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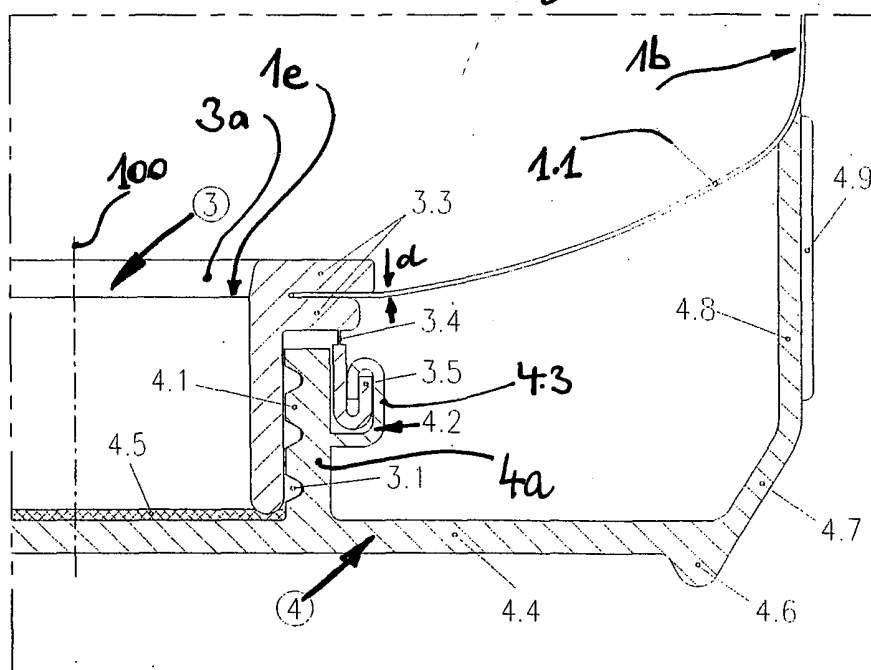
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(54) **Reclosable beverage can**

(57) Suggested is a can body (1) for receiving a beverage filled into an inside (1i) of said body at a filler's location. The body is made from a sheet material, and having a wall portion (1b,1c) with axial ends. One axial end of the wall portion having a first portion (1.1), said first portion having a domed, axially outward vaulted

shape, and being the bottom of the can body. The second portion having a body flange (2.5) for receiving and supporting a lid (2) for seaming and closing the can body to form a closed can. The first portion (1.1) has a spout (3,3') of a diameter less than a diameter of said wall portion (1b), and a cap (4,4') for closing (and opening) the spout, to yield a re-closable can.

Fig. 1b



Description

[0001] The invention concerns a closable can body and a filled can, adapted to be used and closed again after an only partial consumption of a content of the can (body and lid).

Background.

[0002] A beverage metal can (two part system, having an integrated base can body and can lid) is one of the most accepted packages for single servings around the world. Consumers enjoy this package because of its convenience in handling, its quality performance in protecting its content and its attractiveness supported by a number of useful features.

[0003] Beverage cans are popular for drinks consumption at home, in-door and out-door. Out of home consumption represents a remarkable percentage, i.e. during travelling, sports and other events. In the latter, the content of the can is often not consumed at once but with interruptions, so complete emptying of the can may extend into the range of an hour or longer. Here the can lacks a reclosability feature, despite the fact that the beverage can was initially designed for single servings (use) only.

[0004] Reclosability is considered a useful feature not only to preserve product freshness after partial product take-out but also to prevent product contamination and insect penetration during the period from initial opening to final emptying of the can. The latter may also imply a non-neglectable health and hygiene risk during outdoor consumption.

[0005] Prior art is known, opening the can on the lid side, and closing it with a cap from the same axial side, cf. **WO-A 97/36739** (Schmalbach-Lubeca, Lutz Strube) or **WO-A 01/66431** (Goetz, Ackermann, Folland). The bottom (base) of a can already was suggested to be penetrated for closing, when using an inward domed bottom, cf. **WO-A 03/066455** (Schmalbach-Lubeca, Ball Europe, Bert Bast et al.).

Summary of the Invention.

Object of the invention.

[0006] Object of the invention is to comply with a consumer's desire and remove the shortfall of the two part can system not being reclosable by adding such feature to it.

[0007] The result should improve the can's suitability for outdoor application and time extended consumption by allowing the consumer to effectively reclose a take out opening of the can every time after partial drink take-out.

[0008] The invention suggests cooperating components under one of claim 1 to 5 for a can or claims 27 to 30 for a body of a can. The components are

1. A can body for holding liquid, such as beverages;
2. Optional, a can lid;
3. A spout for pouring or drinking, associated with the bottom;
4. A cap for screw able re-closing;
5. Optional, an add-on containment-vessel.

[0009] The invention provides the feature of a reclosing closure near the base of the can or can body, in contrast to a reclosable can lid. The non-openable end portion of the can receives a standard design, with or without having a necked-in portion of the wall, and a body hook flange formed at the most upper part of the can body.

[0010] A commonly concave shaped dome as shaped base of the can is replaced by a convex design, vaulting to the outside (axial direction).

[0011] A circular hole, centred at the convex base provides an aperture for permanently mounting a carrier for the reclosing closure. After attaching, the reclosing closure through its peripheral contour, having an outwardly protruding level rim portion, will enable the package to stationary rest on any level (flat) support, i.e. on conveyors, on machine pusher pads and on the shelf for display, and on other can's top, etc.

[0012] The invention provides that the can is handled on its closure device positioned at the can base. The closure may be provided as pre-assembled by the can manufacturer before the can body is supplied to the filling location. The filler handles the can in the common way, not requiring alterations at the filling and seaming process. After filling of the can body through a fully open second axial end, the same is covered with a can lid which is seamed to the can body for sealing and closing the container including the beverage in it. The can lid ("end") used for closing at the fillers location is without any opening tab or other mechanism, thus no commonly used "easy open end", but a non-openable end.

[0013] The reclosable closure (openable, closable) device comprises a pouring or drinking spout and a re-closing screw able cap. The cylindrical spout is mounted in the opening provided about the centre of the convex can base.

[0014] The twistable cap having a thread fitting to the thread of the spout and therewith allows opening and closing of the can, initial closing and re-closing.

[0015] The screw cap may have a plastic inlay gasket supporting a gas and liquid tight reclosure of the package, through contacting the spout.

[0016] A built-in vent feature inside the closure initiates release of internal can pressure from the can head space during the initial phase of opening, before the liquid content may be discharged from the can by drinking or pouring. An eventual risk of liquid splashing during can opening is at least reduced.

[0017] The reclosable closure may comprise a tamper evidence feature near its bottom end, allowing the consumer to recognize originality or prior opening of the

can.

[0018] Different types of pouring or drinking spouts are suggested. One is rigid and protrudes outwardly from the can base. The other one is of telescopic design; it protrudes inwardly from the can base, when the closure is in a closed position and outwardly, when the closure is open, or at least prepared to be opened.

[0019] The entire reclosable can may also have a detachable containment vessel axially attached to the reclosable closure (claim 26).

[0020] The vessel may hold for the consumer e.g. chips, nuts, crackers or other snacks or promotional gifts, coupons or messages, etc. The vessel may also be used as a drinking cup, if one would not like to drink from the can directly.

[0021] Reclosing will lead to prolonged freshness of the can's content by maintaining e.g. a maximum of the residual carbonation throughout the periods when the can is reclosed. Reclosure also enhances to hygiene and safety of the package to the benefit of the consumer, preventing penetration of contaminants, mainly insects into the beverage content.

Summary of the embodiments.

[0022] The invention comprises several embodiments in four groups of figures.

Figures 1 display a first embodiment in three sets of figures.

Figures 2 display a second embodiment in three sets of figures.

Figures 3 display a third embodiment in three sets of figures.

Figures 4 display a fourth embodiment in three sets of figures.

[0023] Each Figure having an a, b and c set (e.g. Figures 1 a, 1 b and 1 c), representing a side view (a) with seamed (right) and non seamed (left) flanges, an enlargement of a portion near the base (b), and an exploded view showing the components (c).

Detailed description of the embodiments of the invention:

[0024] The drinks can 1 of all **Figures 1 to 4** is as an example made in a DWI process from a cup of metal sheet. It has a convex base profile 1.1 extending lateral from a can centre axis 100. The base profile protrudes outwardly from the can inside 1i. The cross sectional profile of the outwardly domed convex can base may be of 1, 2 or 3 radii design. Its convexity depth may range within a diameter/depth ratio of between 2 and 33, preferably around 7. Its profile geometry may be varied in a

large range.

[0025] The exact profile design is driven by functional and by aesthetic aspects.

[0026] The can base 1.1 has a circular opening 1e at its centre, matching the centre axis of the can. The diameter of the opening is between 20mm to 40mm, preferably around 26mm ($\pm 10\%$). The aperture edge left by the opening 1e is to receive a spout device 3, allowing pouring/drinking. It is a part of the reclosable closure as is subject to the further parts, at least re-closing closure as a cap device 4.

[0027] The drinks can 1 is made from a sheet of steel or aluminium or plastics or cardboard or a combination thereof. A preferred example is the metal sheet.

[0028] The DWI process uses a metallic sheet and provides a cylindrically shaped container, having a thin wall 1b and a thicker bottom 1d. In a necking process the upper end portion 1c of the wall 1b is shaped radially inwards to gain a reduced opening to the can inside 1i, to be closed by the lid 2, as explained in figure 1a.

[0029] **Figure 1c** shows the can 1, the lid 2 and the closing devices 4,3 for the can's bottom end 1d in a detached explosive view. **Figure 1b** is an enlarged part of figure 1a, displaying the permanent mounting of the carrier part 3 to the can's bottom and the cap device 4, shown attached in a closed position. Two threads, one 4.1 at a socket 4a of the cap 4, and one at the outer radial face of the tube-shaped carrier 3, interact for opening (releasing) and/or closing action.

[0030] A can lid 2 is made from steel or aluminium. It is the upper end of the closed can. Although being similar to a commonly used easy open can end it has no easy open mechanism, i.e. no score line and no tab. Its function is limited to closing and sealing of the can body after filling. The can lid comprises a substantially flat end panel 2.1 which connects via an inner chime by a countersink 2.2 (groove) to a chuck wall terminating in an annular end flange portion 2.3 as shown in **Figure 1a** (left part), when laid into the open necked wall 1b, 1c, not yet seamed. The end flange portion 2.3 is curled downward at its outer circumference. The inner surface of the end flange portion and curl are lined with a non displayed sealing compound which establishes liquid and gas tightness of the container after a (double) seam 2.4 has been formed by roll-in of the end flange and a can body flange 2.5 (body hook), after filling of the can, shown in the right part of **Figure 1a**.

[0031] Because of the absence of an easy open mechanism the panel 2.1 of the can lid maintains a flat and geometrically undistorted surface. As such, the panel provides an ideal base for extending the container's billboard through printing or labelling of additional messages and/or images. It is neither openable, nor closable. It may have a slightly domed shape.

[0032] A one-part cylindrically shaped spout 3 is of hollow tube-like design 3a made from a high molecular thermoplastic material. The outside portion of the spout is furnished with a thread 3.1 having between $1\frac{1}{2}$ and

2½ revolutions at one end. The thread has a minimum of 3 and a maximum of 5, preferably 4 longitudinal interruptions 3.2 with an axial orientation parallel to the centre axis 100 of the spout 3. The base of each thread interruption holds an additional small groove projecting over the entire length of the thread interruption and is exceeding the same by a minor length at either end.

[0033] An end opposite of the threaded tube of the spout 3 contains two flanges 3.3 with radial outward orientation. Both flanges are separated by a distance d, corresponding to the sheet thickness of the can base 1.1. After assembling the spout 3 inside the opening 1e of the can base, the flanges are thermo-sealed to either side of a heat-sealably coated material surface surrounding the aperture 1e of the can base, receiving the spout 3.

[0034] The spout's flange permanently mounted to the outer side of the can base 1.1 connects via a number of between 5 and 15, preferably 12 straps 3.4 to a tamper evidence ring 3.5 with a u-shaped cross section. An actuator mechanism 4.2 for treating the tamper evidence ring is part of the closure cap design and is shown in the description of the corresponding part later.

[0035] An alternate embodiment of the spout 3 is shown in **Figures 3 and 4**, named 3' there. It has two parts. The two-part spout 3' is of tube-like design made from a high molecular thermoplastic material. The radial outer part of the spout is furnished with a thread 3.1' and a 360° sliding bed 3.2' at its inside. It also has between 4 and 8, preferably 6 window-like openings 3.3', preferably equally spaced around its circumference, next to two radial flange portions 3.4' used for mounting the outer part 3c of the spout to the can base 1.1. The slide bed 3.2' is located at the axial end portion of the spout part 3c opposite to the mounting flanges 3.4'. A 2 to 3 revolution thread is located at the flange end of the spout. The thread has several, preferably a minimum of 3 and a maximum of 4 or 5 longitudinal interruptions 3.5' with axial orientation parallel to the centre axis 100 of the spout.

[0036] The base of each thread interruption holds an additional groove projecting over the entire length of the thread interruption and is exceeding the same by a minor length at either end.

[0037] The end opposite of the threaded side of the spout 3' contains two flanges 3.4' with outward radial orientation. The flange at the outer position of the spout extends into an annular protrusion 3.6' of substantially circular cross section at its outer surface, facing axially. Both flanges are separated by a distance equivalent to the material thickness of the can base, as previously explained. After assembling the alternative spout 3' inside the opening 1e of the can base 1.1 the flanges are thermo-sealed to either side of a heat-sealably coated material surface surrounding the aperture 1e of the can base.

[0038] The spout's flange located at the outer side of the can base connects via a number of between 5 and

15, preferably 12 thin straps 3.7' to a tamper evidence ring 3.8' with a substantially u-shaped cross section. An actuator mechanism 4.9" for detaching the tamper evidence ring is part of the closure cap design and is shown in the description later.

[0039] The radially inner part 3b of the spout 3' is furnished with further threads 3.9' each at its inner and at its outer radial face. Both threads are located at the same end portion of the inner spout part. The outer thread 3.9' at the outer side matches the inner thread 3.1' at the inner side of the outer spout part. The inner thread 3.9' at the inner side matches a thread at the outer radial face of the closing cap 4 and its socket 4a, which are shown in the description later.

[0040] The inner spout 3b terminates in a tapered portion 3.10' at its threaded end. It matches a slightly narrower tapered receiving portion in a panel of the closure cap for achieving a tight fit to keep both parts locked to each other during a part of the opening of the closure system. The tapers only disengage at the end of axial travel of the inner spout part 3b relative to the outer spout part 3c. This is when the inner spout part has fully telescoped (extended) outwardly during the first phase of the closure opening process. The tapers only lock again at the end of travel during the reclosing process.

[0041] The end of the inner spout part located at the far side from the threads contains an outwardly pointing radial flange 3.11' which travels in the sliding bed of the outer spout part during opening and closing of the reclosable closure. The flange terminates axial travel of the inner spout at both of the slide bed's extreme positions.

[0042] The flanged end of the inner spout part is designed to have between 4 and 8, preferably 6 gaps 3.12' to allow mechanical assembly of the inner spout part inside the outer spout part, and engagement of the radial flange 3.11' in said bed 3.2'.

[0043] The reclosing screw cap 4 of **Figures 1a to 1c** is of cylindrical design made from a high molecular thermoplast. Its outside diameter substantially corresponds to an outside diameter of the can wall 1 b, when round. The cap has a centred inner tubular portion 4a at a panel 4.4 with a thread 4.1 at an inner side of the tube (female design). Both, thread and diameter of the inner "reclosability portion" match their corresponding counter part of the spout 3 (male design). This is called a socket 4a, 4.1.

[0044] The centred inner tubular portion also holds a u-shaped counter piece 4.2 of the tamper evidence feature of the reclosable closure system. u-shaped part at the cap 4 is segmented into between 4 and 15, preferably 12 circumferential sections 4.3. This allows "spring driven" engagement with the u-shaped tamper evidence ring 3.5 attached by straps 3.4 to the outer part of flanges 3.3 of the spout 3 only during first assembly of the cap 4, twisting it onto the thread 3.1 and by turning an axial displacement exerting a radial elastic deflection of the segments 4.3, prior to latching their hook portions

over the counterhook of u-shaped ring 3.5. Figure 1 b displays the locked position.

[0045] The "in principle u-shaped" tamper evidence ring 3.5 will be torn off by breaking the thin straps 3.4 during initial twisting opening of the reclosable closure system, and will remain captured in the u-shaped portions 4.3 inside the screw cap 4. Tamper evidence is recognisable by abrupt change in torque resistance and by pronounced acoustic means only during first time opening of the closure.

[0046] The lateral panel 4.4 in an inner portion of the screw cap 4 is furnished with a gasket type seal plate 4.5 to achieve gas and liquid tightness of the closed cap. The panel 4.4 of the entire screw cap is substantially flat having a rim portion 4.6 near its outer circumference and an outer chime portion 4.7 as transition from the flat panel into a cylindrical wall 4.8.

[0047] The diameter of the rim portion and an inclination of the chime portion are chosen such that the closing cap 4 is nestable with the can lid geometry, preferably radially outside the seam 2.4. Therewith, it is possible to safely stack filled cans on top of each other.

[0048] An outer side of the cylindrical wall 4.8 of the cap is furnished with grip flutes 4.9 to ease the opening and closing operation for the consumer. A ribbed surface 4c faces radially outward, as one embodiment of a "gripping surface" for the cap 4.

[0049] The reclosable screw cap 4' of a further embodiment shown in **Figures 2a to 2c** is identical with the reclosable cap 4 above described, with the following exceptions.

[0050] The outer circumferential wall 4.1' of the screw cap 4' is of stepped design, having a diameter change along its axial extension. The stepped design has a diameter identical to the can diameter at one end and a smaller diameter at the other end, prior to the chime portion 4.7. The outer sidewall is furnished with a minimum of 3 and a maximum of 7, preferably 5 latchkeys 4.2' located near a portion of transition 4.3' from the small diameter to the larger diameter. These latchkeys are to mechanically lock and secure an optional containment-vessel 5, which is shown later, having at least parts of threads Y.

[0051] A further reclosing screw cap 4" is of circular design made from a high molecular thermoplast, as shown in **Figures 3a to 3c**. An outer circumferential wall 4.1" of the third screw cap 4" is of tubular design in its axial direction 100 and has the same diameter as the drinks can. It is connected via a chime portion 4.2" to a rim portion 4.3" of the screw cap.

[0052] The chime portion 4.3" is furnished with a minimum of 3 and a maximum of 7, preferably 5 latchkeys 4.4". These latchkeys are to mechanically lock and secure an optional cylindrical vessel 5, which is shown later. The screw cap 4" also has a centred inner tubular socket portion with a thread 4.5" at its outer side. Both, thread and diameter of the inner "reclosability portion" match their corresponding counter part of the telescopic

spout 3'. The axially facing inner surface of the panel of the screw cap 4" is furnished with an annular groove 4.6" of preferably tapered cross section, geometrically matching a preferably tapered end portion 3.10" of the telescopic part 3b of the spout 3'. Male and female taper interlock the telescopic spout part 3b with the screw cap 4" when the screw cap is in its clockwise extreme position closed. This friction lock enables to move the telescopic part of the spout 3' outside the container when the same is opened by counter clockwise rotation of the screw cap 4".

[0053] An inner surface of the panel of the screw cap 4" also has a groove 4.7", which is furnished with an inlet seal 4.8" geometrically matching an outward protrusion 3.6' at the outer flange of flanges 3.4' of the spout 3'. Seal and protrusion achieve gas and liquid tightness of the container when the reclosable closure is in closed position.

[0054] The panel of the reclosable screw cap 4" also holds an in principle u-shaped counter piece 4.9" of the tamper evidence feature 4.9", 3.8' of the reclosable closure, operating as shown before.

[0055] The u-shaped part 4.9" at the screw cap 4" is axially segmented into several, preferably between 4 and 15, or around 12 sections. This allows spring driven (elastic) engagement with the in principle u-shaped tamper evidence ring 3.8' attached by straps 3.7' to the outer flange of the fixed part 3c of the spout 3' only during first assembly of the screw cap. The tamper evidence ring will be torn off by breaking the straps during initial opening of the reclosable closure and will remain captured in the u-shaped portion inside the screw cap. Tamper evidence is recognisable by abrupt change in torque resistance and/or by pronounced acoustic means only during first time opening of the closure.

[0056] The reclosable cap 4"" of **Figures 4a to 4c** as further embodiment is substantially identical with the reclosable screw cap described under Embodiment 4" with the following exceptions.

[0057] Screw cap 4"" does have a diameter reduced panel 4.1"". Whereas the reduced panel 4.1"" bears the same design features like screw cap 4", bridging parts 4.4"" to the can body diameter provide a material reduced partly open construction. It comprises between three and seven, preferably five legs 4.2"", at least some of them with a container stacking feature 4.2"" and latchkeys 4.3"" to mechanically lock and secure an optional vessel 5, which is shown below, by corresponding counterlatches Y.

[0058] An add-on containment vessel 5 of Figures 3 and 4 is made from a high molecular thermoplastic material. It is preferably of cuplike design with an open top and a closed bottom 5b. The top geometry substantially fits the outside diameter of the container body in the bottom part of the wall 1 b. The bottom 5b of the vessel is of a geometry 5b' similar to the contour of the screw caps 4; 4'; 4" and 4"" to allow stacking of the cup supplied containers. The upper inside of the vessel holds a 3 to 7,

preferably 5-gear thread parts 5.2 with interruptions 5.1 providing latch zones Y in a distance from the upper edge of the vessel 5. The distance substantially corresponds to the axial extension of the outer skirt 4.1", 4.2" or 4.1' including the respective chime or the axial length of the legs 4.2".

[0059] The interruptions 5.2 are matching the latch-keys 4.4" or 4.2' or 4.3" at the circumference of the different screw caps. Interlocking of the vessel and the container is done by clockwise rotation of the vessel around its centre axis 100 and relative to the container. Disengagement of the vessel is achieved by counter clockwise rotation of the vessel around its centre axis and relative to the container.

[0060] The caps 4", 4" are of flatter design in axial direction. They are preferred to have said detachable vessel 5 associated, reducing the overall axial length of the assembled package.

Assembly facilities of the component parts.

[0061] Can 1 and lid 2 will fit with all spout and screw cap designs, as well as vessel designs.

[0062] The one part spout 3 will fit with caps 4 and 4', with or without the vessel 5.

[0063] Two part spout 3' will fit with caps 4" and 4".

[0064] Vessel 5 will fit with caps 4', 4" and 4".

Claims

1. Beverage can (1,2) mainly made from metal sheet, having a wall portion and axial ends thereof, and on both axial ends of the wall portion an *openable first portion* and a *non openable second portion*, respectively,

(i) said first portion having a domed shape (1.1), vaulted axially outward and provided at a bottom end of the beverage can;
(ii) said second portion having a substantially flat panel (2.1) and a seam (2.4) surrounding said panel and attaching said panel to the wall of the can.

2. Beverage can (1,2) mainly made from metal sheet, having a wall portion and axial ends thereof, and on both axial ends of the wall portion an *openable first portion* and a *non closable second portion*, respectively,

(i) said first portion having a domed shape (1.1), vaulted axially outward and provided at a bottom end of the beverage can;
(ii) said second portion having a substantially flat panel (2.1) and a seam (2.4) surrounding said panel and attaching said panel to the wall of the can.

3. Beverage can (1,2) mainly made from metal sheet, having a wall portion and axial ends thereof, and on both axial ends of the wall portion a *closable first portion* and a *non openable second portion*, respectively,

(i) said first portion having a domed shape (1.1), vaulted axially outward and provided at a bottom end of the beverage can;
(ii) said second portion having a substantially flat panel (2.1) and a seam (2.4) surrounding said panel and attaching said panel to the wall of the can.

4. Beverage can (1,2) mainly made from metal sheet, having a wall portion and axial ends thereof, and on both axial ends of the wall portion a *closable first portion* and a *non closable second portion*, respectively,

(i) said first portion having a domed shape (1.1), vaulted axially outward and provided at a bottom end of the beverage can;
(ii) said second portion having a substantially flat panel (2.1) and a seam (2.4) surrounding said panel and attaching said panel to the wall of the can.

5. The beverage can according to one, or any combination of two of the prior claims.

6. Beverage can wherein the outwardly domed base (1.1) having in a substantially centred sub portion thereof a spout (3,3'), giving way to an inside (1 i) of the can, and having at least one thread (3.1,3.9'), adapted to receive an oppositely arranged other thread (4.5",4.1), carried by a reclosing closure (4) designed as bottom cap.

7. Can of claim 5 or 6, the openable first end portion (1.1) having a substantially circular opening (1 e) of smaller diameter than a diameter of the wall (1 b) closable by a cap shaped device (4,4.1").

8. Can of claim 5, wherein in said first portion having an aperture (1e) and thereto permanently mounted a carrier (3,3') for releasably holding a re-closing closure (4,4',4",4"), such as a cap, having a socket (4.1;4a) adapted to said carrier for at least one of a closing and releasing action.

9. Can of claim 8, said action for closing and releasing is at least in part a twisting, screwing or turning movement.

10. Can of claim 8 or 9, said action comprising a pulling or pushing axial movement component.

11. Can of claim 9, said action comprising axial and twisting movement components, to define a screw line.
12. Can of claim 5, a re-closing closure (4) being re-leasably secured (4.1, 3.2) to the bottom portion (1.1) as "first axial portion". 5
13. Can of previous claim 12, said closure having a peripheral contour (4.6, 4.3"), for supporting the closed can for a steady stand on a flat level surface. 10
14. Can of previous claim 13, said peripheral contour (4.6) having an axially protruding rim, shaped at least partly (4.2") in a circumferential direction, and said closure having a substantially flat bottom panel (4.4, 4.1"), surrounded by said at least partly circumferential rim, wherein no portion of said bottom panel exceeding the rim's axial protrusion. 15
15. Can of claims 1 to 5, a top end is opposite to the bottom axial end and near to a seam (2.4) between a lid panel (2.1) and a wall; bottom is where the base is, having no seam near to it. 20
16. Can of claim 5, the closing or opening concerns a smaller portion (4.1", 1 e,3) than the whole openable or closable or non-openable or non-closable first and second portion. 25
17. Can of claim 8, the carrier (3,3') and the socket (4.1; 4a) having tubular shape and each of them carrying a thread for corresponding twistable (screw able) interaction, when one of opening and closing the can base by said re-closing closure (4,4',4",4"). 30
18. Can of previous claim 17, said flange having a diameter substantially smaller than said re-closing closure (4), and said closure having a tubular outer skirt (4.8,4.1'), having a first axial length, larger than a second axial length of said tubular socket (4.1; 4a). 35
19. Can of claim 8 or 12, said re-closing closure (4) having substantially cylindrical shape, and an outer skirt (4.1) adapted for holding and gripping (4.9;4c) to exert rotational forces by hand of human. 40
20. Can of claim 8 or 12, the re-closing closure carrying a gasket (4.5), apt for blocking gas and liquid in a closed position of the re-closing closure against the carrier (3,3'). 45
21. Can of one of claims 8 or 12, said re-closing closure (4) having a radially oriented vent passage (3.4). 50
22. Can of previous claim 21, said vent passage cooperating with several second axial vent passages (3.2) in said carrier (3) to open a passageway through a still not fully disengaged thread pair (3.1, 4.1), releasing an overpressure upon releasing a closed position of said carrier and closure (3.4).
23. Can of claim 8, 12 or 21, the re-closing closure comprises at least a first part of a tamper evidence device (3.5, 3.4, 4.2;3.8",4.9"), near to the bottom of said can, having cooperating segments, adapted to break upon an initial opening action, such as an initial twisting action or an initial pulling action or an initial spiral movement.
24. Can of claim 8, said carrier (3,3') being substantially rigid and having at least one radially oriented ring portion (3.3), permanently mounted to the outwardly domed base, next to the aperture (1e) of said base (1.1).
25. Can of claim 8, said carrier (3.11', 3.2', 3', 3, 4') extending at least partly into said can, and having a first (3.11 ;3b) and a second (3.4';3a) part, for an axial relative movement between said two parts, telescoping the first part against at least the second part (3.4') upon an at least axial movement of said re-closing closure (4",4"). 25
26. Can of claim 8 or 12, comprising a vessel (5) having a closed bottom (5b) and an axially extending wall, is attached to said re-closing closure (4", 4.4", 4', 4.2'), adapted for a detachment (Y) from said closure, releasing an radially protruding locking means (4.4", 4.2', 4.3") between vessel wall and re-closing closure, to take the vessel off the re-closing closure. 30
27. **Can body** (1) for receiving a beverage filled into an inside (1i) of said body at a filler's location, said body made from sheet material, having a wall portion (1b, 1c) and axial ends thereof, and one axial end of the wall portion having an *openable or closable first portion* (1.1;3,4;3',4'), said first portion having a domed shape, vaulted in an axial direction (100) and provided as bottom end of the can body; 35
- (i) said second portion having provided a body hook (2.5) for receiving and supporting a lid (2) having a substantially flat panel (2.1) and a seam building radial outer rim (2.3), surrounding said panel and adapted for attaching said lid (2) to the body hook of the can body;
- (ii) said *openable or closable first portion* (1.1; 3,4;3',4') having a cap shaped closing device (4,4',4",4") of a first diameter, substantially corresponding to a second diameter of said wall portion, and having an axial extension smaller than an axial height of the can body.
28. **Can body** (1) for receiving a beverage filled into an

inside (1 i) of said body at a filler's location, said body made from sheet material, having a wall portion (1 b, 1 c) and axial ends thereof, and one axial end of the wall portion having provided thereto an *openable or closable first portion* (1.1), said first portion having a domed shape, vaulted axially and provided as bottom end of the can body;

(i) said second portion having provided a body hook (2.5) for receiving and supporting a lid (2) having a substantially flat panel (2.1) and a seam building radial outer rim (2.3), surrounding said panel and adapted for seaming said lid (2) to the body hook of the can body to form a closed can;

(ii) said *openable or closable first portion* (1.1) having a cup shaped vessel (5), detachably associated to said first portion (1.1), preferably through a closing member (4,4',4'',4''') associated to the openable or closable first portion in a portion (1e) thereof, smaller than a lateral extension of the cup (5).

29. Can body (1) for receiving a beverage filled into an inside (1 i) of said body at a filler's location, said body made from sheet material, and having a wall portion (1b,1c) and two axial ends thereof, one axial end of the wall portion having provided thereto an *openable or closable first portion* (1.1), said first portion having a domed shape and provided as bottom end of the can body;

(i) said second portion having provided a body hook (2.5) for receiving and supporting a lid (2) having a substantially flat panel (2.1) and a seam building radial outer rim (2.3), surrounding said panel and adapted for seaming said lid (2) to the body hook of the can body at the filler's location;

(ii) said *openable or closable first portion* (1.1) having an extendable spout (3';3b,3c) of a diameter less than a diameter of said wall portion (1 b).

30. Can body (1) for receiving a beverage filled into an inside (1 i) of said body at a filler's location, said body made from sheet material, having a wall portion (1b,1c) and axial ends thereof, and one axial end of the wall portion having provided thereto an *openable or closable first portion* (1.1), said first portion . having a domed shape, vaulted axially outward and provided as bottom end of the can body;

(i) said second portion having provided a body hook (2.5) for receiving and supporting a lid (2) having a substantially flat panel (2.1) and a seam building radial outer rim (2.3), surrounding said panel and adapted for attaching said

lid (2) to the body hook of the can;

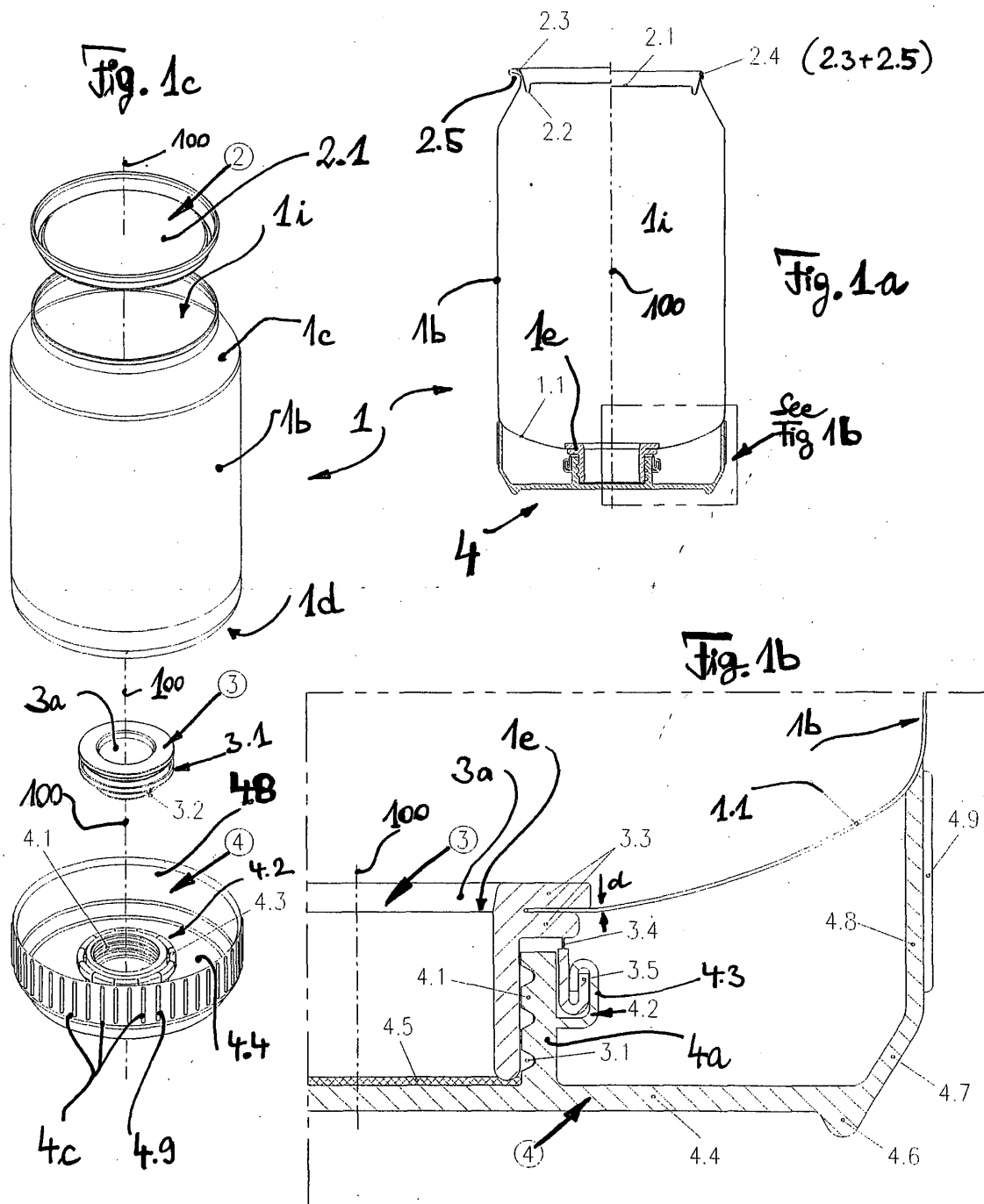
(ii) said *openable or closable first portion* (1.1) having a spout (3,3') of a diameter less than a diameter of said wall portion (1 b).

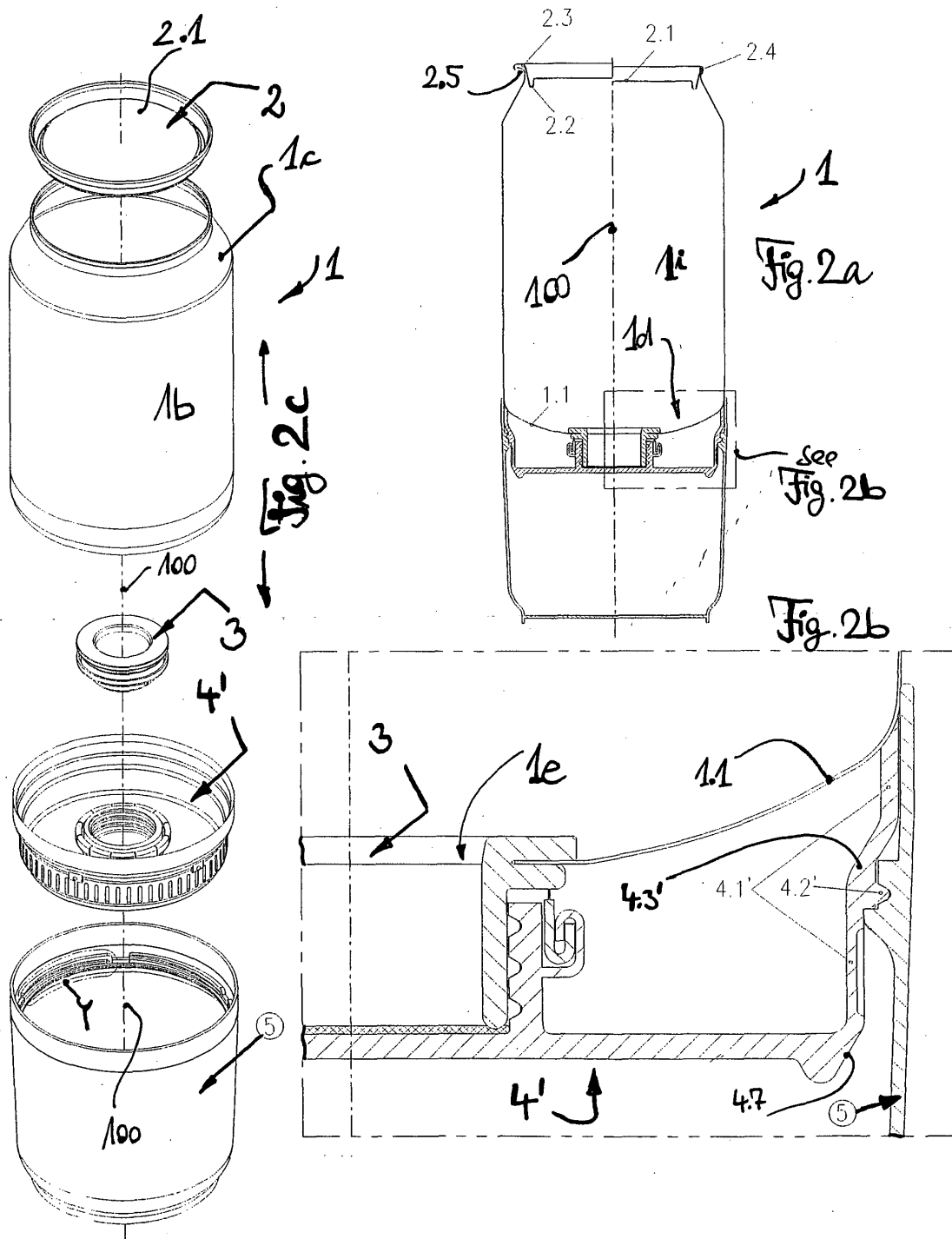
31. Can body of one of claims 27 to 30, said first portion being designed to be openable **and** closable (3,3a; 3';4,4',4'',4''').

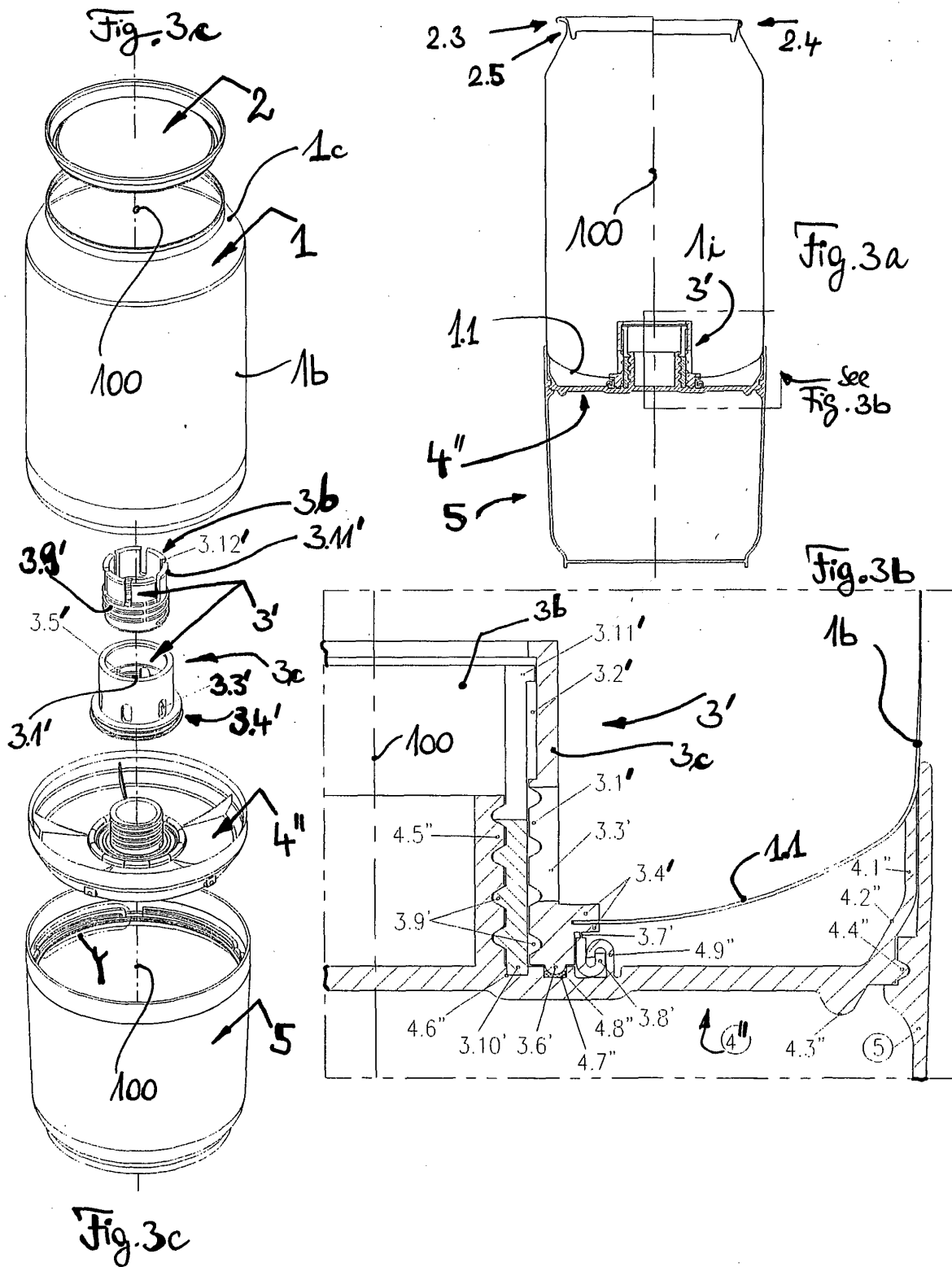
32. Can body of one of claims 27 to 30, produced from a metal sheet, and emerging from a DWI process.

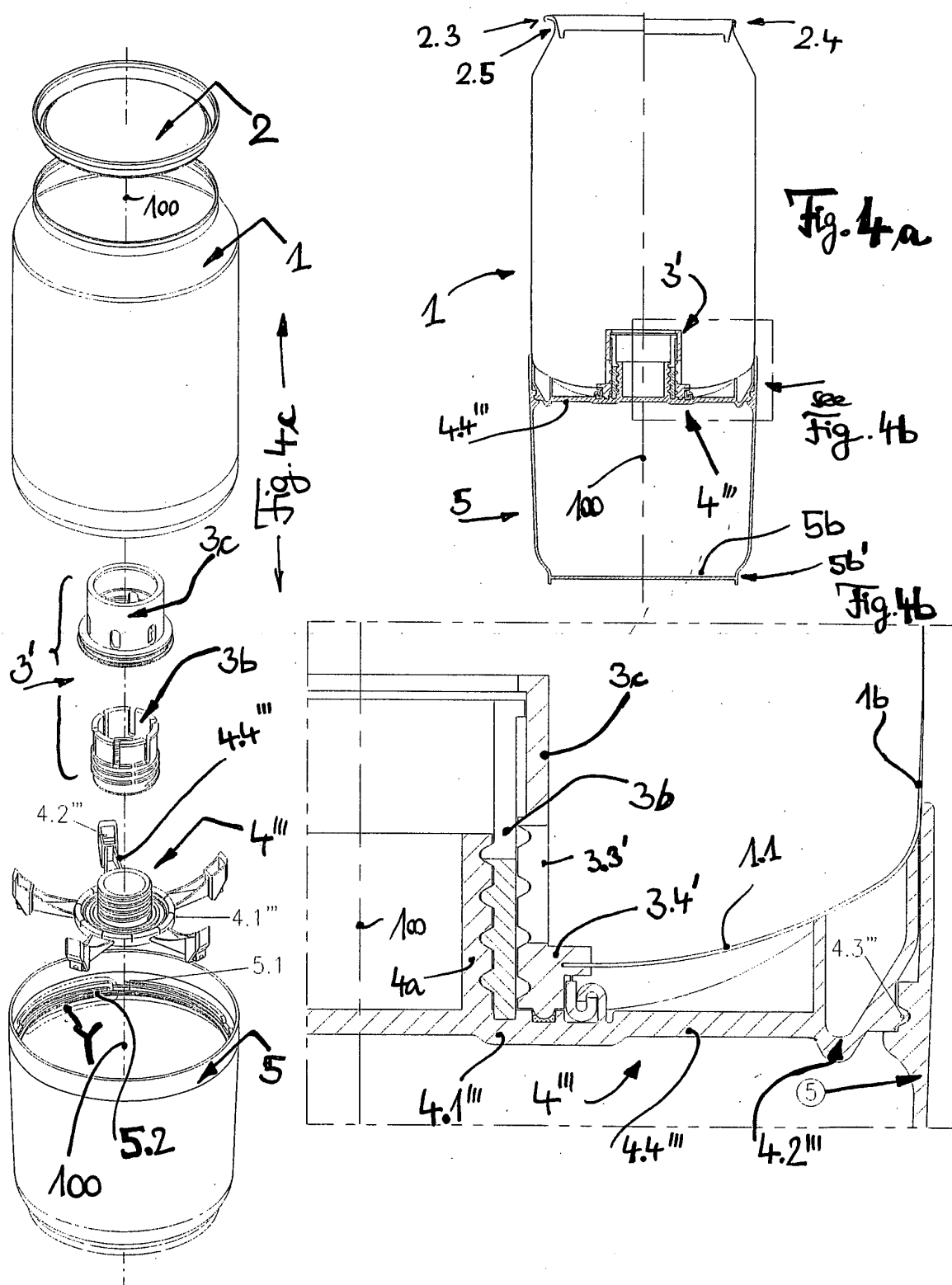
33. Can body of one of claims 27 to 30, said wall portion having a thickness below 0,24 mm.

34. Can body of anyone of the previous claims 27 to 30, having at least one feature of one of claims 6 to 26, without their respective reference to one of claims 1 to 5.











European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 02 3837

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 198 02 953 A (RASSELSTEIN HOESCH GMBH) 29 July 1999 (1999-07-29)	1-12, 15-17, 19,30-33	B65D6/40
Y	* column 3, line 49 - column 4, line 53; figure 1 *	13,14, 25,26, 28,29	
X	----- US 2 867 361 A (TOFT ANDREW M) 6 January 1959 (1959-01-06) * figures 1-4 *	1-12,16, 17,19, 30-33	
Y	----- DE 295 18 382 U (WIRTH DETLEF) 11 January 1996 (1996-01-11) * figures 1,2 *	13,14	
Y	----- US 3 079 022 A (TOMPKINS JAMES G) 26 February 1963 (1963-02-26) * figure 1 *	13,14, 26,28	
Y	----- US 4 273 247 A (EARLS WILLIAM L) 16 June 1981 (1981-06-16) * figure 2 *	26,28	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Y	----- US 2 220 466 A (WILLIAM TAMMINGA) 5 November 1940 (1940-11-05) * figures 1,2 *	25,29	B65D
Y	----- US 4 076 151 A (LITTLEFIELD HERRICK B) 28 February 1978 (1978-02-28) * figures 2,3 *	25,29	
A	----- US 4 176 760 A (ROTH DONALD J) 4 December 1979 (1979-12-04) * figures 1,2 *	1-12, 15-17, 19,30-33	
		-/--	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 21 June 2004	Examiner Fitterer, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 02 3837

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A, D	WO 03/066455 A (BALL PACKAGING EUROP GMBH ;ULLMANN BERND (DE); BAST BERTOLD (DE);) 14 August 2003 (2003-08-14) * figure 1 * -----	1-12, 15-17, 19,30-33	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
<p>6 The present search report has been drawn up for all claims</p>			
Place of search		Date of completion of the search	Examiner
Munich		21 June 2004	Fitterer, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P04C01)



European Patent
Office

Application Number
EP 03 02 3837

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
1-17, 19, 25, 26, 28-33
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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Office

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 03 02 3837

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-12,15-17,19,30-33

A beverage can comprising a dome shaped base having a threaded spout which is adapted to receive a threaded reclosing closure.

2. claims: 13-14

A beverage can comprising a closure having a peripheral contour for supporting the can for a steady stand.

3. claim: 20

A beverage can comprising a closure carrying a gasket.

4. claims: 21,22

A beverage can comprising a closure having a vent passage.

5. claim: 23

A beverage can comprising a closure having a tamper evidence device.

6. claim: 24

A beverage can comprising a carrier having a radially oriented ring portion.

7. claims: 25,29

A beverage can comprising a telescoping spout.

8. claims: 26,28

A beverage can comprising a vessel being attached to a closure.

9. claim: 27

A can body comprising a closing device of a diameter corresponding to the diameter of a wall portion of the can body.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 02 3837

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-06-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19802953	A	29-07-1999	DE 19802953 A1	29-07-1999
US 2867361	A	06-01-1959	NONE	
DE 29518382	U	11-01-1996	DE 29518382 U1	11-01-1996
US 3079022	A	26-02-1963	NONE	
US 4273247	A	16-06-1981	NONE	
US 2220466	A	05-11-1940	NONE	
US 4076151	A	28-02-1978	NONE	
US 4176760	A	04-12-1979	NONE	
WO 03066455	A	14-08-2003	WO 03066455 A2	14-08-2003