLDING A MATERIAL AND DESICCANT

Field of the Invention

The present invention relates to packaging a predetermined volume of material and, more particularly, to a container insert for holding a predetermined volume of material within an outer container and a desiccant positioned between the inner and outer container in fluid communication with the material.

Background of the Invention

In order to decrease the cost and increase the efficiency of packaging materials, it would be useful to have containers of uniform outer dimensions which allow for packaging of different predetermined volumes of material. For example, a typical pharmaceutical manufacturer may package different quantities of a product for shipment to retail pharmacies in correspondingly sized different containers. The manufacturer may decide to ship a product in two or three different quantities (e.g., 50 or 200 tablets) in two or three different sized containers. The tablets, capsules or pills to be shipped may contain different dosages of medication (e.g., 30 mg, 100 mg, etc.). The tablets may be sized or shaped differently. Each of these factors, and other factors too
numerous to mention, may affect the volume of material to be packaged in an individual bottle. A manufacturer may, therefore, need a series of bottles having different interior volumes to accommodate the disparate volumes of material to be packaged. Each series of bottles may have different exterior dimensions and configurations, thereby requiring different equipment lines for packaging and labelling the bottles.

It would be advantageous for a manufacturer to have available containers of uniform outer dimension and configuration in order to standardize systems for filling, closing, and labelling each bottle and rendering tamper-resistant the bottle closures. The size of dispensing and shipping cartons and the packaging system therefor may also be standardized.

In addition, it would be advantageous for a manufacturer to have available a container at least partially formed from recycled materials in order to lessen container cost and to help preserve the environment. However, in areas where contamination of the packaged material is of concern, it is desirable that the recycled portion of the container not contact the packaged material. Contamination of the packaged material is particularly undesirable in the pharmaceutical industry, where product integrity is imperative.

In the packaging of certain materials which are sensitive to moisture, it is often necessary to ensure that the materials be maintained in a relatively dry atmosphere after the material has been packaged into a container for shipping and/or retail or wholesale display. Such materials include, for example, pharmaceutical products in tablet, pill, capsule or powder form, such as chewable vitamins and soft gelatin capsules. Other pharmaceuticals, such as sugar, film-coated tablets and controlled-release coatings, which are packaged in the form of tablets or pills have a certain amount of moisture content as a result of the packaging process.

Conventionally, to maintain the material in the container in a dry atmosphere or to withdraw any moisture from the tablets or
pills within the container, a desiccant is placed within the container and commingled with the material to absorb moisture from within the container. While such an approach has been successful in withdrawing moisture from within the container, it is preferable to avoid such commingling and the problems that could be attendant thereto. In some instances, the desiccant is packaged and labeled in a manner intended to reduce the risk of improper handling thereof. Hence, a need has arisen for a container that can separately house a desiccant and material, while allowing the desiccant to absorb moisture from the container which is housing the material without the need to specially package or label the desiccant.

The present invention fulfills a long-felt need in the art by overcoming the aforementioned disadvantages of the prior art containers and providing other advantages as set forth below.

**Summary of the Invention**

Briefly stated, the present invention comprises a container for holding materials. The container includes an outer container including a container bottom having a periphery and a container wall extending generally upwardly from the periphery. The container bottom and the container wall define an interior container portion having a first volume. The container wall includes a mouth which defines an opening. A container insert is positioned within the interior container portion of the outer container for receiving the material therein. The container insert includes a bottom having a periphery and a wall extending generally upwardly from the periphery. The container bottom and the wall of the insert define an interior portion having a second volume. The second volume is less than the first volume. The wall of the insert is secured to the wall of the outer container. A desiccant is positioned within the interior container portion between the insert and the outer container. At least one of the insert and outer container include a vent for allowing a
fluid to pass between the interior portion of the insert and
the interior container portion whereby the desiccant and the
material within the interior portion of the insert are
separated by the wall of the insert and when a cap is
positioned over the opening of the mouth of the outer
container the desiccant absorbs moisture from within the
interior portion of the insert.

**Brief Description of the Drawings**

The foregoing summary, as well as the following
detailed description of the preferred embodiments of the
invention, will be better understood when read in conjunction
with the appended drawings. For the purpose of illustrating
the invention, there is shown in the drawings two embodiments
which are presently preferred, it being understood, however,
that the invention is not limited to the specific methods and
instrumentalities disclosed. In the drawings:

Fig. 1 is a perspective view of an outer container
having a container insert and desiccant in accordance with a
first embodiment of the present invention therein;

Fig. 2 is an exploded perspective view of the outer
container and container insert of Fig. 1;

Fig. 3 is a cross-sectional view of the outer
container and container insert of Fig. 1 taken along lines 3-3
of Fig. 1;

Fig. 4 is an elevational view, partially in cross
section, of an outer container having a container insert and
desiccant in accordance with a second embodiment of the
invention therein;

Fig. 5 is an elevational view of the container
insert of Fig. 4; and

Fig. 6 is a perspective view of a second outer
container having a second container insert and desiccant
therein, in accordance with the first embodiment of the
present invention therein.
Detailed Description of Preferred Embodiments

Certain terminology is used in the following description for convenience only and is not limiting. The words "right," "left," "lower" and "upper" designate directions in the drawings to which reference is made. The words "inwardly" and "outwardly" refer to directions toward and away from, respectively, the geometric center of the outer container and inner container and designated parts thereof. The terminology includes the words above specifically mentioned, derivatives thereof and words of similar import.

Referring to the drawings, wherein like numerals indicate like elements throughout, there is shown in Figs. 1 through 3 and 6 an outer container, generally designated 10, having a container insert 12 therein for holding a predetermined volume of material (not shown), in accordance with a first embodiment of the present invention.

The outer container 10 comprises a container bottom 14 having a periphery 16 and a container wall 18 extending generally upwardly from the periphery 16. It is preferred that the container bottom 14 be generally planar, although the bottom 14 may be concave (see Fig. 4). The periphery 16 of the container bottom 14 may be slightly rounded to eliminate any sharp edges from the container 10. Preferably, the container bottom 14 and container wall 18 define an outer container 10 which is generally annular in cross section, although the outer container 10 may be of any shape such as generally rectangular in cross section, as one of ordinary skill in the art would understand.

As best shown in Figs. 2 and 3, the container bottom 14 and the container wall 18 define an interior container portion, generally indicated at 10, having a predetermined volume. The interior container portion 20 is sized to accommodate the container insert 12, as described in more detail hereinafter. The container wall 18 comprises a neck portion 22 and mouth defining an opening, indicated generally at 24, for receiving the container insert 12 therein.
Preferably, the opening 24 in the neck portion 22 is generally circular in cross section and has a diameter which is smaller than the inner diameter of the container wall 18. The neck portion 22 includes a transition surface or shoulder 25 between the neck portion 22 and container wall 18. The shoulder 25 is preferably curved to eliminate sharp edges and increase structural integrity. The neck portion 22 has an interior surface 26 complementarily sized to accommodate an exterior surface 28 of the container insert 12 for securely fixing the container insert 12 within the interior container portion 20, as described in more detail hereinafter. The interior surface 26 is preferably generally textured to reduce the surface area of the interior surface 26 and friction between the interior surface 26 and the exterior surface 28 when the container insert 12 is positioned within the outer container 10, as is also described in more detail hereinafter.

As best shown in Fig. 3, it is preferred that the interior surface 26 of the neck portion 22 include a lip 54 extending radially inwardly along the upper end thereof for preventing the insert 12 from being removed from the interior container portion 20. That is, the insert 12 is initially positioned within the outer container 10 with a snap fit. The lip 54 prevents the insert 12 from moving upwardly out of the outer container 10. The neck portion 22 has an exterior surface 30 which preferably includes threads 32 for receiving a cap (not shown). One skilled in the art would understand that other means besides threads 32 may be used to accommodate the cap, such as a friction fit or a child-proof fastener (not shown). In addition, any gap between the cap and the opening 24 of the neck portion 22 may be sealed by a sheet of material, such as plastic, in order to inhibit tampering, as is well known by those of ordinary skill in the art.

As best shown in Figs. 2 and 3, the present invention further comprises a container insert 12 positioned within the interior container portion 20 of the outer container 10. The container insert 12 comprises a bottom 34
having a periphery 36 and a wall 38 extending generally upwardly from the periphery 36. Presently, it is preferred that the bottom 34 and wall 38 of the container insert 12 define a container insert 12 which is generally annular in cross section, although one skilled in the art would understand that the shape of the container insert 12 may be generally rectangular in cross section, or any other complementary shape which may be accommodated within the interior container portion 20 and neck portion 22 of the outer container 10, in keeping with the spirit and scope of the present invention.

The bottom 34 and the wall 38 of the container insert 12 define an interior portion, generally indicated at 40, of predetermined volume for holding the predetermined volume of material. The predetermined volume of the interior portion 40 of the insert 12 shown in Fig. 1 is less than the predetermined volume of the interior container portion 20 of the outer container 10. In Fig. 6 there is shown a second outer container 10, which is generally identical to the outer container 10 shown in Fig. 1, having a second container insert 12 therein. The predetermined volume of the interior portion 40 of the second insert 12 shown in Fig. 6 is less than the predetermined volume of the interior container portion 20 of the outer container 10 as well as the predetermined volume of the interior portion 40 of the insert 12 shown in Fig. 1.

As best shown in Fig. 2, the wall 38 of the insert 12 is secured to the wall 18 of the outer container 10. More particularly, the wall 38 comprises an upper portion 42 spaced apart from the bottom 34. The upper portion 42 defines an opening, indicated generally at 43, for receiving the material to be packaged. As shown in Fig. 3, the upper portion 42 has an exterior surface 44 in facing engagement with the interior surface 26 of the neck portion 22. Preferably the exterior surface 44 and interior surface 26 are securely engaged together by a friction fit, although one skilled in the art would understand that other means, such as adhesive or
fasteners, may be used to maintain the surfaces 44, 26 in engagement. The surfaces 44, 26 are aligned such that the top edge of the exterior surface 44 is in engagement with the lip 54, as best shown in Fig. 3. The upper portion 42 has a height which corresponds to the height of the neck portion 22 of the outer container 10. Once the insert 12 is positioned within the outer container 10, the insert 12 is very difficult to remove from the outer container 10.

The container insert 12 preferably includes vent means in the exterior surface of the wall 38 for allowing fluid, such as air, to pass from the interior container portion 20 to the atmosphere as the container insert 12 is positioned within the outer container 10 and to allow the fluid to pass between the interior container portion 20 and the interior portion 40 of the insert 12 once the insert 12 is positioned within the outer container 10 and the cap is screwed onto the neck portion 22 of the outer container 10.

In the first embodiment, the vent means preferably includes four grooves 46 in the exterior surface of the wall 38 of the insert 12, each groove 46 having a first end 48 and a second end 50. Because of the arcuate periphery of the lip 54, the first end 48 of the grooves 46 is in fluid communication with the atmosphere surrounding the outer container 10 and the insert 12 when the cap is removed and is in fluid communication with the interior portion 40 of the container insert 12 and the interior container portion 20 through the grooves 46 once the cap is secured to the neck 22 of the outer container 10. That is, the second end 50 of the grooves 46 is in fluid communication with the interior container portion 20 of the outer container 10 for allowing fluid, such as air, to pass through the grooves 46 from the interior container portion 20 to the atmosphere as the container insert 12 is positioned within the outer container 10 and for allowing the fluid to pass between the interior container portion 20 and the interior portion 40 of the insert 12 once the insert 12 is positioned within the outer container.
10 and the cap is screwed onto the neck portion 22 of the outer container 10.

Preferably, the second end 50 of the grooves 46 extends to the periphery 36 of the bottom 34, such that the grooves 46 extend the length of the insert 12. Therefore, as the insert 12 is positioned within the interior container portion 20, the interior container portion 20 is in continuing fluid communication with the surrounding atmosphere to allow air within the interior container portion 20 which is displaced by insertion of the insert 12 to pass to the atmosphere.

A skilled artisan understands that the grooves 46 may be of any length sufficient to span the exterior surface 44 of the upper portion 42 of the container insert 12. The width of the grooves 46 may be any width sufficient to allow the air within the interior container portion 20 to escape to the atmosphere without impeding insertion of the insert 12. However, a sufficient portion of the exterior surface 44 must remain to ensure sufficient contact between the exterior surface 44 of the upper portion 42 and interior surface 26 of the neck portion 22 to maintain the desired friction fit. One skilled in the art would understand that any number of grooves 46 may be provided in the wall 38 of the container insert 12 including one, two or six. Presently, it is preferred that the four grooves 46 be formed equidistantly around the exterior surface 44, although they may be randomly placed thereabout.

It is understood by those skilled in the art that other vent means may be provided in the container insert 12 or outer container 10 for allowing air to pass from the interior container portion 20 to the surrounding atmosphere when the cap is off and to the interior portion 40 of the insert 12 when the cap is on. For instance, an opening (not shown) can extend through the wall 38 of the insert 12 or the wall 18 of the outer container 10 or the grooves 46 could be formed in the interior surface 26 of the neck 22 for allowing fluid to
pass therethrough between the interior container portion 20 and the atmosphere or the interior portion 40 of the insert 12 without departing from the spirit and scope of the invention.

In the first embodiment and as shown in Figs. 1, 2 and 6, if the material within the interior portion 40 of the insert 12 is sensitive to moisture or needs to have moisture absorbed therefrom, as described above, a desiccant, generally designated 62, is positioned within the interior container portion 20 between the insert 12 and the outer container 10.

The desiccant 62 is preferably located anywhere in the interior container portion 20 so long as the desiccant 62 is in fluid communication with the vent means or grooves 46. The desiccant 62 interacts with the fluid in the interior container portion 20 and the interior portion 40 of the insert to achieve water absorption from the air therein or from the material within the interior portion 40 of the insert 12.

That is, the desiccant 62 and the material within the interior portion 40 of the insert 12 are separated by the wall 38 of the insert 12 and when the cap is positioned over the opening 24 of the mouth of the outer container 10 the desiccant 62 absorbs moisture from within the interior portion 40 of the insert 12. By separating the desiccant 62 and the material within the interior portion 20 of the insert 12 such that the desiccant 62 is not accessible from outside of the outer container 10, the risk that an individual who is to ingest the material will confuse the desiccant with the material is minimized. Further, special packaging labeling and handling of the desiccant can be avoided. Hence, the present invention physically isolates the desiccant 62 and the material within the insert 12, while allowing the desiccant 62 to absorb moisture from the interior portion 40 of the insert.

It is understood by those of ordinary skill in the art that the present invention is not limited to the use of any particular desiccant, since the particular type and amount of desiccant used will depend on the type and amount of material packaged within the interior portion 40 of the insert.
12 as well as the size of the outer container 10, insert 12 and vent means. However, to prevent the desiccant 62 from contacting the material within the interior portion 40 of the insert 12, it is preferred that the desiccant 62 be sized so that it is greater than the dimensions of the vent means or grooves 46. Typical desiccants include a zeolite compound, such as the crystalline titanium silicate molecular sieve zeolite compound manufactured by Engelhard Corporation of Edison, New Jersey under the trade name ETS and disclosed in U.S. Patent 4,853,202, which is hereby incorporated by reference.

Desiccants are usually packaged in a gas pervious fabric pouch 63, as is well understood by those of ordinary skill in the art. Accordingly, further description thereof is omitted for purposes of convenience only and is not limiting. However, it is understood by those of ordinary skill in the art that the fabric pouch 63 could be omitted and the desiccant be directly placed in the interior container portion 20. While there is shown only a single fabric pouch 63 of desiccant 62 within the interior container portion 20, it is understood by those of ordinary skill in the art that any number of such fabric pouches 63 could be used without departing from the spirit and scope of the invention.

Preferably, at least one of the insert 12 and the outer container 10 is constructed of a thermoplastic, such as a high density polyethylene or polypropylene. For pharmaceutical applications, it is preferred that the insert 12 and outer container 10 be formed from virgin material to inhibit contamination of the material to be packaged therein. However, one skilled in the art would understand that the insert 12 and outer container 10 may be formed from any suitable material, such as glass, and that the outer container 10 could be formed from a recycled material.

It is preferred that the outer container 10 be formed from an injection-blow moldable material which contracts upon cooling to ambient temperature in order to
maintain the friction fit between the exterior surface 44 of the insert 12 and the interior surface 26 of the outer container 10, as described in more detail hereinafter.

Referring now to Figs. 4 and 5, there is shown a second embodiment of an outer container 10 and container insert 12. The outer container 10 is generally identical to the outer container described above in connection with the first embodiment shown in Figs 1 through 3. Similarly, the container insert 12 is generally identical to the container insert 12 described above in connection with the first embodiment, except that the upper portion includes a flange 60 extending generally radially outwardly a distance sufficient to substantially overlap an upper edge 56 of the neck portion 22.

As best shown in Fig. 5, the exterior surface of the container insert 12 includes a complementary groove 58 just below the flange 60 for receiving the lip 54 of the neck portion 22 to assist in securely locking the container insert 12 within the outer container 10. In order to allow the air within the interior container portion 20 to escape to the atmosphere, the grooves 46 extend to the periphery of the flange 60.

Since the container insert 12 includes a flange 60, the material to be packaged does not contact the outer container 10 during packaging and dispensing. Therefore, in the second embodiment, it is preferred that the outer container 10 be formed from a recyclable material, such as plastic. In the pharmaceutical industry, where maintaining product purity is imperative, it is particularly desirable that the recycled portion of the container not contact the packaged material.

In the present invention, the portion of the container insert 12 which receives the material to be packaged is insulated from the outer container 10 by the wall 38 of the container insert 12 and an air barrier 61 between the container insert 12 and the outer container 10 which prevents
contamination of the packaged material as a result of contact with the recycled outer container 10. Thus, the second embodiment is advantageous because recycled plastic is more beneficial to the environment than virgin plastic and is beneficial to the environment.

The second embodiment may also include a desiccant 62 in the interior container portion 20 as described above in connection with the first embodiment. However, because the second end 48 of the grooves 46 faces outwardly, when the cap is placed over the neck 22 of the outer container 20, the interior container portion 20 may not be in fluid communication with the interior portion 40 of the insert 12. Accordingly, in order to permit the desiccant 62 to absorb moisture from within the interior portion 40 of the insert 12, one or more openings 64 are provided in the wall 38 and/or bottom 34 of the insert 12. The openings 64 allow the desiccant 62 to interact with the moisture in the interior container portion 20 and the interior portion 40 of the insert 12 to achieve water absorption from the air therein or from the material within the interior portion 40 of the insert 12.

The openings are preferably sized to prevent the material in the interior portion 40 of the insert 12 from passing into the interior container portion 20 and to prevent the desiccant 62 from passing into the interior portion 40 of the insert 12.

The method according to the present invention for assembling the outer container 10 having a container insert 12 therein will now be described generally. The following description of the method of assembly, while directed to the first embodiment, is equally applicable to the second embodiment.

With reference to Fig. 2, the method comprises the initial steps of forming the outer container 10 and container insert 12. The container 10 and insert 12 are preferably formed by injection-blow molding, although other molding processes, such as extrusion blow molding or injection molding, may be used. It is preferred that the portion of the
mold (not shown) which forms the interior surface 26 of the neck portion 22 be sandblasted with 30 grit aluminum oxide at a pressure of 30 psi. and then be chrome plated. This results in the interior surface 26 being generally textured such that it has a plurality of minute pits and projections 26a. While it is preferred that 30 grit aluminum oxide at a pressure of 30 psi. be used, it is understood by those skilled in the art that other grit sizes, materials and/or pressures could be used to achieve the generally textured surface without departing from the spirit and scope of the invention.

It was found that if the interior surface 26 of the neck portion 22 and the exterior surface 44 of the upper portion 44 were formed to be generally smooth, during the process of inserting the container insert 12 into the outer container 10 from ten to eleven percent of the assembled product would be unusable. More particularly, even with the venting, the relatively high degree of friction between the interior and exterior surfaces 26, 44 during insertion of the container insert 12 often resulted in the interior and exterior surfaces 26, 44 becoming bound together before the container insert 12 is entirely positioned within the outer container 10 causing the shoulder 25 to collapse due to the force of the assembling device (not shown).

By molding the interior surface 26 to be generally rough, the surface area of the interior surface 26 which engages the exterior surface 44 is reduced resulting in less friction between the interior and exterior surfaces 26, 44 during insertion of the container insert 12 into the outer container 10. With less friction between the interior and exterior surfaces 26, 44 the problem of collapsing the shoulder 25 during assembly is obviated.

While it is preferred that the interior surface 26 be generally rough to reduce friction during assembly, it is understood by those skilled in the art that only the exterior surface 44 could be generally rough or both the interior and
exterior surfaces 26, 44 could be generally rough, without departing from the spirit and scope of the invention.

The lip 54 of the outer container 10 provides a gripping surface to maintain the heated outer container 10 on the core rod (not shown) during the molding process, as well understood by those skilled in the art. However, it is understood by those skilled in the art that the present invention is not limited to any particular method of maintaining the container insert 12 or container 10 on the core rod during the injection blow molding process and that other methods could be used without departing from the spirit and scope of the invention.

Next, the temperature of the container insert 12 is controlled such that the container insert 12 is at a first predetermined temperature. Preferably, the step of controlling the temperature of the container insert 12 comprises cooling the container insert 12 to the first predetermined temperature after it has been formed. This cooling may be affected by exposing the container insert 12 to air at ambient conditions or by refrigeration. It is preferred that the first predetermined temperature be ambient temperature, generally between 50°F to 80°F, although one skilled in the art would understand that the first predetermined temperature may be any temperature which is less than the temperature of the container 12, as discussed below.

The temperature of the outer container 10 is controlled such that the outer container 10 is at a second predetermined temperature greater than the first predetermined temperature of the container insert 12. The elevated second temperature is achieved when the outer container 10 is removed from the injection molding apparatus, prior to significant cooling. Preferably, the second predetermined temperature is between 100°F and 150°F. However, it is understood by those skilled in the art that the second predetermined temperature of the outer container 10 can be achieved by reheating the outer container 10 by other means, such as an oven (not
shown), if the outer container 10 has cooled to a temperature below 100°.

When the outer container 10 is at the second predetermined temperature and the insert is at the first predetermined temperature, if desired, the desiccant 62 is then placed within the interior container portion 20 of the outer container 10, either by hand or automatically through machinery, and the container insert 12 is positioned through the opening 124 in the neck portion 22 into the interior container portion 20 of the outer container 10 such that the exterior surface 44 of the upper portion 42 is initially in facing sliding engagement with the interior surface 26 of the neck portion 22. The first end 48 of the grooves 46 is in fluid communication with the atmosphere surrounding the outer container 10 and the second end 50 of the grooves 46 is in fluid communication with the interior container portion 20 for allowing fluid, such as air, to pass through the grooves 46 from the interior container portion 20 to the atmosphere, as best shown in Fig. 3.

It is understood by those of ordinary skill in the art that the desiccant 62 can be placed into the interior container portion 20 of the outer container 10 at any time prior to insertion of the insert 12 therein, without departing from the spirit and scope of the invention.

The outer container 10 is cooled to a third predetermined temperature less than the second predetermined temperature such that the interior surface 26 of the neck portion 22 contracts into tight engagement with the exterior surface 44 of the upper portion 42 of the container insert 12, whereby the container insert 12 is frictionally secured to the neck portion 22 and interlocked to the neck portion 22, as discussed above. As the outer container 10 contracts, the volume of the interior container portion 20 decreases causing air to pass through the grooves 46 to the surrounding atmosphere.
The method of packaging a predetermined volume of material, such as pills, liquids, or powders, by use of an outer container 10 having a container insert 12 therein will now be described generally.

The method generally comprises the initial step of determining a volume of material to be packaged. This determination need not involve the counting of individual portions of material, such as tablets. However, pharmaceutical products are preferably packaged by count. A number of closely packed individual portions of material, such as tablets, generally occupy a known volume even though there may be small gaps between the tablets. This known volume corresponds to the volume of material to be packaged. Where the material to be packaged is fluid, such as a liquid or powder, the volume of the material to be packaged is directly ascertainable.

Next, the person who is packing the material selects an outer container 10 having a volume greater than the determined volume of material to be packaged and a container insert 12 therein having an interior portion 40 of a predetermined volume from a group of outer containers 10 with container inserts 12 having predetermined volumes different than the volume of material to be packaged. Preferably, the step of selecting an outer container 10 comprises selecting an outer container 10 with a container insert 12 therein having an interior portion 40 of a predetermined volume which corresponds to the volume of material to be packaged. By choosing an appropriately sized container insert, the need for cushioning material, such as cotton, to fill the unoccupied volume of the container may be reduced or altogether eliminated without having different sized outer containers.

The material to be packaged is then inserted into the interior portion 40 of the container insert 12. Preferably, the step of inserting the material into the interior portion 40 comprises inserting a number of individual portions of material, such as tablets. However, a skilled
artisan understands that a liquid or powdered material may be similarly packaged. After the material to be packaged is deposited into the container insert 12, the outer container is then sealed with a cap or the like.

Using the foregoing method allows the manufacturer to have a small number of differently sized containers, wherein the outer containers have differently sized container inserts therein. By reducing the number of different outer containers, automatic packaging processes are simple and efficient because the conveying system of the packaging equipment does not have to be reset each time a change in volume occurs. Moreover, the number of different types of shipping cartons and labels is significantly reduced. Furthermore, by providing a larger outer container, the label size can be increased to provide the user with more information. This is easier than the prior solutions of attaching outserts to small containers.

It is understood by those skilled in the art that all of the aforementioned steps may be carried out by an individual person or automatically, as by a robotic assembly line.

From the foregoing description of the preferred embodiment, it can be seen that the present invention comprises an outer container having a container insert therein, a method for assembling the container insert within the outer container, and a method of packaging a predetermined volume of material using the aforementioned combination. It will be appreciated by those skilled in the art that changes could be made to the embodiment described above without departing from the broad inventive concept thereof. For instance, the present invention is not limited to the pharmaceutical industry and is useful in other industries which package different volumes of material, including confectionery and personal care products. It is understood, therefore, that this invention is not limited to the particular embodiment disclosed, but is intended to cover all
modifications which are within the spirit and scope of the invention as defined by the appended claims.
CLAIMS

1. A container for holding a material, said container comprising:
   (a) an outer container including a container bottom having a periphery and a container wall extending generally upwardly from said periphery, said container bottom and said container wall defining an interior container portion having a first volume, said container wall comprising a mouth defining an opening;
   (b) a container insert positioned within said interior container portion of said outer container for receiving the material, said container insert including a bottom having a periphery and a wall extending generally upwardly from said periphery, said container bottom and said wall of said insert defining an interior portion having a second volume, said second volume being less than the first volume, said wall of said insert being secured to said wall of said outer container; and
   (c) a desiccant positioned within said interior container portion between said insert and said outer container, at least one of said insert and outer container including a vent for allowing a fluid to pass between said interior portion of said insert and said interior container portion whereby said desiccant and the material within the interior portion of the insert are separated by said wall of said insert and when a cap is positioned over said opening of said mouth of said outer container said desiccant absorbs moisture from within the interior portion of the insert.

2. The container as recited in claim 1 wherein said vent comprises an opening in one of said wall and bottom of said insert.

3. The container as recited in claim 1 wherein said mouth has an interior surface and said wall of said insert includes an upper portion spaced apart from said
bottom, said upper portion having a exterior surface
dimensioned for complementary engagement with said interior
surface of said mouth.

4. The container as recited in claim 3 wherein
said vent comprises a groove in said wall of said insert
having a first end and a second end, said first end of said
groove being in fluid communication with said interior portion
of said insert, said second end of said groove being in fluid
communication with said interior container portion for
allowing the fluid to pass between said interior portion of
said insert and said interior container portion.

5. The container as recited in claim 1 wherein the
insert is not readily removable from the outer container.

6. The container as recited in claim 1 wherein the
vent is sized to prevent passage of the material into the
interior container portion and to prevent passage of the
desiccant into the interior portion of the insert.

7. The container as recited in claim 1 wherein
said desiccant is contained within a pouch.

8. The container as recited in claim 1 wherein
said desiccant is inaccessible to a user of the container.
### A. CLASSIFICATION OF SUBJECT MATTER

- **ICP(G)**: B65D 81/26; F17C 11/00
- **US CL**: Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

- **U.S.**: 206/204; 215/6, 12.1; 96/147, 148

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>JP, A, 6-80163 (SAWAMURA) 22 March 1994 (22.03.94), see Constitution on the front page.</td>
<td>1-3, 5-6, 8</td>
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<tr>
<td>Y</td>
<td></td>
<td>1-8</td>
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<tr>
<td>X</td>
<td>JP, A, 1,294,473 (SHINSOZAI) 28 November 1989 (28.11.89), see Abstract on front page.</td>
<td>1-3, 5-6, 8</td>
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<td>1-8</td>
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<tr>
<td>Y</td>
<td>US, A, 5,197,602 (BIESECKER ET AL) 30 March 1993 (30.03.93), the entire document.</td>
<td>1-8</td>
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</table>

Further documents are listed in the continuation of Box C. See patent family annex.

- **"A"**: Special categories of cited documents:
  - Document defining the general state of the art which is not considered to be of particular relevance:
  - Document published prior to the international filing date but later than the priority date claimed.

- **"E"**: Earlier document published on or after the international filing date.

- **"L"**: Document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified).

- **"O"**: Document referring to an oral disclosure, use, exhibition or other means.

- **"P"**: Document published prior to the international filing date but later than the priority date claimed.

- **"T"**: Later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention.

- **"X"**: Document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone.

- **"Y"**: Document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

- **"&"**: Document member of the same patent family.

Date of the actual completion of the international search: 09 OCTOBER 1996

Date of mailing of the international search report: 31 OCT 1996

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703) 305-3230

Authorized officer
BRYON GEHMAN
Telephone No. (703) 308-3866

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<th>Relevant to claim No.</th>
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<td>Y</td>
<td>US, A, 2,283,867 (FLOSDORF ET AL) 19 May 1942 (19.05.42), page 2, left column, line 40 through right column, line 12.</td>
<td>1-8</td>
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<td>Y</td>
<td>US, A, 5,037,459 (SPRUIIL ET AL) 06 August 1991 (06.08.91), column 4, lines 50-63.</td>
<td>7</td>
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<tr>
<td>Y</td>
<td>US, A, 4,807,743 (YASUDA) 28 February 1989 (28.02.89), see claim 6.</td>
<td>7</td>
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A. CLASSIFICATION OF SUBJECT MATTER:
US CL :
206/204; 215/6