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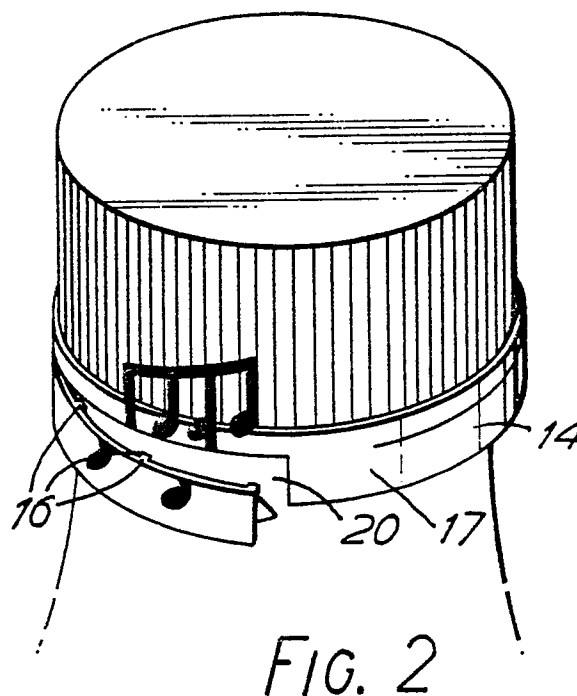
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54 **Container closure.**

57 A tamper-evident closure (10) has a line of weakening between the skirt and the tamper-evident ring (14), with frangible bridges (16) and one or more wide bridges (17) interconnecting the skirt (13) and the ring, and the radially outer faces of the skirt and ring have applied thereto a coherent pattern legend or representation applied thereto which is in colour contrast with the adjacent parts of the skirt and ring. On removal of the closure the pattern, legend or representation becomes visually disrupted or distorted.



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CONTAINER CLOSURE

This invention relates to container closures and is more particularly concerned with tamper-evident closures.

According to the present invention there is provided a container closure comprising a top, a dependent skirt and a tamper-evident ring connected to the bottom edge of the skirt by a plurality of circumferentially spaced frangible bridges or along a circumferentially extending line of weakening, the radially-outer faces of the ring and the skirt of the closure having applied thereto a coherent pattern, legend or representation which is in colour contrast with other parts of the skirt and ring and which becomes visually disrupted or distorted on fracture of the frangible bridges or line of weakening during removal of the closure from a container.

The pattern, legend or representation may extend continuously along the band, and at least the adjoining portion of the skirt. A legend where employed may be in the form of words and/or names and/or digits, for example the name of the product in the container, and/or the manufacturer of the product and/or the batch coding of the products, or a "sell by" date, or a direct message such as "Do not accept if this band is broken". Thus a pattern of lines or a legend would be disrupted by any circumferential displacement of the ring relative to the skirt and would render words distorted or illegible so as to call immediate attention to the fact that the closure had been tampered with, although the tamper-evident ring might otherwise appear to the eye to be still intact and connected to the skirt.

Examples of the types of pattern which may be applied to the ring and the radially-outer surface of the part of the skirt immediately adjoining the band are fine, dotted rectilinear oblique lines, and heavy dotted rectilinear oblique blocks, but there are numerous possible alternative patterns.

In production of the container closures described in the foregoing, the radially outer surface of the band and of at least the immediately adjoining portion of the skirt of the moulded closure may be treated to improve their capacity to form a good bond with the ink or paint to be employed. In one such process, the said surfaces are subjected to a corona discharge, which serves also to neutralize or remove from the closure any of the release agent employed to facilitate removal of the moulding from the mould. Paint or ink is then applied to the surfaces in the desired pattern, legend or representation and is air-dried or cured by heating or infra-red or ultra-violet treatment according to the type of colouring substance used. Where wording is to be employed on the said surfaces, pulse-jet apparatus may be used.

It will be understood that the type of mechanism by which the tamper-evident ring is induced to become at least locally separated from the skirt on removal of the closure is irrelevant to the invention.

One embodiment of the invention is shown in the accompanying diagrammatic drawings in which:

Figure 1 shows a closure according to the invention applied to a container,

Figure 2 shows the commencement of separation of the tamper-evident from the closure as the closure is removed from the container, and

Figure 3 shows the closure after removal from the container.

Referring to the drawings, there is shown a closure 10 of the tamper-evident type secured on the neck of a bottle 11. The closure comprises a top 12, a depending skirt 13 and a tamper-evident ring 14 connected to the bottom end of the skirt by a line of weakening 15 incorporating a series of circumferentially spaced frangible bridges 16 and a wide bridge 17. The top, skirt and ring 14 are moulded in one piece from plastics material but the closure may incorporate a separate sealing gasket made from the same or a different plastics material. From one end of the wide bridge 17 an axial line of weakening 18 extends to the bottom edge of the ring 14. The radially inner surface of the ring 14 has a series of inward projections 19. The neck of the bottle is formed with an external screw-thread by which the closure is engaged on the bottle, and below the screw-thread has an annular security band 20. When the closure is screwed onto the bottle, the projections on the ring 14 pass over the security band, but when the closure is removed the projections 19 engage the bottom edge of the security band 20 and resist upward movement of the tamper-evident ring, causing the frangible bridges to fracture in the well known manner. Numerous forms of projection equivalent to projections 19 have been proposed and the particular form is irrelevant to this invention.

As shown in Figure 1, a representation 21 of some notes of music is printed on the ring 14 and on the adjoining portion of the skirt 13, for example removing any release agent remaining on the closure by means of a corona discharge technique and subsequently applying paint or ink as described previously. The representation 21 forms a coherent whole such that any distortion of the parts thereof on the ring 14 or any displacement of the parts thereof on the skirt 13 is readily apparent to the eye.

As shown in Figure 2, during removal of the

closure from the bottle the ring 14 breaks along the line of weakening 15 and commences to separate from the skirt by breaking the bridges 16. When removal of the closure from the bottle is complete, the ring 14 remains attached to the skirt by the wide bridge 17. However, during removal of the closure, some permanent distortion of the material of the ring takes place, so that even if the closure is replaced on the bottle with the tamper-evident ring 14 apparently in its former position, secured for example by glue, the representation 17 is no longer coherent by reason of the distortion and it is therefore readily apparent to the eye that the closure has been removed and replaced.

The invention is applicable also to metal closures having a tamper-evident ring, including closures where the screw-thread and the tamper-evident ring are rolled on to the closure in the well-known manner.

In all cases it is preferable that there should be one or more wide bridges interconnecting the skirt and the tamper-evident ring so as to produce the maximum distortion of the ring, with at least local permanent stretching or other mis-shaping of the ring, during removal of the closure.

Claims

1. A container closure comprising a top, a dependent skirt and a tamper-evident ring connected to the bottom edge of the skirt by a plurality of circumferentially spaced frangible bridges or along a circumferentially extending line of weakening, the radially-outer faces of the ring and the skirt of the closure having applied thereto a coherent pattern, legend or representation which is in colour contrast with other parts of the skirt and ring and which becomes visually disrupted or distorted on fracture of the frangible bridges or line of weakening during removal of the closure from a container.

2. A closure as claimed in claim 1, wherein a line of weakening is present between the tamper-evident ring and the skirt and has a circumferential interruption whereby the ring remains connected to the skirt along the interruption of the line of weakening on removal of the closure from a container.

3. A closure as claimed in claim 1, wherein the connection between the skirt and the tamper-evident ring includes one or more wide bridges in a line of frangible bridges.

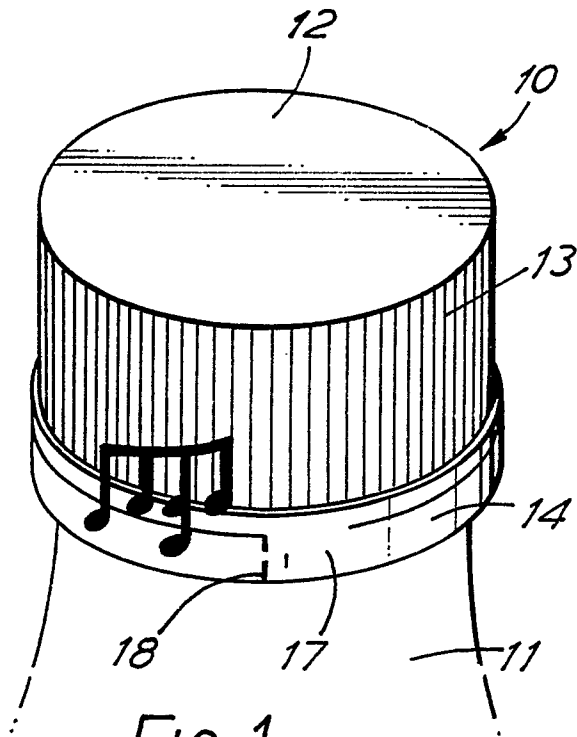
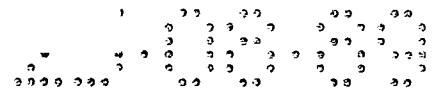


FIG. 1

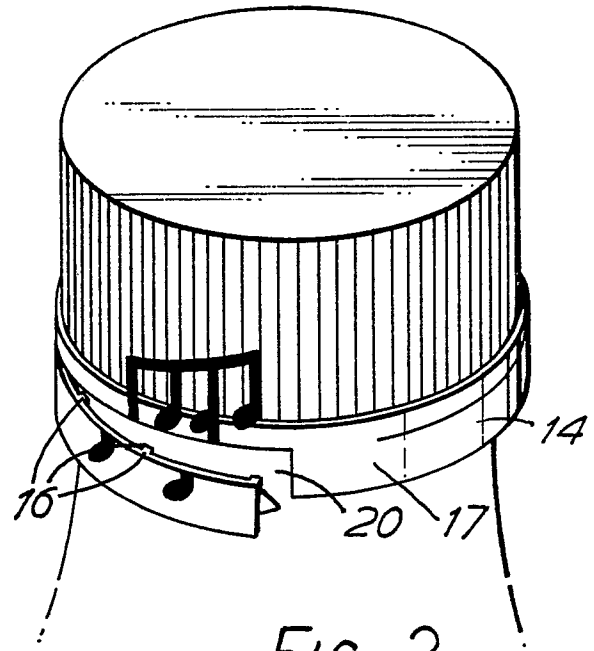


FIG. 2

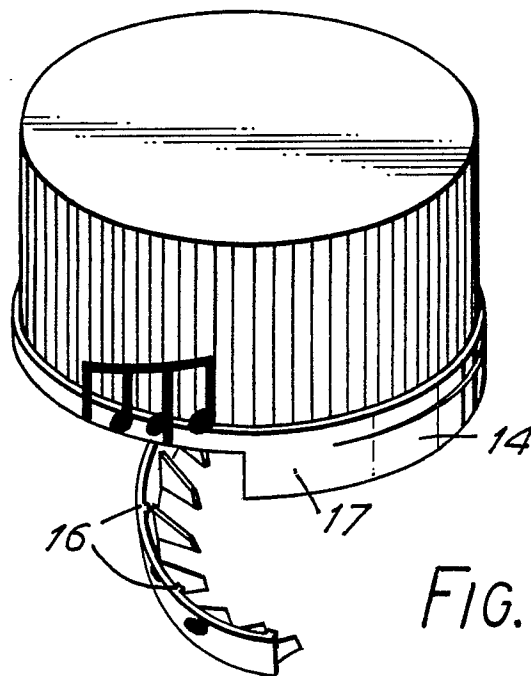


FIG. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	EP-A-0 149 496 (JAPAN CROWN CORK CO.) * Figures 6,7; page 13, lines 6-18; page 18, lines 13-35 * ---	1-3	B 65 D 41/34 B 65 D 55/06
Y	FR-A-2 271 994 (LE BOUCHAGE MECANIQUE) * Figures 1-4; page 1, lines 15-28; page 2, lines 4-22; page 2, line 37 - page 3, line 2 * ---	1-3	
A	EP-A-0 108 548 (MAXWELL LABORATORIES INC.) * Figures 4,5; page 11, lines 15-34 * ---	1-3	
A	EP-A-0 224 649 (H-C IND. INC.) * Figures 2,8; column 9, lines 43-55 * -----	1-3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24-10-1989	Examiner PERNICE, C.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			