Oct. 8, 1957 W. F. SMITH 2,808,954

TAMPER-PROOF CLOSURES FOR CONTAINERS

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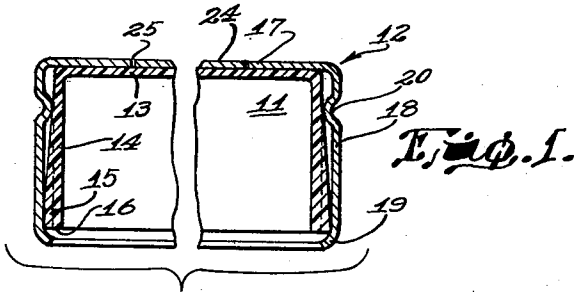


Fig. 1.

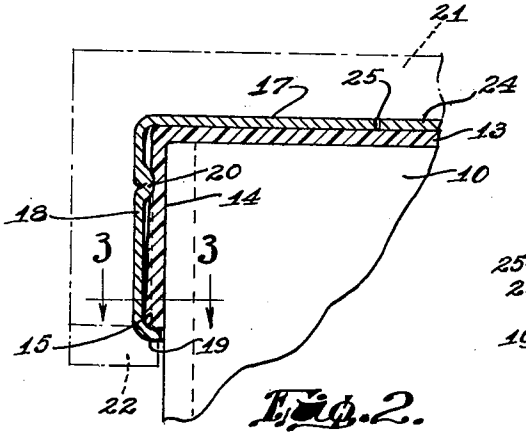


Fig. 2.

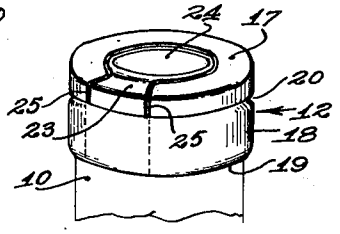


Fig. 5.

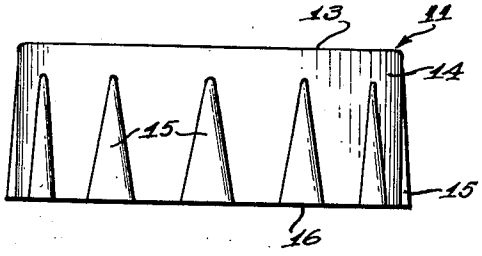


Fig. 4.

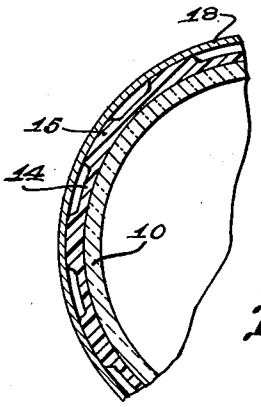


Fig. 3.

INVENTOR
W. F. SMITH

BY
Rule & Hoge
ATTORNEYS

United States Patent Office

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TAMPER-PROOF CLOSURES FOR CONTAINERS

Winfield F. Smith, Vineland, N. J., assignor to Owens-Illinois Glass Company, a corporation of Ohio

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4 Claims. (Cl. 215—38)

The present invention relates to improvements in tamper-proof closures for containers, such for example as shell vials, ligature tubes and similar cylindrical containers which ordinarily are made of drawn glass tubing.

An object of my invention is the provision of a simple, effective and comparatively inexpensive closure including a hood formed of rubber-like material such, for example, as polyethylene, such hood being telescoped over the open end of a vial or tube and firmly held in sealing engagement with the container by means of a thin metal shell, or ferrule.

A further object of my invention is the provision of a closure of the above character in which the shell includes a preformed annular hollow bead projecting radially inward of the skirt and intended to be collapsed vertically by shortening of the shell skirt, all to the end that the bead will press a portion of the hood flange firmly against an external sealing surface of the container.

A further object of my invention is the provision of a plastic hood incorporating on the exterior surface of the flange portion an annular series of vertical cushioning ribs which are intended to prevent application of any excessive compression strain to the glass such as might result from pressure which the shell exerts during and after application. To this end the ribs may be spread laterally under pressure into the space between said ribs.

A still further object is to so form ribs on the exterior surface of the hood flange that they will, to a substantial degree, compensate for variations in the outside diameter of the vial or tube and thereby insure proper and effective sealing and, additionally, to engage an inwardly turned free edge portion of the shell skirt, whereby to hold the two elements against accidental separation.

Other objects will be in part apparent and in part pointed out hereinafter.

In the drawings:

Fig. 1 is a vertical transverse sectional view of a closure incorporating my invention.

Fig. 2 is a fragmentary detail sectional view illustrating the sealing position of a closure upon a vial and in dotted lines a conventional means for affixing the closure to the container.

Fig. 3 is a detail sectional view taken substantially along the plan of line 3—3 of Fig. 2.

Fig. 4 is a side elevational view of the plastic hood.

Fig. 5 is a perspective view of the closure showing the tear-strip feature which facilitates removal of the closure from a container.

In the illustrated embodiment of my invention, it is shown for use with and applied to a glass vial 10 or similar straight-sided container, which is or in any event may be formed of drawn glass tubing. Such a vial is ordinarily a cylinder, the walls of which are relatively thin and, as a consequence, subject to breakage if excessive pressure is applied thereto incident to attachment of a closure.

My tamper-proof closure, as shown, comprises a cup-like plastic hood 11 and a sheet metal shell 12 which is

of generally cup-like form and telescoped over the plastic hood and by novel means, yet to be described, held in assembled relationship to the latter.

The plastic hood may well be formed of polyethylene or other plastic material having similar characteristics and, as shown, comprises a circular top portion 13 and a depending annular flange which preferably has formed on its exterior surface an annular series of ribs 15. Each of these ribs has a base portion 16 lying in the plane of the free lower edge of the flange 14 and, as shown in Figs. 1 and 4, extends upwardly toward, but terminates short of the circular top portion 13. These ribs also taper upwardly so that both their width and thickness decrease toward said top portion.

The shell 12, preferably, although not necessarily, is formed of light-gauge aluminum and comprises a circular panel 17 and depending annular attaching skirt 18 which is of slightly greater height than the flange of the hood 11. The free lower margin of the attaching skirt 18 is turned inwardly slightly to provide a supporting or retaining flange 19 or shelf with which the base portions of the ribs are in contact, as shown in Fig. 1, so that the two elements are effectively secured against accidental separation. A hollow annular bead 20 is formed internally of the skirt 18 of the shell preferably at a point somewhat nearer the panel portion than to the free end of the skirt, such bead projecting radially inward to provide an annular inner surface of somewhat lesser diameter than the inner surface of the attaching skirt proper, for contact initially with the upper end portions of the ribs 15. This hollow bead is collapsible vertically under pressure of closure applying mechanism in a fashion and for the purpose to be set out presently.

In applying a closure of the above form to a vial or such container, the closure, in the form shown in Fig. 1, is telescoped over the open end of a vial and pressed downwardly until the top portion 13 of the hood has been firmly brought into contact with the rim or mouth forming wall of the container. Thereupon an anvil 21 is brought into position as shown in Fig. 2 to apply additional sealing pressure to the closure and confine the skirt 18 so that it will not become deformed incident to deliberately collapsing the hollow bead 20. Next, suitable jaws 22 are moved into position beneath the inwardly curved flange 19 of the skirt 18. Immediately thereafter these jaws 22 are moved axially upward so that the aforementioned flange 19 is bent inwardly and the hollow bead 20 collapsed vertically resulting in a substantial decrease in the overall height of the attaching skirt and consequent snug sealing contact of the hood flange with the side wall of the container 10. As shown in Fig. 2, the hollow bead may be completely collapsed so that it becomes quite deeply embedded in the hood flange 14.

In Fig. 5, I have shown a tear-strip 23 terminating in a finger piece 24 which, together, provides means facilitating ready removal of the closure and at the same time performing the function of well-known tamper-proof closures. Obviously lifting of the finger piece 24 and separating the strip from the closure proper along the score lines 25 simplifies the closure removal problem. It is also apparent that such a closure cannot be reapplied without clearly indicating that the original package has been opened.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. A closure of the character described comprising a cup-like hood formed of a rubber-like material and including a circular top portion, an annular flange depending from the margin of the top portion, a light gauge sheet metal shell within which said hood is nested, said shell including a circular panel, an annular skirt depend-

ing from the margin of the panel, said skirt having its free edge turned inwardly to hold the hood and shell against accidental separation, a hollow axially collapsible annular bead projecting radially inward toward the flange of said hood, and an annular series of external ribs formed on the hood flange and each such rib extending from the free edge of the flange toward but terminating short of the top portion.

2. A closure of the character described comprising a cup-like hood formed of a rubber-like material and including a circular top portion, an annular flange depending from the margin of the top portion, a light gauge sheet metal shell within which said hood is nested, said shell including a circular panel, an annular skirt depending from the margin of the panel, said skirt having its free edge turned inwardly to hold the hood and shell against accidental separation, a hollow axially collapsible annular bead projecting radially inward toward the flange of said hood, and a series of circumferentially spaced ribs formed on the exterior surface of the hood flange, each rib extending from the free edge of the flange toward the top portion and decreasing in width and thickness toward the latter.

3. A closure of the character described comprising a cup-like hood formed of a rubber-like material and including a circular top portion, an annular flange depending from the margin of the top portion, a light gauge sheet metal shell within which said hood is nested, said shell including a circular panel, an annular skirt depending from the margin of the panel, said skirt having its free edge turned inwardly to hold the hood and shell

against accidental separation, a hollow axially collapsible annular bead projecting radially inward toward the flange of said hood, and a series of circumferentially spaced ribs formed on the exterior surface of the hood flange, each rib extending from the free edge of the flange toward the top portion and decreasing in width and thickness toward the latter, each said rib terminating in proximity to the lower side of said hollow bead.

4. A closure of the character described comprising a cup-like hood formed of a rubber-like material and including a circular top portion, an annular flange depending from the margin of the top portion, a light gauge sheet metal shell within which said hood is nested, said shell including a circular panel, an annular skirt depending from the margin of the panel, said skirt having its free edge turned inwardly to hold the hood and shell against accidental separation, a hollow axially collapsible annular bead projecting radially inward toward the flange of said hood, and an annular series of external ribs formed on the hood flange, each such rib having one end in contact with the inwardly turned free edge of the shell skirt and its other end terminating in proximity to but above the hollow bead.

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