

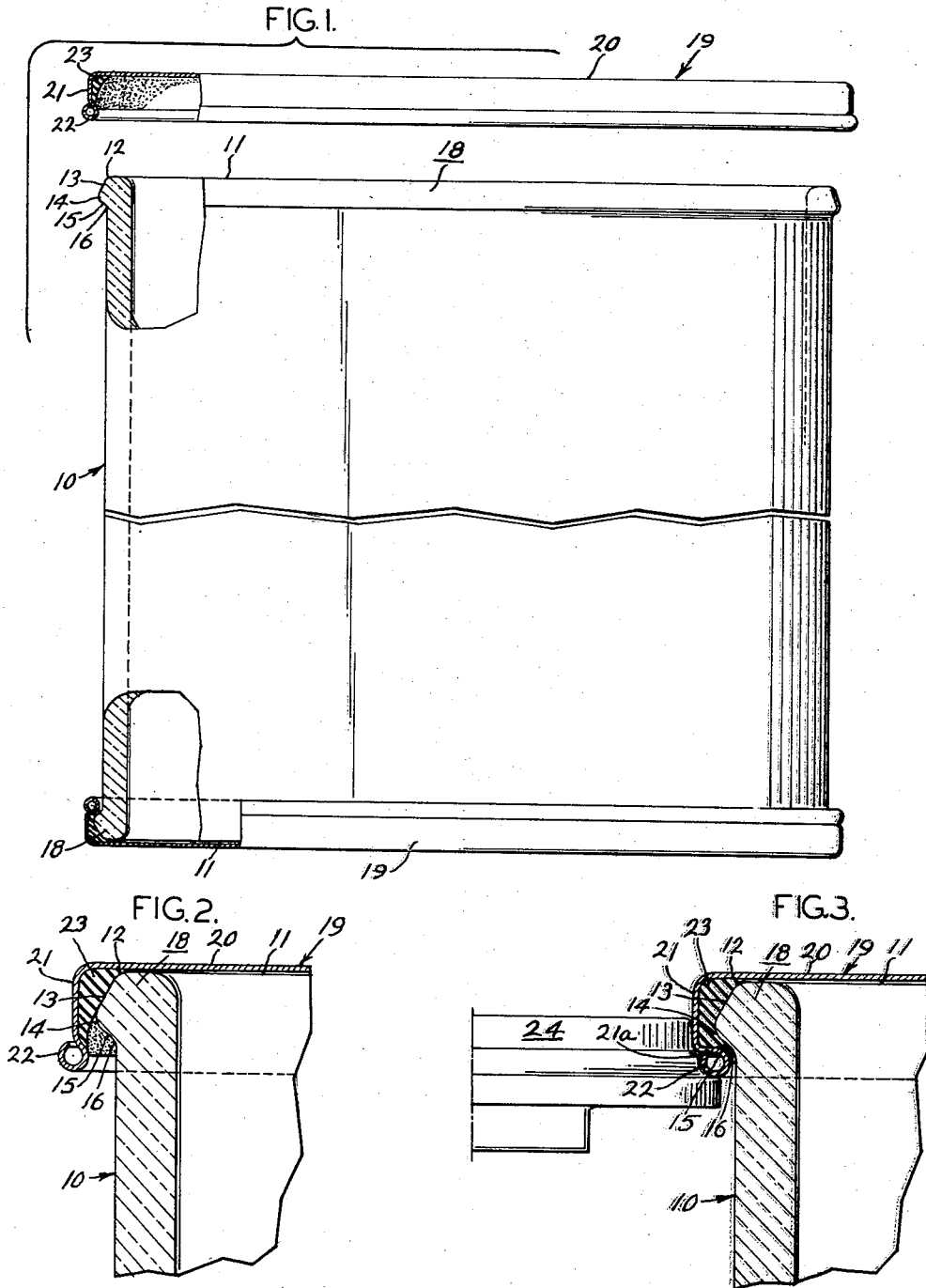
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HERMETICALLY SEALED CONTAINER

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**HERMETICALLY SEALED CONTAINER**

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This invention relates to containers capable of being hermetically sealed and useful in the distribution of food products. This container is of the type having permanent end closures which may be punctured or otherwise broken to provide access to the contents and thus, is particularly suitable as a container for liquids. More particularly, the invention is concerned with a novel container having a generally cylindrical body of glass or a plastic material, the body being open at both ends with the openings closed and hermetically sealed by permanent closures. The closures employed are of simple, inexpensive construction and can be easily secured on the container body. The use of such closures at opposite ends of the body permits the body to be made at low cost by centrifugal molding and the container can thus be made, filled, and sealed at a cost making it competitive with metal cans.

Containers having a hollow cylindrical glass body with its end openings closed by metallic closures have been devised heretofore but have been unsatisfactory in many instances. In some of these containers, the closure and the container body are sealed by an intervening gasket of deformable material and, when the gasket rests on an end surface of the body lying at an angle of 45° or more to the axis of the body, the container is said to have a top seal. If the sealing surface lies at an angle of less than 45° to the axis of the body, an angle seal is formed, while a container having a cylindrical sealing surface is described as provided with a side seal.

Top seal containers are likely to be unsatisfactory, if pressure develops therein, as in the processing of some foods, because the top panel of the cap of the closure is liable to be bulged outward away from the sealing element by the pressure. As a result, the seal may be weakened or destroyed, so that a leak occurs. Also, with a top seal, external pressure on the container closure such as would be caused by stacking cases holding the containers may cut the seal thereby permitting leakage from the container.

In Patent 2,708,050, of which I am one of the copatentees, there is illustrated and described a container having a closure with a side seal as the primary seal which is wholly effective. However, the seal of the patent requires a considerable amount of sealing material and the cost of the closure precludes the use of the container for some purposes.

Effective side seals are difficult to make unless the closure member is of much greater diameter than the diameter of the container because of the fact that the gasket must be relatively thick to permit proper sealing entirely about the container. Additionally, side sealing gaskets are usually formed of a preformed gasket material since it is not commercially feasible to flow a suitable sealing material into a preformed closure and form a gasket having a vertical side wall adapted to engage the side wall of the container. With the angle seal of the present invention, particularly when the angle seal is formed at an angle of 30° or less with the axis of the container, there is considerable latitude in the quantity and dimensions of sealing material required to form a tight seal. The seal may be made, however, with a minimum amount of material permitting a minimum of difference between the external diameter of the closure mem-

ber and the external diameter of the container. With this construction, the angle seal of the present invention provides all of the advantages of the side seal and does not contain any undesirable features of a top seal.

The present invention is, accordingly, directed to the provision of a container having a hollow substantially cylindrical body closed at both ends by simple, inexpensive closures of the permanent type. The closure is of a minimum diameter and provides a tight angle seal with a small consumption of sealing material which can be quickly applied to the container and permanently secured in position.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which:

FIG. 1 is a view partly in elevation and partly in longitudinal section of a container embodying the invention and having one closure applied and the other detached;

FIG. 2 is a fragmentary longitudinal sectional view on an enlarged scale showing the container finish at one end and the detached closure; and

FIG. 3 is a fragmentary longitudinal sectional view on an enlarged scale showing the manner of attaching the closure to the container.

The container shown in FIG. 1 includes a body made of glass or of a substantially rigid plastic material which is preferably transparent. The body is of hollow cylindrical form and, at each end, it has a substantially radial end surface 11, from which an arcuate surface 12 leads inward, that is, away from the end surface of the body, to a frusto-conical sealing surface 13, which in the present instance converges toward the axial end surface of the container. The surface 13 preferably lies at an angle of 30° or less to the axis of the container. The inner edge of the sealing surface is connected by an arcuate surface 14 to a frusto-conical surface 15 which extends inward and toward the container axis and is connected by an arcuate surface 16 to the outer surface of the body inward from the finish. The surfaces 13, 14, and 15 thus define a continuous rib 18, which extends circumferentially of the body. At its other end, the body is formed with the finish above described.

The closure 19 employed with the container comprises a metal cap having a circular top panel 20 which is of greater diameter than the maximum outer diameter of the container body at the rib 18. The cap also includes a skirt 21 of cylindrical form attached to the periphery of the panel and having its free edge curled outwardly to form a bead 22. As initially formed, the inner diameter of the bead 22 is slightly less than that of the skirt 21 and not substantially greater than the maximum diameter of the container body through the rib 18.

The closure is completed by a body 23 of sealing material which is a latex capable initially of being flowed into the cap to fill the area defined by the panel and the skirt. The sealing body adheres to the inner surface of the panel over an annular area adjacent to the periphery of the panel and having an inner diameter not substantially less than the outer diameter of the end surface 11 on the container body. The sealing body 23 also adheres to the inner surface of the skirt and extends to the inner surface of the bead with the body tapering in cross-section from the panel to the bead.

In the formation of the closure, the sealing material is flowed into the cap to fill the space described and is then cured so that it becomes resilient and loses its capacity to flow. The latex employed should be one which retains its resilience at temperature, such as 250° F., to which it may be exposed in the processing of foods. Latices of the characteristics described are commercially available.

In the application of the closure to the container body

to seal an end thereof, the cap is placed on the end of the container with the top panel of the cap resting on the top surface of the container body. In this position of the cap, the bead 22 lies inward beyond the curved surface 14 and opposite the surface 15. With the cap held in this position, the bead is rolled inward as far as it will go, for example, by means of a pressure roller 24 applied throughout the circumference of the bead. In the rolling operation, a section 21a of the skirt is bent inwardly to frusto-conical shape and, as a result, some of the sealing compound is forced beneath the rib 18. When the rolling operation has been completed, the closure is locked firmly in place on the end of the container body and the sealing material is forced tightly against the entire area of the sealing surface 13. A thin film of the sealing material may also be forced between the panel 20 and the top surface 11 of the body but this film does not provide any significant top sealing effect and the seal is essentially an angle seal.

In the use of the container, its bottom end is closed by the application of the cap in the manner above described. The container is then filled and its top closed by a cap applied in the same manner as the bottom cap, after which the container is ready for processing and distribution.

The formation of the skirt of the closure cap with an outwardly curled bead makes it possible to roll the bead inward to underlie the rib 18 of the container finish and the stiff bead tightly locks the cap in place. The formation of the bead at the free edge of the skirt also serves to conceal that edge which, when the cap is made of lacquered sheet, does not have any coating and is thus subject to discoloration.

While particular embodiments of the present invention have been illustrated and described herein, it is not intended limit the invention to such a disclosure and changes and modifications may be incorporated therein within the scope of the following claims.

I claim:

1. A sealed container, comprising in combination: a hollow non-metallic container body of generally cylindrical form having an end opening at at least one end thereof, said container having a flat annular radial end surface and an exterior annular rib adjacent said end surface; said rib having an axially outer frusto-conical

sealing surface portion tapering toward the radial end surface, a rounded surface portion at its maximum diameter, and an axially inner frusto-conical sealing surface portion tapering toward the outer side of the container body; a metallic closure for the end opening of the container body, said closure having a circular end panel of a diameter greater than the maximum diameter of said rib, a circumferential cylindrical skirt extending axially inwardly beyond the inner frusto-conical portion of said rib, said skirt having an outwardly rolled bead at its lower edge; and an annular sealing strip of resilient material disposed within the annular outer portion of said closure; the sealing strip having an axial length to extend from said cap end panel to the axially upper edge of the rolled bead within said skirt, the sealing strip filling the corner between the end panel and the skirt portions of said cap, tapering outwardly on its inner surface from said cap end panel to said bead and having an angle of inclination substantially matching the angle of said outer frusto-conical sealing surface portion and seating thereon when the end panel of the closure is disposed adjacent to but spaced a slight distance from the end surface of the container; in final assembly sealing position of the closure on the container, the skirt bead and lower end of the skirt together with the thin lower end of the sealing strip being disposed beneath the axially inner frusto-conical surface portion of the container rib.

2. A sealed container as set forth in claim 1, wherein the angle between the surface of said outer frusto-conical sealing surface portion of the rib and the axis of the container is not more than 30°.

3. A sealed container as set forth in claim 1, wherein the container has axial openings at both ends and wherein the container and closure construction is the same at both ends.

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