

[54] **TAMPERPROOF CONTAINER AND CLOSURE ASSEMBLY**

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215/256, 252

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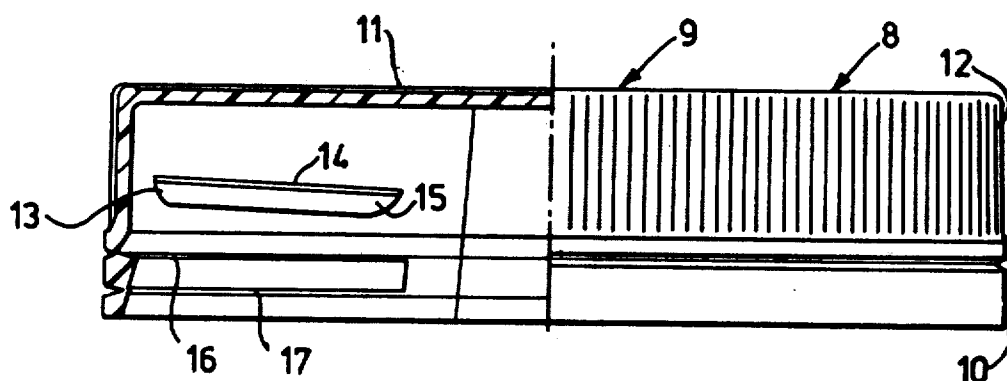
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[57] **ABSTRACT**

A tamperproof container and closure assembly, in which the complete closure comprises a retaining tear band integral with a screw cap, has a discontinuous thread on the cap for engagement with a discontinuous thread on the container. The cooperating threads have sloping surfaces so arranged that the closure may be readily screwed or pushed into position on the container but once in position the closure can only be turned round and round but cannot be removed until the retaining band has been torn away.

8 Claims, 6 Drawing Figures



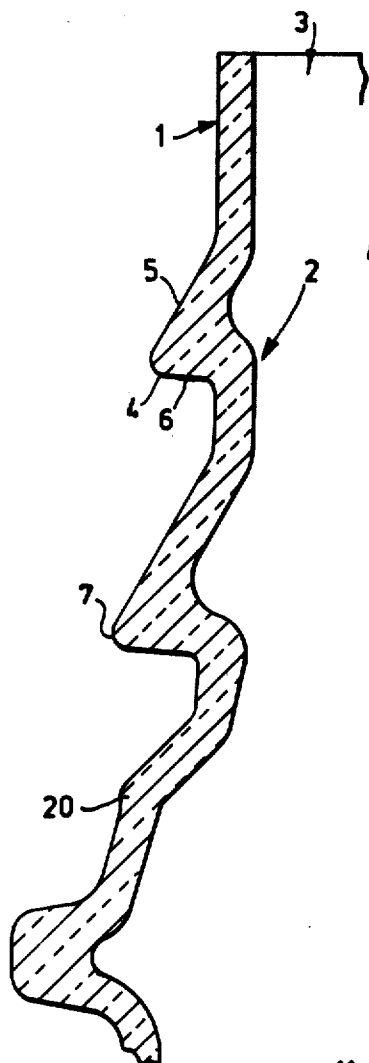


FIG. 1.

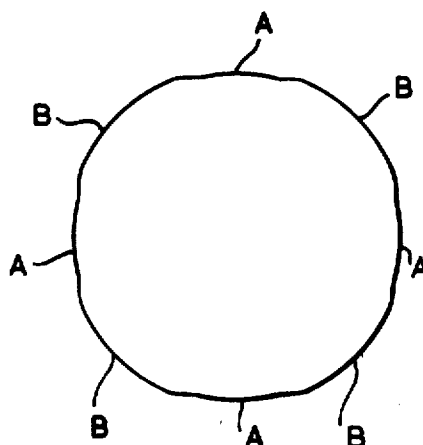


FIG. 2.

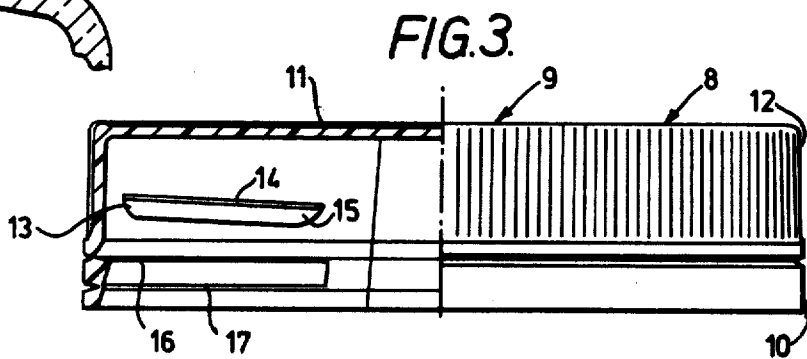


FIG. 3.

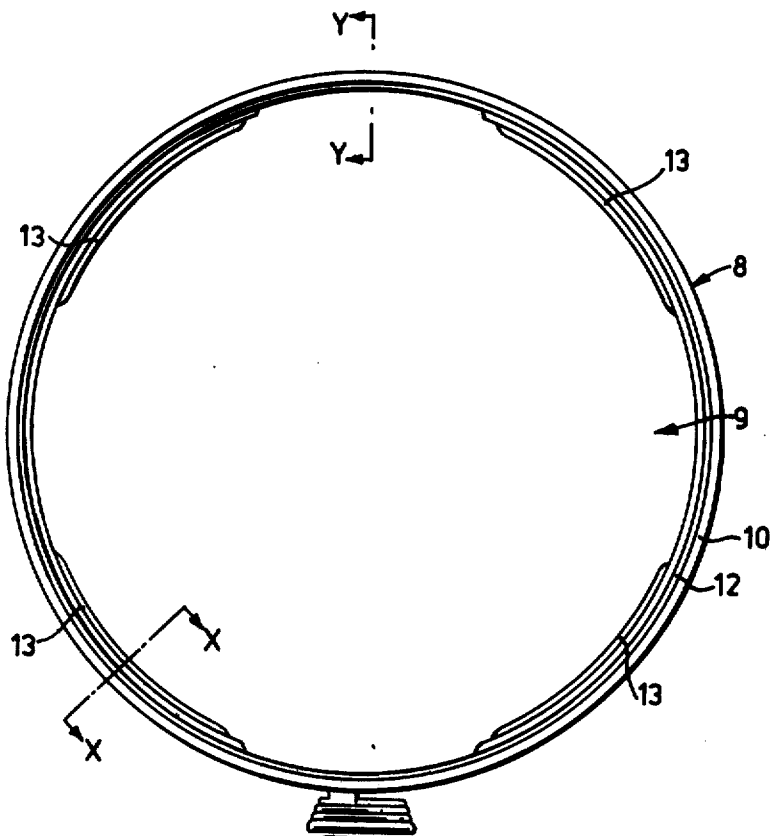


FIG. 4.

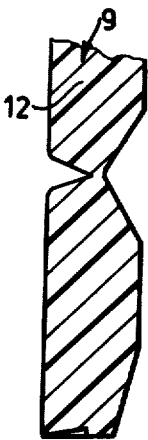


FIG. 5.

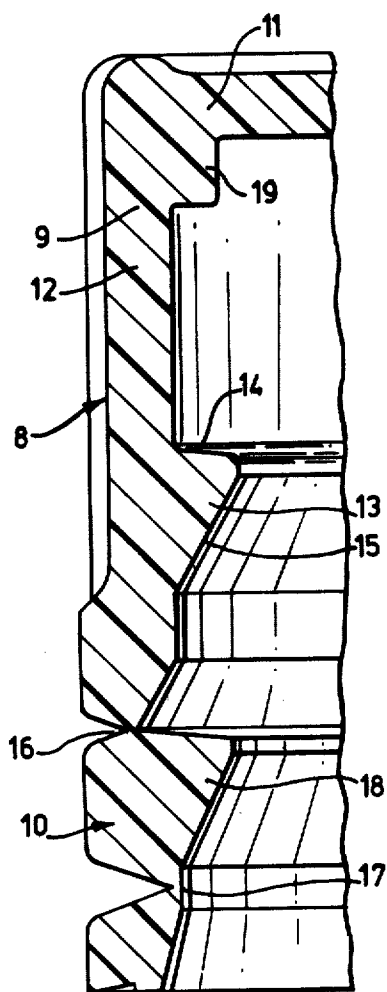


FIG. 6.

TAMPERPROOF CONTAINER AND CLOSURE ASSEMBLY

This invention relates to the provision of an improved tamperproof container and closure assembly especially though not exclusively for relatively wide-mouthed jars.

Sweet shops normally stock boiled sweets, toffies and the like in large jars. Traditionally glass jars with metal or rigid plastic screw caps have been used. For speedy serving of customers retailers like to be able to remove the cap with a half turn or much less and replace it in the same manner, e.g. they like to refer to "the 20° turn." The only change that has taken place in recent years is that the glass jars and metal caps are being replaced by jars and caps of plastics material one advantage of which is that the plastics jars are non-returnable.

The above practice has worked well but sometimes it has been found that jars have been opened between the manufacturer and the retailer and sweetmeats have been removed. In other words there has been a pilfering problem and a demand has grown up for a tamper-proof jar.

Various proposals have been put forward but none have been fully acceptable to the trade. Some proposals have been effective but rather ugly and others have been effective and attractive but have met with resistance for other reasons.

It is an object of this invention to provide an effective and improved tamper-proof screw cap combined with a retaining band.

At this point it should be made clear that there is an inherent difficulty in combining a retaining band with a screw cap. We have found that it is easy to get a screw cap and retaining band into position on a container by screwing and downward pressure but unfortunately, due to the leverage exerted by the screw thread, it is also easy to remove a conventional screw-cap and retaining band as a whole by unscrewing and upward pressure. In other words the retaining band does not do its job, it is relatively easy to open the container without tearing away the retaining band and the closure is no longer tamper-proof.

According to the present invention we provide a container and closure assembly in which the complete closure comprises a retaining band combined with a screw cap characterised by the provision of a discontinuous preferably internal screw thread on the cap for engagement with a discontinuous preferably external screw thread around the mouth of the container, the contour of the screw-threads being such that when the complete closure is being screwed on to the container substantially straight surfaces abut against one another but if an attempt be made to unscrew the complete closure sloping surfaces abut against one another, the resistance of the retaining band being sufficient to cause the sloping surfaces on the cap simply to slip off the sloping surfaces on the container so that the closure goes round and round but does not come off. In other words when screwing on there is an interlocking situation between the threads but when unscrewing there is a sliding situation which depends to a certain extent on the coefficient of friction of the material. Our experiments have shown that the sloping angle of the threads should be between 15° and 45° and preferably between 20° and 40° best results on average being given with an angle of about 30°. It will be understood that in the above de-

scription it is assumed that the container is standing in a vertical position.

In order that the invention may be more clearly understood and readily carried into effect reference is now directed to the accompanying drawings given by way of example, in which:

FIG. 1 is a diagrammatic view of a neck profile of a sweetmeat jar embodying the invention.

FIG. 2 is a diagrammatic plan view of the jar.

FIG. 3 is a side view partly in section of a cap for use with the jar illustrated in FIGS. 1 and 2.

FIG. 4 is an underneath plan view of the cap.

FIG. 5 is an enlarged section on the lines Y — Y of FIG. 4, and

FIG. 6 is an enlarged section on the lines X — X of FIG. 4.

Referring to FIG. 1 a jar 1 has a neck 2 and a mouth 3. The neck 2 has a discontinuous external screw thread 4 with sloping upper surfaces 5 and straight lower surfaces 6. The thread illustrated on the neck 2 is made discontinuous by the provision of four breaks or gaps which can be seen clearly in the plan view FIG. 2, the four thread sections being indicated by B and the four gaps by A so that we have what is called a four start thread. Naturally this is given purely as a convenient and preferable example, but any desired number of gaps may be provided. In addition the jar 1 has an external annular bead 7 below which a tear-band on the closure seats when the closure is in position. The tear-band seats on an elbow shaped part 20 of the jar which is shaped as shown to ensure that the tear-band is a snug fit around the neck of the jar.

Referring now to FIGS. 3 to 6 a closure 8 has cap part 9 and a retaining band 10. The cap part 9 has a top 11 and a skirt 12 and the skirt 12 has an internal discontinuous screw thread 13 with straight upper parts 14 for co-operation with the lower surfaces 6 on the jar 1 and with sloping lower parts 15 for co-operation with the upper surfaces 5 on the jar.

The tear-band 10 is connected to the cap part 9 by an annular weakened line 16 and a second weakened line 17 runs out towards the bottom of the band 10. An internal annular projection 18 is provided to seat under the bead 7 on the jar.

In operation the jar is filled and the closure may then be screwed on to the jar with the upper surfaces 14 on the cap part 9 of the closure 8 engaging with the lower surfaces 6 on the jar 1.

The engagement of the substantially horizontal surfaces 6 and 14 exerts considerable downward pressure on the closure 8 and snaps the retaining band 10 into position with the annular projection 18 on the band 10 below the bead 7 on the jar 1. To open the jar 1 in the normal way it is necessary to tear away the retaining band 10 and then simply unscrew the cap part 9 of the closure 8. It is impossible to tamper with the contents of the jar 1 simply with an upward pull on the closure 8 with the retaining band 10 in position and if an attempt be made to remove the closure 8 as a whole by unscrewing it, the surfaces 15 simply slide off the surfaces 5 and the threads 13 enter the gaps A and so on.

We prefer to mould the closure 8 and the jar 1 from suitable plastics material. The moulding of the closure 8 presents certain problems because it is impossible to screw the closure off the mould because of the presence of the annular retaining projection 18. We have therefore developed, in accordance with a feature of

the invention, a moulding technique in which we use a collapsible internal core combined with an upper axially movable external mould part and lower transversely separating mould parts.

It will be understood that the description with reference to a jar 1 is given only by way of example and any desired container can be used.

Instead of screwing the closure 8 on to the jar 1 the closure 8 may be hand fitted by simple downward pressure provided that the closure 8 is orientated so that the threads on the cap coincide with the gaps A in the thread on the jar.

In order to improve the sealing of the closure 8 upon the neck 2 of the jar 1 especially around the mouth 3 the cap part of the closure has an internal annular fillet 19 to seat around the outside of the mouth 3. Although the invention has been particularly described with reference to sweetmeat containers it is understood that the invention is suitable for many alternative applications e.g. pharmaceutical, cosmetic, chemical and engineering. Also, when pressing a closure into position on a container, orientation of the threads on the cap to coincide with the gaps on the thread on the container is not necessary since the cap will snap into position whatever the relative thread positions.

I claim:

1. A container and closure assembly in which the complete closure comprises a retaining band combined with a screw cap characterised by the provision of a discontinuous screw thread on the cap for engagement with a discontinuous screw thread around the mouth of the container, the contour of the screw-threads being such that if an attempt be made to unscrew the complete closure without first tearing away the retaining band sloping surfaces abut against one another, the resistance of the retaining band being sufficient to cause

the sloping surfaces on the cap simply to slip off the sloping surfaces on the container so that the closure goes round and round but does not come off.

2. A container and closure assembly according to claim 1 wherein the cap has an internal screw-thread and the container has an external screw-thread.

3. A container and closure assembly according to claim 1 wherein the sloping angle of the threads is between 15° and 45°.

4. A container and closure assembly according to claim 3 wherein the sloping angle is substantially 30°.

5. A container and closure assembly according to claim 1 wherein the screw threads have four gaps.

6. A container and closure assembly according to claim 1 wherein the cap part of the closure has an internal annular sealing fillet to seat around the outside of the mouth of the container.

7. A container and closure assembly according to claim 1 wherein the container is a jar.

8. A container and closure assembly in which the complete closure comprises a screw cap and a retaining band to be torn away when it is desired to open the container characterised by the provision of a discontinuous external screw thread with sloping upper surfaces and straight lower surfaces around the mouth of the container for engagement by a discontinuous internal screw thread with straight upper surfaces and straight lower surfaces provided on the screw cap, the arrangement being such that when the complete closure is being screwed on to the container there is an interlocking action between the screw threads but if an attempt be made to unscrew the complete closure there is a sliding action and the closure simply goes round and round but does not come off the container.

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