April 1, 1958 R. W. THOMAS 2,828,886

LIQUID CONTAINER AUXILIARY CLOSURE

Filed Jan. 30, 1956 2 Sheets-Sheet 1

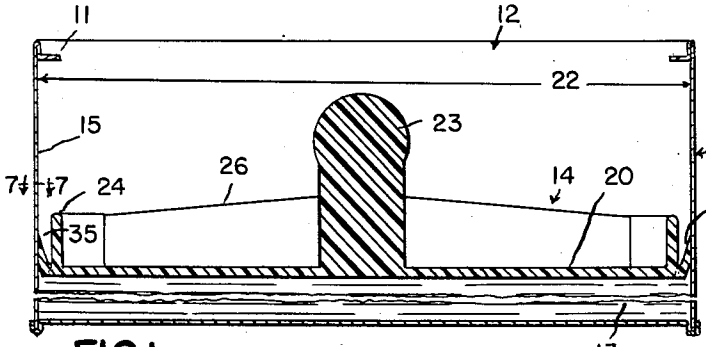


FIG.1.

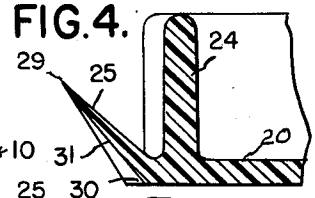


FIG.4.

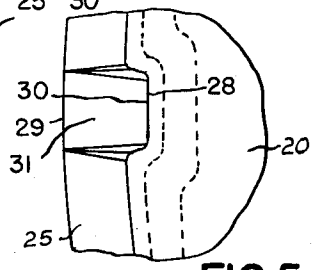


FIG.5.

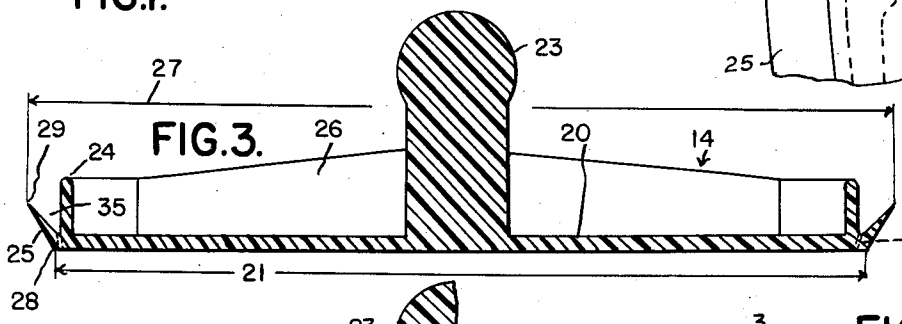


FIG.3.

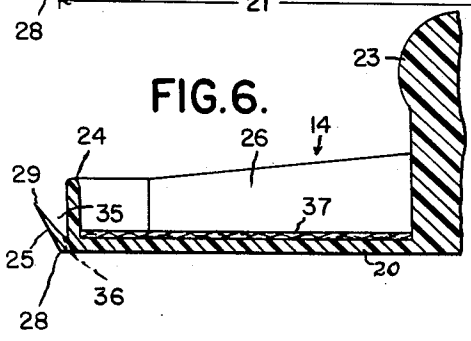


FIG.6.

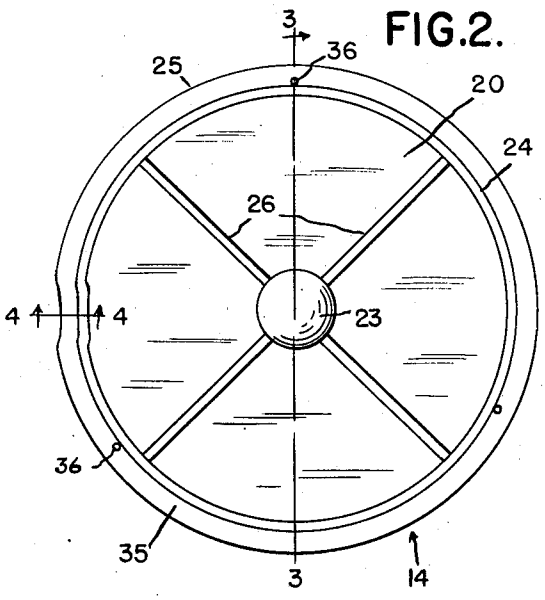


FIG.2.

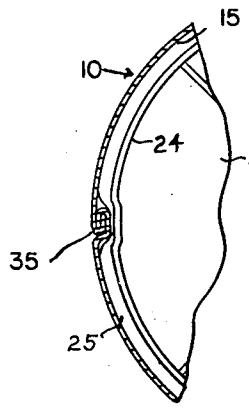


FIG.7.

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LIQUID CONTAINER AUXILIARY CLOSURE

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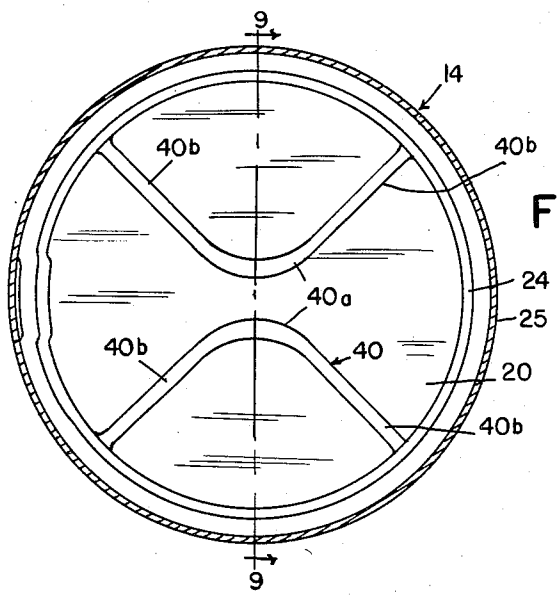


FIG.8.

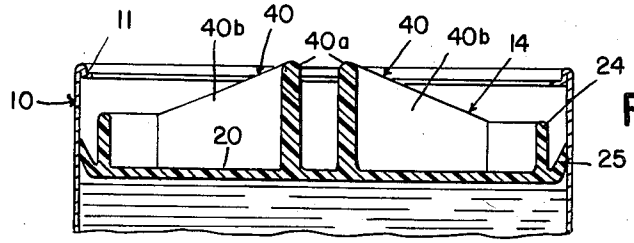


FIG.9.

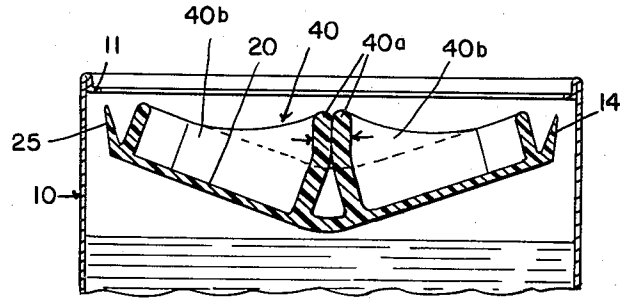


FIG.10.

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LIQUID CONTAINER AUXILIARY CLOSURE

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Application January 30, 1956, Serial No. 562,206

10 Claims. (Cl. 220—93)

My invention relates to liquid containers and more particularly to an auxiliary flexible closure for containers having an inwardly projecting lip, said closure adaptable to be inserted below the container lip to overlie the liquid in order to prevent congealing or deterioration thereof.

It is common knowledge that paint and other liquids, after their containers have been opened, have a tendency to congeal or deteriorate after the lid is replaced on the container, due to the contact with the air trapped inside. The less the amount of liquid left in the container after use, the greater the tendency for this to occur. Various types of auxiliary covers have been proposed, intended to overlie the liquid inside the container and thus exclude the air, but heretofore these have proven impractical either from a production standpoint or because they are in some way inoperative or difficult to manipulate.

Any closure for this purpose must be flexible in order to be put into a container which has an inwardly projecting lip. Being flexible, problems arise as to how to exclude the air from the liquid surface if the closure becomes distorted, how to maintain a good seal against the inner surface of the container, which has a seam and other dents and irregularities, how to prevent buckling due to these irregularities, and how to prevent the liquid from overrunning the cover, where it comes in contact with the hands on inserting or removing the cover. Moreover, the closure should be a low-cost item, and needs to be cheaply produced while yet comprising features intended to overcome the aforesaid difficulties.

Therefore, an object of my invention is to solve the aforesaid difficulties by providing a one-piece distortable auxiliary closure or cover for containers, which will be sufficiently rigid within the container, and constructed for efficiently sealing against the inner surface of the container, conforming to any irregularities therein.

Another object of my invention is to prevent liquid from overrunning the top of such a closure by providing a flange construction so constructed to form a trough for retaining liquid which may be forced upward past the periphery of said closure member.

A further object of my invention is to facilitate the exhausting of air from the surface of the liquid in containers by providing a closure device with an air vent directed into the trough mentioned above, permitting the escape of the air without permitting the liquid which may pass through from overrunning the cover.

A still further object of my invention is to further sealing characteristics of the closure described by providing for utilization of the liquid itself to facilitate sealing, as will be made apparent hereafter.

Additional objects and a more detailed understanding of my invention may be had by reference to the accompanying drawings illustrating a preferred embodiment of the construction in which like characters are referred to like parts throughout the several views and in which

Fig. 1 illustrates a partially emptied liquid container with the auxiliary closure accessory of my invention inserted in the container and overlying the surface of the liquid.

Fig. 2 is a top view of the auxiliary closure.

Fig. 3 is a section substantially on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary sectional detail view, taken substantially on the line 4—4 of Fig. 2.

Fig. 5 is a bottom view of the sectional detail view illustrated in Fig. 4.

Fig. 6 is a view similar to half of Fig. 3, but illustrating a modified construction.

Fig. 7 is a fragmentary section substantially on the line 7—7 of Fig. 1, showing the closure in relation to the seam of the container.

Fig. 8 is a top view illustrating an alternative structure embodying my invention and showing the container in section.

Fig. 9 is a sectional view of the structure taken on the line 9—9 of Fig. 8 and showing the closure inserted in a container, and

Fig. 10 is a sectional view showing the way in which the closure of Fig. 9 is manipulated.

Referring in detail to the drawing, Fig. 1 illustrates a container 10 such as a paint can, having an annular inwardly projecting lip or flange 11 at the top opening 12. The cover (not shown) for the container 10 normally is fitted on the container at this lip 11. The liquid 13 is shown as only partially filling the container, and it is evident that the cover cannot exclude the air from the space between the liquid surface and the lip 11. Therefore, a circular, distortable auxiliary closure 14 is provided to be inserted in the container 10 and to overlie the surface of the liquid 13, providing a seal with the inner side wall surface 15 of the container 10.

The closure 14 comprises a substantially flat plane portion 20 having a diameter 21 which is slightly less than the inner diameter 22 of the container 10, a handle portion 23, an inner upstanding annular flange 24, an outer outwardly inclined or sloped annular flange 25, and radial ribs 26 extending from the handle portion 23 outwardly to the inner flange 24.

The entire closure 14 is distortable so that it may be bent or somewhat folded in order to pass the lip 11 of the container 10, and is yet sufficiently rigid due to the ribs 26 that it will spring out when released to return to its normal or original shape. The outer diameter 27 of the sloping outer flange 25 is slightly larger than the inner diameter 22 of the container, so the closure 14, on springing into shape upon being inserted into the container 10, will force the outer flange 25 against the inner surface 15 of the container 10. It will be noted that the outer flange 25 tapers from its base 28 to a comparatively thin section at the outer edge 29, and is therefore flexible to conform to dents and other irregularities of the container and to maintain an efficient substantially airtight seal without affecting or distorting the flat plane portion 20.

An indented section is also provided to accommodate the vertical inner seam 35 of the container. The flat plane portion 20 has an indentation 30 with which an outer flange indentation 31 is integrally formed. The outer flange indentation 31 is progressively reduced in depth from the base 28 to the lip 29, and the lip 29 is therefore not indented itself, but is sufficiently flexible to form rather closely about the seam without buckling the flange 25, and the substantially flat position of the flat plane portion 20 is also maintained.

It will be observed that the construction of the inner flange 24 and the outer flange 25 is such as to form an annular trough 35 therebetween. Thus, when the closure 14 is pressed downward on the liquid 13, and the air is

expelled around the edge, the liquid may be squeezed past the sealing lip 29 into the trough 35, thus prevented from overflowing the top surface of the flat plane portion 20 where it would come in contact with the fingers. Also the inner flange 24 is higher than the outer flange 25 so that liquid which might fill the trough 35 above the level of the outer flange lip 29 will still not overrun the top of the portion 20. In cases where the liquid 13 is paint or other like substance, it can harden about the lip 29 to further the sealing characteristics of the closure 14. The closure 14 is preferably molded in a single unit of a material such as vinyl or other plastic to which paint will not adhere. Thus, when the closure 14 is removed, any congealed paint about the lip 29 or in the trough 35 may be easily peeled away.

One or more fine pin holes or vents 36 may be provided as shown, extending from the underside of the flat plane portion 20 into the trough 35, and these assist in permitting all the air to be expelled from the surface of the liquid 13. Any liquid squeezed through will only enter the trough 35, where it is retained.

Fig. 6 illustrates a modified construction which may be preferred in some instances, and comprises a backing 37 of fabric or any suitable material may be bonded to the upper surface of the flat plane member 20, in order to extend the life of the closure 14 which must be bent to insert or withdraw it from the container 10 and which may eventually tend to crack or otherwise become weakened.

In Figs. 8, 9 and 10, I have illustrated an alternative type of structure which facilitates removal and insertion of the closure 14. The arrangement of the flat plane portion 20, the inner flange 24, and the sloped outer flange 25 are the same as in the other figures. However, a pair of upstanding generally C-shaped distortable rib members 40 are disposed on the upper surface of the flat plane portion 20. The center portions 40*a* are somewhat thicker and extend higher than the leg portions 40*b*, in order to provide convenient and somewhat more rigid finger grips for manipulation of the closure. The centers 40*a* are close to the center of the flat plane portion 20 and are spaced apart from each other as shown, and the leg portions 40*b* extend substantially radially outward to the inner flange 24.

It may be seen in Fig. 9 that when the closure is within the container 10, it may not be removed without folding or distorting due to the inwardly projecting lip 11. Fig. 10 illustrates how the closure is conveniently manipulated by squeezing the center portions 40*a* together, the force applied being indicated by the arrows. This causes the closure to partially fold as shown, whereby the edge of the outer flange 25 will readily clear the lip 11.

Although I have described but one preferred embodiment of my invention, it will be apparent to one skilled in the art to which my invention pertains that various changes and modifications may be made therein without departing from the spirit of my invention or the scope of the appended claims.

I claim:

1. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, and said disc member constructed and arranged to normally retain the lower surface of said flat plane portion in contact with the surface of the liquid in said container.

2. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, said inner and outer flanges conjoined at the bases thereof to form an annular trough substantially V-shaped in cross-section, said disc member adapted to be pressed downwardly in said container and to overlie the liquid therein, said trough arranged to retain such liquid as may be forced up between said outer flange and the inner surface of the container.

3. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, said inner and outer flanges conjoined at the bases thereof to form an annular trough, substantially V-shaped in cross-section, the vertex thereof substantially peripherally disposed with respect to said flat plane portion, said disc member adapted to be pressed downwardly in said container and to overlie the liquid therein, said trough arranged to retain such liquid as may be forced up between said outer flange and the inner surface of the container, and said inner flange having a height greater than said outer flange.

4. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, said inner and outer flanges conjoined at the bases thereof to form an annular trough, said disc member adapted to be pressed downwardly in said container and to normally overlie the liquid therein, and a vent hole extending from the bottom surface of said flat plane portion into said trough and permitting the escape of air trapped between said closure and the surface of the liquid, said trough arranged to retain such liquid as may be forced up between said outer flange, and the inner surface of the container and such liquid as may be forced up through said vent hole.

5. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said con-

tainer without causing distortion of said flat plane portion, said disc member having a substantially centrally located upstanding handle portion, and distortable radial ribs extending from said handle portion and terminating at said inner flange.

6. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, said outer flange tapered from said flat plane portion to a relatively thin outer edge, said outer flange being therefor substantially triangular in cross-section.

7. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, said disc member having a substantially centrally located upstanding handle portion, and distortable radial ribs extending from said handle portion and terminating at said inner flange, said container having an inner vertical seam, said flat plane portion having an indentation at the outer edge thereof and at the base of said outer flange, said indentation adapted to be positioned about said inner vertical seam, said outer flange having an indentation registering with said flat plane portion indentation, said flange indentation being progressively reduced in depth from base to outer edge, said flange outer edge having substantially no indentation and being readily distortable to closely conform to the contour of said container seam due to said relative thinness of said flange outer edge.

8. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges at the peripheral edge of said flat plane portion, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion,

and fabric cover portions bonded to the flat upper surfaces of said flat plane portion of said closure.

9. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, said disc member having upstanding distortable ribs in the upper surface of said flat plane portion, said ribs being generally C-shaped in plan, the center of said ribs being spaced from each other and near the center of said flat plane portion, the legs of said ribs diverging generally radially outward and terminating at said inner flange.

10. A closure for use with an open top liquid container having a radially inwardly projecting lip about the top opening, and comprising a distortable disc-like member having a substantially circular flat plane portion of a diameter slightly less than the inner diameter of said container, said disc member having inner and outer upstanding concentric radially spaced flanges, said outer flange being flexible and outwardly sloped whereby to engage the extreme outer edge thereof with the inner surface of the container and to conform to irregularities of said container without causing distortion of said flat plane portion, said disc member having upstanding distortable ribs in the upper surface of said flat plane portion, said ribs being generally C-shaped in plan, the center of said ribs being spaced from each other and near the center of said flat plane portion, the legs of said ribs diverging generally radially outward and terminating at said inner flange, said ribs increasing in height from the inner flange inward to the centers, and said centers being thicker in section than the legs.

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