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CONTAINERS AND CLOSURES THEREFOR

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2 Sheets-Sheet 2

Fig. 9.

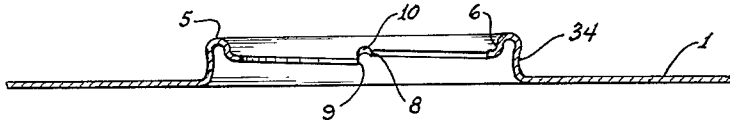


Fig. 10.

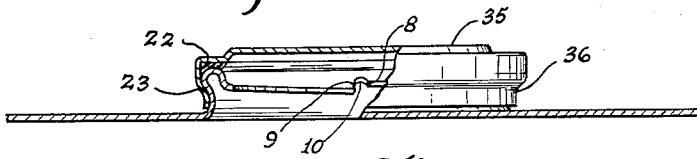


Fig. 11.

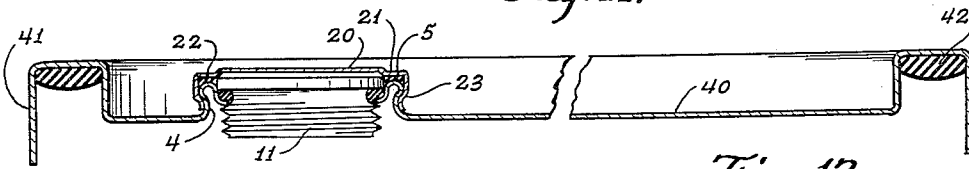


Fig. 12.

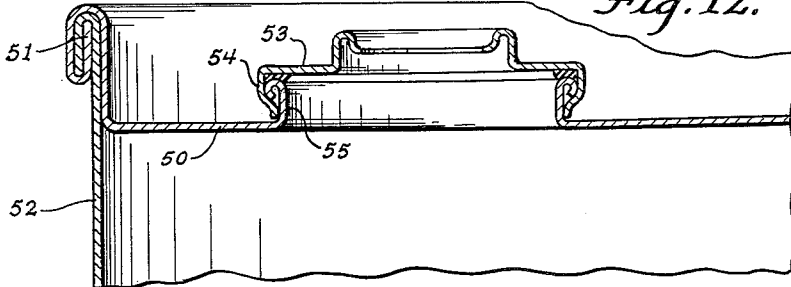
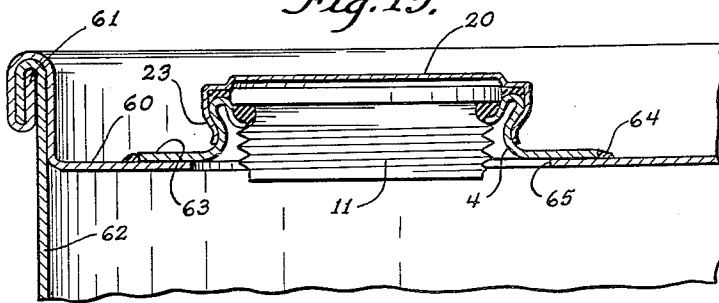


Fig. 13.



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CONTAINERS AND CLOSURES THEREFOR

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This invention pertains to sheet metal containers, to the openings in the walls thereof, and to the closures for such openings. More particularly it relates to such openings and closures therefor, where the openings are formed in thin sheet material being part of, or of material comparable to the material of the container wall.

The prior efforts to provide closures for steel barrels and drums and comparable smaller containers by imparting receiving formations to the container wall stock about openings therethrough, thus eliminating any separate flanges or bushings, failed to provide adequate closures. To a large extent the closures so formed were cumbersome. The plugs were rough and heavy and the gasketing of them, on the container wall stock, was not truly effective. Furthermore the closures lacked facilities for the effective reception of capseals. For these reasons, and others, they failed to find a ready market.

The closure of the instant invention reverses all this and goes further. In addition to satisfying the outstanding needs in the fields for which the prior art closures were contemplated, it finds a place in fields going well beyond the contemplation of the prior art.

The closure receiving opening of the invention is simply formed. It receives plugs or bungs of types commonly employed in other closures and, also, receives capseals in leakproof manner over the openings. The closure of the invention is of lightweight unobtrusive construction and embodies a real step forward in the art.

It is accordingly an object of the invention to form an effective closure opening in container wall material, without the addition of any separate opening bordering member.

Another object is to incorporate in such opening provision for effective reception of either or both of a closure plug and capseal.

Another object is to provide methods for the forming of such openings and for the forming of complete closures embodying the same.

A further object is to provide formations in the container wall stock bordering openings therethrough which effectively receive a screw threaded plug and cooperate therewith to confine a gasket carried by the plug as well as providing for the effective seating of leakproof capseals, whether the plug be present or not.

A still further object is to provide methods for applying closure carrying wall sections to other portions of containers.

Further and more detailed objects of the invention will in part be obvious and in part be pointed out as the description, taken in conjunction with the accompanying drawing proceeds.

In that drawing:

Fig. 1 is a plan view of a section of container wall stock provided with a closure opening in accordance with the invention.

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

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Fig. 3 is a view similar to Fig. 1 of a somewhat modified form of the invention.

Fig. 4 is a vertical section taken on line 4—4 of Fig. 3 and looking in the direction of the arrows.

Fig. 5 is part section, part elevation of a piece of container wall stock formed with a closure therein, in accordance with Figs. 1 and 2, and including a plug in such opening.

Fig. 6 is a similar view showing a capseal applied over the opening.

Figs. 7 and 8 are fragmentary sectional views of a container wall opening, a capseal therefor and a portion of a sealing tool, illustrating the method of forming the neck bordering the opening of the same time the capseal is applied.

Fig. 9 is a view similar to Fig. 2, illustrating the first step in another method of forming the neck to effectively carry a capseal.

Fig. 10 is a view of the neck formation as seen in Fig. 9, with a capseal applied thereto.

Fig. 11 is a vertical section of the head of a container ready to be applied to the body of the container and equipped with a closure in accordance with the invention.

Fig. 12 is a fragmentary sectional view of a portion of the head and a portion of the body of a container, showing the application of an element incorporating a completed closure in accordance with the invention, to an opening in the head of the filled container.

Fig. 13 is a similar view illustrating a different manner of application of the closure.

In the description to follow, the invention will be described from the standpoint of the formation of the closure opening in a complete container wall. It is to be understood, however, that this is for simplicity of description and that the invention is not limited thereto, inasmuch as the closure opening of the invention could just as readily be applied to sections of sheet metal which are afterwise secured to openings in the container walls as illustrated in Figs. 12 and 13.

The section of container wall stock, illustrated at 1 of Fig. 1, is provided with a closure receiving opening 2 which is bordered by a receiving formation generally indicated at 3. This formation consists of an upstanding neck 4 extending directly laterally upward from the body of the container wall stock, which neck is beaded over inwardly and downwardly at its upper end in a smooth rounded bead 5. From the bead 5 a collar 6 extends downwardly in parallel spaced relation with respect to the neck 4. The neck 6 is turned laterally inwardly into a shoulder portion 7. The shoulder portion 7, as here shown, forms a single thread whose beginning and end 8 and 9 are vertically spaced and offset at the notch 10. It will thus be apparent that when a hollow-headed closure plug 11, having a threaded side wall 12, whose threads are mated to the thread formation provided by the rim 7, is engaged with that rim, the plug can be readily turned down into the opening.

From the showing in the drawing it is clearly apparent that the neck 4 and the collar 6 are spaced a substantial distance apart. This, as will be seen from the description to follow, enables the neck 4 to be pressed inwardly in the application of a capseal, or ready for such application, without disturbing the shape and effectiveness of the collar 6 and rim 7 for the reception of a closure plug. Furthermore the bead 5 provides an effective seat for engagement with a capseal gasket, whether a plug be present or not.

The alternative construction of Figs. 3 and 4 is in most respects the same as that of Figs. 1 and 2, the only difference being that instead of providing a rim 8 in the form of a single thread having spaced ends, the collar 6, in

this instance, carries a continuous inclined rim 13 extending laterally therefrom. This rim is formed on the same pitch as that of the threaded member to be engaged therewith and so long as the pitch of this rim, the size of the opening formed therein and the related features of the screw threaded plug to be engaged therewith, are accurately mated, a screw plug, such as shown in 11 of Fig. 5, can be engaged with and turned down within the rim 13, though it is a continuous inclined circle rather than a helix. The form of Figs. 1 and 2 allows greater latitude between the screw plug and the ledge formation so as to be preferred, though the form of Figs. 3 and 4 is equally effective when the parts are related with sufficient exactness.

The plug 11, as shown in Fig. 5, has an outwardly extending head 14 around its upper portion and is recessed at 15 between the undersurface of the head and the threaded portion 12 to receive a compressible gasket 16. From the cross-sectional showing of Fig. 5 it will be apparent that when the plug is screwed home the gasket 16 is confined by the collar 6 and shoulder 7 on one hand and the head 14 and side wall 17 of the plug on the other hand to form, in effect, a packing. Thus, though the gasket is small in cross-section, compared to those of the wide flat type, it nevertheless makes a completely effective seal against leakage. Actually the plug cooperates with the metal of the opening formation to strengthen and re-inforce it while, at the same time, compressing the gasket to the extent needed to make a leakproof joint.

In Fig. 6 the closure of Fig. 5 is shown with a capseal applied thereover in leakproof manner. Such capseal has a disk-like top 20, raised at its center portion to encompass the head of the plug and depressed at 21 where the gasket 22 is received internally thereof. From its depressed portion 21 the capseal continues in a downwardly extending skirt 23 which is tightly secured to the neck 4 beneath the bead 5 by an inward depression of the mid-portion of the neck 4 into which the mated portion of the skirt 23 seats. The depression in the neck 4, as here illustrated, is brought about by the action of the sealing tool as illustrated in Figs. 7 and 8. The tool, for the effective application of these caps, employs a pressure pad 25 which seats on the depressed portion 21, and a plurality of jaws 26 rockably mounted to be forced inward by a contracting bell 27. The jaws 26 have rounded noses, as indicated at 28, and these noses engage the skirt 23 of the seal. Thus when the tool is properly seated on the cap and is actuated, the noses 28 will press that neck in a suitable radius for the effective reception of the capseal. While this is being done the skirt 23 will be drawn down and the gasket 22 will be suitably compressed. The capseal will finally be seated as illustrated in Fig. 6.

A somewhat modified manner of forming the neck for the reception of the capseal is illustrated in Figs. 9 and 10. Here the neck 34, rather than being straight, as illustrated at 4, before the capseal is applied, is initially drawn inward on a small radius. Thus when a capseal 35, as illustrated in Fig. 10, is applied thereto, a further small deformation of the neck is all that is called for to effectively seat the cap. In other words the inward formation of the neck for effective reception of the cap is here accomplished in two stages rather than in the single stage of Figs. 7 and 8. This has been found advisable in some types and thicknesses of metal, in order to avoid too great drawing of the sheet 1 as may result from forming the whole recess in the neck in one stage.

The illustrations of the manner in which the opening and closure formation of the invention introduces improvements into the manufacture and utilization of containers are set forth in Figs. 11, 12 and 13. In Fig. 11 form a complete container head is illustrated at 40, with a suitably edged flange 41 for securing it to the body of a container. Gasketing material 42, to form a tight seal between the head and body, is also illustrated. The head 40, as here shown, is provided with a completely sealed

closure as illustrated in Fig. 6. It is thus contemplated that such heads will be fabricated, complete with closures, and will be shipped direct to the filler of the container who will have on hand container shells complete except for heads. When the container is filled one of the heads 40 will merely be applied to it by a suitable seaming operation between the flange 41, or such other formation as exists at that position, and the top of the side wall of the container. This makes for rapid filling, simplifies the work to be done by the container manufacturer and eliminates the necessity of the filler of the container manipulating a closure for a small opening.

With regard to the shipping of container heads, such as shown in Fig. 11, the closure performs another useful function. For economical shipping the heads would, of course, be nested one within another. If the closure were not present, however, spacers would be needed to prevent the heads from nesting so tightly together that it would be difficult and time consuming to separate them. The closure acts as such spacer, so no separate spacers are needed.

Though a single closure is illustrated as applied to the head 40 it is, of course, to be appreciated that the showing is by no way limiting in this respect. A pair of openings and closures therefor—a large and a small—as commonly found on barrels, pails and drums, can be provided.

In Fig. 12 a head 50 is illustrated as already seamed at 51 to the body 52 of the container wall. Here a separate plate 53, provided with a closure as in Fig. 6, is seamed at 54 to the head 50. Where the container is of a size to locate the closure so that an effective tool can be used for seaming or sealing, such a closure, already complete with capseal and plug in place, could be seamed to the head so as to cover the opening bordered by the portion 55. Thus a relatively large opening could be used for a filling of the container and a closed re-usable closure could be seamed on to cover the opening on completion of the filling. Alternatively, of course, the plate 53, hereto formed with the closure, could be seamed to the head 50 in the making of the same, or while the container was still empty and a supporting member could be inserted through the opening for facilitating the sealing.

Another alternative arrangement is illustrated at Fig. 13, where the head 60 is already seamed at 61 to the container body 62. Here a separate plate 63 is seen as welded at 64 to the head 62 to close the opening. Here, again, if the container is already filled, the plate 63 carrying the complete closure could be applied over the opening 65 and, assuming that the contents of the container were such as would allow it, a torch weld could be made around the periphery of the plate 63 to weld that plate to the head 60.

If it were desired, however, to secure such a plate to the container head, either before the head was installed on the container or afterwards, while a back-up and contact member could still be inserted through the opening, the plate 63 could be welded to the container wall stock around the opening by projection welding. In all of the foregoing assemblies of container and closure wall the sheet, out of which the opening is formed, would preferably be the same as that of the container wall itself, thus facilitating securing by seaming and welding.

It is accordingly believed that the closure receiving opening of the invention, whether it be formed directly in the wall of the container or in a member applied thereto, introduces substantial advances in the art not heretofore contemplated. In the foregoing description and accompanying drawing certain embodiments of the invention have been set forth but it is, of course, to be understood that these are presented in an illustrative and not a limiting manner and that those skilled in the art could devise modifications and variations of the embodiments illustrated without, however, departing from the spirit and scope of the invention.

Speaking more generally it is to be understood that

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since changes in carrying out the above method and modifications in the product which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description, or shown in the accompanying drawing, shall be interpreted as illustrative and not in a limiting sense.

Having described our invention what we claim is new and desire to secure by Letters Patent is:

1. The method of providing capsealed openings in container walls, which comprises forming an opening in a section of container wall material and drawing up a neck from said material bordering said opening, turning over the upper end of said neck to form a gasket seat applying a capseal having a top portion and a skirt portion over said neck with a gasket carried by said capseal engaging said gasket seat and circumferentially recessing the skirt of said capseal and said neck together simultaneously in mated relationship to secure said capseal in place with said gasket compressed against said seat.

2. The method of providing capsealed openings in container walls, which comprises forming an opening in a section of container wall material and drawing up a neck from said material bordering said opening, turning over the upper end of said neck to form a gasket seat, circum-

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ferentially recessing the midportion of said neck inwardly, applying a capseal having a disk-like top portion and a downwardly extending skirt portion therearound over said neck with the gasket carried by said capseal in engagement with said gasket seat on said neck, drawing said skirt portion of said capseal inwardly to mate with said recessed portion of said neck and drawing said neck and said skirt inwardly simultaneously in mated relationship to increase the extent of said recess and secure said capseal in place over said opening.

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