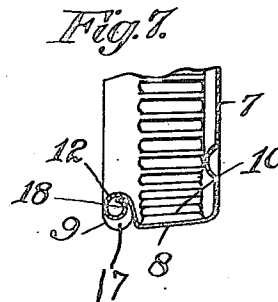
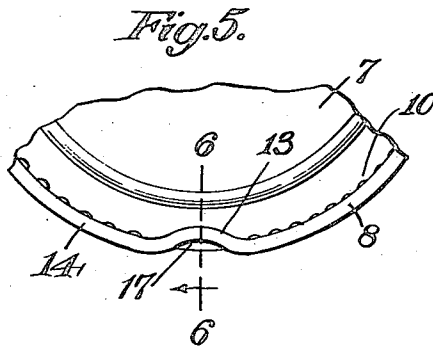
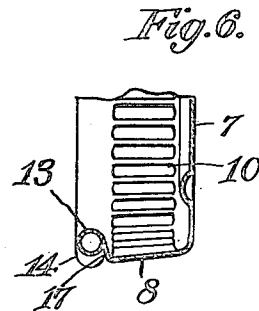
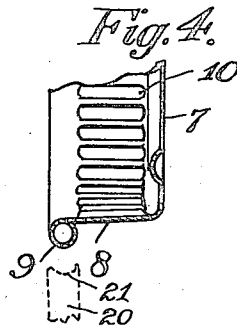
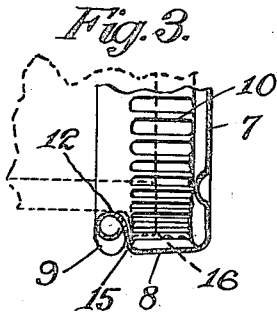
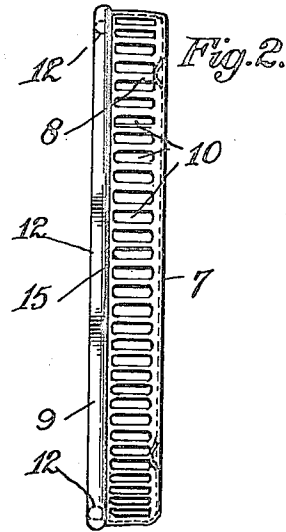
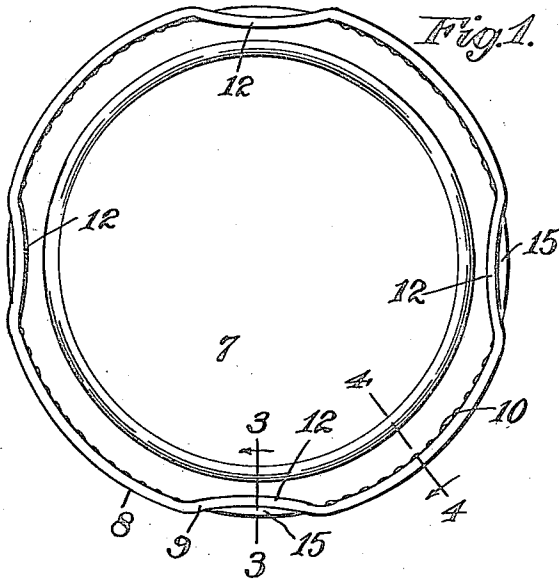


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1,440,984

C. HAMMER.  
SCREW CLOSURE FOR CONTAINERS AND METHOD OF MAKING THE SAME.  
FILED APR. 19, 1921.



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By his Attorney  
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## UNITED STATES PATENT OFFICE.

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## SCREW CLOSURE FOR CONTAINERS AND METHOD OF MAKING THE SAME.

Application filed April 19, 1921. Serial No. 462,498.

To all whom it may concern:

Be it known that I, CHARLES HAMMER, a citizen of the United States, and a resident of Queens, in the county of Queens and State of New York, have invented certain new and useful Improvements in Screw Closures for Containers and Methods of Making the Same, of which the following is a specification.

10 The object of the present invention is to provide an improved form of metal closure for glass containers of various forms, such as bottles and jars having screw threads or lugs, and to the method of making such 15 closure, and which closure is provided with inwardly projecting portions or projections for engagement with the screw threads or lugs on the container, and by means of which the closure will be tightly clamped thereon, 20 but easily and quickly released therefrom, and in which the raw edge of the flange or skirt of the closure is concealed or covered, thereby eliminating the danger of cutting the hands and largely preventing the formation of rust due to moisture, acids, etc., and 25 in which closure a rounded or beaded portion of the margin of the skirt is inwardly deflected without materially changing the cross sectional shape of such deflected portion. 30

A further object of the invention is the provision of an improved metal closure in which a rounded or hollow portion of the skirt margin is deflected inwardly at intervals in such manner that it is connected with 5 the skirt beyond or above the same by a deflected portion, which will in certain forms of these projections act to engage the jar threads or lugs of the glass container.

0 In the accompanying drawing illustrating embodiments of my invention, Figure 1 is a bottom plan view of the closure.

Fig. 2 is a side elevation of the same.

Fig. 3 is a partial section of the closure on the line 3—3 of Fig. 1 and also illustrating in dotted lines a portion of a glass container.

Fig. 4 is a partial section on the line 4—4 of Fig. 1.

0 Fig. 5 is a partial plan view of a modification.

Fig. 6 is a partial section on the line 6—6 of Fig. 5.

Fig. 7 shows the bead coiled beyond a 5 single convolution.

The closure as set forth comprises a top portion 7 and a depending skirt portion 8 shown as substantially vertical. The marginal portion of the skirt is bent or rolled to form a bead or roll or a hollow edge 9, 60 and in the arrangement herein set forth the margin is rolled outwardly, and the bead is shown as making substantially one complete coil or convolution, in Figs. 2 and 3, whereby not only is the cap provided with a strengthened and reinforced edge, but the raw edge 65 of the cap is eliminated so that there is no danger or liability of the user cutting his hands, while at the same time the formation of rust due to acids and moisture is materially prevented. 70

The skirt 8 may be provided with corrugations 10, and which extend from the top 7 nearly to the bead 9. These corrugations not only serve as a gripping means for the 75 cap, but also serve to materially strengthen and reinforce the cap at its flange as well as the inwardly extending projections adjacent thereto. In fact, the corrugations and the rolled or beaded edge both materially reinforce the cap flange and serve to reinforce 80 as it were, one another and the projections, whereby the cap will be maintained in its proper shape practically throughout the life of the cap. 85

At several intervals the bead 9 is deflected inwardly, shown at four places 12, in Fig. 1. Preferably, the cross-sectional area of the bead at this deflected portion 12 is not altered, but the bead remains of uniform size 90 throughout its entire length or perimeter. By these deflected portions, lugs or projections 12 are provided on the inside of the closure skirt at its bottom part, and these will engage the usual lugs or threads on a 95 jar or bottle, that are inclined or spiral, and when the closure is placed on a jar of this character and turned, these projections 12 will engage with the lower face of the lugs and thus serve to draw the closure down on 100 the jar or container, until the bottom face of the top will engage the top edge of the container, whereby to securely seal the container, especially when the usual liner is used. In Figs. 1-4 the projections 12 on the interior 105 of the closure extend through nearly in a straight line or may have a very slight inward curvature. In Figs. 5 and 6 a similar projection 13 is shown in the bead 14 corresponding to the bead 9, in which the 110

projection is deflected inwardly to a greater extent and is in a form that is strongly convex toward the center axis of the cap.

It will be observed in the arrangement in Figs. 1-4 that in Fig. 3 when the bead 9 is deflected inwardly, it is attached to and supported from the flange 8 by a bent portion 15, which connects the bead with the straight portion 8 of the skirt. This deflected portion extends inwardly and also upwardly, and merges into the circular contour of the projection 12, as indicated in Fig. 3. It will be further observed that the actual engaging portions or surfaces that cooperate with the lug or thread 16 on the jar, is mainly this deflected portion 15 of the skirt, and that the bead projection 12 does not engage the thread or lug at any part of its circular cross section. But this portion of the bead at 12 serves to support and strengthen the engaging portion 15 at each projection. The bead 9 together with the corrugations 10 serve to strengthen the skirt, and to prevent undue bending or distortion of the entire closure. It will of course depend largely upon the formation of the threads of the glass container and the amount of inward deflection of the bead as to just what part of the projections come into engagement with the under surfaces of the threads or lugs of the jar, the fact being that the bead is deflected inwardly sufficient to enable the proper formation of a projection to engage the jar threads whether this be a portion of the upper wall of the bead itself or a part or all of the deflected portion of the skirt or the two combined.

In the arrangement shown in Figs. 5 and 6 the construction is substantially the same, except that the curved projection 13 is connected with the skirt portion 17 by a wall similar to the wall 15, which extends inwardly from the vertical flange wall 8, and also upwardly, and merges into the substantially circular bead 9. This arrangement may also have the same form of corrugation 10 on the skirt 8.

A closure formed in this manner will be comparatively easy to manufacture, as a straight flanged cap is simply beaded or rounded, at its margin, and then the bead simply pushed radially inward at several portions; and the corrugations in the skirt formed in the usual manner.

In Fig. 7 a slight modification is shown in which the projections 12 are formed from a bead 19 that is coiled more than a single convolution, whereby the raw edge of the margin is brought inside of the bead and the bead is thereby strengthened.

The deflected portions 12 of the bead 9 are preferably formed by pushing inward the bead by a member 20 provided with a grooved edge or face 21 and can engage the bead and move it inwardly without

changing the circular contour or cross-section of the bead. But obviously, the bead projections might be formed in a different manner if desired.

From the foregoing it will be observed that in forming this improved metal cap, which may be readily made from thin sheet metal and yet have sufficient strength and rigidity to maintain its shape, a blank is first stamped into hat shaped form, that is, comprising a top and a flange or skirt, and then either before or after the formation of the hollow reinforcing edge provided with the corrugations. The hat shaped blank is then subjected to suitable pressure to form the hollow or beaded edge 9, and this beaded edge is then subjected to pressure radially of the cap by some suitable means, as shown at 20-21 Fig. 4, thereby to press or deflect the hollow edge or bead inwardly toward the center of the cap at intervals according to the number of projections it is desired to form, and it will be observed that in the present case these projections, when the cap is completed have substantially the same circular contour or cross section as has that portion of the beaded or curled or rounded edge of the cap that has not been pressed inwardly. I believe therefore, that I am the first to form a metal closure with locking projections by utilizing a beaded or curled or hollow strengthened edge of the cap for this purpose without substantially changing the cross section of such projections as compared with the strengthened edge.

The term "closed" as used herein is intended only as a word of description and not as a word of limitation, that is to say, the bead may be substantially closed for all practical purposes, and therefore it will be understood that by describing in detail herein any particular form, structure, or arrangement it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

What I claim is:

1. A closure for a container having threads or lugs, comprising a top and a skirt having the lower margin rolled to form a continuous annular closed bead that is deflected inwardly at several portions while maintaining a substantially uniform circular cross section throughout the entire bead, whereby container lug engaging portions are provided on the interior of the closure.

2. A closure for a container having threads or lugs, comprising a top and a skirt having the lower margin rolled to form a continuous annular closed bead that is deflected inwardly at several portions on lines curved convex towards the center axis while maintaining a substantially uniform circular cross section throughout the entire

bead, whereby container lug engaging portions are provided on the interior of the closure.

3. A closure for a container having 5 threads or lugs, comprising a top and a skirt having the lower margin rolled to form a bead, said bead having a plurality of portions thereof deflected inwardly beyond the normal line of the bead, the skirt 10 having portions deflected inwardly to merge into said bead inward deflections, which skirt deflected portions constitute the lug engaging portions of the closure.

4. A closure for a container having 15 threads or lugs, comprising a top and a skirt having the lower margin rolled to form a continuous annular closed bead that is deflected inwardly at several portions while maintaining a substantially uniform 20 circular cross section throughout the entire bead, the skirt having portions deflected inwardly to merge into said bead inward deflections, which skirt deflected portions constitute the lug engaging portions of the 25 closure.

5. A closure for a container having threads or lugs, comprising a top and a skirt having the lower margin rolled to form a bead, said bead having a plurality 30 of portions thereof deflected inwardly beyond the normal line of the bead and on lines curved convex towards the center axis, the skirt being deflected inwardly to merge into said bead inward deflections, which 35 skirt deflected portions constitute the lug engaging portions of the closure.

6. A closure for a container having threads or lugs, comprising a top and a skirt having the lower margin rolled to 40 form a continuous annular closed bead that is deflected inwardly at several portions on lines curved convex towards the center axis while maintaining a substantially uniform circular cross section throughout the bead, 45 the skirt being deflected inwardly to merge into said bead deflected portions, which skirt deflected portions constitute the thread-engaging portions of the closure.

7. A closure for a container having 50 lugs or threads, comprising a top and a vertical skirt portion, the lower part of the skirt at intervals being deflected inwardly beyond the normal margin of the skirt with the marginal portion rolled into the form of 55 a closed circular bead that merges into the said deflected skirt portion at a considerable distance inside of and beyond the said vertical skirt portion, which skirt deflected portions constitute the lug engaging portions 60 of the closure.

8. A rotatable metal closure for a container having threads or lugs and comprising a top and a skirt having the lower edge provided with a beaded or curled edge, said 5 bead having a plurality of portions thereof

deflected inwardly to form container engaging projections and having substantially the same cross section as said bead.

9. A rotatable metal closure for a container having threads or lugs and comprising a top and a skirt having the lower edge provided with a continuous substantially circular hollow bead, said bead having a plurality of portions thereof deflected inwardly to form container engaging projections; said bead and inwardly deflected portions having substantially the same cross section.

10. A rotatable metal closure for a container having threads or lugs and comprising a top and a depending skirt having reinforcing corrugations, the lower edge of said skirt being provided with a continuous hollow reinforcing bead of substantially circular form in cross section, said bead having 85 a plurality of portions thereof deflected inwardly to form container engaging projections and each having substantially the same cross section.

11. The method of making a rotatable 90 closure cap, which consists in providing a hat-shaped blank comprising a top and a depending skirt, then subjecting the lower edge of the skirt to pressure to form a hollow beaded or curled edge, and then subjecting 95 the hollow beaded edge at intervals to pressure radially of the cap to deflect portions of said bead inwardly relatively to the major portion of the bead to form container engaging projections and maintaining the said 100 deflected portions of substantially the same hollow formation in cross section as the bead.

12. The method of making a rotatable 105 closure, which consists in first forming a shell having a top and a flange, then forming a reinforced or strengthened edge, and then forcing said strengthened edge inwardly radially of the closure to form projections while maintaining the cross section 110 of said projections substantially the same as that of the strengthened edge.

13. A rotary metal closure for a glass container having a plurality of locking projections formed from a curled edge, said 115 projections having substantially the same cross section as said curled edge.

14. A closure of the class described having a top and a depending flange provided with a rolled edge having inwardly extending 120 locking projections formed from said rolled edge by deflecting practically all of the rolled edge at intervals around the flange to form said projections extending inwardly toward the center of the cap.

15. A closure of the class described having a top and a depending flange provided with a rolled edge having inwardly extending projections formed from said rolled edge by deflecting practically the whole of said 130

rolled edge inwardly of the flange at intervals therearound.

16. A closure of the class described having a top and a depending flange provided with  
5 a rolled edge having inwardly extending locking projections formed from said rolled edge by deflecting practically all of the rolled edge at intervals around the flange to form  
10 said projections extending inwardly toward the center of the cap, said flange having strengthening portions intermediate the rolled edge, projections, and top.

17. A closure of the class described having a top and a depending flange provided  
15 with a rolled edge having inwardly extending projections formed from said rolled edge

by deflecting practically the whole of said rolled edge inwardly of the flange at intervals therearound, said flange having strengthening corrugations intermediate the  
20 rolled edge, projections, and top.

18. A metal cap comprising a skirt having a bead or curl adjacent to its lower edge, and a plurality of inwardly extending projections formed at intervals from such bead  
25 in such manner that practically all of the bead is deflected inwardly from the outer margin of the skirt.

Signed at New York city, N. Y., on April 18, 1921.

CHARLES HAMMER.