June 30, 1953 M. J. QUILLINAN 2,643,790

BUNG CONSTRUCTION

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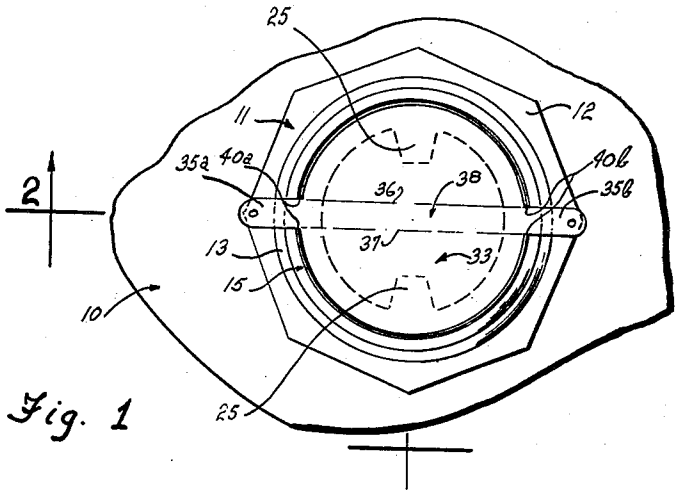


Fig. 1

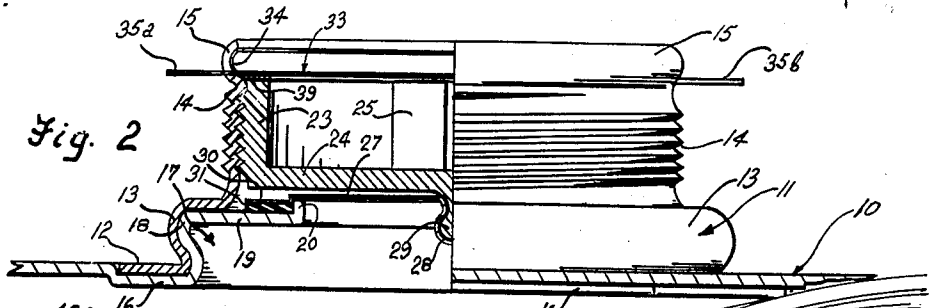


Fig. 2

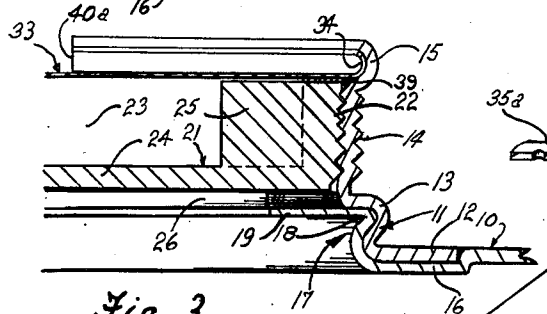


Fig. 3

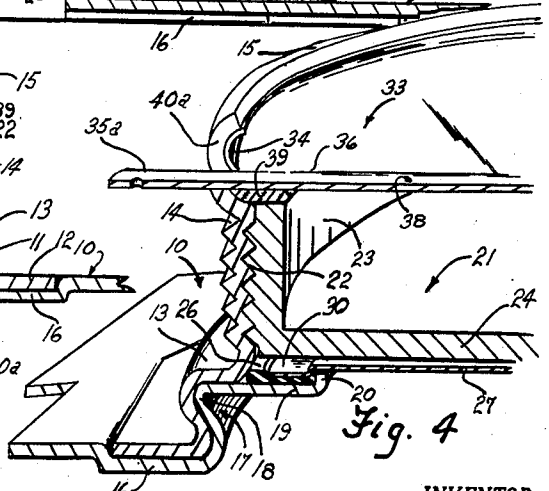


Fig. 4

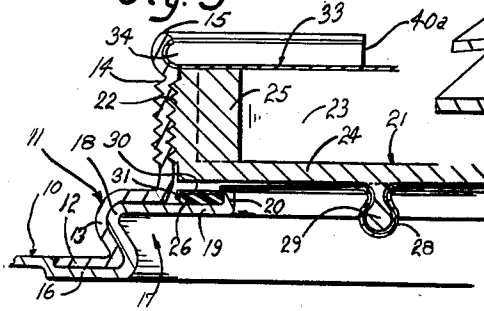


Fig. 5

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BUNG CONSTRUCTION

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9 Claims. (Cl. 220—39)

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This invention relates to a bung construction such as may be used in containers carrying chemical and petroleum products, but may well be adapted to other phases in the problems of sealing integrity facing related industries.

Bung construction has been limited in its development by the inability to manufacture a simple and efficient flange to be inserted in the container wall. Such flanges require threaded portions with anchoring means provided for keeping the flange in a fixed relation with the container wall. The choice of flange, heretofore, has been limited by the number of operations required in its manufacture. Economy in flange production, proving to be elusive, has led to a compromising in the choice of suitable anchoring means. Unfortunately, some containers use a low grade type of metal whose qualities nullify such attempts at economical bung construction by being unsuitable to the operation of flange insertion in the container wall. Such bungs, where used, are not as leakproof as desirable, and are limited in the use to which they are put by their correspondingly poor sealing integrity.

As progress is made in the chemical and petroleum industries, varying behavior characteristics in the activity of the liquids produced necessarily limit the choice of bung, and the components thereof, which are to come into contact with the liquids. This presents a difficulty when both container and closure manufacturers would prefer to provide a single bung type, usable under all sealing conditions. The problem becomes more acute when the features of economy, bung proficiency, and ease of insertion, hereinabove alluded to, are considered.

Briefly, this invention provides for a solution of the above by adapting thread rolling techniques, previously practiced, to the production of a flange that allows for the incorporation of a superior gasketing relationship of the bung's component parts while providing simple and sturdy anchoring means. A blank piece of steel is cupped and drawn a substantial distance forming a cylindrical throat and having a substantially flanged base portion about the lower periphery of the throat. The piece is then placed on a series of rolling dies which draw, swage and burnish the throat forming annular recesses and threads. The piece may then be opened forming a bung flange and the base portion polygonally trimmed. The resulting annuli and base portion are thereafter used as anchoring means wherein the container wall is received and about which it is polygonally embossed. An annular curl resulting on

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the upper extremity of the bung serves to receive a novel capseal, and the threaded flange portion receives a plug constituting the gasket compressing means, all of which will be hereinafter described.

Accordingly, a primary object of the invention is to provide a rugged bung construction adaptable to all sealing conditions.

Another primary object of the invention is to provide a substantially mounted bung construction, fixedly, contiguously and nonrotatably attached to the container wall.

Another object of the invention is to provide a flange in bung construction readily and substantially inserted in the container wall.

Another object of the invention is to provide a flange in bung construction that economically achieves sealing and anchoring means.

Another object of the invention is to provide a bung construction, usable with all types of container wall material.

Another object of the invention is to provide a bung construction that is accessible and tamperproof.

Another object of the invention is to provide a bung construction having superior sealing and gasket seating components.

Still another object of the invention is to provide in a bung construction a combination of economical components, functionally efficient in sealing all types of liquids of varying chemical activity.

Other objects of the invention will be manifest from the following specification which will be described with particular reference to the accompanying drawings wherein:

Fig. 1 is a plan view of the bung inserted in a container wall with accompanying closure plug and capseal in place.

Fig. 2 is a semi-elevation, semi-sectional view of the bung shown in Fig. 1 taken along line 2—2.

Fig. 3 is an enlarged sectional view of a substantial portion of a modification of the bung shown in Figure 2 illustrating an alternate gasketing arrangement.

Fig. 4 is an enlarged perspective view of a substantial part of the sectional view of the bung shown in Figure 2.

Fig. 5 is another enlarged sectional view of a substantial portion of another modification of the bung shown in Fig. 2.

Referring to Figs. 1 and 2, the bung construction consists of a container wall and an annular flange, generally shown as 10 and 11, respectively. The flange has a flat base portion 12

whose outer perimeter is octagonal in shape, and an annular recess 13 about the circumference of the flange extending generally upward from the base portion 12 and gradually increasing in diameter. After a substantial depth of the flange wall is expanded, the recess reduces in diameter, flattens out substantially, and connects with the threaded neck portion 14 of the flange. This neck portion is internally and externally threaded and in section characterizes a zig-zag progression of metal upward along the flange wall.

The remaining free end portion of the flange wall curls outwardly, upwardly and thence, inwardly upon itself, commencing at the terminus of the threaded neck portion 14, thereby forming an annular curl 15.

The container orifice consists of an octagonally embossed portion 16 which matingly receives the flange base portion 12, registering therein snugly so as to be non-rotatable relative thereto. Enhancing this snug fit is the throat portion of the container wall generally shown as 17 in Figs. 3, 4 and 5. This throat portion 17 is circumferentially expanded in the flange insertion operation, as at 18, so as to be substantially in contiguous relation to the contour of the inner face of the recess 13. The free end of the container wall orifice terminates in a flat lip 19 which is substantially perpendicular to the axis of the flange 11 and container orifice.

For many purposes the lip 19 will prove to be an adequate gasket seat. For other uses it will be preferable to curl the lip 19 at its free edge to form an annular collar 20, as will hereinafter be described.

The flange insertion operation may be executed by drawing, embossing and perforating the container wall to conform to the physical features hereinabove described, and thence outwardly expanding the container wall throat into the annular recess 13 provided therefor by a spinning operation.

It will be seen that the depth of the draw required to form the container wall throat is small relative to the width of the draw. Low grade metal, therefore, not requiring any annealing, may be used in container manufacture. Also, as the drawing and perforating operation is executed, the expansion of the throat resulting from the spinning operation does not cause undue stress or strain either of the flange or the material of the throat. This lack of excessive strain in the spinning operation is attributable to a compensating release of stress uniformly about the throat opening as expansion of the throat is executed.

The expanded throat thereby secures the flange 11 against the container wall preventing any upward displacement of the flange 11 from the container. The octagonal base portion 12 stations the flange non-rotatably relative to the container wall. The recess 13, being of substantial thickness, and external of the container throat thus affords a rigid protection against untoward blows on the bung incurred while the container is being handled. The lip 19 and collar 20 serve as a gasket seat sealing the liquid off from the threaded portions of the bung as will be hereinafter described.

A threaded member, hereinafter referred to as a plug, and generally shown as 21, is received within the flange wall and its threads 22 mate with the internal threads of the neck portion 14. The plug 21 substantially approaches in depth the neck portion 14. The plug 21 consists of a cylindrical wall 23 and a disc-like bottom portion 24. Cast therein are lugs 25 which act as wrench engaging means in removing and securing the plug 21 with the threaded neck portion 14 of the flange 11.

Residing below the plug bottom portion 24 is a circular gasket 26 having a circumference comparable to that of the plug 21, and compressed by the latter onto the gasket seat's lip 19.

The gasket 26 shown in Figs. 2, 3, 4 and 5 is not continuous, and therefore serves only to seal the closure. For some liquids it will be essential to provide a continuous gasket covering a substantial portion of the plug bottom 24 in order that the undesirable properties of the plug or the liquid will not bring about a coaction that will prove harmful to either the plug, the liquid or both.

Referring now to Fig. 3, as has been stated, the ordinary demands of sealing integrity are satisfactorily met by the indicated construction.

However, such a sealing relationship, in some instances, leaves much to be desired. Where acute variations in climatic conditions will be encountered along with an accompanying long period of shipment, gasket performance slackens. While some of this is attributable to the gasket material itself, a substantial part of poor gasket performance may be explained by the manner of compressing present day gaskets. There is a point in gasket density whereat sealing integrity decreases as increments of gasket compression continue, especially if the gasketing material is not retained during compression in a confined area. This phenomenon is made manifest by the cracks and furring which appear on gaskets after continued use in gasket seats that distort and spread gaskets rather than compress them.

To overcome the above, the bung construction provided herein allows the substantial gasket compression necessary to seal a container and in addition supplies a check to any detrimental compression and distortion. This is achieved by containing a gasket within a gasket seat so as to allow unidirectional application of gasket compression force.

Referring to Figs. 2, 4 and 5, a disc-like plate 27 is rotatably attached to the plug bottom 24 by any means desirable, such as gripping the plate at its centerpoint 28 to a knob 29 on the plug. The periphery of the plate 27 is embossed substantially as shown in either Fig. 4 or 5, so that its raised platform portion 30, which is parallel to the plane of the plate 27, engages the flat surface of the gasket 26. The outer cylindrically peripheral side 31 of the plate, as shown in Fig. 5, embraces the outer cylindrical surface of the gasket 26, while the inner cylindrical side 32 of the platform 30 mates with the outer surface of the annular collar 20 of the container wall 10.

As the plug 21 is screwed into the neck 14, the plate 27 is displaced downwardly thereby compressing the gasket 26 retained between the collar 20, the peripheral side of the platform 31, the platform 30 and the lip 19.

The gasket 26 is compressed solely in a direction parallel to the axis of the bung. Moreover, the plate 27, being rotatable relative to the plug 21, allows the gasket to remain in place without the scuffing and rubbing present in other gasket compressing means when the plug is screwed home.

Also, it will be seen that the gasket seat formed by the lip 19 and the collar 20 permits the plate

27 to be axially displaced a predetermined amount, although the plug 21 may continue to be rotated after the required degree of gasket compression has been obtained.

The plate 27 may, when necessary, be made from a substantially chemically inactive material comparable to the material of the container wall.

The flange's annular curl 15 serves a very important function. Many times it becomes desirable to place a capseal on the bung identifying the container's contents, and providing a tamperproof seal for the bung. Also as an added precaution an extra gasket of cork or some plastic may be added in the capseal to act as a second seal of the closure. Manufacturers often deem this additional gasket unnecessary and provide the capseal only as a measure to prevent bootlegging or other such practices on the container's contents. However, while such capseals are desirable, they must be durable and easily removable. The annular curl of this invention permits of such a capseal structure which is simple, economical and practical.

The capseal consists of a circular disc 33 of terne or light gauge metal, and a cylindrical wall portion 34 extending substantially perpendicularly upward from the plane of the disc 33 and integral therewith. Also, protruding from the periphery of the disc 33, are a number of tearing ears, 35*a* and 35*b* in the plane of said disc 33 and perpendicular to the axis of the cylindrical wall portion 34. The disc 33 is preferably scored or grooved on its under or upper face, and the resulting lines of weakness 36 and 37 extend diametrically across the disc 33 describing a tearing strip 38 which connects the tearing ears 35*a* and 35*b*. A compressible gasket 39 is lacquered or gummed onto the under face of the capseal disc 33 occupying a substantial portion of the periphery thereof.

The capseal is inserted in the confines of the inner annular face of the curl 15 by a sealing tool. The capseal is placed on the surface described by the top face of the wall portion 23 of the plug 21, and the lower annular face of the flange curl 15. Slots 40*a* and 40*b* are provided on the flange for the reception of the outwardly extending tearing ears, 35*a* and 35*b*, respectively.

The operable portions of the sealing tool engage the inner face of the cylindrical wall portion 34, and expand the latter outwardly against the sloping inner face of the annular curl 15. The resultant of the operating force is a downward displacement of the capseal compressing the gasket 39 against the surfaces adjacent to the gap between the plug 21 and the flange 11, and within the gap therebetween. The cylindrical wall portion 34 of the capseal is rigidly retained within the annular curl 15, and the tearing ears 35*a* and 35*b* extend freely outwardly therefrom.

In removing the capseal, a pliers, or other such comparable tool, is applied to the tearing ears and, with an upward exertion of force, the capseal cleaves along the lines of weakness 36 and 37 forming the tearing strip 38 as a consequence of the balance of the capseal being rigidly retained within the confines of the annular curl 15.

Where a capseal gasket is not specified, the capseal alone may be applied and removed substantially in the manner indicated thereby providing an adequate and readily destructible tamperproof seal as shown in Fig. 5.

Thus I have illustrated structures and modifications thereof to which the bung construction claimed hereinafter will be addressed. While I have indicated a preference to a rolled flange as an article of manufacture, there is no reason why such closure constructions and sealing techniques may not be applied to a flange that is die cast, or otherwise formable.

Accordingly, lest it should be misunderstood, I do not wish to be limited in breadth or scope to the modifications described herein but rather contemplate a broad application to related arts and practices with a bung construction.

Having fully described the invention, what I claim is:

1. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising a recess flaring upward and outward having a base projecting from its lower edge and a return projecting inward from its upper edge, a neck projecting upward from said return adapted to receive a sealing member, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge adjacent said neck and a skirt projecting from its lower edge, said base countersunk in said skirt.

2. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising a recess flaring upward and outward having a base projecting from its lower edge and a return projecting inward from its upper edge, said base having a non-circular free edge, a neck projecting upward from said return adapted to receive a sealing member, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge adjacent said neck and a skirt projecting from its lower edge, said base countersunk in said skirt.

3. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising a recess flaring upward and outward having a base projecting laterally from its lower edge and a return projecting inward from its upper edge, said base having a non-circular free edge, a neck projecting upward from said return adapted to receive a sealing member, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge adjacent said neck and a skirt projecting laterally from its lower edge, said base countersunk in said skirt.

4. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising an annular recess flaring upward and outward having a base projecting laterally from its lower edge and a return projecting inward from its upper edge, said base having a non-circular free edge, a neck projecting upward from said return adapted to receive a sealing member, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge within the inner face of said neck and a skirt projecting laterally from its lower edge, said base countersunk in said skirt.

5. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising an annular recess flaring upward and outward having a base projecting outward from its lower edge and a return project-

ing inward from its upper edge, said base having a polygonal free edge, a neck projecting upward from said return adapted to receive a sealing member, said mouth comprising a complementary flaring throat within said recess and return having a free edge in the form of a lip clearing the inner face of said neck projecting inward from said throat, a skirt projecting outward from the lower edge of said throat having said base countersunk therein.

6. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising a recess flaring upward and outward having a base projecting from its lower edge and a return projecting inward from its upper edge, said base having a non-circular free edge, a neck projecting upward from said return, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge clearing the inner face of said neck and a skirt projecting from its lower edge, said base countersunk in said skirt, said lip having a collar projecting from its free edge, a gasket seated on said lip, a plate seated on said gasket, a plug in threaded engagement with said neck, means rotatably mounting said plate beneath said plug.

7. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising a recess flaring upward and outward having a base projecting from its lower edge and a return projecting inward from its upper edge, said base having a non-circular free edge, a neck projecting upward from said return, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge clearing the inner face of said neck and a skirt projecting from its lower edge, said base countersunk, in said skirt, said lip having a collar projecting from its free edge, a gasket seated on said lip, a plate seated on said gasket having a peripheral edge projecting downward around said gasket, a plug threaded to said neck, means rotatably mounting said plate beneath said plug.

8. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising a recess flaring upward and outward having a base projecting from its lower edge and a return projecting inward from its upper edge, a neck projecting upward from said return, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge clearing the inner face of said neck and a skirt projecting from its lower edge, said base countersunk in said skirt, sealing means seated on said lip including a capseal having a flat bottom and at least one tearing ear projecting from the periphery of said bottom, said neck having a gap permitting said ear to pass therethrough, a pair of lines of weakness terminating at sides of said ear, said gap, and said bottom's periphery, a capseal wall projecting upwardly from the peripheral edges of said bottom commencing at either side of said pair of lines and said gap, said capseal wall embraced by and immovable with respect to said neck's free edge.

9. A bung having in combination a container wall mouth and a fitting mounted thereon, said fitting comprising a recess flaring upward and outward having a base projecting from its lower edge and a return projecting inward from its upper edge, said mouth comprising a complementary flaring open throat within said recess and return having a lip projecting inward from its upper edge and a skirt projecting from its lower edge, said base countersunk in said skirt, a threaded neck projecting upward from said return surrounding said lip, said neck being characterized in section by a zig-zag progression along the sides of said neck commencing at the plane of said return.

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