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CONTAINER AND CLOSURE CAP TO BE USED THEREWITH

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Fig. 1.

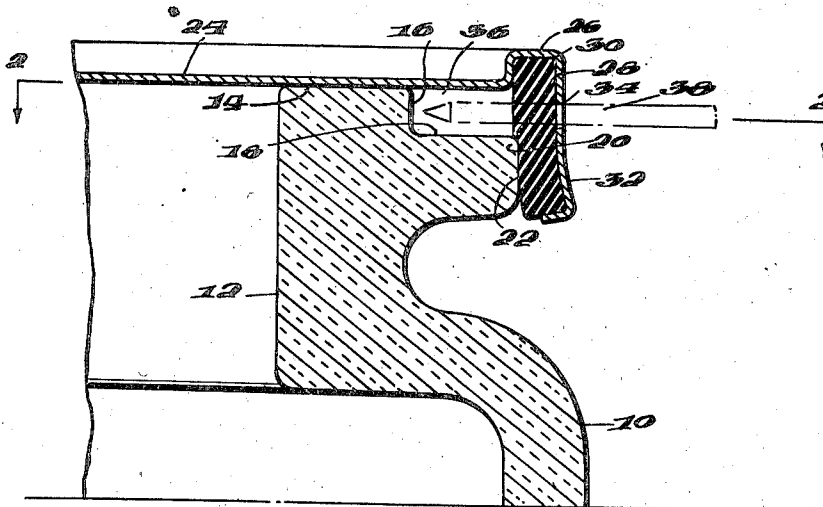
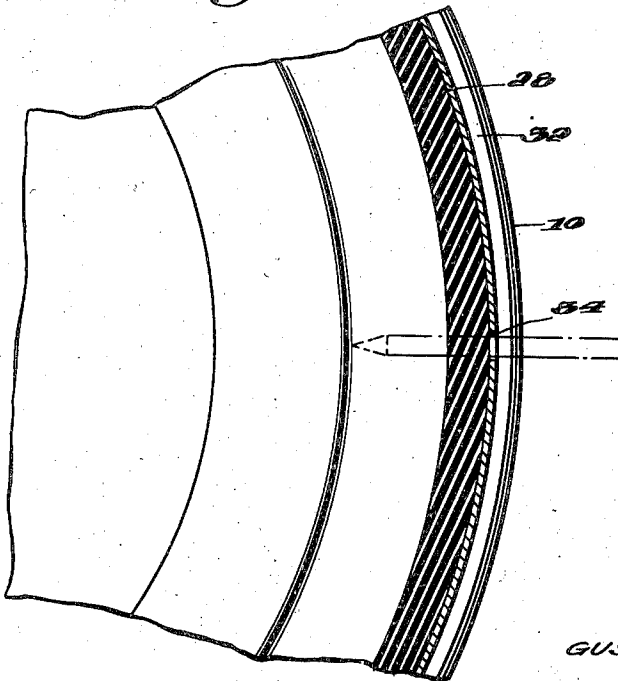


Fig. 2.



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CONTAINER AND CLOSURE CAP TO BE
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3 Claims. (Cl. 215—40)

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This invention relates to sealed containers such as bottles, jars or the like and a closure to be used therewith. More specifically, it relates to a container and closure construction which permits the ready removal of the closure from a hermetically sealed container in such condition as to permit repeated reuse.

The closure caps in common use today on so-called vacuum sealed packages extend over the mouth of the container and seat at the periphery thereof a deformable sealing gasket which is adapted to contact the outer surface of a container in sealing engagement. When air from the interior of the cap has been at least partially evacuated, removal of the conventional closure cap becomes difficult without mutilating the cap, sealing gasket, or both so badly that effective reuse of the cap becomes impossible.

An object of the invention is the construction of a container and a closure to be used therewith in which the closure cap may be easily removed.

It is an object of this invention to provide a closure constructed of thin material such as sheet metal with the closure and the container so designed as to permit application of force about the periphery of the closure for its removal from the container without danger of mutilating either the closure or its sealing gasket.

It is an object of this invention to provide a design of container which will allow the use of closures of a simple design and which are conducive to stacking of the sealed containers and the closures themselves.

It is an object of this invention to provide a closure and container design of the type using a piercing tool wherein the closure adds a minimum of overall height to the sealed container.

It is a further object of this invention to provide a closure and container design which utilizes a piercing tool for venting the interior of the sealed container to the atmosphere and in which it is impossible for the piercing tool to come into contact with the material within the container.

Other objects and advantages of the invention will become apparent from a reading of this specification in view of the drawings forming a part thereof in which drawing like reference numerals indicate like parts and in which:

Figure 1 is a fragmentary vertical cross-sectional view showing the cap seated on the mouth of a container; and

Figure 2 is a fragmentary plan view taken on a line corresponding to line 2—2 of Figure 1.

The container 10 which may be a bottle, jar

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or the like includes a mouth 12, which terminates in a lip 14. At the peripheral edge of the lip is a downwardly extending substantially cylindrical surface 16. At the lower edge of the cylindrical surface 16 is an annular ledge 18. The periphery of the annular ledge 18 terminates in a peripheral sealing corner 20. The sealing corner 20 and a substantially cylindrical depending sealing surface 22 are designed to engage the gasket of a closure to be described.

The closure which may be constructed of light gauge sheet metal includes a top portion 24 which is adapted to overlie the lip 14 at the mouth 12 of the container. The top portion 24 is of such size as to extend substantially to the extended annular plane of the cylindrical sealing surface 22. An annular gasket holding channel 26 is formed about the edge of the top 24.

Seated in the channel 26 is an annular deformable sealing gasket 28 having one edge 30 in tight contact with the bottom of the channel. The inner surface of the sealing gasket 28 is adapted to contact the sealing corner 20 and the sealing surface 22 of the container 10.

A skirt 32 depends from the outer wall of the channel 26 and this skirt is adapted to support the outer surface of the sealing gasket. Near the top of the skirt 32, where it joins the outer wall of the channel 26, there is provided a passage 34 which extends through the skirt 32. This passage is opposite the annular space 36 whose height is determined by the axial extent of the surface 16 and whose width is determined by the radial extent of the ledge 18. This arrangement permits a piercing tool 38 to be moved through the passage 34, through the gasket 28 and into the space 36 thereby venting the interior of the sealed container to the atmosphere. The piercing tool is constructed preferably in accordance with the teaching of my Patent No. 2,187,395 although any small pointed instrument may be used. While it is true that the lip 14 is substantially in contact with the top 24 as shown in Figure 1, nevertheless, the contact at this region is not a seal due to the inherently imperfect nature of the contacting surfaces, and atmosphere admitted to the space 36 above the ledge 18 is readily drawn into the mouth 12 of the container.

It is desirable that the gasket 28 be firmly seated in the annular channel 26 particularly in the region of the passage 34. For the purpose of securing a tight joint, the gasket may be cemented into the channel, although in the illustrated embodiment the gasket is held in place by the in-

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turned bottom edge of the skirt 32. The closure is adapted to be held in container-sealing position by atmospheric pressure, and to produce a rarefied atmosphere within the container, steam is commonly introduced into the head space of the container just before the cap is pressed home with a light application of force. The gasket 28 which is formed of resilient material, for example rubber, comes into sealing engagement with the relatively sharp peripheral sealing corner 20 and to a smaller degree with the cylindrical sealing surface 22 to provide a tight seal. The internal diameter of the closure at the sealing surface is undersize so that deformation of the gasket takes place to insure an effective seal. Preferably also radial deformation or spreading of the skirt can be utilized to increase the effectiveness of the seal. This effect is enhanced by the use of thin resilient material for the skirt and also by increasing the axial length of the cylindrical surface 16 beyond the proportion shown in Figure 1 so that the sealing engagement takes place more nearly at the lower edge of the gasket. The radial sealing force is then more effective to cause resilient deformation of the skirt because of greater leverage about the region of the channel 26.

As stated above, the seal is effected mainly at the peripheral corner 20 of the ledge 18 and to some extent at the adjacent sealing surface 22. By providing the skirt 32 and the attached gasket 28 with a slight flare the sealing force is concentrated at the peripheral sealing corner. Since the pressure on the gasket per unit area is thereby increased, a more effective and sensitive seal is produced.

The condensation of the steam introduced at the time of sealing causes a vacuum in the mouth 12 of the container and in the space 36. This vacuum is utilized to increase the pressure at the sealing surface since, as shown in Figure 1, a large proportion of the area of the inner surface of the gasket is subjected to the inward pull of the vacuum. This force acting about the channel 26 as a fulcrum causes the skirt and gasket to be drawn inwardly into more secure sealing engagement. This effect may be increased by lowering the ledge 18 and thereby increasing the area of the inner surface of the gasket that is subjected to the vacuum.

By use of the structure disclosed, it will be noted that the piercing tool 38 is always inserted at a point below the lip 14 of the container 10. It is unnecessary therefore to deform the top to produce a piercing channel as shown in my Patent No. 2,330,046. It will also be noted that the location of the piercing passage below the lip of the container renders it impossible for the piercing tool to come into contact with the material within the container, which is particularly advantageous where the contents must remain uncontaminated or sterile.

In view of the relatively great amount of space both axially and peripherally which is available to receive the point of the piercing tool 38 it will be seen that great tolerance is allowable in the location of the passage 34, an aid in quantity production. The availability of the space 36 to receive the piercing tool 38 also makes it unnecessary to orient the cap into any particular relationship to the container prior to its application.

To remove the closure normally requires merely the insertion of the piercing tool to relieve the vacuum and the subsequent withdrawal of the closure by the fingers. By use of the structure

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disclosed it is possible to facilitate removal of the closure by use of the piercing tool as a lever. This is particularly advantageous where sticky or dried substances are present at the sealing surfaces. Figure 1 shows the piercing tool 38 in the inserted position. To remove the closure the tool is inserted preferably the maximum amount and an upward force applied on the outwardly projecting end. The innermost tip of the tool engages the ledge 18 which at the point of contact acts as a fulcrum. Additional upward movement of the tool results in removing pressure being applied at the upper edge of the piercing passage 34. By constructing the container so that the annular ledge 18 is relatively wide as compared to the height of the piercing passage 34 above the ledge 18 as shown, a substantially axial removing force is obtainable.

While using the annular ledge as a prying base as described above, there is practically no danger of chipping the container. In addition, since no prying effort is exerted on the lip of the container there is no danger of marring the lip of the container or of chips of container material falling through the mouth of the container into the substance therein.

While I have described my invention in its preferred embodiment, I desire it to be understood that modifications may be made and that no limitations upon the invention are intended other than those imposed by the scope of the appended claims.

I claim:

1. In combination, a container having a mouth and a closure therefor adapted to be hermetically sealed to the mouth of the container by atmospheric pressure upon rarefaction of atmosphere in the container, an annular lip on said mouth, a downwardly extending surface adjacent said lip, an annular ledge generally parallel to said lip and located at the bottom of said downwardly extending surface, a peripheral sealing surface at the outer extremity of said ledge, the closure having a top portion adapted to overlie said lip and to extend radially toward the periphery of said ledge, a skirt depending from the periphery of said top and surrounding said peripheral sealing surface, an upstanding annular channel about the periphery of said top, an annular deformable sealing gasket seated at one edge in said channel, the outer surface of which engages the inner surface of said skirt and the inner surface of which engages said sealing surface thereby defining an annular chamber above said ledge, and a passage extending through the upper portion of said skirt at a point below the plane of said top portion and above said ledge so as to permit venting of said annular chamber upon insertion of a piercing tool through said passage and said sealing gasket.

2. In combination, a container having a mouth and a closure therefor adapted to be hermetically sealed to the mouth of the container by atmospheric pressure upon rarefaction of atmosphere in the container, an annular lip on said mouth, a downwardly extending surface adjacent said lip, an annular ledge generally parallel to said lip and located at the bottom of said downwardly extending surface, a peripheral sealing surface at the outer extremity of said ledge, the closure having a top portion overlying said lip and extending radially to the periphery of said ledge, a skirt depending from the periphery of said top surrounding said sealing surface, an upstanding annular channel about the periphery of said top,

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an annular deformable sealing gasket seated in said channel engaging said sealing surface and the inner surface of said skirt, thereby defining an annular chamber above said ledge, and a passage extending through the upper portion of said skirt at a point below the plane of said top portion and above said ledge so as to give access to the annular chamber above said ledge upon insertion of a piercing tool through said passage and said gasket, the radial width of said ledge being greater than the axial height above said ledge in order that a substantially axial removing force may be produced at the inner edge of said passage when leverage is applied to said piercing tool.

3. In combination, a container having a mouth and a closure therefor adapted to be hermetically sealed to the mouth of the container by atmospheric pressure upon rarefaction of atmosphere in the container, an annular lip on said mouth, a downwardly extending surface adjacent to said lip, an annular ledge located at the bottom of said downwardly extending surface and extending generally parallel to said lip, a sealing corner at the periphery of said ledge, a sealing surface extending downwardly therefrom, the closure having a top portion overlying said lip, an outwardly flared skirt depending from the periphery of said top portion so as to surround said sealing surface, an upstanding annular channel about the periphery of said top, a deformable

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sealing gasket seated at one edge in said channel and lying in contact with said skirt and presenting a flared internal surface toward said container whereby sealing occurs primarily at said sealing corner and thereby defining an annular chamber above said ledge, and a passage extending through the upper portion of said skirt and positioned below the plane of said top portion and above said ledge so as to give access to said annular chamber upon insertion of a piercing tool through said passage and said gasket for the purpose of venting said chamber.

GUSTAVE GLOCKER.

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