

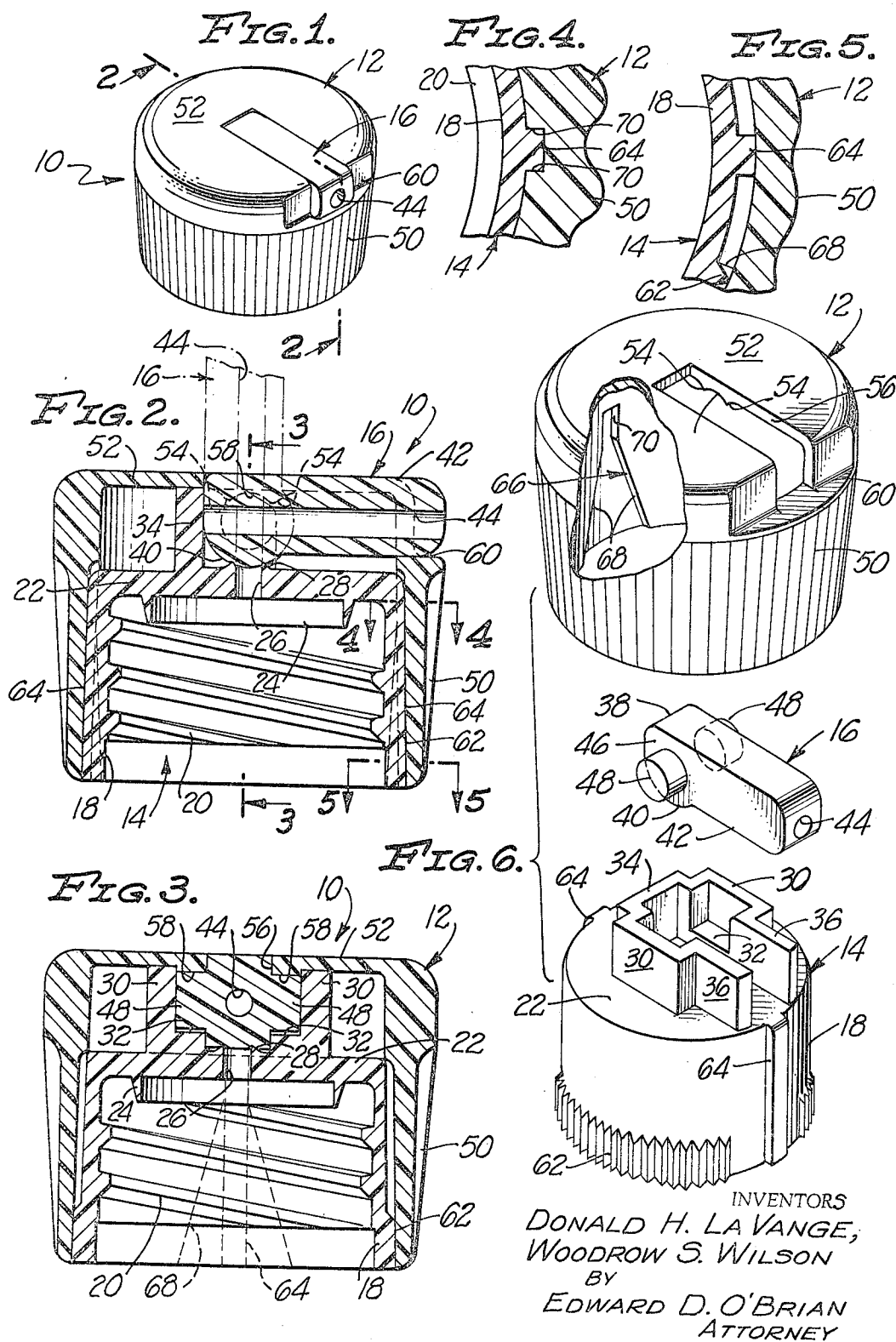
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DISPENSING CLOSURES

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DISPENSING CLOSURES

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8 Claims

ABSTRACT OF THE DISCLOSURE

Three-piece dispensing closures having a cap, a lid and a spout member are disclosed. The lid in such a closure is located over the cap in such a manner as to hold the spout member in a sealed relationship with a hole in the cap so that the spout member may be rotated between open and closed positions. With this structure the lid can be formed at a nominal cost so as to have a desired external configuration for a specific application and different lids can be used with a single cap and a single spout member.

A dispensing closure structure of this type is considered to have a number of significant advantages which are not readily apparent from considering a brief summary of this structure as given in the preceding. With a device of this type the lid can be formed of virtually any external configuration desired for a specific application at a comparatively nominal cost. Because of this with the same internal or cap members and spout members it is possible to utilize a wide variety of different lids having different external configurations as may be desired by purchasers, as, for example, so as to distinguish the goods of one purchaser from the goods of another.

Other advantages of the dispensing closure as indicated in the preceding are comparatively low cost and reliability. In these structures sealing reliability may be achieved with a minimum of difficulty. Dispensing closures as indicated can be formed of parts which are easily and conveniently created by common plastic molding techniques without the use of undercuts, or significant undercuts, from relatively inexpensive dies. These parts are also capable of being easily and conveniently assembled. Dispensing closures constructed as indicated are believed to be particularly adapted to automated assembly as compared to prior "snap in" and otherwise assembled closures of the related category.

A dispensing closure as indicated can be manufactured so that the lid and cap members described have substantially uniform wall thicknesses, and so that the walls of these parts are comparatively thin. From a manufacturing standpoint this is considered to be advantageous. This is because with comparatively "heavy" and/or thick and/or non-uniform walls in "plastic" parts such as are required in prior related closures manufacturing difficulties are frequently encountered. Such difficulties frequently involve problems pertaining to shrinkage of material within these parts and molding cycles.

Various other advantages of dispensing closures of this invention will be apparent to those skilled in the construction and manufacture of these closures from a careful consideration of the remainder of this specification, the appended claims, and the accompanying drawing in which:

FIG. 1 is an isometric view of a dispensing closure of this invention;

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;

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FIG. 4 is a partial cross-sectional view taken at line 4—4 of FIG. 2;

FIG. 5 is a partial cross-sectional view taken at line 5—5 of FIG. 2; and

FIG. 6 is an exploded view showing in isometric projection the parts of the dispensing closure illustrated in the preceding figures, one of these parts being partially broken away so as to indicate a part of its internal construction.

The accompanying drawing is not to be taken as limiting the invention in any way. Those skilled in the art of dispensing closures will realize that a wide variety of differently appearing and differently constructed dispensing closures may be designed and created through the use or exercise of routine engineering skill on the basis of the disclosures embodied within the drawing, this specification and the appended claims. For this reason the invention is to be considered as being limited solely by these claims.

The invention is best more fully explained by referring to the accompanying drawing. Here there is shown a dispensing closure 10 of the rotatable spout type having a lid 12, an internal member or cap 14, and a dispensing or spout member 16. Preferably the cap 14 is formed out of a somewhat resilient material such as various common polyolefins of which linear and non-linear polyethylene are common examples so as to be capable of limited deformation in forming a seal when contacted as hereinafter described by the spout member 16. Various other equivalent materials can, of course, be used in forming the cap 14. Any such materials should be sufficiently rigid when present in a moderately thick section so as to be capable of resisting significant deformation.

The cap 14 includes a cylindrical skirt 18 having common threads 20 on its interior. These threads 20 may be termed "means for attacking" the complete closure to a container (not shown). Other recognized equivalent attaching means can of course be employed. One end of the skirt 18 is closed off by a sub-top 22. This sub-top 22 carries on its side within the skirt 18 a conventional sealing ring 24 of the type adapted to engage the end of a neck of a container (not shown) so as to form a seal. The sub-top 22 is also provided with a centrally located opening 26 extending between the sides of the sub-top.

The side of the sub-top 22 remote from within the skirt 18 carries on its surface a relatively small, annular sealing ring 28 which is of a flexible or deformable character so as to be capable of forming a seal against the spout member 16 as hereinafter described. The sealing ring 28 may be formed as indicated in the Gustafson U.S. Patent No. 3,023,939 issued Mar. 6, 1962, and entitled "Dispensing Closures." It is considered preferable to form the sealing ring 28 so that it has an inverted V-like cross-sectional configuration in an uncompressed condition as shown and as more fully described in the co-owned Akers application for U.S. patent Ser. No. 439,515 entitled Sealing Structure for Valves filed Mar. 2, 1965, now abandoned.

The sub-top 22 also carries on its surface remote from within the skirt 18 upstanding walls 30 located parallel to one another. The surfaces of these walls 30 facing one another are provided with upwardly facing rectangular or squarelike notches 32. It will be noted that these notches 32 "open up" in an upward direction. Because of their function as hereinafter described these notches 32 may be considered as "positioning means". The sub-top 22 also has a cross-wall 34 connecting the walls 30 so as to close off the space between adjacent ends of these walls 30 and parallel walls 36 extending from the other ends of the walls 30 to the periphery of the sub-top 22. If desired the cross-wall 34 and the parallel walls 36 may be considered as a part of the walls 30, and thus

as a part of the "positioning means" within the complete closure 10.

The spout member 16 utilized this closure 10 may be formed of the same material as is used in forming the cap 14 or it can be formed out of another material—either plastic or metal—than is used in forming the cap 14. This spout member 16 includes a base 38, a part 40 of which has the shape of a surface of revolution—specifically a cylinder. A spout 42 extends from the base 38, and a passage 44 extends from the part 40 through the spout 42 to the end of the spout. The base 38 has parallel sides 46 which align axles or trunnions 48. These trunnions 48 are axially aligned with the axis of the part 40 and are dimensioned so as to fit with the notches 32. The base 38 is dimensioned so as to fit between the walls 30, and the spout 42 is dimensioned so as to fit between the walls 36 when the trunnions 38 are located within the notches 32.

The lid 12 includes a cylindrical skirt 50 the interior of which fits closely against the exterior of the skirt 18. The top of this skirt 50 is enclosed by a top 52; this top 52 carries internal partial bearing-like protuberances 54 located upon opposite sides of a slot 56. These protuberances 54 may be termed "hold down means" inasmuch as they include cylindrical surfaces 58 shaped so as to correspond to the configurations of parts of the surfaces of the trunnions 48 and inasmuch as they are designed to engage these trunnions 48 when the complete closure 10 is assembled as indicated so that the part 40 is forced against the sealing ring 28 in order to form a seal therewith.

The slot 56 generally corresponds in dimension to the space between the walls 30, 34 and 36 and leads to the general area of the skirt 50, and extends generally along a short distance of the length of this skirt. Preferably the slot 56 terminates in a notch-like edge portion 60 of the lid 12 so as to facilitate location and engagement of the spout 42 when it is in a closed position as shown. The spout member 16 is, in the structure illustrated, capable of being rotated from this closed position to an open position as shown in phantom in FIG. 2 in which the passage 44 is aligned with the opening 26.

In the particular closure 10 shown the exterior of the skirt 18 carries a plurality of parallel ridges 62. In the embodiment illustrated these ridges 62 only extend a short distance along the length of the skirt 18 from the open end of the skirt. If desired they can extend a longer distance. These ridges 62 are adapted to be deformed by contact with the interior of the skirt 50 when the complete closure 10 is assembled so as to create a substantial amount of friction between the two skirts 18 and 50, this friction securing the lid 12 to the cap 14 so that the protuberances 54 engage the trunnions 48 with sufficient pressure to hold the part 40 in sealing engagement with the sealing ring 28 at all times. Because of their function these ridges 62 can be considered an "engaging means" interconnecting the interior of the skirt 50 with the exterior of the skirt 18.

It will be noted that the ridges 62 extend axially of the skirt 18 so as to facilitate the lid 12 being assembled with respect to the cap 14 by merely being pushed down upon and over this cap. As this occurs it is considered that normally some comparatively minor deformation will occur in the skirt 18, but that such deformation is too insignificant to be noticeable and/or material. If desired ridges such as the ridges 62 may be located within the interior of the skirt 50 instead of on the exterior of the skirt 18. This is not considered preferable because it is desired to keep the configuration of the lid 12 as simple as possible so that a variety of different lids can be provided as cheaply as possible for use with the same cap 14 and spout member 16. If desired the ridges 62 may be located on both the interior of the skirt 50 and the exterior of the skirt 18, although this is not considered necessary.

In order to facilitate assembly, and in particular automated assembly, of the complete closure 10 it is considered preferable to include on the lid 12 and cap 14 co-acting alignment means serving to make it substantially impossible to assemble the lid 12 with respect to the cap 14 in such a manner that the slot 56 does not accurately overlay the space occupied by the spout member 16. In the closure 10 such alignment means include at least one elongated, axially directed rib 64 located on the exterior of the skirt 18 so as to extend between the ends of this skirt. The alignment means in the closure 10 also include an inverted slot 66 for each rib 64. Each slot 66 utilized has sloping walls 68 leading from the open end of the skirt 50 toward parallel walls 70 which are spaced from one another only slightly further than the distance across the rib 64.

With this construction if during assembly the lid 12 is located only generally within the orientation it is to assume with respect to the cap 14 (and the spout member 16) prior to being forced down upon this cap 14 a wall 68 will engage a rib 64 so as to gradually turn the lid 12 to the proper position before the skirt 50 is engaged by the ridges 62, and then after the skirt 50 is engaged with these ridges 62 the rib 64 will slide within the walls 70 as the ridges 62 are engaged by the skirt 50. In the particular structure shown two of these ribs 64 and slots 66 are utilized. It is considered that only one of these ribs 64 and one of the slots 66 need be employed.

From a consideration of the foregoing and the accompanying drawing the manners in which the dispensing closure 10 possesses the various advantages indicated in the preceding initial portions of this specification will be apparent. It will be apparent also that the exterior configuration of the lid 12 is immaterial as far as the "basic" construction of the closure 10 is concerned. Because of the fact that differently appearing closures may be constructed utilizing the essential features or principles of the invention embodied within the closure 10 of this invention is to be considered as to being limited solely by the appended claims forming a part of this disclosure.

We claim:

1. A dispensing closure which includes:

a cap, a lid, and a spout member,

said cap including a skirt, means on said skirt for attaching said skirt to a container and a sub-top enclosing one end of said skirt,

said sub-top having an opening extending through it, a sealing ring extending around said opening, and positioning means for holding said spout member generally in position with respect to said opening, said positioning means being located on the side of said sub-top remote from said skirt and extending from said sub-top,

said spout member having a base, a part of which has the shape of a surface of revolution, sides on said base, aligned trunnion means extending from opposite sides of said base, said trunnion means being in axial alignment with the axis of said surface of revolution, a spout attached to said base so as to extend therefrom, and passage means extending from said part through said spout,

said spout member being located with said trunnion means being positioned by said positioning means so that said part rests against, said sealing ring around said opening in such a manner that said spout is capable of being rotated between open and closed positions,

in said closed position said part engaging said sealing ring so as to close off said opening, in said open position said part engaging said sealing ring around an end of said passage means with said passage means being in communication with said opening, said lid including another skirt fitting closely around the exterior of said skirt on said cap and a top attached to one end of said other skirt, said top fitting

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over said sub-top, said top including slot means for permitting said spout to be rotated between said open and said closed positions, said top also including hold-down means engaging said trunnion means so as to hold said part in sealing engagement with said sealing ring by force transmitted through said trunnion means and said base,

engaging means positioned between the skirt on said cap and said other skirt on said lid for holding said lid and said cap in frictional engagement with one another, and

two co-active alignment means capable of engaging one another during assembly of said lid upon said cap so as to guide said lid into position upon said cap, one of said co-acting alignment means being located on said lid and the other of said co-acting alignment means being located on said cap.

2. A dispensing closure as defined in claim 1 wherein said engaging means comprises a plurality of parallel, axially extending ridges.

3. A dispensing closure as defined in claim 2 wherein said ridges are on the exterior of said skirt of said cap.

4. A dispensing closure as defined in claim 1 wherein: the one of said co-acting alignment means located on said lid is located on the interior of said other skirt of said lid and the other of said co-acting alignment means located on said cap is located on the exterior of said skirt of said cap.

5. A dispensing closure as defined in claim 4 wherein one of said co-acting alignment means is an axially extending ridge wherein the other of said alignment means is a slot having tapered walls leading to further walls spaced one from another a distance corresponding to the width of said ridge.

6. A dispensing closure as defined in claim 5 wherein said engaging means comprises a plurality of parallel, axially extending ridges.

7. A dispensing closure as defined in claim 1 wherein: said alignment means are dimensioned so as to contact with one another during the assembly of said lid upon said cap so as to guide said lid into position on said cap prior to said engaging means being contacted so as to hold said lid with respect to said cap.

8. A dispensing closure which includes: a cap, a lid, and a spout member, said cap including a skirt, means on said skirt for attaching said skirt to a container and a sub-top enclosing one end of said skirt, said sub-top having an opening extending through it, a sealing ring extending around said opening, and positioning means for holding said spout member generally in position with respect to said opening, said positioning means being located on the side of said sub-top remote from said skirt and extending from said sub-top,

said spout member having a base, a part of which has the shape of a surface of revolution, sides on said base, aligned trunnion means extending from opposite side of said base, said trunnion means being in axial alignment with the axis of said surface of revolution, a spout attached to said base so as to extend therefrom, and passage means extending from said part through said spout,

said spout member being located with said trunnion means being positioned by said positioning means so that said part rests against said sealing ring around said opening in such a manner that said spout is capable of being rotated between open and closed positions,

in said closed position said part engaging said sealing ring so as to close off said opening, in said open position said part engaging said sealing ring around an end of said passage means with said passage means being in communication with said opening,

said lid including another skirt fitting closely around the exterior of said skirt on said cap and a top attached to one end of said other skirt, said top fitting over said sub-top, said top including slot means for permitting said spout to be rotated between said open and said closed positions, said top also including hold-down means engaging said trunnion means so as to hold said part in sealing engagement with said sealing ring by force transmitted through said trunnion means and said base,

engaging means positioned between the skirt on said cap and said other skirt on said lid for holding said lid and said cap in frictional engagement with one another,

two co-active alignment means capable of engaging one another during assembly of said lid upon said cap so as to guide said lid into position upon said cap, one of said co-acting alignment means being located on said lid and the other of said co-acting alignment means being located on said cap,

said positioning means including parallel-spaced walls extending from said sub-top, the opposed surfaces of said parallel-spaced walls being provided with upwardly opening notches having rounded bottoms; said trunnion means being axles fitting within said rounded bottoms of said notches;

said hold-down means comprising protuberances on the top of said lid within said skirt of said lid, said protuberances each having cylindrical surfaces engaging said axles so as to hold said part in engagement with said sealing means;

said engaging means comprising a plurality of parallel, axially extending ridges on the exterior said skirt of said cap, said ridges engaging and being deformed by the interior of said skirt on said lid;

the one of said co-acting alignment means located on said lid being located on the interior of said skirt of said lid;

the other of said co-acting alignment means located on said cap being located on the exterior of said skirt of said cap;

one of said alignment means being an axially extending ridge and the other of said alignment means being a slot having tapered walls leading to further walls spaced from one another a distance corresponding to the width of said ridge;

said alignment means being dimensioned so that the said engagement means do not contact the interior of said skirt on said lid until said ridge is located between said further walls of said slots, permitting said tapered walls to guide said ridge to between said further walls of said slot prior to said ridges being engaged.

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ROBERT B. REEVES, Primary Examiner

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,490,659 Dated January 20, 1970

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It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 36, "attacking" should read --attaching--

Column 3, line 12, "which align axles" should read
--which carry aligned axles--;

Column 3, line 14, "with" should read --within--

SIGNED AND
SEALED

JUN 30 1970

(SEAL)

Attest:

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Attesting Officer

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Commissioner of Patents