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(54) Can end.

(57) A metal can end shell has a central panel 2 formed with an aperture 3 surrounded by a downturned wall 4 and a tear open plastics ring-pull closure injection moulded onto the can end shell to close the aperture. That part of the closure which is torn away from the panel during opening is tethered to the can end shell by an integral strap 15 connected to the can end shell through a second aperture 5.

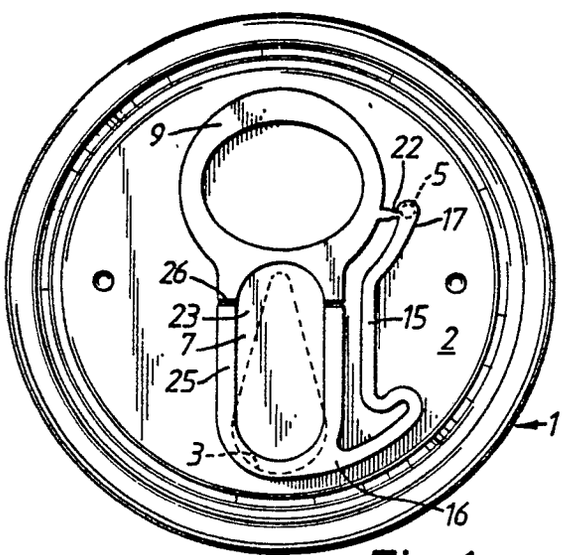

Fig.6.

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CAN END

The invention relates to can ends for seaming to a metal can body for use as a beverage container. In particular the invention relates to metal can ends having a dispensing aperture closed by a tear-open plastics ring-pull closure injection moulded onto the central panel of the can end shell. Such a can end is known for example from GB-A-2180520.

The aim of the present invention is to provide means for tethering the torn out portion of the closure to the can end so that after opening this portion is not discarded as litter but retained for disposal with the empty can. A further aim is to provide this tethering in a manner which permits the torn out portion to be moved clear of the opening by a person drinking or pouring from the can. A further aim is to provide tethering means that permit use of tear open plastics closures in which initial opening (venting) occurs roughly at the centre of the can end so that headspace gas is vented rather than the drink itself.

A first aspect of the present invention provides a can end comprising a metal can end shell having a plastics coating on its underside and an in situ injection moulded plastics closure, the can end shell comprising a central panel formed with a dispensing aperture surrounded by a downturned metal wall extending around the periphery of the aperture; the aperture extending from substantially the centre of the panel in a radial direction, and the plastics closure surrounding the dispensing aperture on both sides of the can end and enclosing the downturned wall and comprising a plug portion closing the dispensing aperture, an upper flange overlying the central panel on its upper side and surrounding the dispensing aperture, a ring pull connected to the upper flange in the region of the centre of the can end, and a lower flange overlying the central panel on its underside and surrounding the downturned wall; the lower flange being bonded to the plastics coating on the underside of the can end shell; characterised in that the can end shell is formed with a second aperture in the central panel spaced from the dispensing aperture and in that the plastics closure is formed with a flexible tethering strap moulded integrally with the plastics closure and overlying the upper side of the central panel of the can end shell; the tethering strap being connected at one end to the upper flange at a region remote from the centre of the can end and connected at its other end to the central panel of the can end by means of the second aperture in the can end shell; the plastics material of the strap extending through the second aperture, closing the second aperture, and forming a flange surrounding the second aperture on the underside of the can end which is bonded to the plastics coating on the can end shell.

Preferably the flange surrounding the second aperture on the underside of the can end is integrally connected to the lower flange surrounding the dispensing aperture on the underside of the can end by means of a further integrally formed strap overlying the underside of the panel.

Preferably, the second aperture is positioned nearer to the centre of the panel of the can end than to the end of the dispensing aperture remote from the centre of the panel.

Preferably, the tethering strap is moulded to follow an indirect path between its ends whereas the further strap is moulded to follow a substantially direct path between its ends.

In a preferred embodiment the tethering strap is connected to the ring pull by means of a breakable pip.

Preferred embodiments of the invention are described below with reference to the accompanying drawings in which:

FIGURE 1 is a section through a can end shell into which apertures have been pierced prior to injection moulding of a plastics closure;

FIGURE 2 is a plan view of the can end shell of Figure 1;

FIGURE 3 is a plan view of a can end after injection moulding of a plastics closure;

FIGURE 4 is a cross-section through the can-end of Figure 3;

FIGURE 5 is an underplan view of the can end of Figure 3;

FIGURE 6 is a plan view of a can end having an alternative closure;

FIGURE 7 is an underplan view of the can end of Figure 6;

FIGURE 8 is a cross section through the can end of Figures 6 and 7;

FIGURE 9 is a plan view of a can end having a further alternative closure;

FIGURE 10 is a perspective view of the can end of Figure 9 after opening of the closure;

FIGURE 11 is a plan view of a can end having a yet further alternative closure;

FIGURE 12 is a perspective view of the top of the can end of Figure 11 after opening of the closure; and

FIGURE 13 is a plan view of a can end with a yet further alternative closure.

Referring to Figures 1 and 2 it will be seen that the can end shell 1 comprises a central panel 2 having a tear-drop shaped dispensing aperture 3 surrounded by a downturned wall 4. The can end

shell has a second small aperture 5 spaced from the aperture 3. The aperture 5 is not provided with a downturned wall and is simply a circular hole in the panel 2. The underside of the can end shell is provided with a coating of a polymer to which the material of the closure bonds on injection moulding of the closure onto the can end shell. As usual, the can end shell is provided with peripheral cover hook 30 for seaming onto a can body and a frusto-conical chuck wall 31 which connects the cover hook to an anti-peaking bead 32 surrounding the central panel.

A tear-open plastics closure which has been injection moulded onto the can end central panel is shown in Figures 3-5. The closure comprises a plug portion 6 which closes the aperture 3, an upper flange 7 overlying the central panel on its upper side and surrounding the aperture 3, a lower flange 8 overlying the central panel on its underside and surrounding the downturned wall 4, and a ring pull portion 9 connected to the upper flange 7. It will be seen that material joining the plug portion 6 to the lower flange 8 covers the lower edge 10 of the downturned wall 4 so that the downturned wall is enclosed by the plastics material of the closure. A relatively thin amount of plastics material covers the lower edge 10 of the downturned wall 4 and this material tears against the edge 10 when the ring is pulled and permits removal of the plug portion from the aperture 3. As can also be seen, the aperture 3 extends substantially radially and has a first end 11 located substantially at the centre of the can end and a second end 12 near to the anti-peaking bead 30. The ring pull 9 is connected to the upper flange 7 in the region of the centre of the panel such that initial opening (venting) takes place at the centre of the can end.

An elongate and non-straight flexible tethering strap 15 is moulded integrally with the closure and is connected at one end 16 to the upper flange 7 at a point remote from the centre of the panel. At its other end 17 it is connected to the panel 2 by means of the small aperture 5. The plastics material of the strap extends through the aperture 5 to the underside of the panel 2 and closes the aperture 5. A flange 27 of plastics material is formed on the underside of the can end surrounds the aperture 5. As can be seen from Figure 5 the flange 27 is connected to the lower flange 8 by a further strap 18. It will be understood that the whole of the closure is integrally formed and injection moulded in a single operation onto the can end shell 1.

The length and flexibility of the strap 15 allow the ring pull 9, plug portion 6, and upper flange 7 to be moved clear of the aperture 3 after opening for easy drinking or pouring from the can. The plastics closure remains firmly tethered to the can end shell by means of the tethering strap 5 which can only be separated from the can end shell by the use of extreme force or by cutting. The second strap 18 follows a direct path from the flange 27 to the flange 8 at a point near to the centre of the panel. The underside of the can end is provided with a coating to which the lower flange 8, strap 18, and flange 27 become bonded during injection moulding. Typically the closure and coating will be of polyproplene. The provision of the lower strap 18 assists during moulding since material can flow to the end 17 of the first strap 15 along two paths. The upper flange 7, ring pull 9, and strap 15 are not bonded to the upper surface of the can end.

An alternative embodiment is shown in Figures 6, 7 and 8. In this embodiment the can end is substantially the same as shown in Figures 1 and 2 but the hole 5 has been moved so that the end 17 of the strap 15 is near to one side of the ring pull 9. The end 17 of the strap is connected to the ring pull by a very thin bridge or pip 22. This pip is broken when the ring pull is raised, and thus provides both a useful tamper indicating feature and a means for holding the ring pull flat against the can end shell. The connection formed by the pip also aids in the flow of material during injection moulding in the same way as does the lower strap 18. The closure of this embodiment has a race-track shaped recess 23 in its upper surface and a tear-drop shaped recess 24 in its lower surface. The thicker part 25 which surrounds the recess 23 is interrupted by two V-shaped notches 26 which assist in causing an interruption of the opening process which divides the process into a first venting stage and a second stage in which the plug is torn completely out of the aperture.

Another alternative embodiment shown in Figures 9 and 10 employs an aperture 3 of a different shape. Also the strap 15 follows a less tortuous but still not straight path. A bend 19 in the strap allows a little extra length to avoid the risk of a lateral restraint being applied to the closure during opening.

In a yet further alternative shown in Figs. 11 and 12, two straps 15 are provided of a length allowing the torn out portion of the closure to be hooked under the rim of the can; the upper flange 7 having a flat edge 20 for this purpose. Two apertures 5 are provided in this embodiment.

A yet further embodiment shown in Figure 13 employs two upper straps 15 connected to one another and to the upper flange 7 by a bridging portion 21. In an embodiment not shown the closure is provided with a notch allowing it to be clipped onto the rim of the can after opening.

Naturally, features of preferred embodiments may be employed, where appropriate, on other embodiments of the can end.

Claims

1. A can end comprising a metal can end shell having a plastics coating on its underside and an in situ injection moulded plastics closure, the can end shell comprising a central panel formed with a dispensing aperture surrounded by a downturned metal wall extending around the periphery of the aperture; the aperture extending from substantially the centre of the panel in a radial direction, and the plastics closure surrounding the dispensing aperture on both sides of the can end and enclosing the downturned wall and comprising a plug portion closing the dispensing aperture, an upper flange overlying the central panel on its upper side and surrounding the dispensing aperture, a ring pull connected to the upper flange in the region of the centre of the can end, and a lower flange overlying the central panel on its underside and surrounding the downturned wall; the lower flange being bonded to the plastics coating on the underside of the can end shell; characterised in that the can end shell is formed with a second aperture in the central panel spaced from the dispensing aperture and in that the plastics closure is formed with a flexible tethering strap moulded integrally with the plastics closure and overlying the upper side of the central panel of the can end shell; the tethering strap being connected at one end to the upper flange at a region remote from the centre of the can end and connected at its other end to the central panel of the can end by means of the second aperture in the can end shell; the plastics material of the strap extending through the second aperture, closing the second aperture, and forming a flange surrounding the second aperture on the underside of the can end which is bonded to the plastics coating on the can end shell.

2. A can end as claimed in claim 1 in which the flange surrounding the second aperture on the underside of the can end is integrally connected to the lower flange surrounding the dispensing aperture on the underside of the can end by means of a further integrally formed strap overlying the underside of the panel.

3. A can end as claimed in claim 1 or claim 2 in which the second aperture is positioned nearer to the centre of the can end than to the end of the dispensing aperture remote from the centre of the panel.

4. A can end as claimed in claim 2 or claim 3 in which the tethering strap is moulded to follow an indirect path between its ends whereas the further strap is moulded to follow a substantially direct path between its ends.

5. A can end as claimed in any preceding claim in which the tethering strap is connected to the ring pull by means of a breakable pip.

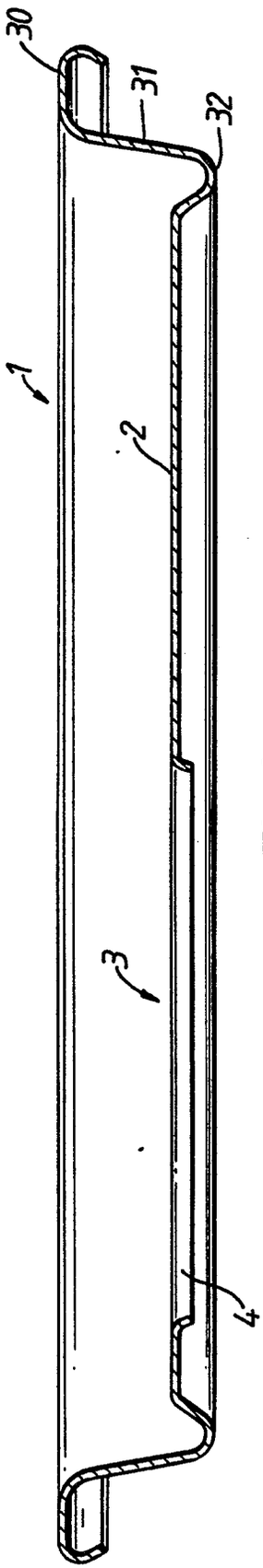

Fig.1.

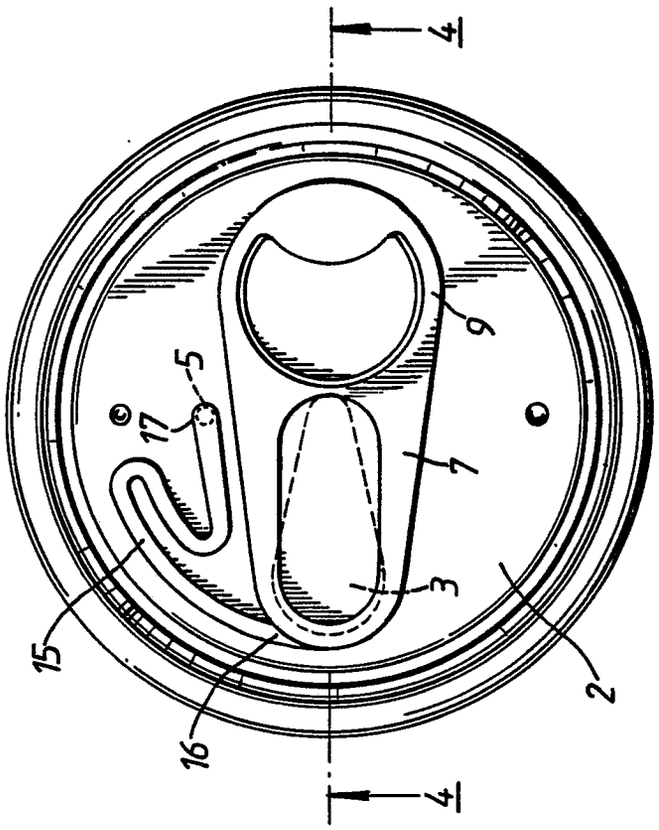

Fig.3.

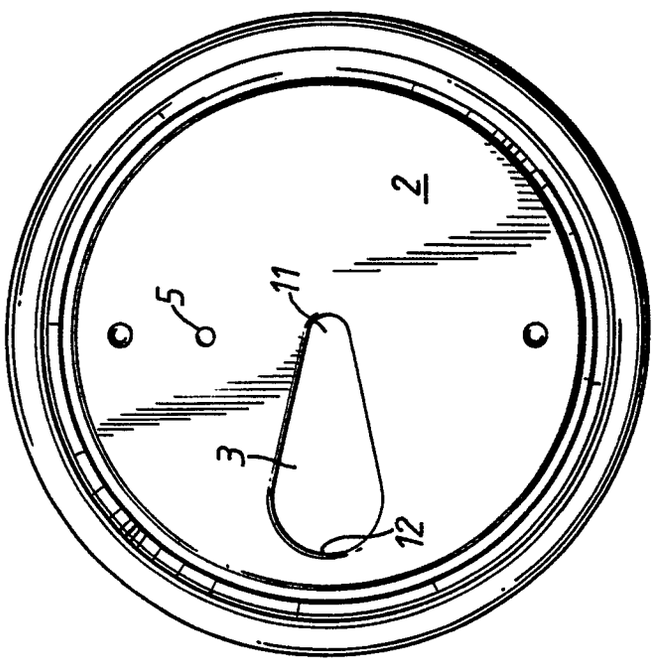

Fig.2.

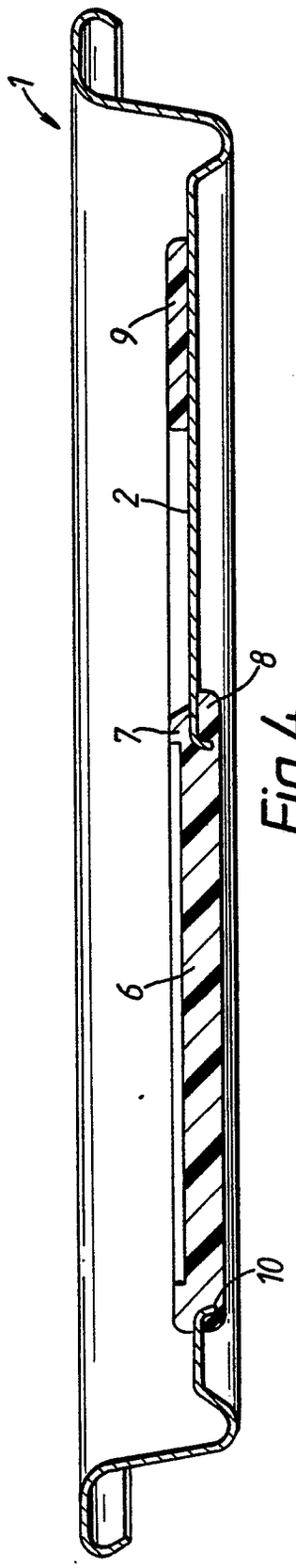

Fig.4.

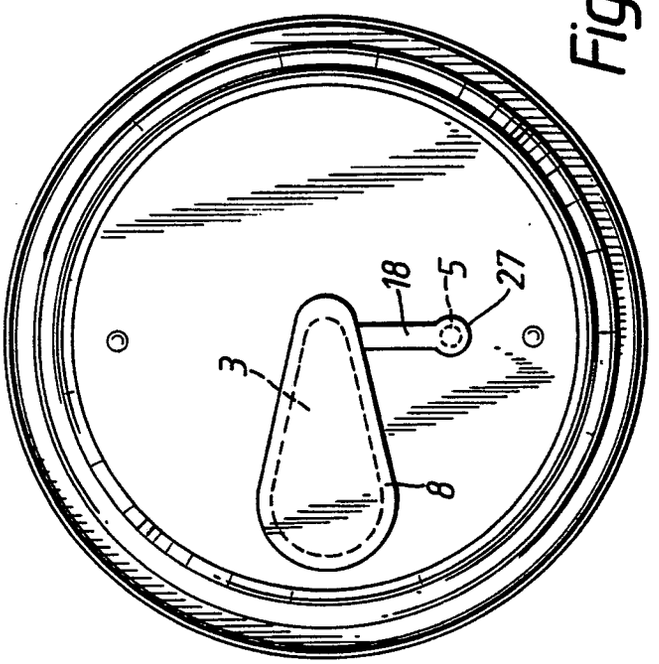

Fig.5.

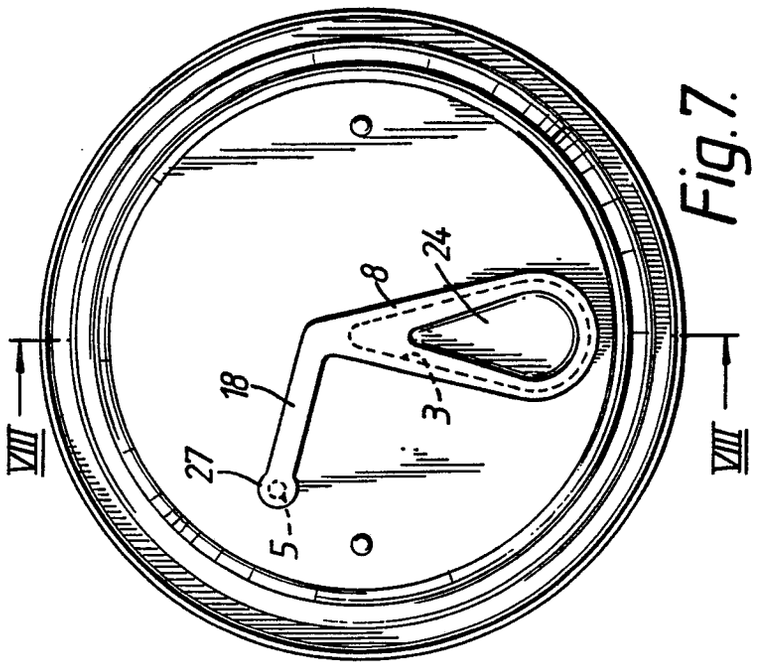

Fig.7.

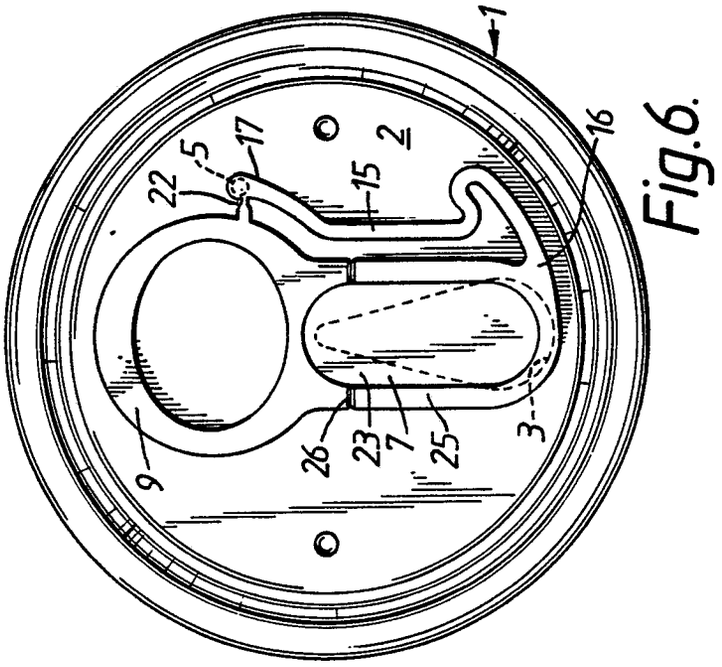

Fig.6.

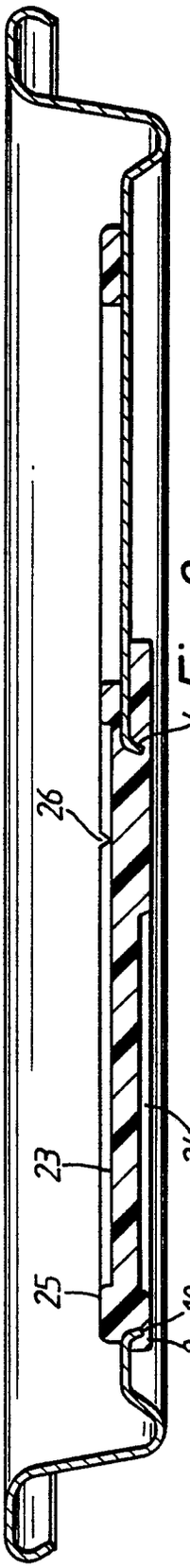

Fig.8.

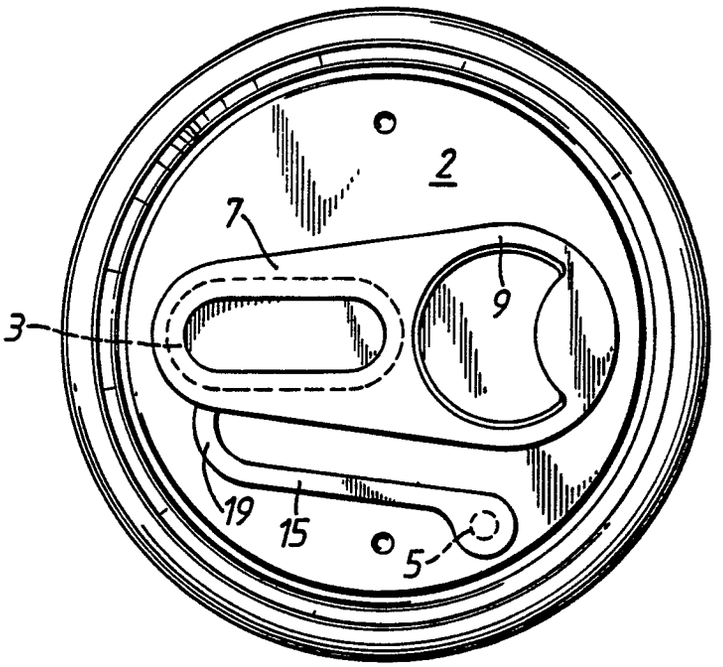

Fig.9.

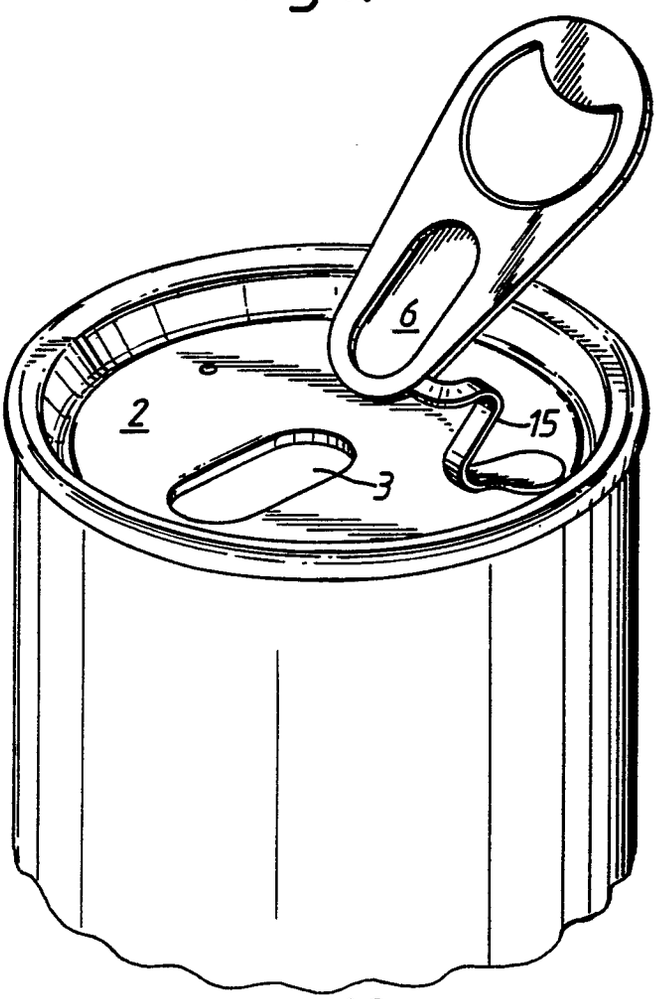

Fig.10.

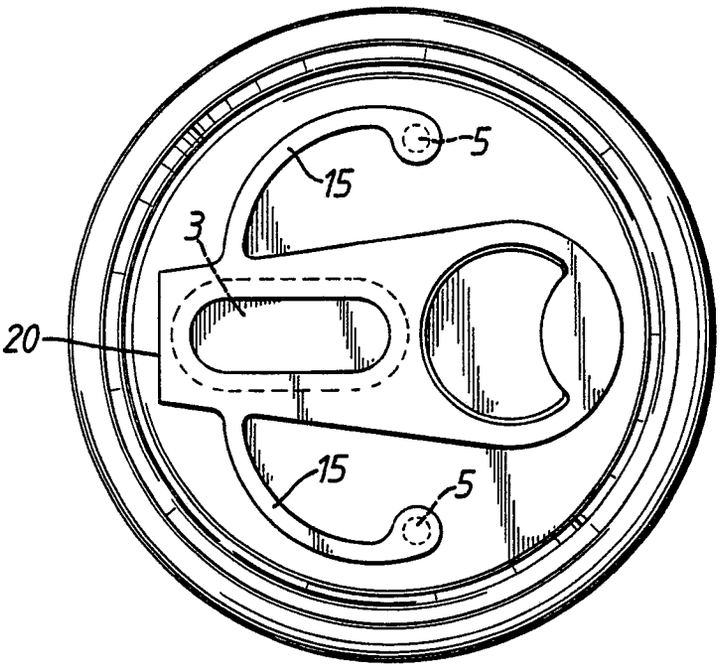

Fig.11.

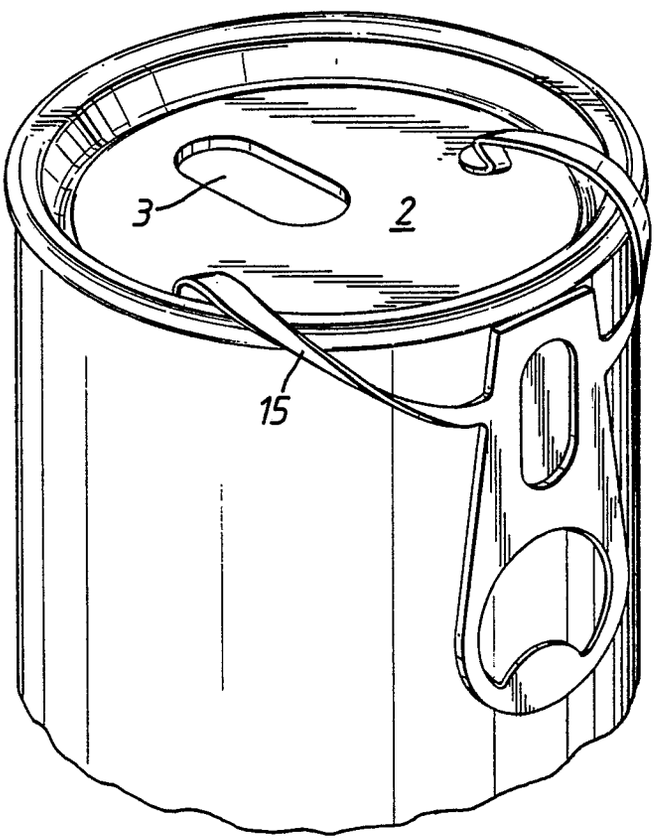

Fig.12.

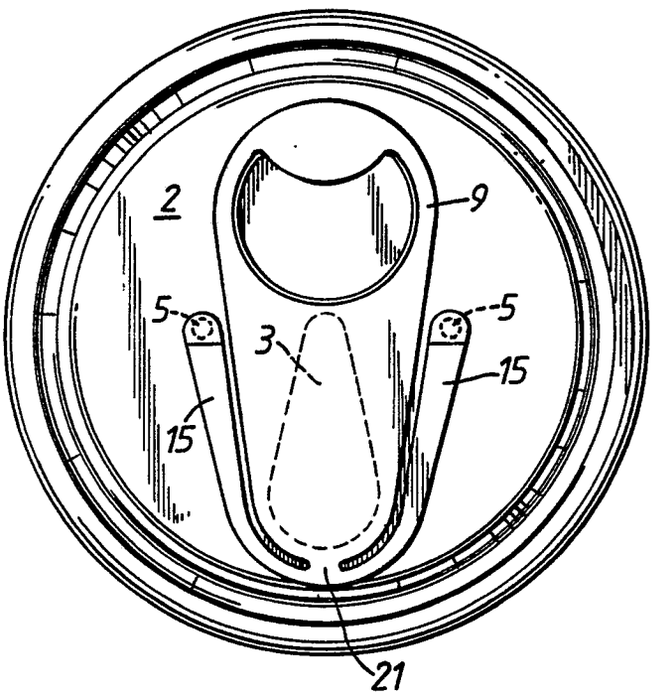

Fig. 13.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 30 0737

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,D	EP-A-0 215 671 (METAL BOX plc) * Page 9, line 19 - page 10, line 20; figures 1-11	1,3	B 65 D 17/50 B 65 D 55/16
Y	WO-A-8 800 560 (SUN COAST PLASTICS) * Page 24, lines 18-30; figures 13-17 *	1,3	
A	US-A-3 246 792 (BRACKMANN) * Figures 1-5 *	1	
A	GB-A-2 180 521 (METAL BOX plc) * Figures 1-11 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11-05-1990	BERRINGTON N.M.

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

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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