

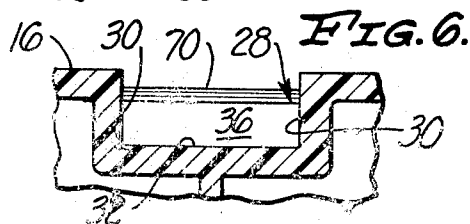
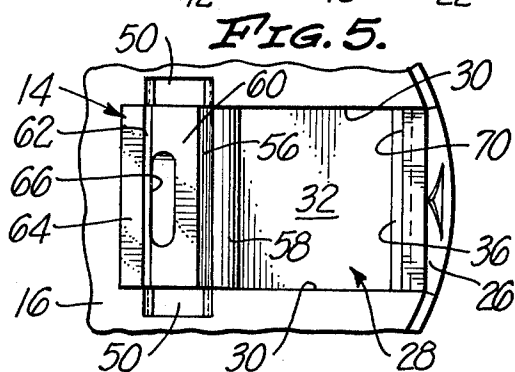
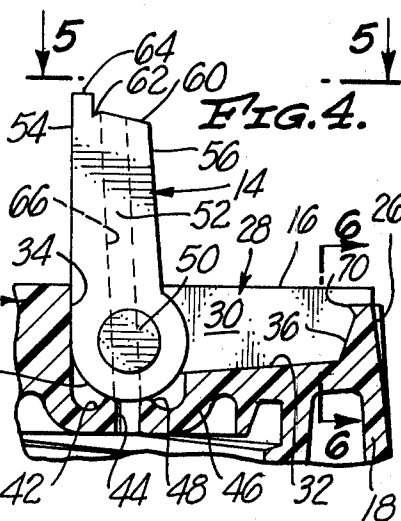
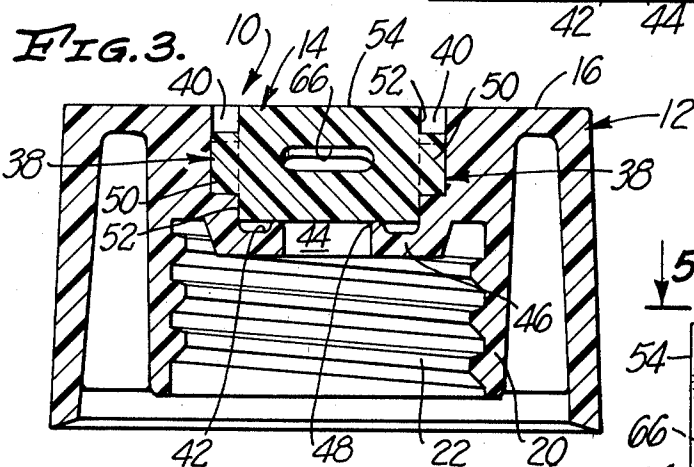
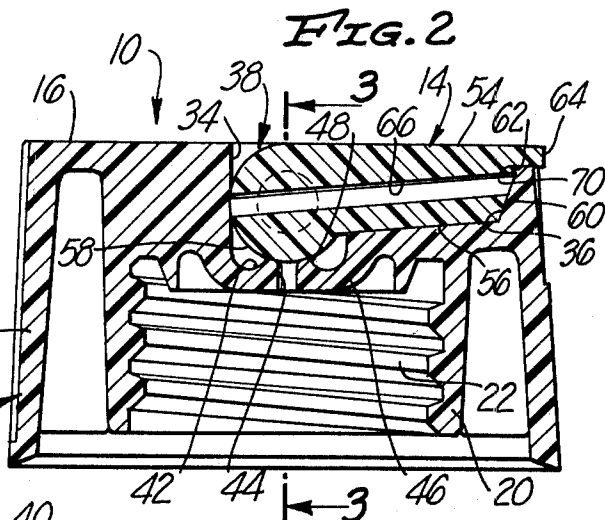
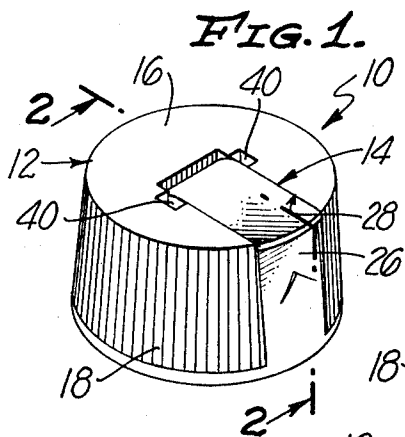
Nov. 11, 1969

R. E. HAZARD

3,477,618

DISPENSING CLOSURE

Filed June 10, 1968



INVENTOR
ROBERT E. HAZARD
BY
EDWARD D. O'BRIAN
ATTORNEY

1

3,477,618

DISPENSING CLOSURE

Robert E. Hazard, North Kingstown, R.I., assignor to
Polytop Corporation, Slatersville, R.I., a corporation
of Massachusetts

Continuation-in-part of application Ser. No. 654,779,
July 20, 1967. This application June 10, 1968, Ser.
No. 735,697

Int. Cl. B67d 3/00

U.S. Cl. 222—534

3 Claims

ABSTRACT OF THE DISCLOSURE

A dispensing closure is disclosed having a spout rotatably mounted on a closure body so that the spout may be rotated between open and closed positions. With this closure in an open position, a straight passage through the spout is aligned with a hole in the closure body, and in a closed position the spout seals off the hole in the closure body and both ends of the passage through this spout are closed by the closure body.

CROSS-REFERENCE

This application is a continuation-in-part of my application Ser. No. 654,779 filed July 20, 1967, now abandoned.

BACKGROUND OF THE INVENTION

This invention is directed to a dispensing closure in which a spout is rotatably mounted on a closure body so as to be capable of being rotated between open and closed positions. Millions of such closures have been manufactured and used in connection with the packaging of various fluid materials. Such closures normally have a passage within the spout which is aligned with a hole in the closure body when the spout of the closure is in an open position. In such a closure, in the closed position the hole in the closure body is sealed off by the spout.

A difficulty has been encountered in use of such closures with certain types of materials which, although fluid in a technical sense, are relatively viscous in character. This difficulty is related to the problem of entrapment of material in a spout in such a closure as the spout is turned from an open position to the closed position. Generally, the spouts in this type of closure are held vertically when they are being closed. Because of this, during the closing operation any fluid which flows relatively easily tends to drain back into the container to which the closure is attached. However, not all fluids will so flow.

As an example of this, various viscous materials such as toothpaste, various food items, some hand lotions and the like will, when used with the type of dispensing closure indicated, tend to adhere to the interior of the spout in such a closure. As a result of this they will be trapped, to a degree, in the spout of such a closure as the spout is moved to a closed position. If an end of the passage in such a spout is directly exposed to the atmosphere, the material in the spout is open to contamination. Further, the material which hangs up in the spout of a normal dispensing closure tends to dry out, making the movement of further material through such a spout difficult. With food items, there is a danger of spoilage within such a spout in the prior type of dispensing closures indicated in the preceding.

SUMMARY OF THE INVENTION

An object of this invention is to provide new and improved dispensing closures of the rotatable spout category with which there is no, or substantially no danger of con-

2

tamination, spoilage, drying or the like of material within the passage in the spout. An object of the present invention is to provide dispensing closures in which this objective is achieved by closing both of the ends of the passage in the spout when the spout is in a closed position. Further objects of this invention are to provide dispensing closures of this category which are relatively inexpensive, which are easy to use, and which are effective for their intended purposes.

A further object of the invention is to provide dispensing closures which are more attractive in appearance because the outer end of the passage through the dispensing spout is concealed by the closure body when the spout is disposed in closed position. The dispensing closures accordingly resemble conventional non-dispensing closures in appearance.

Another object of the invention is to provide dispensing closures in which the top wall of the spout is substantially longer than the bottom wall, to provide a protruding lip for manually moving the spout to open position. The portion of the closure body skirt which is disposed directly beneath the protruding lip of the spout is preferably provided with a vertically directed recess, so that the top wall of the spout need not protrude substantially beyond the periphery of the remainder of the skirt.

It is among the objects of the invention to provide dispensing closures in which, if desired, interengaging detent means may be provided between the outer end of the spout and the inner wall of the closure body for holding the spout in closed position.

These various objects of this invention are achieved by providing dispensing closures having a closure body and a spout rotatably mounted on the closure body so as to be capable of being rotated between open and closed positions, the spout having a straight passage extending therethrough which is aligned with a hole in the closure body when in an open position and which is closed at both ends by the closure body when in a closed position, the spout also sealing the hole in the closure body in this closed position.

The actual details of the present invention, as well as many advantages of it, will be apparent from a careful consideration of the remainder of this specification, the attached claims more fully defining the invention, and the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawing:

FIG. 1 is an isometric view of a dispensing closure of this invention with the spout 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 taken at line 3—3 of FIG. 2;

FIG. 4 is a partial cross-sectional view corresponding to FIG. 2 showing the spout in an open position; the spout in this view being shown in elevation;

FIG. 5 is a partial top plan view taken at line 5—5 of FIG. 4; and

FIG. 6 is a partial cross-sectional view taken at line 6—6 of FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

In the drawing there is shown a dispensing closure 10 which represents a presently preferred embodiment or form of the invention. From a consideration of this description, it will be recognized that various closures using the invention concepts of this invention as defined by the appended claims may be designed and constructed on the basis of this disclosure through the use and exercise of routine engineering skill.

The closure 10 has a closure body or cap 12 and a rotatable spout 14. This body 12 includes a flat top 16, an outer, peripheral dependent skirt 18, and an inner dependent skirt 20. The inner skirt 20 is preferably provided with internal threads 22 serving as a means for attaching the closure 10 to a container. Other equivalent conventional structures for this same purpose may be employed.

The top 16 of the body 12 is constructed so as to include a radially extending cavity 28 having parallel side walls 30, a bottom wall 32 and substantially vertical inner and outer end walls 34 and 36. With this structure, aligned bearing openings 38 extend from the top 16 and from the side walls 30 in the center region of the top 16. The bearing openings 38 may be of a character as are set forth in the Wilson et al. Patent No. 2,793,795, issued May 28, 1977, entitled "Dispensing Closures" or as set forth in the Wilson application Ser. No. 574,972, filed Aug. 25, 1966, entitled "Dispensing Closures." In the interest of brevity these openings are not described in detail herein. The entire disclosures of the Wilson patent and application are incorporated herein by reference. Each of such bearing openings 38 is provided with an entrance 40 of restricted dimensions.

Between the bearing openings 38 and the bottom wall 32 there is located what can be described as a dish-out cavity 42. A vertically directed hole 44 extends from the center of this cavity 42 through a wall 46 into the interior of the inner skirt 20. Within the cavity 42 a small sealing member 48 extends completely around the hole 44. This sealing member is preferably constructed as set forth in the Akers application Ser. No. 439,515, filed Mar. 2, 1965, entitled "Sealing Structure." The entire disclosure of this application is incorporated herein by reference. It is also possible to use other suitable sealing means.

The spout 14 is provided with aligned trunnions 50 which extend from side walls 52. These side walls 52 are connected by a top wall 54, a bottom wall 56, and a cylindrical end wall 58. The trunnions 50 are coaxial with the cylindrical end wall 58. The walls 52 are also connected by an end wall 60 of the spout 14. The entire spout 14 has a centrally located internal passage 66 extending in a straight line between the cylindrical end wall 58 and the end wall 60.

The outer end of the top wall 54 of the spout 14 is provided with an integral lip 64 which extends a substantial distance beyond the outer end of the bottom wall 56. The upper edge of the outer end wall 36 of the cavity 28 forms a ledge which is disposed beneath the top of the closure body 12 a distance substantially corresponding to the thickness of the lip 64 of the spout 14.

The skirt 18 of the closure body 12 is preferably provided with a vertically directed recess 26 which terminates at the upper end wall 36.

When the spout 14 is in closed position, the lip 64 extends across the upper edge of the outer end wall 36 and also across the upper end of the recess 26, so that the finger or fingernail of the user may be moved vertically upwardly along the recess 26 into engagement with the lip 64 to manually pivot the spout 14 upwardly to open position.

Both the body 12 and the spout 14 are preferably formed by common injection molding techniques out of a material such as a polyolefin capable of temporary deformation and possessing sufficient physical strength when relatively thick so as to be capable of being handled, moved and the like. These parts may be formed of various common grades of linear and nonlinear polyethylene, polypropylene and the like. When so formed, the spout 14 may be assembled upon the body 12 by locating the spout 14 so that the trunnions 50 are located above the entrance 40 to the bearing openings 38 and then applying force to the spout so as to temporarily deform the bearing openings 38 until the trunnions 50 are located within them. At this point the spout 14 can be rotated between a closed

position, as indicated in FIG. 2, and an open position as indicated in FIG. 4.

In this open position, the passage 66 is aligned with and forms a vertically directed extension of the hole 44 so that the material may be dispensed by the entire closure 10. In this configuration, the inner end wall 58 of the spout 14 engages the sealing member 48, so that a seal is formed around the junction between the hole 44 and the passage 66. When the spout 14 is rotated from a vertically directed open position, as shown in FIG. 4, to a horizontally directed closed position, as shown in FIG. 2, the sealing member 48 engages the cylindrical inner end wall 58 of the spout 14 in such a manner as to completely close and seal off the hole 44. When the spout 14 is in closed position, the inner end wall 58 of the spout 14 either fits against or is disposed in close proximity to the inner wall 34 of the cavity 28, so as to conceal and close off the inner end of the passage 66. Simultaneously, the outer end wall 60 of the spout 14 either fits against or is disposed in close proximity to the outer end of the passage 66.

It will be understood that if an actual seal is required, the spout 14 and cavity 28 can be dimensioned so that both ends of the passage 66 abut and make sealing engagement with the inner end wall 34 and outer end wall 36 of the cavity 28. With many materials, however, it is sufficient if the ends of the passage 66 do not actually engage the walls 34 and 36, but are merely disposed in sufficiently close proximity to them so that the walls 34 and 36 conceal both ends of the passage 66 and close them against directly open exposure to the atmosphere.

The outer end wall 60 of the spout 14 may, if desired, be provided with a small depression 62 extending completely or partially across the outer end of the spout 14. The upper edge of the outer end wall 36 of the cavity 28 may then be provided with a complementarily formed inwardly directed bead 70. The bead 70 and the depression 62 are adapted to engage and form a detent type of locking means for holding the spout 14 in a closed position. From this position, the spout 14 may be released and moved to an open position by the lip 64 being engaged by the finger or fingernail of the user brought up along the outer skirt 18 through the recess 26.

In such an open position, the closure 10 may be used for dispensing purposes. Normally, when such a closure is to be closed it will be located so that the spout is vertical, or substantially vertical. Various materials which flow easily will drain back through the passage 66 in the spout 14 when the spout is held in this manner so as to pass through the hole 44. Some relatively viscous or sticky materials, however, will not flow in this manner. This invention is considered to have its greatest utility with such materials. With them, it is immaterial if some material "hangs up" within the passage 66 since both ends of this passage are effectively sealed in the closed position. Such sealing prevents contamination, drying out, and various types of spoilage.

In order to facilitate the use of the closure 10 with certain relatively difficult-to-flow materials, such as toothpaste, some foodstuffs and the like, it may be desirable for both the passage 66 and the hole 44 to be of the same elongated slot-like configuration shown in the drawing. It is to be understood, however, that the hole 44 and the passage 66 may be of any other configurations.

It is also to be understood that the complete dispensing closure 10 may be modified in various other ways. Although one manner of forming this closure so that the spout 14 is rotatably mounted on the body 12 has been illustrated, any other structures which achieve the same result may be used. Because of the nature of this invention and the fact that it is susceptible to such modifications, the invention itself is to be considered as being limited solely by the appended claims forming a part hereof.

I claim:

1. A dispensing closure having a closure body, a spout

5

rotatably mounted in a cavity in said closure body, said body having a vertically directed hole formed therein, said spout having a passage extending in a straight line through the entire length of said spout, sealing means surrounding the hole in said body, said spout being adapted to be rotated between a vertically directed open position in which the inner end of said spout is aligned with and forms a vertical extension of said hole and said sealing means forms a seal around the junction between said hole and the inner end of said passage and a horizontally directed closed position in which the inner end of said passage is out of alignment with said hole and said sealing means engages the inner end of said spout to form a seal around said hole, said cavity having a substantially vertically directed inner end wall disposed adjacent to the inner end of said spout, the inner end of said passage being disposed adjacent to said inner end wall of said cavity when said spout is in closed position, so that said wall conceals and substantially closes the inner end of said passage, said cavity having a substantially vertically directed outer end wall disposed adjacent to the periphery of said body, the outer end of said passage being disposed adjacent to said outer wall when said spout is in closed position, so that said wall conceals and substantially closes the outer end of said passage:

said spout having a substantially flat top wall, said body having a substantially flat top, said top wall of said spout being substantially flush with the top of said body when said spout is disposed in closed position, said spout and passage extending vertically upwardly from the top of said body when said spout is disposed in open position;

said top wall of said spout having a lip at the outer end thereof, said lip extending beyond the adjacent outer edge of said body when said spout is disposed in closed position to provide means for manually engaging said lip for rotation of said spout to open position;

the upper edge of said outer wall of said cavity being spaced from the top of said body a distance substantially equal to the thickness of said lip, said lip extending across said upper edge when said spout is in position so that the top wall of said spout is substantially flush with the top wall of said body when said spout is in closed position.

2. The structure described in claim 1, said lip extending beyond said outer wall of said cavity, but not extending substantially beyond the outer peripheral edge of the top of said body when said spout is disposed in closed position.

3. A dispensing closure having a closure body, a spout rotatably mounted in a cavity in said closure body, said body having a vertically directed hole formed therein,

6

said spout having a passage extending in a straight line through the entire length of said spout, sealing means surrounding the hole in said body, said spout being adapted to be rotated between a vertically directed open position in which the inner end of said spout is aligned with and forms a vertical extension of said hole and said sealing means forms a seal around the junction between said hole and the inner end of said passage and a horizontally directed closed position in which the inner end of said passage is out of alignment with said hole and said sealing means engages the inner end of said spout to form a seal around said hole, said cavity having a substantially vertically directed inner end wall disposed adjacent to the inner end of said spout, the inner end of said passage being disposed adjacent to said inner end wall of said cavity when said spout is in closed position, so that said wall conceals and substantially closes the inner end of said passage, said cavity having a substantially vertically directed outer end wall disposed adjacent to the periphery of said body, the outer end of said passage being disposed adjacent to said outer wall when said spout is in closed position, so that said wall conceals and substantially closes the outer end of said passage, said spout having a top wall and a bottom wall, said top wall having a lip at the outer end thereof;

complementarily formed detent means carried by the outer end of said spout and the outer end wall of said cavity, said detent means being engagable upon the movement of said spout to closed position to hold said spout in such closed position;

said detent means comprising a depression extending transversely across a substantial portion of the outer end of said spout directly beneath said lip and a complementarily formed bead extending transversely across a substantial portion of said outer end wall of said cavity directly beneath the upper edge thereof.

References Cited

UNITED STATES PATENTS

3,089,626	5/1963	Kubilunas	222—536 X
3,163,337	12/1964	Wilson	222—534
3,181,743	5/1965	Libit et al.	222—538 X
3,194,441	7/1965	Brown	222—538 X
3,255,930	6/1966	Woodard	222—534 X
3,318,494	5/1967	Porter et al.	222—534

ROBERT B. REEVES, Primary Examiner

FREDERICK R. HANDREN, Assistant Examiner

U.S. Cl. X.R.

222—536, 538