United States Patent [19]

Norberg

[11] **3,901,405**

[45] **Aug. 26, 1975**

[54] **HERMETIC CLOSURE MEMBER**

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[22] Filed: **Feb. 4, 1974**

[21] Appl. No.: **439,343**

[52] **U.S. Cl.** **220/287**

[51] **Int. Cl.²** **B65D 51/00**

[58] **Field of Search** ..... 220/24 R, 60 R, 287

[56] **References Cited**

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Attorney, Agent, or Firm—Schroeder, Siegfried, Ryan & Vidas

[57] **ABSTRACT**

An elastomeric sheet having a stiffening edge region provides a hermetic seal by simple hand manipulation to a variety of containers and is usable on containers of different sizes.

5 Claims, 4 Drawing Figures

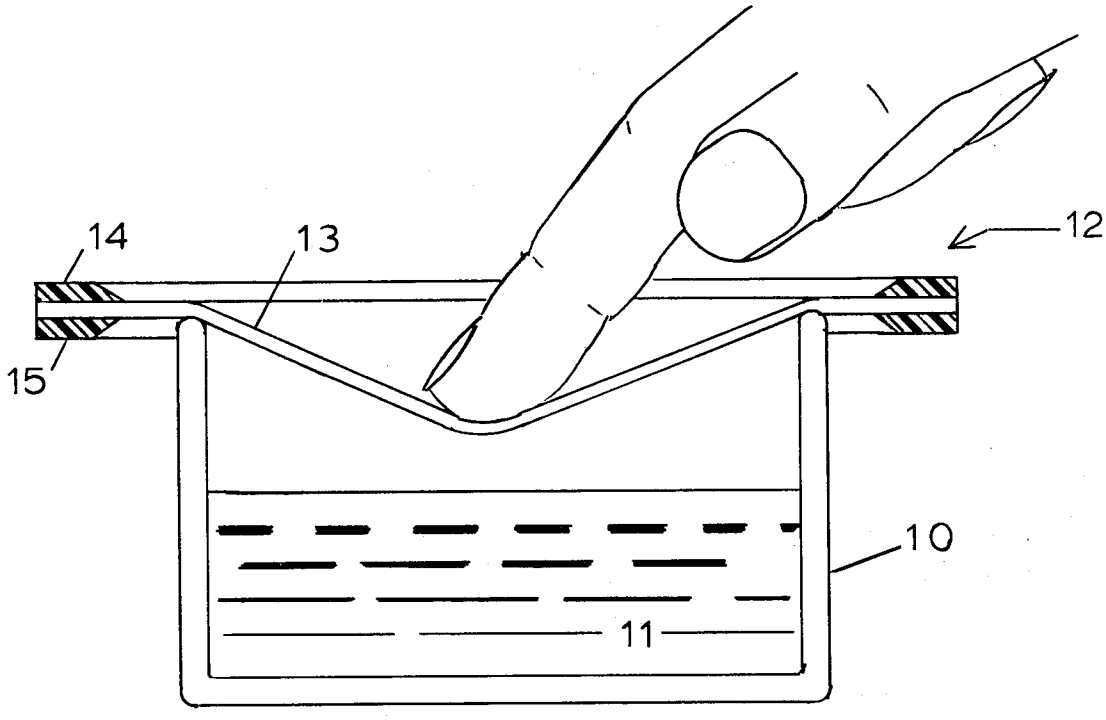


FIG 1

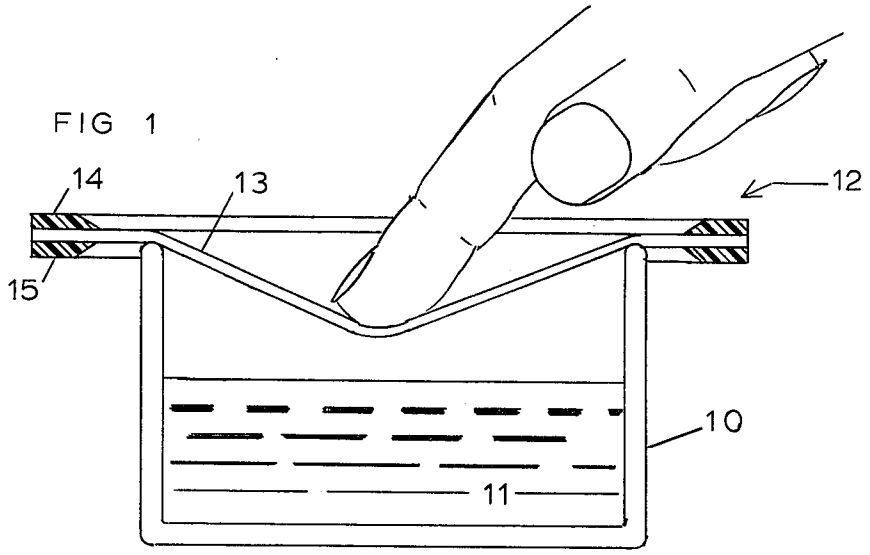


FIG 2

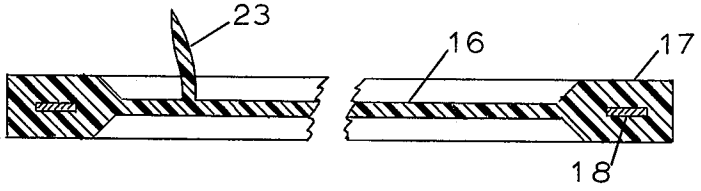


FIG 3

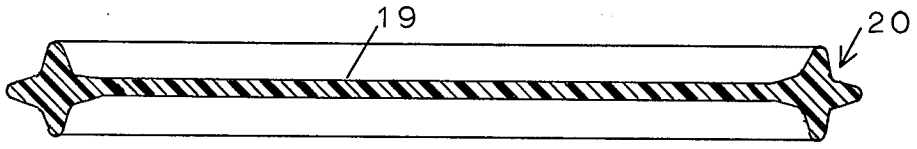


FIG 4



HERMETIC CLOSURE MEMBER

The present invention is directed to a simple container closure means which for a single size thereof can be utilized on a variety of container openings to provide a substantially hermetic seal. The seal is provided by utilizing differential atmospheric pressure on the outer side of the closure member from that inside of the container to both hold the closure member in conjunction with the container and to insure that a substantially hermetic seal is maintained.

In accordance with the invention, the term "hermetic" is intended to include both completely gas-tight seals as well as to include those seals which are tight enough to maintain a differential pressure thereacross over periods of at least one day.

The invention will be best understood in conjunction with the description which follows and the accompanying figures wherein:

FIG. 1 is a cross-sectional view of a container and closure means in accordance with the invention;

FIG. 2 is a cross-sectional view of a closure in accordance with the invention including a pull tab;

FIG. 3 is a modified form of the invention; and,

FIG. 4 is yet another variation of a closure in accordance with the invention.

Referring first to FIG. 1, there is illustrated therein a container 10 which might be a conventional glass container having a circular opening comprising the upper end thereof with the edges of the opening being in the same plane. Positioned across the surface of container 10 is a closure member in accordance with the invention. The closure member is generally designated 12.

Closure member 12 is formed of a sheet of thin elastomeric material 13 which has at least the container facing side thereof of substantially smooth nature. Around the outer edges of sheet 13 there has been provided a stiffening ring formed of members 14 and 15 which are joined by suitable means such as an adhesive or rivoting to sheet 13. As shown in the figure, stiffening members 14 and 15 are quite close to the opening in container 10. However, it should be understood that they can be relatively remotely positioned with respect to the opening in container 10 and still provide the same function of stiffening as needed in the invention.

Sheet 13 can be of a variety of elastomeric materials, although both natural and synthetic rubbers are the preferred forms of material. The thickness of sheet 13 can likewise vary over relatively broad limits and be usable in the invention. Typically, the sheet will form 1/32 to 1/16 inch in thickness.

In use, as illustrated in FIG. 1, the sheet of elastomeric material 13 is positioned over the opening in container 10 with the stiffening ring beyond the edges of the container. The user presses downwardly in the central portion of the opening in container 10 on the outer surface of sheet 13, as illustrated, resulting in a build-up of pressure within the container. The excess air within the container is at least partially exhausted around the edges of the lip of container 10. This exhaustion of excess air is expedited by the operator lifting the edge portion at some point around the periphery of the containers so as to allow freer release of the gas within the container. The edge is then allowed to again completely re-engage the surfaces of the opening and the operator now releases the finger pressure in the central portion of sheet 13. Sheet 13 by its elastic nature will tend to want to restore back into a planar configuration, but will be restrained from doing so by the differential pressure generated between the external atmosphere and the now reduced atmosphere within container 10. The lip edge of the container 10 will thus be in a hermetic sealing arrangement with elastomer 13.

The effectiveness of the seal and the duration thereof are enhanced if the surfaces of sheet 13 which are to engage the lip portion of container 10 are moistened with water or such other liquid material 11 as is contained within container 10.

As can be readily appreciated, it is necessary to have a stiffening ring such as members 14 and 15 so as to prevent the differential pressure across 13 from pulling the sheet downwardly into the container 10.

Referring now to FIG. 2, there is shown a modified form of the closure member of FIG. 1. In FIG. 2 a sheet of elastomeric material 16 has had joined thereto a pull tab member 23 to simplify the release of air within the container during the closure operation or at a later date when it is desired to release the lid from the container. The outer edges 17 of the sheet 16 have been thickened to aid in stiffening and have been encapsulated about a metal ring 18 for reasons already explained with regard to the showing of FIG. 1. The device of FIG. 2 functions essentially as already described with the exception of the use of the pull tab as an aid to raising a portion of member 13 for releasing air expelled from container 10 during the closing or as a means of releasing the edge portion so as to allow the partial vacuum to be lost when it is desired to remove the closure.

FIG. 3 is yet another form of my invention wherein the closure member is cast in a single operation to form a thin sheet 19 integrally joined to a star-shaped outer edge portion generally designated 20. The star-shaped cross-sectional edge portion of the closure member is arranged so that the points of the four-sided star are at right angles to one another with one set of stars lying on the same plane as the main membrane 19. This type of a configuration provides a degree of stiffening sufficient to prevent the sheet portion 19 from being pulled into the jar thereby resulting in a loss of the sealing action without the necessity for utilizing a second type of material to accomplish the necessary stiffening action.

FIG. 4 is still another form of the invention wherein a sheet of elastomeric material 21 has had joined to the outer edges thereof a non-elastomeric plastic material 22 in a bead-like form as illustrated. Plastic material 22 may be any of a variety of essentially non-elastomeric plastics which will bond to the choice of elastomer utilized in forming sheet 21. All that is required is that the material 22 be joinable to sheet 21 and be of sufficient stiffness to prevent inward movement of the peripheral edges of sheet 21 when it is utilized to seal a container.

What is claimed is:

1. In combination, a container, said container including wall portions which define a smooth-surfaced planar-edged opening, a closure member for said opening, said closure member comprising a flat sheet of smooth-surfaced gas impermeable elastomeric material of a thickness from about 1/32 inch to 1/16 inch and of a size to extend beyond the outermost edge of said opening, said sheet including stiffening means adjacent the outer edges thereof and beyond the edges of the wall portion of said container which defines said opening, said stiffening means being of sufficient strength to hold the edges of said sheet external of the edges of said

opening against inward movement thereof when the central portion of said sheet is distended in a direction perpendicular to the plane of said sheet and into the container.

2. A combination in accordance with claim **1** wherein said stiffening means is an annular ring of material different from said sheet.

3. A combination in accordance with claim **2** wherein said stiffening means is metal.

4. A combination in accordance with claim **3** wherein said metal ring is imbedded in a thickened edge portion of said sheet.

5. A combination in accordance with claim **1** wherein said stiffening means is composed of the same material as said sheet and comprises an annular ring having a four-pointed star cross-sectional configuration with one of said points joined to said sheet.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,901,405

DATED : August 26, 1975

INVENTOR(S) : Robert B. Nordberg

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Correct the spelling of the inventor's last name in both instances where it occurs on the patent as follows: delete "Norberg" and insert -- Nordberg --.

Signed and Sealed this

second Day of December 1975

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks