May 30, 1944. R. D. PATTERSON 2,349,913

CONTAINER CLOSURE

Filed Feb. 25, 1941 2 Sheets-Sheet 1

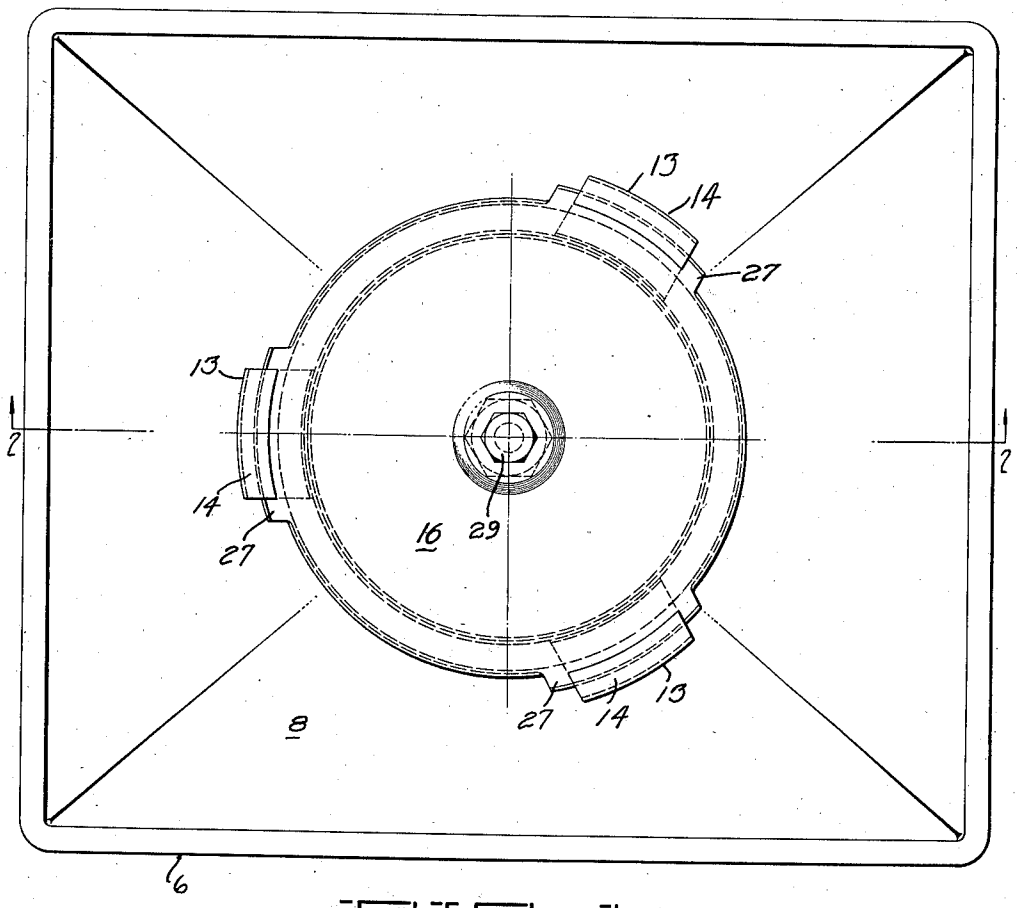


FIG. 1

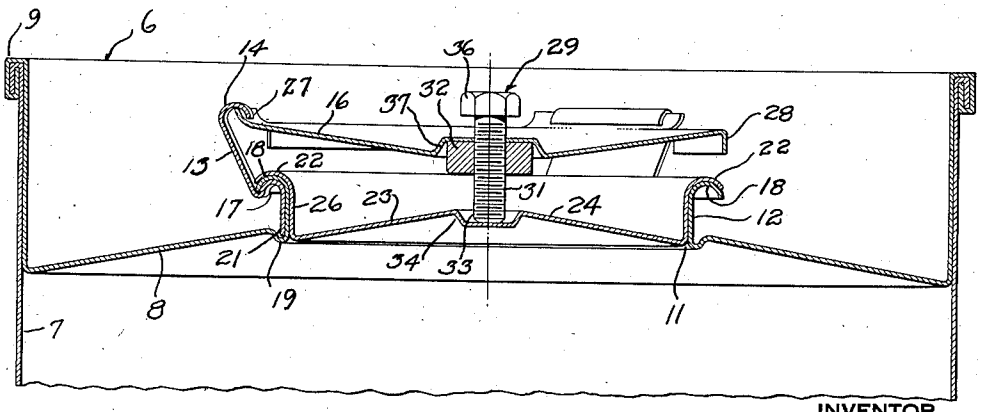


FIG. 2

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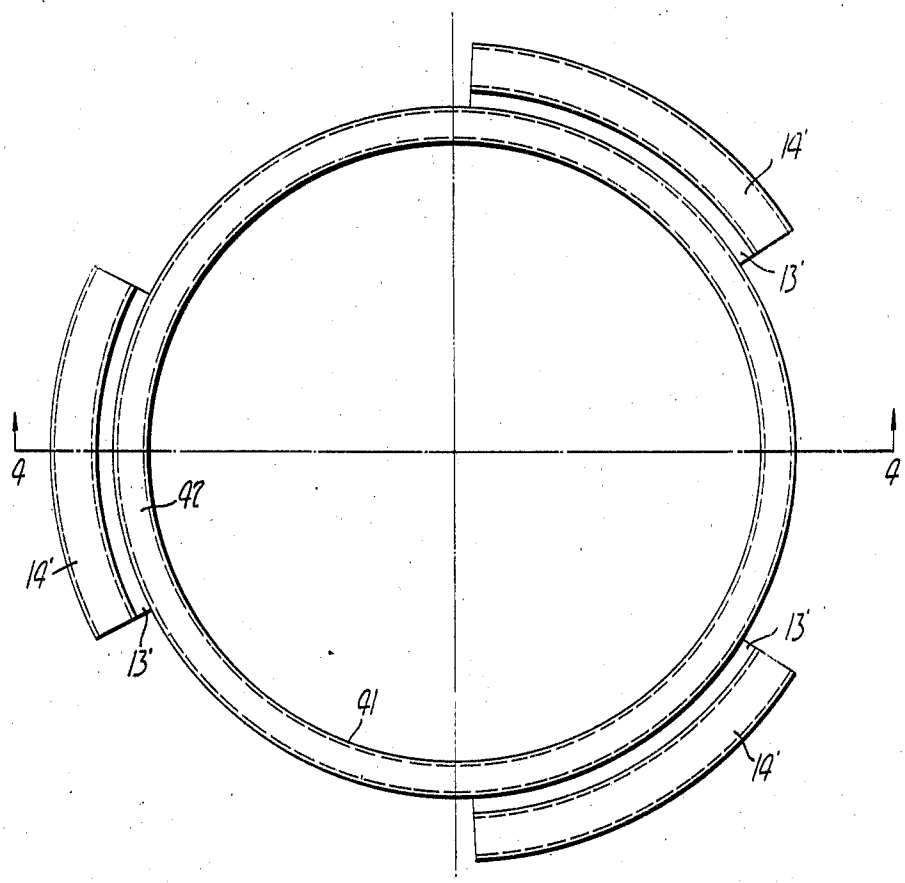


FIG. 3

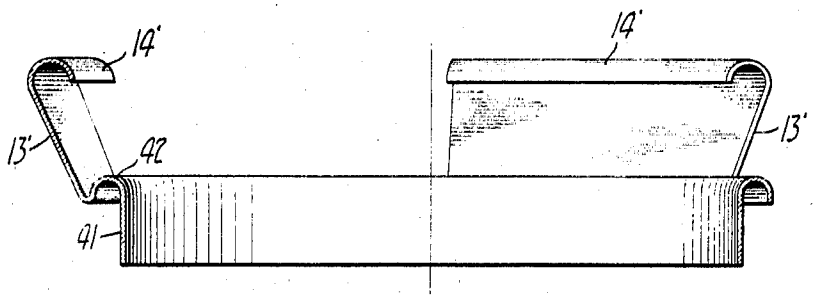


FIG. 4

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CONTAINER CLOSURE

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Application February 25, 1941, Serial No. 380,422

3 Claims. (Cl. 220—25)

The invention relates to containers and closures therefor.

An object of the present invention is to provide an improved closure structure for steel containers wherein a locking member is detachably supported on the wall of the container adjacent the opening to be sealed and which coacts with a compression member for sealing a closure in the opening. A particularly important feature of the present invention is the means and construction used for securing the locking member in place.

Another object of the invention is to provide a closure construction of the character described which will provide a powerful closing force on the closure member and for a concentric distribution of such force for uniformly sealing the closure.

A further object of the invention is to provide a closure construction of the character described in which substantially all of the parts may be formed of flat steel stock of the same material as the container itself and wherein substantially all machining operations are eliminated.

Still another object of the invention is to provide a closure construction of the character described which will be extremely rugged in construction and wherein certain of the parts serve to reenforce and strengthen the container wall at the opening and wherein the locking member above referred to is positioned to fully protect and shield the closure member in the wall opening.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawings:

Figure 1 is a plan view of a container closure constructed in accordance with the present invention.

Figure 2 is a vertical cross-sectional view of the container and closure illustrated in Figure 1.

Figure 3 is a plan view of a modified form of a part of the closure assembly.

Figure 4 is a vertical sectional view of the part illustrated in Figure 3 and is taken substantially on the plane of line 4—4 of Figure 3.

The container closure of the present invention consists briefly in the combination with a container wall having an opening formed therein and provided with a seat about said opening, of means extending from the wall in circumferentially spaced relation around the axis of the opening and in spaced relation to the seat and a closure for the opening formed to engage the seat and a locking member detachably supported by the aforementioned means across the opening in spaced axial relation to the closure and a compression member connected between the locking member and the closure for urging the latter against said seat. While the present closure construction may be used for general application with steel containers and the like, the present construction is particularly designed for sealing containers carrying powdered or equivalent material.

With reference more specifically to the accompanying drawings, the closure construction therein depicted is embodied on a steel container 6 having side walls 7 and a head or end wall 8. In the present showing, the closure construction is formed in the head wall 8 although as will be understood the closure construction may be formed in any of the container walls. As here shown, the peripheral edge of the head wall 8 is secured to the upper end of the side walls 7 by a lock seam 9 and adjacent such seam the head wall is depressed inwardly from the end of the container so that the head wall extends across the end of the container in inset relation to the upper end of the container, whereby all of the closure parts may be included within the longitudinal confines of the container.

The head wall 8 is formed centrally thereof with an opening 11 which is bounded and defined by an axially extending flange 12 which is here formed from the material of the head wall 8 and as a continuation thereof. Preferably the opening is circular and the flange 12 is cylindrical and arranged concentrically of the opening and the longitudinal center line of the container, although as will be understood, the opening and flange may be of other and non-circular form. As aforementioned, means is secured to the head wall and extends outwardly axially therefrom to provide a plurality of circumferentially spaced portions for detachably supporting a locking member in place. In the construction illustrated in Figures 1 and 2 of the drawings, this means consists of a plurality of arms or lugs 13 which are of elongated form and are positioned at the outer periphery of

the flange 12 in circumferentially spaced positions around the flange and extend axially outwardly from the container head 8 and are provided at their outer ends 14 with hook portions for detachably engaging a locking member 16. The lugs are formed intermediate their length with a transversely offset portion or shoulder 17 over which the outer end 18 of the flange is bent and rolled so as to securely lock and clamp the lugs against the container wall 8. Preferably, the container wall is formed with an annular depression or socket 19 at the flange 12 which receives and anchors the inner ends 21 of the lugs. As here shown, the transverse offset portion 17 of the lugs is curved upwardly and outwardly and the outer end 18 of the flange is formed into a complementary curve over the upper side of the portions 17 as by a rolling or die curling operation, whereby the portions 17 are held against both radial and axial movement. At the same time the forming of the flange end into a smooth curve, with the convex side of the curve upwardly, fashions such end into a suitable seat for a complementary formed edge part 22 of a closure 23. The central main part 22 is here of dished form having the convex side 24 thereof outward with respect to the container and with a cylindrical skirt part 26 which terminates in the rounded edge part 22 and which is formed to loosely slidably engage the cylindrical inner surface of the flange 12.

The locking member 16 is here of disc form provided with a plurality of circumferentially spaced radial projections or ears 27 equal in number to the number of the lugs 13 and having a radial extension sufficient to engage the hooked ends 14 of the lugs, whereby the member 16 is supported across the opening in spaced relation to the closure. The member 16 is preferably dished downwardly, as viewed in cross-section in Figure 2 and is provided with a circumferentially extending flange 28 which depends from the outer edge of the member and which is bent up at circumferentially spaced portions to define the projections or ears 27. Desirably the portions 27 curve upwardly to engage within and interlock with the hooks 14 and also preferably, the circumferential dimension of the portions 27 is somewhat greater than the circumferential dimension of the lugs whereby the projections or ears 27 may be engaged at the opposite sides of the lugs, as viewed in Figure 1, to hold the member 16 against rotation relative to the lugs.

A compression member 29 is mounted between the locking member 16 and the closure member 23 for urging the closure against its seat on the outer end of the flange. In the present construction the compression member 29 consists of a screw 31 threaded through a threaded part or nut 32 carried by the locking member 16 and engaging at its inner end 33 in a depression or socket 34 formed in the closure. The outer end 36 of the screw is preferably formed with a polygonal head for engagement by a wrench or other tool to tighten the screw assembly. The nut 32 is here seated in a socket 37 formed on the under-side of the member 16 and is preferably welded or otherwise secured to the member to prevent rotation relative thereto. Desirably and as here shown, the screw is positioned axially of the closure and locking members so as to apply a concentric force to the closure whereby the sealing force will be uniformly distributed around the periphery of the closure. By reason of the dish shape of the closure, the compression action of the screw tends to flatten the central dished part of the closure and to effect a diametrical expansion of the closure in the flange. By the selection of the weight of material used in the closure member, this diametrical expansion effect can be controlled to suit the needs of any particular construction.

Preferably a gasket, not shown, is positioned between the opposite sealing faces 18 and 22 of the flange and closure, various types of compressible ring gaskets being available for sealing of various materials which may be stored in the container.

As will be seen from the foregoing, the positioning of the lugs 13 around the outer periphery of the flange and the clamping of these lugs in place by the rolling of the outer end of the flange over a part of the lugs and the anchoring of the lugs in the socket 19 in the head, provides a novel and effective construction utilizing a minimum number of parts and at the same time providing a reenforcing of the flange and a very strong and rugged throat construction for the head, thus enabling the application to the closure of a powerful concentric sealing pressure. As will be further seen from the drawings, the diameter of the outer rim 22 of the closure is of a size adapted to fit between the hook portions 14 of the lugs whereby the closure may be moved axially into and out of its seated position. In applying the closure, the locking plate is rotated to a position locating the projections or ears 27 between the lugs 13 and then moved with the closure axially until the projections 27 lie inwardly of the hooks 14 and then rotated to interengage the projections and hooks. The screw 31 may thereupon be turned to force the closure to its seated position. As will be clear from Figures 1 and 2, the member 16 is of a size and form which will permit the member to serve as a full cover for the container opening in place of the closure 23 when the latter is removed or omitted.

A modified form of the means for supporting the locking member 16 is illustrated in Figures 3 and 4, wherein a plurality of lugs 13' are formed as projections extending generally upwardly from a cylindrical base portion 41 which is adapted to directly surround the flange 12 of the container wall and to be clamped in place in the same manner as the lugs 13 of the first embodiment. As will be seen in Figure 4, the upper end 42 of the base portion 41 is curved outwardly and upwardly to provide an annular seat over which the outer end 18 of the flange 12 is rolled or curled, so as to securely anchor the member 41 in place. In this connection the shape of the roll or curve of the upper end 42 is substantially the same in cross section as the shape of the intermediate shoulder 17 of the lugs 13 of the first embodiment. In the modified construction, the projections 13' extend from the outer edge of the rolled upper end 42 of the base and are provided with hook portions 14' at their outer ends in the same form and manner as described in connection with the first embodiment. The modified form of construction has an advantage in permitting fabrication from a single strip of material wherein the lugs 13' may be formed by blanking out of a flat strip leaving projections to form the lugs, and the ends of the strip welded or otherwise secured to provide a continuous cir-

cular collar. As will also be understood, the collar provides complete circumferential and axial reenforcing of the openings.

I claim:

1. In combination with a container wall having a circular opening therein and a cylindrical flange bounding said opening in concentric relation therewith, said wall being formed with an annular external depression at said flange, a plurality of lugs each formed of an elongated strip of metal positioned at one end in said depression and extending outwardly of said wall alongside of said flange, each of said lugs being formed with a transverse offset portion intermediate its length and a hook portion at the outer end thereof, the outer end of said flange being bent over the offset portion of each of said lugs to clamp said lugs against said wall and to form a seat at the outer end of said flange, a closure for said opening adapted to engage said seat, a disc shaped locking member provided with a body portion of substantially the same circumference as said closure and having a plurality of radially extending projections equal in number to the number of said lugs and formed to detachably engage said book portions for supporting said locking member across said opening in spaced relation to said closure, and a screw mounted centrally of said locking member and engageable with said closure for urging the same against said flange seat.

2. In combination with a container wall formed with an opening therein defined and bounded by a flange extending from said wall and formed to provide vertical and transverse closure-seat portions, a collar surrounding said flange and forming a reinforcement for each of said seat portions and secured thereto and formed integrally with a plurality of projections extending away from said wall in circumferentially spaced relation around the axis of said opening and in spaced relation to said flange, a closure for said opening formed to seat against said flange, a locking member detachably supported by said projections across the axis of said opening in spaced relation to said closure and including a substantially imperforate plate forming a cover for said closure and being of a size and shape to provide a full covering for said opening, independent of said closure, and a compression member connected between said locking member and said closure for urging the latter to a seated position against said flange.

3. In combination with a container wall having a circular opening therein and a cylindrical flange defining said opening and having a vertical closure-seat portion and a transverse closure-seat portion, said container wall, including said flange, being formed to provide vertically opposed external depressions, circumferentially spaced lugs having upper locking portions and lower reenforcing portions conforming with said flange and engaged within and clamped between said depressions, a closure for said opening having portions corresponding with and arranged to engage said seat portions, a locking member arranged for superimposition on said closure and having a plate of a form and size to provide a full closure for said opening and projections engageable with the locking portions of said lugs, and means mounted centrally of said locking member and engageable with said closure for urging the same against each of said seat portions.

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