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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 application is a division of my copending application Serial #565,461 filed November 28, 1944, now Letters Patent No. 2,447,535 issued August 24, 1948, and embraces especially the construction shown in Figure 5 of that application. The invention relates to closures for metal containers used in shipping chemicals, gasoline, lubricating oils and the like. Among the objects are to provide a closure which is rugged and simple; which is inexpensive to manufacture; which provides "multiple-service" through interchangeability with existing closures; which does not require a seal-cap to make it liquid tight, and which employs only a single gasket, round or square in cross-section, that rests in a prepared complementary seat and may be reused repeatedly.

Other objects and novel features of my invention will appear from the following description, are pointed out in the appended claims and are illustrated in the accompanying drawings, in which

Figure 1 is a sectional side elevation of my improved closure;

Figure 2 is an inverted vertical section through the housing C and the ring-like insert A showing these parts as they appear before the housing is closed in on the insert;

Figure 3 is a top plan view of the ring-like insert shown in Figures 1 and 2, and

Figure 4 is a bottom view thereof.

My improvement comprises an internally threaded ring-like insert die cast or otherwise formed in one or more pieces of any desired material, preferably a non-corrosive material. The insert is provided with an annular flat upper face 6 between which and the threads 7 a vertical wall 8, and a suitable gasket seat 23, Figures 2 and 3, are formed. The smooth annular flat surface 9 of the insert extends downwardly and outwardly from the face 6 for a distance approximately half the height of the insert, and thence curves or flares inwardly to form a shoulder or seat 10 which merges with the base or cylindrical neck 11, of the insert Figures 3 and 4. The drum head B is initially provided, as by pressing, with a housing C shaped to closely receive the surfaces 6, 8 and 9 of the insert, Figures 2 and 1. An annular bead 12 is formed around the housing and defines the bottom thereof. It projects below the plane of the inner face of the drum head B, and serves to facilitate folding the bead 12 over the shoulder 10 of the insert into tight interlocked engagement therewith and with the surfaces 6, 8 and 9. The vertically disposed portion 14 of the housing fits snugly

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against its complementary bearing 8 and extends downwardly to a point approximately in the plane of the top of the gasket seat 23. The arrangement is such that when the insert is dropped into the housing C (while the latter is inverted, Figure 2) the surfaces 8 and 9 engage their bearings in the housing in advance of engagement between the housing and the flat face 6 of the insert, Figure 2. This relationship between the parts insures that when the bead 12 of the housing is wrapped over the shoulder 10, drawing the housing into tight wedging engagement with the surfaces 6, 8 and 9, the insert will be under spring tension from the surrounding metal of the housing thereby providing a friction lock between the assembled parts. However, to positively lock the insert immovably against rotation in the housing C, I provide the portion 14 of the housing with a plurality of lugs or teeth 26 which extend downwardly from its lower edge into openings or slots 22 formed at the bottom of the wall 8 adjacent the gasket seat 23. The lugs are curved or flared at their opposite corners 15, and the slots 22 are similarly shaped at their upper edges, to guide the lugs into the slots as the insert A is dropped into the housing, Figure 2. For this purpose, these lugs may, if preferred, be generally V-shaped and of any desired number equally spaced or otherwise arranged on the bottom of the wall 14 to mate with complementary shaped openings in the ring-like insert A.

A gasket 24 which may be either square or round in cross section rests in a seat 25, Figure 1, on the hollow plug D and seals the joint between the plug, the insert A and the housing. If the gasket is square in cross section it may be twisted and still it will, with my improvement, make a tight joint between the parts to be sealed. The reason is that the four walls of the conformed gasket seat 23, 14 and 25, together with the annular flange 27 of the plug D, provide smooth solid surfaces against which the four spiral ridges (that is, the four corners) of the twisted gasket are tightly drawn as the plug is wrenched down by a suitable tool engaging the lugs 18 diametrically arranged on the inner walls of the plug D. If neither a round cross-section gasket, nor a gasket square in cross-section, is available a flat gasket (not shown) may instead be successfully used with my improvement. For this purpose I extend the octagonal annular flange 27 of the plug D across the flat top surface 28 of the housing C. On this flat surface, or gasket seat, the flat gasket is mounted and is tightly compressed

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thereon by the flange 27 when the plug is threaded home.

To prevent undisclosed tampering with the contents of the drum D and to facilitate identification of its contents, a thin cap or cover F (Figure 1) painted or embossed as desired, and removable on destruction, is set over the plug and housing C and extends downward to a point near the drum head B. By means of a suitable tool, the lower edge 20 of the cap is crimped or rolled into the external annular groove 21 of the housing, which groove is formed whilst folding the bead 12 over the shoulder 10 of the insert A. This method of moving the bead into its final position not only creates the groove 21 in which to anchor the closure seal, but avoids the stresses in the metal of the drum head that would occur if the bead were folded back flat on itself at this point. The groove also receives a tie ring sometimes used to tag the drum and identify its contents.

The foregoing improvements produce a simple, rugged closure that is leak proof and corrosion proof in which the plug D will not "freeze"; a closure that is easy to insert in the drum head and which cannot loosen or rotate therein, and which provides "multiple-service" because interchangeable with the plugs and gaskets of existing closures. Through its single joint formed by the gasket 24 and its smooth conforming seat 22, 14 and 25, no water on the drum head can be vacuumed into the drum. Content dilution cannot therefor occur. The tight wedging action of the tapered surface 9 against the housing C as the insert A is forced into final assembly, and the fact that the harder the plug D is wrenched down the tighter the insert is friction locked against the walls of the housing, materially augment the holding effect of the interlock between the lugs 26 and their sockets or slots 22 and increase security against the insert loosening or turning in the drum head. Expansion variables do not adversely affect my improvement due to its rugged construction and to the compensating spring tension against the insert A placed in the housing C when closing the housing over the insert. I have shown the insert made in one piece, but obviously it may be formed in sections or curled from profiled stock in which the thread has been rolled or milled (or is later tapped) this because the joint between the housing C and the insert A are both sealed by the single gasket 24 and do not depend for tightness upon any other seal.

I am aware that to those skilled in the art other modifications may occur that do not depart from the spirit or scope of my invention. I, therefore, desire not to be limited to the specific embodiments herein disclosed.

What I claim is:

1. In a closure receiving ring-like insert for a metal container, in combination, a wall of the container having an opening defined by an outwardly extending sleeve, the outer end portion of the sleeve having an annular inwardly directed flange formed with a depressed marginal wall against which a gasket is adapted to seat, a lug extending downwardly from the inner edge of said wall and an externally flanged ring-like insert, internally threaded for the reception of a flanged closure plug, disposed within said sleeve and having an annular depression formed to receive said marginal wall and to provide a seat for a gasket, said annular depression having at its base a recess which receives said lug, a portion of the metal forming the inner end of the sleeve

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being forced into engagement with said insert beneath the flange of the latter to firmly grip and maintain the insert within said sleeve with said lug locked in said recess, whereby wrenching down of the plug materially augments the holding effect between said lug and the annular depression to lock the insert against rotation relative to said container wall.

2. A closure receiving ring-like insert for a metal container, in accordance with claim 1, wherein the threaded insert is a die casting, and wherein tension to compensate for shrinkage variables between the insert and the sleeve is established in the sleeve when the bottom thereof is folded over the insert.

3. A closure receiving ring-like insert for a metal container, in accordance with claim 1, wherein the depressed marginal wall and said annular depression co-act with said closure to form a gasket seat conforming to the outline of the gasket to be mounted therein whereby to co-operate with the edges of a twisted gasket to form a tight joint.

4. In a closure receiving ring-like insert for a metal container, in combination, a wall of the container having an opening defined by a sleeve extending outwardly of the container wall, a ring-like insert disposed within the sleeve and having its outer end face formed with a counter-bored portion, said insert being internally threaded for the reception of a flanged closure plug and having its outer end provided with an external flange defining a downwardly facing shoulder, the inner end of the sleeve being forced into engagement with the insert beneath said shoulder, the remainder of the sleeve being forced into engagement with the insert so as to conform to the contour of and to cover the outer face of the insert whereby the inner face of the container wall is disposed and maintained substantially flush with the inner end face of the insert, said sleeve including a vertical wall bearing rigidly against a complementary wall in said counterbored portion, and a plurality of lugs extending away from the bottom of said wall into recesses formed in said counterbored portion to receive them, whereby wrenching down of said closure plug materially augments the holding effect of the interlock between said lugs and the complementary recesses in said counterbored portion.

5. In a closure receiving ring-like insert for a metal container, in combination, a wall of the container having an opening defined by a sleeve extending outwardly of the container wall, a ring-like insert disposed within said sleeve and having its plane outer end face formed with a counterbored portion providing a gasket receiving seat and a plurality of recesses, said insert being internally threaded for the reception of a flanged closure plug and having its outer end formed with an inwardly facing external shoulder, the inner end portion of the sleeve being forced into engagement with the insert beneath the external shoulder, and the sleeve being forced into engagement with the remainder of the insert and terminating within said counterbored portion in a plurality of lugs formed to enter and interlock with said recesses, whereby wrenching down of the plug materially augments the interlock between said lugs and the recesses referred to and maintains the insert against movement relative to the sleeve.

6. In a closure receiving ring-like insert for a metal container, in combination, a wall of the

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container having an opening defined by an outwardly extending sleeve, the outer end portion of the sleeve having an annular inwardly directed right-angle flange formed with a vertically depressed marginal gasket receiving wall, an externally flanged ring-like insert disposed in said sleeve, said insert being internally threaded for the reception of a flanged closure plug and having an annular depression formed to receive the depressed seat portion of the sleeve, the outer end portion of the sleeve being preformed so that the inner face of the wall defining the depressed marginal gasket receiving wall is spaced from the opposite inner face of the sleeve a distance less than the thickness of the outer end portion of the ring-like insert, whereby to provide tensioned gripping engagement between the insert and the sleeve when the inner end portion of the sleeve is forced inwardly beneath the external flange of the insert to force the insert into the preformed outer end of the sleeve and to form

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skin-tight engagement between all the mating surfaces of the parts, and a plurality of projections extending downwardly from the bottom of said vertical wall into recesses formed in said insert to receive them whereby wrenching down of the closure plug augments the interlock between said projections and the recesses and more positively locks the insert against rotation in said sleeve.

JOSEPH ROBINSON.

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