

[54] **PUSH-PULL CLOSURE WITH PROBE TO PREVENT CLOGGING**

[75] Inventor: **Robert E. Hazard**, North Kingston, R.I.

[73] Assignee: **Polytop Corporation**, Slatersville, R.I.

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[58] Field of Search 222/149, 521-525;
239/114-118

[56] **References Cited**

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Primary Examiner—Robert B. Reeves

Assistant Examiner—Francis J. Bartuska

Attorney, Agent, or Firm—Edward D. O'Brian

[57] **ABSTRACT**

A dispensing closure constructed so as to include a closure base adapted to be mounted on a container and a spout member movably mounted on the base so as to be capable of being moved relative to the base without being detached from the base between opened and closed positions can be improved through the incorporation of an elongated, flexible probe mounted on the base. The probe used is located on the base so as to extend into a passage in the spout. When the spout member is moved from the opened position to the closed position, the probe extends an increasing distance into this passage so as to tend to push from the passage any material which may have accumulated within the passage. The passage and the probe are dimensioned so that the probe does not interfere with the movement of material through the passage when the spout member is in an opened position.

3 Claims, 4 Drawing Figures

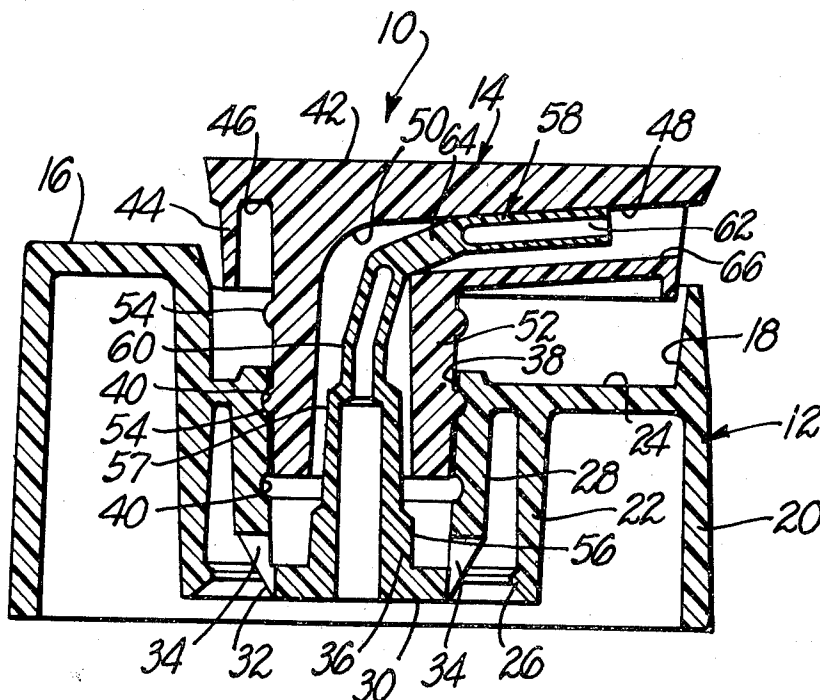


FIG. 1.

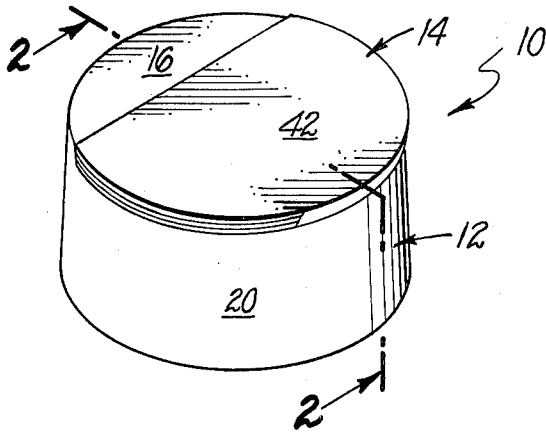


FIG. 2.

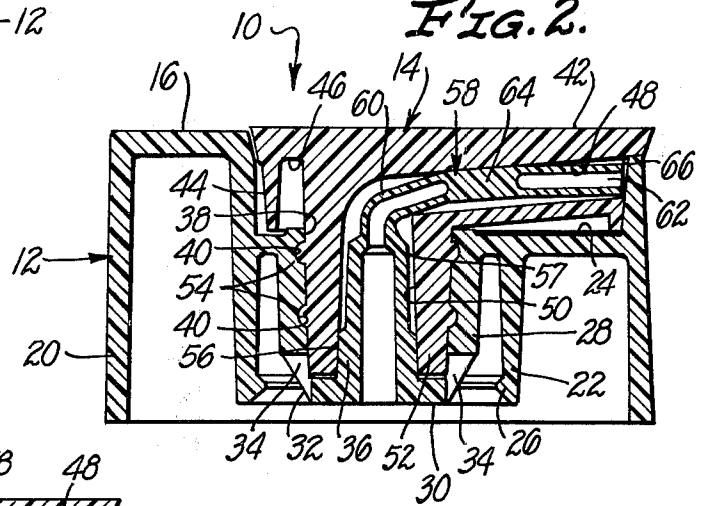


FIG. 3.

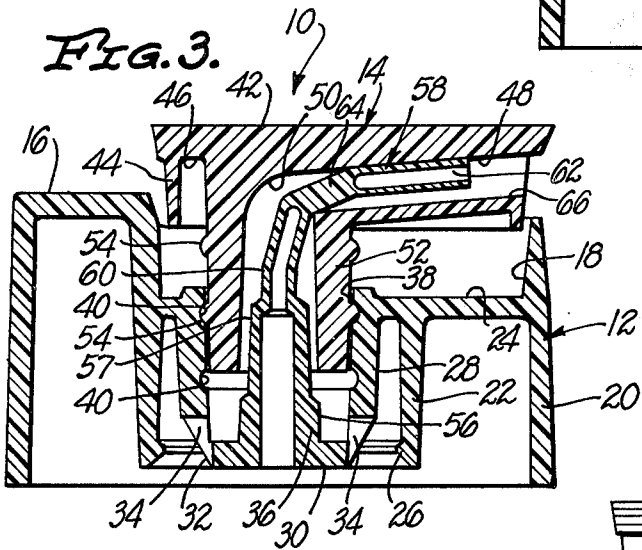
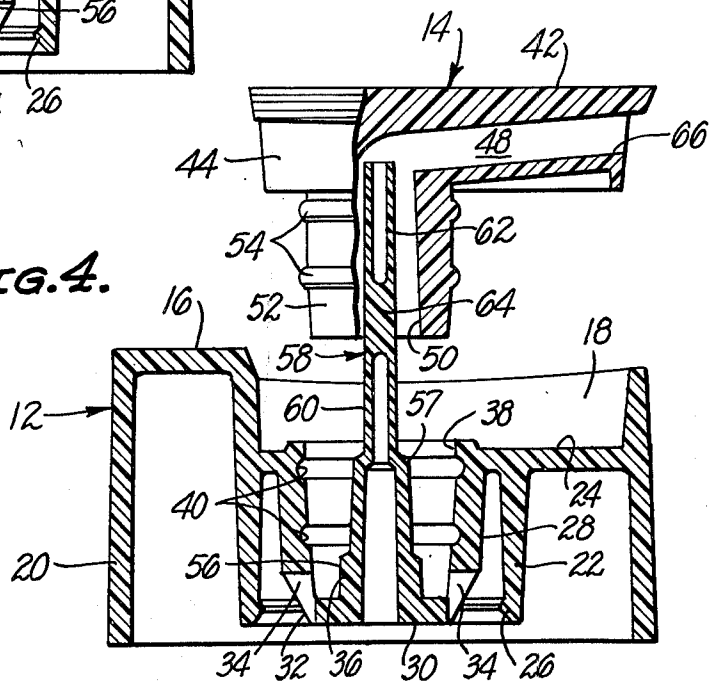


FIG. 4.



PUSH-PULL CLOSURE WITH PROBE TO PREVENT CLOGGING

BACKGROUND OF THE INVENTION

The invention set forth in this application pertains to new and improved dispensing closures and is primarily directed towards new and improved push-pull type dispensing closures.

Although such dispensing closures may be constructed in a number of specific ways they are normally constructed so as to include a closure base adapted to be mounted on a container and a spout member movably mounted on the base so as to be capable of being moved linearly relative to the base without being detached from the base between an opened and closed positions. Normally a push-pull type of dispensing closure will be constructed so as to include a plurality of passages extending through the base and what may be regarded as a valve seat located on the base adjacent to these passages.

With this type of structure the spout member includes an internal passage extending between its extremities and what may be regarded as an internal valve body. This valve body is located on the closure base so that when the spout member is in the closed position this valve body-like portion seats against the valve seat so as to seal off the passages extending through the closure body.

Dispensing closures of a push-pull type as indicated in the preceding discussion are unquestionably highly utilitarian. On occasion they are utilized in dispensing products which for one reason or another do not drain adequately from the passage in the spout member in such a closure. The reasons for this are immaterial to an understanding of this invention. As a consequence of this, however, on occasion such material may be retained within the spout member when the spout member is moved from an opened to a closed position.

Any such retained material is apt to at least in part dry out and/or become contaminated. When a dispensing closure as indicated having such an accumulation of material in the spout member is opened and used, the movement of material through the spout member will either be impeded by such accumulated material and/or such accumulated material will be discharged before other material from within the container. Both of these consequences are of an undesirable character. An individual using the dispensing closure normally expects to obtain fresh product from within a container through such a closure.

SUMMARY OF THE INVENTION

As a consequence of this, it is considered that there is a need for improvement in the field of dispensing closures of this type indicated. More specifically it is felt that there is a need to improve push-pull type dispensing closures so as to avoid the accumulation and/or so as to minimize the accumulation of material within the passage in a spout member in such a closure. An object of the invention is to fulfill this need. Other objects of this invention are to provide structures to fulfill this need which are not significantly more expensive than known dispensing closures, which can be easily assembled and used and which are effective for a relatively prolonged period for their intended purpose or function.

In accordance with this invention, these objectives are achieved in a dispensing closure having a closure base and a spout member, said closure base being adapted to be attached to a container and having passage means extending therethrough, said spout member having a passage extending therethrough and being mounted on said base so as to be movable between an opened position in which the spout member is spaced from the passage means and a closed position in which the spout member fits against the base adjacent to the passage means so as to close off the passage means by the improvement which comprises: an elongated, flexible probe means located on the base so as to extend into the passage in the spout member, the probe means being sufficiently long so as to extend nearly through this passage when the spout member is in the closed position.

BRIEF DESCRIPTION OF THE DRAWING:

Inherently a summary such as the foregoing is incapable because of its length of indicating many aspects, features, advantages and the like of an invention. Such items will be apparent from a detailed consideration of the remainder of this specification, including the appended claims and the accompanying drawing in which:

FIG. 1 is an isometric view of a presently preferred embodiment or form of a dispensing closure of the invention in a closed position;

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

FIG. 3 is a cross-sectional view corresponding to FIG. 2 showing the orientation of parts with the closure in an open position;

FIG. 4 is an expanded cross-sectional view corresponding to FIG. 2 indicating the manner of assembly of the illustrated closure in which a part of the closure is shown in elevation.

The closure illustrated in the drawing and subsequently discussed in this specification utilizes certain essentially intangible features or concepts as are verbally set forth or summarized in the appended claims. Those skilled in the art of the design of dispensing closures will realize that these concepts can be employed in a wide variety of differently appearing and/or somewhat differently constructed dispensing closures through the exercise of routine skill in this art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

In the drawing there is shown a closure constructed in accordance with this invention so as to utilize a closure base or body 12 and a spout member 14. Preferably both of these parts are constructed or formed in a known manner out of a somewhat resilient material such as a polyethylene as is commonly used for dispensing closures so that these two parts 12 and 14 may be snapped or popped together.

The base 12 is of a generally cylindrical configuration and includes a flat top 16 within which there is an enlarged recess 18. A decorative skirt 20 extends from the edge of the top 16 and around part of the recess 18 in a downward direction. A conventional mounting skirt 22 extends from the bottom 24 of the recess 18 concentrically within the skirt 20. A conventional sealing flange or bead 26 is preferably located on the skirt 22 in a position where it will mate with a correspond-

ingly shaped element on a container neck (not shown) inserted into the skirt 22. It is to be understood that the shape of this mounting skirt 22 can be changed in accordance with conventional practice.

Within the closure 10 a cylindrical, plug-like member 28 is also attached to the bottom 24 of the recess 18. This member 28 is concentric with the two skirts 20 and 22 and is located within the skirt 22. If desired its exterior may be shaped so as to fit closely within the interior of the container neck (not shown) referred to in the preceding. The bottom of the member 28 is closed off by a wall 30. This wall 30 is preferably segregated from the remainder of the member 28 by a beveled wall 32 in which there are located at least one and preferably a plurality of slot-like passages 34 leading through the base 12 into the interior of the member 28.

The wall 30 also carries an internal, hollow stepped pillar 36 which extends concentrically within the member 28 and the skirts 20 and 22. This pillar 36 extends approximately to the level of an enlarged opening 38 leading through the bottom 24 of the recess 18 into the interior of the member 28. Two spaced, parallel grooves 40 are located within the interior of this member 28 in a plane transverse to the axis of the member 28 above the passages 34 and between these passages 34 and the bottom 24 of the recess 18.

The spout member 14 is formed so as to include a generally flat top 42 which, when the spout member 14 is in a closed position completely covers the recess 18 and slightly overhangs the edge of the skirt 20 in such a manner that this spout member 14 may be manually engaged. A small, dependent flange 44 completely extends around the bottom 46 of the top 42 so as to fit within the recess 18 in normal open and closed positions of the spout member 14. This flange 44 in effect serves as an alignment means preventing twisting of the spout member 14 as it is moved.

The spout member 14 also preferably includes a dependent, enlarged conduit 48 located nearly parallel to the top 42 and extending through the flange 44 generally along the top 42 at a nearly horizontal, downwardly descending angle into the interior 50 of a closure member 52. The conduit 48 and the interior 50 in effect define a dispensing passage. This closure member 52 is of a nearly cylindrical shape and is attached to the top 42 so as to depend from it and so as to extend into the space between the member 28 and the pillar 36. The exterior of this closure member 52 is provided with two extending, annular beads 54 which are parallel to one another in planes transverse to the axis of the member 52 and which are spaced from one another distances corresponding to the distance between the two grooves 40.

This closure member 52 is dimensioned so as to fit within the member 28 in such a manner that it may be moved through the application of a downwardly directed force from a preassembled position as shown in FIG. 4 to an opened position as shown in FIG. 3 and then to a closed position as shown in FIG. 2 by a temporary deformation type of action in which the beads 54 are "snapped" or "popped" into grooves 40 so as to be in a sealed relationship with the interior of the member 28. The interior 50 is preferably slightly tapered as shown so that when the spout member 14 is in an opened position as indicated in FIG. 3 this interior is in communication with the passages 34. This tapered shape of the interior 50 enables the closure member 52

to fit tightly against a base 56 of the pillar 36 so as to form a seal therewith when the spout member 14 is in a closed position. Thus, this closure member 52 acts as a valve member or body which respect to the member 28 and the pillar 36 so as to seal off the passages 34 in much the manner in which a valve member or body fits against a valve seat.

The uppermost extremity 57 of the pillar 36 is formed integrally with an elongated, flexible probe 58 which extends through the interior 50 and into the conduit 48 so as to be adjacent to the end of this conduit 48 remote from the closure member 52 when the spout member 14 is in a closed position. This probe 58 has a hollow bottom 60 which is in communication with the interior of the pillar 36 and a hollow end 62 separated from the bottom 60 by a centrally located solid portion 64. This structure is designed so that the probe 58 will flex and give so as to turn the corner between the interior 50 of the closure member 52 and the conduit 48 as the spout member 14 is moved in various positions as indicated in the preceding discussion.

This probe 58 is, however, sufficiently rigid so as to be capable of exercising a pushing action against any material which may be accumulated in the conduit 48 as the spout member 14 is moved to a closed position. The probe 58 is also sufficiently small as to not interfere with the passage of material through what in effect is a passage constituted or defined by the interior 50 of the conduit 48. Preferably the end 62 is dimensioned so as to fit reasonably closely within the end 66 of the conduit 48 when the spout member 14 is in a closed position. Preferably also this passage gradually increases in diameter from the end 66 back towards the interior of the closure 10.

It is believed that it will be obvious how the closure 10 operates from the preceding description. This closure is a simple effective structure for its intended purpose which may be manufactured without significant difficulty at a comparatively nominal cost. Although the principles of the invention can be applied to any dispensing closure in which a spout member is moved with respect to a closure base so that there is relative displacement between the closure base and the spout member it is preferred to utilize the invention with a structure as shown in which a passage or passage structure in the spout delivers material to the side of a dispensing closure. With this type of construction the closure can have a completely flat top. Such a top is desirable for aesthetic reasons as well as for utilitarian reasons such as stacking and the like.

Further with the structure shown any material which for one reason or another might not be displaced from within the passage by the probe 58 will to a degree be sealed against drying out or contamination because in the closed position the spout member 14 fits completely within the recess 18. Also the end 62 is preferably dimensioned so as to effectively or nearly close off the end 68 when the spout member 14 is in a closed position. Thus, with the preferred structure illustrated it may be regarded that three different closing actions are involved along with the action of pushing material from the spout member. The combination of these features is considered desirable. However, effects in accordance with the broad aspects of the invention can be achieved with structures in which the spout member 14 is merely directed vertically.

I claim:

1. A dispensing closure having a closure base and a spout member, said closure base being adapted to be attached to a container and having passage means extending therethrough, said spout member having a discharge passage extending therethrough and being mounted on said base so as to be movable between an opened position in which said spout member is spaced from said passage means and in which said discharge passage is in communication with said passage means and a closed position in which said spout member acts as a valve member and fits against said base adjacent said passage means so as to close off said passage means from said discharge passage in which the improvement comprises:

one portion of said discharge passage being at an angle to another portion of said discharge passage, an elongated, flexible probe means located on said base so as to extend into said discharge passage in said spout member for displacing material from within the interior of said discharge passage when said spout member is moved from said open position to said closed position, said probe means being sufficiently long so as to extend nearly through said discharge passage in said spout member when said spout member is in said closed position, and being sufficiently flexible so as to bend intermediate its ends to accommodate changes in position of said spout member and said discharge passage relative to said closure base said spout member terminating in an end remote from said passage means, said end fitting against a portion of said closure base when said spout member is in said closed position.

2. A dispensing closure as claimed in claim 1 wherein:

portions of said probe means which are displaced from one another along the length of said probe means are more flexible than other portions of said probe means so as to facilitate the bending of said probe means as said spout member is moved between opened and closed positions.

3. A dispensing closure having a closure base and a spout member, said closure base being adapted to be attached to a container and having passage means extending therethrough, said spout member having a passage extending therethrough and being mounted on said base so as to be movable between an opened posi-

tion in which said spout member is spaced from said passage means and a closed position in which said spout member fits said base adjacent said passage means so as to close off said passage means in which the improvement comprises:

an elongated, flexible probe means located on said base so as to extend into said passage in said spout member for displacing material from within the interior of said passage when said spout member is moved from said open position to said closed position, said probe means being sufficiently long so as to extend nearly through said passage in said spout member when said spout member is in said closed position,

said closure base having a top which has a recess formed therein,

said spout member fitting within said recess in said closed position and including guide means for guiding said spout member with respect to said recess so that said spout member will not rotate as it is moved between opened and closed positions,

said passage extending vertically and horizontally within said spout member so as to terminate in a discharge end which is directed horizontally and which is located within said recess when said spout member is in said closed position and which is spaced from said recess when said spout is in said open position, said end being convered when said spout member is in said closed position,

said passage increasing in dimension from said discharge end towards the other end of said passage, portions of said probe means being more flexible than other portions of said probe means so as to accommodate flexure of said probe means during movement of said spout member between said opened and closed positions,

the extremity of said probe means closest adjacent to said discharge end fitting closely within said discharge end when said probe means is in said closed position,

said probe means being dimensioned so as to be smaller than said passage so that material may move through said passage when said spout member is in said open position.

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