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COMBINATION VACUUM BOTTLE AND CLOSURE MEANS THEREFOR

Filed April 8, 1959

FIG. 1

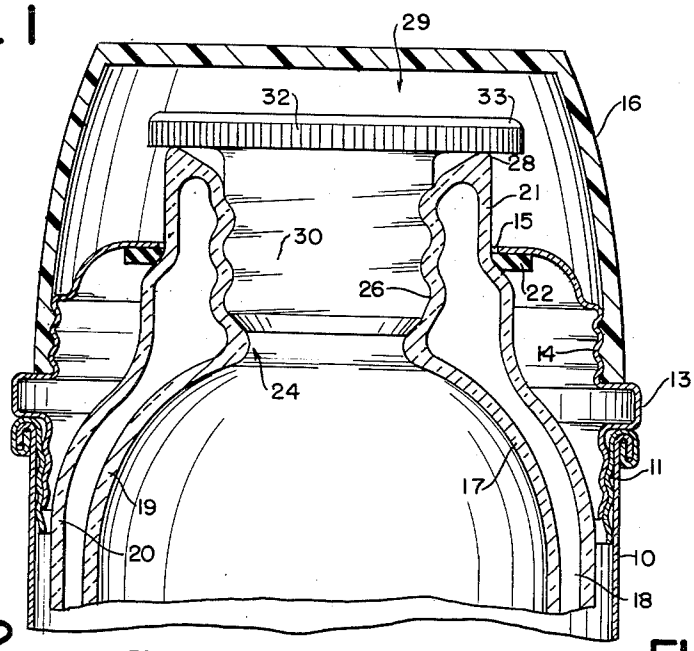


FIG. 2

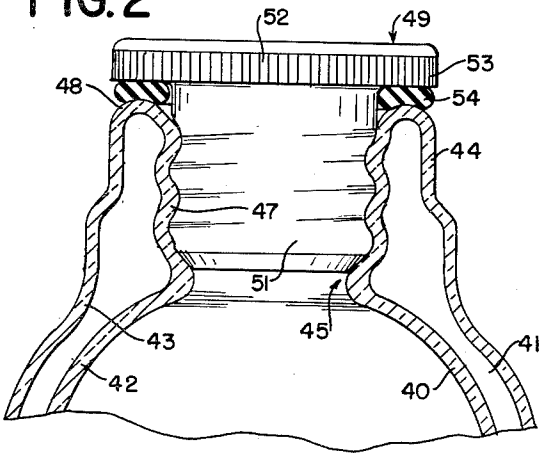


FIG. 3

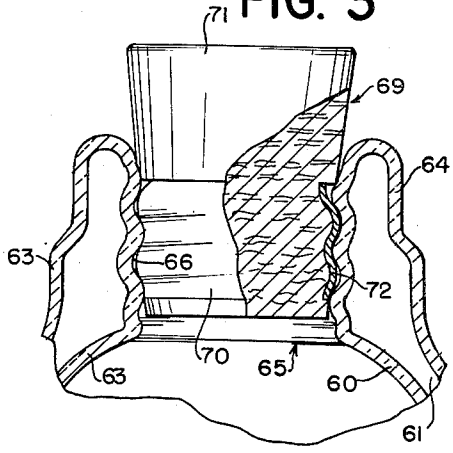
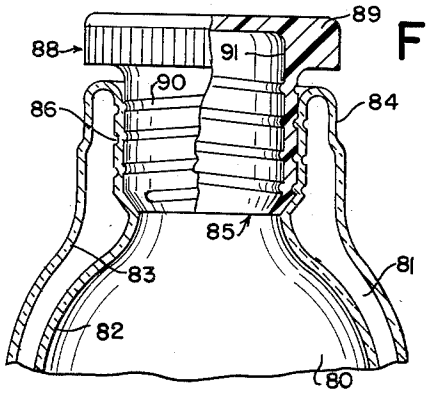


FIG. 4



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COMBINATION VACUUM BOTTLE AND CLOSURE MEANS THEREFOR

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8 Claims. (Cl. 215—13)

This invention relates to a combination vacuum bottle and removable closure means therefor and, more particularly, to the provision in such combination of a resilient threaded stopper adapted to be inserted into the neck of a double-walled vacuum bottle filler in threaded engagement with internal threads formed integrally in the inner wall of the filler.

Vacuum bottle assemblies generally include an open-ended cylindrical casing, a hollow filler enclosed in the casing, and a cup-like cover element removably threaded onto the open end of the casing to protect the filler. The filler itself is a fragile member in which an evacuated space is defined between thin double walls to maintain the content of the bottle at a substantially constant temperature. A generally cylindrical opening, tapering slightly inwardly, is defined by a neck portion at one end of the filler and some form of removable resilient stopper, enclosed within the cup-like cover, is usually employed to close off this opening since the cup-like cover is not itself a seal.

Ordinarily, the effectiveness of the seal provided by the resilient stopper is determined largely by the amount of force applied thereto when it is wedged into place in the opening of the filler. However, since vacuum bottle fillers are made of quite fragile thin material, such as blown glass, there is a limit to the amount of radial stress which the neck of the filler can withstand and, thus, to the amount of force which may be applied to a resilient stopper when it is wedged into the opening of the filler. This, in turn, limits the effectiveness of the seal provided by the stopper.

One of the primary purposes of the present invention, therefore, is to provide a vacuum bottle stopper which does not have to be tightly force-fitted into the opening of the filler to insure a satisfactory seal. The possibility of fracturing the fragile filler is thus avoided. At the same time, it is intended that a dependable seal be provided even though the stopper is not tightly wedged in place, thereby preventing the possibility of leakage regardless of the position of the vacuum bottle.

The new removable closure means is to be employed in combination with a vacuum bottle having an evacuated space defined between thin double walls and a generally cylindrical opening in a neck portion at one end thereof. The closure means comprises a generally cylindrical stopper of resilient material adapted to be inserted into the opening. Internal threads are formed integrally in the opening in the inner wall of the filler and corresponding external threads are formed around the generally cylindrical surface of the stopper. By this construction, the stopper may be inserted into the opening in threaded engagement therewith.

A preferred embodiment of the new vacuum bottle closure means is described hereinbelow with reference to the accompanying drawing, wherein

FIG. 1 is a fragmentary cross sectional view of the new combination vacuum bottle and closure means;

FIG. 2 is a fragmentary cross sectional view of a second form of the invention;

FIG. 3 is a fragmentary cross sectional view similar to FIG. 2, of a third form of the invention; and

FIG. 4 is a fragmentary cross sectional view of a fourth form of the invention.

Referring first to FIG. 1, a conventional cylindrical casing 10 has a separate annular threaded member 11 crimped to the edge of the open end thereof such that threads are defined around the inside of the open end portion of the casing. These threads on the member 11 receive corresponding threads formed on the lower portion of a collar 13 to permit the collar to be secured coaxially to the end of the casing. Another externally threaded portion 14 is formed on the collar sides and a concentric circular opening 15 is located on top of the collar. To cover the open end of the casing 10, an internally threaded cup-shaped element 16 may be removably engaged with the threaded portion 14 of the collar 13.

Located within the casing is a double-walled hollow, blown-glass filler 17 which defines an evacuated space 18 between thin fragile inner and outer walls 19 and 20 respectively. The filler 17 includes a neck portion 21 which extends upwardly through the opening 15 of the collar 13 and is held firmly in the aperture by a gasket 22. In the neck portion 21 of the filler, a generally cylindrical opening 24 is defined communicating with the interior of the filler. To seal the filler effectively, a closure element is inserted in the opening 24.

The form of the invention shown in FIG. 1 includes internal threads 26 formed integrally around the inner wall 19 of the filler 17, in the neck portion 21. The threads 26 are relatively shallow and rounded and have a relatively long pitch such that only a few turns can be provided in a neck of normal length. Advantageously, the threads 24 are formed in the filler 17 when the filler itself is manufactured. Hence, since the filler 17 is of blown glass, the threads 26 may be tapped by any of the standard glass-forming methods well known in the art. The outer edge of the neck portion 21 is also formed with a relatively sharp, annular sealing rim 28 when the filler is manufactured.

Shown in operative position in FIG. 1 is a removable, generally cylindrical stopper 29 of resilient material threaded into the neck opening 24 of the filler. External threads 30 corresponding to the internal threads 26 in the filler are formed around the otherwise generally cylindrical surface of the stopper 29 thereby permitting the stopper to be inserted into the opening 24 in fluid-tight threaded engagement therewith.

At the exterior end of the stopper 29, an integral manual gripping portion 32 extends from the filler 17, as shown, when the stopper is inserted in the opening. The gripping portion 32 includes an annular flange 33, knurled or serrated on its periphery to provide a good gripping surface, which projects over the sealing edge 28 of the neck portion 21 of the filler when the stopper is operatively positioned. Thus, when the stopper 29 is threaded into the filler the flange 33 seats on the sealing edge 28 around the end of the opening 24 to provide a double seal.

When the stopper 29 is threaded into the opening 24 in the filler, a reliable fluid-tight seal is obtained without unduly stressing the fragile neck portion 21 radially. At the same time, the stopper is secured firmly in place and will not dislodge inadvertently even though the vacuum bottle may be positioned upside down.

In the embodiments of FIGS. 2–4, only the top portion of a filler is shown in each though it is to be understood that the filler is to be associated with a casing, a collar, and a cup-like cover as described in the previous embodiment.

Referring to FIG. 2, a double-walled, blown-glass filler 40 is shown which defines an evacuated space 41 between thin inner and outer walls 42 and 43 respectively. The

filler 40 also includes a neck portion 44 defining a generally cylindrical opening 45 communicating with the interior of the filler. Internal threads 47 are formed integrally around the inner wall 42 of the filler 40, in the neck portion 44, and the outer edge of the neck portion 44 is formed with a rounded annular rim 48.

A generally cylindrical stopper 49 is threaded into the opening 45 of the filler, with external threads 51 on the stopper 49 engaging the threads 47 in the filler to form a fluid-tight seal therewith. An integral manual gripping portion 52 extends from the filler 40, as shown, when the stopper 49 is inserted in the opening. The gripping portion 52 includes an annular flange 53 which projects over the rounded sealing edge 48 of the neck portion 44 of the filler when the stopper 49 is operatively positioned.

Fitted around the stopper 49, intermediate the threaded portion 51 and the gripping portion 52 against the underside of the flange 53, is an annular, deformable sealing gasket 54. Thus, when the stopper 49 is threaded into the filler, the flange 53 squeezes the gasket 54 against the rounded sealing edge 48 on the filler to provide a particularly effective double seal. The embodiment of FIG. 2, therefore, offers an alternate type of double seal which may be used with advantage instead of the sharp sealing rim described in the previous embodiment.

Turning now to FIG. 3, a filler 60 defines an evacuated space 61 between inner and outer walls 62 and 63 respectively which form a neck portion 64 at one end of the filler. In the neck portion 64, a substantially cylindrical opening 65 is defined communicating with the interior of the filler. Threads 66 are formed integrally in the inner wall 62 of the filler, around the opening 65 in the neck portion 64. The outer edge of the neck portion 64 is rounded as shown.

In the embodiment of FIG. 3, a generally cylindrical stopper 69 is included, having threads 70 at one end thereof and an extended manual gripping portion 71 at the opposite end. Though the gripping portion 71 does not include a flange, such construction could easily be employed therewith along with a sharp sealing edge or annular gasket to provide a double seal.

The stopper 69, which is adapted to be threaded into the opening 65 in the filler 60 with the manual gripping portion 71 extending outwardly therefrom, advantageously is provided with a thin metallic jacket 72 which covers and conforms to the threads 70 on the stopper. This metallic jacket, which may be formed of aluminum, functions to reduce the frictional resistance between the resilient stopper and the threads 66 of the filler when the stopper is threaded into operative position.

Referring now to the embodiment of FIG. 4, a filler 80 defining an evacuated space 81 between inner and outer walls 82 and 83, respectively, is shown to include a neck portion 84 having an opening 85 communicating with the interior of the filler. In this embodiment, the threads formed in the inner wall 82 around the inside of the neck portion 84 consist of a helical bead 86 characterized by the fact that it has a lead which is substantially greater than its width. A stopper 88, having a manual gripping portion 89 at one end, is adapted to be threaded into the opening 85 in the filler 80 and thus has a helical groove 90 formed therein corresponding in width and lead to the helical bead 86. The stopper 88 also is formed with a recess 91 extending thereinto from the end adapted to be innermost in the filler 80.

Since the stopper 88 is of resilient material, it can be deformed to a relatively great degree when it is threaded into the opening 85 because of the bore 91 therewithin. Hence, the radial force exerted by the stopper 88 on the neck portion 84 of the filler is correspondingly reduced. Since the helical bead 86 and groove 90 mate particularly well, they function to compensate for this reduction in force of the stopper against the inner wall of the filler to provide an effective fluid-tight seal. In this embodiment also, a sharp sealing edge or annular gasket may be incorporated along with the flange shown on the stopper to provide a double seal if desired.

Another advantage of the construction shown of the various closure means as illustrated in the drawings is that initial sealing is made between the stopper and the lower part of the neck portion of the filler. Thus in FIGS. 1, 2, and 4, there is a seal portion shown between the bottom of the stopper and the restricted bottom of the neck. This bottom seal shown in the figures is important in that it confines liquid in the vacuum bottle below the neck portion which results in the vacuum bottle having better insulating properties than if liquid were allowed in the neck portion. If fluid is allowed to leak past this bottom seal, up between the threads of the bottle and threads of the stopper, the liquid will be closer to the relatively uninsulated opening at the top end of the neck. The other seals made between the stopper of the vacuum bottle, namely, the seals between the threads of the bottle and the resilient stopper and between the top of the neck portion and the bottom of the annular flange on the top of the stopper, form additional safety seals.

We claim:

1. In combination with a blown glass vacuum bottle filler and the like having an evacuated space defined between thin double walls and a generally cylindrical opening in a neck portion at one end thereof, removable closure means for the opening in said filler comprising a generally cylindrical stopper of resilient material adapted to be inserted into said opening, internal threads in said opening formed integrally in the inner wall of the double-walled filler, and corresponding external threads formed around the generally cylindrical surface of said stopper permitting said stopper to be inserted into said opening in threaded sealing engagement therewith, the shape of the stopper and of the neck portion of the filler including the thread clearance is such that when the stopper is threaded into the filler, radially expanding loads introduced against said filler neck portion by the stopper are substantially reduced.

2. In combination with a blown glass vacuum bottle filler and the like having an evacuated space defined between thin double walls and a generally cylindrical opening in a neck portion at one end thereof, removable closure means for the opening in said filler comprising a generally cylindrical stopper of resilient material adapted to be inserted into said opening, internal threads in said opening formed integrally in the inner wall of the double-walled filler, corresponding external threads formed around the generally cylindrical surface of said stopper permitting said stopper to be inserted into said opening in threaded engagement therewith, a sealing portion on the end of said stopper adapted to fit into said neck portion for engaging said sealing portion, and a seat portion in the bottom of said neck portion.

3. The combination of claim 2 wherein a metallic jacket covers and conforms to the external threads on said stopper.

4. The combination of claim 2 wherein the internal threads formed in the inner wall of said opening and the external threads formed on the resilient stopper are in the form of a helical bead and corresponding groove respectively each having a lead substantially greater than its width.

5. The combination of claim 2 wherein said gripping portion is an annular flange adapted to project over the edge of the neck portion of said filler on the exterior thereof when the stopper is inserted in said opening.

6. The combination of claim 5 wherein a deformable annular sealing gasket is fitted snugly around said stopper and is adapted to be squeezed between said annular flange and the edge of the neck portion of said filler when the stopper is inserted in said opening.

7. The combination of claim 5 wherein the edge of the neck portion of said filler defines a sharp annular sealing

rim, the projecting annular gripping flange being adapted to seat on said sealing rim when the stopper is inserted in said opening.

8. In combination with a vaccum bottle filler having an evacuated space defined between thin double walls and a generally cylindrical opening in a neck portion at one end thereof, removable closure means for the opening in said filler comprising a generally cylindrical stopper of resilient material adapted to be inserted into said opening and form a first sealing surface with the top of said neck portion, internal threads in said opening formed integrally in the inner wall of the double-walled filler, corresponding exterior threads formed around the generally cylindrical surface of said stopper permitting said stopper to be inserted into said opening in threaded engagement therewith, a second sealing surface on the end

of said stopper means adapted to be inserted into said opening, and a seating surface in the bottom of said neck portion adapted to be engaged by said second sealing surface.

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