June 18, 1940. H. W. SNODGRASS 2,204,831

CLOSURE

Filed March 2, 1938

Fig. 1

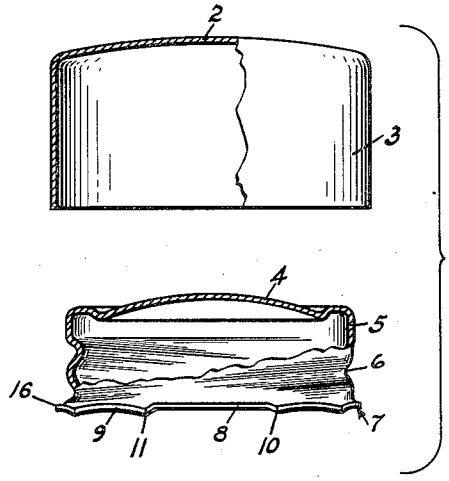


Fig. 2

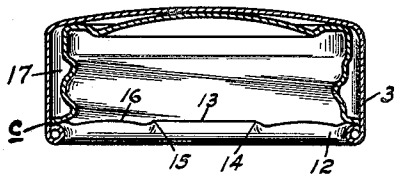


Fig. 3

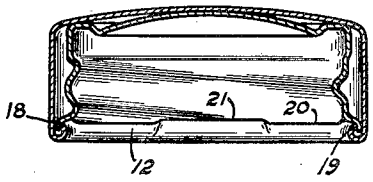
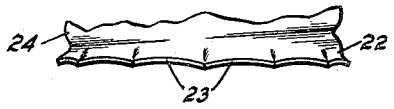


Fig. 4



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2,204,831

CLOSURE

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Application March 2, 1938, Serial No. 193,404

5 Claims. (Cl. 215—43)

My invention relates to closures and more particularly to the so-called "double shell" closures which generally comprise an inner cap provided with means for removably securing the closure to a receptacle, such as screw thread formations, and an outer shell telescoped over the inner cap and secured thereto and serving to conceal the thread or other formations when the closure is in sealing position on a receptacle. One of the major problems in the manufacture of closures of this type is to prevent relative rotation between the inner cap and the outer shell caused by the turning stress required to remove the closure from the receptacle it seals. This turning stress is often greatly augmented by poorly formed threads on the receptacle or by reason of adhesion of the closure and the receptacle caused by seepage of the contents of the receptacle or corrosion of the metal parts.

An object of my invention is to provide a simple and effective union between the inner cap and the outer shell whereby relative rotation is prevented and to provide a union which may be effected by the simple expedient of deforming the skirt of the outer shell, preferably by the formation of a bead upon the exposed end thereof.

In my preferred embodiment, the inner cap is provided with a radial flange extending substantially normal to the cap axis and having extended surface areas lying in a plurality of planes, with adjacent areas joined at a relatively sharp angle so as to provide an abutment between adjacent surfaces. Some or all of the surfaces may be of arcuate contour to provide "cam surfaces" which upon association with the bead of the outer shell prevent relative movement between the parts, since any movement in either a clockwise or counter-clockwise direction will cause the component parts to more firmly interengage, the cap being normally rotatable only in a single plane.

My invention is illustrated in the attached drawing, in which

Figure 1 is an exploded view partly in elevation and partly in section illustrating an outer shell and an inner screw threaded cap prior to assembly into a double shell closure;

Figure 2 is a sectional view of an assembled closure embodying my invention;

Figure 3 is a similar view illustrating a modification; and

Figure 4 is a broken plan view of a modified type of flange for the inner cap structure.

Referring first to Figure 1, the outer shell comprises a top portion 2 and a skirt 3. The inner cap is formed with a top 4 and a skirt 5; the length of the skirt 3, being slightly greater than the skirt 5, provides an extended portion for subsequent deformation to effect interlocking of the cap and shell upon assembly. The skirt 5 is provided with screw thread formations 6 although other types of securing means may be employed and the cap may assume various forms depending upon the size and type of container to be sealed.

The skirt 5 is provided with a flange 7 which, in the embodiment illustrated, extends radially from the skirt of the cap and lies substantially normal to the axis of the cap. The surface of the flange 7 is deformed to provide extended surface areas lying in a plurality of planes.

In the embodiment illustrated in Figure 1, lands 8 and 9 are provided, each of which extends in a different plane. These lands 8 and 9 are alternated about the surface of the flange 7 and it has been found that six lands are satisfactory for a 28 mm. screw cap. It is desirable to provide surfaces of extended area so that the outer shell when deformed by engagement with the flange 7 may readily follow the contour thereof, thus assuring a positive locking engagement of the shell with the cap. It is also desirable to connect the adjacent flange areas lying in different planes at a relatively sharp angle to provide abutments such as illustrated at 10 and 11 in Figure 1 which limit relative movement.

Referring now to Figure 2 which clearly shows the interlocking of the component parts, it will be observed that the cap has been telescoped within the outer shell and that the projecting portion of the skirt 3 is formed into an inwardly, upwardly and outwardly extending bead 12 which is deformed about the flange 7 so that portions 13 of the bead lie in engagement with the lands 8 and are provided with abutments 14 and 15 lying in engagement with the corresponding abutments 10 and 11 of the flange 7. It will be further noted that portions 16 of the bead 12 are of arcuate formation corresponding to the arcuate portions 9 of the flange 7 and thus may be defined as being in substantially the same plane. The bead 12 closely follows the contour of the flange 7 throughout its entire area, due largely to the fact that the deforming surfaces 8 and 9 are all of relatively extensive surface area.

In my preferred closure, the flange 7 terminates in a cut surface 16, and the outer diameter of the flange 7 is preferably slightly greater than the inner diameter of the skirt 3, say .002" on a 28 mm. cap, thus causing the cut surface C of the flange 7 to engage the inner surface 17 of the

skirt 3 enhancing the interlocking engagement of the cap and shell. In Figure 3, the flange 7 is not trimmed to a true circumference and the irregular edge portion is formed into an axially extending flange 18 which, upon assembly, lies parallel to the skirt of the outer shell and is held firmly thereagainst by the cut edge 19 of the bead 12. In this embodiment of my invention, the surfaces 20 and 21 of the bead 12, and their corresponding lands lie in parallel planes normal to the axis of the cap, whereas in the embodiment of Figure 1, the lands 9 are of arcuate formation.

Figure 4 illustrates a modified flange constructiton in which the flange 22 is undulatory and provided with undulations 23. In this structure the flange is directed outwardly and downwardly from the skirt 24 at an angle of approximately 45°. The undulations provide a plurality of arcuate surfaces similar to those designated by the numeral 9 in Figure 1 and serve to prevent relative rotation of the members. The surfaces 23 act as "cams" always tending to enhance the engagement of the deformed portion of the outer shell therewith regardless of the direction of rotation.

In the fabrication of closures embodying my invention, the inner shell is telescoped within the outer shell and a curling tool is applied to the skirt of the outer shell to deform the same and urge it into engagement with the surface of the locking flange. Thus, the assembly of the inner cap and the outer shell into locking engagement is simple, rapid and inexpensive. Obviously, the interlocking may be accomplished by means other than the specific bead structure illustrated.

While I have described and illustrated certain preferred embodiments of my invention, it will be understood that the invention may be otherwise embodied and practiced within the scope of the following claims.

I claim:

1. A double shell closure comprising an outer shell and an inner cap telescoped one within the other in substantially axial alignment, an outwardly extending flange on the cap, said flange having its outwardly extending surface disposed as a plurality of extended surface areas lying in a plurality of planes, the outer shell interengaging with a plurality of said extended surface areas and locking said cap and shell against relative rotation.

2. A double shell closure in accordance with claim 1 in which at least some of the extended surface areas on the outwardly extending flange are of arcuate contour with respect to a plane normal to the longitudinal axis of the cap and in which portions of the outer shell lie in face to face engagement therewith to lock the component parts against relative rotation.

3. A double shell closure in accordance with claim 1 in which the flange terminates in a cut edge penetrating the material of the skirt of the outer shell and is held in such position by portions of the outer shell lying in planes substantially corresponding to the planes of the extended surface areas of the flange.

4. A double shell closure comprising an inner cap having a skirt provided with means for removably securing the closure to a receptacle, an outwardly extending flange on the skirt of the cap, said flange lying substantially normal to the axis of the cap, certain portions of the flange of extended surface area being deformed and out of the plane of other portions of the flange, said portions being connected at a relatively abrupt angle whereby a substantially axially extending abutment is formed between areas in one plane and areas in another plane, an outer shell telescoped over the inner cap, the skirt of the shell being deformed about and cooperating with the flange to prevent relative rotation of the cap and shell.

5. A double shell closure comprising an inner cap having a skirt provided with means for removably securing the closure to a receptacle, an outwardly extending flange on the skirt of the cap, said flange having extended surface areas lying in a plurality of planes, an outer shell telescoped over the inner cap, the skirt of the outer shell being formed into an inwardly, upwardly and outwardly extending bead, the outwardly extending portion of said bead lying in substantially the same planes as the planes of the surface of the flange on the inner cap.

HENRY W. SNODGRASS.