Aug. 4, 1925. 1,548,459

C. HAMMER

METAL CAP

Filed Dec. 14, 1923

Fig. 1.

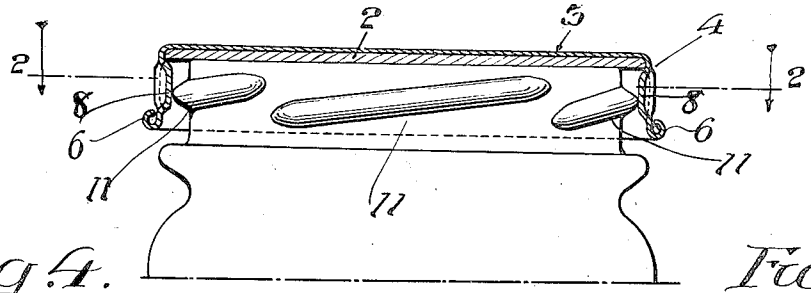


Fig. 4.

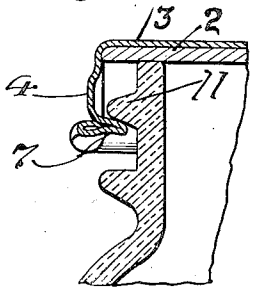


Fig. 2.

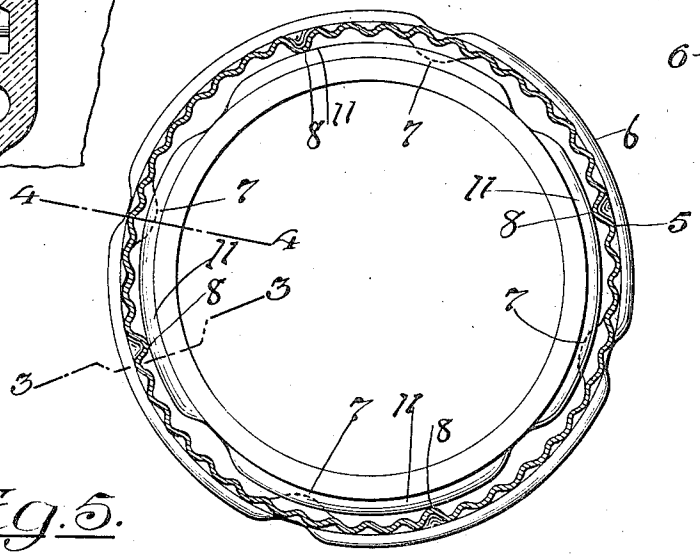


Fig. 3.

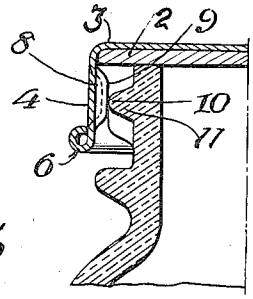
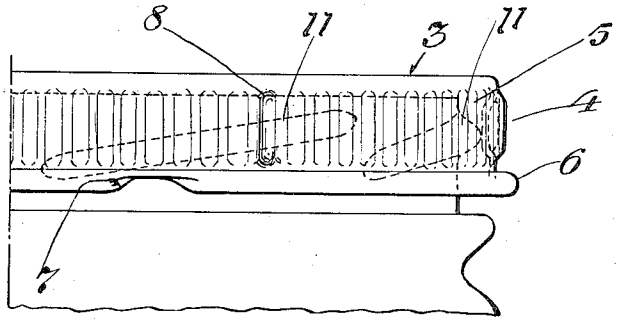


Fig. 5.



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Patented Aug. 4, 1925. 1,548,459

UNITED STATES PATENT OFFICE.

CHARLES HAMMER, OF HOLLIS COURT BOULEVARD, NEW YORK.

METAL CAP.

Application filed December 14, 1923. Serial No. 680,585.

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 Metal Caps, of which the following is a specification.

This invention relates to metal caps or closures and to the method of making the same, an object of the invention being to provide an improved metal cap having increased holding efficiency upon the container, and also to provide a package comprising a container and closure so constructed that the backward turning of the cap on the container is prevented whereby the premature release of the cap is avoided.

An object of the invention is the provision of an improved metal cap or closure having a locking or holding projection in position to engage under the thread, lug, or projection of a container and an additional holding means for engaging a container projection or thread on the outer face thereof which will assist in centering and holding the cap on the container and prevent the premature release of the cap.

A further object of the invention is the provision of an improved metal cap or closure particularly adapted for use with glass containers of the bottle or jar form having divided or interrupted threads or projections, which cap can be made of relatively thin sheet metal in a comparatively inexpensive and efficient manner, and in which the top is provided with a depending skirt having a strengthened, rolled or curled lower edge, thereby preventing the cutting of the hands of the user and the exposure of the raw edge to the action of rust and acids, etc., and from which curled edge the holding projections or lugs are formed, and between which projections and the top of the cap are located suitable reinforcements shown in the form of strengthening corrugations, serving among other advantages to strengthen the cap, flange, and projections, and which skirt in the present instance, at the rear of each holding or locking lug is provided with an enlarged or deepened corrugation in position to engage the outer face of the container thread and thereby act as an additional means for holding the cap onto the container.

The present invention is therefore an improvement upon the caps shown and described in my two prior Patents Nos. 1,079,238 and 1,440,990, dated respectively November 18, 1913 and January 2, 1923, in which the holding lugs are formed from the curled edge of the cap. These two caps have proved very successful and many millions thereof have been sold and when the glass container threads with which they are used are uniformly and properly made, the caps hold on the container with great efficiency. But as the container projections or threads are inclined downwardly toward the usual shoulder of the container and the lugs are more or less horizontally located, these lugs tend to slip backward or ride up the inclined under face of the glass thread under certain conditions, and thus the cap turns off the container. This occurs when the threads of the glass containers are not uniform or come from the molds under size, being over a millimeter off, with the result that when the caps are used on those particular containers, they do not fit as tightly as they should so that the caps become loose and eventually slip or jar off. To state it in other words, the caps are designed to fit glass threads of a certain size with a permissible variation of about one millimeter, but when for any reason the glass threads are below the minimum size for which the caps are designed they do not fit as tightly as they should and are liable, and in fact do, under these conditions come off. Furthermore as the caps are not infrequently applied by hand it follows that if the cap is too forcibly applied, as by an operator having a too powerful grip, the cap may be forced too far on to the container and the skirt stretched, so that the cap does not hold as efficiently as it should. In other instances where the container threads are small and then are below the minimum size the cap will not fit at all.

It has also been the common practice to make these metal caps with an annular groove in the top thereof forming a V-shaped projection engaging the sealing disc or liner usually used to effect a tight seal between the liner and the upper edge of the container. I have found however that when unusual pressure is placed on the cap top it tends to flatten out and so increase the distance between the lug and the sealing liner, thus loosening the cap on the container. In other words it is not infrequently the

practice to place a box or crate of filled and capped containers, one on top of the other, and I have found that the weight of such a box on top of the caps therebelow has a tendency to flatten out this V-shaped groove and so stretch the top of the cap and thus slightly enlarge the diameter of the cap top, and while the strengthened or curled lower edge tends to prevent the locking lugs from moving outward, nevertheless, this stretching or flattening out of the metal of the top effects the position of the lugs with relation to the threads of the container in such way, especially when the glass thread is not uniform, that the cap becomes loose in transportation or handling and slips or jars off.

I have also found that when the glass threads are below the minimum size permissible, the tendency of the cap is to slip to one side, thus permitting the other side to ride up and over the glass thread. These various disadvantages however are overcome by the present improvement since when a V-shaped groove is used in the top of the cap, any flattening out thereof will have a tendency to increase instead of decrease the holding efficiency of the cap on the container.

Further more this additional holding means is such that if for any reason the glass threads are defective or below the minimum size and the holding lugs do not therefore as effectively hold, it will hold the cap in place against backward rotation in much the same way as a lock nut acts to prevent the rotation of the main holding nut, for it will be observed that as the enlarged vertical projection contacts with the outer or front face of the thread, which has no inclination at this point but is comparatively flat or straight, there is no tendency of this projection to ride up the thread. Therefore the tendency of the lug to ride up the inclined thread is offset and prevented by the engagement of the vertical projection with the front of the thread. To put it in other words the contact portions of the vertical projection and the front of the thread provide two relatively flat surfaces one against the other so that there is no tendency of one to move relatively to the other but where a lug engages an inclined thread the inclination of the thread tends to cause the lug to ride backward under jar, vibration or pressure, and this tendency of the lug is in the present improvement prevented by what may be well termed the "check-nut" action obtained by the use of the enlarged projection.

Moreover the present improvement acts, because of its frictional contact with the outer face of the thread, as a warning to the operator placing the cap on the container, thus preventing him from forcing it too far on and so stretching the cap. So efficiently does the deep corrugation work that I have found that if a series of them are enlarged in the rear of each holding lug, that the frictional contact is such between the corrugations and the thread that it is somewhat difficult to apply the cap. That is to say, if the frictional contact between the outer face of the glass thread and the corrugation is increased by enlarging a number of corrugations. it is difficult to turn the cap on as far as it should be turned to have the holding lugs thereof engage under the threads. After considerable experimentation I have found that the best results are obtained by the provision of one deepened corrugation at the rear of and spaced from each lug, although in some instances more than one corrugation might be used to advantage depending somewhat upon the number of cap lugs. But in the general run of caps having four holding lugs the best results have been obtained by increasing the depth of one corrugation only.

Thus the present improvement has the very important advantage of enabling the cap to hold even though the glass thread may be less than the minimum size, and to hold even though the glass thread be a small thread. In other words the present improvement makes the cap operative for small threads when heretofore it would be inoperative on such a form of thread unless especially made for the purpose. Therefore the cap with the present improvement is more interchangeable with glass containers than was heretofore possible, that is, it can be used with the size of thread for which the cap was designed or with a container having a small thread for which the cap was not designed. Thus, in the present improved cap I have provided two efficient holding means, one in the form of a horizontal lug or projection preferably formed from the curled edge of the cap and adapted to engage under the glass thread, and the other in the form of an inwardly extending vertical projection shown as formed from the reinforcements or corrugations of the skirt by increasing the depth of one or more corrugations to engage the outer or front face of the thread and frictionally resist the slipping off of the cap either by any weight which may be placed upon the jars due to the piling of boxes one upon another, or the piling of jars upon a shelf one upon the other or to other causes.

My experiments have further shown that the depth of the projection in the skirt need not be so deep as to make it conspicuous or distort the appearance of the outer side of the skirt, and yet when of the proper depth it will efficiently act to accomplish the purpose herein set forth.

That the present improvement successfully accomplishes its purpose is easily determined

by the application of a cap with the improvement to a container, and then the application of a cap without such improvement, the frictional resistance of the former before the horizontal lug is forced home being immediately felt by the hand.

In fact it has been estimated that the present improvement increases the efficiency of the cap by about one hundred per cent, that is to say, it permits the cap to hold in those instances where it would not hold before, and it enables the cap to be used in those instances where it could not be used before.

I believe that I am the first to provide a cap of the character described having a holding or locking means preferably in the form of a lug adapted to engage under the thread of a glass container, and also having a projection adapted to engage the outer face or wall of a thread of such container, that is, two holding means, one engaging under the thread and the other engaging the outer face of a thread of the container, whereby one acts as a check upon the other, thus enabling the cap to hold with more efficiency and also enabling it to be used in instances where this style of cap could not be used heretofore, and also to provide a package comprising a container member and a closure member having cooperating holding means with one of the members also having an additional holding means cooperating with one of the cooperating holding means of the other member.

In the drawings accompanying and forming a part of this specification Fig. 1 illustrates the upper portion of a glass container having this improved cap applied thereto, the cap being shown in vertical section; Fig. 2 is a horizontal cross sectional view taken on the line 2—2 of Fig. 1, looking in the direction of the arrows; Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a cross sectional view taken on line 4—4 of Fig. 2; and Fig. 5 is a side view of the cap applied to the mouth of a glass container, parts being shown in dotted lines.

Similar characters of reference indicate corresponding parts in the several views.

Before explaining in detail the present improvement and mode of operation thereof, it is desired to have it understood that the invention is not limited to the details of construction and arrangement of parts which are illustrated in the accompanying drawings, since the invention is capable of other embodiments, and that the phraseology which is employed is for the purpose of description and not of limitation.

In the preferred form thereof herein shown and described, the cap, which is usually used with a suitable liner 2 to effect a tight seal is constructed of relatively thin sheet metal and comprises a top 3, which in the present instance has either no V-shaped groove or a very slight one therein, and a depending skirt or flange 4 having therein around the same suitable reinforcements in the form of corrugations 5 located between the top and the strengthened, rolled or curled edge and which corrugations serve, among other advantages, to strengthen the flange, the projections, and the cap generally. In this improved form of cap the ends of the corrugations may be brought relatively close to the projections or lugs, thereby assisting materially in reinforcing them. These corrugations also 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 or rolled edge, preferably in the form of a curl or bead 6 and preferably formed by bending or curling the lower raw edge of the skirt outwardly into engagement with the outer side of the skirt or flange, thereby practically concealing the raw edge and protecting the hands of the user from being cut as well as protecting the raw edge from attacks of acids, moisture and rust, which protection is very highly desirable in caps of this general construction.

At spaced intervals around the skirt the curled edge is provided with inwardly extending holding lugs or projections 7, four of which are herein shown, although a greater or less number thereof can be used if desired. They are formed in any suitable way, but are usually formed by forcing the curled edge inwardly by means of suitable pressure applied to the beaded or curled edge at intervals, thereby forcing a portion of the curled edge radially toward the center of the cap, and compressing or somewhat flattening this part of the bead. Some of the various ways of doing this are set forth in my patents hereinbefore referred to and need not be again described in detail herein.

At the rear (as the cap is turned on to the container) of each of the horizontally located holding lugs or projections 7, the skirt is provided with an inwardly extending vertical projection 8 which in the present instance is formed by making one of the inwardly extending corrugations larger or deeper whereby it will engage the outer wall or face of the glass thread as the cap is turned on to the container.

The location of the vertical projection in the rear of the horizontal lug permits the inner face or wall 9 of the vertical projection see Fig. 3 to extend across and to contact with the outer face or wall 10 of the container thread 11, and not only centers the cap during the application thereof to the container but prevents transverse movement thereof if for any reason the

container threads are below the minimum size, or weight is placed upon the cap top. It also increases the frictional resistance of the cap on the container threads.

I have found it desirable to locate each of these vertical projections, which may be obtained by deforming the skirt or one of its corrugations, at the point where it will have its greatest holding efficiency when the lug 7 is in tight engagement with the under face of a glass thread, that is, when the lug 7 is fully pressed home, and as this usually would be the point where the glass thread and the projection 8 have the greatest surface contact, and therefore where the projection 8 engages entirely or substantially across the face of a glass thread, the projection is therefore shown in the form of cap illustrated as located or spaced at about five corrugations from the center of the lug 7, counting the center corrugation as one. Of course the location of these projections 8 depends somewhat upon the size and construction of the cap and the fineness and number of the corrugations which may be used.

It is to 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.

Having thus explained the nature of my said invention, and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the modes of its use, I claim:

1. A metal cap comprising a top having a depending skirt provided with holding means effective to engage under a container thread or projection having its outer face of non-wedge-shaped construction, and with holding means effective to engage a small part only of the length of the outer face of the container thread.

2. A metal cap comprising a top having a depending skirt provided with holding means to engage under an inclined projection of a container, and means extending perpendicular of the skirt for preventing the backward riding of said holding means on the inclined projection of the container.

3. A metal cap comprising a top having a depending skirt provided with holding means to engage under an inclined projection of a container having its outer face of non-wedge-shaped construction, and means for preventing the backward riding of said holding means on the inclined projection of the container, and comprising an enlarged projection in the skirt of the cap effective to engage less than half the length of said inclined projection.

4. A metal cap comprising a top having a depending skirt provided with holding means to engage under an inclined projection of a container, and means for preventing the backward riding of said holding means on the inclined projection of the container and comprising an enlarged projection in the skirt of the cap in the form of a corrugation.

5. A metal cap comprising a top having a depending skirt provided with an inwardly extending holding means, and spaced therefrom to the rear thereof means adapted to engage the outer face of a container projection or thread having its outer face of non-wedge-shaped construction.

6. A metal cap comprising a top having a depending skirt provided with an inwardly extending holding lug and in the rear thereof a vertical projection adapted to engage the outer face of a container projection or thread.

7. A metal cap comprising a top having a depending skirt provided with an inwardly extending holding lug and in the rear thereof a vertical projection adapted to engage the outer face of a container projection or thread, said rear projection comprising an enlarged or deepened corrugation.

8. A metal cap comprising a top and a depending skirt having a horizontally located lug adapted to engage under the thread or projection of a container, and a vertically located projection adapted to engage the outer face of the thread of the container.

9. A metal cap comprising a top and a depending skirt having a series of reinforcements or corrugations, and also having a holding lug and in the rear thereof a projection formed from one of said corrugations for engaging the outer face of a container thread.

10. A cap comprising a top and a depending skirt having a strengthened lower edge provided with an inwardly extending lug formed therefrom, and spaced therefrom to the rear thereof a projection adapted to engage the outer face of a container projection having its outer face of non-wedge-shaped construction.

11. A metal cap comprising a top provided with a depending skirt having similar reinforcements therein, and a strengthened rolled or curled lower edge provided with an inwardly extending lug, one of said similar reinforcements spaced from and to the rear of said lug being enlarged or deepened to engage the outer wall of a container thread.

12. A metal cap comprising a top and a depending skirt provided with two inwardly extending holding projections, one adapted to engage under a holding projection of a container having its outer face of non-wedge-shaped construction and the other to

engage the outer wall of a container projection and of less width circumferentially than said first holding projection.

13. A metal cap comprising a top and a depending skirt provided with two holding projections, one a horizontally located holding projection and the other a vertically located holding projection effective to engage the outer wall of said thread.

14. A sealed package comprising a container having an inclined locking projection or thread, a closure thereon comprising a top and a depending skirt having therein means for sealing the mouth of the container, said skirt having holding means engaging under the inclined face of the container thread, and non-wedge-shaped holding means engaging the outer face or wall of said thread.

15. The method of making a metal cap for threaded containers which consists in forming a top with a depending skirt, and simultaneously with the pressing into said skirt of a series of similar reinforcements, pressing one of said similar reinforcements deeper than the others and providing said skirt with a holding projection at one side of said deep reinforcement.

16. The method of making a metal cap which consists in providing a top and a depending skirt, forming at the lower edge thereof a strengthened, rolled or curled edge, reforming the same to provide an inwardly extending holding means, and deforming the skirt to form a projection in position to engage a part only of the outer wall of a container thread having its outer face of non-wedge-shaped construction.

17. A package comprising a container member and a closure member therefor, said members having cooperating holding means, and one of said members having holding means extending crosswise of the holding means of the other member.

18. A package comprising a container member and a closure member therefor, said members having cooperating holding means, one of which is inclined, and one of said members also having holding means extending crosswise of the holding means of the other member.

19. A package comprising a container member and a closure member therefor, said members having cooperating holding means one of which is inclined, and one of said members also having holding means enagaging crosswise of the inclined holding means of the other member.

20. A package comprising a container member and a closure member therefor, said members having cooperating holding means one of which is inclined and one of which is substantially straight, the member having the substantially straight holding means also having holding means engaging crosswise of the holding means of the other member.

Signed at Brooklyn, N. Y. this 12th day of December 1923.

CHARLES HAMMER.