

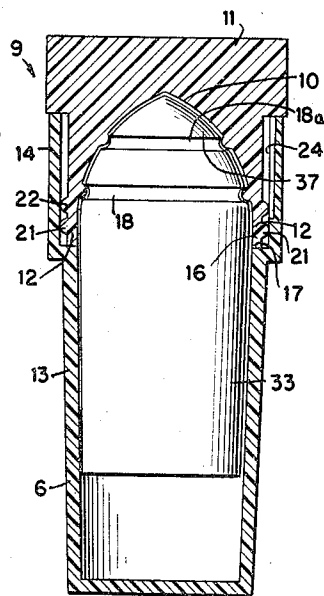
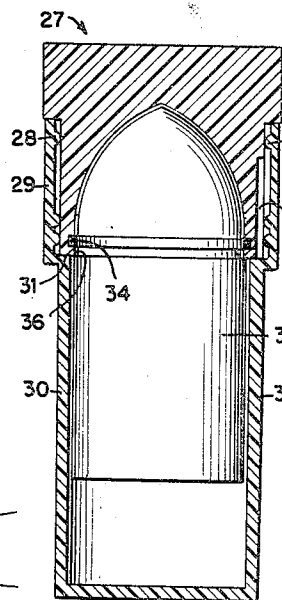
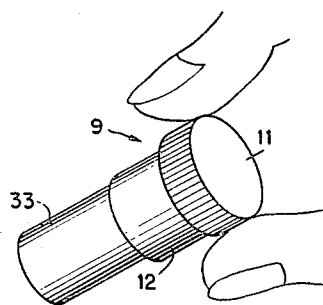
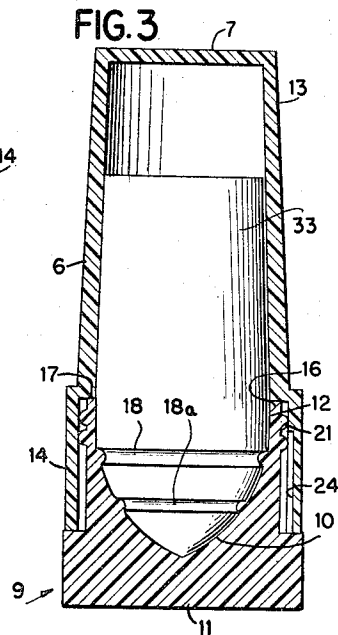
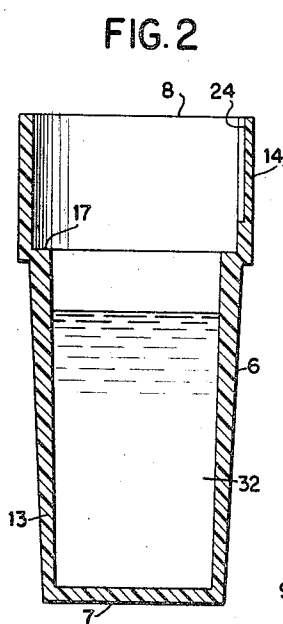
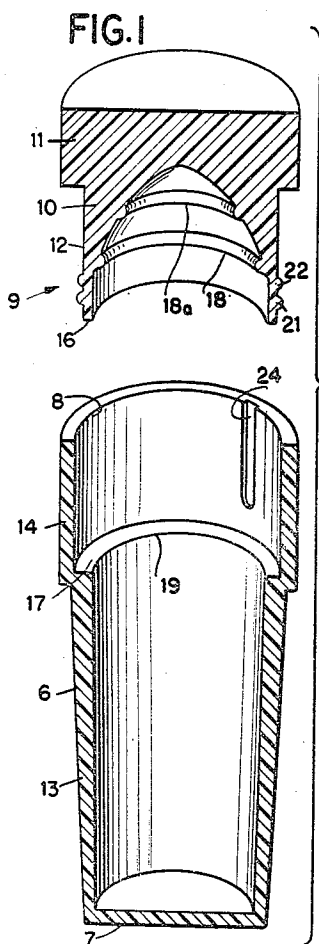
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PACKAGE

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2,950,813

PACKAGE

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This invention relates to the packaging of material, and is particularly concerned with the packaging of material such as suppositories which can be formed by molding.

Suppositories are commonly formed of a small amount of a medication dispersed in glycerinated gelatin or a mixture of glycerol and soap, or similar material, such as, for example, cocoa butter and stearates, and hence the suppositories are greasy solids at slightly above normal temperatures. This property complicates production and handling. Thus, when suppositories are produced, as is commonly the case, by casting the suppository composition in forming molds, removing the cast suppositories from the molds and packaging them in individual containers, it is usually necessary to clean the molds after each casting and to handle the cast suppositories with special care. The invention provides means for packaging suppositories which avoids these disadvantages.

The invention provides a novel receptacle in which suppository composition can be cast to form a suppository and in which the suppository can be stored under aseptic conditions until used. The receptacle is advantageously formed of a plastic material such as, for example, polyethylene, and includes a container provided with a stopper having a cavity in its inner end and a bead projecting into the cavity. A suppository is packaged in the receptacle by partially filling the container with a melt of the suppository composition, closing the container with the stopper, and then inverting the receptacle and allowing it to stand upside down while the melt cools and solidifies. During cooling, the composition moves downwardly and a portion of the melt flows into the cavity of the stopper past the bead projecting into the cavity. After solidification, the suppository is thus engaged by the bead, and so remains until used. When the stopper is withdrawn, the suppository is pulled out of the container by the stopper. The suppository can then be separated from the stopper by breaking it loose from the bead. No significant injury is done to the suppository upon breaking it loose as only a small portion adjacent the bead is broken away from the body of the suppository. In one embodiment of the invention, the receptacle is made so that the stopper skirt is compressed inwardly when the stopper is in position in the container, and, when the stopper is withdrawn from the container, the skirt expands radially thus causing the bead to be released from tight engagement with the suppository so that the suppository can be conveniently removed from the stopper.

Thus, the suppository receptacle of the invention provides a convenient and sanitary means for the production of suppositories and also provides adequate aseptic and mechanical protection for the suppository and permits easy removal for use.

The invention will now be described with reference to the accompanying drawing in which:

Fig. 1 is a vertical-section of a perspective view of a

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receptacle according to the invention shown in open position;

Fig. 2 is a vertical section of the container portion of the receptacle shown in Fig. 1 partially filled with a melt of a suppository composition;

Fig. 3 is a vertical section of the closed receptacle shown in inverted position with the suppository melt therein;

Fig. 4 is a vertical section of the receptacle of Fig. 1 in normal position with a solidified suppository therein;

Fig. 5 is a vertical section of an alternative construction for a receptacle according to the invention; and

Fig. 6 is a perspective view showing a suppository secured to a receptacle closure as it appears just after removal of the closure from the container.

Referring to the drawing, the receptacle comprises the combination of a container 6 having a closed bottom 7 and open top 8, and a closure for the container in the form of a stopper 9 having a body portion 10, head 11 and depending skirt 12. The container has a lower portion 13 which tapers throughout its length toward the bottom and is circular in cross-section, and a cylindrical upper side wall portion which forms a sleeve 14 adjacent the container open top 8. The sleeve extends from the container lower portion 13 to the container opening. The body portion 10 of the stopper 9 is likewise cylindrical in form and is adapted to fit within the container sleeve 14 with the lower end 16 of the stopper skirt 12 resting on an annular shoulder 17 formed in container 6 at the juncture of container lower portion 13 and container sleeve 14.

The stopper 9 has projections in the form of a first inside bead 18 and second inside bead 18a, extending inwardly from the inside wall of the skirt 12. These beads are adapted to engage and support a solid body such as suppository 33 (Fig. 3). They are each disposed in a substantially horizontal plane and, as can be seen in Fig. 4, when the stopper is positioned in the container opening, the inside beads 18 and 18a, extend out over the space within the container lower portion 13. The stopper 9 also has a positioning bead 22 which extends around the outside of the stopper, and as can also be seen in Fig. 4, facilitates positioning of the stopper 9 in the container opening.

The stopper skirt is advantageously formed of resilient material, and, if desired, the container and stopper can be made so that the skirt fits tightly within the container sleeve with the skirt held inwardly by the sleeve. Then, upon removing the stopper from the container, the skirt will expand so that the beads are released from tight engagement with a solid body. In order that this releasing action be obtained, it is necessary to have only two spaced projections of the stopper skirt embedded in the solid body upper portion 37. The projections can be merely two spaced portions of the bead 18, which can be considered to be made up of an infinite number of projections. The degree to which the projections and solid body become disengaged upon removal of the stopper is a matter of choice and, if desired, the stopper and container can be constructed so that upon withdrawing the stopper, the projections become totally disengaged from the solid body.

In order to facilitate removal of the stopper, the container includes means for venting the interior of the container upon partial withdrawal of the stopper. Thus, drawing any substantial vacuum on the container during withdrawal of the stopper is precluded. This means comprises the groove 24 disposed in the container sleeve 14 and the sealing bead 21. The groove extends upwardly along the container upper portion from a level such that the sealing bead 21, when, as is shown in Fig. 4, the

stopper 9 is positioned in the container with the lower end 16 of the stopper skirt 12 resting on the annular ring 17 of the container 6, is below the bottom of the groove, thus, with the stopper so positioned in the container opening, the sealing bead 21 seals the receptacle, and upon partial withdrawal of the stopper, the sealing head enters over the groove venting the container to the air.

In the embodiment shown in Fig. 1 and Fig. 4, the groove 24 is disposed in the container sleeve 14 and the sealing bead 21 projects outwardly from the stopper. An alternative construction is shown in Fig. 5. As shown in Fig. 5, a groove 26 is disposed in stopper 27 and a sealing bead 28 projects from the sleeve 29 of container 30. The groove 26 extends upwardly from the lower end 31 of the stopper 27 to a level below the level of the sealing bead 28 when the stopper 27 is positioned within the container as shown in Fig. 5. This construction functions in a manner similar to that shown in Fig. 1 and Fig. 4 to bring the container into communication with the outside thereof upon partial withdrawal of the stopper.

Thus, according to the invention and considering the receptacle with the stopper positioned in the container opening, the means for facilitating removal of the stopper comprises a sealing bead extending around the outside of the stopper and a groove spaced from the bead and extending upwardly along the outside of the stopper whereby during withdrawal of the stopper the bead enters over the groove thereby bringing the inside of the container into communication with the outside thereof.

In the embodiment depicted in Fig. 1, the container sleeve 14 of the container 6 is cylindrical. Alternatively, the upper portion of the container can be of any other form having constant inside area in horizontal cross-section. Likewise, the lower portion 13 of container 6, instead of being tapered and circular in cross-section as is shown in Fig. 1, can be cylindrical or of non-circular cross-section. If the lower portion is not circular in cross-section, however, the bead projecting inwardly from the inside wall of the skirt is preferably of such form that the inside outline thereof follows the inside outline of the lower portion at the top thereof, and the crosswise inside dimensions of the bead are less than the corresponding crosswise inside dimensions of the lower portion at the top thereof.

An alternative construction for the inside bead projecting inwardly from the inside wall of the stopper skirt is shown in Fig. 5. As shown in Fig. 5, a bead 36 is provided by disposing a groove 34 a short distance above the lower end 31 of the stopper 27. Thus, the bead is formed between groove 34 and lower end 31.

Thus, as can be best seen in Fig. 4 and Fig. 5, the invention provides a package formed by a container 6 having an open top and including a sleeve 14 disposed adjacent the container opening, a stopper 9 having a depending skirt 12 positioned in the container opening with the stopper skirt disposed in the container sleeve, and a solid body such as the suppository 33 positioned within the container. An upper portion 37 of the solid body is encircled by the skirt, and projections in the form of beads 18 and 18a extend inwardly from the inside wall of the skirt and are embedded in the solid body so that the solid body is suspended from the stopper skirt.

The steps involved in packaging a suppository are depicted in Fig. 2, Fig. 3 and Fig. 4. The container 6 is partially filled, as indicated in Fig. 2, with suppository composition melt 32 consisting essentially of a mixture of water, sodium stearate and potassium stearate having a small amount of a medication dispersed therein and melting at 52° to 60° C. Stopper 9 having a depending skirt 12 and engaging means in the form of inside beads

18 and 18a fixedly secured to the inside wall of the skirt, is then positioned in the container so that the open end of the skirt confronts space within the container, and the container is inverted and allowed to cool in this position.

During cooling the suppository composition moves downwardly and a portion of the melt flows into the depending skirt and envelopes the beads 18 and 18a of the stopper. While the container is inverted, the melt solidifies forming bullet-shaped suppository 33 with the beads embedded in the composition so that when the receptacle is turned over to an upright position, as is shown in Fig. 4, the suppository is suspended from beads and can be removed from the container merely by withdrawing the stopper 9, as is indicated in Fig. 6.

The stopper and container can be made of any of a number of materials including glass, rubber and plastic. Advantageously, the stopper is formed of a resilient material, and preferably the receptacle and stopper are formed of a plastic material resistant to water and having a waxy surface. A waxy surface has been found to be highly desirable when forming a suppository within the container from a melt. Polyethylene is satisfactory, and low pressure polyethylene is preferred since it provides the desired waxy surface and is highly resistant to water. A useful low-pressure polyethylene is "Marlex 50," a commercially available polymer manufactured by the Phillips Petroleum Company. The properties of this polymer are described in detail and compared with those of high-pressure polyethylene in papers entitled "Molecular Structure of Marlex Polymers" by R. Vernon Jones and P. J. Boeke, published by the Division of Petroleum Chemistry, American Chemical Society, General Paper, Preprints, volume 1, No. 1, February 1956, pages 219-239.

What is claimed is:

1. A package comprising a container having an open top and a closed bottom and including an upper sidewall portion of constant inside area in transverse cross-section extending downwardly from the container open top and forming a sleeve defining the container open top, a stopper having a depending skirt positioned in the container open top with the stopper skirt disposed in said sleeve, a solid body of solidified material formed and positioned within the container having the upper portion thereof encircled by the stopper skirt, a projection extending inwardly from the inside wall of the skirt and at least partially embedded in the solid body whereby the solid body is suspended from the stopper skirt and upon raising the stopper relative to the container the solid body is raised within the container, a sealing bead extending around the outside of the skirt between the skirt and container sleeve, and a groove spaced from said sealing bead and extending upwardly along the outside of the stopper whereby during withdrawal of the stopper said sealing bead enters over said groove thereby bringing the inside of said container into communication with the outside thereof.

2. The package of claim 1 in which the container and stopper are of polyethylene.

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