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J. W. DAVIE

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CONTAINER AND CLOSURE

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Fig. 1

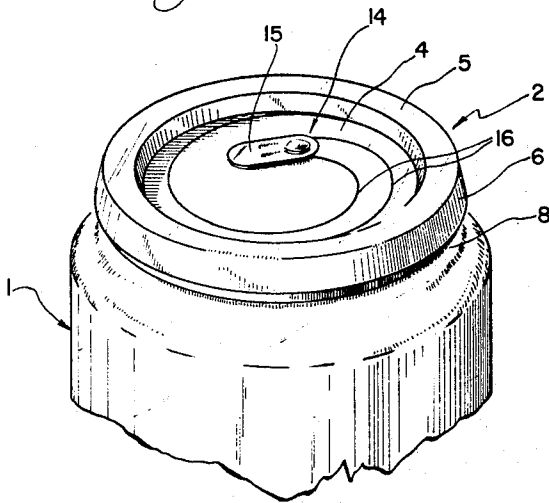


Fig. 2

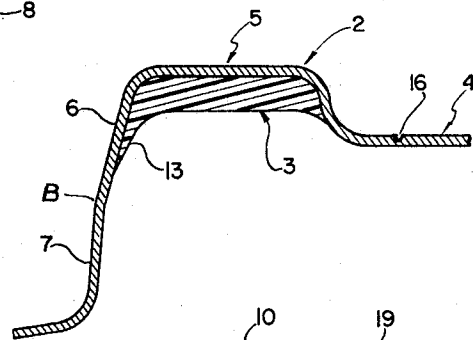
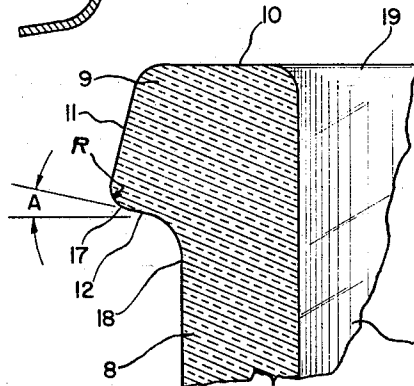
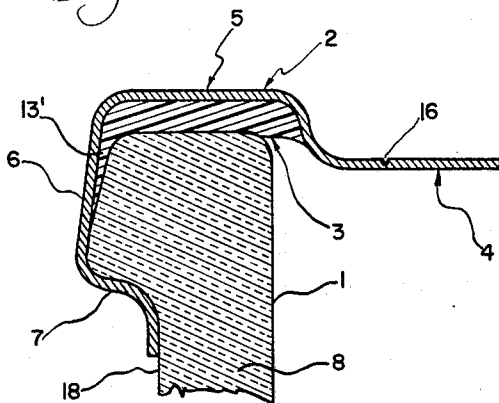


Fig. 3

Fig. 4



INVENTOR.

JAMES W. DAVIE

BY

Robert F. Teeter

ATTORNEY

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CONTAINER AND CLOSURE

James W. Davie, Monroeville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa., a corporation of Pennsylvania

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This invention relates to sealed containers and more particularly to containers for food products which require a high degree of protection in order to prevent spoilage.

Attempts to provide an effectively sealed container which is also capable of being opened with a minimum amount of force have not been completely successful in many applications. In the conventional container employing lug-type or threaded closures, if the closure is sufficiently loose to readily permit opening of the container by closure removal, problems of transmission of gases such as air through the gasket, reduced impact resistance and resultant food spoilage, are commonly encountered. When the container is sealed in a more substantial manner, difficulties in opening the container, as well as cutting of the closure liner by the container, are frequently encountered. As a result, a great deal of effort has been devoted toward the development of frequently uneconomical closure liner lubricants which might provide adequate sealing and yet permit opening by means of the application of a reasonable amount of torque. These, by and large, have not been completely successful. Even where lubricants which are reasonably effective have been employed, the quantity used on each closure is so small that a lack of consistency between required opening force from closure to closure has developed.

It is an object of this invention to provide a container and closure assembly which will economically and consistently provide safe and effective sealing for food products.

Another object is to provide a container and closure assembly which may be sealed as tightly as needed without the need for being concerned about possible interference with opening qualities.

Another object is to provide a container assembly having improved impact resistance and resistance to the transmission of gases.

Another object is to provide a container assembly designed so as to prevent cutting of the closure liner by the container mouth.

Yet another object of the invention is the provision of an effectively sealed container without the need of employing a liner lubricant.

Other objects and advantages of the invention will be understood from the following description of the invention, on reference to the illustrations hereto, in which:

FIG. 1 is a perspective view of the sealed container having a type of pull tab opening device;

FIG. 2 is an enlarged sectional view of the closure and sealing gasket;

FIG. 3 is an enlarged sectional view of the container neck; and

FIG. 4 is an enlarged sectional view of the container, closure and sealing gasket in sealed relation.

As used herein the term "wide mouth container" is intended to refer to containers whose opening is sufficiently large to permit ready access to the container interior by means of a spoon, fork or other suitable utensil in order to facilitate removal of the food products. While the invention is not so limited, the type of opening device selected for purposes of illustration is most advantageously employed with wide mouth containers.

Referring now to the drawings, a container 1 is made

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of glass, plastic or other suitable substantially rigid non-metallic material and is adapted to be used with a metal closure 2 having a sealing gasket 3. The container 1 has a generally right cylindrical configuration with an opening or mouth 19 at one end. The exterior wall surface may be substantially straight between the base and the bead 9 or optionally it may have a neck portion 8 in close proximity to the bead 9. In the form selected for illustration, the container 1 has an annular neck 8, extending upwardly and terminating in an annular locking ring or bead 9. The bead 9 has an upper sealing surface 10, an abutting downwardly disposed outer sealing surface 11, and an abutting inwardly disposed shoulder surface 12 terminating in the exterior surface 18 of the annular neck 8. The upper sealing surface 10 is preferably substantially flat in order to prevent cutting of the closure liner by said surface. As a result of the substantial flatness of the surface 10 and the resultant increase in area of glass-to-gasket contact, forces applied during the sealing and processing operations are spread over an area of maximum breadth thereby avoiding concentration in a limited area which promotes liner cutting. The outer sealing surface 11 may conveniently be outwardly disposed so as to provide an additional bearing surface for such forces and an even further increase in area of glass-to-gasket contact. The corner at which the upper sealing surface 10 abuts the outer sealing surface 11 is preferably rounded so as to minimize cutting of the closure liner.

The metal closure 2 as shown in the drawings has a scored central closure panel 4, with a pull tab affixed thereto within the scoring to provide an integral opening device 14, a peripheral annular gasket retaining portion in the form of a channel 5, and an unscored depending skirt 6 of substantially uniform length. Where such a channel is not provided, the peripheral portion of the closure may serve as the gasket retaining portion, which portion may be disposed either substantially coplanar with the central panel 4, or even beneath the plane of the central panel 4. Where clearance for the integral opening device is desired, the central panel 4 may conveniently be recessed as shown in FIGURES 2 and 4. Such a recess also serves to facilitate nesting of the closures. As shown in FIG. 4 the gasket material is retained between the closure channel 5 and upper sealing surface 10, and has a wedge-shaped portion 13 retained between the closure skirt 6 and the outer sealing surface 11.

The use of the terms "gasket" or "sealing gasket" herein is intended to refer to either preformed, flowed in, post-formed or compound type sealing means. The sealing gasket, which may be resilient, may be composed of rubber, a thermoplastic material such as polyvinyl chloride or any other conventional gasket material or sealing compound.

Polyvinyl chloride and other thermoplastics offer the advantage of either being soft at room temperature for room temperature sealing, or softening as elevated sealing temperatures are approached, depending upon the particular material selected. This property causes them to flow and fill any voids which might exist between the glass finish and the closure, thereby providing a complete seal and repairing defects which might arise from glass imperfections. As the gasket will not be severed in opening the container, an adhesive composition may also be used. For the same reason, the need for liner lubricants is eliminated.

In sealing the container 1, the closure 2 is placed on the container and is retained in contact therewith while the lower skirt portion 7 is necked in, or rolled or crimped under and against the annular shoulder surface 12. If the skirt is sufficiently long, the lower skirt portion 7 will extend down the exterior portion 18 of the annular neck 8. If the lower skirt portion 7 is to be conformed to

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the exterior portion 18 of the annular neck 8, it may be preformed to the configuration of the intersection of the shoulder 12 and the exterior neck portion, thereby minimizing the amount of closure reshaping needed to produce a sealed container. Also, the amount of reformation required during the sealing operation may be minimized by placing a slight bend B in the closure skirt 6 as shown in FIGURE 2.

In a wide mouth container employing the type of opening device 14 shown in FIGURE 1, opening is effected by grasping the tab or tongue 15, which is attached to the central panel at the area of origin of the pair of scored lines 16 and between said lines, and raising it, causing the scored lines 16 to sever, thereby removing substantially all of the closure panel. This will provide access to the container interior. It will be appreciated that the closure channel or gasket retaining portion 5 and skirt 6 are not removed during the container opening operation. The closure edge, gasket and container may therefore be placed in a substantially permanent sealing relationship without the necessity of considering ease of seal severance. Thus, full and complete sealing of the container is effected without concern about opening torques. The fact that the entire closure is not to be removed permits the unique design of the container assembly which provides improved sealing characteristics.

The invention is such that it may be employed successfully with pressurized packages as well as atmospheric or vacuum packages. As the container is so effectively and substantially sealed without the need for relying on elevated internal container pressure to maintain the closure and gasket in sealed relationship with the container, the invention is particularly suited for use with products packed at internal pressures less than atmospheric pressure.

The admission of gases, and particularly oxygen may cause product damage. For example, the entry of oxygen into a container of food would bring contaminating bacteria into contact with the food. Also, it would provide nourishment for any small amount of bacteria which might already be in the container. The transmission of gases, such as oxygen, through a sealing medium, is directly related to the length of material and minimum cross-section through which they must pass. The increased length of the glass-to-gasket contact as a result of the gasket extending along the outer sealing surface 11 produces improved resistance to gas transmission. As is indicated in FIGURES 2 and 3, the wedge-shaped portion 13, 13' of the gasket 2 is narrowed as a result of its being under compression when affixed to the container in sealed relationship. The wedge-shaped configuration coupled with this compression of the gasket, results in a very small minimum cross-section which reduces gas transmission. The outward and downward direction of the outer sealing surface 11 cooperates with the interior of the closure skirt to produce the compressive force thereby enabling the gasket to assume the narrow wedge-shaped configuration. This helps to prevent leakage caused by impact. These advantages obtained by use of this gasket configuration could not be readily obtained in a closure which had to be removed in order to provide access to the container interior, as the increased frictional resistance would make closure removal more difficult.

The angle of inclination of the annular shoulder 12 with respect to the horizontal (angle A) should be kept relatively small, and preferably should be less than about ten degrees. As the inclination of the shoulder 12 approaches the horizontal, the shoulder 12 provides a finish over which the closure may be locked more intimately.

The corner 17 at which the outer sealing surface 11 abuts the annular shoulder surface 12 is preferably rounded to avoid sharp creasing or rupture of the closure skirt during the sealing operation. It is, however, desir-

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able to keep the interior radius of curvature R relatively small, less than about .025 inch. A preferred range of radius dimensions is from about .015 to .025 inch. This relatively sharp radius permits maximum closure retention while minimizing the possibility of closure rupture.

For food uses wherein the contents of the container may not be entirely consumed on the initial opening, such as baby foods, a convenient reclosure may be provided. For example, a snap-on reclosure having a panel portion and a depending skirt portion may be provided. The depending skirt portion may conveniently terminate in a bead. The bead, if internally disposed, could engage the annular shoulder 12. Alternatively a reclosure which is inserted into the container mouth 19, having its exterior periphery bearing on the upper sealing surface, might be provided. The reclosure might economically be made of a light metal, polyethylene or other suitable material.

Whereas particular embodiments of the invention have been described above for purposes of illustration, it will be apparent to those skilled in the art that numerous variations of the details may be made without departing from the appended claims.

What is claimed is:

1. In combination,
a container

having a substantially rigid neck portion terminating in an annular bead provided with an annular upper sealing surface, an outwardly and downwardly disposed outer sealing surface, an inwardly and downwardly disposed shoulder surface, inclined downwardly at a relatively small angle from a horizontal plane with a rounded corner connecting said outer sealing surface with said shoulder surface,

a metal closure

having a recessed scored central panel with a pull tab affixed thereto within the scoring to provide an opening device, a peripheral sealing gasket retaining channel, and an unscored depending skirt of substantially uniform length, said skirt being necked in against said container shoulder surface in a substantially permanent sealed relationship, said central panel being adapted to be substantially entirely removed on opening said container without removing the remainder of said closure; and

an adhesively retained annular sealing gasket

having a portion thereof disposed in said gasket retaining channel and retained between said channel and said upper sealing surface, and having a generally wedge-shaped portion thereof retained between said closure skirt and said outer sealing surface, said sealing gasket adapted to remain intact on opening said container; and the assembly having an internal pressure less than atmospheric pressure.

2. In combination,
a container

having a substantially rigid neck portion, terminating in an annular bead provided with a substantially flat annular upper sealing surface, an outwardly and downwardly disposed outer sealing surface, an inwardly and downwardly disposed shoulder surface, inclined downwardly at an angle of less than ten degrees from a horizontal plane, with a rounded corner connecting said outer sealing surface with said shoulder surface,

a metal closure

having a recessed scored central panel with a pull tab affixed thereto within the scoring to provide an opening device, a peripheral sealing gasket retaining channel, and an unscored depending skirt of substantially uniform length, said skirt

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being necked in against said container shoulder surface, in a substantially permanent sealed relationship, and conformed to said surface and said outer sealing surface, said recessed central panel being adapted to be substantially entirely removed on opening said container without removing the remainder of said closure; and

an adhesively retained resilient annular sealing gasket having a portion thereof disposed in said gasket retaining channel and retained between said channel and said upper sealing surface and having a generally wedge-shaped portion thereof retained between said closure skirt and said outer sealing surface, said gasket adapted to remain intact on opening said container.

3. In combination

a wide mouth container

having a substantially rigid neck portion terminating in an annular bead provided with a substantially flat annular upper sealing surface, an outwardly and downwardly disposed outer sealing surface, an inwardly and downwardly disposed shoulder surface, inclined downwardly at an angle of less than ten degrees from a horizontal plane, with a rounded corner having an internal radius of less than about .025 inch connecting said outer sealing surface with said shoulder surface,

a metal closure

having a recessed scored central panel with a pull tab affixed thereto within the scoring to provide an opening device, a peripheral sealing gasket retaining channel, and an unscored depending skirt of substantially uniform length, said skirt

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being necked in against said container shoulder surface in a substantially permanent sealed relationship and conformed to said surface, said recessed central panel being adapted to be substantially entirely removed on opening said container without removing the remainder of said closure;

a sealing gasket

having a portion thereof disposed in said gasket retaining channel and retained between said channel and said upper sealing surface and having a generally wedge-shaped portion thereof retained between said closure skirt and said outer sealing surface, said gasket adapted to remain intact on opening said container.

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JOSEPH R. LECLAIR, *Primary Examiner.*

R. PESHOCK, *Assistant Examiner.*