Oct. 21, 1952 J. ROBINSON 2,614,868

CONTAINER CLOSURE

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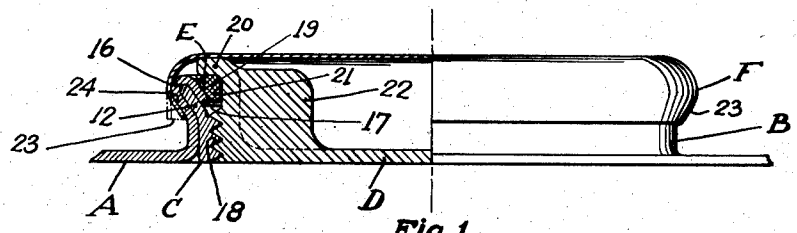



Fig. 1.

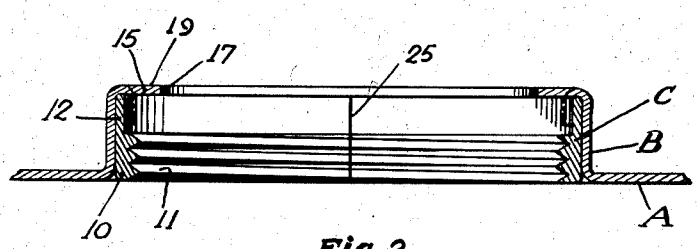



Fig. 2.

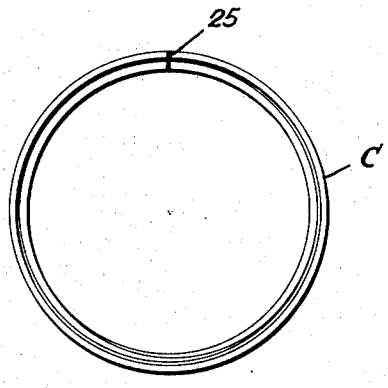



Fig. 3.

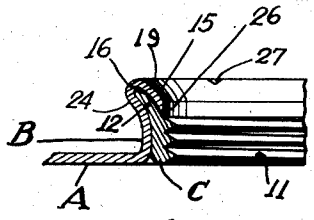



Fig. 4.

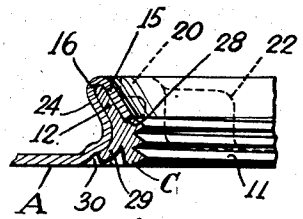



Fig. 5.

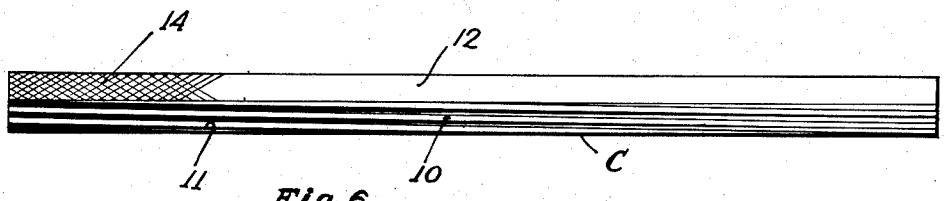



Fig. 6.

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## CONTAINER CLOSURE

Joseph Robinson, New York, N. Y.

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6 Claims. (Cl. 285—49)

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This invention relates to container closures of the type generally used in gasoline drums and the like, and is an improvement on the closure shown in my co-pending application Serial No. 571,748, filed January 8, 1945, which has since matured into U. S. Patent No. 2,445,802, granted July 27, 1948. The primary object is to provide a closure of high performance and extreme simplicity which requires a minimum of preparation of the drum to receive it; mounts easily therein; uses but one gasket instead of the usual two gaskets, and is simpler and cheaper to manufacture than any known closure of like size and purpose. In carrying out this primary object I provide, as an important part of my improvement, a simple insert or threaded ring which may be die cast, cut from tubing on automatic machines, or shaped from a relatively thin narrow bar on which the threads are rolled while the bar is flat or cut after the bar has been formed into a ring.

Other objects and advantages of my improvement are described in the following specification, pointed out in the appended claims and illustrated in the accompanying drawings in which

Figure 1 is a half vertical section and half elevation of my improved closure showing the parts assembled and the seal cap F in place. In this view, and in Figure 2, the parts are shown approximately one and one-half times actual size;

Figure 2 is a vertical section through the housing B and the threaded insert or ring C with the parts as they appear in one stage of assembly;

Figure 3 is a top view, natural size, of the insert B shown in Figure 2;

Figure 4 is a detail in vertical section of a modified assembly of the insert B and housing;

Figure 5 is a detail in vertical section of a modification of the parts, and of the assembly thereof, and

Figure 6 is a plan view, from the threaded side, of the relatively thin flat bar from which the ring or insert C is formed. In this view the rolled threads, and one type of knurling, are shown.

Referring to Figures 1 and 2 of the drawings: The drum A is provided with an outwardly extending housing B pressed from the drum stock and pierced by a single forming operation. In this housing my improved insert or cylindrical bushing or ring C is mounted flush with the bottom of the housing. The ring is relatively narrow and has a base 10, internally threaded at 11. The thickness of the base is approximately ⅛" and the height thereof is about half the

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vertical width of the ring. From the top of the threads upward the ring is reduced in thickness to approximately half the thickness of the base 10. This forms the upper half or anchor portion 12 of the ring which may be left smooth on both sides or it may be suitably knurled on one or both sides, as indicated at 14 in Figure 6. The horizontal lip or flange 15 of the housing is pressed down over the anchor portion 12 of the ring and is powerfully swedged thereagainst to lock the ring rigidly in the housing. This assembly operation imbeds the knurling 14, Figure 6, into the adjacent walls of the housing B as additional, but not indispensable, anchorage between the parts. Further movement of the same die flares, and additionally swedges, the upper part 16 of the housing, and the anchor portion 12 of the ring C, to the shape shown in Figure 1, and carries the edge 17 of the flange out of the path of the threads 18 on the hollow plug D. This assembly firmly locks the ring against vertical and rotary movement in the housing B and provides a smooth annular seat 19 on the inner face of the flange 15 to receive the gasket E. The gasket may be of any desired shape and material, preferably round in cross-section and of pliable resilient material. The plug D is provided, immediately below its annular flange 20, with an annular retaining seat 21 in which the gasket E rests. Suitable wrench lugs 22 are formed on the inner walls of the plug, and spaced diametrically opposite one to the other, to receive a tool for inserting and removing the plug. When it is desired to positively prevent undetectable tampering with the contents of the container, a seal cap F of light material is placed over the housing B and plug D and its lower portion 23 (indicated also in dotted lines in Figure 1) is tightly crimped, by means of a suitable tool, under the retaining shoulder 24 formed by the outward flare of the housing. With the cap in place as shown access to the plug D can be had only by destroying the cap.

The insert or ring C may, as aforesaid, be die cast, fully threaded, as a solid continuous ring or it may be rapidly cut on an automatic screw machine from a tube having the outside diameter desired for the ring. When made in this way the threads 11 and the anchor portion 12 of the ring are formed on the same automatic machine. Or the ring may be shaped from a flat bar approximately ⅛" thick and about ⅜" wide. When made in this manner the thinned anchor portion 12 and the threads 11 are rolled, or both may be machined after the flat bar is formed

into a ring. The butt joint 25, Figures 2 and 3, need not be welded because the gasket E, compressed by the plug B against its seat 19 on the flared flange 15, seals both the joint between the ring C and the housing B and between the ring and the plug D. This advantageous construction requires the use of but one gasket (instead of the usual two gaskets) to seal a container perfectly tight with my improved closure. It provides an insert or ring C of extreme simplicity and low manufacturing cost, since it can be made of inexpensive materials and by the simplest and most rapid manufacturing techniques. The relatively thin anchor portion 12 of the ring, even though made of die casting alloys, will yield sufficiently, without overstressing or cracking, to provide the effective anchorage and interlock between it and the flared portion 16 of the housing B, Figures 1, 4 and 5.

The modification shown in Figure 4 contemplates wrapping the flange 15 down against the top thread in the insert C, the beveled inner edge 26 being provided to clear the threads 18 of the plug D. In this embodiment of my improvement the outward flare of the parts is slightly curved as shown, and the upper edges of the housing B and ring C are indented as at 27 to further lock the ring against rotation in the housing. In Figure 5 is shown another modification of the parts. It permits a long overlap of the flange 15 with respect to the anchor portion 12 of the ring, and allows a seat 28 to be formed adjacent the top thread of the ring, and at an angle to the vertical axis of the ring, into which the lower edge of the flange 15 is forced, clear of the threads 18 of the plug D, as the parts are flared and swedged together. This arrangement permits the plug (indicated by dotted lines in this figure) and the gasket E to be threaded into the housing until the top of the plug flange 20 is approximately flush with the top of the housing B. This brings the gasket against not only its seat 19 of the flange but also against the top thread of the ring C and against the point of contact between the flange 15 and the seat 28, making a dependably tight joint. In this embodiment of my improvement the base 10 of the ring is thicker than in the case of the construction shown in the other figure. This permits a lug 29 to be broached from the sides of the base at intervals around its outside diameter. These lugs fit into grooves or indentations 30 formed in the base of the housing B to positively lock the ring against rotation in the housing. If this construction of the ring is cast these lugs would, of course, also be cast and would not curl outwardly from the base of the ring but would be solid therewith. In this construction of my improvement, as in the embodiments shown in Figures 1 and 3, when the plug D is screwed to the extreme limit of its downward movement in the ring C its flange 20 engages the flaring surface 19 of the housing which acts as a stop for the plug.

The simple construction of my improved insert or ring C permits, as aforesaid, the use of a shallow easily formed housing B, and provides, by a single die operation, a simple and powerful anchorage between the housing and the ring. No gasket other than the one on the plug D is required to seal the entire closure absolutely tight. Water accumulating in the tops of drums left out of doors cannot "breathe" into the drum. Breathing is a common fault with present types of closures, and is injurious—often ruinous—to the contents of the drum. Where more than one gasket is used the chances for leakage and for breathing are, of course, increased. Variable expansion ratios between the metal of the drum and the material of the insert C, is another cause of leakage and breathing, especially under sharp climatic changes. My improvement minimizes this hazard, first because the insert C is similar in weight to the thickness of the drum stock and is anchored in the housing at but one point, its quite thin top portion 12, and secondly because the bottom of the insert does not overlap against the bottom of the housing B to be put under strain when the housing expands vertically. Compressing the gasket E against a smooth cone-shaped or flaring seat 19 is another important protection against leakage and breathing. The sliding or slipping action of the gasket on this seat as it moves to final rest improves the seating contact between the parts and sets up compressional forces on the gasket in directions at an angle to the vertical axis of the plug D as well as parallel to that axis. The arrangement pushes the gasket inwardly tightly against its seat 21 on the plug and vertically against its seat on the underside of the plug flange 20. "Freezing" of the plug D in the insert or ring C is minimized by my improvement because both the plug and the insert may be economically manufactured of non-corrosive materials. Compressing the gasket against the drum stock itself and not against the insert C, contributes importantly to the removal of "freezing" common to present type closures. If a gasket, long in the tightly sealed joint formed by my improvement, "freezes" or sticks to its seat 19 there is no tendency to turn the insert or ring C in the housing B under heavy wrenching of the plug D to remove it. These various features of my improved closure combine to make enduringly tight joints which, along with low cost is, of course, the ideal result.

What I claim is:

1. A closure receiving mouth for a metal container comprising in combination a container wall having an opening therein defined by an outwardly extending cylindrical housing, a ring-like insert disposed in said housing with its bottom edge adjacent the lower portion thereof and its exterior surface in engagement therewith, said insert having an internally threaded base and a non-threaded anchor portion, the anchor portion of said insert being arranged above said threaded base and having a wall thickness less than the wall thickness of said base and generally comparable with the wall thickness of the housing, the outer extremity of said housing being turned downward over the anchor portion of the insert to form a U-shaped section at the outer extremity of the housing, the U-shaped section of the housing and the anchor portion of the insert being flared outward simultaneously relative to the internally threaded base of the insert to positively lock said insert against vertical movement in the housing and to form an upwardly facing generally cone shaped seat for a gasket.

2. A closure receiving mouth for a metal container, in combination, in accordance with claim 1, wherein the lower edge of said flange when the flange is outwardly flared lies above the topmost thread of said threaded base and in approximately the plane occupied by the root of the threads of said base.

3. A closure receiving mouth for a metal container, in combination, in accordance with claim 1, wherein the insert is a split ring formed of a straight relatively thin and relatively narrow strip of metal having two thicknesses and a common width throughout its length, the part of greatest thickness forming said base and the part of lesser thickness forming said anchor portion, the threads of said base having been rolled therein as said ring was shaped.

4. A closure receiving mouth for a metal container, in combination, in accordance with claim 1, wherein the outwardly flared U-shaped section of said housing forms a downwardly facing inclined shoulder which retainingly receives a seal cap for preventing undisclosed tampering with the contents of said container.

5. A closure receiving mouth for a metal container, in combination, in accordance with claim 1, wherein a gasket is received by said cone-shape seat and constitutes the only sealing means for preventing leakage through said closure of the contents of said container.



6. A closure receiving mouth for a metal container, in combination, in accordance with claim 1, wherein means are provided on the anchor portion of the insert for augmenting the interlock between the flange of said housing and said anchor portion.

JOSEPH ROBINSON.


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