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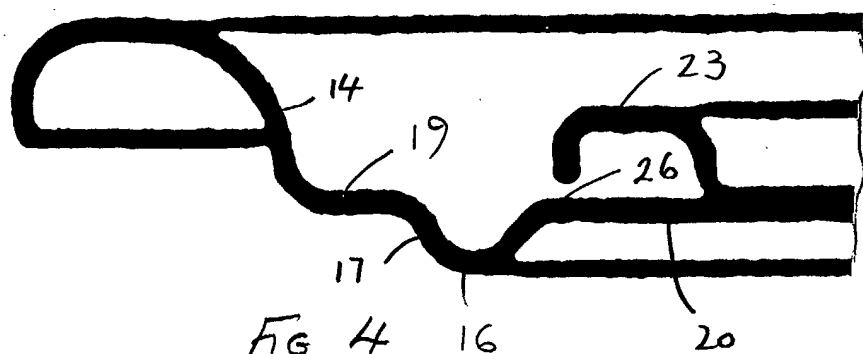
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(54) **Can end**

(57) A can end (10) of the full aperture easy open end type, which comprises a seaming panel (12), a wall (14) depending from the seaming panel, a radiussed portion or "countersink" (16) and a centre panel (20).

The end of the invention further includes a flat annulus or stepped portion (19) between the wall (14) and the countersink (16) such that, in the alternative, the can end is openable by engaging the blade of a can opener with the stepped portion.



EP 1 336 570 A1

## Description

**[0001]** This invention relates to a can end and, in particular to a can end which is adapted for opening by at least two different methods.

**[0002]** Easy open can ends, in which a ring pull or tab is provided for removal of a panel defined by a score line, are well known. Full aperture easy open ends in which the score line surrounds the whole of a centre panel adjacent to the circumferential seam are in common use for the packaging of food items. Such ends open in two stages: an initial "pop" when the tab is raised and tilted to rupture the score and break any vacuum within the can, and a "tear" stage when the tab is pulled away from the can in order to peel open and remove the end. Much design work has been directed to reducing the forces required for opening the can end, without compromising the integrity of the can or reducing pressure resistance to unacceptable levels.

**[0003]** Although the current design for full aperture easy open ends has been optimised in many ways, for example by the provision of beads or by control of grain orientation, many people still find such ends difficult to open. Even with access to the ring on the tab increased by a finger well, those with weak fingers or hands may still find the lifting of the tab too difficult. Often such people will choose to open the can at the opposite end where there is no ring pull and score, using a conventional can opener, in preference to the so-called "easy open end". This, of course, may lead to leakage of the contents if the score at the easy open end has been ruptured at all. In some instances, a product in a can which has two conventional ends, that is neither end being an easy open end, will be purchased in preference.

**[0004]** This invention seeks to provide a solution to this problem.

**[0005]** According to the present invention, there is provided a can end comprising a seaming panel, a wall depending from the seaming panel, a countersink bead and a centre panel; in which the centre panel includes a circumferential score and a tab adjacent the score, and the can end further includes a substantially flat portion between the wall and the countersink bead, such that the can end is adapted for opening either by raising the tab to rupture the score and thereby remove the centre panel, or by engaging the flat portion with a can opener blade and cutting around an annulus defined by the flat portion to remove the radially inward part of the can end, including the countersink and centre panel.

**[0006]** A preferred embodiment of the invention will now be described, by way of example only, with reference to the drawings, in which:

Figure 1 is a side section of a prior art full aperture easy open end;

Figure 2 is an enlarged part side section of another prior art full aperture easy open end;

Figure 3 is a side section of the end of the present

invention;

Figure 4 is the enlarged view of IV in figure 3; and

Figure 5 is the enlarged view of V in figure 3.

**[0007]** The easy open can end 10 of figure 1 includes a seaming panel 12, wall 14 joining the seaming panel 12 to a countersink bead 16 and inner wall 18 of the countersink bead which supports a centre panel 20 of the can end. A line of weakness, typically in the form of a score, extends around the centre panel 10 near the wall 14 to define a removable panel.

**[0008]** In the easy open end of figure 1, a pull tab 22 is fixed to an integral rivet 24 raised from the metal of the centre panel 20. The tab is raised to break or "pop" the score line and is then pulled progressively to remove the removable panel by tearing the rest of the score line. European patent application EP-98921661.9 describes how selective positioning of the tab with respect to the grain orientation of the metal of the can end reduces tear force requirements without adversely affecting the pop force needed to break the score. Orienting of the can end during manufacture, however, necessitates extra tooling and, possibly, additional tooling stations. Whilst the resultant can end may be more readily opened than conventional easy open ends, the extra capital costs involved may deter some manufacturers.

**[0009]** The enlarged section of figure 2 shows the part of a can end which included seaming panel 12, centre panel 20 and score 30. In this can end, however, there is no countersink and the wall 14' is joined to the centre panel 20 by a double fold 32, 34. Score 30 is situated in lower fold 34, rather than on the centre panel, and is partially covered by upper fold 32. This means that the aperture obtained on opening the can end is maximised as not only centre panel 20, but also most of lower fold 34 is removed. Nonetheless, the abuse resistance of this can end is poor (i.e. when the can is dropped) as distortion of the double fold is transmitted directly through the score, causing score rupture. Furthermore, during processing of product (such as food) within a can which is closed by the end of figure 2, pressure changes within the can may lead to rotation of the tab until it becomes hooked over the seam and risks hook-up on parts of the retort apparatus.

**[0010]** In figure 1, the outer wall of the countersink 16 is integral with the wall 14. In the can end of the invention, as shown in figures 3 to 5, the wall 14 and outer wall 17 of the countersink 16, are separated by a flat "stepped" portion 19. The nose 23 of pull tab 22 overlies the score 26 in the centre panel 20, as in figure 1.

**[0011]** In contrast in particular with the prior art design of figure 2, the provision of a countersink, i.e. radiused portion 16, gives improved abuse and pressure performance and avoids "tab over seam" hook-up.

**[0012]** A most important aspect of the present invention is that the can end of figure 3 to 5 not only gives better performance than the prior art design of figure 2 and equal pressure resistance to the design of figure 1,

but it also offers an alternative opening method to the consumer. Thus, although it is expected that the majority of customers will use the pull tab to break the score and remove the centre panel 20 in conventional manner, there is an alternative available to those unwilling or unable to use the tab. 5

**[0013]** Specifically, the "stepped portion" 19 between wall 14 and outer wall 17 of the countersink 16 comprises a flat annulus of approximately 4 mm in width (difference between inner and outer diameter). By use of a can opener, the user is able to engage the wheel blade of the can opener on the flat portion and, by progressive cutting of the stepped portion 19 around the whole of the can end, removal of the centre panel 20 and countersink 16 is possible. 10 15

**[0014]** This annulus can be up to 10 mm although clearly the larger the annulus, the smaller the aperture of an end of the same overall diameter will be. The annulus should ideally not be less than 2 mm as this will leave insufficient width of flat portion for engagement of a can opener. 20

**[0015]** By providing a combination of opening methods to the consumer, the applicant has found that the consumer offered more choice in opening, but there is not only no adverse affect on performance but also potential improvements in abuse and pressure performance. 25

## Claims 30

1. A can end (10) comprising a seaming panel (12), a wall (14) depending from the seaming panel, a countersink bead (16) and a centre panel (20); in which: 35

the centre panel (20) includes a circumferential score and a tab (22) adjacent the score; and the can end further includes a substantially flat portion (19) between the wall (14) and the countersink bead (16); 40

such that the can end is adapted for opening either by raising the tab to rupture the score and thereby remove the centre panel, or by engaging the flat portion with a can opener blade and cutting around an annulus defined by the flat portion to remove the radially inward part of the can end, including the countersink and centre panel. 45

2. A can end according to claim 1, in which the substantially flat portion (19) is 2 mm or more in width. 50
3. A can end according to claim 1 or claim 2, in which the substantially flat portion is 10 mm or less in width. 55
4. A can end according to any one of claims 1 to 3, in

which the substantially flat portion is 4 mm in width.

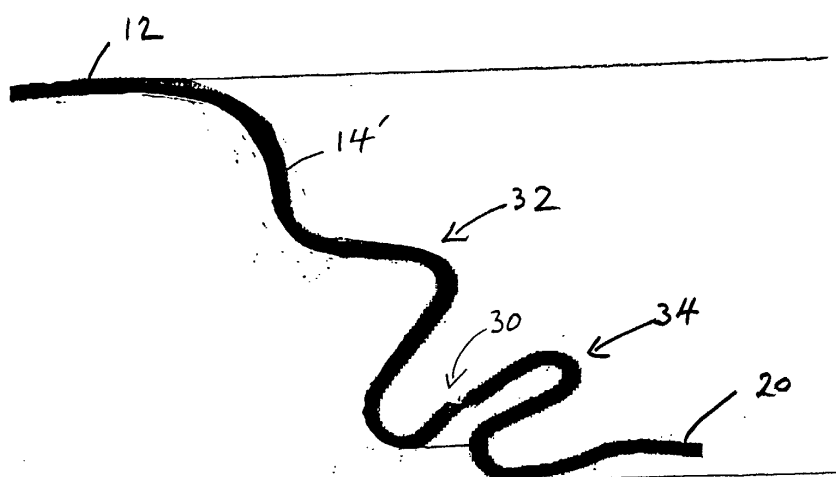
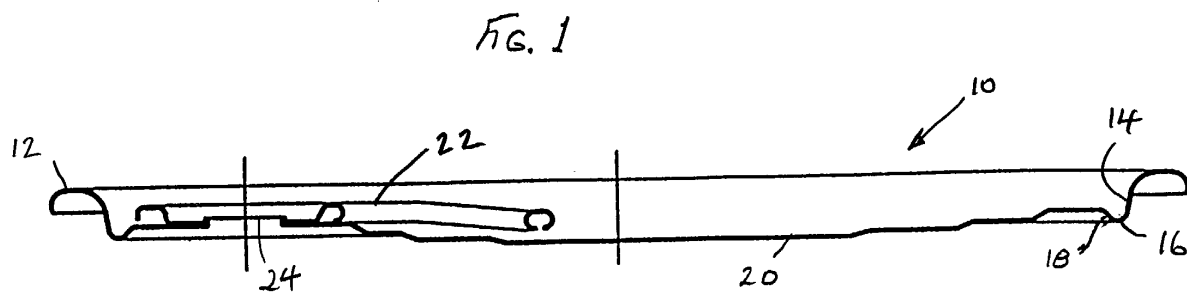
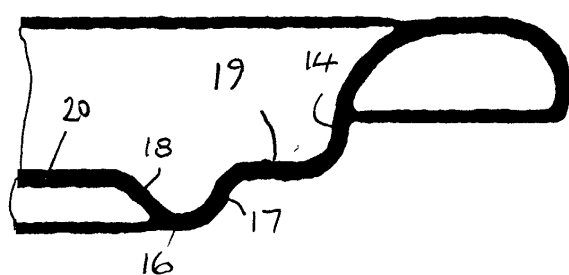
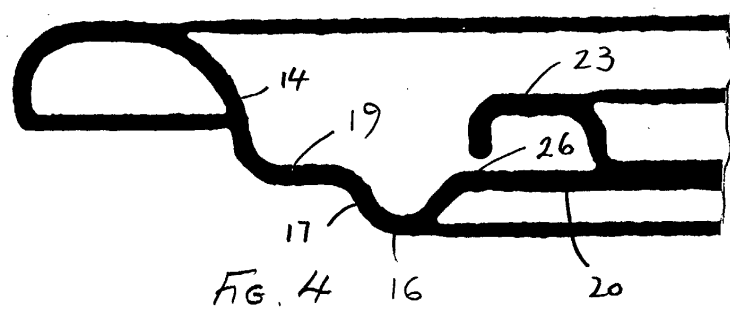
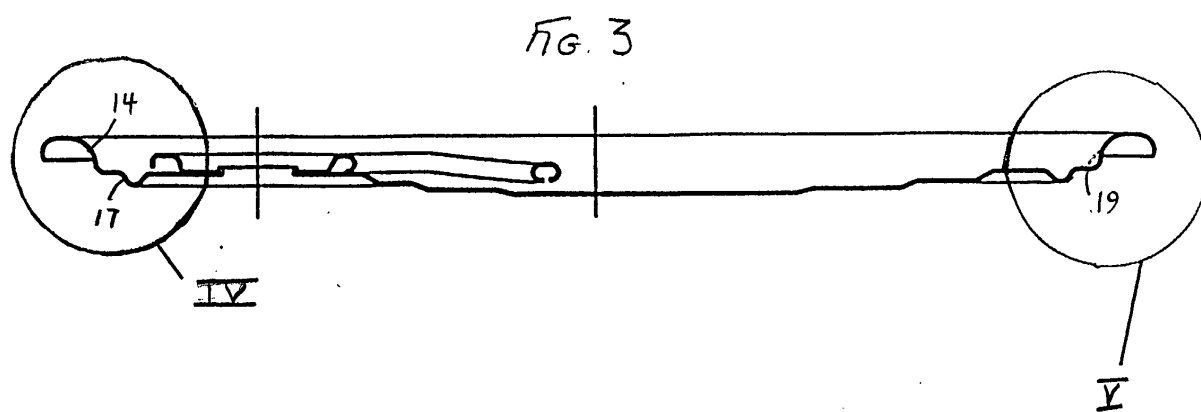


FIG. 2





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# EUROPEAN SEARCH REPORT

Application Number  
EP 02 25 1059

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	GB 2 168 672 A (TOYO SEIKAN) 25 June 1986 (1986-06-25) * page 2, line 3 - line 55; figures 4-6 *	1-4	B65D17/28 B65D17/42
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A	WO 00 09406 A (HEINZ) 24 February 2000 (2000-02-24) * column 20, line 16 - line 22; figures 2,3 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 July 2002	Examiner Newell, P
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 02 25 1059

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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