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A. J. PORTER ETAL

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DISPENSING AND CLOSURE CAP FOR CONTAINERS

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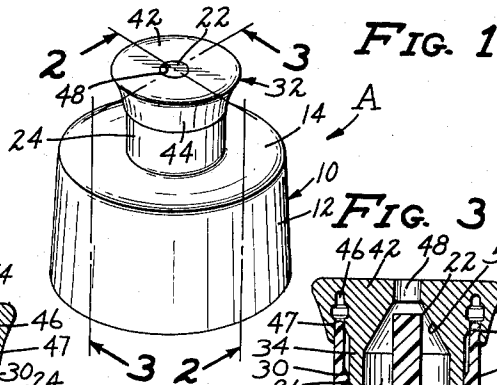


FIG. 2

FIG. 3

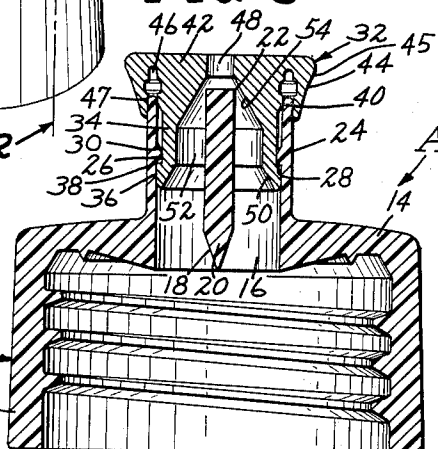
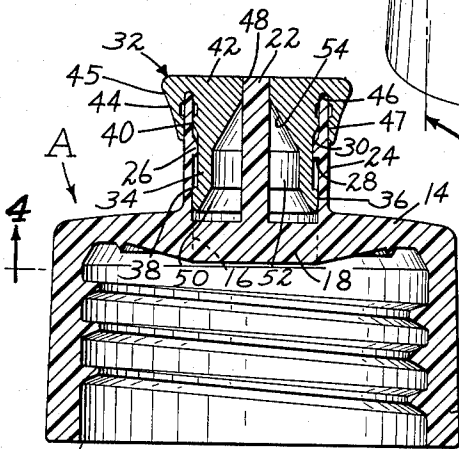


FIG. 4

FIG. 5

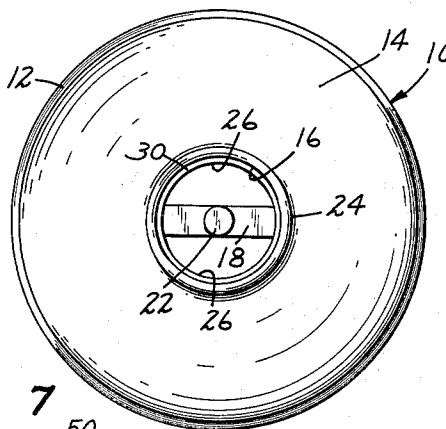
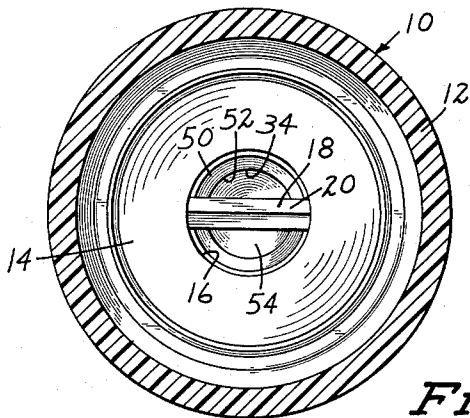


FIG. 7

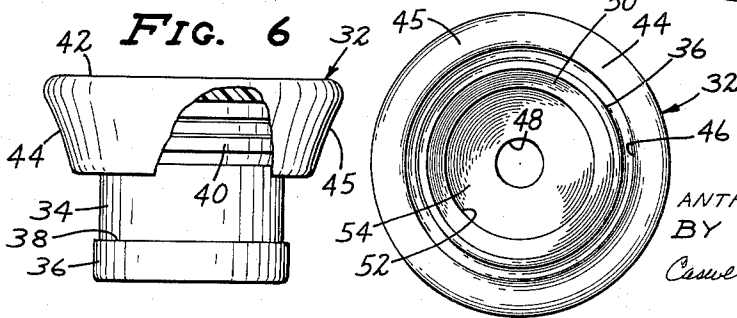


FIG. 6

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3,201,013 DISPENSING AND CLOSURE CAP FOR CONTAINERS

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6 Claims. (Cl. 222-525)

The invention relates to an improvement in a cap for containers containing a liquid or semi-viscous liquid and more particularly to a cap which provides a closure and a dispensing element, the cap being mounted on a neck of the container.

It is an object of the invention to provide a dispensing and closure cap for a container having a base member and a stopper member which is reciprocable longitudinally on a neck formation formed on the base, one of the members being molded of a relatively rigid plastic material and the other member of an elastic plastic whereby the elastic member may be deformed slightly to allow the two members to be joined together to complete the cap, the more rigid member lending materially to the stability of the cap.

Each member includes a construction which allows the same to be deformed slightly, if made of elastic plastic, whereby the two members may be joined to complete the cap. Although the construction of the cap allows deformation, the same provides for a highly effective and positive seal between the stopper and the base, and in addition provides for a positive sliding movement of the stopper with a minimum of lateral or canting movement of the stopper on the neck of the base. In addition, the construction of the stopper and the cooperating structure of the base allows the stopper to be made in one piece. It is a further feature to provide a hollow neck extending from the top of the base member, the neck being threadless with both the inner and outer surfaces smooth except for a stop shoulder formed internally of the neck.

It will not be here attempted to set forth and indicate all of the various objects and advantages incident to the invention, but other objects and advantages will be referred to in or else will become apparent from that which follows.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings, showing by way of example a preferred embodiment of the inventive idea wherein like numerals refer to like parts throughout.

In the drawings forming part of this application:

FIGURE 1 is a perspective view of the cap.

FIGURE 2 is an enlarged sectional view on the line 2-2 of FIGURE 1.

FIGURE 3 is an enlarged sectional view on the line 3-3 of FIGURE 1.

FIGURE 4 is a sectional view of the entire cap on the line 4-4 of FIGURE 2.

FIGURE 5 is a top plan view of the base with the stopper portion removed therefrom.

FIGURE 6 is an enlarged side elevation of the stopper removed from the base, a portion thereof being broken away.

FIGURE 7 is a bottom plan view of the stopper as shown in FIGURE 6.

Referring to the drawings in detail, the cap A includes the base 10 which is formed of the internally threaded cylindrical wall portion 12 adapted to be screwed on the threaded neck of a container. The base 10 is preferably molded of a plastic material and also includes the circular top portion 14 which has extending there-

through the axial circular opening 16 communicating with the inside of the wall portion 12 and which is bisected by the support bar 18 extending across a diameter of the opening 16. The support bar 18 is formed with the V-formation 20 at the lower edge thereof to facilitate flow of material past the same. Extending upwardly from the top edge of the support bar 18 and axially of the opening 16 is the elongated closure pin 22.

Also forming part of the base and extending outwardly of the top portion 14 and in axial alignment with the circular opening 16 is the hollow cylindrical neck portion 24 open at the outer end and which communicates with the opening 16. The neck is threadless and smooth surfaced except for the annular stop rib 26 formed internally thereof which has the inner edge portion 28 normal to the axis of the neck 24 and the angularly disposed annular edge portion 30. The annular stop rib 26 is interrupted at two or more places to aid in molding.

The numeral 32 designates a movable stopper member which is reciprocable longitudinally of the neck 24 from an inner, valve closed position, to an outer valve open position. The stopper 32 includes the hollow cylindrical body portion 34, the outer diameter of which is slightly less than the inner diameter of the neck 24. Formed on the outer lower edge of the body portion 34 of the stopper 32 is the annular stop flange 36, the upper edge 38 of which provides a shoulder. The outer diameter of the flange 36 is substantially that of the inside diameter of the neck 24 whereby sliding sealing contact is made between the flanges 36 and the inner surface of the neck.

Further provided is the upper annular guide and sealing flange 40 formed on the outer surface of the cylindrical stopper body portion 34 and spaced from the stop flange 36 sufficiently whereby it is outwardly of the inner stop rib 26 of the neck 24. The outer diameter of the flange 40 is substantially that of the inner diameter of the neck 24 whereby sliding sealing contact is made with the inner surface of the neck. The position of the sealing and guide flange 40 on the stopper is such that it remains in contact with the neck in the uppermost position of the stopper on the neck.

The stopper 32 also includes the outer circular top end portion 42 which has depending therefrom the annular outer flange portion 44 which is spaced from and overlying a portion of the cylindrical body portion 34. With the outer flange portion 44 spaced from the body portion 34 there is thereby formed the annular channel 46 therebetween into which the upper portion of the neck 24 extends. The inner surface of the outer flange 44 is formed with annular sealing rib 47, the inner diameter of which is substantially that of the outer diameter of the neck 24 whereby sliding sealing contact is made between the flange 44 and the neck. The outer flange 44 is flared as at 45 to allow easy gripping of the stopper for sliding movement of the same upon the neck.

The stopper member 32 is operatively mounted on the neck 24 by inserting the cylindrical body portion 34 of the stopper into the neck 24 and due to its resiliency or the resiliency of the neck 24 the same can be forced upon the neck whereby the stop flange 36 is passed downwardly and over the annular stop rib 26 to a position below or inwardly of the rib 26. The engagement of stop flange 36 with stop rib 26 limits the outward movement of the stopper on the neck.

The stopper 32 has formed in the top 42 thereof the axial outlet hole 48 which receives the closure pin 22 when the stopper is moved into closed position as shown in FIGURE 2. The hollow stopper body portion 34 includes the angular annular portion 50 which terminates in the cylindrical opening portion 52 which in turn

terminates in the frusto-conical portion 54 leading to the outlet hole 48.

The depth of the annular channel 46 and the length of pin 22 are such that when the upper edge of the neck 24 bottoms out in the bottom of the channel, the upper end of the closure pin extends fully into the outlet hole 48 to thereby close off the hole 48 by inwardly directed slidable movement of the stopper upon the neck.

To open the cap, the stopper 32 is pulled outwardly and slidably on the neck thereby withdrawing the pin 22 from the outlet hole 48, FIGURE 3, whereby material can be caused to flow past the support bar 18, the pin 22 and out the hole 48. The outward movement of the stopper 32 upon the neck 24 is limited by the stop flange 36 contacting the annular stop rib 26. The inward movement of the stopper to a closed position is limited by the upper edge of the neck 24 contacting the bottom of the channel 46.

The guide and sealing flange 40 guides the cap in its reciprocating movement and maintains a seal on the inner surface of the neck 24. The annular stop rib 26 of the neck 24 provides a stop shoulder for engagement with the edge 38 of stop flange 36 to limit the outward extent of movement of the stopper on the neck 24.

The annular sealing rib 47 of the stopper flange 44 makes sealing engagement with the outer surface of the neck 24 at all times and the rib 47 together with flange 40, and stop flange 36 not only provides effective sealing but positive effective guiding of the stopper in its sliding movement on the neck 24. Further guiding of the stopper is accomplished by the stop rib 26. Further sealing is effected between the neck 24 and the stopper 32 in closed position by reason of the upper edge of the neck bottoming out in the channel 46.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a two-piece closure and dispensing cap for the neck of a container, a cylindrical base having a top portion with an opening extending therethrough and a hollow cylindrical neck extending therefrom in axial alignment with said opening, an annular stop rib formed on the inner surface of said neck, a closure pin connected to said base and extending axially through the neck, a stopper member having a top portion and a hollow cylindrical body portion for reciprocable movement in said neck, an annular stop flange formed on the lower outer surface of said stopper body portion adapted to sealingly engage the inner surface of the neck and engage said stop rib in said neck, an annular sealing and guide flange formed on the outer surface of said stopper body portion and spaced from said stop flange adapted to sealingly engage the inner surface of the neck, an annular outer flange portion depending from said stopper top portion and spaced from said stopper body portion to form an annular channel surrounding a portion of said cylindrical body portion of said stopper, an annular sealing rib formed on the inner surface of said annular outer sealing and guide flange adapted to make slidable sealing contact with the outer surface of said neck, said top portion of said stopper having an outlet hole formed axially therethrough and adapted to receive said closure pin to close off said hole when said stopper is slidably moved inwardly on said neck with said neck within said annular channel.

2. In a two-piece closure and dispensing cap for the neck of a container, a cylindrical base having a top portion with an opening extending therethrough and a hollow cylindrical neck extending therefrom in axial alignment with said opening, an annular stop rib formed on the inner surface of said neck, a support bar extending across said opening, a closure pin extending from said

support bar axially through said neck, a stopper member having a top portion and a hollow cylindrical body portion for reciprocable movement in said neck, an annular stop flange formed on the lower outer surface of said stopper body portion adapted to sealingly engage the inner surface of the neck and engage said stop rib in said neck, an annular sealing and guide flange formed on the outer surface of said stopper body portion and spaced from said stop flange adapted to sealingly engage the inner surface of the neck, and annular outer flange portion depending from said stopper top portion and spaced from said stopper body portion to form an annular channel surrounding a portion of said cylindrical body portion of said stopper, an annular sealing rib formed on the inner surface of said annular outer flange adapted to make slidable sealing contact with the outer surface of said neck, said top portion of said stopper having an outlet hole formed axially therethrough, and adapted to receive said closure pin to close off said hole when said stopper is slidably moved inwardly on said neck with said neck within said annular channel.

3. In a two-piece closure and dispensing cap for the neck of a container, a cylindrical base having a top portion with an opening extending therethrough and a hollow cylindrical neck extending therefrom in axial alignment with said opening, an annular stop rib formed on the inner surface of said neck, a support bar extending across said opening, a closure pin extending from said support bar axially through said neck, a stopper member having a top portion and a hollow cylindrical body portion for reciprocable movement in said neck, an annular stop flange formed on the lower outer surface of said stopper body portion adapted to sealingly engage the inner surface of the neck and engage said stop rib in said neck, an annular sealing and guide flange formed on the outer surface of said stopper body portion and spaced from said stop flange adapted to sealingly engage the inner surface of the neck, an annular outer flange portion depending from said stopper top portion and spaced from said stopper body portion to form an annular channel surrounding a portion of said cylindrical body portion of said stopper, said top portion of said stopper having an outlet hole formed axially therethrough and adapted to receive said closure pin to close off said hole when said stopper is slidably moved inwardly on said neck with said neck within said annular channel.

4. In a two-piece closure and dispensing cap for the neck of a container, a cylindrical base having a top portion with an opening extending therethrough and a hollow cylindrical neck extending therefrom in axial alignment with said opening, stop means formed on the inner surface of said neck and spaced from the outer end of the neck, a support bar connected to said base and extending across said opening of said top portion thereof, a closure pin extending from said support bar axially through said neck, a stopper member having a top portion and a hollow cylindrical body portion of reciprocable movement in said neck, an annular stop flange formed on the lower outer surface of said stopper body portion adapted to sealingly engage the inner surface of the neck and engage said stop means in said neck, an annular sealing and guide flange formed on the outer surface of said stopper body portion and spaced from said stop flange adapted to sealingly engage the inner surface of the neck, an annular outer flange portion depending from said stopper top portion and spaced from said stopper body portion to form an annular channel surrounding a portion of said cylindrical body portion of said stopper, said top portion of said stopper having an outlet hole formed axially therethrough and adapted to receive said closure pin to close off said hole when said stopper is slidably moved inwardly on said neck with said neck within said annular channel.

5. In a two-piece closure and dispensing cap for the neck of a container, a cylindrical base having a top portion with an opening extending therethrough and a hollow

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cylindrical neck extending therefrom in axial alignment with said opening, stop means formed on the inner surface of said neck and spaced from the outer end of the neck, a closure pin connected to said base and extending axially through the neck, a stopper member having a top portion and a hollow cylindrical body portion for reciprocal movement in said neck, an annular stop flange formed on the lower outer surface of said stopper body portion adapted to sealingly engage the inner surface of the neck and engage said stop means in said neck, an annular sealing and guide flange formed on the outer surface of said stopper body portion and spaced from said stop flange adapted to sealingly engage the inner surface of the neck, an annular outer flange portion depending from said stopper top portion and spaced from said stopper body portion to form an annular channel surrounding a portion of said cylindrical body portion of said stopper, said top portion of said stopper having an outlet hole formed axially therethrough and adapted to receive said closure pin to close off said hole when said stopper is slidably moved inwardly on said neck with said neck within said annular channel.

6. In a two-piece closure and dispensing cap for the neck of a container, a cylindrical base having a top portion with an opening extending therethrough and a hollow cylindrical neck extending therefrom in axial alignment with said opening, stop means formed on the inner surface of said neck and spaced from the outer end of

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the neck, a closure pin connected to said base and extending axially through the neck, a stopper member having a top portion and a hollow cylindrical body portion for reciprocal movement in said neck, an annular stop flange formed on the lower outer surface of said stopper body portion adapted to sealingly engage the inner surface of the neck and engage said stop means in said neck, an annular outer flange portion depending from said stopper top portion and spaced from said stopper body portion to form an annular channel surrounding a portion of said cylindrical body portion of said stopper, said top portion of said stopper having an outlet hole formed axially therethrough and adapted to receive said closure pin to close off said hole when said stopper is slidably moved inwardly on said neck with said neck within said annular channel.

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