Jan. 2, 1923. 1,440,990

C. HAMMER.
SCREW CLOSURE FOR CONTAINERS.
FILED JUNE 14, 1922.

Fig. 1.

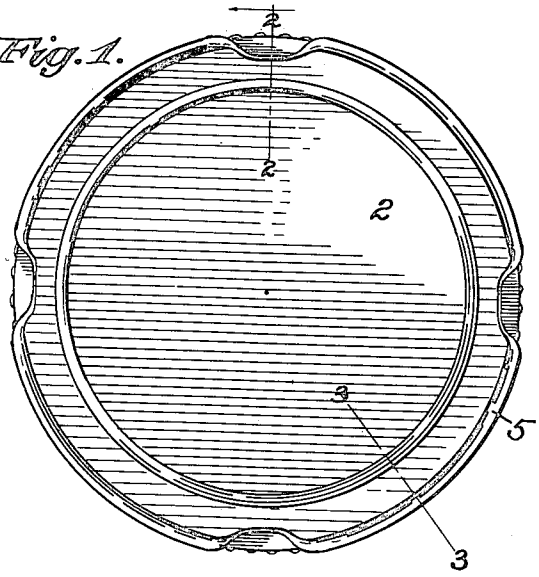


Fig. 2.

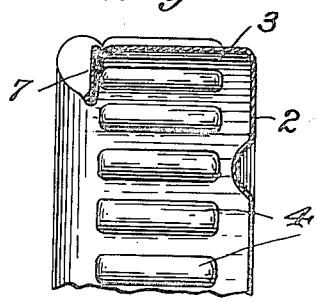
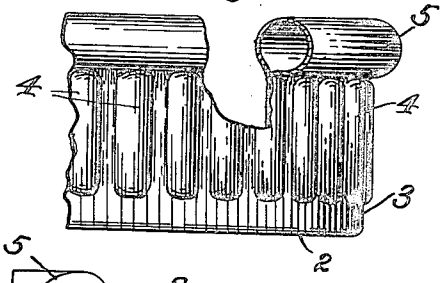


Fig. 3.



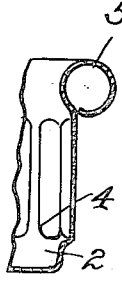


Fig. 4.

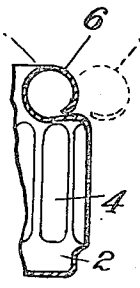


Fig. 5.

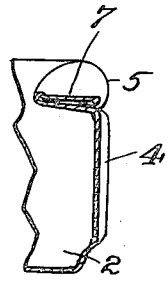


Fig. 6.

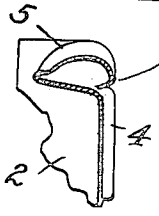


Fig. 9.

Fig. 7.

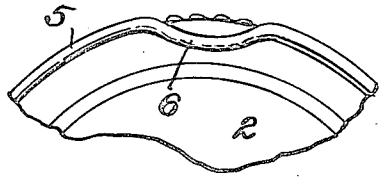
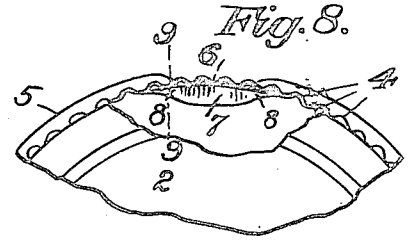


Fig. 8.



Inventor
Charles Hammer,
By his Attorneys
Read & Gray

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UNITED STATES PATENT OFFICE.

CHARLES HAMMER, OF HOLLIS COURT BOULEVARD, NEW YORK.

SCREW CLOSURE FOR CONTAINERS.

Application filed June 14, 1922. Serial No. 568,278.

To all whom it may concern:

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

This invention has to do with metal closures for glass containers, such as bottles and jars having divided or interrupted threads or lugs, and more particularly to that class of containers known as the wide mouthed variety, the object of the invention being to provide an improved metal cap or closure having an improved form of projection, whereby a longer, wider and stronger projection and therefore one having greater efficiency and rigidity is obtained, and to the method of making such cap, the present invention being an improvement on the cap shown and described in Letters Patent No. 1,079,238 dated November 18, 1913.

An object of the invention is the provision of an improved metal cap or closure, which can be made of relatively thin sheet metal in a comparatively inexpensive and efficient manner and in which the top is provided with a skirt or flange having a strengthened, rolled or curled edge, thereby obviating the cutting of the hands of the user and exposure to attacks by acids and moisture, and from which the improved projections or lugs are largely or wholly formed, and between which projections and the top of the cap are located strengthened corrugations which serve, among other advantages, to strengthen the cap, the flange and the projections.

Although the cap of the patent referred to has proved a great commercial success, and many hundred of millions thereof have been sold, yet like everything of real merit, it is capable of improvement, and long experience with that cap has demonstrated that there are certain disadvantages among which is, that owing to the construction of the lugs or projections, the caps would at times shake off. It is therefore the purpose of the present improvement to so form the projection as to avoid this and other disadvantages of the prior cap, while retaining all of the good features of that prior cap, and it is therefore the purpose of the present improvement to provide a cap with projections so formed that they will have such a spring or frictional engagement with the projections, threads or lugs of the container when the cap is screwed thereon, that it will have a clinging effect thereto and will not shake off, while at the same time it will take up greater variation in the glass jars, which as is well known, vary during their manufacture by reason of the fact that they are made of glass, so that it is not infrequently the case that glass jars of the same size will vary approximately a millimeter, although supposed to be of the same size.

In the present improvement the projections on the cap are both wider and longer than those shown in my prior patent aforesaid, and consequently are not only more effective to take up greater variation in glass containers, but have other advantages due to the manner in which they are formed, in which the under or holding side of the projections merges into the bead or curled edge at each side thereof by cornute-like projections, thus materially reinforcing and strengthening the holding portions of the projections.

In my prior patent aforesaid, the projections were formed by, as it were, flattening the bead or curled edge with the result that a portion of the bead or curled edge was projected inwardly of the flange or skirt while another portion thereof remained at the exterior of the skirt. Consequently it followed that all of the metal of the bead was not fully utilized in the formation of the projections and therefore they were not as deep or as wide as in the present improvement, wherein all of the metal of the bead is utilized to form the projections, so that none of this metal or only a very small part thereof is at the outer side of the skirt.

In other words, in the present improvement practically all of the metal of the bead is utilized in forming the projections so that, consequently they are both wider and longer and therefore materially stronger than the projections of my said prior patent. This result is obtained by reason of the fact that at intervals around the cap, the beaded, curled or strengthened edge is first forced inwardly and maintained practically in a tubular cross section and when the whole

of this beaded portion has been forced inwardly, pressure is exerted thereon to thin out that tubular cross section and which pressure is largely exerted on the under side or bottom of the projection, that is, that side that is at the bottom when the cap is on the container. Thus, in the present instance practically the whole bead at intervals around the cap is forced inwardly to form a projection of tubular form and then the bottom or lower portion of this tubular formed projection is compressed so as to thin out the projection and lengthen it, thereby widening and lengthening it while maintaining the holding or inner face of the projection at the proper distance from the top of the cap to engage the threads or lugs of the jar, thus obtaining a less abrupt projection as well as a wider and a longer one, and therefore a more efficient one than was obtained in my said prior patent, and which will therefore have a greater holding efficiency on the glass container.

In the drawings accompanying and forming a part of this specification, which are illustrative only, Fig. 1 is a bottom plan of this improved cap; Fig. 2 is a partial sectional view taken on line 2—2 of Fig. 1; Fig. 3 is a partial sectional view taken on line 3—3 of Fig. 1; Figs. 4, 5, and 6 are cross sectional views illustrating the several steps during the formation of the cap projections; Fig. 7 is a detail bottom plan view illustrating the tubular form of projection shown in Fig. 5; Fig. 8 is a similar view to Fig. 7 illustrating the form of the projection shown in Fig. 6; and Fig. 9 is a cross sectional view taken on line 9—9 of Fig. 8.

Similar characters of reference indicate corresponding views in the several figures of the drawings.

In the preferred form thereof shown and described, the cap, which is usually used with a suitable liner to effect a tight seal and constructed of relatively thin metal, comprises a top 2 and a depending skirt or flange 3 having therein around the same suitable corrugations 4 located between the top and the strengthened, rolled or curled edge 5, and which corrugations serve, among other advantages, to strengthen the flange, the projections and the cap generally. Moreover, in this improved form of cap, the ends of the corrugations may be brought relatively close to the projections thereby assisting materially to reinforce them. These corrugations furthermore very materially assist in the proper registration and positioning of the cap between the forming rolls during the making of the cap. The lower edge of the skirt or flange is provided with a strengthened edge preferably in the form of a curl or bead and preferably formed by bending or curling the raw edge outwardly into engagement with the outer side of the skirt or flange, thereby practically concealing the raw edge and thus protecting the hands of the user from being cut as well as protecting the raw edge from attacks of acids and moisture, etc., which is very highly desirable in caps of this general construction. Of course the curl could be one or more coils, this merely depending upon the extent to which the raw edge of the cap is curled. In the present improvement the curl is shown simply as one coil. At spaced intervals around the flange the curled edge is first forced inwardly to form what may be generally designated as a projection of tubular cross section. In the present instance, four of these projections are shown, although a greater or less number could be provided if desired, and each of these projections is formed by forcing inwardly practically the whole bead at the point where the projection is located. In other words pressure is applied to the bead or curled edge and practically this whole bead is forced radially toward the center of the cap without however, at this particular moment, compressing or flattening the bead. The result of this is that but practically little of the bead or curled edge is left at the outside or margin of the skirt, practically all of it having been forced inwardly toward the center of the cap. Thereupon pressure is brought to bear upon the projection at the bottom or lower side thereof when the cap is in its normal operative position, and this bead is thus flattened toward the top of the cap to provide a comparatively thin projection. The operations of pressing inwardly practically the whole bead and of flattening the same may be in sequence or nearly simultaneously so long as the second pressure operation takes place upon the whole portion of the bead, which has been forced inwardly toward the center of the cap. Any suitable means may be used to accomplish these steps, it being merely necessary to provide a suitable means or roller on the inside of the cap for holding the upper or top side of the projection in its proper position during the pressure on the bead at the underside thereof, so as to prevent the shortening of the distance between the top of the cap and the projection to cooperate with suitable pressure means operative to first force in practically the whole bead and then compress it in the manner hereinbefore described. Thus, referring to the drawings it will be observed in Fig. 4 that the curled or beaded portion 5 around the lower edge or flange of the skirt has been formed, this curl being shown as terminating at the outside or exterior of the skirt. In Fig. 5 the curled portion designated by 6 has been pressed or forced radially inward so that practically all of it is within the margin of the skirt, the dotted

lines illustrating the position of the curl in Fig. 4 and the full lines illustrating the position thereof after it has been forced inwardly in the manner hereinbefore described. Fig. 6 illustrates the structure of the projection after practically the whole of the forced-inward part of the curled edge has been subjected to suitable transverse pressure to thin out the projection as at 7. Fig. 7 illustrates the deflection of practically the whole bead inwardly of the flange as at 6, Fig. 5, while Fig. 8 illustrates at 7 the form of the projection shown in Fig. 6 after it has been subjected to transverse pressure, the tapered tubular or cornute end portions being shown at 8, the cross section of which is shown in Fig. 9.

From this it will be observed that as the entire bead is practically utilized in the formation of the projection, it necessarily follows that the projection is wider and longer than heretofore was found possible in the formation of the projection in the manner shown and described in my said prior patent, and that the projection merges into the curled portion of the cap at each end of the projection by tubular, tapered or cornute portions which very materially strengthens and reinforces the projection and holds it in its proper operative position. Thus, by deflecting practically the whole of the bead toward the center of the cap in the first instance, and then subjecting it to pressure, I am enabled to utilize practically all of the metal of the bead to form a suitable sized projection which was not heretofore done, since as hereinbefore stated, it was only practicable to utilize a portion of the bead to form the projection. In practice, the inner or holding faces of the bead may be given the desired shape found most suitable in use as relatively flat, that is, substantially parallel with the top of the cap, or they may have a slightly curved formation in cross section, so long as they are sufficiently thinned out to provide the necessary holding surface on the thread or lug of the jar. The thinning out of the projections in the present instance is obtained largely by pressure exerted on the bottom or lower walls of the projection, although of course some pressure is exerted on the top or upper walls thereof. In practice the pressure brought upon the inwardly pressed curled portions may vary according to the thinness or thickness of the projection that it is desired to form, so that the top and bottom walls of the projection may be practically brought into contact or may be left spaced apart, this not being material so long as the projection is suitably formed to properly engage the threads or lugs of the glass container when rotated or turned thereon to form a tight seal.

It will be observed that in the formation of these improved projections the raw edge of the curled or beaded portion during the forcing thereof inwardly and after the complete formation of the projection remains practically concealed and enclosed so that there is no raw edge of any consequence around the margin of the cap to either cut the hand or be subjected to rust or attack by acids or the atmosphere. As hereinbefore stated, the projections 7 merge or terminate into the bead or curled portions 5 of the cap at each end of the projections by tubular, tapered or cornute formed portions 8 (see Figs. 8 and 9), which serve to reinforce and strengthen the main holding portions of the projections against deflection or bending caused by the inclined or helical faces of the thread walls on the jar neck when the closure is screwed down, and these extended surfaces or portions will also assist the sealing or binding engagement with the jar threads by reason of the greater frictional contact, thus tending to prevent retrograde movement of the cap, which would ordinarily loosen the cap on the container.

From the foregoing, it will be observed that I have provided an improved metal cap having strengthening corrugations and a curled edge, practically the whole of which curled edge at intervals is utilized to form inwardly extending projections, first of tubular form and then of compressed or flattened form, so that these projections have comparatively great width and length, and that this is obtained in the present instance by first pressing inwardly practically the whole of the curled edge at intervals to form a tubular projection and then pressing such tubular projection in a transverse direction to thin or flatten it into that shape where it will form the desired size of jar thread engaging projection, and that furthermore the projections gradually taper at each end so as to merge into the rolled or curled edge of the cap instead of projecting comparatively abruptly as heretofore.

One of the important advantages in forming the projections in the manner described resides in the fact that because a greater portion of the curled edge is utilized than heretofore to form the projections, it follows that the projections are not only somewhat wider as hereinbefore stated, thus giving them greater holding area on the threads of the jar, but they can be made thinner in cross section so that the inner relatively flat surface will have a more efficient holding upon the threads of the jar, whereas heretofore, as practically all of the curled edge of the flange was not utilized to form the projections, the result was that in cross section these projections had a more triangular form, which assisted at times in the shaking off of the cap from the jar, since this tapered

holding face would more easily slip than the relatively flat holding surface of the present form of projection.

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.

It will also be understood that in making these improved projections only that portion of the rolled, curled or beaded edge at the points where the projections are located is first forced inward toward the center of the cap so that the term as used herein "forcing inward of the whole bead" is intended to apply only to those portions of the bead or rolled edge where the projections are located, the remaining portions of the bead or rolled edge not being disturbed.

One of the highly desirable things in practice is to have the angle of the thread at the underside of the glass jar and the angle of the projection on the inside or that face nearest to the top of the cap when in its normal position correspond as nearly as practicable, and consequently when the under face of the glass thread is horizontal or substantially so and the under or working face of the thread corresponds therewith, not only is the projection a stronger one, but more pressure is required to turn the cap over the threads of the jar, so that it has a greater holding efficiency. In other words, this improved construction prevents the thread slipping around on the glass threads of the jar beyond the desired point.

In the present improvement it will be observed that by making the projections in the manner hereinbefore set forth, they can be so formed that the working or under face, that is that face nearest the top of the cap when in its normal position, can be at right angles to the flange of the cap, so that they can conform to the angle of the underside of the thread, which at the present time is usually of this form also.

In other words, as hereinbefore stated, it is now practicable to make the projections having a relatively flat working surface instead of as heretofore, having a more triangular form in cross section.

I claim as my invention:

1. A closure of the class described having a top and a depending flange provided with a rolled edge having inwardly extending locking projections formed from said rolled edge by utilizing practically all of the rolled edge at intervals around the flange to form said projections extending inwardly toward the center of the cap the cross section of each of said projections being less than that of the rolled edge.

2. 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 rolled edge inwardly of the flange at intervals therearound the cross section of each of said projections being less than that of the rolled edge.

3. 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 rolled edge inwardly of the flange at intervals therearound, and subjecting said deflected rolled edge to transverse pressure.

4. A closure of the class described having a top and depending flange provided with a curled edge having at intervals practically all of said curled edge pressed inward toward the center of the cap, and transversely to form inwardly extending projections around said flange.

5. A closure of the class described having a top and a depending flange provided with a curled edge having at intervals practically all of said curled edge pressed inward toward the center of the cap, and transversely to form inwardly extending projections around said flange, said projections merging into the curled edge at each end thereof by tubular portions.

6. A closure of the class described having a top and a depending flange provided with a curled edge having at intervals practically all of said curled edge pressed inward toward the center of the cap, and transversely to form inwardly extending projections around said flange, said projections merging into the curled edge at each end thereof by tubular portions of cornute form.

7. A closure of the class described having a top and a depending flange provided with a rolled edge having at intervals all of said curled edge pressed inward toward the center of the cap and transversely to form inwardly extending projections around said flange having relatively flat portions and tubular portions.

8. A closure of the class described having a top and a depending flange provided with a rolled edge having at intervals all of said curled edge pressed inward toward the center of the cap and transversely to form inwardly extending projections around said flange having relatively flat portions and tubular portions, the relatively flat portions being located intermediate the tubular portions.

9. A closure of the class described having a top and a depending flange provided with a curled edge having relatively thin, cornute connected inwardly extending pro-

jections of relatively great width and length by utilizing practically all of the curled edge at intervals around the flange to form the said projections extending inwardly toward the center of the cap.

10. A closure of the class described having a top and a depending flange provided with a rolled edge having inwardly extending locking projections formed from said rolled edge by utilizing practically all of the rolled edge at intervals around the flange to form said projections extending inwardly toward the center of the cap, the cross section of each of said projections being less than that of the rolled edge, said flange having strengthening portions intermediate the rolled edge, projections, and top.

11. 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 rolled edge inwardly of the flange at intervals therearound, the cross section of each of said projections being less than that of the rolled edge, said flange having strengthening corrugations intermediate the rolled edge, projections, and the top.

12. A closure of the class described having a top and a depending flange provided with a curled edge having relatively thin, cornute connected inwardly extending projections of a relatively great width and length by utilizing practically all of the curled edge at intervals around the flange to form the said projections extending inwardly toward the center of the cap, said flange having strengthening corrugations between the curled edge, projections, and the top.

13. 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 in such manner that practically all of the bead extends inwardly from the outer margin of the skirt the cross section of each of said projections being less than that of the bead or curl.

14. A metal cap comprising a flange having a curl or bead and projections extending inwardly therefrom, each connected with the bead at opposite sides by cornute portions.

15. A metal cap comprising a depending flange having a curl or bead and projections extending therefrom, each having a substantially horizontal or flat upper holding face substantially parallel with the top of the cap and connected with the bead at opposite sides by cornute portions.

16. A rotatable metal cap comprising a top having a depending skirt provided with reinforcing corrugations and a curled or beaded lower edge having formed therefrom at intervals a plurality of inwardly extending projections each having relatively great length and width, and merging at its opposite ends into the bead by substantially similarly formed cornute portions, practically all of said bead adjacent to said projections being utilized to form said inwardly extending projections.

17. A metal cap comprising a depending flange having a bead and inwardly extending projections formed therefrom, by pressing practically the whole of the bead adjacent to said projections inwardly, and then pressing a substantial part thereof transversely whereby each projection lies substantially wholly within the outer margin of the flange.

18. A metal cap comprising a depending flange having a bead and inwardly extending projections formed therefrom by pressing practically the whole of the bead adjacent to said projections inwardly, and then pressing a substantial part thereof transversely whereby each projection lies substantially wholly within the outer margin of the flange, said flange having between the projections, bead, and the top of the cap, reinforcing corrugations.

19. A metal cap comprising a depending flange having a bead and inwardly extending projections formed therefrom by pressing practically the whole of the bead adjacent to said projections inwardly, and then pressing a substantial part thereof transversely whereby each projection lies substantially wholly within the outer margin of the flange, each projection gradually merging into the bead whereby each of the projections is relatively thin at the holding part thereof and is of considerable length, width, and increased strength.

20. The method of making a metal cap which consists in providing a cap with a flange and a curled edge, then at intervals pressing in practically the whole of the curled edge to form a tubular projection, and then subjecting the tubular projection to transverse pressure thereby to form an inwardly extending relatively thin projection.

21. The method of making a metal cap which consists in providing a cap with a flange and a curled edge, then at intervals pressing in practically the whole of the curled edge to form a tubular projection, and then subjecting the tubular projection to transverse pressure thereby to form an inwardly extending relatively thin resilient projection, of considerable width and length.

22. The method of making a metal cap which consists in providing a cap with a flange and a curled edge, and then at intervals pressing in practically the whole of the curled edge radially toward the center of the cap and then subjecting the curled edge to pressure thereby to form an inward-

ly extending projection connected at the opposite ends thereof with the curled edge by tubular formed portions.

23. The method of making a metal cap which consists in providing a cap with a flange and a curled edge, then at intervals pressing in practically the whole of the curled edge to form a tubular projection, and then subjecting the tubular projection to transverse pressure to form an inwardly extending projection connected at the opposite ends thereof with the curled edge by tubular cornute formed portions.

Signed at 1822 Park Row Building, New York, New York, this 9th day of June, 1922.

CHARLES HAMMER.