March 28, 1939. E. F. ANDERSEN 2,151,826

CONTAINER AND CLOSURE

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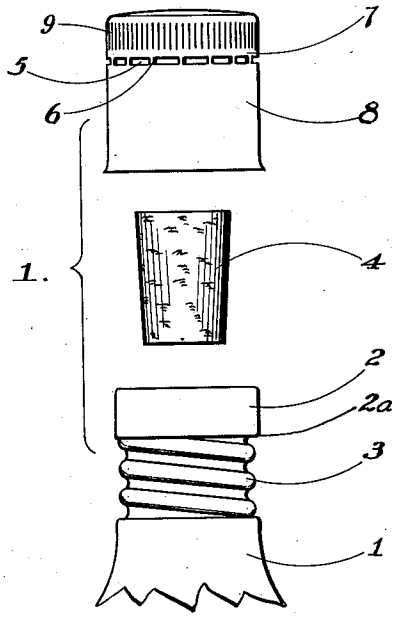


Fig. 1.

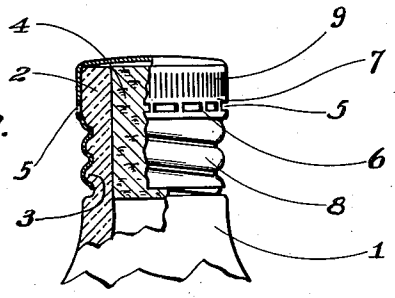


Fig. 2.

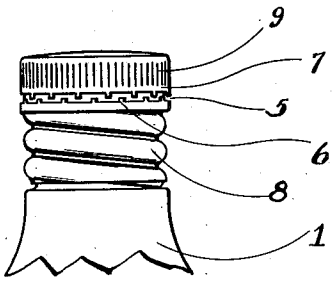


Fig. 3.

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CONTAINER AND CLOSURE

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3 Claims. (Cl. 215—46)

This invention relates to closures, and relates particularly to an improved combination of closure and container.

An object of the invention is to improve a closure or closure shell that is adapted to be removed by relative movement between the shell and container, so that the container is tamper-proof to the point that the closure or shell must be mutilated beyond all possibility of re-use by any attempt to remove it, regardless of the manner in which the attempt is made. Closures of the general type to which this invention relates, that is, closures having a weakened circumferential portion that will fracture or shear with attempted rotation, are known in the art, but the known closures have been combined with container detents of such a character that the closure can be loosened from the detents and the entire closure removed for re-use, and it is this possibility that the present invention is intended to remove.

Coincidental with this object is the object to combine the improved tamper-proof characteristics with the ease of authorized opening that characterizes the earlier closures of this type.

Another object of the invention is to extend the improvement to closures in which a stopper forms a part, as well as to closures consisting of a sealing element carried within a skirted shell.

These and additional objects will be apparent when considered in the light of the following detailed description accompanying the drawing, in which:

Fig. 1 is a side view of the component parts of a closure combination arranged in sequence of assembly;

Fig. 2 is a side view of the complete combination with a fragment shown in section; and

Fig. 3 is a side view of the combination after fracture of the closure shell.

With reference now to Fig. 1, the reference numeral 1 indicates generally a container such as a bottle or the like which has a cylindrical surface 2 extending downwardly from the mouth end of the container and an inwardly disposed shoulder 2*a* adjoining the lower edge of the cylindrical surface. Immediately below the shoulder there is a threaded portion 3 in which the thread base or root is recessed with respect to at least the edge of the shoulder 2 adjacent thereto. The threads are so disposed that a complementary threaded portion will be advanced along the threads away from the mouth of the container by counter-clockwise rotation; that is to say, the threads are of the type commonly called left-hand threads. A friction stopper 4, which may be made of cork or any satisfactory material, is shown above the mouth of the bottle. Above the stopper is shown a cup-shaped metallic shell in its fabricated form that consists of an enclosed end and depending skirt. The skirt is circumferentially perforated or slit as at 5. These perforations, in order to aid in the removal of the shell, are of considerably greater length than width. Between the perforations are narrow bridges of metal 6 that connect the portions of the shell otherwise divided by the perforations into two portions 7 and 8. The upper portion 7 is preferably knurled, as indicated at 9, to provide a satisfactory gripping surface.

In Fig. 2, the combination of Fig. 1 is shown in assembly. The perforated shell is retained by the portion 8 which has been deformed by radial pressure against the threaded portion 3 of the container to conform closely therewith. In other words, the threads of the shell skirt are formed against the bottle which serves as the mandrel. This is best accomplished by progressively rolling the skirt downwardly into threads by means of a tool free to follow the declination of the threads while the top of the shell is maintained under pressure. The threads of the portion 3 serve, therefore, as detents for the shell. Because of the projection of the shoulder 2*a*, shown to advantage in Fig. 1, beyond the thread roots, it is necessary that the shell be deformed into threads when in assembled position. As shown in the fragmentary section of Fig. 2, the perforations 5 are located adjacent the cylindrical surface 2, preferably near the lower edge thereof, to provide a large gripping surface.

Immediately after an attempt to rotate the shell counter-clockwise, the combination appears as shown in Fig. 3. The connecting bridges 6 are broken or fractured since the shell top prevents the shell from advancing appreciably in the direction of lead of the threaded portion 3, so that the force applied, augmented by the mechanical advantage incident to the threads, tears the shell along the line of perforations. To guarantee full availability of the mechanical advantage of the thread-like detents, it is necessary, as shown in Figs. 2 and 3, to have the threaded portion 3 extend below the bottom of the shell skirt as applied, so that some advancement is possible.

The described relationship of shoulder and threads makes impossible the retraction of the "custom fitted" shell, since the threads of the shell will immediately jam against the shoulder. If an attempt is made to iron or smooth out the

threaded portion of the skirt by continued rotation, the shell will fracture or shear along the weakened circumferential line. When the shell is turned counter-clockwise, that is, for advancement along the threads of the bottle, the top of the shell will bind and the shell fractures easily due to the combination of torsional force and tension resulting from the mechanical advantage incident to the threads. The final tamper-proof feature results from the very nature of the detents or threads. Once the shell is threaded against the bottle detents, it is impossible to smooth out the skirt to remove the entire shell without fracturing the metal. The crests and troughs of the convolutions of the threads make impossible any attempt to loosen the skirt from the bottle. Consequently, the invention provides a closure that can be removed in only two ways, as authorized or by cutting the entire shell from the bottle.

The invention has been described with reference to one embodiment which fully illustrates the relationship of container or bottle finish and closure shell, which forms the essence of the invention. In the embodiment shown, a friction stopper is included, and it might well be considered the closure proper with the enclosing shell serving as a tamper-proof securing device. A flanged stopper can be substituted for the stopper shown, or the shell may be used as a true closure by omitting the stopper and using a sealing element in the shell, such as a compressible disc. The intention here is to point out definitely that the invention is in no way dependent upon the exact manner in which the contents of the container are sealed.

The closure shell is one easily manufactured, in that it requires a single blanking and drawing operation followed by a single perforating or slitting operation that can be made upon the same press as the drawing operation. The affixation of the shell is a simple, single operation that can be accomplished by several methods dependent upon the gauge and ductility of the material used. While gauges coming within the classification of foil are not preferable, nevertheless when such gauges are used the shells can be affixed by pressure applied simultaneously to the entire shell. The full advantage of the invention, however, is gained by use of metal that can be progressively rolled into conformity with the threads. In all cases, it is necessary to use material that can be molded or worked into conformity with the contour of the container.

Since the invention has been fully described, the following claims are appended with intent to include all forms coming within the inventive concept defined.

I claim:

1. A container having a neck portion comprising a plain external surface of revolution extending downwardly from the mouth end of the neck with its axis coincident with the major axis of the container, an inwardly disposed shoulder adjoining said surface, and thread-like detents immediately below said shoulder, in combination with a cup-like rotatably severable shell of sheet metal having a depending skirt provided with a gripping surface extending from the closed end of said shell to a circumferential line of perforations adjacent the lower end of said surface of revolution, and below said line with rotatably indestructible detents engaging those of the container to secure said shell thereto and extending radially inward an appreciable distance with respect to the outer edge of said container shoulder, whereby the shell portion above said line of perforations is rotatably removable only by severance along said line, preferentially by rotation in a direction opposite to that of the detent inclination, and the shell portion below said line is permanently locked to said neck by said shoulder.

2. A container having a neck portion comprising a cylindrical surface extending downwardly from the mouth end of the neck, an inwardly disposed shoulder adjoining said surface, and left hand screw threads immediately below said shoulder, in combination with a cup-like, rotatably severable shell of sheet metal having a depending skirt provided with a gripping surface extending from the closed end of said shell to a circumferential line of perforations adjacent said container shoulder, and below said line with rotatably indestructible threads engaging those of the container to secure said shell thereto and extending radially inward an appreciable distance with respect to the outer edge of said container shoulder, whereby the shell portion above said line of perforations is rotatably removable only by severance along said line, preferably by counter-clockwise rotation, and the shell portion below said line is permanently locked to said neck by said shoulder.

3. A combination comprising a container having a neck portion provided with a mouth, a friction stopper seated in said container mouth, and a cup-like rotatably severable shell enveloping the mouth end of said neck, said container neck portion having a plain external surface of revolution extending downwardly from the mouth end of said neck with its axis coincident with the major axis of the container, an inwardly disposed shoulder adjoining said surface, and screw threads immediately below said shoulder, and said shell being made of sheet metal and having a depending skirt provided with a gripping surface extending from the closed end of said shell to a circumferential line of perforations adjacent the lower edge of said surface of revolution, and below said line with rotatably indestructible threads engaging those of the container to secure said shell thereto and extending radially inward an appreciable distance with respect to the outer edge of said container shoulder, whereby the shell portion above said line of perforations is rotatably removable only by severance along said line, preferentially by rotation in a direction opposite to that of the thread inclination, and the shell portion below said line is permanently locked to said neck by said shoulder.

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