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2,979,218

CLOSURE CAP AND SEALED PACKAGE

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Fig. 1.

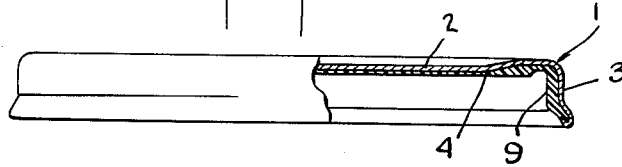


Fig. 2.

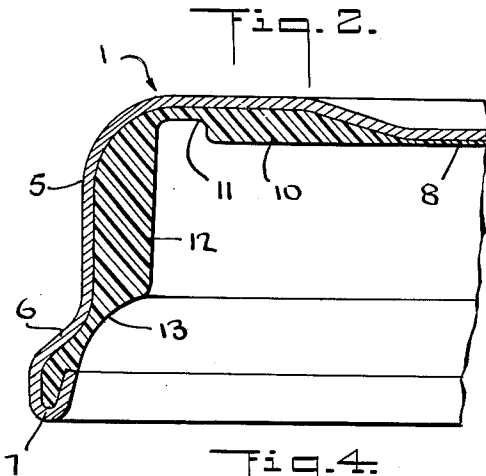


Fig. 3.

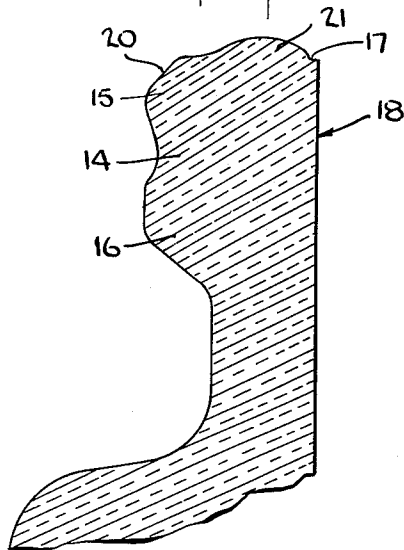


Fig. 4.

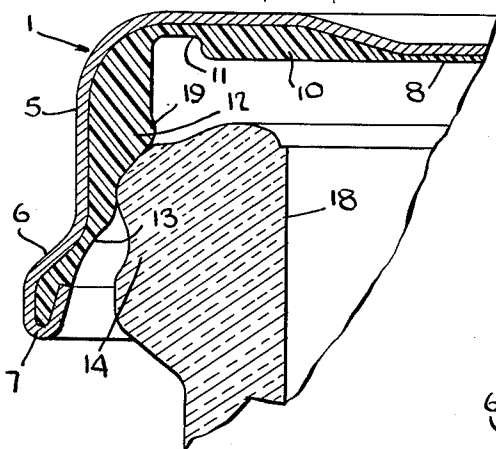


Fig. 5.

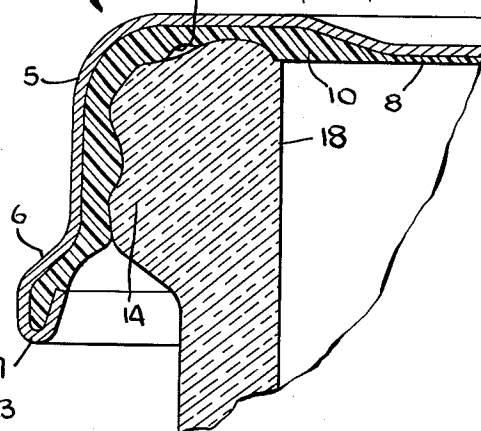
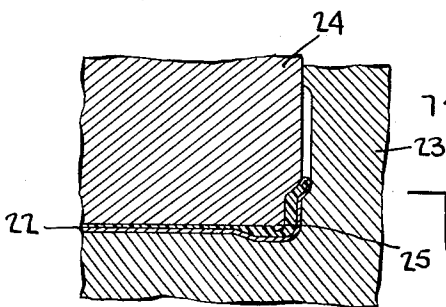


Fig. 6.



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2,979,218

CLOSURE CAP AND SEALED PACKAGE

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4 Claims. (Cl. 215—40)

The present invention relates to the sealing art and more particularly to an improved closure and a container finish for making a hermetic seal on a glass container and to a method of making the closure.

More particularly the invention is an improvement upon the closure and container of the inventor's Patent No. 2,772,013, issued November 27, 1956, and his co-pending application Serial No. 465,027, filed October 27, 1954, now Patent No. 2,817,453, issued December 24, 1957.

The rapidly increasing use of food products which are preferably packaged in hermetically sealed containers presents a continually growing demand for suitable packages and for improved sealing closures which are easily manufactured and which are at the same time easily applied to containers such as glass jars to provide a lasting hermetic seal. The closures must be easily and rapidly applied and removed and at the same time they must be capable of maintaining a tight seal during the handling incident to storage and shipment of the containers.

The above mentioned Patent No. 2,772,013, and application Serial No. 465,027, now Patent No. 2,817,453, each relate to closures adapted for hermetic sealing and having sealing gaskets molded into a metal closure shell. In order to provide for the accommodation of the closure gasket to the sealing finish of the container the closures of Patent No. 2,772,013 and application Serial No. 465,027, now Patent No. 2,817,453, each have grooves formed in the skirt portion of the closure gasket. The formation of this groove requires a separate manufacturing operation after the gasket has been molded into the closure.

I have now discovered that the position of the sealing groove may be moved from the closure skirt to a portion of the gasket underlying the closure cover while retaining an equal or an improved sealing action. The closure of the present invention has its groove in the closure gasket at such a position that the groove may be formed simultaneously with the formation of the remainder of the gasket while at the same time providing an effective air-tight seal.

An object of the present invention is to provide an improved closure and a method of making the closure.

Another object of the present invention is to provide an improved closure which is adapted for easy manufacture.

Another object of the present invention is to provide an improved method of manufacturing closure caps.

Another object of the invention is to provide an improved container finish.

Another object of the present invention is to provide an improved sealed package.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been

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chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is an elevational view, partly in section, of a closure illustrating a preferred embodiment of the present invention;

Fig. 2 is an enlarged fragmentary sectional view of a portion of the closure shown in Fig. 1;

Fig. 3 is a fragmentary sectional view of a container showing a preferred finish in accordance with the present invention;

Fig. 4 is an enlarged fragmentary sectional view of the closure and the container showing the closure partly applied to the container;

Fig. 5 is an enlarged fragmentary view similar to Fig. 4 with the closure fully applied to the container; and

Fig. 6 is a fragmentary sectional view of a device for shaping the gasket according to the present invention.

Referring to the drawing and more particularly to Figs. 1 and 2 thereof illustrating a preferred embodiment of the invention, a closure cap 1 is shown having a cover portion 2 and a depending skirt 3 formed from sheet metal and a sealing gasket 4 bonded thereto.

The skirt 3 has a generally cylindrical upper portion 5 and a flaring lower portion 6 which terminates in an inwardly curled lower edge 7 which envelopes the lower edge of the gasket skirt portion.

The preferred embodiment of the gasket 4 extends over the entire inner surface of the closure and comprises a relatively thin protective center portion 8 and a thicker sealing portion 9 at the outer edge of the closure cover portion 2. The center portion 8 of the gasket 4 provides a protective coating to protect the contents from the metal shell of the closure. This portion may be omitted where such protection is not required. The thicker sealing portion 9 of the gasket 4 is shaped, as will be more fully described below, to allow a rapid sealing of the container and to hermetically seal the container. The entire gasket 4 may be formed in a single operation as will be described in connection with the description of the method below.

The sealing portion 9 of the gasket 4 comprises a relatively thick portion 10 on the cover 2 adjacent to the junction of the closure cover 2 and skirt portion 3. A relatively deep annular groove 11 is provided in the portion 10 to facilitate the sealing action as will be described below. The thick portion 10 connects with a relatively thick side sealing gasket portion 12 on the closure skirt 3. The side sealing portion 12 extends downwardly in a generally straight line on the cylindrical portion 5 of the closure skirt 3 and then flares outwardly as seen at 14 on the flaring portion 6 of the skirt 3. The lower edge of the flaring gasket portion 13 has its lower edge enveloped by the inwardly turned lower edge 7 of the closure skirt 3.

The relatively thick sealing portion 9 of the gasket 4 is adapted to engage the rim of a container which preferably has an outwardly extending annular bead adjacent to the mouth of a container. The rim of the container and the bead engage the sealing portion 9 to provide a hermetic seal as will be more fully described below in the description of the preferred embodiment of the container finish as illustrated in Figures 3, 4, and 5.

As seen in Figure 3, the preferred container finish comprises an annular enlargement 14 adjacent to the rim 17 of the container 18. A pair of maximum diameter portions or beads 15 and 16 cooperate to form a channel 19 intermediate the beads 15 and 16. When the closure is applied to the finish of Figure 3, the beads 15 and 16 embed themselves at least partially into the side sealing portion 12 of the gasket 4. Since the preferred rubber-like materials for the gasket are essen-

tially incompressible, the application of the closure 1 to the container causes a reshaping of the gasket material. This reshaping occurs in the preferred forms of the gasket and container finish disclosed herein to tightly seal the container and to provide a sealing action which permits relatively easy subsequent removal of the closure 1 from the container 18. Since the embedding of the beads 15 and 16 into the gasket 4 displaces a certain amount of the incompressible gasket material, it has been found necessary to provide an accommodation means to accept the displaced material. In the preferred gasket illustrated in Figs. 1 and 2 channel 11 is provided at the outer edge of the thickened gasket portion 10 on the closure top 2. During the sealing of the container the excess gasket material is displaced by a rolling or wiping action and the necessary amount of gasket material is forced upwardly from the gasket portion 12 into the channel 11. This displacement is illustrated in Figure 4 in which the container 12 is shown with the closure 1 partially applied. The upper bead 15 has engaged the thickened gasket portion 12 causing a displacement of a small amount 19 of the compressible gasket material. As the closure 1 is forced further onto the container 18, the excess material in the bulge 19 is gradually forced upwardly into the channel 11. When the closure has been completely applied to the container, as is seen in Fig. 5, the channel 11 is at least partially filled with the displaced gasket material.

In order to provide for an efficient displacement of the gasket material so that an effective sealing engagement is obtained between the closure 1 and the container 18, the upper surface of bead 15 has a relatively flat angular gasket contacting surface 20. The surface 20 engages the surface of the gasket portion 12 at a relatively sharp angle so that it lifts or wipes the excess gasket material ahead of the surface 20 into the channel 11 during the sealing action described above. In a preferred form of the container finish, the surface 20 is relatively flat and an angle of about 51° plus or minus 2½° with a horizontal plane defined by the container rim has been found to provide unexpectedly superior seals with the preferred closure gasket shape. The transfer of gasket material from the relatively thick side portion 12 of the gasket or covering 4 provides for a tight seal between the beads 15 and 16 and the gasket 12 and also provides for an efficient top seal between the upwardly facing bead 21 on the container rim 12 and the portion of the closure gasket at the reshaped groove 11.

Prior closures such as the closure of applicant's prior Patent No. 2,772,013 provide grooves in the side portions of the closure gasket which will receive displaced portions of the gasket material to facilitate a sealing action. The formation of these radially directed grooves complicates the closure manufacture in that it has been found impractical to form them in a single molding step. The channel 11 of the present closure and its cooperating gasket finish provide a satisfactory gasket material accommodation action and at the same time are readily formed in a single molding action with a relatively simple die. A preferred method of forming the gasket finish is illustrated in Figure 6. After the closure shell 22 has been shaped by suitable dies, the shell 22 is placed in the die member 23 with a measured blank of gasket material positioned within it. A shaping plunger 24 is then forced downwardly into the closure shell 22 so that the gasket material is forced into the shape of Figure 1 by the molding action of the cooperating die 23 and the plunger 24. The channel 11 is formed simultaneously with the other portions of the gasket 4 by a suitable flange 25 on the plunger 24. When the plunger 24 is removed from the closure shell 22, a completely shaped gasket 4 has been formed therein. The closure 1 is completed by a suitable curing of the

gasket material or it may be applied without curing where an unvulcanized gasket is desired.

It will be seen that an improved closure and method of making have been provided by the present invention. A closure results which provides a tight hermetic seal and which is readily adapted for application and removal from the container. At the same time the closure and its integral gasket are easily manufactured with a minimum number of steps so that the closures are adapted for use in large quantities with the preferred container finish of the invention in high speed automatic packaging operations.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention I claim:

1. A closure cap of the class described comprising a metal shell having a top and a peripherally depending skirt having an uppermost cylindrical portion and a lowermost outwardly flaring portion and a rubber gasket bonded to the inner surface of the metal shell and forming an imperforate covering over the entire inner walls of said top and depending skirt and comprising a gasket skirt portion having an upper cylindrical relatively thick sealing zone and a lower relatively thin outwardly flaring zone, said zones being bonded directly to the correspondingly shaped portions of the skirt of the metal shell and comprising also a gasket top area having relatively thin central and peripheral zones connected by a substantially thicker zone for making sealing engagement with a relatively wide zone of a container finish whereby said relatively thin peripheral zone of said gasket top area forms a groove into which gasket material may flow when displaced from the adjacent cylindrical zone of the gasket skirt portion and the thicker zone of the gasket top area when the cap is pressed onto a container and both of said last named zones of the gasket become deformed to the shape of the container finish, and the lower edge of the outwardly flaring skirt of the metal shell extending inwardly and upwardly about the lower edge portion of the lower outwardly flaring zone of the gasket.

2. In a sealed package of the press-on closure type, the combination of a glass container having an annular enlargement on the side thereof adjacent the container mouth comprising in vertical cross section a pair of maximum diameter bead-like portions spaced vertically from one another with a relatively shallow groove therebetween, a closure cap seated on the glass container comprising a metal shell having a top and a peripherally depending skirt having an uppermost cylindrical portion and a lowermost outwardly flaring portion and a rubber gasket bonded to the inner surface of the metal shell and forming an imperforate covering over the entire inner walls of said top and depending skirt and comprising a gasket skirt portion having an upper cylindrical relatively thick sealing zone engaging said bead-like portions of the container and a lower relatively thin outwardly flaring zone, said zones being bonded directly to the correspondingly shaped portions of the skirt of the metal shell and comprising also a gasket top area having a relatively thin central and peripheral zones connected by a substantially thicker zone for making sealing engagement with a relatively wide zone of the container top whereby said relatively thin peripheral zone of said gasket top area forms a groove into which gasket material may flow when displaced from the adjacent cylindrical zone of the gasket skirt portion and the thicker zone of the gasket top area when the cap is pressed onto the container and both of said last named zones of the gasket become deformed to the shape of the container finish, and the lower edge of the outwardly flaring skirt of the metal shell

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extending inwardly and upwardly about the lower edge portion of the lower outwardly flaring zone of the gasket.

3. The combination as claimed in claim 2 in which the uppermost of said bead-like portions has its upper surface sloping inwardly and upwardly from its outermost edge along a straight line.

4. The combination as claimed in claim 3 in which said straight line portion forms an angle of about 51° from a plane defined by the container rim.

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