Aug. 13, 1968 E. F. OPPASSER 3,396,866

CAP FOR AEROSOL CONTAINER

Filed Dec. 6, 1966

FIG. 1

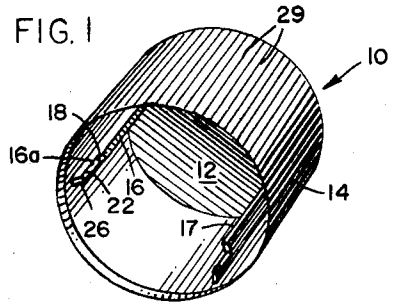


FIG. 2

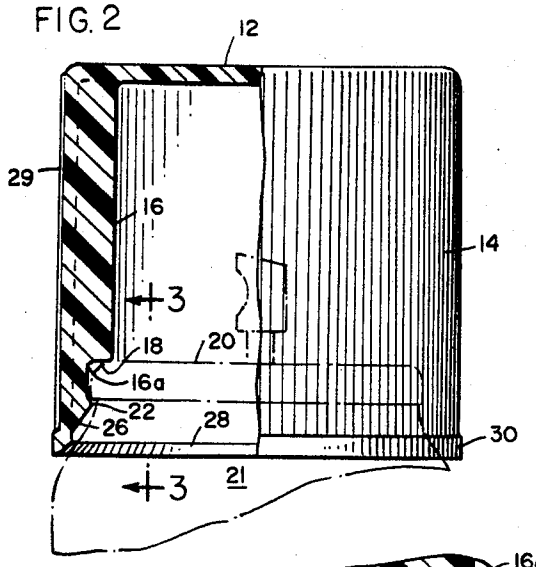


FIG. 3

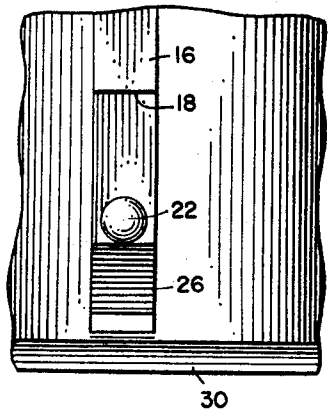
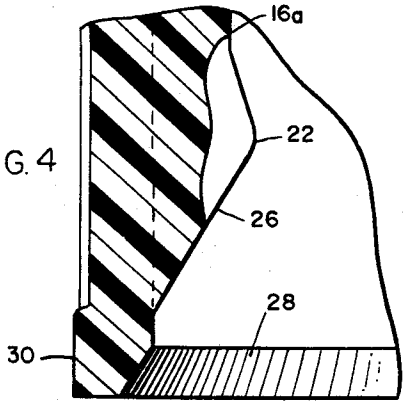


FIG. 4



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United States Patent Office 3,396,866 Patented Aug. 13, 1968

3,396,866

CAP FOR AEROSOL CONTAINER

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Filed Dec. 6, 1966, Ser. No. 599,462
6 Claims. (Cl. 220—60)

ABSTRACT OF THE DISCLOSURE

A molded cap for an aerosol container having a peripheral flange where the cap is applied, retained, and removed by the action of internal rib means which provide transverse shoulders for engaging the flange top, axial shoulders for engaging the flange sides, slight inward protuberances for engaging the flange bottoms, and lower beveled surfaces for guiding the cap onto the flange.

Summary

This invention relates to a cap, and more particularly, to a cap suited for assembly on an aerosol container.

Aerosol container caps have been known, but they have, in general, had inherent disadvantages both in the manufacturing of the cap and in the assembling of the cap on the container and removal therefrom.

The cap of the present invention overcomes many prior art disadvantages and provides a cap which is economically and easily manufactured, easily assembled on a container, and structurally strong to provide additional bracing strength when stacked for display.

An object of the present invention is to provide a cap which is easily assembled to an aerosol container by including means for guiding the cap onto the container and means for centering the cap over an upper peripheral flange of the container during assembly. Assembly is further facilitated by providing an improved grip on the cap by means of serrations around its external circumference and a passage for trapped air when the cap is secured to the container.

Another object of the present invention is to provide a cap for an aerosol container which is economically manufactured by minimizing the undercut surfaces which obstruct the ejection of the mold.

A still further object of the present invention is to provide an aerosol container cap which is adaptable to a wide variation of tolerances of the metal flange which it engages in an assembled state.

An even further object of the present invention is to provide an aerosol container cap which, in assembled condition, firmly engages an upper peripheral flange on the container thereby providing bracing strength for the combination; and yet one which is conveniently and readily removed from the container.

Briefly, the above objects are accomplished by providing an integral molded cup-shaped member with cylindrical side walls depending from a top, and a plurality of equally-spaced ribs integral with the interior of the side wall and the cap top. Each rib is provided with a radial recess forming an upper shoulder which limits the axial movement of the cap by engaging the upper peripheral flange of the container. The rib at the lower portion of the recess has a protuberance which bears against the bottom surface of the flange in snug engagement. The radial width of the ribs may have a slight draft from the recess to the top of the cap for facilitating mold ejection during manufacture; hence, the only undercut surface over which a mold must be moved is the small radial protuberance defining the lower edge of the recess.

Detailed description

Other advantages of the present invention will be obvious to those skilled in the art from the following detailed description, accompanied by the attached drawing in which:

FIG. 1 is a perspective view of an aerosol container cap according to the present invention;

FIG. 2 is a partly sectioned side elevational view of the cap of FIG. 1 assembled on an aerosol container;

FIG. 3 is a front close-up view of the recess provided in each of the ribs of the cap of FIG. 1; and

FIG. 4 is a close-up side view of the protuberance for engaging a container flange.

Referring then to the drawing, identical reference numerals will refer to like elements in the different views. The general outline of the cap is defined by a cup-shaped member **10**. The cup-shaped member **10** comprises a circular top segment **12** having an integral depending generally cylindrical side walls **14** terminating in an open bottom. The exterior surface of the side wall **14** is serrated continuously about its circumference with the ridges formed by the serrations **29** extending axially of the cylindrical side wall **14**. The serrations perform the two-fold function of providing a gripping surface for assembly and removal of the cap as well as covering up the manufacturing sink marks which occur in the side wall due to the extra bulk of the interior ribs which will be described in more detail directly.

Integral with the interior of the side wall **14** are three elongated ribs extending longitudinally of the side wall **14** from the top **12**. The ribs may have a draft for further facilitating mold ejection. Two of the ribs, **16** and **17**, can be seen in FIG. 1. The third cannot be seen because of the perspective view. All have the same structure and only one need be described in detail to understand the form of the others.

As seen in FIG. 2, the rib **16** extend as solid continuous elements from the upper closed top portion **12** to a radial inwardly extending shoulder portion **18** which abuts the top of a peripheral flange **20** on an aerosol container **21**. When assembled cans are stacked, the force is transmitted from the top of the cap through the ribs to the flange of the container. For purposes of illustration, the flange **20** on aerosol container **21** is shown as a rolled edge, but broadly it need not be so. The rib **16** may have a slight taper, as mentioned, for facilitating the manufacture of the cap by reducing obstructions to mold ejection. As shown, the shoulders **18** are substantially horizontal and terminate at their inner ends without extending downwardly, thereby facilitating free outward adjustment on the container flange.

The shoulder **18** of rib **16** together with an axial shoulder **16***a*, and node **22** which is a slight radial extension or protuberance from the rib **16**, define a recess for receiving and snugly engaging respectively the top, side, and bottom of flange **20** of the aerosol container **21**.

As seen in the close-up view of FIGS. 3 and 4, the bearing surface of the protuberance **22** can take a generally hemispherical form. As shown in FIG. 2, the protuberance **22** extends radially inward of the side wall **14** beneath the bottom edge portion of the flange **20** by an amount sufficient to grip the flange **20** in cooperation with the shoulder **18**, but not so strongly that removal of the cap is difficult. The axial shoulders **16***a* as shown in FIG. 2 are substantially vertical and bear against the side surface of flange **20**.

The lower end of rib **16** is provided with a beveled surface **26** extending from the protuberance **22** to the interior of the side wall **14** adjacent its lower end. These lower beveled surfaces on each of the interior ribs cooperate to center the cap on the flange **20** during assem-

bly, and to guide flange **20** onto and over protuberances **22**.

The interior of the lower end portion of the cap, that is, the end away from top **12**, is chamfered for further assisting the guiding of cap onto the container **21** during the initial stages of assembly, and for allowing the escape of trapped air from the interior of the cap when it is placed on the container. As shown in FIGS. 2 and 4, the beveled surface **28** is generally in alignment with the rib beveled surfaces **26**. Previously, caps have been provided with an interior chamfer for guiding them onto the container, but they have been susceptible of cracking at this thinner segment, and therefore, an outwardly extending reinforcing rim **30** extending radially of the chamfer **21** has been provided. As shown, the rim **30** is preferably opposite the beveled portion **28**, and the beveled rib surfaces **26** extend substantially to the surface **28**.

It will be noted that the reinforcing rim **30** also provides an aesthetic function in its being located relative to the container **21** such that the side walls of the container **21** and the outer side wall **14** appear to be a continuous surface when viewed in silhouette. In addition, the reinforcing rim **30** interrupts and provides a lower termination for the axial serrations **29** on the external surface of the side wall **14**, thereby preventing discomfort in handling as in the case where the serrations extend completely lengthwise of the cap forming a jogged edge at its opening. As shown in FIGS. 1 to 3, the serrations **29** are distributed around the outside of side wall **14** and extend for about the same length as rib means **16**.

With the cap as illustrated above, wherein each of the ribs extends from top portion **12** and is provided with a radial protuberance and a recess defining shoulders **18** and **16***a* for snugly engaging the upper peripheral flange of the aerosol container, additional bracing strength is added to the assembled container and cap. This is advantageous in stacking the cans so that the cap will not settle on the container and will not be accidentally dislodged if the container is dropped.

From the above description, it can be seen that the container cap of the present invention is an easily manufactured, conveniently assembled cap which provides additional structural strength in an assembled position. It will also be noted that the cap is uniquely suited for storage and assembly at different ambient temperatures and with flanges of varying tolerances, in that it is capable of being distorted to adjust for variations in tolerances in the upper flange of the container on which it is assembled. As indicated by the shading in the drawings, the cap is formed of a molded plastic, as is well known in the art.

What is claimed is:

1. A cap for an aerosol container having an upper peripheral flange with top, side, and bottom surfaces, comprising a molded integral cup-shaped member providing a generally cylindrical side wall extending downwardly from a closed upper end portion to an open bottom, a plurality of circumferentially spaced rib means integral with said side wall extending axially downward along its inner surface from said closed end portion, said rib means providing in combination an inwardly extending transverse shoulder for engaging the top surface of said container flange, an axial shoulder outwardly of said transverse shoulder for engaging the side surface of said flange, a slight inward protuberance at the lower end of said axial shoulder for engaging the bottom edge portion of said flange, and a beveled surface inclining downwardly and outwardly from said protuberance to said side wall inner surface adjacent the open bottom of said cap for guiding said cap onto said flange.

2. A cap for an aerosol container having an upper peripheral flange with top, side, and bottom surfaces, comprising a molded integral cup-shaped member providing a generally cylindrical side wall extending downwardly from a closed upper end portion to an open bottom, a plurality of circumferentially spaced rib means integral with said side wall extending axially downward along its inner surface, said rib means providing in combination an inwardly extending transverse shoulder for engaging the top surface of said container flange, an axial shoulder outwardly of said transverse shoulder for engaging the side surface of said flange, a slight inward protuberance at the lower end of said axial shoulder for engaging the bottom edge portion of said flange, and a beveled surface inclining downwardly and outwardly from said protuberance to said side wall inner surface adjacent the open bottom of said cap for guiding said cap onto said flange, said transverse shoulders being substantially horizontal and terminating at their inner ends without extending downwardly for free outward adjustment on said container flange, said axial shoulders being substantially vertical, said integral rib means extending downwardly as solid continuous elements from the underside of said cap closed end portion to said transverse shoulders, and also extending radially inward as solid continuous elements from the inner surface of said side wall to said axial shoulders, said protuberances, and said beveled surfaces.

3. A cap for an aerosol container having an upper peripheral flange with top, side, and bottom surfaces, comprising a molded integral cup-shaped member providing a generally cylindrical side wall extending downwardly from a closed upper end portion to an open bottom, a plurality of circumferentially spaced rib means integral with said side wall extending axially along its inner surface from said closed end portion, said rib means providing in combination a transverse shoulder for engaging the top surface of said container flange, an axial shoulder outwardly of said transverse shoulder for engaging the side surface of said flange, a slight inward protuberance at the lower end of said axial shoulder for engaging the bottom edge portion of said flange, and a beveled surface inclining downwardly and outwardly from said protuberance to said side wall inner surface adjacent the open bottom of said cap for guiding said cap onto said flange, the lower end portion of said cylindrical side wall being provided with an interior chamfer and an exterior peripheral rim, said interior chamfer defining a beveled surface generally in alignment with said rib means beveled surfaces for the initial guiding of said cap onto said flange, said peripheral rim reinforcing said chamfered side wall portion, said integral rib means extending for substantially the full length of said cylindrical side wall, and the outer surface of said side wall being provided with axial serrations distributed therearound and extending for about the same length as said rib means, said serrations being interrupted at their lower ends by said rim.

4. A cap for an aerosol container having an upper peripheral flange with top, side, and bottom surfaces, comprising a molded integral cup-shaped member providing a cylindrical side wall extending downwardly from a closed upper end portion to an open bottom, three circumferentially spaced rib means integral with said side wall extending axially along its inner surface, said rib menas providing in combination a transverse shoulder for engaging the top surface of said container flange, an axial shoulder outwardly of said transverse shoulder for engaging the side surface of said flange, a slight inward protuberance at the lower end of said axial shoulder for engaging the bottom edge portion of said flange, and a beveled surface inclining downwardly and outwardly from said protuberance to said side wall inner surface adjacent the open bottom of said cap for guiding said cap onto said flange, said transverse shoulders being substantially horizontal and terminating at their inner ends without extending downwardly for free outward adjustment on said container flange, said integral rib means extending downwardly as solid continuous elements from the underside of said cap closed end portion to said transverse shoulders and also extending inwardly as solid continuous elements from the inner surface of said side wall to said axial

shoulders, said protuberances, and said rib means beveled surfaces, the lower end portion of said cylindrical side wall being provided with an interior chamfer and an exterior peripheral rim, said interior chamfer defining a beveled surface generally in alignment with said rib means beveled surfaces for the initial guiding of said cap onto said flange, said peripheral rim reinforcing said chamfered side wall portion, said integral rib means extending for substantially the full length of said cylindrical side wall, and the outer surface of said side wall being provided with axial serrations distributed therearound and extending for about the same length as said rib means, said serrations being interrupted at their lower ends by said rim.

5. In a cap and container device, an aerosol container having an upper peripheral flange with top, side, and bottom surfaces, a cap comprising a molded integral cup-shaped member providing a cylindrical side wall extending downwardly from a closed upper end portion to an open bottom, a plurality of circumferentially spaced rib means integral with said side wall extending axially along its inner surface, wherein the improvement comprises: said rib means providing in combination a transverse shoulder for engaging the top surface of said container flange, an axial shoulder outwardly of said transverse shoulder for engaging the side surface of said flange, a slight inward protuberance at the lower end of said axial shoulder for engaging the bottom surface of said flange, and a beveled surface inclining downwardly and outwardly from said protuberance to said side wall inner surface adjacent the open bottom of said cap for guiding said cap onto said flange, said transverse shoulders being

substantially horizontal and terminating at their inner ends without extending downwardly for free outward adjustment on said container flange, said integral rib means having their upper ends integral with said closed upper end portion and extending downwardly as solid continuous elements from the underside of said upper end portion to said transverse shoulders, and also extending inwardly as solid continuous elements from the inner surface of said side wall to said axial shoulders, to said protuberances, and to said beveled surfaces.

6. The device of claim 5 wherein the lower end portion of said cylindrical side wall is provided with an interior chamfer and an exterior peripheral rim, said interior chamfer defining a beveled surface generally in alignment with said rib means beveled surfaces for the initial guiding of said cap onto said flange, said peripheral rim reinforcing said chamfered side wall portion, said integral rib means extending for substantially the full length of said cylindrical side wall, and the outer surface of said side wall being provided with axial serrations distributed therearound and extending for about the same length as said rib means, said serrations being interrupted at their lower ends by said rim.

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