

July 14, 1970

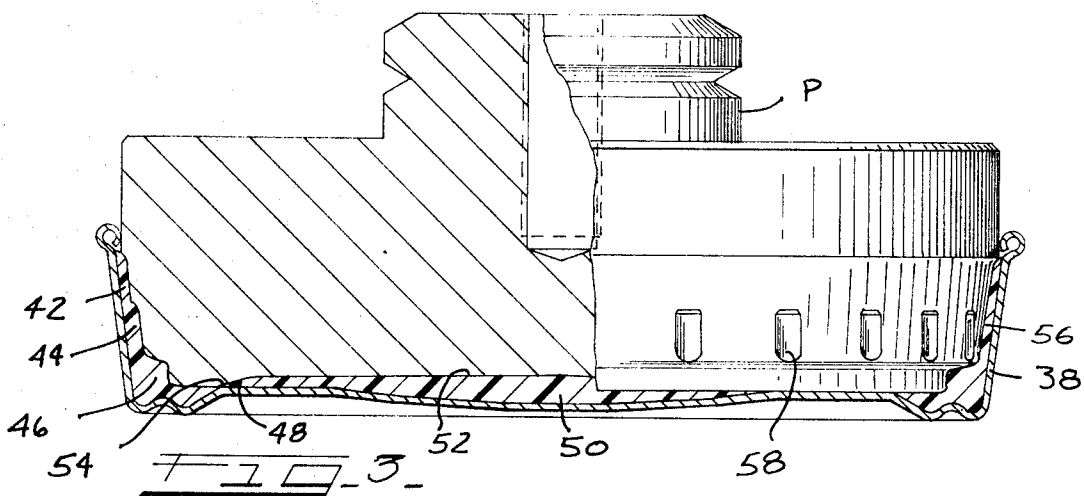
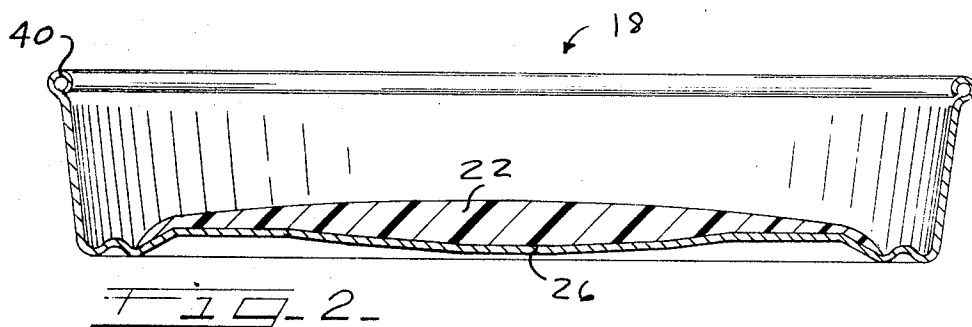
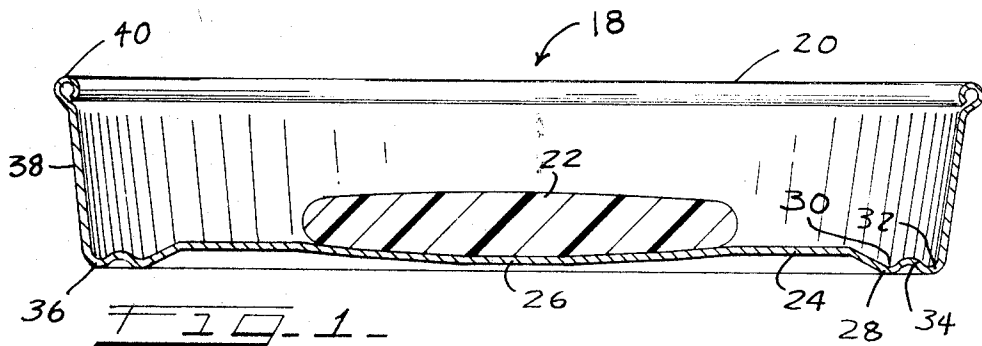
P. A. VERCILLO

3,520,436

CLOSURE HAVING A COATED INTERIOR

Filed Nov. 20, 1968

2 Sheets-Sheet 1



INVENTOR.

PETER A. VERCILLO

BY

Grist, Lockwood, Grannell & Deming
ATT'YS.

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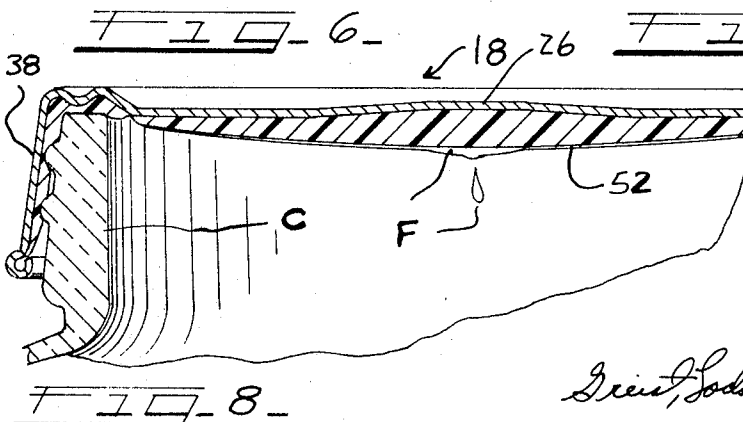
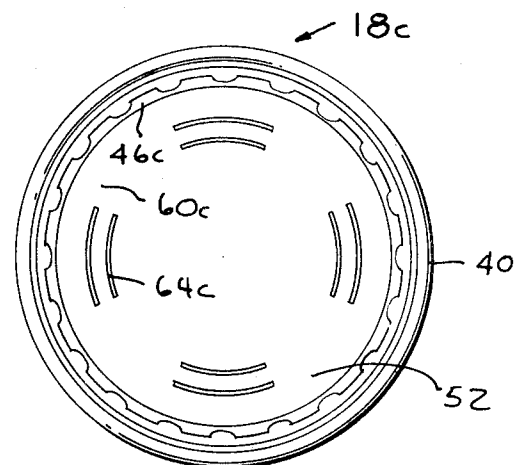
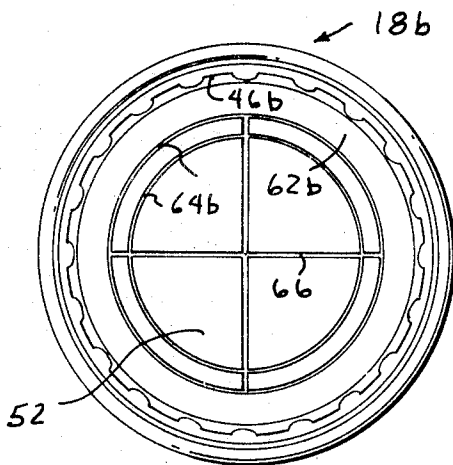
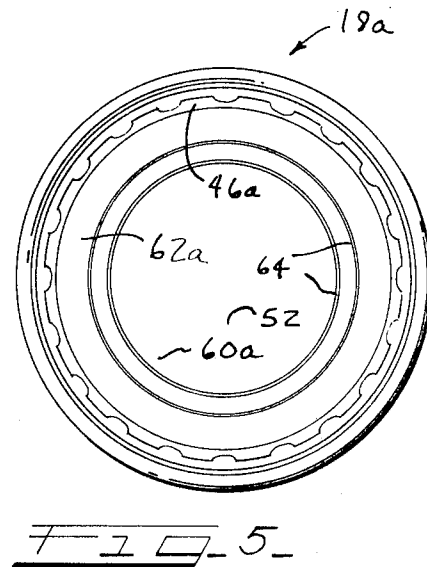
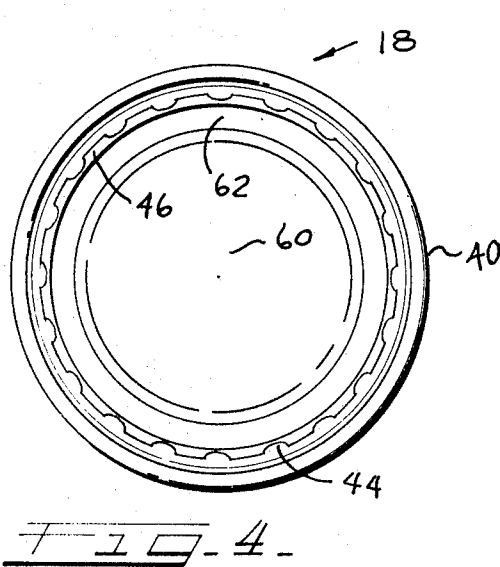
P. A. VERCILLO

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CLOSURE HAVING A COATED INTERIOR

Filed Nov. 20, 1968

2 Sheets-Sheet 2



INVENTOR.
PETER AVERCILLO

BY

Greene, Lohwood, Greanawalt & Dewey
ATT'YS.

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3,520,436

CLOSURE HAVING A COATED INTERIOR

Peter A. Vercillo, Chicago, Ill., assignor to Continental Can Company, New York, N.Y., a corporation of New York

Filed Nov. 20, 1968, Ser. No. 777,292

Int. Cl. B65d 23/00, 53/00

U.S. Cl. 215-40

8 Claims

ABSTRACT OF THE DISCLOSURE

A container closure which includes an exterior shell portion having a skirt portion for engaging a finish portion of a container in a snug relation, a gasket on the inner surface of the shell adjacent an outer margin thereof, a layer of a heat insulating, protective coating disposed on the inner surface of the top panel of the closure, and having sufficient thickness to provide heat insulation at least in an area disposed radially inwardly of the outer margin, and means for causing the liquid contents of the container which form, condense on, or are disposed adjacent the margin of the closure to flow inwardly toward the central portion of the closure when the container with which the closure is associated is in an upright position of use, whereby any liquid remaining on the cap is protected from excessive heat transferred through the shell portion of the closure during a pasteurizing or like operation. Typical means for causing flow toward the center of the cap include shaping the interior insulation coating so that the center thereof is low relative to the outer margin portions, providing grooves or notches in the coating for collecting liquid, and may include forming or shaping the shell so that, with the contents of the container in their normal condition, the center of the cap will be lower than the radially outer margin portions of the interior thereof. The preferred interior coating is a foamable plastisol material.

BACKGROUND OF THE INVENTION

Field of the invention

The field of the present invention is generally that of closures, and particularly, closures for containers such as jars and the like for processed foods. More particularly, the field is that of closures which comprise an exterior shell portion and which contain protective coatings and gasket materials on the inside thereof, as well as locking threads or lugs, or means for forming lugs or threads after the closure is in place over a container.

Also, the field of the invention is that of closures which are adapted to protect the contents of a food product container, and particularly to minimize or eliminate prior art problems which, for example, resulted in unsightly appearing caps or closures being presented to the consumer. More specifically, the field of the invention is that of closures in which a single deposit of interior coating material may be made within a container shell, which material may thereafter be formed into a shape to provide material not only along the skirt of the shell from which threads may be formed, as well as a gasket along the outer margin of the top panel for engaging the top seal finish of the container in a gas- and liquid-tight relation, but also to provide a center, protectively coated area so sized and shaped as to prevent product particles forming on the cap from being burned and thereby decomposed in place on the inside surface of the cap.

Description of the prior art

In the prior art, closures are known which include an exterior shell having a top panel portion, an outer margin

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thereof, and a skirt depending from the margin, and in which a sealing gasket is placed along such margin. Furthermore, caps are known in which a plastisol or like material forms the gasket and also covers the skirt portion, whereby, after such cap is pushed vertically into position over a container with which it is to be associated, flow of the plastisol forms threads which hold the closure in place over the container until it is opened by rotation and disengagement between the closure and the threads.

Similar closures are also known which include the plastisol gasket and which use other types of thread means, such as rolled or turned threads or lugs in the skirt or curl portions of the closure shell.

Since one method of forming such plastisol in place within the shell includes disposing a deposit thereof in the center and moving it to the edges thereof with a forming or molding punch, closures having a thin plastisol coating in the center of the top panel portion thereof are also known.

With closures of any of the above types, particularly when used with food products, such as milk-containing baby foods, a common problem has been that of "burn-on," which occurs in the pasteurizer, retort or cooker which processes such food products in their containers after they have been filled and sealed. This problem occurs when milk or the like which has, either through handling, or through evaporation and condensation, become adhered to the top panel portion of the closure, is overheated by transfer of heat from the exterior of the closure through the shell and into the container.

One reason for this is that when steam or the like in a pasteurizer or cooker is applied to a container, particularly a glass jar, heat transfer to the product is relatively slow through the glass portion and relatively fast through the metal closure shell portion, not only because of the inherent heat capacities and heat transfer characteristics of these materials, but also because a large mass of the product is in contact with virtually all of the glass surface, and very little, if any, food product mass is in contact with the metal shell. Thus, food product in contact with the shell absorbs a great deal of heat rapidly, rises to a high temperature quickly, and may be "burned on" to the interior of the closure.

Since the plastisol or like gasket-forming and insulating material is formed in place within the shell by a molding punch, and since the most common method of locating or limiting the movement of the punch is by reference to contact with the closure shell, it is common for a portion of the cap just inwardly of the margin portion containing the sealing gasket to be free from plastisol material, or to include such material in greatly reduced thickness. Accordingly, in prior art constructions having such plastisol-free areas, or in constructions wherein the entire top panel portion of the closure is free from coating material, the "burn-on" problem has become significant. It has therefore appeared that the "burn-on" problem is one which was inherently associated with the requirements for making caps in a simple and economical manner without changing existing manufacturing techniques and equipment, and without sacrificing the advantages of existing caps of the the types referred to herein.

SUMMARY OF THE INVENTION

In view of the shortcomings of prior art devices, it is an object of the present invention to provide a closure which possesses the advantages of prior art closures without presenting a problem of "burn-on," particularly in relation to food products.

A further object is to provide a closure having means therein for causing food products collecting on the inner surface of the top panel portion of the closure to move

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to or collect on a portion thereof which contains a sufficiently thick layer of insulating material to prevent any product adhering thereto from being burned or decomposed during pasteurization, sterilization, or cooking.

Still another object is to provide a closure wherein the means for engaging the side finish and the top seal finish of a container, and the means for providing heat insulation for food products deposited on the top panel portion of the closure shell, may be provided by deposition and molding therein of one application of gasket forming material in a single step.

A further object is to provide a closure in which a heat insulating covering is provided for the top panel portion of the closure in a shape adapted to cause collection of liquid food product at or near the center portions thereof.

Still another object is to provide a closure in which, in use, the center portion of the top panel of the closure is disposed below the level of the portions thereof adjacent the outer, gasket-containing margin.

A further object is to provide a closure having a lowered, heat insulating center portion which includes means for facilitating collection of liquid from the marginal edge portions thereof and for causing such liquid to move to the center of the closure.

A still further object is to provide a method of making closures having the above names characteristics in a simple and economical way.

The present invention accomplishes these objects by providing a closure having an exterior shell with a top panel portion, an outer margin portions, a skirt portion depending from the margin, a heat insulating protective coating on the radially inner portions of the top panel, and means for causing liquid associated with the top panel portion, in use, to collect at the center thereof. The objects of the invention are also achieved by providing a method which includes forming a protective, heat insulating coating on the interior of a cap shell so that liquid forming on the inside of the closure will collect generally centrally thereof where the heat insulating properties of the container closure are greatest.

These objects, and other objects which are inherent in the invention and the manner of their attainment, will be more clearly apparent when considered in conjunction with the following detailed description of the preferred embodiments of the invention, the appended claims, and the accompanying drawings, in which like reference numerals indicate corresponding parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical sectional view through the shell portion of a closure showing, a step in the formation of a covering for the inner surface thereof;

FIG. 2 is a vertical sectional view showing a subsequent step in the process of making a closure according to the invention;

FIG. 3 is a view, partly in elevation and partly in section, showing the final step in the formation of a gasket and insulating and protective coating for the interior of a closure;

FIG. 4 is a plan view showing the interior of one form of closure made in accordance with the present invention;

FIGS. 5, 6 and 7 are plan views similar to FIG. 4, showing modified forms of closures made according to the present invention; and

FIG. 8 is a vertical sectional view, with portions broken away, showing a closure made according to the present invention in position of use atop a container.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

Referring now to the drawings in greater detail, FIG. 1 shows a closure assembly 18 which comprises an ex-

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terior shell portion 20 and a mass of material 22 from which certain elements of the closure will be formed. The shell 20 comprises a top panel portion 24, a "button" 26 in the center thereof, an outer margin portion 28, which may include a pair of annular grooves 30, 32 defined by a re-entrant 34, and shows that the margin 28 is joined by a radius 36 by a skirt portion 38, which terminates in a bead or curl 40 in the bottom of the skirt. It will be understood, in reference to the description herein, and to the claims, that the cap is shown inverted in relation to its normal position of use in FIGS. 1, 2 and 3, since caps are normally manufactured in this position. FIG. 8 shows the cap in its ordinary position of use atop a container.

Referring now to FIG. 2, the material 22 is shown to be spreading outwardly and beginning to cover the outer margin 28 of the shell 20. Normally, assuming that the material 22 is a foamable vinyl plastisol material, such as is conventionally used in the art, FIG. 2 illustrates the extent to which the viscous but fluent deposit of material will flow under the influence of gravity or centrifugal force imparted thereto by rapidly rotating the closure shell 20 in a conventional manner.

FIG. 3 illustrates a molding punch P in position within the closure shell 20 and shows that the material 22 is now formed so as to include a side finish-engaging portion 42 which includes a plurality of ribs 44 therein, a principal, gasket-forming portion 46 disposed within the margin 28 defined by the grooves 30, 32, a reduced thickness portion 48 and a thickened center portion 50 disposed centrally of the cap. In the orientation shown in FIG. 3, the inner liner has an inwardly facing surface 52 which is level or tapered slightly upwardly as it extends inwardly. The molding punch P is seated within the shell 20 when a land portion 54 thereof contacts the shell 20, and the portion of the closure shell 20 immediately beneath the land normally has a very thin layer of plastisol adhered thereto.

FIG. 3 also shows that, in the embodiment illustrated, the skirt portion 38 of the closure 20 is tapered, and accordingly, the face portion 56 of the punch P is also tapered. A plurality of recesses 58 are provided for forming the ribs 44 in the coating material 22 when the molding punch has imparted the final configuration to the coating material 22. The plastisol is normally fluxed by the application of heat, either during the forming operation, or thereafter, or both. Typically, a heated punch is used, which imparts a set to the plastisol, after which it may be postcured in a conventional manner. Preferably, the plastisol is also foamed upon being heated, to impart added resiliency thereto.

When a closure 18, such as that shown in FIG. 3, is removed, inverted, and placed atop a container in a sealed relation, vacuum on the inside of the container will cause the central or button portion 26 of the top panel portion 24 to move axially inwardly of the container, imparting an inwardly and downwardly extending shape to the inner surface 52 of the coating of material 22. Therefore, liquid forming on the part of the closure 18 adjacent the outer margins 28 will flow inwardly along the surface 52, and that portion which does not drip back into the mass of product held within the container will be protected by the insulating characteristics of the material 22 from "burn-on," or other like adverse effects of heat. This product will therefore not attain a temperature which is significantly higher than that of the remainder of the product held in the container.

FIG. 4 shows a typical embodiment of the invention in which the inner surface 52 includes an area 60 having a relatively thick coating of plastisol disposed inwardly of the top seal finish engaging portion 46, a region 62 having a relatively thin coating of plastisol, and lying beneath and adjacent the region into which the land 54 extends, as shown in FIG. 3, during forming.

FIG. 5 shows a closure 18a which includes the regions 46, 60, and the inner surface 52, but in this embodiment, the region of reduced coating thickness 62a is

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defined by two or more concentric rings 64 which are formed by lands (not shown) on a forming punch in which contact is made by circular ribs rather than by a land such as that shown at 54 in FIG. 3. Since such ribbed molding punches are known in the art, they are not further described herein. The principal differences between the embodiment of FIG. 5 and FIG. 4, is that, whereas both regions 62, 62a have little plastisol or other coating material therein, the material is localized differently, since the application method is somewhat different.

FIG. 6 shows a similar closure 18b having the regions 46b, 60b and having rings 64b, but further including radially inwardly directed collector grooves 66, which aid in the collection of liquid or the like and which serve to cause liquid to flow radially inwardly therein toward the center of the closure 18b. It is understood that the grooves 66 are of relatively small depth compared to over-all thickness of the coating material 22 beneath the surface 52.

FIG. 7 shows a closure 18c which includes the regions 46c, 60c, and the inner surface 52, but this embodiment differs in that the rings 64c are intermittent or fragmentary rather than being circular, as shown in FIGS. 5 and 6. In any event, the rings 64, 64b and the partial or fragmentary rings 64c are formed by lands which ordinarily engage the inner surface of the closure shell 20 during forming so as to create the desired thickness of plastisol material 22 within all of the desired areas of the closure.

FIG. 8 shows a container C having the closure 18 associated therewith in position of use, and shows that a thin layer of food product F, such as milk or like liquid, covers the inner portion of the cap but is localized on the radially inner or centrally disposed portions of the closure 18, from where the liquid will be protected from heat and will drip back into the container C.

As pointed out above, closures made according to the present invention may be made without significantly altering existing manufacturing techniques, and yet the provision of the coating material in the desired thickness and the desired shape, without using excessive or additional coating material, provides the heat insulation required to protect portions of the product associated with the cap, to insure a higher quality product and to provide a cap having a greatly improved appearance and consequent acceptance by the consumer. It has also been discovered that the use of a molding punch such as that shown helps avoid entrapping air in the liner and produces consistently high quality inner liners or coatings, free from voids and pock marks. Although the contour of the inner surface 68 of the molding punch P in and near the center thereof is shown in FIG. 3 as being flat, it is understood that it may taper inwardly and upwardly in the orientation shown in FIG. 3, if a more steeply tapered form were desired to be imparted to the sealing material 22, for example, because of limited deflection of the closure shell, for use with a pressure packed product, or for other reasons.

It will thus be seen that the present invention provides a novel container closure and method having a number of advantages and characteristics, including those hereinbefore pointed out and others which are inherent in the invention.

I claim:

1. A container closure comprising, in combination, an exterior shell portion including a generally centrally

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disposed top panel portion, an outer margin portion jointed to said top panel portion, a skirt portion attached to and depending downwardly from said outer margin portion, a relatively narrow sealing gasket disposed on the inner surface of said shell portion, and a relatively wide heat insulating, protective coating disposed on the inner surface of said top panel portion, having a substantial thickness in an area at least generally centrally of said top panel portion, and means permitting a flowable product adhering to the inner surface of said coating to flow from said outer margin portion of said closure toward said central portion when said shell is in an upright position of use and associated with a container, whereby said flowable product will be protected by said relatively wide insulating coating from heat applied to the exterior of said shell.

2. A closure as defined in claim 1 in which said coating is a foamable plastisol material.

3. A closure as defined in claim 1 in which said means for allowing said product to flow inwardly includes a coating having the portion thereof adhered to said centrally disposed portion of said closure disposed at a lower level, in position of use, than the portions of said coating disposed immediately radially inwardly of said sealing gasket.

4. A closure as defined in claim 1 in which said means for allowing said product to flow inwardly includes an axially movable button portion on said shell disposed generally centrally thereof and movable downwardly, in position of use, in response to a vacuum in a container with which said closure is operatively associated, so that the inner surface of the coating disposed on the inner portion of said shell beneath said button portion will be disposed beneath the inner surface of the coating of said margin portion of said closure.

5. A closure as defined in claim 1 in which said coating, in at least portions of the margin of said shell, is of reduced thickness relative to the thickness thereof in the central portion of said shell.

6. A closure as defined in claim 1 in which said heat insulating coating is a continuous coating which is relatively thick in the central area of said top panel portion, to provide substantial heat insulation, in which said coating thickness diminishes to a reduced thickness in the radially inner portion of said margin, to provide means for allowing said product to flow therefrom into said central portion, and in which said coating is of increased thickness along the radially outer portion of said margin to provide a sealing gasket.

7. A closure as defined in claim 1 in which said means for allowing said product flow includes a plurality of grooves extending generally from said margin portion of said closure to said central portion thereof.

8. A closure as defined in claim 1 in which said skirt portion also includes annular gasket means disposed on a portion of the inner surface thereof.

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