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(71) Applicant: **Johnsen & Jorgensen Plastics Limited**
Grinstead House Grinstead Road
London SE8 5AB(GB)

(72) Inventor: **Davis, Eugene Edward**
72a Hamilton Avenue
Barkingside, Ilford IG6 1AD(GB)
Inventor: **Stubbs, Peter**
14, The Old Yews, New Barn
Longfield, Kent(GB)

(74) Representative: **Wilson, Joseph Martin et al**
WITHERS & ROGERS, 4, Dyer's Buildings, Holborn
London SE8 5AB(GB)

(54) Tamper resistant closure cap for containers.

(57) A TR closure of plastics material for application to a standard form of container with a projecting neck ring as herein defined. The closure has a top (7), an annular skirt (8) depending from the top, a TR band (10) connected to the skirt by frangible means (11) and an annular expandable or adjustable safety flap (12) adapted when in operative position to engage with the underside of the neck (4) ring of the container.

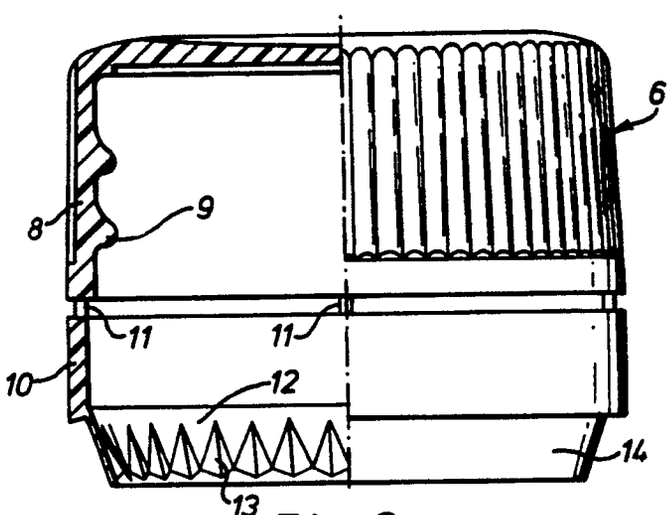

Fig.2.

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IMPROVEMENTS IN AND RELATING TO CLOSURE CAPS FOR CONTAINERS

This invention is concerned with the provision of a tamper resistant (TR) cap or tamper indicating cap made of plastics material and specially adapted for application to a container of standard form provided with a neck ring, as shown for example under reference number G.F.304 in a pamphlet issued by the Glass Manufacturers Federation.

Millions of such standard containers are made every year and such containers are at present closed by what is known in the trade as an ROPP (roll on pilfer proof) cap made of aluminium. ROPP caps are very satisfactory but aluminium is becoming increasingly expensive and a demand has been growing for the production of a tamper resistant cap of plastics material for these standard bottles. The main difficulty in the production of such a cap is that it is necessary for the cap to engage under the neck ring of the standard container. With the existing aluminium ROPP caps appropriate deformation of the metal is effective to shape the cap to engage under the neck ring and once deformed to the required shape the cap remains in its deformed condition. On the other hand plastics material after deformation does not normally hold its new shape unless it is positively held in position.

An attempt to solve this problem was made by Kerr Glass Manufacturing Corporation in their European Application published on 29.08.84 under No.0117104 A2. In accordance with the Kerr Glass proposal a TR closure is provided which includes a threaded cap and TR means having upwardly and inwardly folded spaced apart tabs which lock against the lower surface of an annular shoulder formed by the neck ring on the container. A disadvantage of the Kerr Glass proposal is that it may be possible to remove the cap from the container without breaking the TR means by inserting an implement into the gaps between adjacent tabs.

Another proposal has been put forward by Owens-Illinois Inc. in their European Patent Application published on 02.01.86 under No.0166572 A2. The Owens Illinois proposal also uses spaced apart tabs, which in that proposal are of wedge shape so that when there is an attempt to remove the closure the thicker portion of each tab wedges against the container wall to apply torque to the TR band which breaks the frangible means connecting the band to the skirt of the closure. Once again the gaps between adjacent tabs cause a problem.

In another proposal ACI Australia Ltd. have tried to solve this problem in their European Patent Application No.0213742 A2 published on 11.03.87. In the ACI Australia proposal an annular flap is joined to the TR band of the cap so that the gap problem is overcome but unfortunately the container requires specially shaping by the provision of an axially inclined ramp surface on the container and this modification of the container shape would not be welcome to manufacturers who want to use containers of standard shape which are already available at a relatively inexpensive price. There may also be a problem in the correct application of the cap to the container due to the presence of the flap which is completely annular and smooth in profile and so the cap may be difficult to apply to a container.

It is an object of the present invention to provide an improved tamper resistant or tamper indicating cap of plastics material for a standard form of container with a neck ring without any modification to the container.

In accordance with the present invention there is provided a TR closure of plastics material for application to a standard form of container with a projecting neck ring wherein the closure has a top, an annular skirt depending from the top, a TR band connected to the skirt by frangible means and an annular expandable or adjustable flap adapted when in operative position to engage with the underside of the neck ring of the container. Preferably the flap is corrugated or pleated so that it can, if necessary, expand as the closure is being applied to the container and can then contract again so that it is properly seated in operative position.

In order that the invention may be more clearly understood reference is now directed to the accompanying drawings.

Figures 2 to 7 being given by way of example only. In the drawings:-

Figure 1 is a side view of the upper part of a container of standard form according to reference GF 304.

Figures 2 to 4 are various views of one embodiment of the invention, and

Figures 5 to 7 are various views of another embodiment of the invention.

Referring first to Figure 1 a container 1 has a mouth at the top 2, a screw thread 3 around the mouth and a neck ring 4 below the thread 3 shaped to provide a shoulder 5.

In Figures 2 to 4, a cap 6 has a top 7, a depending skirt 8, a screw thread 9, and a TR band 10 connected to the bottom edge of the skirt 8 by frangible tongues 11. As described so far the cap 6 is of conventional construction, but in accordance with this invention the cap has an expandable or self-adjusting annular flip over ring or flap 12 depending from the bottom of the band 10, the flap being internally corrugated at 13 and having a smooth external surface 14.

The cap 6 may be moulded in an injection moulding machine with the parts in the position shown in Figure 2, the cap may then be applied to the standard container 1 and then the flap 12 may be turned up into the position shown in Figure 4 so that the end of the flap 12 is disposed below the shoulder 5 of the neck ring 4.

If the container be intended to hold medicaments such as pills or medicines or other products which it is desired should not come into contact with plastics material, the cap may be provided with a wad or liner 15 as shown in Figure 4 so arranged that the wad or liner 15 seats on the rim around the mouth of the container and so seals the contents of the container from coming into contact with the plastics material of which the cap is made. As the cap is screwed on to the container, which is usually a glass bottle, the wad or liner 15 is compressed between the rim of the bottle and the inside of the cap so that a very effective seal is produced. If the wad or liner 15 is fitted as a means for providing a seal between bottle and cap, then the inversion of the self-adjusting annular flip-over ring or flap can take place during the insertion of the wad or liner 15. By this means, no further secondary operations are required to prepare the cap 6 for screwing onto the mouth of the container 1. Preferably the cap is made of Polypropylene or High Density Polyethylene. The embodiment illustrated in Figures 5 to 7 differ from the embodiment illustrated in Figures 2 to 4 only in that the self-adjusting annular flip over ring or flap 12 is corrugated not only internally at 13 but also externally at 16.

The corrugations illustrated in the two embodiments described give the flap 12 a sufficient degree of adjustability to enable the annular flap easily to pass over the neck ring 4 on the container 1.

In this specification by "a standard form of container" we mean a known form of container with a neck ring and substantially in accordance with Figure 1. By "a tamper resistant cap" we mean a cap that renders the assembly of cap and container resistant to tampering once the cap has been initially applied to the container because the cap cannot be removed without mutilating the cap which in turn gives evidence that the contents of the container may have been tampered with.

It will be understood that a TR closure in accordance with this invention may if desired be corrugated only on the outside with a smooth internal surface.

Claims

1. A TR closure of plastics material for application to a standard form of container with a projecting neck ring as herein defined, wherein the closure has a top, an annular skirt depending from the top, a TR band connected to the skirt by frangible means and an annular expandable or adjustable safety flap adapted when in operative position to engage with the underside of the neck ring of the container.

2. A TR closure according to claim 1, wherein the safety flap is corrugated or pleated so that it can expand as the closure is being applied to the container and can then contract again so that it is properly sealed in operative position.

3. A TR closure according to claim 2, wherein the safety flap is internally corrugated with a smooth external surface.

4. A TR closure according to claim 2, wherein the safety flap is corrugated on the outside with a smooth internal surface.

5. A TR closure according to claim 2, wherein the closure is corrugated both internally and externally.

6. A container and closure assembly including a standard form of container and a TR closure according to any of the preceding claims.

7. A TR closure substantially as hereinbefore described with reference to Figures 2 to 7 of the accompanying drawings.

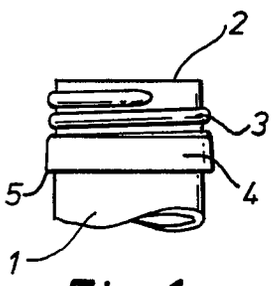

Fig.1.

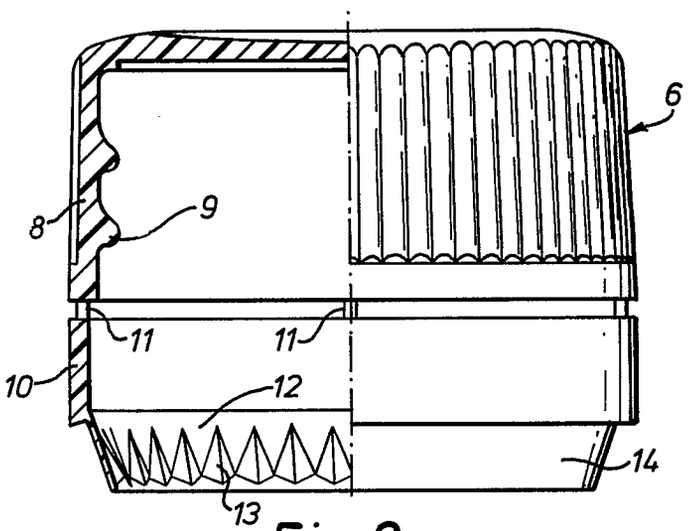

Fig.2.

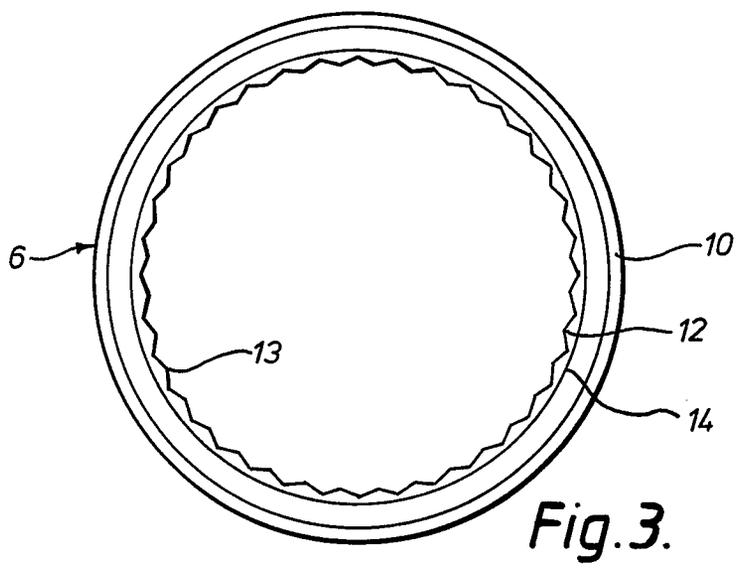

Fig.3.

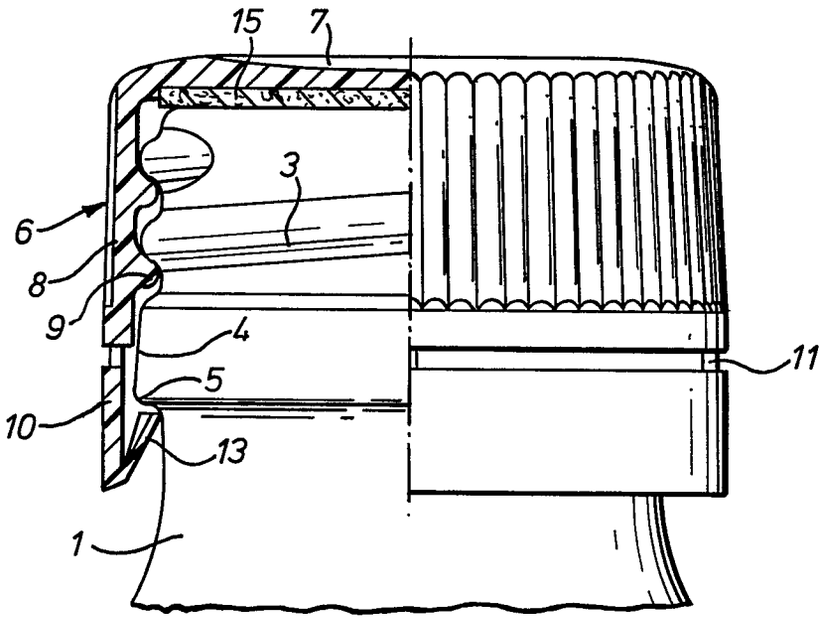

Fig.4.

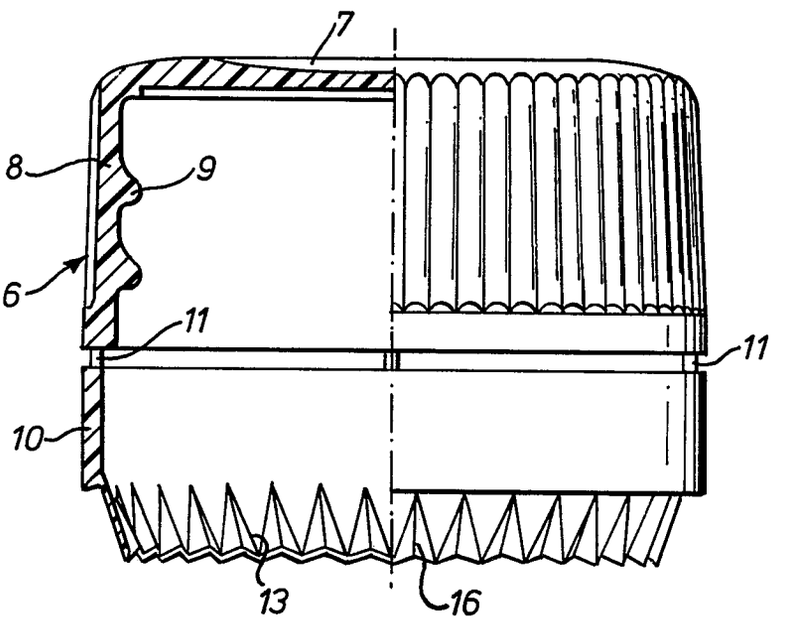

Fig.5.

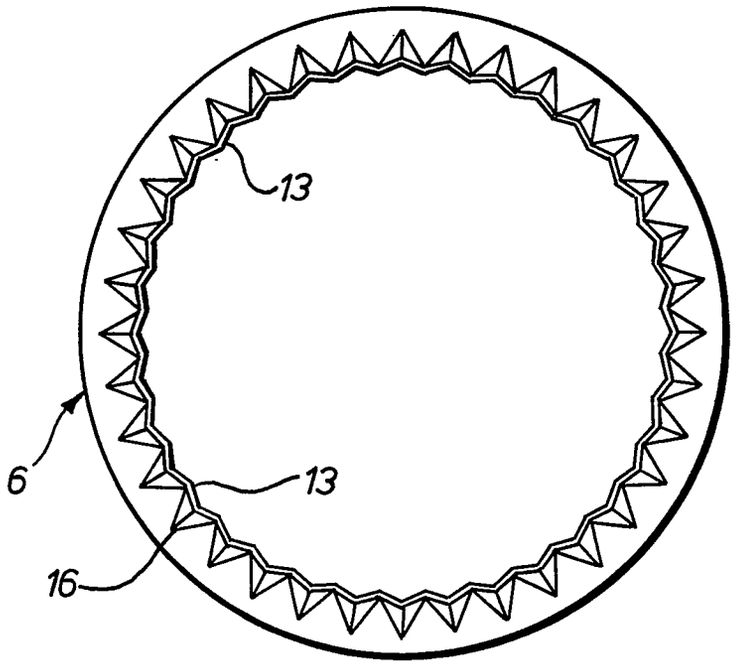

Fig. 6.

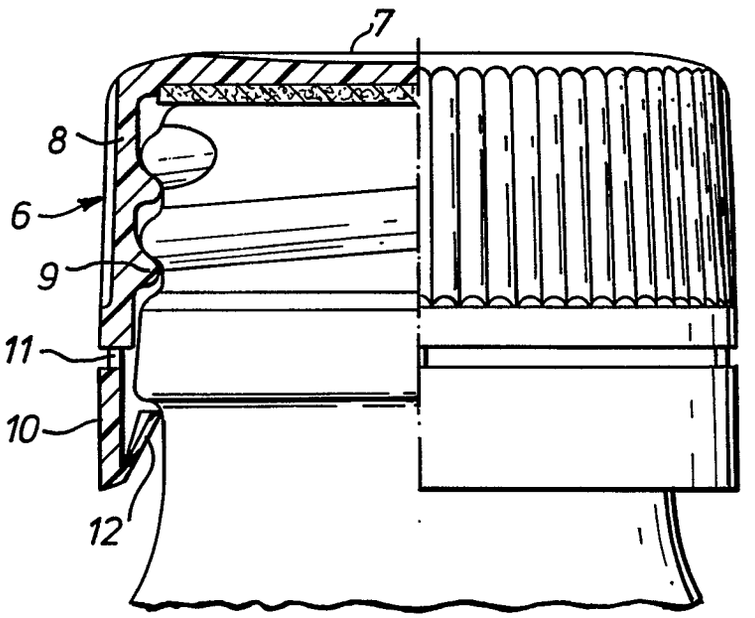

Fig. 7.

European Patent Office

PARTIAL EUROPEAN SEARCH REPORT

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

Application number: EP 90 30 3030

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.4)
X	US-A-4 801 031 (BARRIAC) * Column 2, lines 24-50; figures 5-8 *	1,2, 5,6	B 65 D 41/34
X	US-A-4 478 343 (OSTROWSKY) * Column 1, lines 59-69; figures 1-6 *	1,2,4, 6	
X	EP-A-0 200 293 (OWENS-ILLINOIS) * Abstract; figures 1-4 *	1	
A	US-A-4 657 153 (HAYES)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 D

INCOMPLETE SEARCH

The Search Division considers that the present European patent application does not comply with the provisions of the European Patent Convention to such an extent that it is not possible to carry out a meaningful search into the state of the art on the basis of some of the claims.

Claims searched completely: 1-6
Claims searched incompletely:
Claims not searched: 7
Reason for the limitation of the search:

Claim 7 not admissible Rule 29.6 of the European Patent Convention

Place of search	Date of completion of the search	Examiner
The Hague	22-06-1990	LEONG

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

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