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CLOSURE SEAL FOR CONTAINERS

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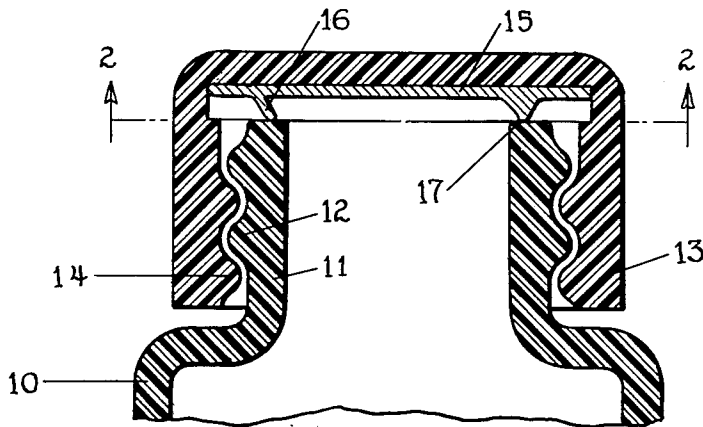


Fig 1

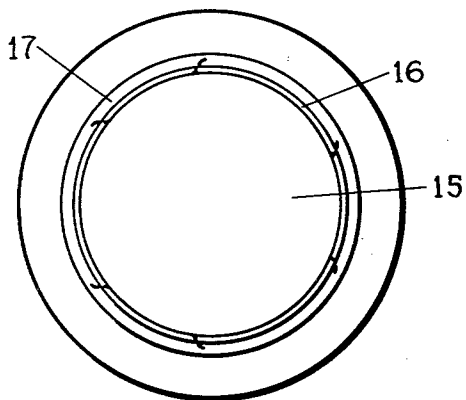


Fig 2

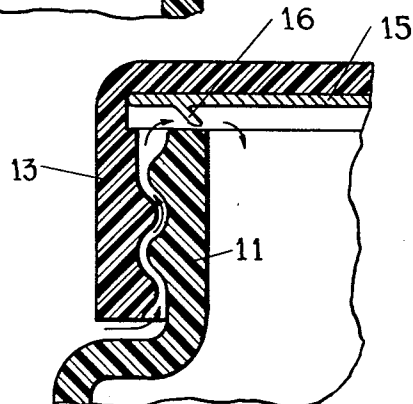


Fig 3

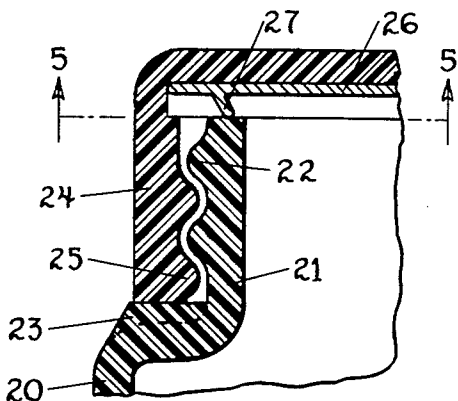


Fig 4

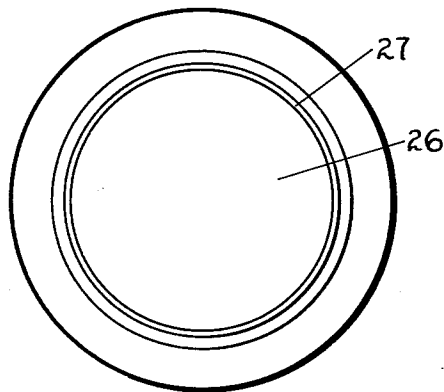


Fig 5

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CLOSURE SEAL FOR CONTAINERS

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This invention relates to seals for caps or closures of containers, and more particularly to the seals for containers made of relatively flexible material.

Recently more and more materials, particularly fluids and semi-fluids, are being packaged in relatively soft, plastic containers of the so-called "squeeze" type. There are a variety of reasons for this, such as greater eye appeal to the customer, resistance to corrosion of the container by certain types of contents, and for ease in dispensing the contents. The containers can be molded into a variety of shapes instead of being more or less confined to uniform cylindrical, oval, or rectangular cross-section.

These filled containers are usually packed and shipped in boxes of a dozen or more, and it is frequently the custom to ship them in inverted position; in other words, with the cap down. This is particularly true where the various ingredients forming the contents are apt to stratify. Thus when the product reaches the retailer's shelves and the containers are set in an upright position, the contents are again mixed by agitation. It is necessary that there be a suitable seal between the closure and the container in order that the contents will not escape. This did not cause any great problem in the case of metal or glass containers, because they are quite rigid, but in the case of flexible containers, if the latter are filled when the contents are warm, and are then transferred to cooler temperatures, the containers frequently collapse to a certain extent, at least to the point where they present an unsightly appearance. This necessitates the opening of each container to permit air to enter so as to equalize the air pressure within and without the container, and subsequent resealing of the container by the retailer.

It is the principal object of the present invention therefore, to provide a novel type of gasket to be used between the container and its closure which will eliminate this condition by permitting air to breathe into the container, even when the container is inverted, without permitting the escape of the contents of the container.

This object is attained by providing a gasket having a thin flexible flange which contacts the rim of the neck of the container, between the container and closure, the flange being sufficiently flexible to permit air to enter under light pressure, but should the container be inverted, the pressure of the contents on the flange will prevent its escape. Means is also provided to hold the closure and container spaced sufficiently so that the seal cannot be compressed to the point where air cannot enter the container.

These objects will more fully appear in the following specification and the accompanying drawings, wherein:

FIGURE 1 is a fragmentary cross-sectional view of a container, closure and sealing gasket embodying the invention;

FIGURE 2 is a bottom plan view of the sealing gasket;

FIGURE 3 is a fragmentary cross-sectional view similar to FIGURE 1 but showing the breathing action of the sealing flange;

FIGURE 4 is a fragmentary cross-sectional view of a modified form of the invention; and

FIGURE 5 is a cross-sectional view taken on substantially the line 5—5 of FIGURE 4 and looking in the direction of the arrows.

Referring now more particularly to the drawings:

FIGURES 1 to 3 show a container 10 having a neck 11

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with threads 12 of conventional form. A closure or cap 13 provided with cooperating threads 14 is screwed onto the neck 11. The closure may be of any suitable material such as plastic or metal, but the container is usually made of flexible plastic material, because the invention finds its greatest usefulness with such containers.

Located within the closure 13 is a gasket 15. It is fitted snugly into the inside of the top of the closure. The gasket is preferably formed from a plastic material such as neoprene or polyethylene.

Adjacent to the perimeter of the gasket body is a flange 16 which is concentric with the perimeter of the gasket body and extends downwardly and inwardly therefrom. Most of this flange is very thin, and of uniform thickness. However, at spaced intervals, preferably three in number, the flange is thickened considerably, as shown at 17. The flange is located on the body of the gasket so that it contacts the end of the neck 11 of the container 10 between the inside and outside of the neck. The flange must be very carefully positioned, so that even when flexed by screwing the cap onto the container, the free edge of the flange will always be in a position to fit against the end of the neck of the container. The thickness of the thin portions of the flange is dependent upon the size of the neck of the container and its closure, and upon the stiffness of the material from which it is made.

The thicker portions of the gasket are for the purpose of preventing the closure from being tightened sufficiently onto the container so that the thinner portions are squeezed to the point where they prevent air from leaking between the closure and the container. In other words, the thicker portions of the gasket are thick enough, and radially stiff enough so that when the closure is screwed onto the container with the proper force, usually from 8 to 15 inch pounds, air can enter the container when there is a sufficient pressure differential between the inside and the outside of the container to collapse the latter.

It will be realized that there is always enough space between the threaded portions of the neck of the container and the closure to permit air to leak in as far as the seal between the gasket and the neck of the closure.

It might be possible to screw the closure down tightly enough to prevent the leakage of air between the gasket and the container. However, as it is the usual practice to fill the containers and cap the same by machinery, the capping machinery can be adjusted so that the pressure used to screw the closures onto the containers will be uniform on all containers, and of the proper amount. Even though the cap should be screwed on much harder after the container has first been opened, this is unimportant because the air pressure has already been equalized.

FIGURES 4 and 5 show a modified form of the invention in which the flange on the gasket is of uniform thickness throughout its circumference, and a different mode of spacing the gasket from the neck of the container is utilized. In this form of the invention container 20 and a closure 24 similar to those previously described are provided. The container has a neck 21 having threads 22, and the closure has threads 25 cooperating with those on the container. The container, however, is provided with circumferentially spaced shoulders 23 thereon extending up from the main body of the container. The closure has a gasket 26 with a flange 27 extending around, but spaced from the perimeter of the gasket as before. This flange is of uniform thickness throughout.

The shoulders previously mentioned are just high enough to permit the flange to touch the neck of the container with the proper pressure, but prevent the flange

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from being completely compressed and thereby prevent the leakage of air.

From the foregoing it will be seen that this invention provides a novel means of retaining the contents of containers, yet it prevents collapsing of the latter upon an excess of pressure on the outsides of the containers.

The scope of the invention is indicated in the appended claims.

We claim:

1. In combination with a container member having an annular neck forming an opening therein and a closure member therefore fitting over said neck, means on said neck and said closure member for holding the latter on said container member, and a gasket forming a seal between the container member and said closure member, said gasket having a disk like body portion located in said closure member, said gasket having a thin annular flange having flexible portions extending from said body portion into contact with one of said members and adapted to flex to permit the passage of air between said flange and said members upon a predetermined air pressure differential between the interior and exterior of the container member, and means on said gasket cooperating with one of said members for holding the cover member in sufficiently spaced relation from the container member to permit flexing of said flange upon the attainment of said predetermined air pressure differential.

2. In combination with a container member having an annular neck forming an opening therein and a closure member therefore fitting over said neck, means on said neck and said closure member for holding the latter on said container member, and a gasket member forming a seal between the container member and said closure member, said gasket member having a disk like body portion located in said closure member, said gasket member having a thin annular flange having flexible portions extending from said body portion into contact with said neck and adapted to flex to permit the passage of air between the flange and neck upon a predetermined air pressure differential between the interior and exterior of the container member, said contact being between the

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free edge of the flange and the end of the neck, and means on one of said members cooperating with another member for holding the cover member in sufficiently spaced relation from the container member to permit flexing of said flange upon the attainment of said predetermined air pressure differential.

3. The combination defined in claim 2 wherein the flange on the gasket member is frusto-conical and extends radially inwardly and downwardly from the body portion of the gasket member.

4. The combination defined in claim 2 wherein the means for holding the cover member spaced from the container member consists of a thickened portion of the flange, said thickened portion being relatively inflexible.

5. The combination defined in claim 2 wherein the means for holding the cover member spaced from the container member consists of a shoulder on the container in contact with the rim of the closure.

6. A gasket for sealing a closure to a container, comprising a disk like body portion having an annular flange adjacent to the perimeter of the body portion and extending downwardly therefrom, circumferentially spaced portions of said flange being very thin and flexible, and other portions of said flange being relatively thick and axially relatively inflexible.

7. A gasket for sealing a closure to a container, comprising a disk like body portion having an annular flange adjacent to the perimeter of the body portion and extending downwardly therefrom, circumferentially spaced portions of said flange being very thin and flexible, and stop means on said body portion adjacent to said thin portions of said flange.

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