

Oct. 6, 1970

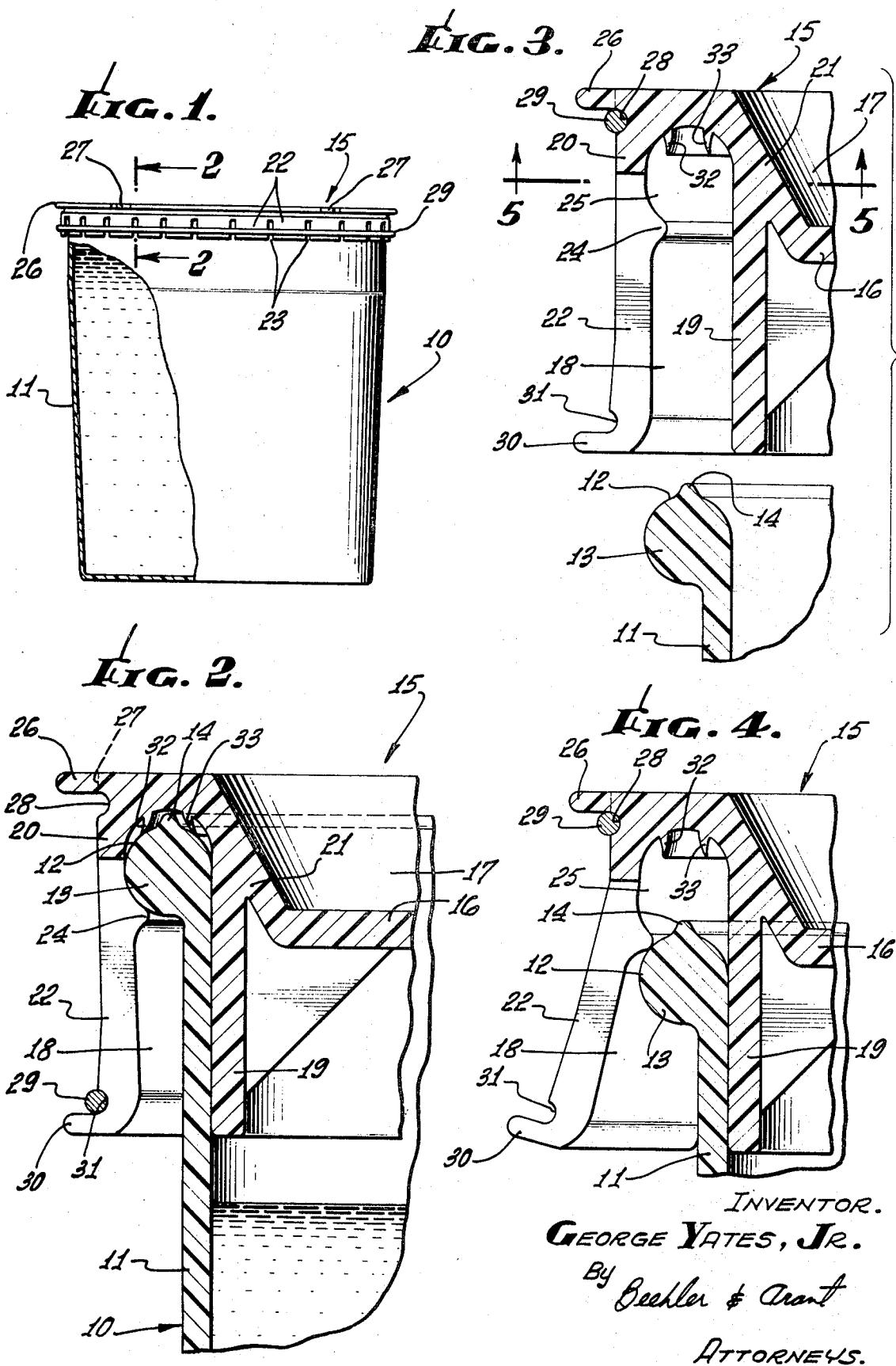
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3,532,244

SEAL FOR RESEALABLE BUCKET CLOSURE

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 5.

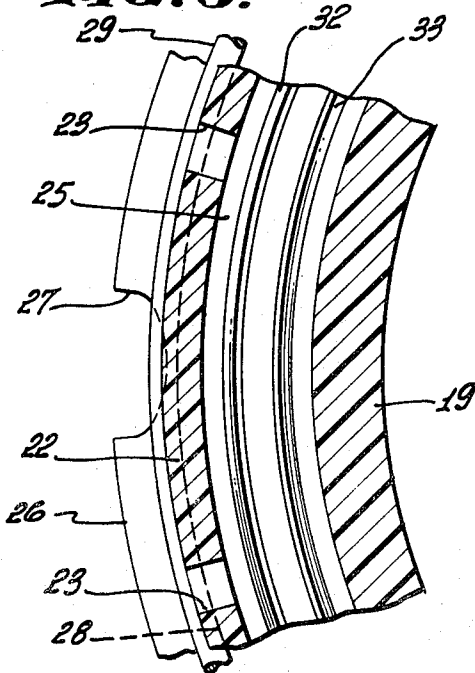


FIG. 8.

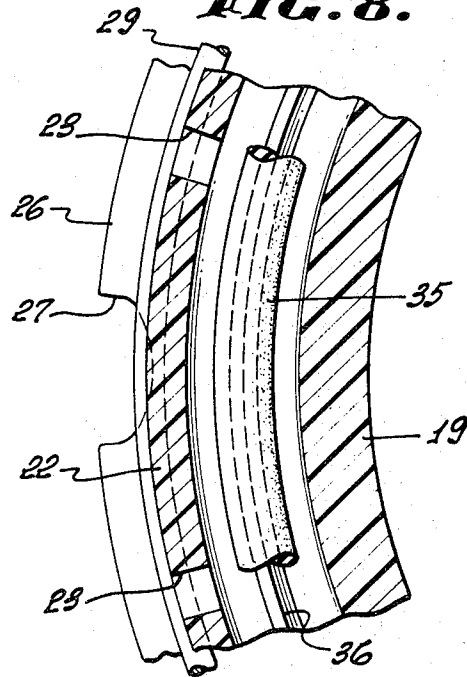


FIG. 6.

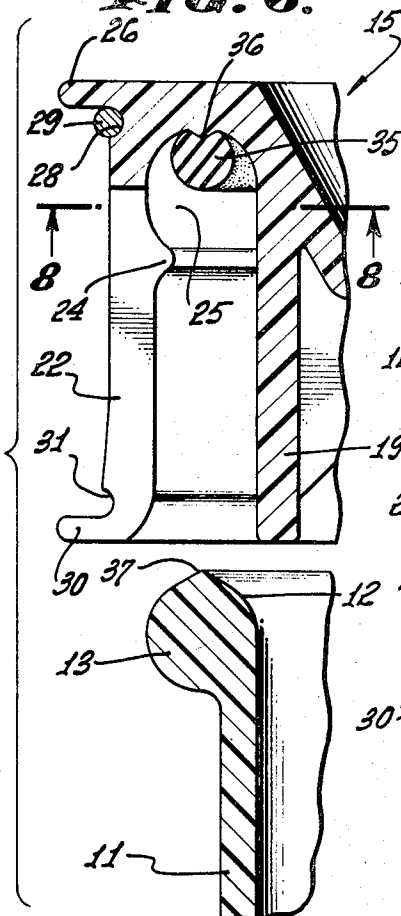


FIG. 9.

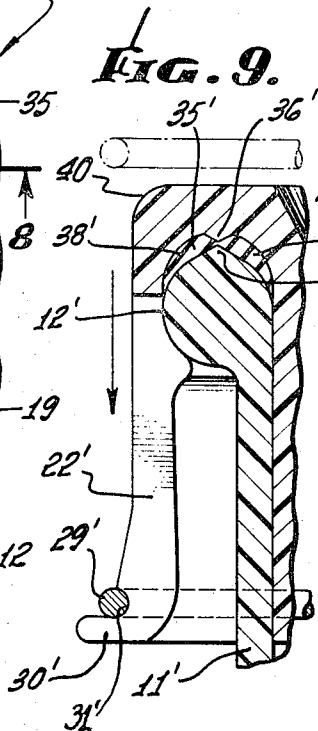
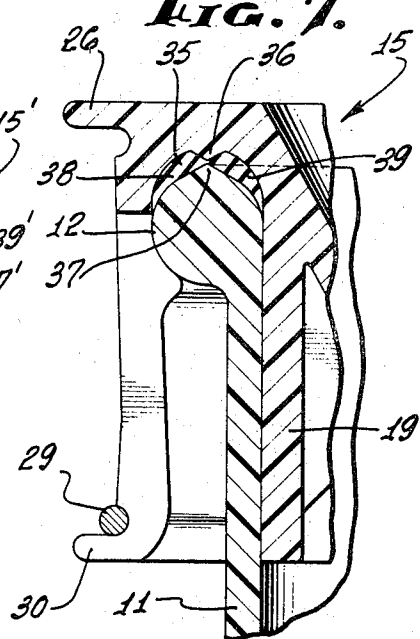


FIG. 7.



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1

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SEAL FOR RESEALABLE BUCKET CLOSURE
George Yates, Jr., Glendale, Calif., assignor to Growth International Industries Corp., Cleveland, Ohio, a corporation of Delaware
Continuation-in-part of application Ser. No. 598,471, Dec. 1, 1966. This application Jan. 17, 1969, Ser. No. 791,933

Int. Cl. B65d 41/22

U.S. Cl. 215—41

8 Claims

ABSTRACT OF THE DISCLOSURE

A plastic closure for a container having a perimetral rim engaged by a U-shaped channel of the closure at the bottom of which are a plurality of ridges which may be flexible in character extending between the bottom of the channel and the rim, the ridges being located either all on the closure or being located in part on the closure and in part on the rim, and which when located in part on the closure and in part on the rim are assisted by the presence of a yieldable sealing medium likewise located at the bottom of the channel.

This is a continuation-in-part of applicant's copending application Ser. No. 598,471, filed Dec. 1, 1966, now Pat. No. 3,425,471.

The invention relates to the container arts and particularly to a reusable plastic closure suitable for use with plastic and metal containers.

Although there has been considerable interest in the adaptation of plastic to containers and particularly shipping containers, the substitution of plastic for metal in the manufacture of such objects has encountered an appreciable number of problems. Certain plastics are soft and pliable, and, when containers are made of such material, it is difficult to provide a closure which will remain in sealed-tight engagement with the container when it is subjected to rough handling. On the other hand, buckets made of more rigid plastics tend to be fragile and easy to break under such circumstances.

It has been proposed that closures for such containers be reinforced with metal in order to provide the required degree of stiffness and a more permanent seal, as evidenced by applicant's co-pending United States patent application Ser. No. 598,471, filed Dec. 1, 1966.

More recently, a one-piece molded plastic lid has been suggested featuring a depressed center section and a peripheral inverted U-shaped channel, with a detent lug formed on the inner side of the outer leg of the U-shaped channel, the said lug being adapted to lockingly engage a bead formed adjacent the open end of the container body. Although such systems have been known for many years (see, e.g., U.S. Pats. Nos. 2,339,343 and 2,977,019), the more recent efforts to use such known design technology in a plastic container system have encountered much difficulty. Although such an arrangement does provide a relatively secure seal (one of the objectives that must be achieved), by virtue of the design of the system and of the materials from which the closure is fabricated, removal of the sealed closure from the container body has been achieved only with great difficulty, generally involving mutilation of the closure to such a degree that it cannot be reused. Further, because of the depressed center section of the closure, the space between the closure and the contents is insufficient, possibly resulting in an explosion when the contents are heated or otherwise expand.

It is therefore among the objects of the invention to provide a new and improved container closure of plastic material that can be readily applied by hand and can be

2

removed with equal ease by hand and without the use of tools.

Another object of the invention is to provide a new and improved container closure which can be removed easily by hand and wherein, when reapplied to reseal the container, the reapplication of the closure to the container is performed in the same manner as the initial application.

Still another object of the invention is to provide a new and improved resealable container assembly wherein the sealed connection between the closure and the open end of the container consists of a multiple number of associated parts which reinforce each other and provide a high degree of stiffness at the open end of the container sufficient to withstand the usual rough handling to which shipping containers are subjected.

Still another object of the invention is to provide a new and improved resealable container assembly which is relatively simple in form and construction such that both the container and closure can be readily molded by conventional methods and wherein the number of parts comprising the seal is confined to substantially a minimum.

Yet another object is to provide a plastic container closure suitable for use on metal as well as plastic container bodies.

Still further among the objects of the invention is to provide a new and improved resealable container assembly which is not only simple in construction, but also one which is inexpensive to manufacture and quick to apply whether made in small, medium, or large sizes.

It is also among the objects of the invention to provide a new and improved plastic closure for a container wherein a special construction molded at the same time that the closure is molded, provides a yieldable line contact seal with the container thereby making it possible to dispense with the employment of a special sealing medium, while at the same time greatly improving the dependability of the seal.

With these and other objects in view, the invention consists in the construction, arrangement, and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a side elevational view of one form of the container partially broken away.

FIG. 2 is an enlarged longitudinal sectional view on the line 2—2 of FIG. 1 showing the closure applied to the container in sealed condition.

FIG. 3 is a fragmentary longitudinal sectional exploded view showing the condition of the closure immediately prior to being applied to the container.

FIG. 4 is a fragmentary longitudinal sectional view similar to FIG. 3, but showing the relationship of parts as the closure commences to be pressed into position on the container.

FIG. 5 is a fragmentary cross-sectional view taken on the line 5—5 of FIG. 3.

FIG. 6 is a fragmentary longitudinal sectional exploded view of a modified form of the device showing the condition of the closure immediately prior to being applied to the container.

FIG. 7 is a fragmentary longitudinal sectional view similar to FIG. 6 showing the closure of FIG. 6 applied to the container in sealed condition.

FIG. 8 is a fragmentary cross-sectional view taken on the line 8—8 of FIG. 6.

FIG. 9 is a fragmentary cross-sectional view of a closure assembled on a container showing still another form of the invention.

In an embodiment of the invention chosen for the purpose of illustration there is shown a container 10

3

having a side wall structure 11 at the open end of which is a rim 12 defined by a solid bead 13. The container is of some suitable material such as one of the currently commercially available plastics or metal and the bead may be solid as shown or otherwise formed to the exterior configuration as desired.

A closure 15 is of moldable synthetic plastic resin material and consists of a center section 16, provided with a depression 17 which is helpful in stacking one filled and closed container upon another. Around the perimeter of the closure is an integrally formed peripheral U-shaped channel 18 which is defined by an inner flange 19 and a somewhat composite outer flange 20, both flanges being of substantially the same length and adapted to extend over a substantial portion of the side wall structure 11 located below the bead 13. A wall 21 of the depression 17 joins the inner flange 19 at its upper end and provides appreciable reinforcement and stiffening.

The outer flange 20 is divided into a multiplicity of perimetally spaced separate tabs 22 having slots 23 therebetween, the tabs being flexible in character. On the interior of each tab 22 is an interlocking means in the form of rounded inwardly extending bead 24 which forms a pocket 25 somewhat longer than the bead 13 at the open end of the container.

At the upper outside corner of the closure 15 is a radially extending flange 26 which extends entirely around the closure and which is provided with a number of recesses 27. Immediately beneath the radially extending flange 26 is a groove 28 which accommodates a continuous fastening ring 29. At the lower end of the outer flange 20 is a similar composite radially extending flange 30 on the upper side of which is a similar annular groove 31 which is also adapted to accommodate the ring 29 in closed condition.

To make certain that there is a dependable tight seal between the closure and the container, there is provided at the bottom of the pocket 25 a pair of flexible flanges 32 and 33 which may be tapered from the base toward the end, the flanges being molded from the same material as the closure and made thin enough so that they are capable of flexing. As an additional precaution there is provided an annular ridge 14 which is located substantially centrally with respect to the top of the bead 13, the height of the ridge being somewhat less than the length of the flexible flanges 32 and 33 and located between them. When the closure 15 is applied to the container 10, as shown in FIG. 2 for example, engagement of the ridge with the bottom of the pocket 25 serves to keep the bottom of the pocket spaced a short distance from the rim 12 and in that way permitting the flexible flanges 32 and 33 to flex while their ends engage the rim without the flexible flanges being crushed or pancaked to the extent that they might not resume their initial shape after the closure has been removed. Although mere application of the closure to the container would not normally be sufficient to crush the flexible flanges to the extent suggested, such a condition would exist under some circumstances where full containers are stacked one upon the other, such that the weight of two, three or more full containers above the lowermost container would be carried to the closure of the lowermost container and force it downwardly sufficient to close the normal sealing gap between the bottom of the pocket 25 and the rim 12. By providing the ridge 14 as described, a space will always be preserved between the bottom of the pocket and the rim.

In operation the ring 29 initially occupies a position in the groove 28 as shown in FIG. 3. The closure is then pressed into the open end of the container at which time the tabs 22 flex outwardly from the positions shown in FIG. 4 as the bead 24 is pressed into engagement with the bead 13. The bead 24 is finally cammed over the bead 13 and ultimately engages the underside of the bead 13 in a position tending to draw the closure more firmly

4

into position upon the rim of the container. The distance between the bead 24, moreover, and the free ends of the flexible flanges 32 and 33 is less than the depth of the bead 13 so that when the closure is in closed position as shown in FIG. 2, the flexible flanges are bent or flexed over as those free edges engage the rim 12 causing an appreciable compressive force to be exerted at the free edges thereby to make a doubly effective line contact acting as a seal between the closure and the container. A space will be preserved between the bottom of the pocket 25 and the rim 12 whether or not the ridge 14 is in contact with the bottom of the pocket. Since the flanges 32 and 33 are made inherently flexible, when the closure is removed from the container, they may return to their initial outwardly extending positions subject to reflexing into sealing position when the closure is re-applied.

In a second form of the device a pair of line contact seals is provided as shown in FIGS. 6, 7, and 8, by making use of a flexible or resilient sealing medium 35 which may be a separate sealing ring located at the bottom of the pocket 25 or a flowed in seal. In this instance there is provided at the bottom of the pocket 35 a perimetral ridge 36 which tapers to a narrow edge at its outermost end and which is integrally formed or molded at the same time that the closure is molded. As an additional sealing precaution there may be provided an opposite perimetral ridge 37 at the outer edge of the rim 12 which, when the closure is applied to the container, is substantially opposite in its location from the ridge 36. Located in the relationships shown, when the closure is applied to the container, the ridges 35 and 37 penetrate opposite sides of the sealing medium 15, thereby providing two perimetral line contacts between the sealing medium and respectively the closure and the container, spreading the sealing medium into opposite portions 38 and 39 as shown in FIG. 7, thereby to assure a tight seal. Here again, when the closure is removed from the container, the sealing medium, being flexible in character, may flex back to a semblance of its initial shape from which it is capable of being again deflected into the sealing relationship shown in FIG. 7 upon reapplication of the closure to the container.

In a third form of the invention illustrated in FIG. 9 of the drawing a slightly modified form of closure 15' is shown applied to a container provided with a typical side wall structure 11' terminating in a bead 12' and provided with a perimetral ridge 37'. The closure 15' has tabs 22' similar to those disclosed in the first form of the invention at the lower end of which is a flange 30' and an annular groove 31' immediately adjacent the flange 30'. For this form of device there is a rounded upper outside corner 40 and no radially extending flange 26 as provided in the first form of the invention. In other respects, the form of invention of FIG. 9 resembles the first described form in that there is a perimetral ridge 36' at the bottom of the pocket which penetrates a sealing medium 35' separating the sealing medium into portions 38' and 39'.

When the closure of FIG. 9 is to be applied and secured in position, a continuous ring 29' is entirely removed and the closure snapped over the rim 12' in the same manner as heretofore described in connection with FIGS. 3 and 4. After the tabs 22' have been snapped over the rim 12' and returned sufficient to engage the closure with the bead, the ring 29' is slipped over the outside corner 40 and then forced downwardly along the exteriors of the tabs 22' until the ring lodges in the groove 31'. This is sufficient to adequately hold the ring in place and the closure in a firmly sealed position on the container. When it comes time to remove the closure, the ring 29' is withdrawn and removed from the closure, after which it can be discarded. A sufficient number of tabs 22' are then lifted to clear the closure from engagement with the bead, after which the closure can be removed from the container. When the closure is reapplied, the same oper-

5

ation is performed to snap the tabs into position over the rim, except that the ring 29 will not again be used. There is sufficient resiliency in the material of the tabs to draw them into engagement with the rim of the container for normal resealing use, especially where the device is used to contain sundry household ingredients.

While the invention has herein been shown and described in what is conceived to be a practical and effective embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. A plastic closure assembly adapted for removable replacement over a perimetral rim on a side wall structure of a container body, said closure comprising

a center section,

an integrally formed peripheral U-shaped channel defined by an inner flange, an outer flange and an intermediate section interconnecting the inner and outer flanges, the inner flange being formed integrally with the center section,

the lower portion of the outer flange having the form of a plurality of separate flexible tabs,

interlocking means on the interiors of the tabs adapted to engage said rim with said tabs being normally positioned in locking engagement with the side wall structure of the container body, and providing a space between the rim and the bottom of the U-shaped channel, said tabs being flexible outwardly from their respective normal positions so as to disengage the interlocking means from said rim, retaining means for retaining the tabs in their respective normal positions, and

auxiliary sealing means between said rim and the closure at the bottom of said U-shaped channel comprising a perimetral substantially line contact means located in said space.

2. A plastic closure as in claim 1 wherein said line contact elements comprises at least one flexible flange at the bottom of said U-shaped channel formed integrally

6

with said closure and adapted to engage said perimetral rim.

3. A plastic closure as in claim 1 wherein said line contact means comprises a plurality of flexible flanges at the bottom of said U-shaped channel formed integrally with said closure and adapted to engage said perimetral rim.

4. A plastic closure as in claim 3 wherein there is a perimetral bead on the rim at a location between said flexible flanges adapted to engage the bottom of said U-shaped channel at a location between said flexible flanges.

5. A plastic closure as in claim 1 wherein there is a yieldable sealing medium at the bottom of said U-shaped channel and said line contact means comprises a perimetral ridge at the bottom of the U-shaped channel formed integrally with said shoulder and projecting into said sealing medium.

6. A plastic closure as in claim 5 wherein there is a perimetral ridge at the outside face of said rim substantially coinciding with said ridge on the closure, the ridge on the rim projecting into said sealing medium in a direction opposed to projection of the ridge on said closure into said medium.

7. A plastic closure as in claim 3 wherein there is an annular ridge on said rim at a location between adjacent flexible flanges.

8. A plastic closure as in claim 3 wherein there is an annular solid ridge on said rim at a location between adjacent flexible flanges, said ridge having a height less than the length of said flanges and adapted to engage the bottom of said U-shaped channel when excessive pressure is applied to the closure.

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GEORGE T. HALL, Primary Examiner

U.S. Cl. X.R.

220—46, 60; 150—.5