

(19)



(11)

**EP 2 197 755 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**22.08.2012 Bulletin 2012/34**

(51) Int Cl.:  
**B65D 17/34 (2006.01)**

(21) Application number: **08838560.4**

(86) International application number:  
**PCT/US2008/078903**

(22) Date of filing: **06.10.2008**

(87) International publication number:  
**WO 2009/048832 (16.04.2009 Gazette 2009/16)**

(54) **TAB AND CAN END EMPLOYING THE SAME**

FLACHSTECKER UND DOSENENDE DAMIT

LANGUETTE ET COUVERCLE DE CANETTE L'EMPLOYANT

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR**

- **MITCHELL, Mark Richard Sidney Ohio 45365 (US)**

(30) Priority: **10.10.2007 US 978882 P**

(74) Representative: **Parry, Simon James et al Mewburn Ellis LLP 33 Gutter Lane London EC2V 8AS (GB)**

(43) Date of publication of application:  
**23.06.2010 Bulletin 2010/25**

(73) Proprietor: **Stolle Machinery Company, LLC Centennial, Colorado 80112 (US)**

(56) References cited:  
**WO-A1-94/24006 GB-A- 2 459 387**  
**US-A- 4 880 137 US-A- 6 129 230**  
**US-A1- 2007 039 961 US-B1- 6 244 456**

(72) Inventors:  

- **MCELDOWNEY, Craig Allen Russia Ohio 45363 (US)**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

**EP 2 197 755 B1**

## Description

### Field of the Invention

**[0001]** The invention generally relates to openers for opening containers and, more particularly, to tabs used to open can ends, such as beer/beverage can ends and food can ends. The invention further relates to can ends having tabs.

### Background Information

**[0002]** A tab is typically secured to a can end by a rivet, and the can end is opened by lifting a lift portion of the tab by pulling upwards on the tab so as to pivot the tab about the rivet. Specifically, when the tab pivots after the lift portion of the tab has been lifted upwards, the opposite end (e.g., nose portion or end) of the tab fractures a score line disposed on the can end, which permits the end-user to access the contents of the can.

**[0003]** Prior to use, the tab is generally in a flat orientation, parallel to the plane of the end panel of the can end. Lifting the tab requires the end-user to reach with their finger between the tab and the seam of a can end and to exert an upward lift force on the bottom side of the tab. Such an approach can create difficulty for the end-user to acquire proper leverage to open the can end. The difficulty can become more pronounced if the end-user has relatively long fingernails and/or weak fingers that make it awkward for the end-user to reach between the tab and the seam of the can end. Also, the area available for finger access between the tab and the seam decreases for smaller can end diameters, as well as for can ends having smaller center panels. This further increases the difficulty associated with opening the can end.

**[0004]** US 6,129,230 discloses an end closure for a can having a stay-on-tab.

**[0005]** There is, therefore, room for improvement in tabs, and in can ends, such as beer/beverage can ends and food can ends, which employ tabs.

### SUMMARY OF THE INVENTION

**[0006]** These needs and others are met by embodiments of the invention which are directed to a tab for containers (e.g., cans) wherein the tab is structured to facilitate access to the tab and relatively easy actuation of the tab to facilitate easy opening of the can end by the end-user.

**[0007]** As one aspect of the invention, a tab is provided for a can end. The tab has a body comprising a bottom surface disposed in a plane, and a top surface disposed opposite the bottom surface at a preselected height,  $h_1$ , with respect to the plane of the bottom surface; a nose portion located at a first end of the body of the tab; a lift portion located a second end of the tab, opposite nose portion; a rivet receiving portion located proximate to the

nose portion, the rivet receiving portion including a rivet hole; and a flange located at the rearward edge of the lift portion of the tab, the flange including an upper portion and an underside disposed opposite the upper portion.

5 The underside of the flange is disposed at a preselected height,  $h_2$ , with respect to the plane of the bottom surface of the tab. The preselected height,  $h_2$ , forms a ratio,  $h_2:h_1$ , with respect to the preselected height,  $h_1$ , which has a value of between about 0.60 to about 0.95. A portion  
10 of the nose portion of the tab has curled or hemmed edges. A portion of the lift portion of the tab has curled or hemmed edges. The flange of the tab has a single metal thickness which is substantially devoid of any curl or hem.

### 15 BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** A full understanding of the invention can be gained from the following description of the preferred embodiments when read in conjunction with the accompanying drawings in which:

20 **[0009]** Figure 1 is an isometric view of a tab, in accordance with an embodiment of the invention;

**[0010]** Figure 2 is a top plan view of the tab of Figure 1;

25 **[0011]** Figure 3 is a bottom plan view of the tab in Figure 1;

**[0012]** Figure 4 is a sectional view taken along line 4-4 of Figure 3;

**[0013]** Figure 5 is a side elevation view of the tab of Figure 1;

30 **[0014]** Figure 6 is an end elevation view of the lift portion of the tab of Figure 1;

**[0015]** Figure 7 is a top plan view of the tab coupled to a can end, in accordance with an embodiment of the invention;

35 **[0016]** Figure 8 is a sectional view taken along line 8-8 of Figure 7;

**[0017]** Figures 9 and 10 are isometric views of tabs, in accordance with other embodiments of the invention; and

40 **[0018]** Figure 11 is a sectional view of a tab, in accordance with another embodiment of the invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

45 **[0019]** For purposes of the description hereinafter, directional phrases used herein such as, for example, "right", "left", "upper", "lower", "vertical", "horizontal", "axial", "top", "bottom", "front", "aft", "back", "behind", "rearward", and derivatives thereof shall relate to the invention, as it is oriented in the drawing, as if the invention  
50 was placed in operational relationship with a level can end coupled to an upright can body with the can body resting on a flat horizontal surface. It is to be understood that the specific elements illustrated in the drawings and described in the following specification are simply exemplary embodiments of the invention. Therefore, specific dimensions, orientations and other physical characteristics related to the embodiments disclosed herein are not

to be considered limiting with respect to the scope of the invention.

**[0020]** As employed herein, the terms "can" and "container" are used substantially interchangeably to refer to any known or suitable container or can having an end to which the disclosed tab may be coupled.

**[0021]** As used herein, the term "arcuate" means an elliptical or rounded: (i) arc; (ii) arch; (iii) bend; (iv) bow; (v) curve; (vi) radius; and/or (vii) the like that has one or more radii of curvatures.

**[0022]** As used herein, the term "tab" refers to an opening device (e.g., opener) made from substantially rigid material that has undergone one or more forming and/or tooling operations, and which is structured to be suitably affixed to a can end for the purpose of being pivoted to sever a score line and open at least a portion of the can end.

**[0023]** As used herein, the term "curled" or "hemmed" means bent or formed with respect to a longitudinal axis of the tab, wherein the bend is at least ninety degrees relative to a vertical axis that passes through the tab perpendicular to the longitudinal axis.

**[0024]** As used herein, the term "number" shall mean one or an integer greater than one (i.e., a plurality).

**[0025]** As used herein, the statement that two or more parts are "attached", "connected", "coupled", or "engaged" together shall mean that the parts are joined together either directly or joined through one or more intermediate parts.

**[0026]** Figures 1-8 show a tab 10 in accordance with the invention. The body of the tab 10 includes a nose portion 12 at the front end (e.g., right end from the perspective of Figures 1, 5 and 8; left end from the perspective of Figures 2-4) of the tab 10 and a lift portion 14 at the back end (e.g., left end from the perspective of Figures 1, 5 and 8; right end from the perspective of Figures 2-4) of the tab 10. Each portion 12,14 is generally U-shaped along its periphery such that the two portions 12,14 compliment each other to form the generally oval-shaped tab 10, shown in Figures 1-3 and 7.

**[0027]** In one non-limiting example embodiment of the invention, the tab 10 includes first and second slots 16 (both shown in Figures 1-3 and 7) between the nose portion 12 and the lift portion 14 on opposing sides of the tab 10, although it will be appreciated that such slots 16 are not required (see, for example, tabs 110, 210 and 310 of Figures 9, 10 and 11, respectively). In combination, the two slots 16 form a first fulcrum 18 that extends generally transverse to a first or longitudinal axis 20 that passes through the length of the tab 10, as shown in Figures 2 and 3. Each slot 16 is of a preselected length and depth, with the fulcrum 18 forming an axis or bend line that divides the tab 10 approximately in half and allows the lift portion 14 of the tab 10 to pivot (e.g., flex) in relation to the nose portion 12. This is shown, for example, in phantom line drawing in Figure 5. Thus, the fulcrum 18 and slots 16 have the benefit of enabling an end-user to more easily lift (e.g., upward from the perspective of

Figure 5) the tab 10 when it is affixed to a can end 74 (partially shown in phantom line drawing in Figure 5; also shown in Figures 7 and 8) and access the contents of a can (not shown).

**[0028]** In the example of Figure 4, the nose portion 12 includes first curled or hemmed edges 22 along a periphery of the nose portion 12. That is, the edges 22 are curled underneath the nose portion 12 to form a cylindrical cross-section shaped curl or edge portion 24 to rigidize the nose portion 12 and provide beam strength to the nose portion 12, thereby increasing the overall strength of the tab 10. It will be appreciated, however, that the edge portion 24 could have any other known or suitable alternative configuration (not shown), without departing from the scope of the invention. The first curled edges 22 extend around the outer generally U-shaped periphery of the nose portion 12, as shown in Figures 1-3. The front 26 (Figures 1-3 and 7) of the nose portion 12 may be more significantly rolled, for example, to increase the area of the nose portion 12 that contacts a tear panel 80 (Figure 7) of the can end 74 (Figures 5, 7 and 8) or a removable end panel (not shown) of a can end, such as, for example, for a food can (not shown).

**[0029]** Continuing to refer to Figures 1-3, the nose portion 12 of the tab 10 further includes a rivet receiving portion 28, which is generally semi-circular shaped (shown) but which can be square-shaped (not shown) or rectangular-shaped (not shown), and is located rearwardly of the nose portion 12. The rivet receiving portion 28 includes a rivet hole 30 that is shaped to receive an integral rivet 86 (Figures 7 and 8) to affix the tab 10 to the can end 74 (Figures 7 and 8), and which enables the nose portion 12 to pivot about the rivet 86 (Figures 7 and 8). The rivet receiving portion 28 is integrally attached to the nose portion 12 along one or more indentations 32 (one is shown in Figures 1-3). The indentations 32 enable flexibility about the rivet 86 (Figures 7 and 8) when the nose portion 12 of the tab 10 is actuated (e.g., lifted and/or pivoted).

**[0030]** A generally C-shaped relief aperture 34 (e.g., from the top plan and bottom plan perspectives of Figures 2 and 3, respectively) surrounds a portion of the rivet hole 30 adjacent the outer periphery of the rivet receiving portion 28. The generally C-shaped relief aperture 34 presents a void or hole that further facilitates flexibility of the tab 10. Opposing ends of the generally C-shaped relief aperture 34 define a second fulcrum 36, which extends generally transverse to the first or longitudinal axis 20, as shown in Figures 2 and 3. It will be appreciated, however, that the generally C-shaped relief aperture 34 may alternatively have one leg longer than the other leg, as is shown in Figure 1. That is, the ends of the C-shaped relief aperture 34 are offset with respect to one another such that the second fulcrum (not shown in Figure 1) would not be generally transverse the first axis 20, but rather would pass through the first axis 20 (Figures 2 and 3) at an angle (e.g., greater than or less than 90 degrees) (not shown) with respect thereto. The second fulcrum 36

provides another bend line about which the tab 10 can pivot as shown, for example, in phantom line drawing in Figure 4.

**[0031]** It will be appreciated that other features could be additionally or alternatively included on the tab 10, without departing from the scope of the invention. For example and without limitation, a generally V-shaped coin (not shown) may optionally be provided between the rivet hole 30 and the front 26 of the nose portion 12, proximate to the indentations 32. The generally V-shaped coin (not shown), would, for example, function to render the first curled edge 22 more rigid and would assist in preventing tearing of the tab 10 during the stress of opening the can end 74 (Figures 7 and 8).

**[0032]** As previously noted, lift portion 14 is the part of the tab 10 that is actuated (e.g., lifted; pivoted upwards and/or downwards) by an end-user to open the can end 74 (Figures 7 and 8). The lift portion 14 is generally U-shaped (e.g., from the perspectives of Figures 1-3 and 7) with second curled or hemmed edges 38 (Figures 1-6) extending along a portion of the periphery of the lift portion 14. The profile of the flange 62 (described hereinbelow) at the end of the lift portion 14 of the tab 10 extends between the endpoints of these second curled or hemmed edges 38 and has an arcuate shape that may be oriented convexly (e.g., bowing away from the finger hole 40, as shown in Figures 1-3 and 7; see also flange 162 of Figure 9) or concavely (e.g., curved inwardly as shown, for example and without limitation, in Figures 10 and 11). The second curled edges 38 are curled or hemmed underneath a portion of the lift portion 14, as best shown in Figures 4 and 6. It will be appreciated that the second curled edges 38 may have a substantially cylindrical curl along a portion of the periphery of the lift portion 14 that is proximate to but not at the tab end. The lift portion 14 further includes a finger hole 40 (Figures 1-3 and 7) disposed through a top surface 42 (Figures 1-4, 6 and 7) of the lift portion 14.

**[0033]** As shown in Figure 6, the top surface 42 of the lift portion 14 is disposed at a preselected height,  $h_1$ , above the plane of the bottom surface of the tab 10 (see also flange 362 of tab 310 of Figure 11, which is tilted or curled upwards to further increase the preselected height,  $h_1$ , of that tab 310). It will be appreciated that while the finger hole 40 is shown as having the shape of a circle, it could have any known or suitable shape such as, for example and without limitation, an oval or ellipse (see, for example, finger holes 140 and 240, shown in Figures 9 and 10, respectively) or any other known or suitable geometric shape (not shown). In front (e.g., toward the rivet hole 30) of the finger hole 40, a tapered portion 44 (Figures 1-3) extends downward to a recessed paneled or beaded area 46, which is disposed at a lower height or plane in relation to the top surface 42 of the lift portion 14. More specifically, the paneled area 46 (Figures 1-4) is a compressed area adjacent and integral to the lift portion 14, and is located at about the middle of the tab 10 in front (e.g., toward the rivet hole 30) of the

finger hole 40 and top surface 42 of the lift portion 14, and generally between the aforementioned slots 16. That is, the paneled or beaded area 46 forms a web that extends from at or about one slot 16 on one side of the body of the tab 10 to at or about the corresponding opposing slot 16 on the opposite side of the body of the tab 10. It will be appreciated that a relatively abrupt wall portion may extend from the top surface 42 of the lift portion 14 toward the paneled or beaded area 46.

**[0034]** The paneled area 46 further includes extensions 48 that extend generally in the direction of the first axis 20, toward the nose portion 12. The extensions 48 are integrally connected to the nose portion 12 of the tab, thereby integrally attaching the nose portion 12 and the lift portion 14 through the middle of the tab 10, as shown in Figures 1-3. The paneled or beaded area 46 provides the middle of the tab 10 with increased strength and rigidity such that the lift portion 14 resists disconnection (e.g., without limitation, fracture) from the remainder of the tab 10 after movement of the lift portion 14 about the fulcrum 18 (Figures 2 and 3). It will be appreciated, however, that the aforementioned features (e.g., without limitation, generally C-shaped relief aperture 34; paneled or beaded area 46) are somewhat specific to the tab 10, which includes slots 16. As previously noted, in accordance with certain embodiments of the invention, the slots 16 are not required and, in fact, are not included at all (see, for example, tabs 110, 210 and 310 of Figures 9, 10 and 11, respectively, discussed hereinbelow). Therefore, the above features (e.g., without limitation, generally C-shaped relief aperture 34; paneled or beaded area 46), which are associated with the slots 16, are also not required. For example, as discussed hereinbelow with respect to Figures 9-11, the thin flange 162 (Figure 9), 262 (Figure 10), 362 (Figure 11) feature of the invention, which provides increased accessibility to the end-user to lift the tab 110 (Figure 9), 210 (Figure 10), 310 (Figure 11) can be employed independently with respect to any of the other tab features disclosed herein (e.g., without limitation, without slots 16). The flange 162 (Figure 9), 262 (Figure 10), 362 (Figure 11) may also be employed with any known or suitable type (e.g., without limitation, aluminum; steel; beer/beverage; food) and configuration of tab.

**[0035]** Referring again to the example of Figures 1-3, the aforementioned slots 16 and other features of tab 10 will now be discussed in greater detail. Specifically, although the slots 16 shown and described herein extend all the way to the paneled area 46, this need not necessarily be the case. For example and without limitation, a small connector (not shown) could be provided between the paneled area 46 and the inward edges of the slots 16, which would be integrally connected to the nose portion 12 and the lift portion 14 to provide strength to the tab 10 during the stress of upward movement of the lift portion 14 about fulcrum 18 (Figures 2, 3 and 5) when the end-user actuates the lift portion 14 to open the can end 74 (Figures 7 and 8) and the downward movement

of the lift portion 14 about fulcrum 18 (Figures 2, 3 and 5), for example, when the lift portion 14 is pushed downward by the end-user to conclude the opening process. It will also be appreciated that although the example tab has two opposing slots 16, that the tab 10 could have any known or suitable alternative number and/or configuration of slots (not shown), which are preferably disposed in opposing pairs to form corresponding fulcrums (e.g., bend lines).

**[0036]** It will also be appreciated that in certain embodiments of the invention, the paneled or beaded area 46 has a first edge 50 (Figures 1-3) that is connected to the tapered portion 44 adjacent to the finger hole 40. First edge 50 extends generally transverse to the first axis 20. In the example of Figures 1-3, the opposite ends 52 of the first edge 50 have corresponding edges (e.g., second edge 54 and third edge 56, respectively). More specifically, the second and third edges 54,56 extend outwardly from the opposing ends 52 of the first edge 50 in opposed relationship to each other, and generally lie in the direction of the first axis 20 (e.g., longitudinal axis). Each of the second edge 54 and the third edge 56 terminate at a juncture with a corresponding portion of the generally C-shaped relief aperture 34. However, the end points of the second and third edges 54,56, at the juncture with the generally C-shaped relief aperture 34, are integrally connected to each other via a fourth edge 58 of the paneled or beaded area 46 (e.g., web), which is formed at the outer periphery of the generally C-shaped relief aperture 34, as shown in Figures 1 and 2. In other words, the web of the paneled or beaded portion 46 extends longitudinally from the base of the first edge 50 to the fourth edge 58, and transversely form the base of the second edge 54 to the base of the third edge 56. The fourth edge 58 has an arcuate shape in the example shown, although it will be appreciated that it could have any known or suitable alternative shape and/or configurations, without departing from the scope of the invention.

**[0037]** In certain embodiments, the curled edges 22 and 38 that curl underneath the periphery of both the nose portion 12 and a portion of the lift portion 14, respectively, have portions that connect beneath slots 16, thereby further integrally connecting the nose portion 12 and the lift portion 14. Thus, in certain embodiments, the slots 16 do not extend completely through the depth of the periphery of the tab 10, such that the curled edges beneath the slots 16 are not cut. The curled edges 22 and 38 of the nose portion 12 and the lift portion 14, respectively, and the curled edges beneath slots 16, together, form a continuous curl portion 60 around a portion of the periphery of the tab 10, as shown in Figure 3. The continuous curl portion 60 improves the strength of the tab 10 during the lifting of the lift portion 14 upward about fulcrum 18, and during the resetting of the lift portion 14 downward about fulcrum 18, as shown for example in phantom line drawing in Figure 5, and functions to hold the nose and lift portions 12,14 of the tab 10 together during use.

**[0038]** To assist in end-user activation and, in particular, access to and initial lifting of the tab 10, the tab 10 includes the aforementioned flange 62 (best shown in Figures 4-6, 7 and 8; see also flanges 162,262 and 362 of Figures 9,10 and 11), which is located at the rearward edge 66 of the lift portion 14 of the tab 10. The top portion or surface 64 of the flange 62 is preferably generally coplanar with the top surface 42 of the lift portion 14, as shown in Figure 4. The flange 62 has an arcuate shaped edge 66, which in the example shown is oriented convexly with respect to the finger hole 40 of the tab 10 (see also flange 162 and convex edge 166 thereof of tab 110 of Figure 9). However, it will be appreciated that it could be oriented concavely (see, for example, flange 262 and concave edge 266 thereof of tab 210 of Figure 10). It will further be appreciated that the flange 62 (Figures 1-8), 162 (Figure 9), 262 (Figure 10), 362 (Figure 11), is a primary feature of the invention, which could be employed with any known or suitable tab type (e.g., without limitation, aluminum; steel; beer/beverage; food) or configuration either with the aforementioned features (e.g., without limitation, slots 16) or independently thereof (see, for example, tabs 110, 210 and 310 of Figures 9, 10 and 11, respectively, which are devoid of slots (e.g., 16)).

**[0039]** The flange 62 and, in particular, edge 66 is not curled or hemmed like edges 38, previously discussed hereinabove. The edge 66 may alternatively or additionally be bent, deformed or wiped down as shown in Figures 1-3, although the edge 66 would still not be curled or hemmed like edges 38, as such terms are defined and illustrated herein. Rather, the flange 62 is relatively thin, and preferably comprises a single metal thickness,  $t$ , as shown in Figures 4 and 6 (see also single metal thickness,  $t$ , of flange 362 of tab 310 of Figure 11). As shown in Figures 4-6 and 8, the thin structure (e.g., single metal thickness) of the flange 62 increases the gap 68, which is defined under the flange 62, for example, between the plane of the underside or a bottom surface of the tab 10 and the underside or bottom surface of the flange 62. The gap 68 provides space for an end-user to insert a finger (not shown), a mechanical lifting device (not shown) or the like, between the flange 62 of the tab 10 and the top of the can end 74 (partially shown in phantom line drawing in Figure 5; see also Figures 7 and 8). That is, the bottom surface or underside of the flange 62 is disposed a height,  $h_2$ , above the bottom surface or the plane of the underside of the tab 10, as shown in Figure 6. Also shown in Figures 4 and 6, is that the flange thickness,  $t$ , is measured by the difference between the overall height,  $h_1$ , of the tab 10 and the preselected height,  $h_2$ , from the bottom surface of the tab 10 to the underside of the flange 62.

**[0040]** With reference to Figure 2, a second axis 70 passing through the rivet hole 30 and one end of the arcuate shaped edge 66 forms an angle,  $\theta_1$ , with respect to a third axis 72 passing through the rivet hole 30 and another end of the arcuate shaped edge 66.  $\theta_1$  is preferably about 10 degrees to about 50 degrees. More pref-

erably, as shown in the example of Figure 2,  $\theta_1$  is between about 25 degrees to about 45 degrees. The arcuate shaped edge 66 extends from a position of about eleven o'clock to a position of about one o'clock on the tab 10 relative to a twelve o'clock position or center point 90. In Figure 2, the twelve o'clock position 90 is at the right side of the tab 10, on the rearward portion of the lift portion 14. Longitudinal axis 20, which passes through the length of the tab 10, also passes through the twelve o'clock position or center point 90.

**[0041]** With reference to Figure 3, the second curled or hemmed edges 38 terminate at ends 92 proximate to the flange 62. The ends 92 have an arcuate shape when viewed from the bottom plan view perspective of Figure 3, and are integrally connected to the flange 62. From the end elevation view perspective of Figure 6, the second curled or hemmed edges 38 terminate at ends 92 in a generally tapered shape 94 that extends upwardly at an angle from the bottom surface of the tab 10. The generally tapered shape 94 integrally connects the ends 92 to the flange 62.

**[0042]** As previously noted, the tab 10 has a preselected height,  $h_1$ , which is measured from the plane of the bottom surface of the tab 10 to the top surface 42 of the tab 10, as shown in Figure 6. In one non-limiting example, the preselected height,  $h_1$ , is about 1.52 mm (0.060 inches) to about 1.65 mm (0.065 inches) and the preselected height,  $h_2$ , of the aforementioned gap 68, which is measured from the plane (e.g., a phantom horizontal line that extends horizontally from the underside or bottom surface) of the underside or bottom surface of the tab 10 to the bottom surface or underside of the flange 62, of about 1.12 mm (0.044 inches) to about 1.37 mm (0.054 inches). It will be appreciated that this generally represents the height of the underside of the flange 62 above the public surface (e.g., exterior) of an end panel 76 (Figures 7 and 8) of the can end 74 (Figures 7 and 8), as partially shown in phantom line drawing in Figure 5, although it is somewhat less than the height above the end panel 76 because it does not account for end panel features (e.g., finger well 96; beads (not numbered)) that cause the flange 62 to be further from the end panel 76, as shown in Figure 8. It will also be appreciated that the height,  $h_2$ , of the gap 68 (as well as height,  $h_1$ ) can be further increased by tilting, curling or otherwise suitably elevating the flange 362 of the lifting portion 314 of the tab 310 and, in particular, the edge 366 of the flange 362, with respect to the remainder of the tab body, as shown, for example and without limitation, in Figure 11 (discussed hereinbelow). The ratio of  $h_2$  to  $h_1$  is preferably about 0.68 to about 0.9, although it will be appreciated that it could be greater, such as for example and without limitation, from about 0.60 to about 0.95 or any value or range therebetween.

**[0043]** Accordingly, it will be appreciated that the flange 62 (see also tabs 110, 210, 310 and flanges 162, 262, 362, respectively, of Figures 9-11) and gap 68 provided thereby, result in a substantial increase in height

compared to prior art tabs (not shown), wherein although the tab would also have a preselected height measured from the bottom surface of the tab to the top surface of the tab of about 1.52 mm (0.060 inches) to about 1.65 mm (0.065 inches), the preselected height of the gap (not shown) measured from the plane of the bottom surface of the tab to the bottom surface of the curl (not shown) at the rearward portion of the lift portion, from the bottom of the gap to the top of the gap, or from the public surface of an end panel of a can end to the bottom surface of the curl (not shown) at the rearward portion of the lift portion, was only about 0.81 mm (0.032 inches). Moreover, the ratio of the preselected height of the tab to the preselected height of the gap in prior art tabs is about 0.49 to about 0.53. Accordingly, known tabs do not provide as much space for an end-user to insert a finger (not shown), a mechanical lifting device (not shown) or the like between the can end 74 (Figures 7 and 8) and the bottom surface of the rearward portion (e.g., flange 62) of the tab 10 as the gap 68 provided by the disclosed tabs 10 (Figures 1-8), 110 (Figure 9), 210 (Figure 10), 310 (Figure 11). Thus, the increased size of the gap 68 of the disclosed tabs 10 (Figures 1-8), 110 (Figure 9), 210 (Figure 10), 310 (Figure 11) allows the end-user to facilitate opening of the can end 74 (Figures 7 and 8).

**[0044]** Turning to Figure 7, the tab 10 of the invention is shown affixed to can end 74, which is representative of can ends commonly used in beer/beverage applications. The can end 74 has an end panel 76, which is generally circular in shape and includes a circumferentially extending raised curl 78 (best shown in Figure 8) for attaching the can end 74 to a suitable beer/beverage can (not shown) or the like. In general, the can end 74 will be manufactured from a relatively ductile metal such as, for example, and without limitation, aluminum alloyed sheet, but it will be appreciated that it may be made from other acceptable materials such as, for example and without limitation, steel alloyed sheet. It will also be appreciated that the tab 10 may be affixed to any known or suitable other type of container or container end (e.g., without limitation, food can ends) (not shown), without departing from the scope of the invention.

**[0045]** Continuing to refer to Figure 7, a retained tear panel 80 extends across the can end 74 from a position spaced inwardly of the raised curl 78 to approximately the center of can end 74. The tear panel 80 is defined by a generally U-shaped score line 82 with closed end 84 of the generally U-shaped score line 82 being positioned proximate to the center of can end 74. As shown, the score line 82 is interrupted so that tear panel 80 will be captively retained on the underside or product side of can end 74 once it has been opened (not shown). The aforementioned integral rivet 86 is positioned adjacent the closed end 84 of generally U-shaped score line 82, and secures the tab 10 to the can end 74.

**[0046]** Referring again to Figure 5, an upwardly extending fourth axis 88 is shown extending from the slots 16 at an angle,  $\theta_2$ , with the first axis 20 that extends along

the length of the tab 10. In certain embodiments,  $\theta_2$  will have a value of about 90 degrees. However, it will be appreciated that  $\theta_2$  may have other suitable values such as, for example and without limitation, a value from about 80 degrees to about 100 degrees. In operation, when the lift portion 14 of the tab 10 is raised upwards about fulcrum 18, lift portion 14 flexes or bends upward along the fulcrum 18, as shown in phantom line drawing, to enable the end-user to obtain proper leverage and more easily lift the lift portion 14 to open a can end 74 (partially shown in phantom line drawing in Figure 5). Specifically, the lift portion 14 bends upward about fulcrum 18 by a preselected angle of less than about 45 degrees and more preferably less than about 30 degrees, while the position of the nose portion 12 remains substantially unchanged. That is, the nose portion 12 continues to lie along substantially flat and parallel to the first axis 20 (e.g., longitudinal axis). The angle that the lift portion 14 bends (e.g., flexes) upward is defined by the angle,  $\alpha$ , formed between a line (shown in phantom line drawing in Figure 5) extending from the flange 62 of the lift portion 14 and the first axis 20.

**[0047]** It will be appreciated that the amount of upward lift or deflection or flexion of the lift portion 14 is dependent upon the specific configuration of the slots 16 used on the tab 10. During the initial upward lift or movement of lift portion 14, the nose portion 12 remains at an angle of about 0 degrees, which angle is defined by the angle formed between a line extending through the length of the nose portion 12 of the tab and the first axis 20. At sufficient upward lift of the lift portion 14 about fulcrum 18, the slots 16 are sufficiently closed, which preferably corresponds to a preselected angle,  $\alpha$ , of less than 45 degrees and more preferably less than 30 degrees. At this point, the lift portion 14 can no longer move upward without causing force (e.g., tension) to be translated to the nose portion 12 through the substantially closed (not shown) slots 16. As the lift portion 14 is lifted upward past this point, the rivet 86 (Figures 7 and 8) onto which the tab 10 is staked, is bent forwardly (not shown) toward the tear panel 80 (Figure 7). The movement of the rivet 86 toward the tear panel 80 causes an initial rupture of the score line 82 proximate the rivet 86. Thus, as the tab 10 is actuated, it functions like a lever causing the nose portion 12 to pivot toward the tear panel 80.

**[0048]** Further upward movement of the lift portion 14 will induce downward movement of the nose portion 12, wherein the nose portion 12 pivots (not shown) about rivet 86 (Figures 7 and 8). The nose portion 12 thereafter initiates a tear along score line 82 (Figure 7), causing tear panel 80 (Figure 7) to bend downwardly (not shown) in a generally well known manner. As the lift portion 14 is raised further, the score line 82 is caused to tear and a portion of the tear panel 80 remains secured to the can end 74. Accordingly, the tear panel 80 is captivity retained on the underside or product side of the can end 74. When the lift portion 14 has been raised so the tear panel 80 is sufficiently open (not shown), the lift portion 14 may be

bent downward about the fulcrum 18 and reset so as to lie substantially flush against the top surface of the end panel 76 of the can end 74. This flexibility of the lift portion 14 permits the lift portion 14 to not interfere with the end-user is consumption of the contents (not shown) of the opened can (not shown).

**[0049]** As previously discussed, the paneled or beaded area 46 and continuous curl 60 around a portion of the periphery of the tab 10 assist in preventing the lift portion 14 of the tab 10 from breaking off from the nose portion 12 during upward or downward movement of the lift portion 14 about fulcrum 18. Accordingly, the disclosed tab 10 is structured to resist the limitation of having the lift portion possibly break off from the remainder of the tab 10 as a result, for example and without limitation, of the fulcrum not being reinforced with a paneled or beaded area adjacent to the fulcrum or a continuous curl about a portion of the periphery of the tab, as in the exemplary tab 10.

**[0050]** As can be seen in Figure 8, the absence of curled or hemmed edges 38 (Figures 1-6) at the flange 62 (see also flanges 162,262 and 362 of Figures 9, 10 and 11) assists in defining the gap 68 under the flange 62 (Figures 1-8), 162 (Figure 9), 262 (Figure 10), 362 (Figure 11), between a phantom horizontal line that extends from the underside or bottom surface of the tab 10 (Figures 1-8), 110 (Figure 9), 210 (Figure 10), 310 (Figure 11) to define the plane of the bottom surface of the tab 10, 110, 210, 310 and the underside or bottom surface of the flange 62, 162, 262, 362 or between the bottom surface of the flange 62, 162, 262, 362 and the public surface of the end panel 76 (Figures 7 and 8) of the can end 74 (Figures 7 and 8) to which the tab 10, 110, 210, 310 is attached (only tab 10 is shown attached to a can end 74 in Figures 7 and 8, although it will be appreciated that tabs 110, 210, 310 and other suitable tabs (not shown) in accordance with embodiments of the invention are structured to be suitably attached to a corresponding can end (not shown) in a similar generally well known manner). In this manner, the flange 62, 162, 262, 362 provides increased space for the end-user to relatively easily insert a finger (not shown), a mechanical lifting device (not shown), or the like into the gap 68 for actuation of the tab 10, 110, 210, 310. It will also be appreciated that a finger well 96, as shown in the examples of Figures 7 and 8, may optionally also be provided on the end panel 76 of the can end 74 to further assist the end-user in inserting the finger, mechanical lifting device or the like into the gap 68 to facilitate actuation of the tab 10 and opening of the can end 74. Moreover, the lift portion 14 of tab 10 in the example of Figures 1-8, which includes the aforementioned optional slots 16, also flexes or bends by way of such slots 16 (Figures 1-5 and 7) to further facilitate the can end 74 (Figures 7 and 8) opening process.

**[0051]** Figure 9 shows the aforementioned tab 110 which, unlike the tab 10 disclosed hereinabove with respect to Figures 1-8, employs the thin (e.g., without limitation, single metal thickness) flange 162 of the inven-

tion, independently of the slots 16. That is, the thin flange 162 can be employed with any known or suitable tab (e.g., without limitation, 110; see also tabs 210 and 310 of Figures 10 and 11), without the slots 16 and various other features (e.g., generally C-shaped relief aperture 34; beaded paneled area 46) that are associated with the slots 16. In the example of Figure 9, the flange 162 at the lift portion 114 of tab 110 has a single metal thickness, and includes an arcuate edge 166 that is oriented convexly (e.g., bowing outwardly away from) with respect to the finger hole 140 of the tab 110.

**[0052]** Figure 10 illustrates a non-limiting alternative embodiment of a tab 210 in accordance with the invention, wherein the tab 210 has a lift portion 214 with a flange 262, wherein the edge 266 of the flange 262 at the rearward end of the lift portion 214 is oriented concavely (e.g., curved inwardly towards) with respect to the finger hole 240 of the tab 210, rather than convexly (Figure 9).

**[0053]** Figure 11 shows the aforementioned tab 310, which has the flange 362 tilted, curved, curled or otherwise suitably elevated upwardly with respect to the remainder of the body of the tab 310. For example and without limitation, in Figure 11, the flange 362 and, in particular, the edge 366 thereof, is disposed at an angle 370 with respect to the plane 372 of the tab body. In one non-limiting embodiment, the angle 370 is about 20 degrees. However, it will be appreciated that the flange 362 could be disposed at any suitable alternative angle (e.g., less than 20 degrees; greater than 20 degrees), without departing from the scope of the invention. As previously discussed hereinabove, it will also be appreciated that no such angle 370 is required. However, it can be optionally implemented to further increase the height,  $h_2$ , of the underside of the tab flange 362 above the underside of the body of the tab 310, as shown. It will be further appreciated that this feature (e.g., the tilted, curled or otherwise suitable elevated flange 362), as well as the convex and concave features of the tabs 110 and 210 of Figures 9 and 10, respectively, of the single metal thickness flange 62 (Figures 1-8), 162 (Figure 9), 262 (Figure 10), 362 (Figure 11) can be employed independently from, or in any suitable combination with, any of the other tab features (e.g., without limitation, slots 16) disclosed hereinabove.

**[0054]** As previously discussed, although the example shown and described with respect to Figures 7 and 8 is directed to a can end 74 for beer/beverage applications for the purpose of drinking a liquid or pouring a liquid into another container directly from the can, it will be appreciated that the tab 10,110,210,310 of the invention could also be applied to other types of can ends (not shown) such as, for example and without limitation, food can ends (not shown) that have the entire end panel removed. Thus, one of ordinary skill in the art would readily appreciate that the teachings of the invention would equally apply to can ends used in beer/beverage applications as well as in food applications. As such, the disclosed tab

10,110,210,310 encompasses tabs that are affixed to beer/beverage can ends, food can ends and any other known or suitable container ends. It is noted that the details of the tab 10 of the invention, with respect to an end use affixed to such other can ends (not shown), has been omitted for economy of disclosure and simplicity of illustration.

**[0055]** The tooling and method of forming the tab 10,110,210,310 have been omitted from the Figures and specification for economy of disclosure and simplicity of illustration. Generally, in the tooling (not shown) for the manufacture of the tab 10,110,210,310 of the invention and associated method, material to be converted into a plurality of tabs 10,110,210,310 is conveyed into a conversion press (not shown) in a generally well known manner. In the typical operation of a conversion press, material is introduced between at least one upper tool member and at least one lower tool member that are in an open, spaced apart position. A ram advances the upper tool member toward a lower tool member in order to perform any of a variety of tooling operations such as rivet forming, hole punching, scoring, paneling, embossing and/or final staking. After performing an operation at a specific station, the press ram retracts until the upper tool member and lower tool member are once again in the open, spaced apart position. The partially converted material is transported to the next tooling station until the tab 10,110,210,310 is completely formed and discharged from the conversion press. As the material leaves a given tooling operation, more material is introduced to the vacated operation, for example, as part of a continuous sheet, thus continuously repeating the manufacturing process. It will be appreciated that the tooling for the manufacture of the tab 10,110,210,310 and associated method could be performed by any number of a variety of tooling shapes having a wide variety of suitable configurations, without departing from the scope of the invention.

**[0056]** While specific embodiments of the invention have been described in detail, it will be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. Accordingly, the particular arrangements disclosed are meant to be illustrative only and not limiting as to the scope of the invention which is to be given the full breadth of the claims appended hereto.

## Claims

1. A tab (10) structured to be affixed to a can end (74), the tab (10) comprising:
  - a body comprising a bottom surface disposed in a plane, and a top surface disposed opposite the bottom surface at a preselected height,  $h_1$ , with respect to the plane of the bottom surface;



- a nose portion (12) located at a first end of the body of the tab (10);  
 a lift portion (14) located at a second end of the body of the tab (10), opposite the nose portion;  
 a rivet receiving portion (28) located proximate to the nose portion (12), the rivet receiving portion (28) including a rivet hole (30); and  
 a flange (62) located at the rearward edge of the lift portion (14), the flange (62) including an upper portion and an underside disposed opposite the upper portion,  
 wherein the underside of the flange (62) is disposed at a preselected height,  $h_2$ , with respect to the plane of the bottom surface of the body of the tab (10),  
 wherein the preselected height,  $h_2$ , forms a ratio,  $h_2:h_1$ , with respect to the preselected height,  $h_1$ , which has a value of between about 0.60 to about 0.95, the tab being **characterized in that** a portion of the nose portion (12) of the tab (1) has curled or hemmed edges (2); a portion of the lift portion (14) of the tab (10) has curled or hemmed edges; and  
 the flange (62) comprises a single metal thickness which is substantially devoid of any curl or hem..
2. The tab (10) of claim 1, wherein the value of the ratio  $h_2:h_1$  is between about 0.65 to about 0.93.
  3. The tab (10) of claim 1, wherein the upper portion of the flange (62) is generally coplanar with the top surface of the body of the tab (10) at the lift portion (14) of the tab (10).
  4. The tab (10) of claim 1, wherein the edge (66) of the flange (62) is disposed at an angle with respect to the remainder of the body of the tab (10).
  5. The tab (210) of claim 1, wherein the lift portion (214) of the tab (210) includes a finger hole (240); wherein the flange (262) has an arcuate edge (266); and wherein the arcuate edge (266) of the flange (262) is oriented concavely with respect to the finger hole (240).
  6. The tab (110) of claim 1, wherein the lift portion (114) of the tab (110) includes a finger hole; wherein the flange has an arcuate edge (166); and wherein the arcuate edge (166) of the flange (162) is oriented convexly with respect to the finger hole (140).
  7. The tab (10) of claim 1, wherein the flange (62) has an arcuate-shaped edge (66) comprising opposing ends; wherein a first axis (70) passes through the rivet hole (30) and one of the opposing ends of the arcuate-shaped edge; wherein a second axis (72) passes through the rivet hole (30) and the other of the opposing ends of the arcuate-shaped edge (66); wherein the first axis (70) is disposed at an angle,  $\theta_1$ , with respect to the second axis (72); and wherein the angle,  $\theta_1$ , has a value between about 10 degrees and about 50 degrees.
  8. The tab (10) of claim 7, wherein the arcuate-shaped edge (66) of the flange (62) further comprises a center point (90) disposed intermediate the opposing ends of the arcuate-shaped edge (66); wherein a third axis (20) extends longitudinally through the center of the tab (10), thereby passing through the center point (90); wherein the first axis (70) is disposed on one side of the center point (90) at an angle of  $\theta_1/2$  with respect to the third axis (20); and wherein the second axis (72) is disposed on the other side of the center point (90) at an angle of  $\theta_1/2$  with respect to the third axis (20).
  9. The tab (10) of claim 1, wherein the curled or hemmed edges (38) of the lift portion (14) terminate at ends proximate to the flange (62); and wherein the curled or hemmed edges transition into the flange (62) by tapering from a hem or partial curl into an area of folded, flattened metal about twice the thickness of the flange (62).
  10. The tab (10) of claim 1, wherein the body further comprises opposing first and second sides, a longitudinal axis (20) extending between the first and second ends of the body intermediate the opposing first and second sides, and a plurality of slots (16) extending through corresponding portions of the opposing first and second sides of the body of the tab (10) between the nose portion (12) and the lift portion (14); wherein the slots (16) are disposed in opposing pairs; wherein each of the opposing pairs of slots (16) combine to form a fulcrum; wherein the fulcrum defines a bend axis (18) that extends generally transverse to the longitudinal axis (20) of the body of the tab (10); and wherein the slots (16) are structured to enable the lift portion (14) of the tab (10) to flex about the bend axis (18) with respect to the nose portion (12) of the tab (10).
  11. The tab (10) of claim 10, wherein the body further comprises a relief aperture (34) and a paneled or beaded area (46); wherein the relief aperture (34) is disposed adjacent to an outer periphery of the rivet receiving portion (28) and surrounds a portion of the rivet hole (30) of the rivet receiving portion (28); wherein the paneled or beaded area (46) is disposed adjacent the relief aperture (34), between the relief aperture (34) and the lift portion (14); and wherein the paneled or beaded area (46) is recessed with respect to the top surface of the body of the tab (10).
  12. The tab (10) of claim 11, wherein the relief aperture

(34) is generally C-shaped and includes an outer periphery; wherein the paneled or beaded area (46) includes a first edge, a second edge, a third edge and a fourth edge; wherein each of the first edge, the second edge and the third edge is disposed proximate to the top surface of the body of the tab (10) and extends downwardly toward the bottom surface of the body of the tab (10); wherein the first edge extends generally transversely with respect to the longitudinal axis (20) of the tab (10) and terminates at opposing ends; wherein the second edge extends outwardly from a corresponding one of the opposing ends of the first edge toward the nose portion (12) of the tab (10); wherein the third edge extends outwardly from the other corresponding one of the opposing ends of the first edge, opposite the second edge; wherein each of the second edge and the third edge terminates at a corresponding juncture with the outer periphery of the generally C-shaped relief aperture (34); wherein the fourth edge is disposed at the outer periphery of the generally C-shaped relief aperture (34); and wherein the fourth edge extends from the corresponding juncture between the second edge and the generally C-shaped relief aperture (34) to the corresponding juncture between the third edge and the generally C-shaped relief aperture (34), thereby integrally connecting the second edge and third edge.

13. The tab (10) of claim 12, wherein the paneled or beaded area (46) forms a web; wherein the web extends longitudinally from the base of the first edge to the fourth edge; and wherein the web extends transversely from the base of the second edge to the base of the third edge.
14. A can end (74) in combination with a tab (10) in accordance with any of Claims 1-13, the tab (10) being affixed to the can end (74).

#### Patentansprüche

1. Lasche (10), die strukturiert ist, um an einem Dosenende (74) angebracht zu werden, wobei die Lasche (10) Folgendes umfasst:

einen Körper, der eine in einer Ebene angeordnete untere Fläche und eine der unteren Fläche entgegengesetzte obere Fläche in einer vorbestimmten Höhe  $h_1$  in Bezug auf die Ebene der unteren Fläche umfasst;  
einen Ansatzabschnitt (12), der an einem ersten Ende des Körpers der Lasche (10) angeordnet ist;  
einen anhebbaren Abschnitt (14), der an einem zweiten Ende des Körpers der Lasche (10) dem Ansatzabschnitt entgegengesetzt angeordnet

ist;

einen Nietenaufnahmeabschnitt (28), der nahe des Ansatzabschnitts (12) angeordnet ist, wobei der Nietenaufnahmeabschnitt (28) ein Nietloch (30) umfasst; und

einen Bördelrand (62), der an der Hinterkante des anhebbaren Abschnitts (14) angeordnet ist, wobei der Bördelrand (62) einen oberen Abschnitt und eine dem oberen Abschnitt entgegengesetzt angeordnete Unterseite umfasst, wobei die Unterseite des Bördelrands (62) auf einer vorbestimmten Höhe  $h_2$  in Bezug auf die Ebene der unteren Fläche des Körpers der Lasche (10) angeordnet ist,

wobei die vorbestimmte Höhe  $h_2$  mit der vorbestimmten Höhe  $h_1$  in einem Verhältnis  $h_2:h_1$  steht, das einen Wert zwischen etwa 0,60 bis etwa 0,95 aufweist, wobei die Lasche **dadurch gekennzeichnet ist,**

**dass** ein Abschnitt des Ansatzabschnitts (12) der Lasche (1) einen gerollten oder gesäumten Rand (2) aufweist, ein Abschnitt des anhebbaren Abschnitts (14) der Lasche (10) einen gerollten oder gesäumten Rand aufweist und der Bördelrand (62) eine einfache Metallstärke aufweist, die im Wesentlichen weder eine Rollung noch einen Saum aufweist.

2. Lasche (10) nach Anspruch 1, worin der Wert des Verhältnisses  $h_2:h_1$  zwischen etwa 0,65 und etwa 0,93 liegt.
3. Lasche (10) nach Anspruch 1, worin der obere Abschnitt des Bördelrands (62) im Allgemeinen koplanar in Bezug auf die obere Fläche des Körpers der Lasche (10) an dem anhebbaren Abschnitt (14) der Lasche (10) vorliegt.
4. Lasche (10) nach Anspruch 1, worin der Rand (66) des Bördelrands (62) in einem Winkel in Bezug auf den übrigen Körper der Lasche (10) angeordnet ist.
5. Lasche (210) nach Anspruch 1, worin der anhebbare Abschnitt (214) der Lasche (210) ein Fingerloch (240) umfasst; worin der Bördelrand (262) einen bogenförmigen Rand (266) aufweist und worin der bogenförmige Rand (266) des Bördelrands (262) in Bezug auf das Fingerloch (240) konkav ausgerichtet ist.
6. Lasche (110) nach Anspruch 1, worin der anhebbare Abschnitt (114) der Lasche (110) ein Fingerloch umfasst; worin der Bördelrand einen bogenförmigen Rand (166) aufweist und worin der bogenförmige Rand (166) des Bördelrands (162) in Bezug auf das Fingerloch (140) konvex ausgerichtet ist.
7. Lasche (10) nach Anspruch 1, worin der Bördelrand (62) einen bogenförmigen Rand (66) aufweist, der

- entgegengesetzte Enden umfasst; worin eine erste Achse (70) durch das Nietloch (30) und eines der entgegengesetzten Enden des bogenförmigen Rands verläuft; worin eine zweite Achse (72) durch das Nietloch (30) und das andere der entgegengesetzten Enden des bogenförmigen Rands (66) verläuft; worin die erste Achse (70) in einem Winkel  $\theta_1$  in Bezug auf die zweite Achse (72) angeordnet ist und worin der Winkel  $\theta_1$  einen Wert zwischen etwa  $10^\circ$  und etwa  $50^\circ$  aufweist.
8. Lasche (10) nach Anspruch 7, worin der bogenförmige Rand (66) des Bördelrands (62) ferner einen zentralen Punkt (90) umfasst, der zwischen den entgegengesetzten Enden des bogenförmigen Rands (66) angeordnet ist; worin eine dritte Achse (20) sich längs durch das Zentrum der Lasche (10) erstreckt und dabei durch den zentralen Punkt (90) verläuft; worin die erste Achse (70) an einer Seite des zentralen Punkts (90) in einem Winkel von  $\theta_1/2$  in Bezug auf die dritte Achse (20) angeordnet ist und worin die zweite Achse (72) an der anderen Seite des zentralen Punkts (90) in einem Winkel von  $\theta_1/2$  in Bezug auf die dritte Achse (20) angeordnet ist.
9. Lasche (90) nach Anspruch 1, worin die gerollten oder gesäumten Ränder (38) des anhebbaren Abschnitts (14) an Enden nahe des Bördelrands (62) enden und worin die gerollten oder gesäumten Ränder in den Bördelrand (62) übergehen, indem sie sich von einem Saum oder einer teilweisen Rollneigung in einen Bereich aus gefaltetem, glattem Metall verjüngen, der etwa die doppelte Dicke des Bördelrands (62) aufweist.
10. Lasche (10) nach Anspruch 1, worin der Körper Folgendes umfasst: eine erste und eine zweite Seite, die einander entgegengesetzt sind, wobei sich eine Längsachse (20) zwischen dem ersten und zweiten Ende des Körpers zwischen der ersten und zweiten Seite, die einander entgegengesetzt sind, erstreckt, und eine Vielzahl an Schlitzen (16), die sich durch entsprechende Abschnitte der ersten und zweiten Seite des Körpers der Lasche (10), die einander entgegengesetzt sind, zwischen dem Ansatzabschnitt (12) und dem anhebbaren Abschnitt (14) erstrecken, worin die Schlitze (16) in einander entgegengesetzten Paaren angeordnet sind; worin jedes der Paare einander entgegengesetzter Schlitze (14) in Kombination einen Hebelpunkt bildet; worin der Hebelpunkt eine Biegeachse (18) definiert, die sich im Allgemeinen quer zu der Längsachse (20) des Körpers der Lasche (10) erstreckt und worin die Schlitze (16) strukturiert sind, um zu ermöglichen, dass sich der anhebbare Abschnitt (14) der Lasche (10) um die Biegeachse (18) in Bezug auf den Ansatzabschnitt (12) der Lasche (10) verbiegt.
11. Lasche (10) nach Anspruch 10, worin der Körper ferner eine Aussparungsöffnung (34) und einen getäfelten oder verwulsteten Bereich (46) umfasst; worin die Aussparungsöffnung (34) in Bezug auf den Außenumfang des Nietenaufnahmeabschnitts (28) benachbart angeordnet ist und einen Abschnitt des Nietlochs (30) des Nietenaufnahmeabschnitts umgibt; worin der getäfelte oder verwulstete Bereich (46) in Bezug auf die Aussparungsöffnung (34) benachbart zwischen der Aussparungsöffnung (34) und dem anhebbaren Abschnitt (14) angeordnet ist und worin der getäfelte oder verwulstete Bereich (46) in Bezug auf die obere Fläche des Körpers der Lasche (10) vertieft vorliegt.
12. Lasche (10) nach Anspruch 11, worin die Aussparungsöffnung (34) im Allgemeinen C-förmig ist und einen Außenumfangsrand umfasst; worin der getäfelte oder verwulstete Bereich (46) einen ersten Rand, einen zweiten Rand, einen dritten Rand und einen vierten Rand umfasst; worin der erste, zweite und dritte Rand jeweils nahe der oberen Fläche des Körpers der Lasche (10) angeordnet ist und sich nach unten zu der unteren Fläche des Körpers der Lasche (10) erstreckt; worin sich der erste Rand im Allgemeinen quer in Bezug auf die Längsachse (20) der Lasche (10) erstreckt und an entgegengesetzten Enden endet; worin der zweite Rand sich von einem entsprechenden Ende der entgegengesetzten Enden des ersten Rands in Richtung des Ansatzabschnitts (12) der Lasche (10) nach außen erstreckt; worin sich der dritte Rand von dem anderen Ende der entgegengesetzten Enden des ersten Rands dem zweiten Rand entgegengesetzt nach außen erstreckt; worin der zweite und der dritte Rand jeweils an einer entsprechenden Stelle enden, an der sie mit dem Außenumfangsrand der im Allgemeinen C-förmigen Aussparungsöffnung (34) zusammentreffen, worin der vierte Rand am Außenumfangsrand der im Allgemeinen C-förmigen Aussparungsöffnung (34) angeordnet ist und worin der vierte Rand sich von der Stelle, an der der zweite Rand und die im Allgemeinen C-förmige Aussparungsöffnung (34) zusammentreffen, bis zu der Stelle, an der der dritte Rand und die im Allgemeinen C-förmige Aussparungsöffnung (34) zusammentreffen, erstreckt, wodurch der zweite und der dritte Rand einstückig verbunden werden.
13. Lasche (10) nach Anspruch 12, worin der getäfelte oder verwulstete Bereich (46) einen Steg bilden; worin sich der Steg in Längsrichtung von der Basis des ersten Rands zu dem vierten Rand erstreckt und worin sich der Steg quer von der Basis des zweiten Rands zu der Basis des dritten Rands erstreckt.
14. Dosenende (74) in Kombination mit einer Lasche (10) nach einem der Ansprüche 1 bis 13, wobei die

Lasche (10) an dem Dosenende (74) angebracht ist.

### Revendications

1. Languette (10) structurée pour être fixée sur un couvercle de canette (74), la languette (10) comprenant :

un corps comprenant une surface inférieure disposée dans un plan, et une surface supérieure disposée à l'opposé de la surface inférieure à une hauteur présélectionnée,  $h_1$ , par rapport au plan de la surface inférieure ;

une partie de nez (12) positionnée au niveau d'une première extrémité du corps de la languette (10) ;

une partie de levage (14) positionnée au niveau d'une seconde extrémité du corps de la languette (10), opposée à la partie de nez ;

une partie de réception de rivet (28) positionnée à proximité de la partie de nez (12), la partie de réception de rivet (28) comprenant un trou de rivet (30) ; et

un rebord (62) positionné au niveau du bord arrière de la partie de levage (14), le rebord (62) comprenant une partie supérieure et une face inférieure disposée à l'opposé de la partie supérieure,

dans laquelle la face inférieure du rebord (62) est disposée à une hauteur présélectionnée,  $h_2$ , par rapport au plan de la surface inférieure du corps de la languette (10),

dans laquelle la hauteur présélectionnée  $h_2$  forme un rapport  $h_2:h_1$ , par rapport à la hauteur présélectionnée  $h_1$ , qui a une valeur comprise entre environ 0,60 et environ 0,95, la languette étant caractérisée en ce qui :

une partie de la partie de nez (12) de la languette (1) a des bords moletés ou ourlés (2) ; une partie de la partie de levage (14) de la languette (10) a des bords moletés ou ourlés ; et

le rebord (62) comprend une seule épaisseur de métal qui est sensiblement dépourvue de moletage ou d'ourlet.

2. Languette (10) selon la revendication 1, dans laquelle la valeur du rapport  $h_2:h_1$  est comprise entre environ 0,65 et environ 0,93.

3. Languette (10) selon la revendication 1, dans laquelle la partie supérieure du rebord (62) est généralement coplanaire avec la surface supérieure du corps de la languette (10) au niveau de la partie de levage (14) de la languette (10).

4. Languette (10) selon la revendication 1, dans laquelle le bord (66) du rebord (62) est disposé selon un angle par rapport au reste du corps de la languette (10).

5

5. Languette (210) selon la revendication 1, dans laquelle la partie de levage (214) de la languette (210) comprend un trou de doigt (240) ; dans laquelle le rebord (262) a un bord arqué (266) ; et dans laquelle le bord arqué (266) du rebord (262) est orienté de manière concave par rapport au trou de doigt (240).

10

6. Languette (110) selon la revendication 1, dans laquelle la partie de levage (114) de la languette (110) comprend un trou de doigt ; dans laquelle le rebord a un bord arqué (166) ; et dans laquelle le bord arqué (166) du rebord (162) est orienté de manière convexe par rapport au trou de doigt (140).

15

20

7. Languette (10) selon la revendication 1, dans laquelle le rebord (62) a un bord de forme arquée (66) comprenant des extrémités opposées ; dans laquelle un premier axe (70) passe à travers le trou de rivet (30) et l'une des extrémités opposées du bord de forme arquée ; dans laquelle un deuxième axe (72) passe à travers le trou de rivet (30) et l'autre des extrémités opposées du bord de forme arquée (66) ; dans laquelle le premier axe (70) est disposé selon un angle  $\theta_1$ , par rapport au deuxième axe (72) ; et dans laquelle l'angle  $\theta_1$  a une valeur comprise entre environ 10 degrés et environ 50 degrés.

25

30

35

8. Languette (10) selon la revendication 7, dans laquelle le bord de forme arquée (66) du rebord (62) comprend en outre un point central (90) disposé entre les extrémités opposées du bord de forme arquée (66) ; dans laquelle un troisième axe (20) s'étend longitudinalement à travers le centre de la languette (10), passant ainsi à travers le point central (90) ; dans laquelle le premier axe (70) est disposé d'un côté du point central (90) selon un angle de  $\theta_1/2$  par rapport au troisième axe (20) ; et dans laquelle le deuxième axe (72) est disposé de l'autre côté du point central (90) selon un angle de  $\theta_1/2$  par rapport au troisième axe (20).

40

45

9. Languette (10) selon la revendication 1, dans laquelle les bords moletés ou ourlés (38) de la partie de levage (14) se terminent aux extrémités à proximité du rebord (62) ; et dans laquelle les bords moletés ou ourlés effectuent un mouvement de transition dans le rebord (62) en se rétrécissant progressivement à partir d'un ourlet ou moletage partiel dans une zone de métal aplati plié sur environ deux fois l'épaisseur du rebord (62).

50

55

10. Languette (10) selon la revendication 1, dans laquelle le corps comprend en outre des premier et second

- côtés opposés, un axe longitudinal (20) s'étendant entre les première et seconde extrémités du corps entre les premier et second côtés opposés, et une pluralité de fentes (16) s'étendant à travers les parties correspondantes des premier et second côtés opposés du corps de la languette (10) entre la partie de nez (12) et la partie de levage (14) ; dans laquelle les fentes (16) sont disposées en paires opposées ; dans laquelle chacune des paires opposées de fentes (16) se combine afin de former un point de pivot ; dans laquelle le point de pivot définit un axe de pliage (18) qui s'étend généralement de manière transversale jusqu'à l'axe longitudinal (20) du corps de la languette (10) ; et dans laquelle les fentes (16) sont structurées pour permettre à la partie de levage (14) de la languette (10) de fléchir autour de l'axe de pliage (18) par rapport à la partie de nez (12) de la languette (10).
- 5
- 10
11. Languette (10) selon la revendication 10, dans laquelle le corps comprend en outre une ouverture en relief (34) et une zone à panneau ou bourrelet (46) ; dans laquelle l'ouverture en relief (34) est disposée de manière adjacente à une périphérie externe de la partie de réception de rivet (28) et entoure une partie du trou de rivet (30) de la partie de réception de rivet (28) ; dans laquelle la zone à panneau ou à bourrelet (46) est disposée de manière adjacente à l'ouverture en relief (34), entre l'ouverture en relief (34) et la partie de levage (14) ; et dans laquelle la zone à panneau ou à bourrelet (46) est évidée par rapport à la surface supérieure du corps de la languette (10).
- 15
- 20
- 25
- 30
12. Languette (10) selon la revendication 11, dans laquelle l'ouverture en relief (34) est généralement en forme de C et comprend une périphérie externe ; dans laquelle la zone à panneau ou à bourrelet (46) comprend un premier bord, un deuxième bord, un troisième bord et un quatrième bord ; dans laquelle chacun parmi le premier bord, le deuxième bord et le troisième bord est disposé à proximité de la surface supérieure du corps de la languette (10) et s'étend vers le bas vers la surface inférieure du corps de la languette (10) ; dans laquelle le premier bord s'étend généralement transversalement par rapport à l'axe longitudinal (20) de la languette (10) et se termine par les extrémités opposées ; dans laquelle le deuxième bord s'étend vers l'extérieur à partir d'une extrémité correspondante des extrémités opposées du premier bord vers la partie de nez (12) de la languette (10) ; dans laquelle le troisième bord s'étend vers l'extérieur à partir de l'autre extrémité correspondante des extrémités opposées du premier bord, opposé au deuxième bord ; dans laquelle chacun parmi le deuxième bord et le troisième bord se termine par une jonction correspondante avec la périphérie externe de l'ouverture en relief (34) généralement en forme de C ; dans laquelle le quatrième bord est disposé au niveau de la périphérie externe de l'ouverture en relief (34) généralement en forme de C ; et dans laquelle le quatrième bord s'étend à partir de la jonction correspondante entre le deuxième bord et l'ouverture en relief (34) généralement en forme de C jusqu'à la jonction correspondante entre le troisième bord et l'ouverture en relief (34) généralement en forme de C, raccordant ainsi de manière solidaire le deuxième bord et le troisième bord.
- 35
- 40
- 45
- 50
- 55
13. Languette (10) selon la revendication 12, dans laquelle la zone à panneau ou à bourrelet (46) forme une bande ; dans laquelle la bande s'étend longitudinalement à partir de la base du premier bord jusqu'au quatrième bord ; et dans laquelle la bande s'étend transversalement à partir de la base du deuxième bord jusqu'à la base du troisième bord.
14. Couverture de canette (74) en combinaison avec une languette (10) selon l'une quelconque des revendications 1 à 13, la languette (10) étant fixée au couvercle de canette (74).

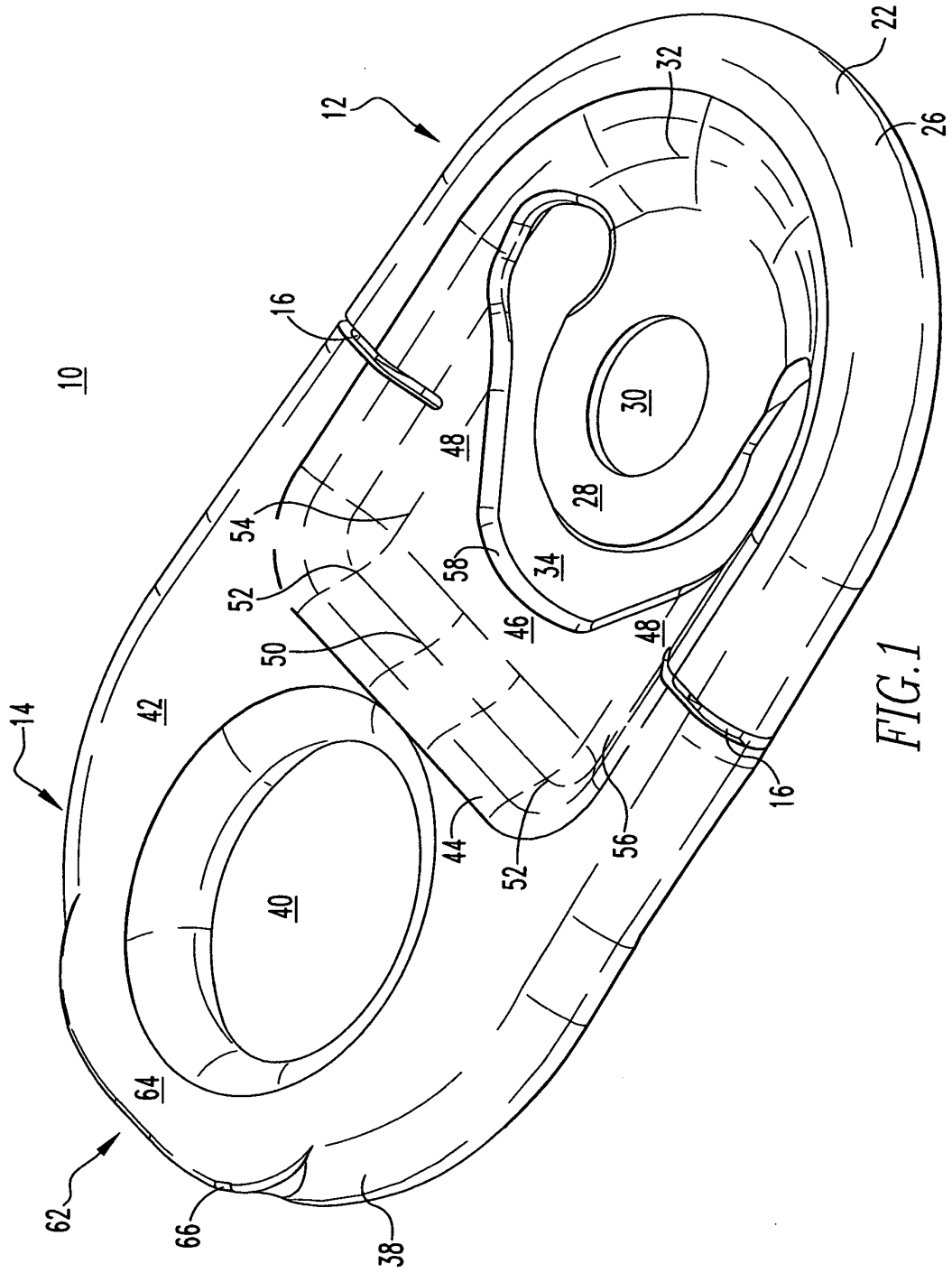


FIG. 1

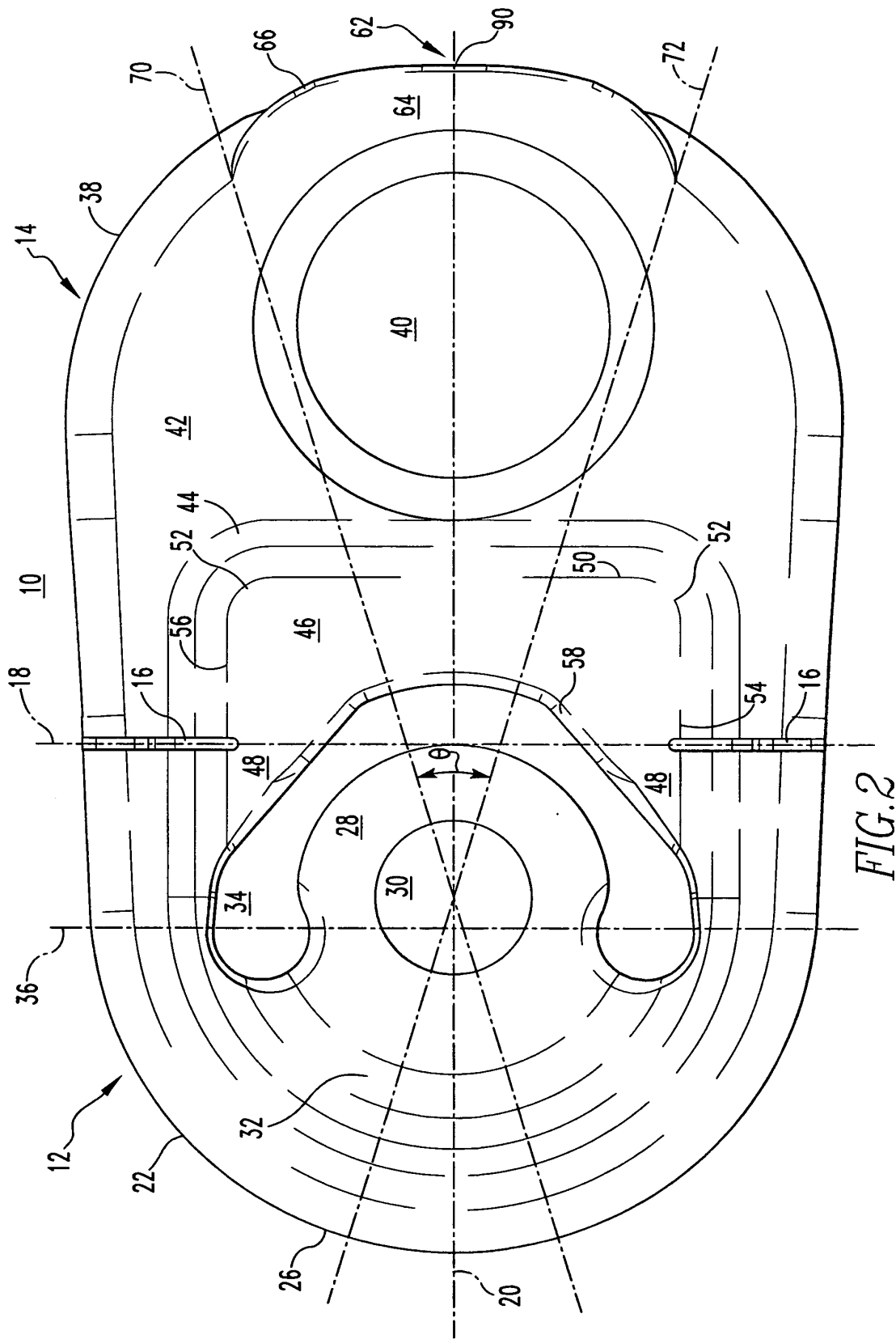


FIG. 2

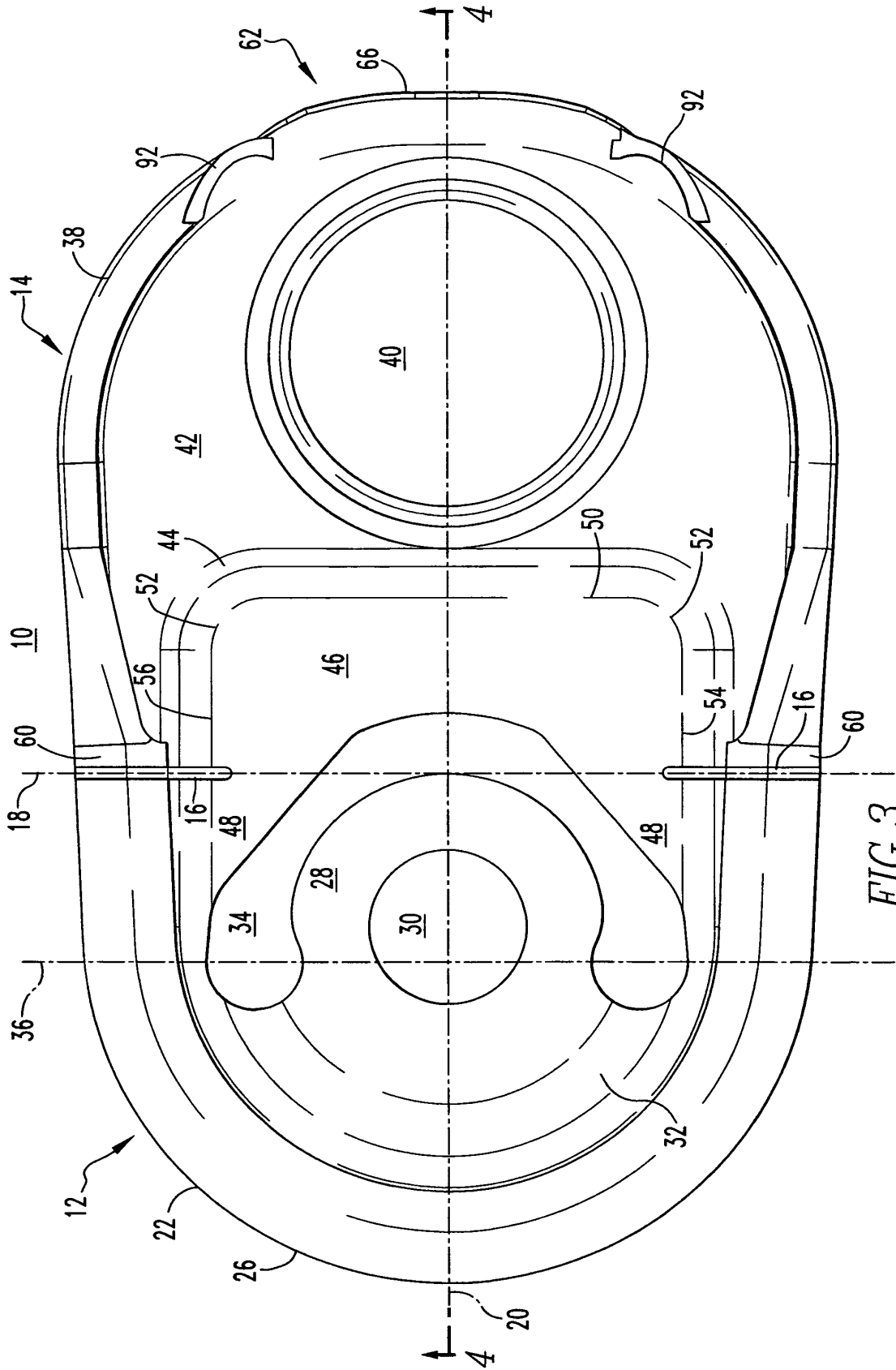


FIG. 3



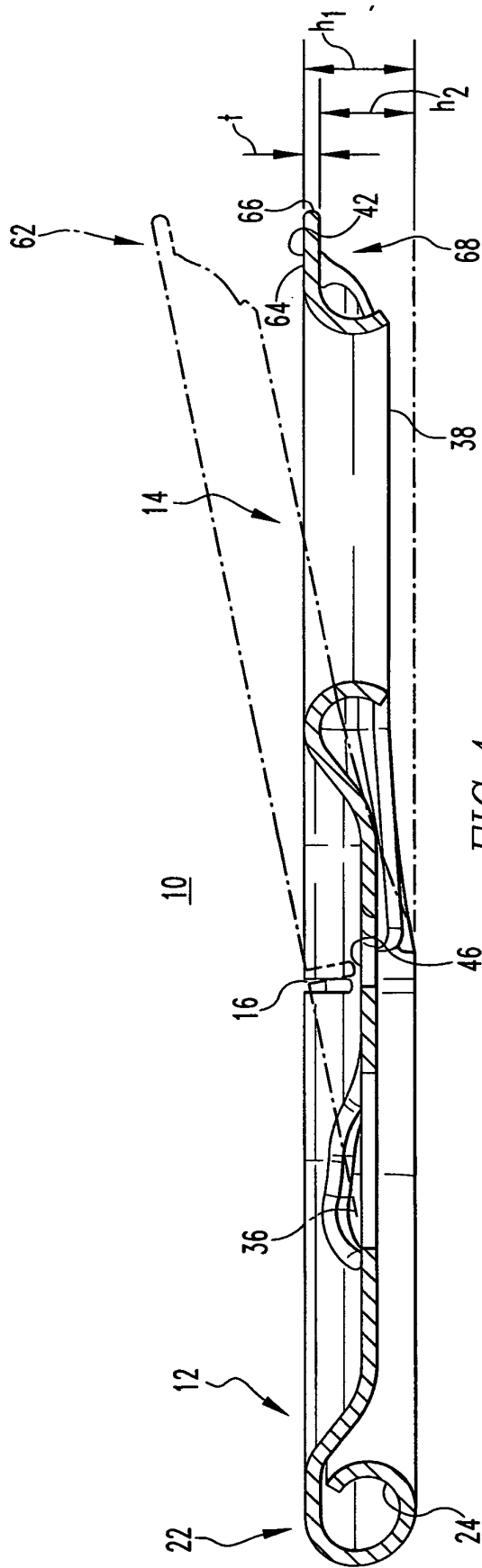


FIG. 4

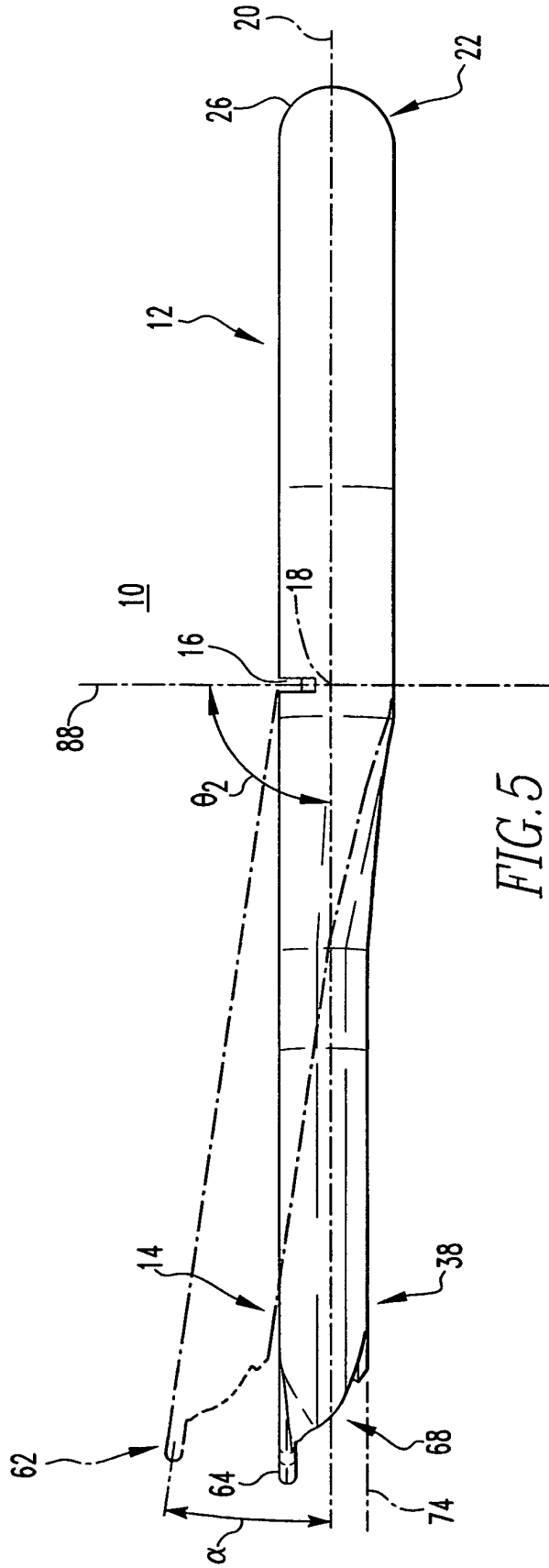
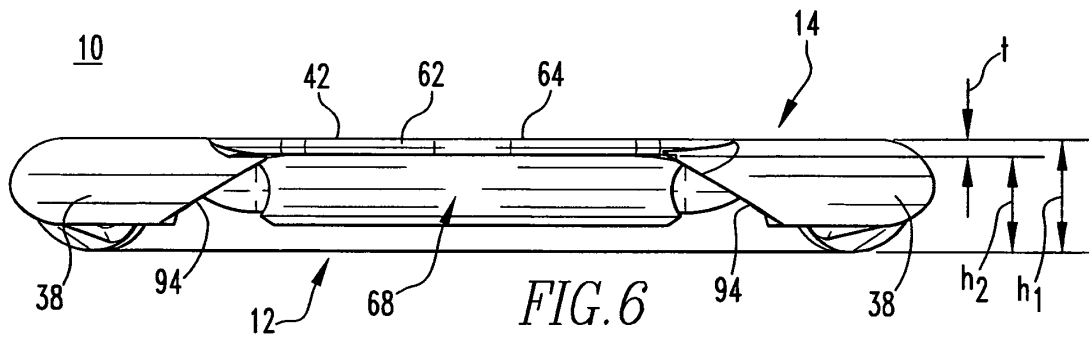


FIG. 5



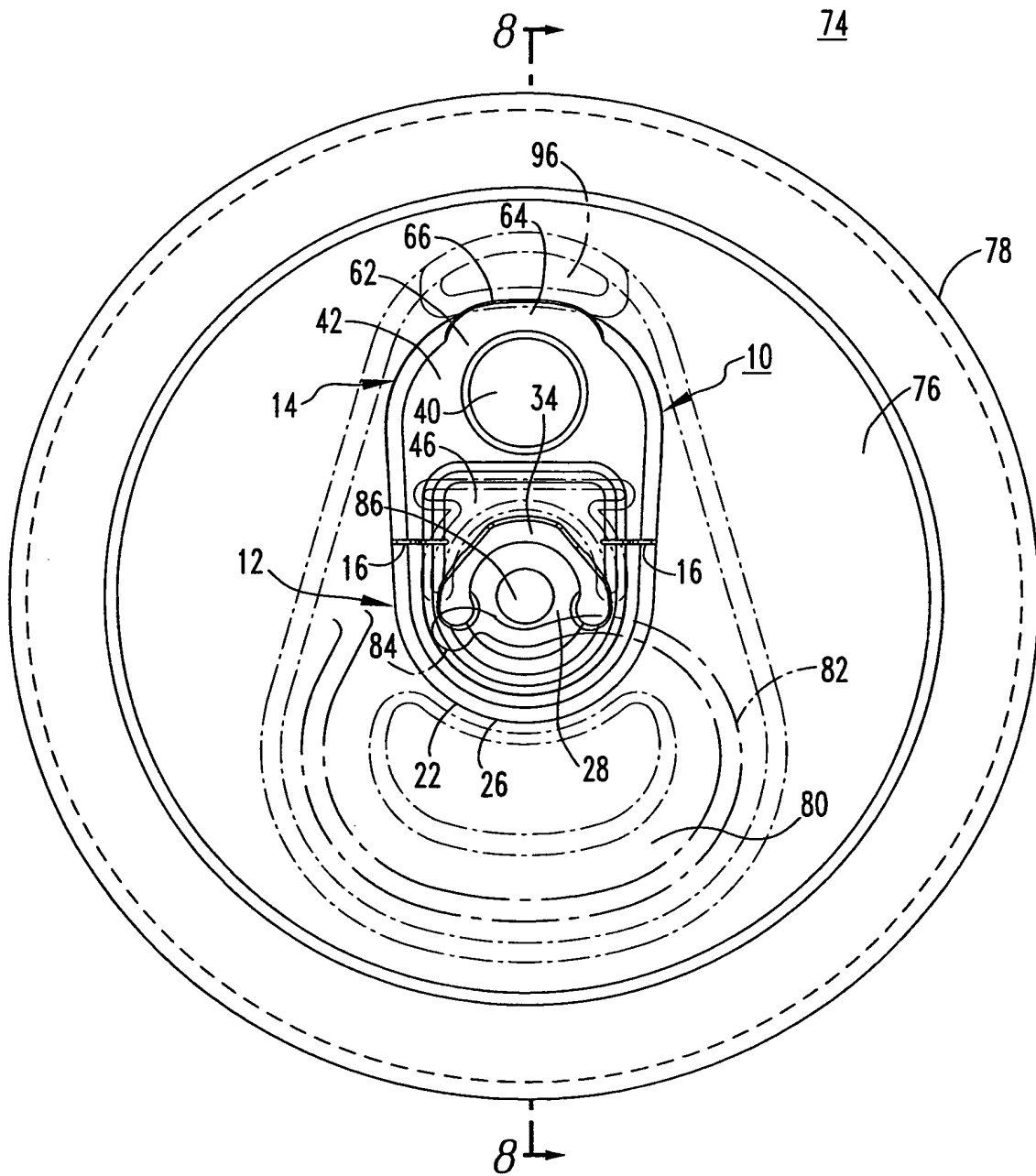
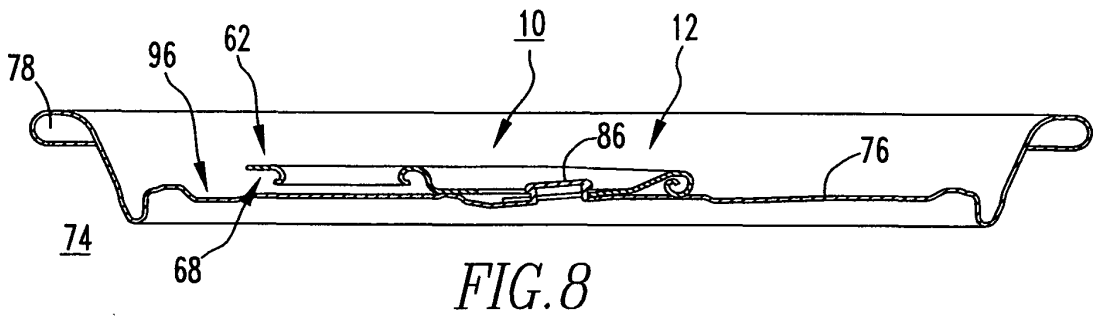


FIG. 7



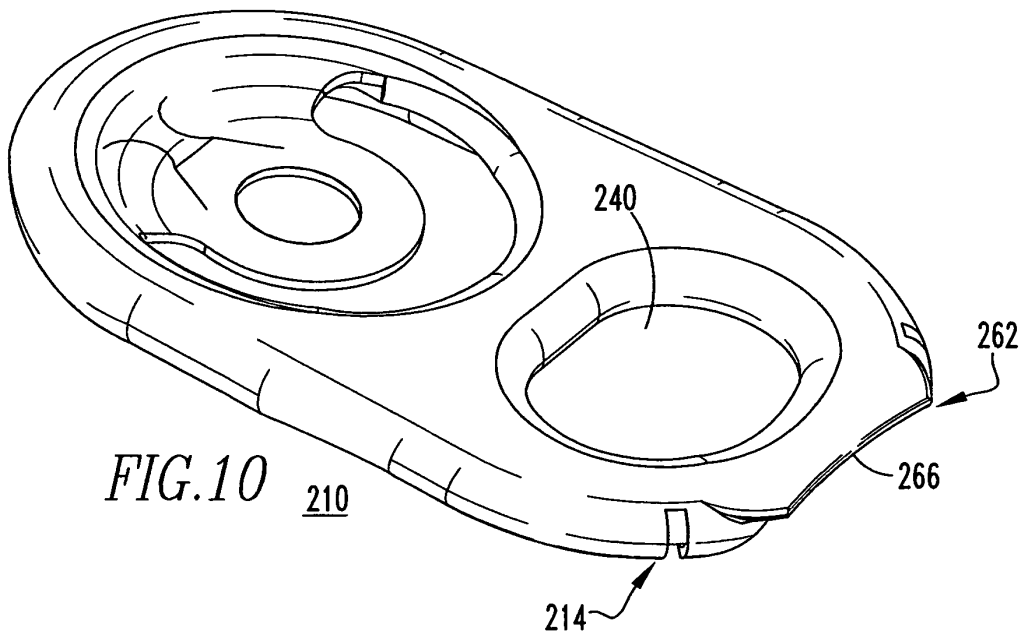
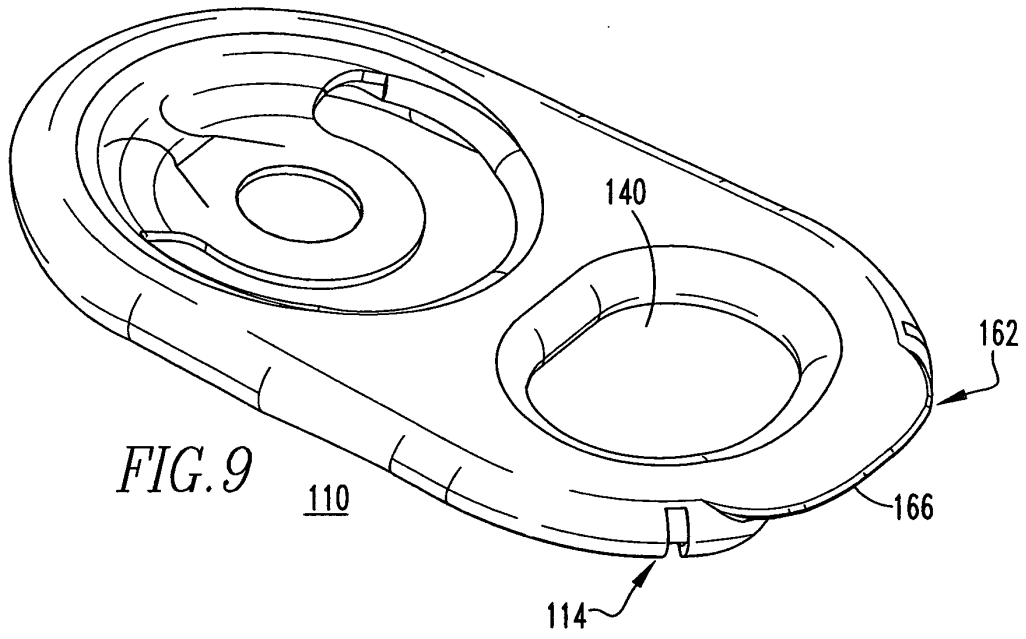




FIG.11

310

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- US 6129230 A [0004]