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SEALED PACKAGE AND METHOD OF SEALING

Filed July 30, 1932

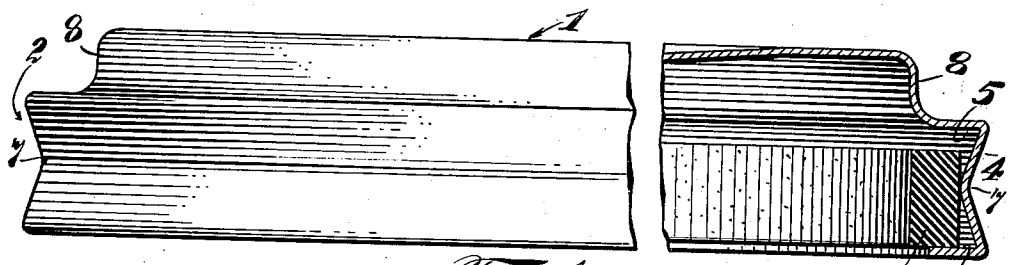


Fig. 1.

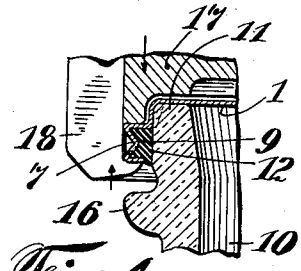


Fig. 4.

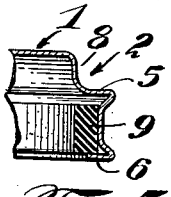


Fig. 5.

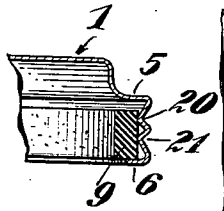


Fig. 6.

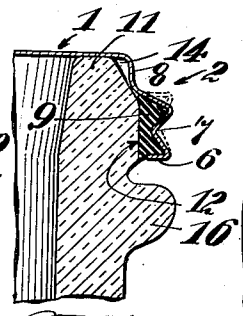


Fig. 7.

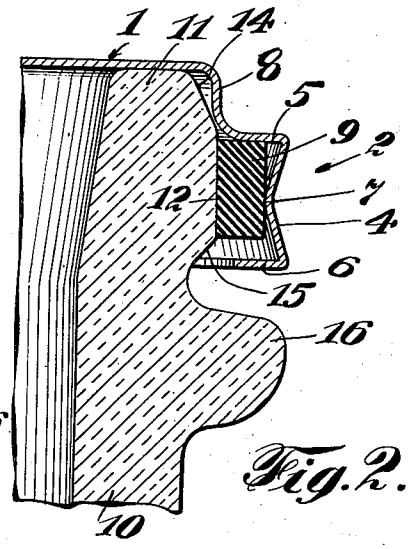


Fig. 2.

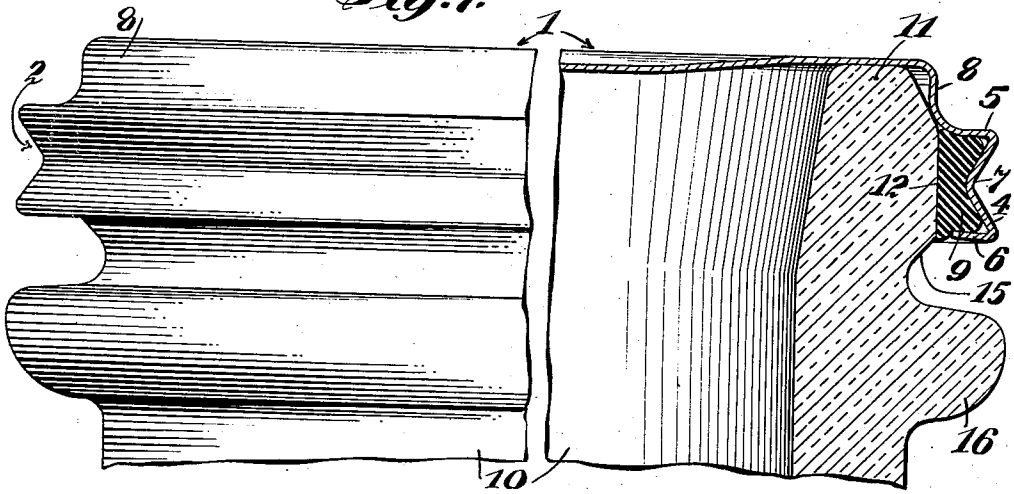


Fig. 3.

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SEALED PACKAGE AND METHOD OF SEALING

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5 Claims. (Cl. 215—40)

The present invention relates to the sealing art, and more particularly to a hermetically sealed package and the method of sealing it.

Among the requirements of a commercial closure cap for hermetically sealing containers are: a secure seal on glass varying slightly in size and shape; simplicity of sealing; adjustability in the tightness of seal; easy removal; and attractive appearance. Glass containers, due to manufacturing limitations, vary in size from a true standard and are slightly out of round. Difficulty has been encountered in obtaining tight seals on the undersized containers, without breaking the oversized containers during the sealing operation. Certain types of products are sterilized after they are sealed in containers and require very tight seals to prevent the caps from popping off during the heating of the packages. In addition to the above requirements, closure caps should be readily removable to avoid complaints from consumers. A single complaint from a consumer causes a packer to wonder just how many other consumers are dissatisfied with his package.

The present invention aims to achieve the above objects with an inexpensive closure which can be readily sealed and removed.

Another object of the present invention is to provide a secure, inexpensive seal which can be readily made by a simple sealing mechanism.

Another object of the invention is to provide a seal which can be readily adjusted for the desired tightness required by the product packed.

Another object of the invention is to provide a closure which will accommodate containers varying a maximum amount from a standard size, without impairment of the seal and without breakage of containers.

Another object of the invention is to provide an improved method of forming a hermetic seal.

A further object of the invention is to improve the appearance of hermetically sealed packages.

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

Fig. 1 is a side elevational view of a closure cap, partly in section;

Fig. 2 is a fragmentary side elevational view of the package, partly in section, prior to the sealing operation;

Fig. 3 is a side elevational view, partly in section, of a sealed package illustrating the present invention;

Fig. 4 is a partial sectional view illustrating parts of a sealing chuck for sealing the package;

Fig. 5 is a fragmentary sectional view of a slightly different form of closure;

Fig. 6 is a further modification of a closure cap; and

Fig. 7 is a modified package and method of sealing.

Referring again to the drawing, there is shown a closure cap having a cover portion 1, and a depending skirt 2. The skirt of the cap preferably has a bead 4, having an upper side 5 and a lower side 6. The outer peripheral side wall has a substantially V-shaped groove 7 formed therein, with the concave portion thereof on the exterior of the skirt and the convex portion on the interior thereof. The portion 8 of the skirt, connecting the bead with the cover portion, is preferably flared outwardly slightly to conform more or less to the upper end of the container. A gasket 9, preferably of vulcanized rubber, is mounted in the bead of the cap and supported by the lower side 6 thereof. Preferably, the apex of the V-shaped groove 7 is slightly below the middle of the bead and engages the gasket, as shown more particularly in Figs. 1 and 2. The distance may be varied, but excellent results have been obtained by locating the apex of the groove about one-thousandth of an inch below the middle of the bead.

The above closure may be sealed on various types of containers, but the preferred embodiment illustrated herein comprises a container 10, having a rim 11 and side wall sealing surface 12. Directly above the side wall sealing surface is a tapered portion 14, for purposes to be described hereinafter, and directly below the sealing surface is a groove 15 leading to the pry-off shoulder 16. Various types of sealing mechanisms may be utilized for applying the closure to the container, but preferably a sealing chuck is utilized, having an anvil 17 engaging the cover part of the closure with its periphery resting upon the upper side of the bead and a series of jaws 18 adapted to engage under the bottom of the bead. The sealing is effected by raising the

lower jaws to collapse the groove 7, causing the apex thereof to move inwardly toward the side of the container, thereby pressing the gasket firmly against the side of the container and forming a secure seal. Suitable adjustments in the sealing mechanism permit the groove to be collapsed to any desired extent. The further the groove is collapsed, the tighter is the seal. In this way, any desired tightness may be obtained. It will be noted, also, that the sealing forces applied by the sealing mechanism are entirely in a vertical direction. The inward pressure on the gasket is through the intermediation of the apex of the groove, and, hence, the metal of the cap, being resilient and slightly flexible, cooperates with the gasket or other sealing material to accommodate irregularities in the container, without breakage. By utilizing a cap, as illustrated herein, a flat surface is presented at the bottom of the cap, which is spaced a slight distance from the shoulder 16 on the container, so that a coin or other tool may be inserted between the bottom of the cap and the upper side of the shoulder 16 to pry it off. The groove 15 in the container facilitates the insertion of the tool and the removal of the cap by enabling the tool to be inserted further under the edge of the cap. In addition, the cap may be sealed sufficiently low on the sealing surface so that it locks into the groove. By reason of this operation, that is, by reason of the seal being partly below the cylindrical sealing surface 12, it is possible to secure a very strong seal, which may be sufficient to resist any internal pressures occasioned by processing the package after the sealing operation. The tapered surface 14, directly above the sealing surface 12, facilitates removal of the closure. By tapering this surface, the amount that the skirt of the cap has to be stretched in order to clear the upper edge or rim of the container is reduced to a minimum, thereby greatly facilitating the removal operation.

The closure shown in Fig. 5 is substantially similar to that described above, except that the inner portion of the groove is rounded more into a U-shape than that of the closure shown in Figs. 1 to 4. The operation of the closure is essentially similar, but the rounded portion gives a broader sealing engagement with the gasket.

The closure in Fig. 6 differs from that shown in Figs. 1 to 4 in that the outer side wall of the bead has a pair of grooves 20 and 21. When the bead is collapsed, the two grooves 20 and 21 move inwardly forming, in effect, a double seal, which is quite effective. As a very stiff metal is used, the seal has an added advantage of being more resilient and has a wider pressure zone than a seal formed with a bead having a single groove on it.

Another method of sealing is shown more particularly in Fig. 7, wherein a closure cap and container, similar to that shown in Figs. 1 to 5, is sealed by holding the lower jaws 18 of a chuck substantially stationary and by pushing downwardly an anvil 17, suitably shaped to force the upper side of the bead from the dotted position shown in Fig. 7 to the solid line position. An advantage of this type of seal is that the downward pressure on the bead of the cap tends to reduce to a minimum, the distance between the bottom of the cap and the pry-off ledge 16. This has certain advantages in improving the appearance of the cap and in facilitating removal of it. In addition, by reason of this type of seal, it is possible to regulate the distance between the lower side of the bead and the shoulder on the container, which is also desirable in many cases.

In utilizing the present invention, the closure cap, as shown in Fig. 1, is first formed by a stamping operation and a subsequent rolling operation and, thereafter, the gasket 7 is placed in the closure and the caps shipped complete, with the gaskets, to packers. The packers place the caps on the containers, which are preferably sufficiently small so that the caps rest loosely thereon. The covered package is then placed in a sealing machine, which collapses the bead 2 by means of an anvil 17 and jaws 18, as illustrated more particularly in Fig. 4. By adjusting the sealing mechanism, the groove in the cap may be forced inwardly to any desired extent by drawing the upper and lower sides of the beaded cap closer together. The cap may be readily removed by applying a coin, or any flat tool, between the bottom of the cap and the shoulder on the container, to pry the cap from the container. After it is removed, the cap may be reapplied merely by pressing the cap on the container. A very effective reseal is formed, although it will be appreciated that a reseal ordinarily does not have to be a hermetic seal to preserve the contents of the package during consumption. The bevelled surface 14, on the rim of the container, facilitates application of the closure for resealing purposes.

It will be seen that the present invention provides a very secure seal, the tightness of which may be varied within wide limits. The seal is made through the intermediation of an elastic piece of sheet metal, and a rubber gasket, which is double assurance against breakage of the container on account of irregularities in it. The closure may be readily removed without special tools, it being merely necessary to insert a coin or knife between the shoulder on the container and the bottom of the cap, to pry it off. After removal, the closure may be re-applied for resealing the contents during consumption. The package is inexpensive, being made by a one-piece cap, a gasket, and a container, and is fully capable of withstanding the rough usage to which it may be subjected, without impairing the seal. The closure may be applied with a vacuum in the container, or it may be applied as a hermetic seal without a vacuum. In either case, the closure will hold securely upon the container.

As various changes may be made in the form, construction and arrangement of parts without departing from the spirit and scope of the invention and without sacrificing 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. As an article of manufacture, a closure cap comprising the combination of a cover portion, a depending skirt, and an annular bead in said skirt adapted to receive a gasket, the outer wall of said bead being substantially V-shaped with the apex of the V being sufficiently below the middle of the bead to increase substantially the strength of the lower outer side wall of the bead with respect to the upper outer side wall.

2. A sealed package comprising the combination of a container having a tapered upper outer edge and a substantially cylindrical portion below said tapered portion, a closure cap having a cover portion and a depending skirt, a bead in the skirt of said cap, and a gasket in said bead, a

groove in the outer side wall of said bead, the apex of said groove being sufficiently below the middle of said bead to increase substantially the strength of the lower outer side wall with respect to the upper outer side wall, said groove being partially collapsed to force said gasket against the cylindrical portion of said container.

3. In a sealed package, the combination of a container having a sealing surface, a closure cap having a cover portion and a depending skirt, a bead in the skirt of said cap and a gasket in said bead, a pair of grooves extending circumferentially of the outer side of said bead, said grooves being partially collapsed to force said gasket against the sealing surface of the container.

4. As an article of manufacture, a closure cap comprising a cover portion, a depending skirt, and an annular bead in said skirt adapted to receive a gasket, the outer side wall of said bead having a pair of grooves formed therein to engage a gasket by means of their apices to press the gasket against the container.

5. A sealed package comprising the combination of a container having a sealing surface adjacent the upper end thereof, a pry-off ledge below said sealing surface, a closure cap, a bead in the skirt of said cap, said bead having an annular groove in the outer peripheral wall thereof, the apex of the groove being below the middle of the bead to substantially increase the strength of the side of the bead below the apex with respect to the side above the apex, a gasket in said bead, said bead being collapsed to increase the depth of said groove and to force the gasket against the sealing surface of the container, the bottom of said cap which forms the bottom of the bead being spaced a sufficient and proper distance from said pry-off ledge to permit the cap to be removed by prying it off with a knife or coin.

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