United States Patent [19]

Bell

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[54] **CLOSURE FOR LINED VACUUM BOTTLE**

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[52] **U.S. Cl.** ..... **215/13 R**, 215/49, 220/39 R

[51] **Int. Cl.** **A47j 41/00**

[58] **Field of Search** ..... 215/13 R, 49, 40; 220/39 R

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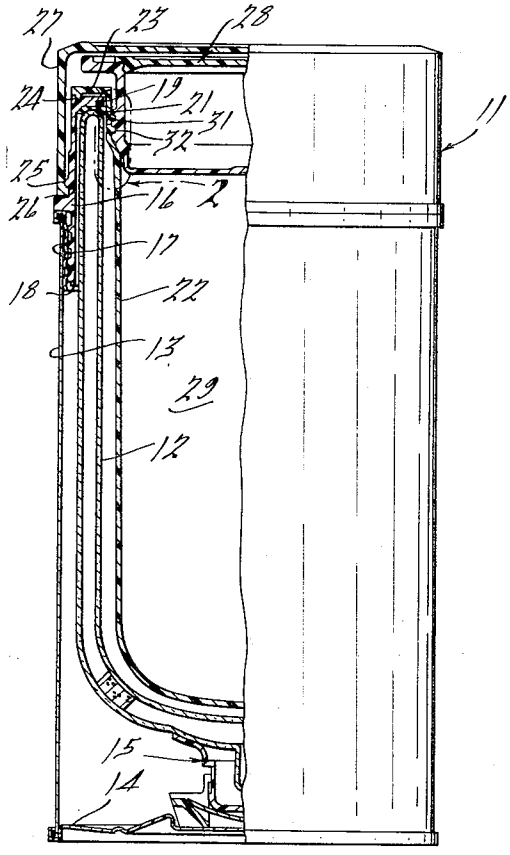
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[57] **ABSTRACT**

A vacuum bottle incorporating a liner for protecting the glass vacuum filler. A closure construction is used in which the stopper and liner have cooperating sealing surfaces that are disposed at an angled relationship to each other. At least one of the angled sealing surfaces is flexible for deformation upon the exertion of a sealing pressure to establish and maintain a good seal.

2 Claims, 3 Drawing Figures



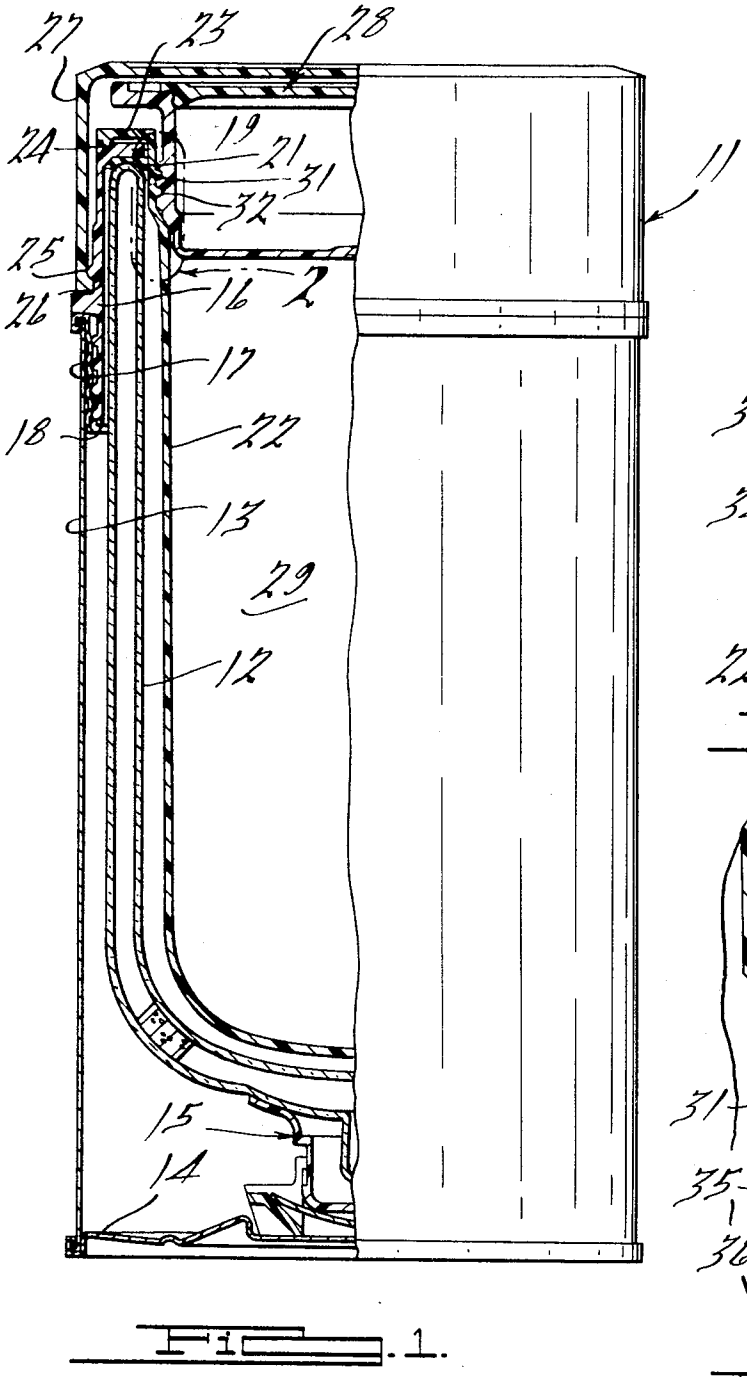


Fig. 1.

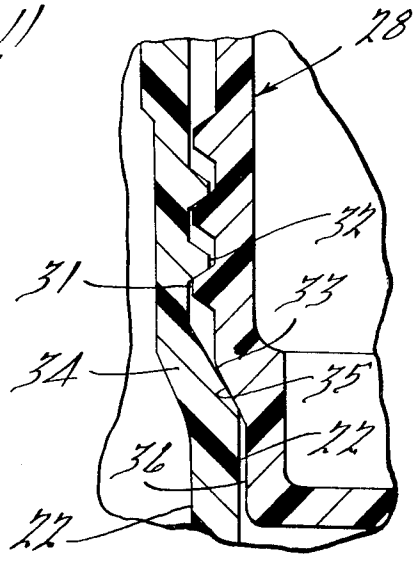


Fig. 2.

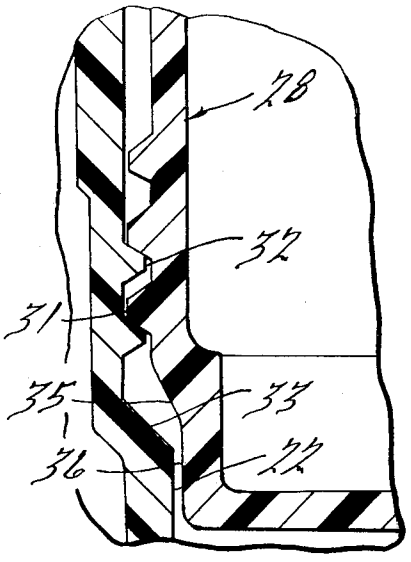


Fig. 3.

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CLOSURE FOR LINED VACUUM BOTTLE

BACKGROUND OF THE INVENTION

This invention relates to a vacuum bottle construction and more particularly to an improved closure arrangement for a lined vacuum bottle.

In the necessity of safety and to reduce damage to the vacuum fillers, it has been proposed to employ a liner that surrounds the interior of the filler and forms the cavity that retains the liquid or other substance to be stored in a vacuum bottle. Because of cost and other considerations plastics have been employed as such liners. It is difficult to maintain an accurate sealing surface on such plastic liners, particularly when they are used in wide mouth vacuum bottles having relatively large openings. The sealing problem is aggravated when hot liquids such as coffee are placed within the liner since such liquids cause thermal distortion.

It is, therefore, a principal object of this invention to provide an improved closure construction that is particularly adapted for use in a lined vacuum bottle.

It is another object of the invention to provide a closure construction that will insure a good seal at a reasonable cost thus lending itself to high volume manufacture.

BRIEF SUMMARY OF THE INVENTION

This invention is adapted to be embodied in a closure construction for a container member that defines a cavity adapted to receive a liquid or the like. The container member is formed with threads at one end of the cavity and a sealing surface interposed between the threads and the cavity. A closure member is employed to close the cavity and has a sealing surface and threads complementary to and engaged with the threads of the container member. The sealing surfaces of the members are inclined to the axis of the threads at different angles and at least one of the sealing surfaces is deformable upon threading of the closure member to the container member for insuring a tight seal.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a vacuum bottle embodying this invention, with a portion shown in cross section.

FIG. 2 is an enlarged view of the area encompassed by the circle in FIG. 1 and shows the seal between the stopper and the liner.

FIG. 3 is an enlarged view, in part similar to FIG. 2, showing the stopper and liner as they appear before a seal has been effected.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, a vacuum bottle embodying this invention is identified generally by the reference numeral 11. The vacuum bottle 11 is comprised of a vacuum filler 12 that is positioned within a case or outer housing consisting of a cylindrical side wall 13 and a base 14. A combined protective and supporting member, indicated generally by the reference numeral 15, supports the vacuum filler 12 upon the base 14.

A breast piece 16 has external threads 17 that are threaded into corresponding internal threads 18 formed at the upper end of the side wall 13. The breast piece 16 has an inwardly extending portion 19 that overlies the upper edge of the vacuum filler 12. A gasket 21 is compressed between the breast portion 19 and the vacuum filler 12 to assist in locating and supporting the filler 12 as well as providing a seal at its upper end.

It will be noted that the vacuum filler 12 has a generally cylindrical side wall and defines a relatively large opening or mouth at its upper end. The interior surface of the vacuum filler 12 is protected by means of a liner 22 that extends around the inner surface of the vacuum filler 12. The liner 22 may be formed from any suitable material such as a plastic and has an outwardly extending portion 23 at its upper end that is connected to the breast 16 by means of a spinwelded joint, indicated generally by the reference numeral 24. Hence, the liner 22 and breast piece 16 form a unitary assembly.

The breast piece 16 is formed with external threads 25 that mate with internal threads 26 on a cap 27.

A closure member, indicated generally by the reference numeral 28 is threaded into the liner 26 to form a closure for the food containing cavity 29 and the liner 22. The closure member 28 has external threads 31 that mate with internal threads 32 formed at the upper end of the liner 22.

Referring now to FIGS. 2 and 3, an improved arrangement is provided for effecting a seal between the closure member 28 and the liner 22. At the lower end of the internal threads 32 the liner 22 is formed with an inclined sealing surface 33. The sealing surface 33 is formed in part by a section 34 of the liner 22 at a point where the diameter of the liner is reduced. Hence, the section 34 forms what may be considered to be a cantilevered joint or connection between the threaded and main portions of the liner 22.

The closure member 28 is formed with an inclined seating surface 35 at the lower end of its threaded portion 31. If desired, a small pilot portion 36 of a cylindrical shape may extend below the inclined sealing surface 35. When the sealing surfaces 33 and 34 are not engaged with each other (FIG. 3) they are disposed at different angles with respect to the longitudinal axis of the liner 22. Preferably, the liner sealing surface 33 is disposed at a forty five degrees angle to the longitudinal axis and the sealing surface 35 of the closure member is disposed at a 30° angle to this axis.

As the closure member 28 is threaded into the liner 22 the surfaces 33 and 35 will become engaged (FIG. 2). Upon continued tightening of the closure member 28 into the liner 22, the surface 33 of the liner 22 will deflect. This deflection is accomplished because the liner 22 is inherently more flexible than the closure member 28 particularly due to the aforedescribed cantilevered condition of the liner section 34. If there are any out of round conditions, this deflection will compensate for these conditions and insure a good seal around the circumference of the liner 22. Upon full seating engagement, the portion of the liner sealing surface 33 that is engaged with the closure sealing surface 35 will be disposed at the same angle due to the aforedescribed deflection.

It should be understood that this invention has been described in connection with a preferred embodiment of the invention. Various changes and modifications may be made without departing from the spirit and scope of the invention, as defined by the appended claims. For example, the outer shell 13 and base 14 have been illustrated as being made of sheet metal. These elements can be made from plastics and can be

threadedly connected to the breast piece **16** or may be integral with it.

I claim:

1. A vacuum bottle comprising an evacuated filler wall defining a cavity, a liner member open at one end having a main portion positioned in said filler cavity and spaced from the wall thereof defining a cavity adapted to contain a liquid or the like, a threaded portion on said liner adjacent its open end, and a sealing portion interconnecting said threaded portion and said main portion and providing a cantilevered joint therebetween free to deflect relative to said threaded portion, said sealing portion defining a frusto-conical sealing surface, and a closure member for closing said liner member cavity, said closure member being formed with

threads complementary to and engaged with said threaded portion of said liner and a frusto-conical sealing surface adapted to cooperate with said liner sealing surface, said sealing surface of said closure member being disposed at an angle to the axis of the filler cavity that is different from the angle which said sealing surface of the liner makes with said filler axis for effecting cantilevered deflection of said liner sealing portion upon threading of said closure member to said liner for improving the seal therebetween.

2. A vacuum bottle as set forth in claim **1** wherein the threaded portion of the liner member comprises internal threads which are positioned in the cavity of the filler.

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