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(54) **Can, and a body and panel therefore**

(57) The invention relates to a can, comprising a body provided with a panel, wherein the panel is provided with a tab comprising a front tab part and a rear tab part for gripping in forming by engagement of the front tab part with the panel of an opening in the panel, wherein the panel is provided with a flip panel area at least beneath the rear tab part, which panel area forms a depression beneath the rear tab part dependent on a negative pressure difference over the panel, and to a body and panel for such can.

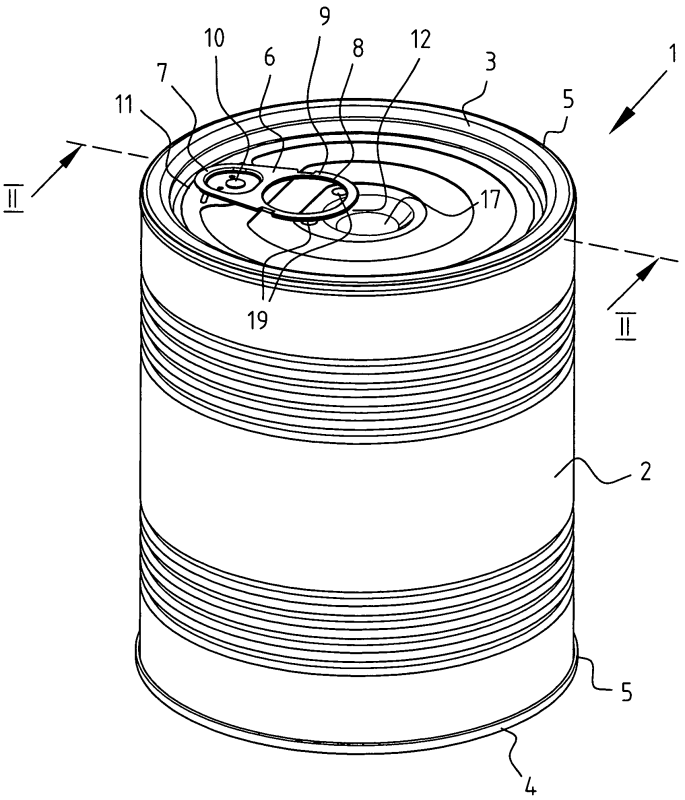

FIG. 1

EP 1 958 882 A1

Description

[0001] The present invention relates to a can, and to a body and a panel therefore.

[0002] This can according to the invention may be of the type having a so-called easy opening closure. An easy opening closure is a metal closure for a can in which an opening may be formed by using one or more fingers and without the requirement of a separate opening tool. To that extent the can is provided with a tab for forming an opening in the panel of the can. The tab functions as a lever.

[0003] The tab comprises a rear tab part which is to be gripped by the user. By levering or tilting of the tab the front tab part is actuated. Actuation by levering or tilting results in popping an initial opening in the panel. The opening is defined by a score line. The score line is generally circumferential. With the tab in an upright position a maximum popping opening is formed. Tearing the tab outwardly results in scoring out of the panel. Finally, by hinging the panel is torn apart from the can and the can opening is formed.

[0004] The can according to the invention may also be provided with a smaller opening by the levering action of the tab, thereby forming a small opening just sufficient for emptying the content of the can.

[0005] Users of the types of can described above appreciate sometimes a problem in gripping the rear tab part. Normally, this required that a nail or finger tip is inserted in between the panel and the rear tab part for starting the gripping action.

[0006] The invention has for its object to improve the initial gripping action by the user. This improvement is under the condition that other functions of the can and tab are not influenced, such as the manufacture, filling, handling and opening of the can by the tab.

[0007] The present invention is based on the insight that cans may have, after filling and closure, an internal pressure, which is lower than the surrounding atmospheric pressure. There is a negative pressure difference over the panel. Such negative pressure difference may be the result of hot filling and/or cooking of the content of the can before closing it. After closure and cooling the gas phase above the content will reduce in volume, thereby forming a negative pressure difference over the panel and the surrounding. This negative pressure difference is used to have the panel acquire a depressed or concave form. These forms result in an increase of the space beneath the rear tab part. The increased space improves the gripping action. Obviously, this panel change occurs after manufacture of can and panel, after filling and closing. There is substantially no interference with the traditional handling of such cans.

[0008] Accordingly, the present invention provides a can, comprising a body provided with a panel, wherein the panel is provided with a tab comprising a front tab part and a rear tab part for gripping in forming by engagement of the front tab part with the panel of an opening in the panel, wherein the panel is provided with a flip panel area at least beneath the rear tab part, which panel area forms a depression beneath the rear tab part, which depression preferably has a concave form dependent on a negative pressure difference over the panel. The flip panel may be formed by providing the panel with a particular structure and/or by providing the panel in the flip panel area with a different thickness. In essence it is required that the flip panel area has a higher flexibility than other parts of the panel such that by the negative pressure difference the concave form beneath the rear tab part is provided.

[0009] It is noted that jars, cans and bottles for fruit juice and marmalades may be provided with a screw cap having a similar flip panel area. However, these screw caps are not provided with a tab.

[0010] According to a first embodiment the flip panel area flips between a concave form and a flat form dependent on the negative pressure difference over the panel. Thus, when the negative pressure difference is neutralized the flip panel parts flips from a concave form to a substantially flap form.

[0011] According to another embodiment the flip panel area flips between a concave form and a convex form dependent on a negative pressure over the panel. The provision of a convex form to the flip panel part does not interfere with the opening action using the tab because the tab is than in a more tilted position remote from the flip panel area.

[0012] According to a preferred embodiment the flip panel area is part of a terrace structure. Accordingly, there is a better controlled area in the terrace structure in which the flipping of the flip panel part could take place. In this respect it is preferred on a consumer perspective that the flip panel area is a central terrace structure.

[0013] According to another embodiment the panel is provided with a slanted or gradually depressing form (when the negative pressure difference exists). However, when the pressure difference is neutralized the flip panel area flips from the slanted concave form to a flat or convex form.

[0014] In order to or precisely define or limit the substantial horizontal position of the tab prior to the opening of the can, it is preferred that the tab movement is limited by a panel rest structure. According to an embodiment the panel structure has the form of a dimple on which the tab may rest or by which dimple the downward movement of the tab part is limited. Although it is preferred that the flip panel area is located in the central panel part, other locations off-centered are also suitable.

[0015] The panel may be connected to the body of the can by any known means. The panel may be unitary with the body or may be connected by any means, such as soldering, seaming and the like. It is preferred that the panel is seamed to the can body.

[0016] An other aspect of the present invention relates to a body provided with a panel having a flip panel area, which has a concave form dependent on the negative

pressure difference over the panel.

[0017] Finally, a last aspect of the invention relates to a panel which has a flip panel area which has a concave form dependent on a negative pressure over the panel when part of a can described above.

[0018] Mentioned and other features of the can, body and panel according to the invention will be further illustrated by way of the following examples which are given for illustrative purposes and not intended to limit the present invention to any extent, while making reference to the following drawings.

[0019] In the drawings is:

Figure 1 a perspective view of a can according to the invention;
Figures 2A and 2B a cross section following line II-II given in Figure 1 and showing the flipping of the flip panel area according to the invention;
Figures 3A and 3B showing an alternative of the can according to the invention; and
Figures 4A/4B and 5A/5B show other alternatives.

[0020] Figure 1 shows a can 1 according to the invention. The can comprises a body 2, a top panel 3 and a bottom panel 4. Top panel 3 and bottom panel 4 are seamed via a seam connection 5 to the body 2.

[0021] The top panel 3 is provided with a traditional tab 6. The tab 6 comprises a front tab part 7 and a rear tab part 8. The rear tab part 8 is provided with an opening 9 into which a finger of the user may be inserted.

[0022] The tab 6 is connected to the top panel 3 via a rivet 10. Other methods for connection of the tab 6 include welding with metal or plastic welding material. The rivet 10 may be a separate rivet or may have been formed of material originating from the top panel and formed into a rivet shape.

[0023] The panel is provided with a score line 11 which is having a circular form. The score line defines the opening in the can 1.

[0024] The can is opened by inserting a finger or nail beneath the rear tab part 8 in a so called gripping space 12. Levering or tilting the tab 6 results in a popping at the front tab part 7 in the score line 11 by a movement illustrated in figure 2B.

[0025] Figure 2A shows more in detail and in cross section the top panel 3 according to the invention. The top panel 3 is provided with a terrace structure 13 having three concentric terrace rings 14-16 at a lower position relative to the seam 5. The terrace structure comprises a central area, which is a flip panel area 17 according to the invention. As shown in figure 2A the flip panel area 17 has a concave structure for reasons that there exists a negative pressure difference over the panel from the inside to the outside. That is, the atmospheric pressure at the outside is higher than the internal pressure at the interior 18 of the can 1 according to the invention.

[0026] It is noted that the downward movement of the tab 6 at its rear tab part it limited by the presence of a resting structure which has the form of a dimple 19.

[0027] After popping open the panel 3 thereby forming a popping opening 20, the pressure difference is neutralized resulting in a flipping of the flip panel area 17 from the concave form illustrated in figure 2A into the convex form illustrated in figure 2B.

[0028] Obviously, by having a concave form as illustrated in figure 2A there is a larger and increased gripping space 12 beneath the rear tab part 8 and the panel 3 at the location of the flip panel part 17.

[0029] Figures 3A and 3B show an alternative of the can 21 according to the invention. The can is provided with a panel 22 having a slanted form. The panel has a central area 23 (at least beneath the rear tab part 8 of the tab 6), thereby forming the gripping space 12 under the rear tab part 8.

[0030] The panel 23 is soldered to the body 24. Due to the hot content of the can 21 after closure there will be an internal pressure which is lower than the atmospheric pressure and accordingly there is a negative pressure difference over the panel 22. Due to this negative pressure difference the flip panel part 23 has a concave form.

[0031] Popping opens the panel 22 by levering or tilting the tab 6, the flip panel area 23 flips over into a convex form.

[0032] Figures 4A and 4B show another can 25 according to the invention. The top panel 26 has a central flip panel area 27 which has in cross-section a wavy shape. This wavy shape defines a depression 28 beneath the rear tab part 8 thereby forming the increased gripping space 12.

[0033] Figure 4B shows that upon opening the can 25 with the tab 6 and after pressure equilibration over the top panel 26, the flip panel 27 changed form such that the depression 28 is transformed in a more flat area 29. However, the trendline 30 changed from a substantially concave into a substantially convex form.

[0034] Figures 5A/5B show another can 31 according to the invention. The can 31 has a panel 32 comprising a flip panel area which has an annular depression 34 and a central flat portion 35. After neutralization of the negative pressure difference over the panel 32, the flip panel area 33 changes from the form depictured in figure 5A into the form depictured in figure 5B whereby the depression 34 has disappeared and the central portion 35 moved upwardly. Again, the trendline 36 has changed from a substantially concave form into a substantially convex form.

[0035] The can, body and/or panel may be made of metal, such as aluminium and steel.

[0036] The cans may be round or non-round (oval and rectangular). When round the can may have a diameter from about 52 to 153 mm. At lower diameters, the panel having a terrace structure will have about 1 or 2 terraces but at higher diameters the number of terraces may increase. The advantage of such terrace structures is to provide stiffness in the terrace structures and to allow

the best flexible flipping properties controlled and relied to the flip panel area which is generally the central panel area.

[0037] When made of steel the panel may have a thickness as from 0.13 to 0.30 mm. The thickness may be less in the area forming the flip panel area.

[0038] It is noted again that the tab used may be a conventional tab. The object of the invention is to provide an improved and larger space available for the user for inserting nail and/or finger tip under the rear tab part thereby improving the gripping action and the opening of the can.

Claims

1. Can, comprising a body provided with a panel, wherein the panel is provided with a tab comprising a front tab part and a rear tab part for gripping in forming by engagement of the front tab part with the panel of an opening in the panel, wherein the panel is provided with a flip panel area at least beneath the rear tab part, which panel area forms a depression beneath the rear tab part dependent on a negative pressure difference over the panel.

2. Can according to claim 1, wherein the panel area has a concave form dependent on a negative pressure difference over the panel.

3. Can according to claim 1 or 2, wherein the flip panel area flips between a concave form and a flat form dependent on the negative pressure difference over the panel.

4. Can according to claim 1 or 2, wherein the flip panel area flips between a concave form and a convex form dependent on a negative pressure over the panel.

5. Can according to claim 1-4, wherein the flip panel area is part of a terrace structure.

6. Can according to claim 5, wherein the flip panel area is a central terrace structure.

7. Can according to claim 1-4, wherein the flip Panel area is formed in a slanted panel.

8. Can according to claim 1-7, wherein the tab movement is limited by a panel rest structure.

9. Can according to claim 8, wherein the panel rest structure is a dimple.

10. Can according to claim 1-8, wherein the panel is seamed to the can body.

11. Body provided with a panel according to claim 1-9.

12. Panel according to claim 1-9.

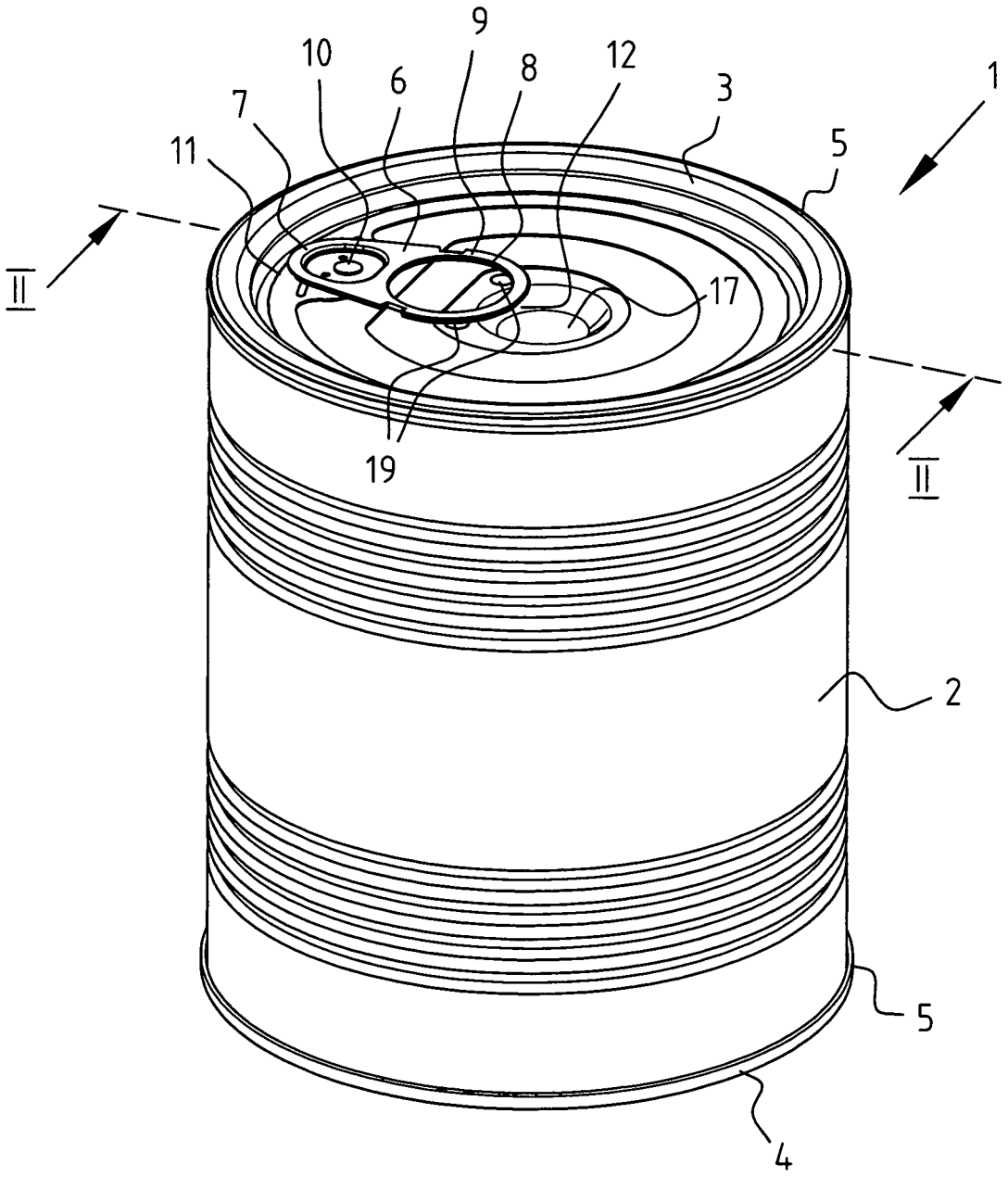

FIG. 1

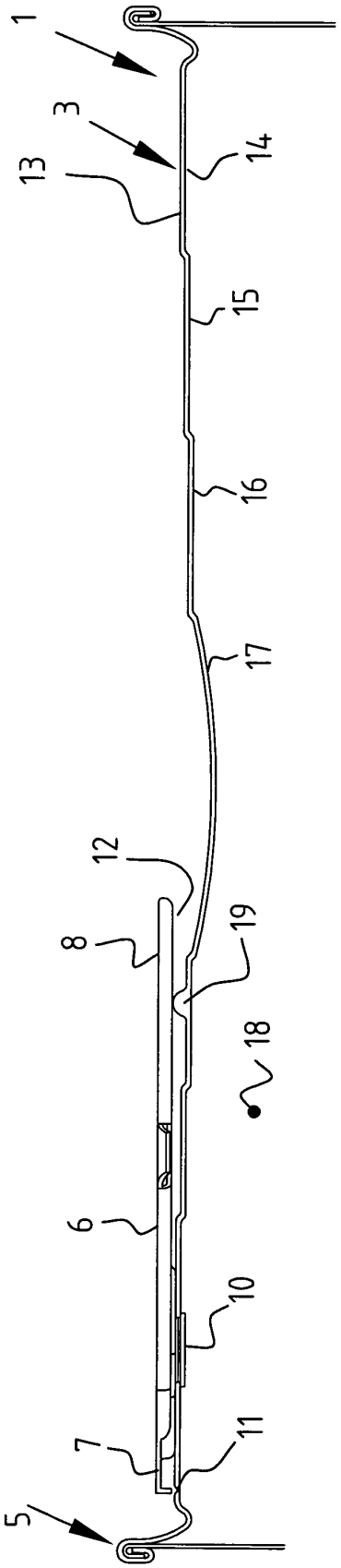

FIG. 2A

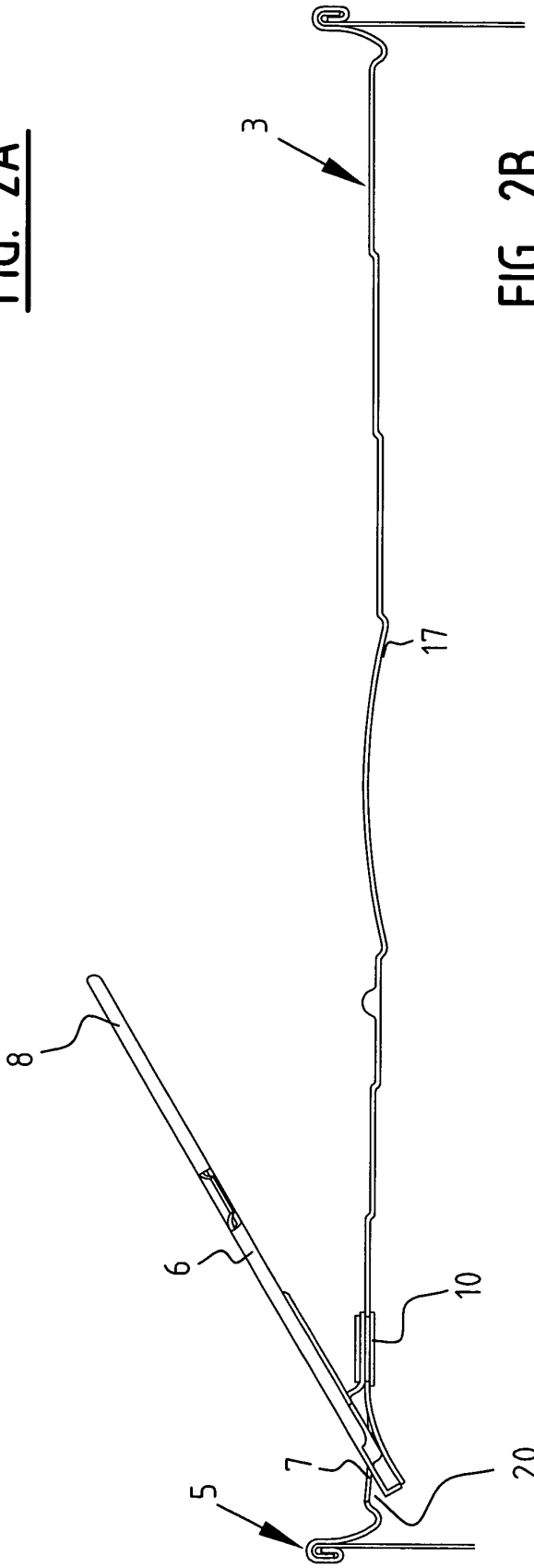

FIG. 2B

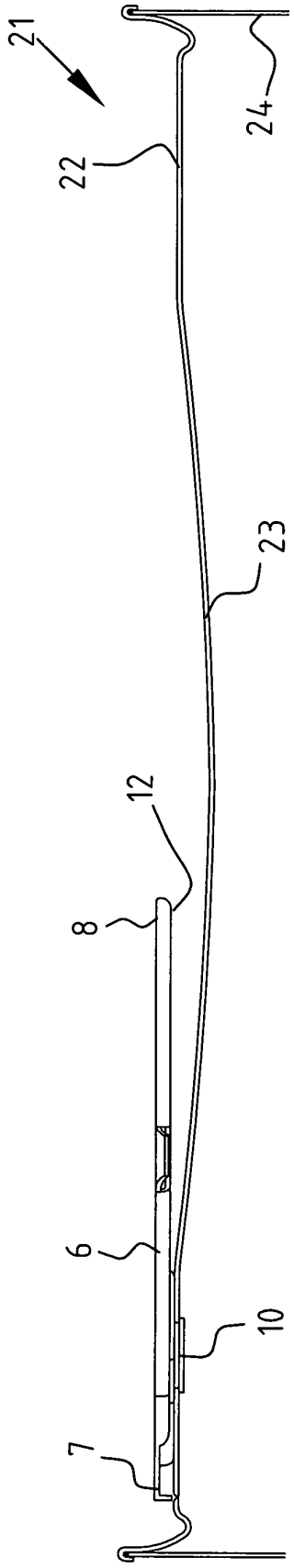

FIG. 3A

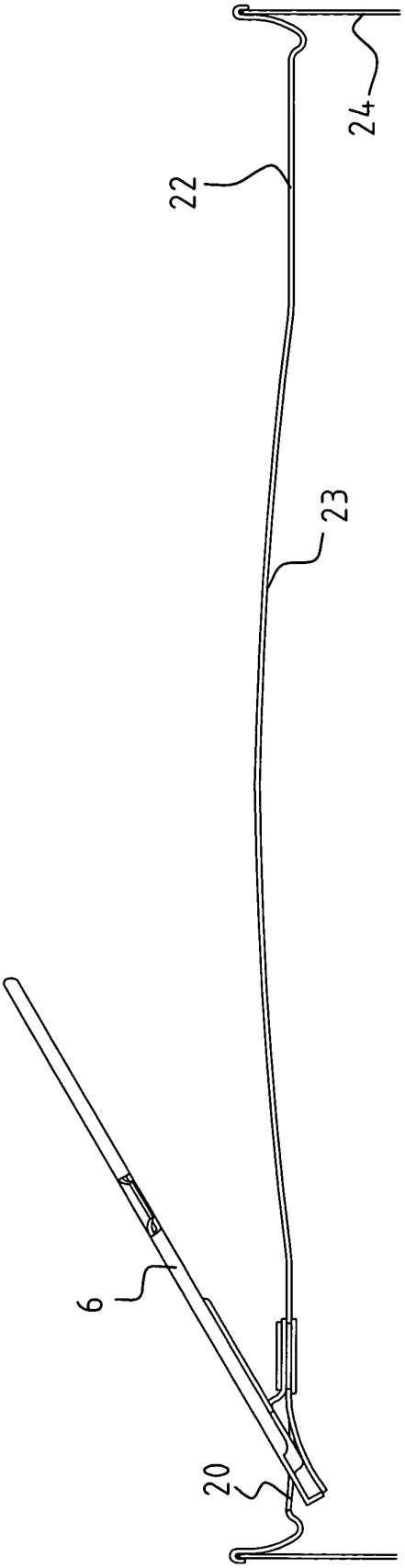

FIG. 3B

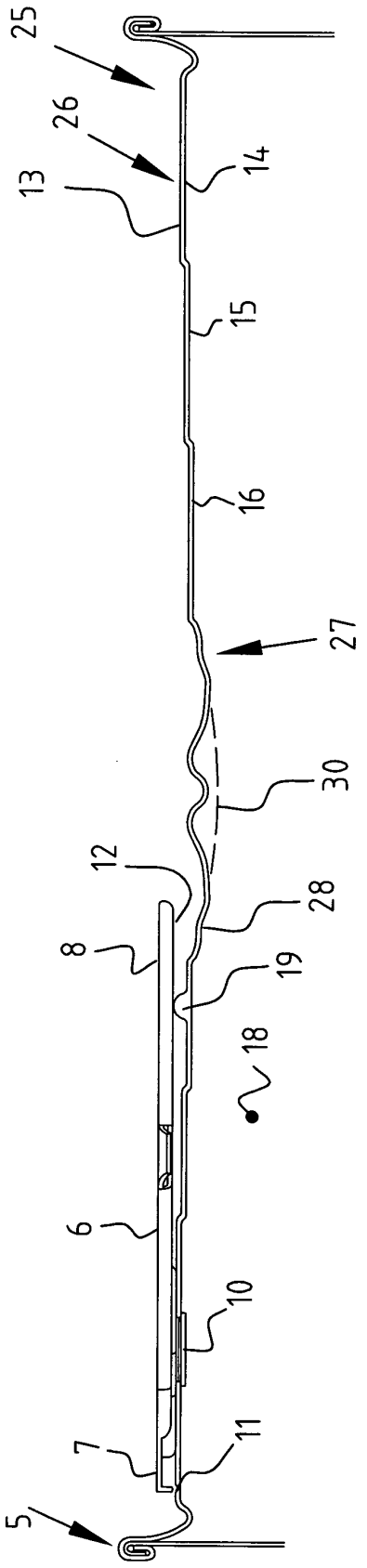
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FIG. 4A

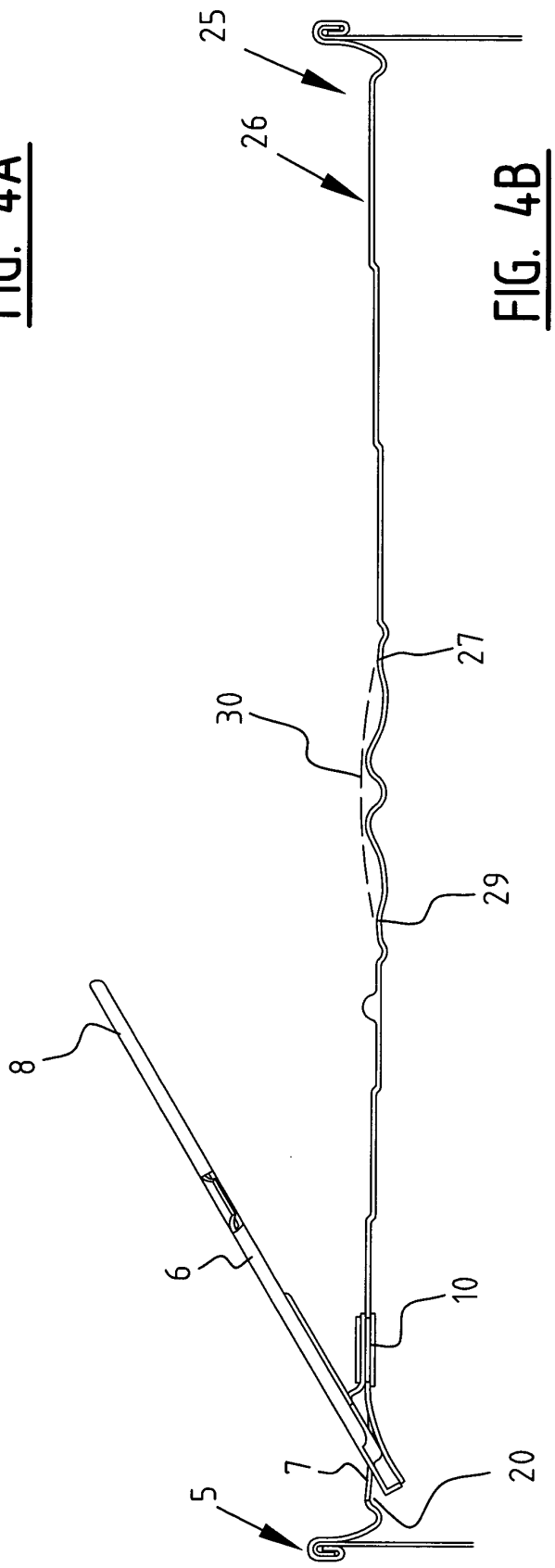
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FIG. 4B

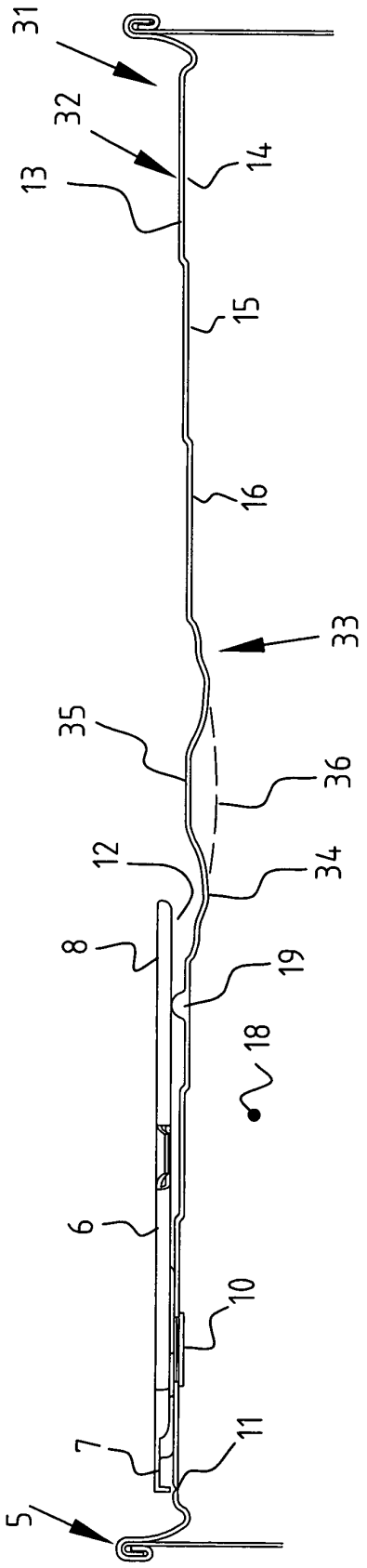
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FIG. 5A

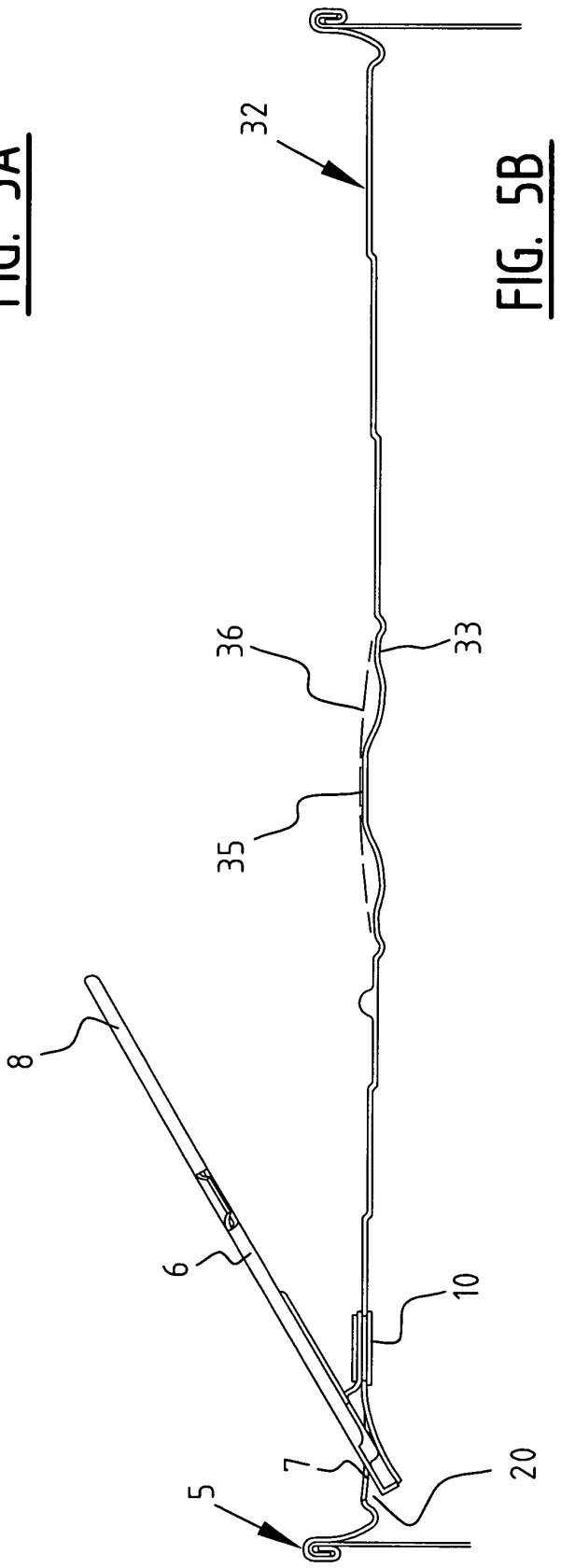
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FIG. 5B

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EUROPEAN SEARCH REPORT

Application Number
EP 07 07 5131

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 3 930 592 A (DIIANNI DANIEL) 6 January 1976 (1976-01-06) * figures 1-4 *	1,2,4-12 3	INV. B65D17/28 B65D79/00
Y	WO 97/14614 A (DIAMOND GEORGE B [US]) 24 April 1997 (1997-04-24) * page 2, line 9 - page 3; figures 1a-1d *	3	
A	US 3 105 765 A (CREEGAN ROBERT M) 1 October 1963 (1963-10-01) * figures 1-7 *	1-12	
A	WO 88/05407 A (WEIRTON STEEL CORP [US]) 28 July 1988 (1988-07-28) * figures 13-19 *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 July 2007	Jervelund, Niels

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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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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