

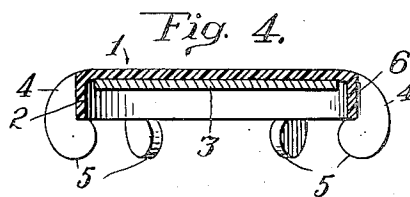
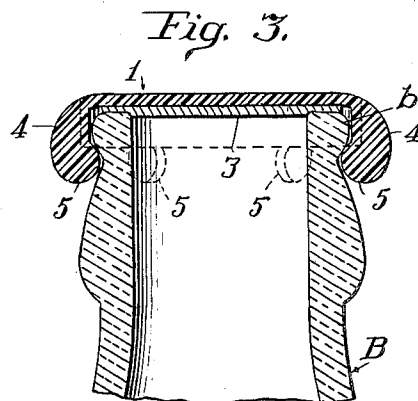
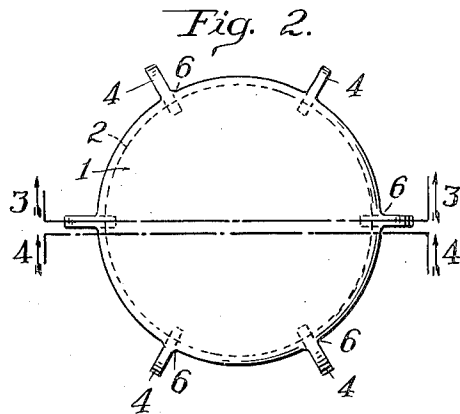
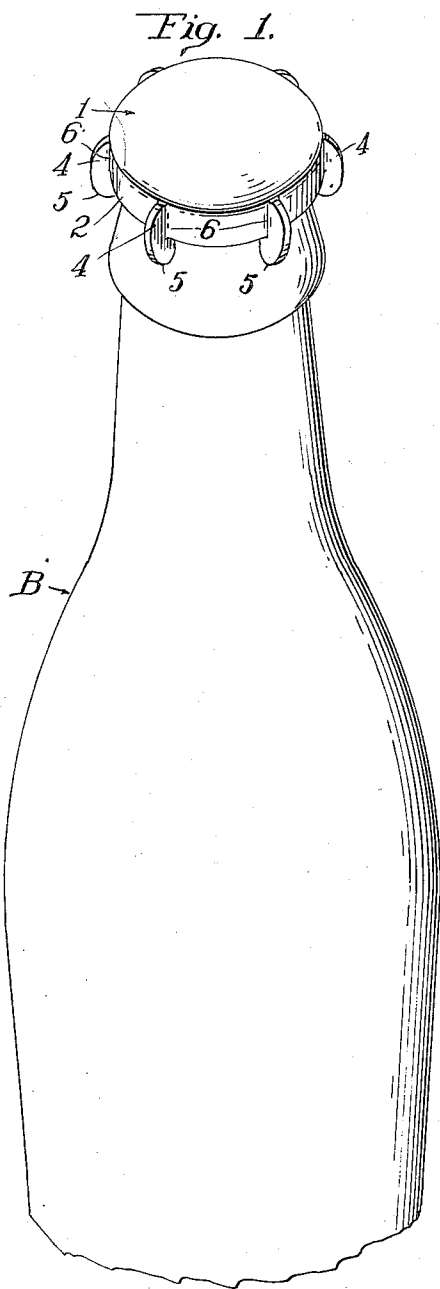
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BOTTLE CAP

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BOTTLE CAP

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This invention relates to bottle caps for use in sealing bottles or containers such as are usually employed for holding carbonated beverages, beer and the like.

The primary objects of the invention are: to provide a novel type of bottle cap which is particularly adapted for economical mass production by molding from suitable plastic or other materials; and, to provide such a cap having bottle gripping elements which are resiliently radially expandible to pass down over the usual retainer bead of the bottle neck as the cap is pressed thereon and then resiliently contract therebeneath to maintain the cap in place, but which are frangible when subjected to circumferential or tangential deflection, thus permitting ready removal of the cap without the use of a special tool or opener.

Further incidental objects are: to so locate the bottle gripping elements that they are readily accessible for tangential deflection, by hand or by pressure against any handy fixed object, and will not obstruct the paths of deflection of adjacent gripping elements; to so form the bottle gripping elements that tangential deflection forces acting thereon will be transmitted with a substantial mechanical advantage to the zones of breakage of said elements; to provide such a cap which presents no rough or sharp edges which might injure the hands of bottling plant workers and others, and in which the said gripping elements are disposed below the level of the top of the cap so that crates of bottles may be stacked one on the other in usual manner with each crate supported on the caps of the bottles in the crate therebeneath, without damage to any of the caps; and to provide such caps which will require only slight modifications in existing types of capping machines to adapt same for efficient use therewith.

In this application I have shown and described only the preferred embodiment of my invention, simply by way of illustration of the practice thereof, as by law required. However, I recognize that my invention is capable of other and different embodiments and that the several details thereof may be modified in various ways, all without departing from my said invention. Accordingly, the drawings and description herein are to be considered as merely illustrative and not as exclusive.

In the accompanying drawings:

Figure 1 represents a perspective view on an enlarged scale showing the upper portion of a usual carbonated beverage bottle having one of

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the caps of my invention operatively applied thereto;

Figure 2, a top plan view of one of the bottle caps of my invention, also on an enlarged scale;

Figure 3, an axial section on the line 3-3 of Figure 2, looking in the direction of the arrows, and showing the cap as it appears when applied to a bottle, the upper portion of the bottle also being shown in axial section; and,

Figure 4, a section on the line 4-4 of Figure 2, looking in the direction of the arrows.

Referring now in detail to the accompanying drawings, the reference character B therein designates a usual bottle (of which only the upper portion is shown) such as is customarily employed to contain carbonated and other beverages. Disposed around the neck of said bottle adjacent its upper end is the usual retainer beading or flange or lip b, which functions as a projection around and under which the gripping portions or elements of a bottle cap may engage to maintain the cap in operative sealing relation over the opening or mouth of the bottle.

The bottle cap of my invention is preferably formed by usual molding or casting operations from a suitable plastic material having characteristics which permit it to be resiliently bent a substantial amount without breaking or assuming a permanent set, but which is frangible when subjected to excessive bending or flexing. In the preferred embodiment, the cap is formed from polystyrene, though such materials as Celuloid, cellulose acetate, synthetic resins and the like might also be employed.

Such a cap comprises a flat disc top 1 adapted to extend across and cover the bottle mouth or opening, and may also advantageously include an integral depending annular skirt 2 adapted to extend axially over part of the bottle neck adjacent the mouth and protect same against contamination, while also strengthening the cap structure.

In accordance with usual practice, the cap may employ a sealing disc or gasket 3 of yielding material positioned concentrically therein beneath the disc top 1 to extend across the top or end of the bottle neck and provide a fluid tight and pressure tight seal for the mouth of the bottle, all in accordance with usual practice.

Formed integrally with the cap, and in particular with the depending skirt 2 thereof where such a skirt is employed, are at least several relatively circumferentially spaced axially disposed fins or bottle gripping elements, each des-

ignated 4. These elements or fins project radially from the cap and preferably are disposed entirely below the level of the upper surface of the disc top 1 so that crates of bottles equipped with these caps may be stacked as heretofore, with each but the lowermost crate resting on the caps of the bottles within the crate therebeneath, without damaging any of said caps.

The lower ends of these fins 4 project axially beneath the disc top 1 and have bottle gripping portions 5 projecting radially inwardly therefrom respectively at a common level spaced below said top. In the embodiment illustrated, said lower ends or gripping portions 5 project beneath and radially inwardly from the lower edge of the depending skirt 2, as will be readily apparent in each of Figures 1, 3 and 4.

The radial dimensions or thicknesses of the respective fins 4 are substantial, being chosen in accordance with the character of the cap material to provide a substantial degree of resilient resistance to radial deflection, but to withstand without breaking such deflection as is required to permit the gripping portions 5 to pass over the retainer beading and engage therebeneath as the cap is pressed onto a bottle. It is a further requirement of these fins 4 that their resilient radial gripping action beneath the beading b, after the cap is applied to the bottle, be at least sufficient to maintain the cap firmly in sealing relation on the bottle against the internal pressure normally exerted by the carbonated bottle contents.

The depending skirt 2, as shown in the illustrated embodiment, cooperates with the fins 4 by tying same together adjacent their lower extremities and thus reinforcing the radial grip of the portions 5 on the bottle. Also such a skirt permits the axial zone or line of juncture 6 between the respective fins 4 and the cap to be of substantial axial extent and thus effectively maintains the several fins 4 against inadvertent axial misalignment during the capping process.

Each of the fins 4 is formed in such a manner that an excessive tangential force exerted thereon will cause it to be bent or deflected about its juncture with the cap and eventually to break along or adjacent to said junction or zone of attachment 6. In order to accomplish this it is necessary only that the tangential dimension or thickness of the fin be substantially reduced or diminished along or adjacent said junction or line of attachment 6, though in the preferred embodiment each of the fins 4 is formed throughout its entire extent of a uniform tangential thickness which is substantially diminished relative to its radial dimension or thickness.

The tangential dimensions of the fins 4 may of course vary in accordance with the strength and resiliency of the particular material used in fabricating the caps, it being required only that these dimensions be such as will render the respective fins frangible when they are bent or deflected excessively in tangential directions.

In the use of these bottle caps, same may be applied to conventional bottles by pressing them axially onto the necks of said bottles in conventional manner. If desired, existing types of bottling machines may be easily adapted for this purpose, it being required primarily that such machines be modified and simplified to the extent necessary to cause them to omit the crimping function which is required in connection with usual metal crown caps.

Where it is desired to remove such a cap from

its bottle, this may be readily accomplished without the aid of an opener or special tool, by applying sufficient tangential pressure against one or more relatively adjacent fins to break same away from the cap. Such pressure may be applied in any suitable manner, as by finger pressure where the tangential strength of the fins will permit this, or by pressure against any suitable solid object.

It will be apparent that such a tangential force applied to any of the fins 4 will deflect same about an axis generally defined by its axial line of juncture 6 with the skirt 2, and in moving about this axis the gripping portion 5 of the fin will swing away from the bottle neck toward a position beneath the skirt 2 without being obstructed in such movement by any portion of the bottle or cap. In this connection it is pointed out that in the preferred embodiment the several fins are uniformly circumferentially spaced around the cap at intervals in excess of the maximum radial dimensions of the respective fins. Thus each fin may be swung or deflected tangentially through an arc of approximately ninety degrees, (if this should be necessary to break it away from the cap) and during the course of such movement the gripping portion 5 will be moved out of effective gripping engagement with the retainer beading b of the bottle even though the fin should fail to break away completely from the cap.

Due to the substantial radial dimensions of the respective fins 4, tangential pressure against the radially outer portions of each of these will be transmitted with a considerable mechanical advantage to its juncture 6 with the cap, to facilitate breaking away of the said fins with a minimum of pressure.

After a sufficient number of relatively adjacent fins 4 are removed from one side of the cap, as aforementioned, the cap may be removed from the bottle by an upward pull on said side. In the illustrated embodiment of the invention wherein six uniformly spaced fins are employed, it has been found necessary to break away only one of these fins in order to permit removal of the cap, though where a greater number of fins are employed it will accordingly prove necessary to break away a greater number thereof.

Having thus described my invention, I claim:

1. A molded bottle cap of frangible but slightly resilient plastic material comprising a flat disc top adapted to extend across the opening in a bottle neck, an annular depending skirt integral therewith, and a plurality of relatively circumferentially spaced axially extending fins integral with and projecting radially from said skirt, the lower ends of said fins projecting beneath and radially inwardly from the lower edge of said skirt, said fins being of sufficient radial thickness that their lower ends may be resiliently radially expended without breaking sufficiently to pass over the usual retainer beading of a bottle neck during application of the cap to a bottle and will thereafter contract beneath said beading to maintain the cap in operative sealing relation on the bottle, and of such relatively smaller tangential thickness adjacent their juncture with said skirt as to be readily frangible in the zone of said juncture when subjected to excessive tangential deflection.

2. A bottle cap as defined in claim 1, including a sealing disc disposed concentrically within said depending skirt against the lower surface of said top disc.

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3. A bottle cap of frangible slightly resilient material comprising an annular skirt adapted to extend around the neck of a bottle, a sealing disc carried within said skirt to extend across the bottle mouth, and a plurality of relatively circumferentially spaced fins integral with and projecting radially from said skirt, the lower ends of said fins projecting beneath and radially inwardly from the lower edge of said skirt, said fins being of sufficient radial dimensions to be radially deflectible without breaking and to provide a strong resilient radial grip around the bottle neck, and of such relatively diminished tangential thickness in a zone adjacent their juncture with said skirt as to be readily frangible when subjected to excessive tangential deflection.

4. A bottle cap of frangible slightly resilient material embodying a disc top, and a plurality of relatively circumferentially spaced fins each integral with said cap along an axial line of juncture and projecting radially from said line of juncture, said fins depending axially from said cap and having bottle gripping portions projecting radially inwardly therefrom respectively at a common level spaced below said top, said fins respectively being of sufficient radial thickness to be radially deflectible without breaking and to provide a strong radially resilient grip around a bottle neck, and of such relatively smaller tangential thickness as to be frangible when subjected to not more than ninety degrees of tangential deflection.

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5. A molded bottle cap of frangible slightly resilient material embodying a disc top adapted to extend across the mouth of a bottle, bottle gripping means on one side of said cap to engage beneath the retainer beading of the bottle neck, and at least one radially projecting fin integral with said cap along an axial line of juncture on the side opposite said bottle gripping means, said fin depending axially from said cap and having a bottle gripping portion projecting radially inwardly therefrom at a location spaced below said top, said fin being of sufficient radial thickness to be stiffly radially deflectible without breaking and to resiliently radially press said gripping portion against said bottle neck, and of such relatively smaller tangential thickness as to be readily frangible when subjected to excessive tangential deflection.

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