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(54) Title: BEVERAGE CAN WITH DISC

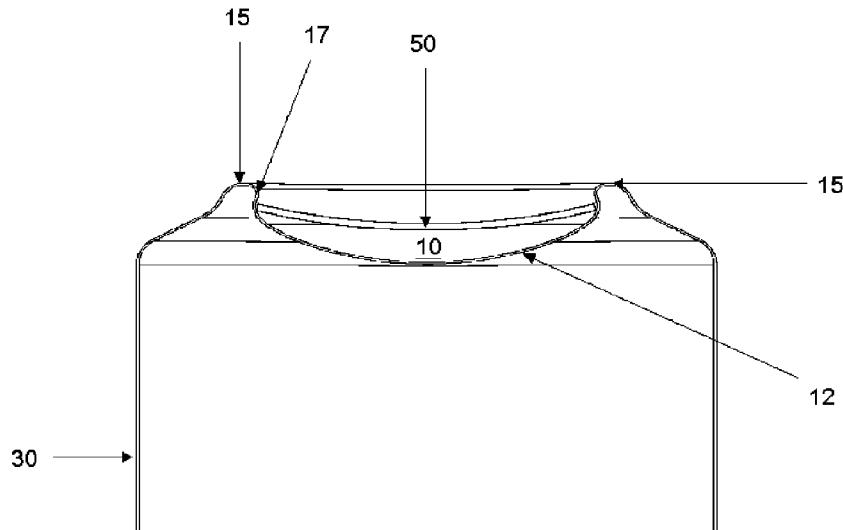


FIG. 6

(57) Abstract: A beverage can (1) having a base (10) defining a re-entrant bead (17) in which a resilient disc (50) is held captive. The maximum dimension of the disc (50) is designed to be larger than the internal diameter of the re-entrant bead (17) and thus, when the resilient disc (50) is fitted into the re-entrant bead (17), the disc (50) adopts a concave, domed shape. The degree of doming can accommodate any variance between the dimensions of the disc (50) and that of the reformed base (10) of the can (1). One or more drainage ports may be provided on the periphery of the resilient disc (50) so that any liquid trapped between the surfaces of the base (10) and the resilient disc (50) may drain.

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**Description****BEVERAGE CAN WITH DISC****Technical Field**

[0001] The present invention includes a conventional beverage can having a body, which incorporates an integrally domed base and a side-wall, and an end, which is fixed to the open end of the body using conventional techniques, a double seam for example.

**Background Art**

[0002] It is already known to internally reform the domed base of a beverage can to provide a re-entrant profile. This technique is primarily used to increase the strength of the base, which in turn allows light weighting. For example, EP 0482581 A (BALL CORP) 29.02.1992 describes an apparatus suitable for reforming the base of a beverage can in this way. In particular, Figure 11 of this application shows an enlarged cross-section view through a portion of the base of a beverage can after such reforming.

[0003] WO 96/24539 (KOHORN INTERNATIONAL PTY LIMIT ) 15.08.1996 describes a container formed with an open void separate from the main containment volume. Examples of such containers are metal cans, which are formed with a generally concave or domed void in the base, as commonly used for soft drinks, beer etc. This document describes removal means that are provided to substantially close this void, thereby creating a second containment volume that may be used for promotional goods, a second active ingredient or such like.

[0004] Both these ideas are combined in EP 0958182 B (SCHMALBACH LUBECA) 24.11.1999 which describes a two piece beverage can made substantially of sheet metal having a base that is drawn-in to the inner side of the container, so that the diameter of the base is evidently smaller than the diameter of the container. This document also describes a separate disc-shaped component that is adapted to be fixed into the base. The separate disc-shaped component ("false bottom part") is separately produced and may therefore be easily decorated etc.

**Summary of invention**

[0005] The present invention provides a beverage can (1) having a base (10)

defining a re-entrant bead (17) in which a resilient disc (50) is held captive, characterised in that

the diametric dimension of the disc (50) is larger than the internal diameter of the re-entrant bead (17) and when the resilient disc (50) is fitted into the re-entrant bead (17), the disc (50) adopts a concave, domed shape.

- [0006] According to the present invention, a resilient disc is snapped into the re-entrant bead at the base of a beverage can. The disc has a means of removal, by which it can be prised out of the re-entrant bead by a user. For example, the disc may have a cut-out that allows it to be prised out of the re-entrant, bead using a tab or a coin.
- [0007] The disc and domed base of the beverage can together define a compartment, which can be used to store additives for the contents of the container or an item such as seeds, a compass, USB device etc. The disc is preferably stamped from a printed sheet of thermoplastic material e.g. PP, PET or other polymer, although other materials such as metal or card are also possible
- [0008] The disc may be fitted into the base of the beverage can either before or after filling the can with product, by a canmaker or packer respectively. Preferably, cut-outs are provided in the disc to allow drainage of any liquid that has collected in the compartment. This allows the disc to be optionally fitted prior to pasteurising or rinsing on the filling line.
- [0009] The inventors have found that the disc can be manufactured to a much tighter tolerance than may be achieved for the diameter of the re-entrant bead and thus, during trials the disc was found to fit tightly in the reformed base of some cans, whereas it only fitted very loosely in the reformed base of other cans. Upon further investigation the inventors found that if the diametric dimension of the disc (i.e. the maximum points of the disc plotted within a circle) was larger than the diameter of the re-entrant bead, the disc could be snapped into the reformed base, but the stresses exerted on the disc by the re-entrant bead, causes the disc to and flex into a concave, dome configuration. Depending upon the dimensions of the disc and the diameter defined by the re-entrant bead of the reformed base (as manufactured), the domed disc takes up a lesser or greater degree of

doming.

- [0010] This variable shaped dome has a number of advantages. Firstly, the degree of doming can accommodate any variance between the dimensions of the disc and that of the reformed base of the can. For example, the disc can be manufactured having a tolerance of + - 0.1mm whereas the reformed base conventionally has a tolerance of + - 0.3mm.
- [0011] The disc proposed by the invention includes one or more cut-outs arranged on its periphery. The concave, domed shape of the disc once fitted in the reformed base of the can, assists with the drainage of water from the internal surface of the disc and the stressed / fitted disc is more difficult to remove from the base of the can, reducing the risk of accidental separation from the can.
- [0012] The disc is provided with a removal means, which is sized and shaped to allow a user to remove the disc from the base of the can. The removal means takes the form of a cut-out, which allows a user to insert a lever e.g. a coin or tab, to prise the disc out of the base of the can.
- [0013] In an embodiment of the invention, the disc and base of the can together define three contact points and the removal means is provided by a cut-away, which allows a user to apply a lever under the disc. The two contact points located on either side of the cut away serve as energising prongs. These energising prongs may be located immediately adjacent to the cut-away or they may be displaced from the cut-away, but they must be located within the same half of the disc as the cut-way. The contact point located diametrically opposite the cut away acts as a pivot. In combination, the energising prongs and the pivot causes the disc to spin upon release from the base of the can, much like the flipping of a coin. This provides the opportunity for a simple decision based game.

#### **Brief description of drawings**

- [0014] The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:
- [0015] Figure 1 is an isometric view of an upturned beverage can having a reformed base suitable for use in the invention.
- [0016] Figure 1a is a section taken through the base of the beverage can shown

in figure 1.

- [0017] Figure 2 is a section view of the beverage can according to the invention having a reformed base (as shown in figure 1a) with a disc constrained therein, illustrating where a user may apply a lever to prise the disc out of the beverage can base.
- [0018] Figure 3 is an isometric view of an upturned beverage can having a disc according to a first embodiment of the invention, illustrating how a tab may be used as a lever to prise the disc out of the beverage can base.
- [0019] Figure 3a is a plan view of the disc shown fitted in the reformed base of the beverage can shown in figure 3.
- [0020] Figure 4 is an isometric view of an upturned beverage can having a disc according to a second embodiment of the invention, illustrating how a coin may be used as a lever to prise the disc out of the beverage can base.
- [0021] Figure 4a is a plan view of the disc shown fitted in the reformed base of the beverage can shown in figure 4.
- [0022] Figure 4b is an isometric view of the disc shown in figures 4 and 4a.
- [0023] Figure 5 is an isometric view of an upturned beverage can having a disc according to an enhanced third embodiment of the invention.
- [0024] Figure 5a is a plan view of the disc shown fitted in the reformed base of the beverage can shown in figure 5.
- [0025] Figure 5b is an isometric view of the disc shown in figures 5 and 5a.
- [0026] Figure 6 is a section view of the beverage can according to the enhanced third embodiment of the invention where the diametric dimension of the disc is larger than the maximum diameter of the cavity formed in the reformed base of the beverage can and when the disc is constrained therein, the disc adopts a concave, domed shape.
- [0027] Figure 1 generally shows a conventional beverage can 1 according to the prior art, having a base 10 with a stand annulus 15, a top 20 and a side-wall 30. In particular, figure 1a shows a cross section taken through the base 10 of the can illustrated in figure 1, which more clearly shows the stand annulus 15 and the concave dome 12 of the base 10.
- [0028] The base of the can according to the invention is illustrated in figure 2, where a resilient disc 50 is shown trapped in the re-entrant bead 17. A

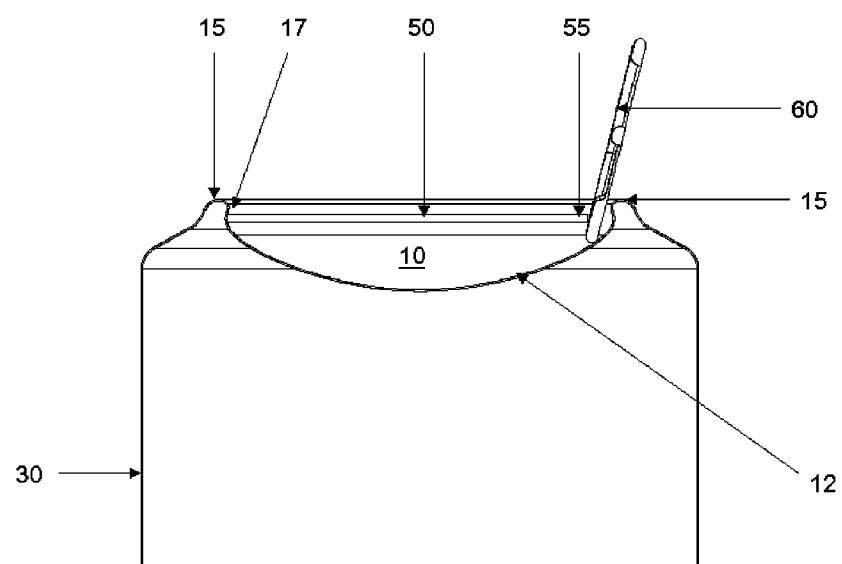
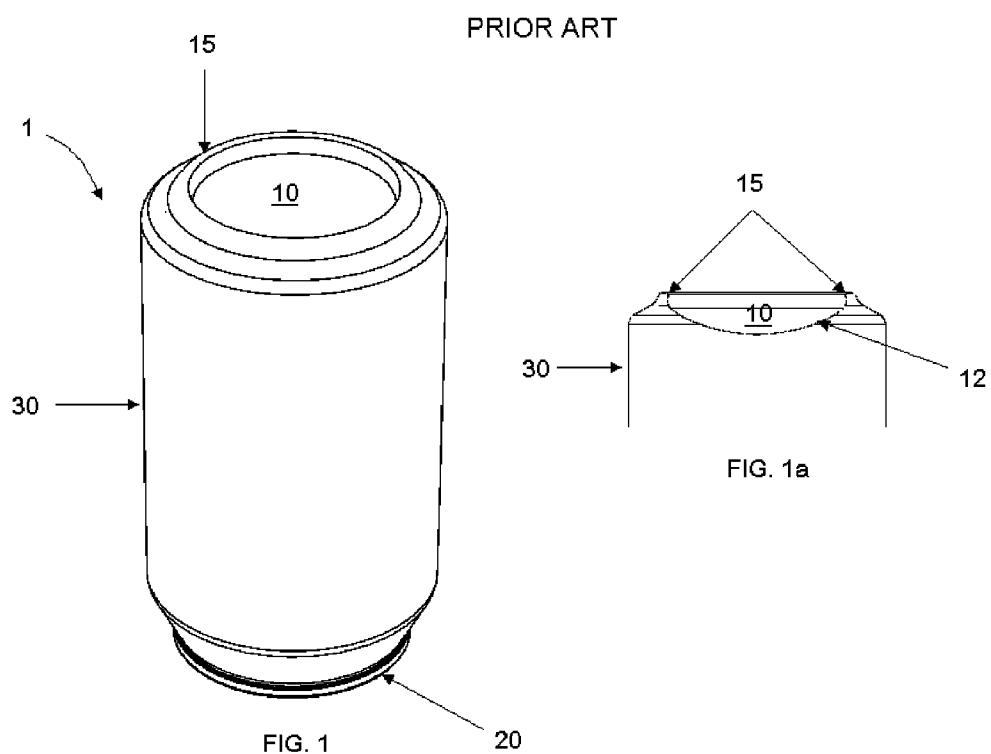
compartment (not labelled) is clearly shown, defined between the disc 50 and the domed base of the can 12. The disc 50 may be removed from the re-entrant bead 17, using a lever 60 inserted under the disc 50 via a cut-away 55. Figures 3 and 4 show alternative examples of levers 60 suitable for use in the invention. Figure 3 illustrates how a tab 60' may be used as a lever upon opening and after separation from the top of the can and figure 4 illustrates the use of a coin 60".

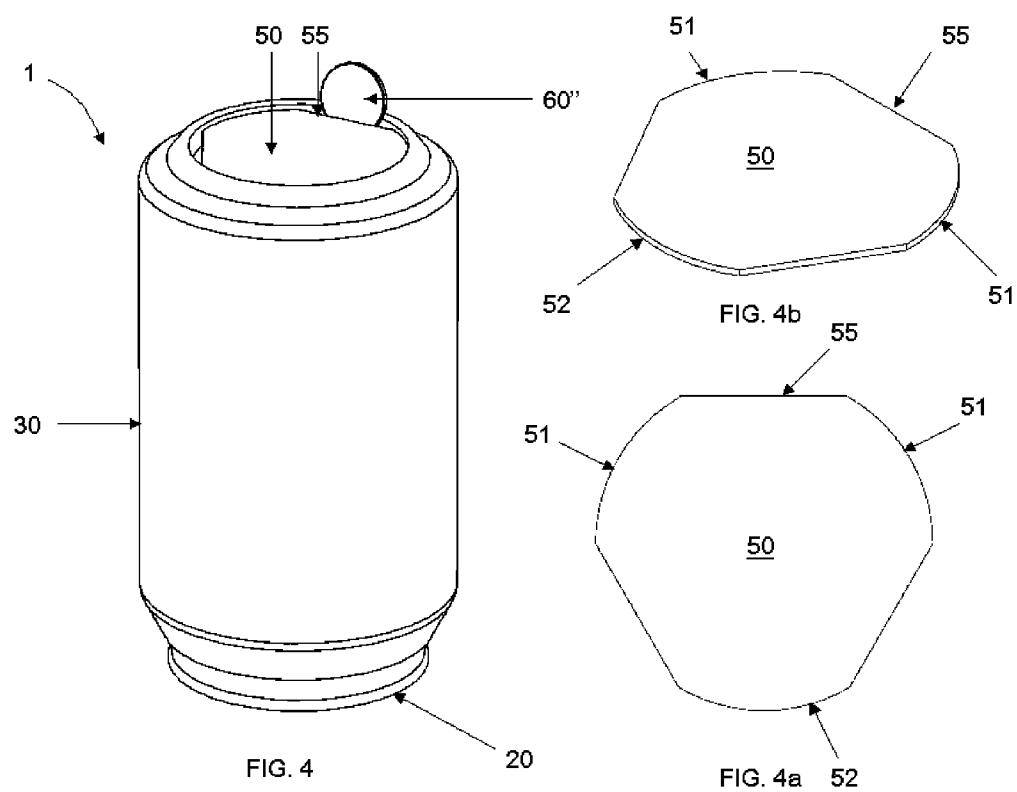
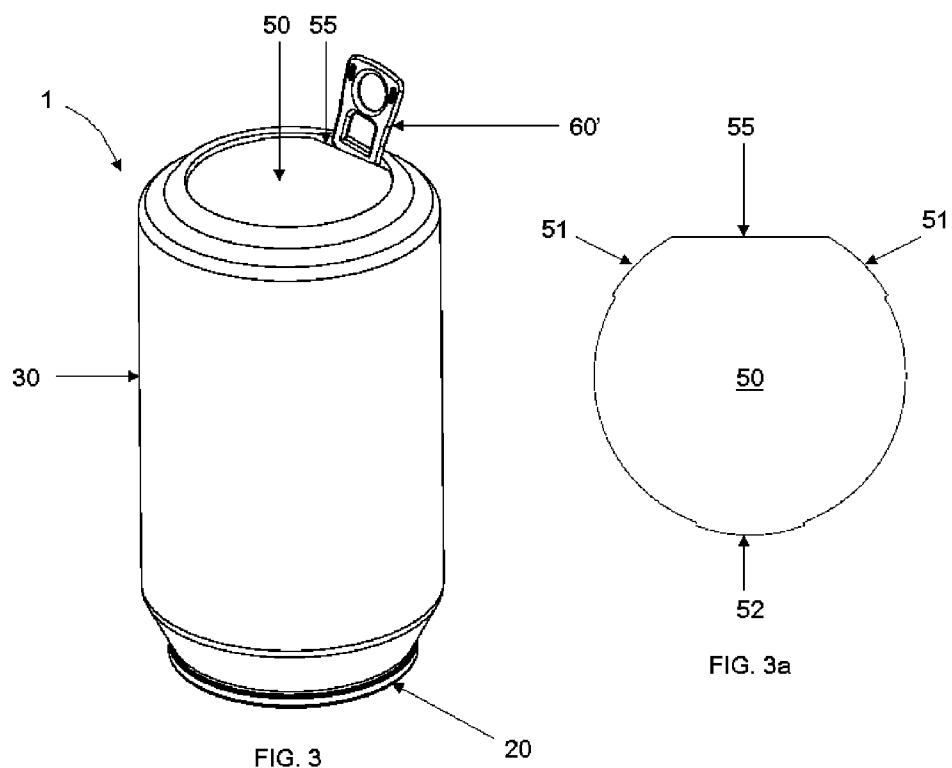
- [0029] Figure 3a illustrates a plan view of a disc 50 suitable for use in the invention. This disc 50 has a cut-away 55 to allow insertion of a suitable lever 60 and the disc 50 also defines two energising prongs 51 and a pivot 52. Upon application of a lever 60' by a user of the can (as shown in figure 3), the disc 50 is prised from the re-entrant bead (17) and the combined action of the energising prongs 51 and the pivot 52, causes the disc to spin (much like the flip of a coin) upon release from the re-entrant bead 17.
- [0030] Figures 4a and 4b show an alternative disc 50 suitable for use in the invention. This disc 50 has a cut-away 55 to allow insertion of a suitable lever 60, but the disc 50 is modified to include three large cut-outs (not labelled) between the energising prongs 51 and the pivot 52. These cut-outs minimise the amount of moisture trapped between the disc 50 and the base of the can 10 and also allow any moisture that is trapped to drain / dry out efficiently.
- [0031] Figure 5 shows a beverage can 1 according to the invention with an enhanced variant of the disc 50 illustrated in Figures 4, 4a and 4b inserted into the re-entrant bead 17. Figures 5a and 5b show a plan view and isometric view of the enhanced disc 50. Radii have been provided on the corners of the contact points (energising prongs and pivot) so there are no longer any sharp corners, as shown Fig. 5a. These smoothed corners provide a smooth release as the disc 50 is flipped out of the re-entrant bead 17. This is independent of the degree of doming of the disc (50) caused by the variation in dimensions of the disc and the diameter defined by the re-entrant bead of the reformed base.
- [0032] It will be apparent to those skilled in the art that the different examples of suitable lever devices or means to remove the disc from the can may be

applied to any of the examples in the drawings. Furthermore, different cut-away designs and number and/or location of cut-outs may be employed without departing from the general teaching of the invention.

## Claims

1. A beverage can (1) having a base (10) defining a re-entrant bead (17) in which a resilient disc (50) is held captive, characterised in that the diametric dimension of the disc (50) is larger than the internal diameter of the re-entrant bead (17) and when the resilient disc (50) is fitted into the re-entrant bead (17), the disc (50) adopts a concave, domed shape.
2. A beverage can (1) according to claim 1, wherein the base (10) comprises a concave dome (12) and a stand annulus (15) and the base is reformed to provide the re-entrant bead (17) at the junction between the concave dome (12) and the stand annulus (15).
3. A beverage can (1) according to claim 2, wherein a cavity (19) is defined between the surfaces of the concave dome (12) and the disc (50) and the disc (50) is shaped to provide one or more cut-outs (55), which allow any liquid to drain from the cavity (19).
4. A beverage can (1) according to any one of the preceding claims, wherein the resilient disc (50) defines at least three contact points (51, 51) spaced around the periphery thereof, and when the resilient disc (50) is fitted into the re-entrant bead (17) the disc (50) makes contact with the re-entrant bead (17) at the contact points (51,52).
5. A beverage can according to claim 4, wherein the three contact points (51, 52) comprise two energising prongs (51) arranged on either side of the disc (50) and a pivot (52) diametrically opposite the energising prongs (51), wherein the energising prongs (51) energise the disc (50) as it is prised out of the re-entrant bead (17) and the pivot (52) causes the disc to spin orthogonal to the plane of the disc, as it is released from the re-entrant bead (17).
6. A beverage can according to any one of the preceding claims, wherein the disc (50) includes a tab or slot (70) to allow a user to remove the disc from the re-entrant bead (17).
7. A method of filing a beverage can (1) according to any one of the preceding claims, wherein the resilient disc (50) is fitted into the re-entrant bead (17) prior to filling the beverage can (1) with a product and processing as required.





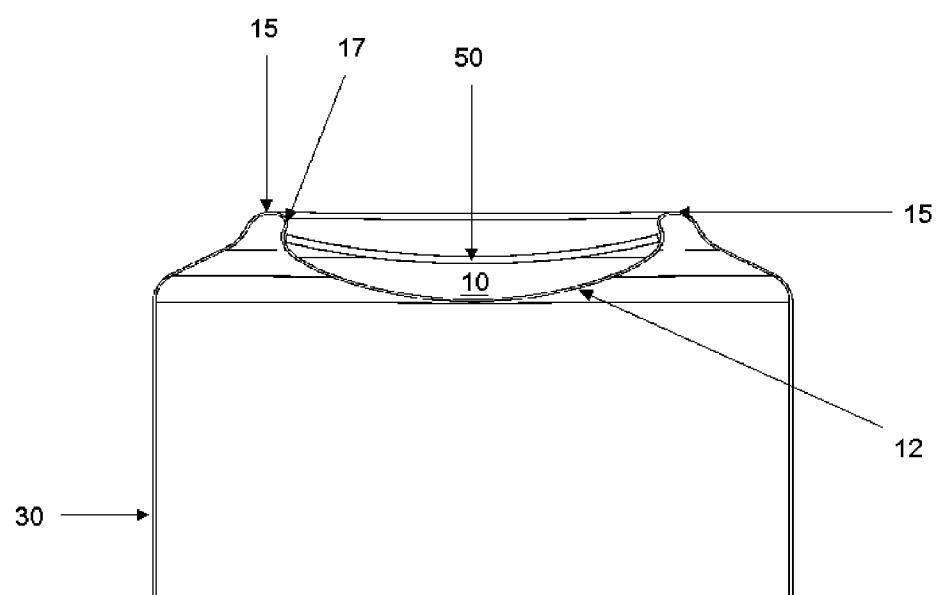
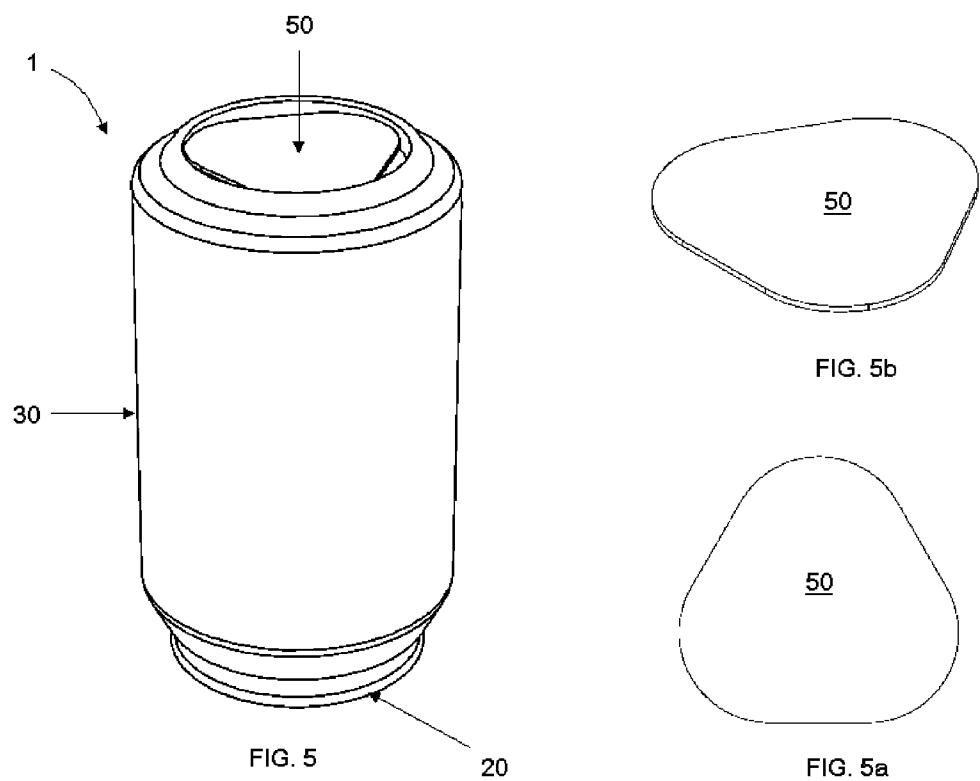


FIG. 6

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2011/050364

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. B65D17/00 B65D1/16  
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 197 04 522 A1 (SCHMALBACH LUBECA [DE]) 20 August 1998 (1998-08-20)	1,6,7
Y	column 3, line 40 - column 4, line 29; figures -----	2,3
Y	US 4 181 219 A (MARION THOMAS E [US]) 1 January 1980 (1980-01-01) the whole document -----	2,3
A	WO 96/24539 A1 (KOHORN INTERNATIONAL PTY LIMIT [AU]; VON KOHORN STEVEN [AU]) 15 August 1996 (1996-08-15) figure 3 -----	1
A	DE 295 19 352 U1 (HOFER RUDOLF [DE]) 29 February 1996 (1996-02-29) the whole document -----	1
		-/-

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance  
"E" earlier document but published on or after the international filing date  
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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  
"&" document member of the same patent family

Date of the actual completion of the international search  23 February 2011	Date of mailing of the international search report  03/03/2011
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Serrano Galarraga, J

**INTERNATIONAL SEARCH REPORT**International application No  
PCT/EP2011/050364**C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category <sup>*</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 524 468 A (JENTZSCH K REED [US] ET AL) 11 June 1996 (1996-06-11) cited in the application figures 3-11 -----	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2011/050364

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US 5524468	A 11-06-1996	NONE			