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R. L. PARISH, JR., ET AL

2,842,282

CONTAINER CLOSURE AND COMBINATIONS

Filed June 22, 1951

Fig. 1.

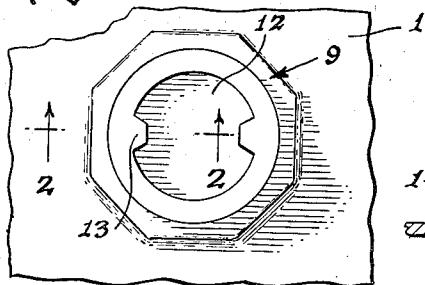


Fig. 2.

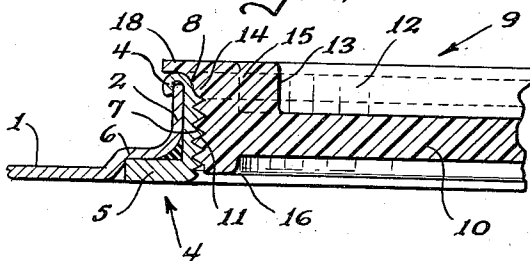


Fig. 3.

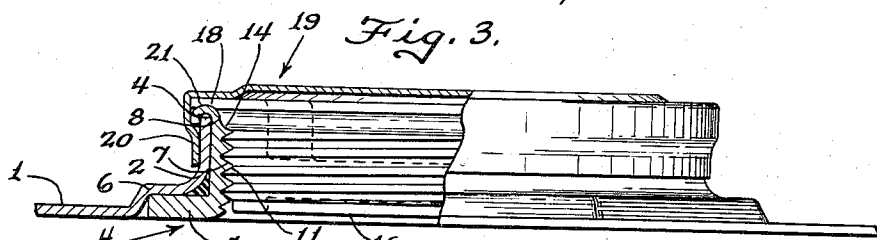


Fig. 4.

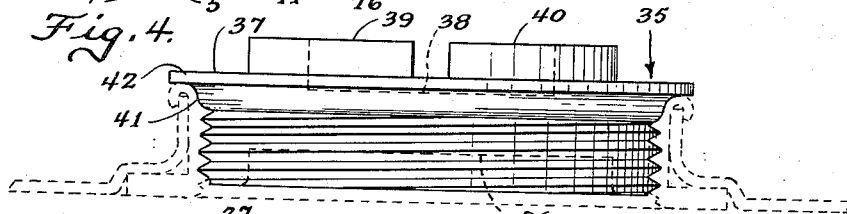


Fig. 5.

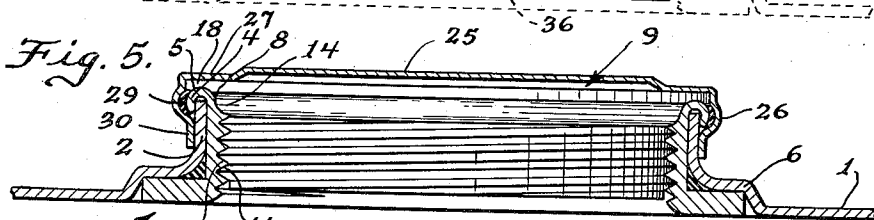
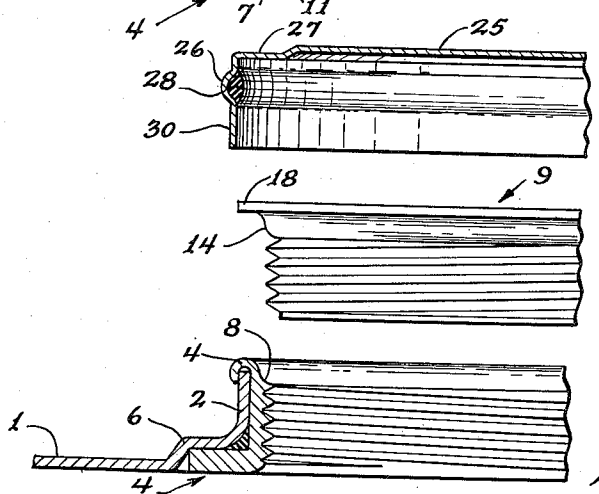


Fig. 6.



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CONTAINER CLOSURE AND COMBINATIONS

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1 Claim. (Cl. 220—39)

The invention relates to container closures and combinations and particularly to such closures for closing and sealing the openings in large barrels and drums.

One object of this invention is to provide closure plugs for container which plugs are complete in one piece of material.

Another object is to provide such closure plugs formed out of material resistant to the chemical action of a wide variety of materials shipped in containers.

Another object is to provide such closure plugs which can be threaded into receiving bushings, having coated threads, without injuring such coating.

Further objects are to form such closure plugs out of material which is self-gasketing and non-sparking.

A still further object is to provide closure combinations employing an integral extension of the closure plug as the gasket for a capseal.

A more detailed object is to provide closure plugs for containers formed out of material capable of performing both securing and gasketing functions.

Further and more detailed objects of the invention will in part be obvious and in part be pointed out as the description of the illustrative embodiments of the invention, shown on the accompanying drawing, proceeds.

In that drawing:

Fig. 1 is a plan view of a section of a container wall illustrating the preferred form of the closure plug, of the invention, applied to the opening in such wall.

Fig. 2 is a fragmentary vertical section taken on lines 22 of Fig. 1 and looking in the direction of the arrows.

Fig. 3 is an elevation with a part broken away and shown in section, of the closure combination including the plug, as shown in Figs. 1 and 2, with a suitable capseal applied thereover.

Fig. 4 is a side elevation of a modified form of closure plug with the receiving flange and container wall therefor shown in dotted lines.

Fig. 5 is a vertical section of a modification of the combination as shown in Fig. 3.

Fig. 6 is a fragmentary exploded view, in section, of the parts of the combination as shown in Fig. 5.

Many relatively chemically inert so-called plastic materials, possessed of physical characteristics such as, resilience, yieldability, toughness and others, have been developed. At the same time a need has existed for container closures taking advantage of certain of these characteristics. This need has increased with the improvement in coatings for steel barrels and drums enabling such containers to be used for the shipment and storage of commodities which would otherwise attack the ordinary metals out of which the containers and their parts are made.

Coatings, now available, adhere satisfactorily to the threads of the closure flanges or bushings but attempts to engage similarly coated metal closure plugs with such coated flanges have not met with much success. Neither of the base materials yield, hence some of the coating is likely to come off of the screw threads of the plug or of

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the flange, or both, during the threading of such parts together.

The closing and opening of drums, carrying highly inflammable materials, has to be carried out with extreme care where the closure parts are of metals likely to give off any kind of a spark when engaged with each other and when moved with respect to each other. This factor has led to the taking of extreme precautions in such places as the filling plants where such inflammables are introduced in the drums.

This invention eliminates the prior art difficulties and introduces several improvements into the field. Such is done by the proper construction of a closure plug formed out of properly impervious, tough, resilient, non-metallic material in such a manner as to do the job effectively.

The preferred material selected for this purpose, due to the wide range of its imperviousness, is polyethylene. It is to be understood, however, that other so-called plastic materials, having generally the same physical characteristics as polyethylene and a desired range of imperviousness, can be employed in place of polyethylene.

A properly formed plug, made out of such material, is self-gasketing, thus eliminating the practice, heretofore followed, of employing a separate gasket. Additionally the plug may be extended into a portion providing a capseal gasket. When such is done, it results not only in the elimination of the capseal gasket but, also, serves to improve the characteristics of the plug itself. Also a plug made of polyethylene, or comparable material, has sufficient surface unctiousness and structural yieldability that it can be engaged with and disengaged from the coated threads of a metal bushing without disturbing the coating on such threads.

Plugs formed of polyethylene, or comparable material, are also of entirely non-sparking characteristics when engaged with metal flanges. Thus the use of them for the closing of drums containing inflammables will enable an elimination of some of the precautions now found necessary while, at the same time, increasing the safety factor and reducing the cost of the operation.

In the form of Figs. 1 to 3 a section of container wall stock is shown at 1, provided with an opening bordered by a neck 2, which neck receives the internally screw threaded neck 3 of the flange 4. The flange 4 is secured in place by having the upper end of its neck beaded over at 5 around the free end of the neck 2. The flange 4 has a base 6 lying within an embossing 7 in the container wall and the upper end of its screw threaded neck 3 is provided with a substantially conical gasket seat 8.

The inner surface of the container wall 1, the bottom surface of the flange 4 and the threaded portion 3 may, if desired, be coated with material impervious to the product to be shipped in the container. Whether such surfaces are coated or not, the closure plug 9 forms an effective closing member for the opening bordered by the screw threaded flange.

The closure plug generally shown at 9 has a base 10, a screw threaded side wall portion 11 and a shallow hollow head 12 into which actuating lugs 13 extend.

At the top of the threaded portion 11 the plug 9 is formed with an enlarged rounded portion 14 formed to be suitably mated with the gasket seat 8 on the flange 4. This portion 14 takes the place of and eliminates the customary separate gasket carried by closure plugs to provide a tight closure. Previous attempts to render integral gasketing effective have failed because of lack of appreciation of the factors that need to be overcome. In particular there was a lack of appreciation of the necessity for, as well as the manner of providing, sufficient rigidity to the head of the plug to render the integral gasket effective.

Plugs as heretofore constructed merely had the wall in back of the threads of sufficient thickness to protect the threads against a shearing action. Thus if the plug were made of yieldable material, such as polyethylene, it would tend to collapse inwardly and could be screwed right through the bushing or, if that did not take place, would be of insufficient rigidity to hold in place.

This defect has been overcome by the instant invention, through forming the side wall of the plug between the interior of the hollow head 12 and the threads, or integral gasket portion 14, of a thickness several times the depth of the threads. This thickness is illustrated by the distance between the gasket seat 8 and the dotted line 15 in Fig. 2. In addition to this mere thickening, the strength of the wall has been further increased by thickening the bottom or base 10, and moving it up a substantial extent from the lower extremity 16 of the side wall. This upward movement is limited by the necessity of having sufficient depth in the hollow head 12, to receive a suitable wrench in proper engagement with the lugs 13. However, as appears from the Fig. 2 showing, the top 17 of the base 10 is close enough up towards the integral gasket 14 to cooperate with the thickened side wall in backing up the integral gasket. Hence when this plug is screwed home, there is sufficient strength in the plug body to cause a tight engagement of the gasket portion 14 with the gasket seat 8 and thus provide a leak-tight joint.

Closures for steel barrels and drums are commonly protected against leakage and tampering by means of crimped on capseals. One common form of such capseals carries a gasket which seats on the bead 5. In the present instance, however, the gasket carried under the head of the capseal is eliminated and is replaced by extending an integral portion of the head of the plug 9 out over the bead, as indicated at 18. Then, when the capseal 19 is applied, by a downwardly drawing action and a crimping in of its skirt 20 against the neck 2 under the bead 5, a gasketing between the top of the capseal and the bead is effected by the forcing of the portion 18 against the bead 5 and deforming it thereover as shown at 21.

This application of the capseal 19, with the drawing downwardly and inwardly of its skirt 20, not only provides for the gasketing of the capseal, it also increases the gasketing action of the portion 14 against the gasket seat 8. This it does by reversing the tendency of the portion 18, when unrestrained from above, to flare upwardly when engaged with the bead 5 and thus tend to move the upper part of the integral gasket portion 14 slightly away from the surface 8. The fully effectiveness of this action is readily apparent from the fact that the portion 18 is not only held down against the bead 5, but is actually flowed around that bead by the downward component involved in applying the capseal, as illustrated at 21.

A modified combination is illustrated in Figs. 5 and 6. Here the plug 9 remains the same as previously described, as does the flange 4, the container wall neck 2 and the bead 5. Consequently the integral gasket portion 14 engages the gasket seat 8 and when the capseal is applied the extending portion 18 of the plug is flowed down over the top of the bead 5. The novel capseal 25 of this combination, however, has its skirt recessed convexly outwardly at 26, spaced a short distance below the depressed portion 27, to receive a small flowed in gasket 28. The gasket 28, when this capseal is applied, as best seen in the Fig. 5 form, engages and flows around the outer surface of the bead 5. This flows the gasket into concave form as seen at 29, when the lower portion 30 of the skirt is crimped in against the neck 2.

The combination of Figs. 5 and 6 not only incorporates all the inherent advantages of the construction of Figs. 1

through 3 but, also, sets up a block against the moisture vapor transmission characteristics of some of the plastic materials. In other words, though such materials form adequate closures to prevent the leakage of the container contents, some of them transmit moisture vapor. Thus should a partial vacuum occur within the container when moisture is present on the outside, some of the plastic materials might allow the breathing in of such moisture vapor with consequent contamination of the contents of the container. Such breathing action is precluded by the particular formation of the capseal and the selection of proper gasketing material as here employed.

Of particular note is the fact that the capseal gasket 28 is so located in the skirt of the capseal that, when properly applied, it will contact the rounded outer portion of the bead 5. In doing so the gasket is changed from the concave, as shown in Fig. 6, to the convex of Fig. 5 thus forming perfect gasketing all around the bead 5, regardless of possible small variations in the contour of that bead introduced during the application of the flange to the container wall.

An alternate form of plug is illustrated in Fig. 4. Here, instead of being hollow headed, the plug 35 has the inner portion of its bottom recessed materially upwardly as shown by the dotted line 36. From the line 36 up to the top surface 37 of its head, the plug is solid, save for the small recess indicated at the line 38 between the actuating lugs 39 and 40. Thus the integral gasket portion 41 here is backed up by a completely solid web which assures against the portion 41 being forced away from the mated gasket seat on the flange as the plug is screwed down with its edge portion 42 engaging the top of the bushing bead. The lugs 40 are suitably spaced yet of substantial rigidity so that actuation of the plug can be effected by any suitable instrument such as an iron bar. These lugs preclude capsealing of the type shown in Figs. 3 and 5 unless the capseal be domed upward to cover them. This form of plug, however, is intended for application where capsealing is not normally carried out.

Having described our invention what we claim is new and desire to obtain Letters Patent for is:

A closure combination for containers, comprising a container wall formed with an opening therein, a neck formed from said wall and extending upwardly therefrom around said opening, a screw threaded bushing received within said opening and formed with an outwardly extending bead overlying the free end of said neck, an integral one-piece non-metallic yieldable resilient closure plug formed with a screw threaded body portion received within said screw threaded portion of said closure plug, a gasketing portion formed from the material of said closure plug and extending outwardly into engagement with said bushing above the threads thereof, an outwardly extending integral shoulder on said plug, extending outwardly with respect to the body of said plug, overlying said bead and in gasketing engagement therewith, said shoulder being relatively thin with respect to the body of said plug and a capseal, said capseal including a disc-like top portion and a downwardly extending skirt around said top portion, said top portion engaging the upper surface of said shoulder and deforming the same against said bead and said skirt portion being engaged by said neck beneath said bead.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,842,282

July 8, 1958

Richard L. Parish, Jr., et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 51, for "closure plug" read -- bushing --.

Signed and sealed this 18th day of June 1963.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents