July 16, 1935. E. B. KRAMER ET AL 2,008,587

LUG CAP

Filed Sept. 16, 1932

Fig. 1.

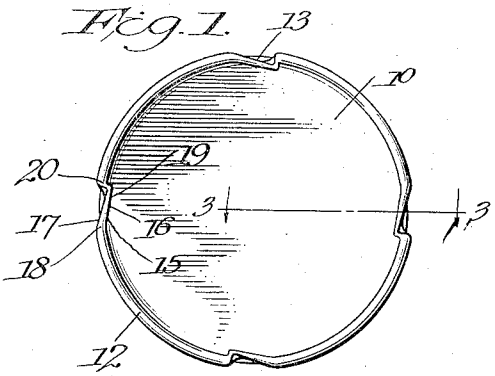


Fig. 2.

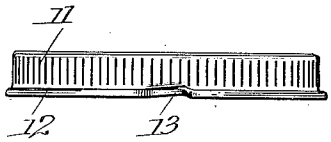


Fig. 3.

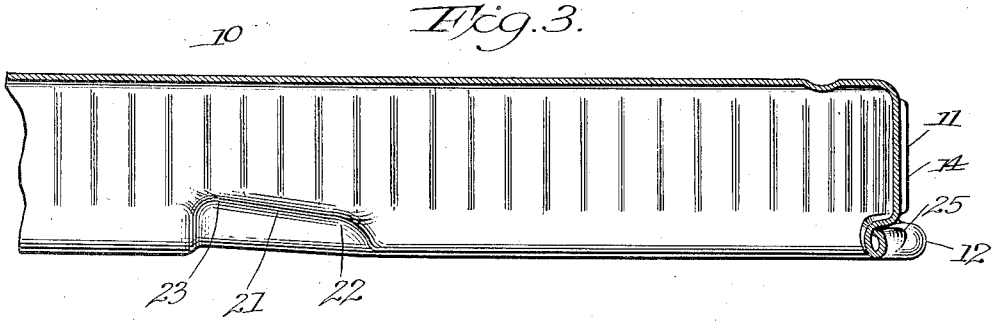


Fig. 4.

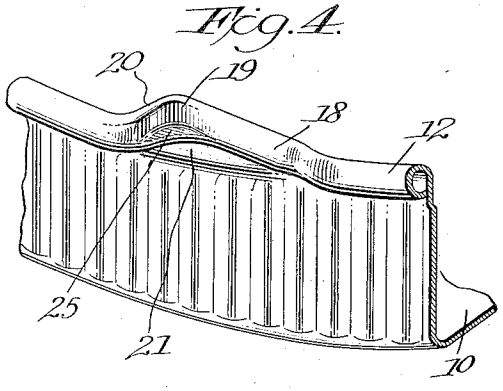
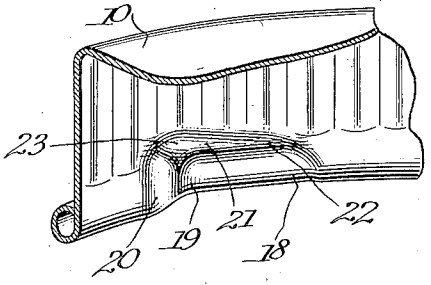


Fig. 5.



Inventor

Eric B. Kramer.
Edward M. Erkur.

By. Cushman Bryant & Darby & Cushman,

Attorneys

Patented July 16, 1935

2,008,587

UNITED STATES PATENT OFFICE

2,008,587

LUG CAP

Eric B. Kramer and Edward M. Enkur, Baltimore, Md., assignors to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York

Application September 16, 1932, Serial No. 633,513

7 Claims. (Cl. 215—44)

The present invention relates to caps or closures, and more particularly, to caps commonly known as "lug caps" for use on glass bottles and containers which have threads thereon, whereby, upon rotation of the cap, the lugs will engage the threads and securely lock the cap on the container.

An object of the invention is to provide a lug cap which has a stronger and more substantial locking lug than caps of this type which have been heretofore used, and which will, therefore, afford a greater sealing pressure against the mouth of the container.

A further object of the invention is to produce a lug having a novel form characterized by increased strength and rigidity and including a wedge-like thread contacting surface. Heretofore, it has been proposed to form lugs in the skirt of a cap provided with a generally wedge-shaped contour, but because of the thin nature of the metal in the cap skirt, lugs of this type have not had sufficient strength and rigidity to function properly. Consequently, any advantages which might have been expected to flow from the use of a wedge surface have, in the past, been lost by the fact that the lugs were inherently weak. It has also been proposed in the past to form locking lugs by deflecting and bending the rolled or beaded edge of a cap skirt in various ways, and lugs formed in this manner from the beaded edge have, as a whole, proved to be stronger and generally more satisfactory than lugs formed from the material of the skirt between the top and bead.

The present invention contemplates securing all of the functional benefits and advantages of the wedge-shaped lug, and also all of the advantages of strength and rigidity resulting from forming the lug from the material of the beaded edge. This is accomplished by deflecting a portion of the bead itself into the form of a wedge lug.

It is a further object of the present invention to form the lug in such a manner that the major portion of the bead which is forced inwardly is not distorted and not collapsed while the innermost, terminal portion thereof which is the principal thread contacting portion is collapsed, compacted, and strengthened. Thus, the thread contacting portion of the lug is hardened to resist wear, and strengthened to prevent deflection from normal position upon the application of the cap to a container.

It is a further object of the present invention to form a lug from the beaded edge of a cap in such a manner that a wedge-shaped thread contacting surface is provided, and without destroying the appearance of the cap by forcing the lower edge of the bead at the lug portion out of line with the major circumferential portion of the bead around the cap. Although the thread contacting surface of the lug of the present invention is inclined a substantial degree with respect to the plane of the top circumferentially of the cap, the lower edge of the lug, or in other words, the lower edge of the bead below the lug, is only slightly inclined, if at all, from a horizontal plane.

The lug of the present invention has a radially shallow and axially narrow forward end, considered from the point of view of the direction of rotation applied to the cap in locking the same upon a receptacle, and this forward end merges gradually with the circumferential portion of the bead. The rear end of the lug is radially deeper and axially wider than the forward end and is joined to the adjacent circumferential portion of the bead by an abruptly outwardly turned, substantially radially disposed portion. Preferably, the bead or rolled edge at the rear end of the lug and at the outwardly turned portion is substantially collapsed.

In the accompanying drawing, a preferred embodiment of the invention is shown, in which,

Figure 1 is a bottom plan view of a cap,

Figure 2 is a side view showing one of the lugs in elevation,

Figure 3 is a fragmentary sectional view taken on line 3—3 of Figure 1, showing one lug in elevation and another in section,

Figure 4 is a detailed view of the lug of the present invention taken from the outside of the cap, and

Figure 5 is a perspective view of the lug taken from the inside of the cap.

In the drawing, a cap comprising a top 10, a depending skirt 11 having a rolled or beaded edge 12 is disclosed. Although in the specific embodiment illustrated, four locking lugs 13 are illustrated, it will be understood that the invention is not limited to this number, and one or more may be employed. The cap skirt 11 is preferably provided with a plurality of reinforcing ribs and grooves, or knurls 14, which provide a roughened surface for manipulating the cap, in a well known manner.

Each of the lugs of the present invention comprises an inwardly struck portion 15 having a substantially straight inner edge or surface 16

and an outer surface 17 substantially parallel therewith. The forward end 18 of the lug merges with the circumferential portion 12, whereas the rear end 19 of the lug is disposed inwardly a substantial distance from the circumferential portion adjacent thereto. This rear end is joined to its adjacent circumferential bead portion by a short substantially radially disposed section 20.

In most cases, this section 20 of the bead will be completely collapsed during the forming operation. Also, the inner or rear end 19 of the lug will also be collapsed and the material thereof compacted and hardened.

The upper surface 21 of the lug immediately above the bead is inclined with respect to the plane of the top in a direction circumferentially of the cap. Thus, the forward end 22 of the thread contacting upper surface adjacent the forward end 18 of the lug, merges with the cylindrical portion of the skirt and is more remote from the plane of the cap top than the rear end 23 of the thread contacting surface. As a result, a wedge-like surface is provided which is inclined upwardly in the direction of rotation of the cap, so that it rides under and binds upon a thread, projection, or lug positioned upon the container.

It will be understood that the rear end 23 of the thread contacting surface will receive most of the wear and locking strain when the cap is tightly applied to a container. In order to make this portion of the surface strong and resistant to wear, we compress and collapse the material of the bead adjacent thereto. Further, in many cases, it is desirable to leave an upper portion 25 of the bead directly underlying this surface in a substantially horizontally disposed position to act as a reinforcing member. Referring to Figure 4 of the drawing, it will be noted that the portion 25 of the bead spans the corner between the sections 20 and 19 of the lug and underlies the thread contacting surface 21. Although the bead at this point is preferably completely collapsed, the upper portion 25 is not struck inwardly to the same degree that the lower portions of the bead are, and serves as a connecting and reinforcing member for the strain receiving portion of the lug.

From an inspection of Figure 3, it will be noted that the lower edge of the lug is only slightly inclined to a horizontal plane whereas the upper thread contacting surface is inclined a substantial degree with respect thereto. Thus, the uniform appearance of the cap is not impaired, but all of the advantages of an inclined thread engaging surface are secured.

Actual use of the cap of the present invention shows that the lug is extremely rugged in construction and that it provides a wedge-like locking surface which functions in a new and improved manner in that it binds itself upon the thread of the receptacle and locks the cap thereto with a maximum of sealing pressure by the application of a minimum of turning force. The lug, being formed from the material of the bead, is of such rigid construction that it cannot be distorted by the application of any reasonable force thereto.

Although the invention has been described in detail, it will be understood that it is not limited to all features set forth in the drawing and in the foregoing description, and that modifications may be made without departing from the scope of the invention.

We claim:

1. A closure cap comprising a top, a skirt terminating in a circumferential rolled bead, and a plurality of locking lugs formed in said bead, each of said lugs comprising an inwardly struck portion of said bead having a shallow forward end merging into a circumferential portion of said bead, and a deep rear end displaced radially inwardly a substantial distance from the circumferential portion of said bead adjacent said rear end and joined thereto by an abruptly outwardly turned portion of said bead, the bead adjacent said outwardly turned portion being flattened to provide angularly disposed webs adapted to strengthen said lug.

2. A rotatable closure cap comprising a top, a skirt terminating in a rolled bead, and a plurality of locking lugs, each formed by bodily displacing a section of said bead inwardly, each of said lugs having a radially shallow and axially narrow forward end in the rotational direction of applying said cap to a receptacle, and a radially deeper and axially wider rear end, whereby said lug presents a wedge surface inclined radially inwardly and axially upwardly for binding action on a receptacle upon which said cap is applied by rotation, the bead at the rear end being flattened to provide a substantially vertical web and a substantially horizontal web to strengthen said lug.

3. A rotatable closure cap comprising a top, a skirt terminating in a rolled bead, and a plurality of locking lugs formed in said bead, each of said lugs comprising a thread contacting portion formed from said bead, inclined upwardly circumferentially of the cap to present a surface adapted to engage a thread or lug of a receptacle in wedging relation to bind said cap upon said receptacle, a portion of the bead underlying said thread contacting portion being collapsed to provide angularly disposed portions and a horizontally flattened web connected thereto and disposed in position to brace and strengthen said thread contacting portion.

4. A closure cap comprising a top, a depending skirt, a hollow rolled bead at the edge thereof, and a plurality of locking lugs comprising inwardly struck portions of said bead, each of said lugs having a forward end of minimum radial depth and a rear end of maximum depth, and having a thread engaging surface inclined upwardly from said forward end to a maximum height adjacent said rear end, said bead adjacent said rear end of said lug being collapsed and the material thereof highly compressed, and a portion of the bead at the lugs being formed into a substantially horizontal web underlying a portion of the thread engaging surface to brace the same, said thread engaging surface presenting a wedge-like surface for contact with a receptacle thread.

5. A closure cap comprising a top, a depending skirt, a hollow rolled bead at the edge thereof, and a plurality of locking lugs comprising inwardly struck portions of said bead, each of said lugs having a forward end of minimum radial depth and a rear end of maximum depth, and having a thread engaging surface inclined upwardly from said forward end to a maximum height adjacent said rear end, said forward end being bent bodily inwardly but being substantially unchanged in cross section, said bead adjacent said rear end of said lug being collapsed and the material thereof highly compressed, whereby said lug presents a wedge-like surface for contact with a receptacle thread, a portion of

the bead at the lugs being formed into a substantially vertical web and a substantially horizontal web underlying the thread engaging surface to strengthen and brace the same.

6. A rotatable closure cap comprising a top, a depending skirt, a circumferential hollow rolled edge, and a plurality of locking lugs formed from inwardly struck sections of said rolled edge, each of said lugs comprising a substantially straight section of said rolled edge inclined from the forward end of the lug, rearwardly thereof, and inwardly with respect to a circumferential portion of the edge, each of said sections being uncollapsed throughout its major extent, but being collapsed at its innermost, rear end to resist wear and to effectually withstand sealing pressures applied thereto at that point, each of said lugs further comprising a short section connecting the rear end of the lug to the adjacent circumferential portion and being collapsed into substantially vertically disposed web form to brace and strengthen said lug.

7. A closure cap comprising a top, a depending skirt terminating in a circumferential rolled bead, and a plurality of locking lugs, each of said lugs comprising an inclined thread contacting surface disposed above an inwardly struck portion of said bead, said inwardly struck portion of said bead terminating in a substantially collapsed inner end connected to the adjacent circumferential portion of said bead by an angularly and substantially radially disposed collapsed bead portion, a part of the material of said bead adjacent the juncture of said collapsed portions being substantially horizontally disposed and spanning the angle therebetween and underlying said inclined thread contacting surface to reinforce the same and brace said lug.

ERIC B. KRAMER.
EDWARD M. ENKUR.