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(54) **The combination of a metal can with a lid**

(57) The invention relates to a combination of a metal can (2) and a lid (3),

which can comprises: a bottom (4) and a standing wall (6) which is connected thereto and of which the end zone remote from the bottom comprises an outward extending beaded edge (7) with a first part (8) extending in cross section through more than 360° and a second part (9) connecting thereto and having a smaller radius of curvature, which first part has an inward pressed zone (10); and which lid comprises a central part (14) and a peripheral part (13) connected thereto, which peripheral part has a form such that it can sealingly co-act with the inner surface of the can wall in the region of the beaded edge and extends through a certain chosen angle over the part located axially furthest outward of this beaded edge.

The combination according to the invention has the feature that the inward pressed zone is situated predominantly in a range of 90°-210°; and that the wall has a snap part (11) at a slight distance from the beaded edge for snapping co-action with a correspondingly shaped snap part (12) present on the peripheral part of the lid.

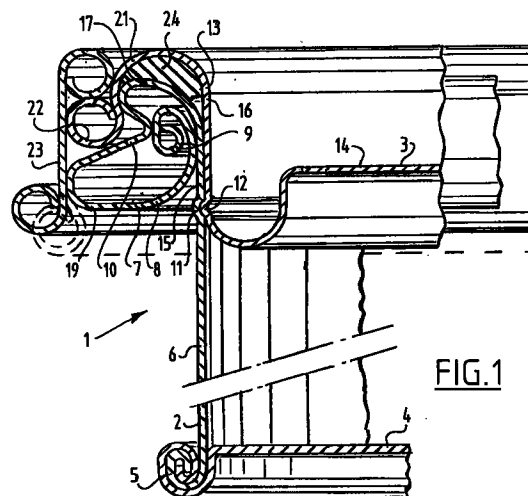


FIG.1

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Description

The invention relates to a combination of a metal can and a lid,

which can comprises: a bottom and a standing wall which is connected thereto and of which the end zone remote from the bottom comprises an outward extending beaded edge with a first part extending in cross section through more than 360° and a second part connecting thereto and having a smaller radius of curvature, which first part has an inward pressed zone; and

which lid comprises a central part and a peripheral part connected thereto, which peripheral part has a form such that it can sealingly co-act with the inner surface of the can wall in the region of the beaded edge and extends through a certain chosen angle over the part located axially furthest outward of this beaded edge.

Such a combination is known from applicants earlier patent application EP-A-0 516 204.

It is an object of the invention to modify the known combination such that the seal between can and lid is improved, while with very simple means the lid can nevertheless be arranged on the can and can be removed therefrom by a user.

With a view hereto, the combination according to the invention has the feature that the inward pressed zone is situated predominantly in a range of 90°-210°; and that the wall has a snap part at a slight distance from the beaded edge for snapping co-action with a correspondingly shaped snap part present on the peripheral part of the lid.

The combination is preferably embodied such that the snap parts extend substantially along the whole periphery.

A specific embodiment has the special feature that the inward pressed zone is bounded by two relatively protruding boundary zones, of which the first is situated in a range of about 90°-140° and the second is situated in a range of about 200°-250°.

This embodiment has in other words two radially outward protruding zones located at axial mutual distance and between which is situated a zone located radially inward. This embodiment provides the possibility that the peripheral part of the lid can engage snappingly round the first boundary zone.

Another embodiment has the characteristic that the inward pressed zone is bounded by two relatively protruding boundary zones of which the first is situated in a range of about 35°-85° and the second is situated in a range of about 190°-240°.

It is noted that with adapted dimensioning this variant also offers the possibility that the peripheral part of the lid can engage snappingly round the first boundary zone.

A variant has the feature that the wall has a cylindrical form in the region of the beaded edge and that the peripheral part of the lid has a cylindrical part fitting

closely therein. This variant has the advantage that the axial extension of the clampingly co-acting surfaces of respectively the can wall and the peripheral part result in a very high reliability of closure.

A particular embodiment has the special feature that the free end edge of the peripheral part of the lid has a beaded edge which is situated in the region of the inward pressed zone, wherein the circular peripheral lines located radially furthest outward of said beaded edge of the free end edge of the lid and the second protruding boundary zone lie substantially in one cylindrical plane co-axially of the can.

This variant provides the option of a sealing strip extending over the whole periphery round the beaded edge of the free end edge of the lid and the second protruding boundary zone. Such a sealing strip is embodied such that it ensures the coupling between the can and the lid. The lid can only be removed from the can after breaking of this sealing strip.

A preferred embodiment has the feature that between the axial end zone of the beaded edge of the can wall and the peripheral part of the lid is situated a space in which a ring of sealing material is received.

The invention will now be elucidated with reference to the annexed drawings. Herein:

figure 1 shows a partial cross section of a combination according to the invention in a first embodiment;

figure 2 shows the beaded edge of the wall of the can of figure 1 with a schematically represented Cartesian coordinate system;

figure 3 shows a view corresponding with figure 1 of the upper part of a wall; and

figure 4 shows a view corresponding with figure 2 of the beaded edge of the can wall according to figure 3.

Figure 1 shows a combination 1 of a metal can 2 and a lid 3.

The can 2 comprises a bottom 4 and, connected thereto by means of a folded seam 5, a cylindrical standing wall 6 of which the end zone remote from the bottom comprises an outward extending beaded edge 7 with a first part 8 extending in cross section through more than 360° (see also figure 2) and a second part 9 connected thereto having a smaller radius of curvature. The first part 8 has a zone 10 which is pressed inward. This is situated predominantly in a range of 90°-210°, in which respect reference is again made to figure 2.

The wall 6 has a snap channel 11 at slight distance from the beaded edge 7 for snapping co-action with a correspondingly shaped snap rib 12 in the peripheral part 13 of the lid 3 to be described hereinafter. This lid 3 has a general plate-shaped central part 14 and the already mentioned peripheral part 13 which is connected thereto and which has a form such that it can co-act sealingly with the inner surface of can wall 6 over some axial distance and extends over this beaded edge

through an angle of more than 180°. As shown in figure 1, the can wall 6 has a cylindrical part 15 in the region between snap channel 11 and the beginning of beaded edge 7. This co-acts clampingly and sealingly with a cylindrical part 16 forming part of the peripheral part 13.

As shown in figure 2, the inward pressed zone 10 is bounded by two relatively protruding boundary zones, defined from the centre of the coordinate system according to figure 2. The first boundary zone 17 lies at an angle of about 100°, as indicated with the dash-dot line 18, while in this embodiment the second protruding zone 19 lies at an angle of about 225°, as designated with dash-dot line 20.

Figure 1 shows that the peripheral part 13 has a part 21 which extends through more than 180° and lies axially furthest to the outside, which part 21 can engage snappingly round the foremost protruding zone 17. This part 21 ends in a beaded edge 22 which has the same radial extension as the second protruding zone 19, so that a substantially cylindrical sealing strip 23 can be arranged close-fittingly round both of them.

Arranged in the space between the first protruding zone 17 and the part 21 is a ring 24 consisting of a sealing mass.

In order to open the combination 1 the sealing strip 23 must first be removed, whereafter the lid 3 can be lifted for removal by for instance exerting locally a wedging force on beaded edge 22 while pushing against the part of the beaded edge 7 located thereunder. It must be understood that this removal requires some force in respect of the snapping co-action between snap channel 11 and snap rib 12 and the friction and clamping force between cylindrical parts 15 and 16.

Figure 3 shows an alternative combination 25. After the detailed description with reference to figures 1 and 2, the description of figures 3 and 4 will be kept shorter. Elements of figures 1 and 2 which functionally at least substantially correspond with elements according to figures 3 and 4 are designated in these latter figures with the same reference numerals increased by 100.

In particular a comparison between figures 3 and 4 clearly shows the difference between combination 1 and combination 25. In combination 25, as clearly shown in figure 4, the inward pressed zone 110 is bounded by two boundary zones which protrude relative to the centre of the shown coordinate system, wherein the first boundary zone 117 is situated in an angular range of about 60°, while the second boundary zone is situated in an angular range of about 220°.

At variance with the combination 1, wherein the part 21 co-acts snappingly with the first protruding zone 17, the part 121 of figure 3 and the first protruding zone 117 co-act clampingly via a more or less axially extending cylindrical part, which for the sake of clarity is designated with 26 in figure 4.

Both drawn combinations have in common that the beaded edge on the end of the can wall co-acts sealingly on the inside as well as the outside with the peripheral part 13 of the lid.

In addition, both drawn lids can be arranged on the associated can by a simple axial press-on operation.

Claims

1. The combination of a metal can and a lid, which can comprises: a bottom and a standing wall which is connected thereto and of which the end zone remote from the bottom comprises an outward extending beaded edge with a first part extending in cross section through more than 360° and a second part connecting thereto and having a smaller radius of curvature, which first part has an inward pressed zone; and which lid comprises a central part and a peripheral part connected thereto, which peripheral part has a form such that it can sealingly co-act with the inner surface of the can wall in the region of the beaded edge and extends through a certain chosen angle over the part located axially furthest outward of this beaded edge, **characterized in that** the inward pressed zone is situated predominantly in a range of 90°-210°; and that the wall has a snap part at a slight distance from the beaded edge for snapping co-action with a correspondingly shaped snap part present on the peripheral part of the lid.
2. Combination as claimed in claim 1, **characterized in that** the snap parts extend substantially along the whole periphery.
3. Combination as claimed in claim 1, **characterized in that** the inward pressed zone is bounded by two relatively protruding boundary zones, of which the first is situated in a range of about 90°-140° and the second is situated in a range of about 200°-250°.
4. Combination as claimed in claim 3, **characterized in that** the peripheral part of the lid can engage snappingly round the first boundary zone.
5. Combination as claimed in claim 1, **characterized in that** the inward pressed zone is bounded by two relatively protruding boundary zones of which the first is situated in a range of about 35°-85° and the second is situated in a range of about 190°-240°.
6. Combination as claimed in claim 1, **characterized in that** the wall has a cylindrical form in the region of the beaded edge and that the peripheral part of the lid has a cylindrical part fitting closely therein.

7. Combination as claimed in claim 1,
characterized in that

the free end edge of the peripheral part of the lid has a beaded edge which is situated in the region of the inward pressed zone, wherein the circular peripheral lines located radially furthest outward of said beaded edge of the free end edge of the lid and the second protruding boundary zone lie substantially in one cylindrical plane co-axially of the can.

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8. Combination as claimed in claim 7,
characterized by

a sealing strip extending over the whole periphery round the beaded edge of the free end edge of the lid and the second protruding boundary zone.

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9. Combination as claimed in claim 1,
characterized in that

between the axial end zone of the beaded edge of the can wall and the peripheral part of the lid is situated a space in which a ring of sealing material is received.

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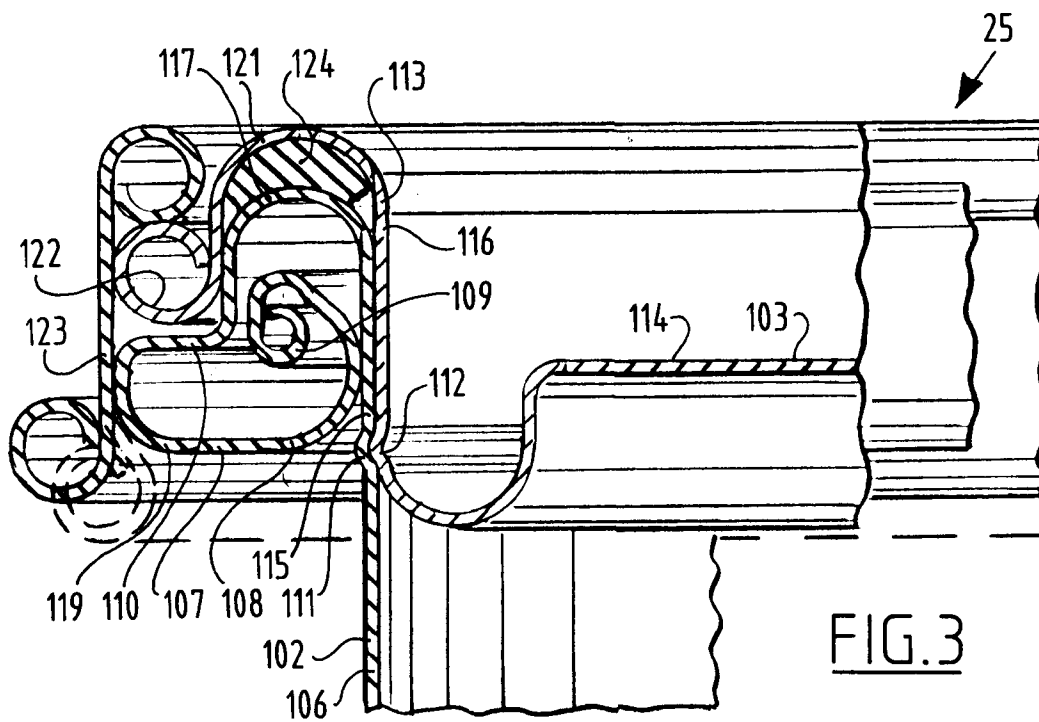
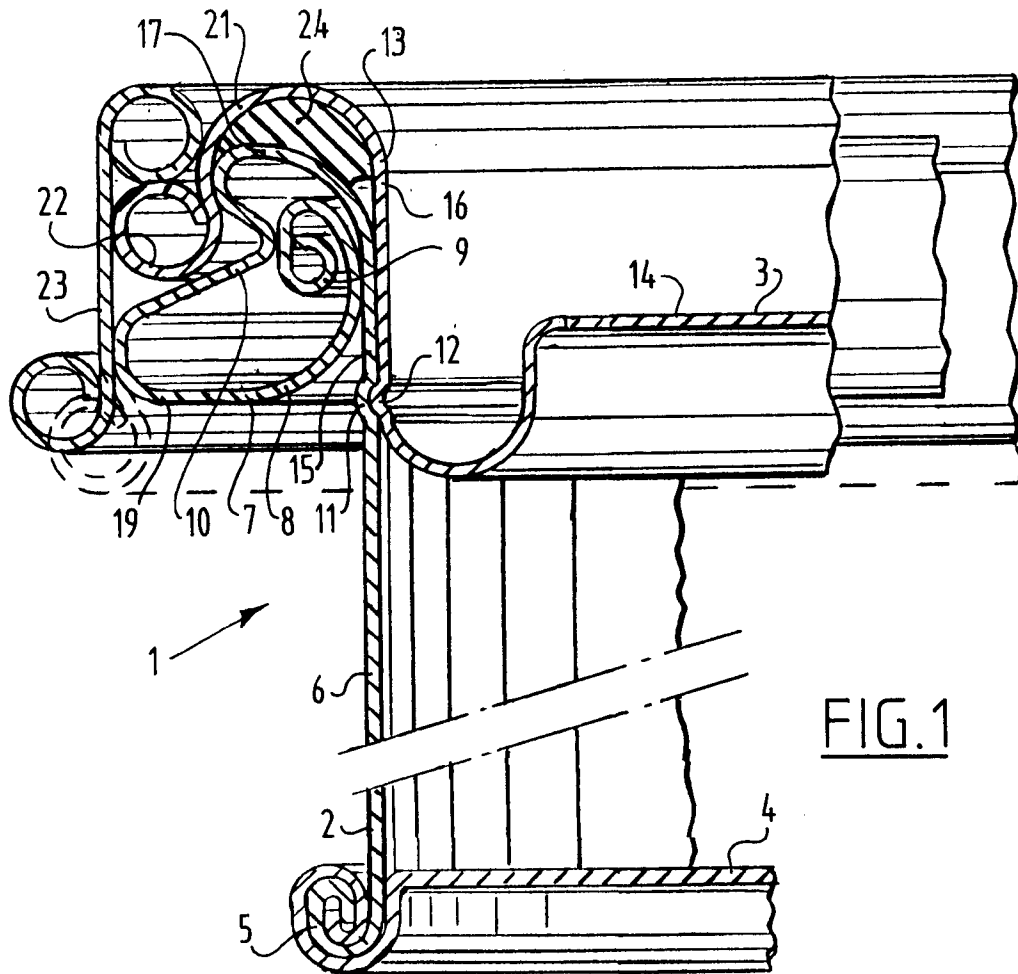


FIG.2

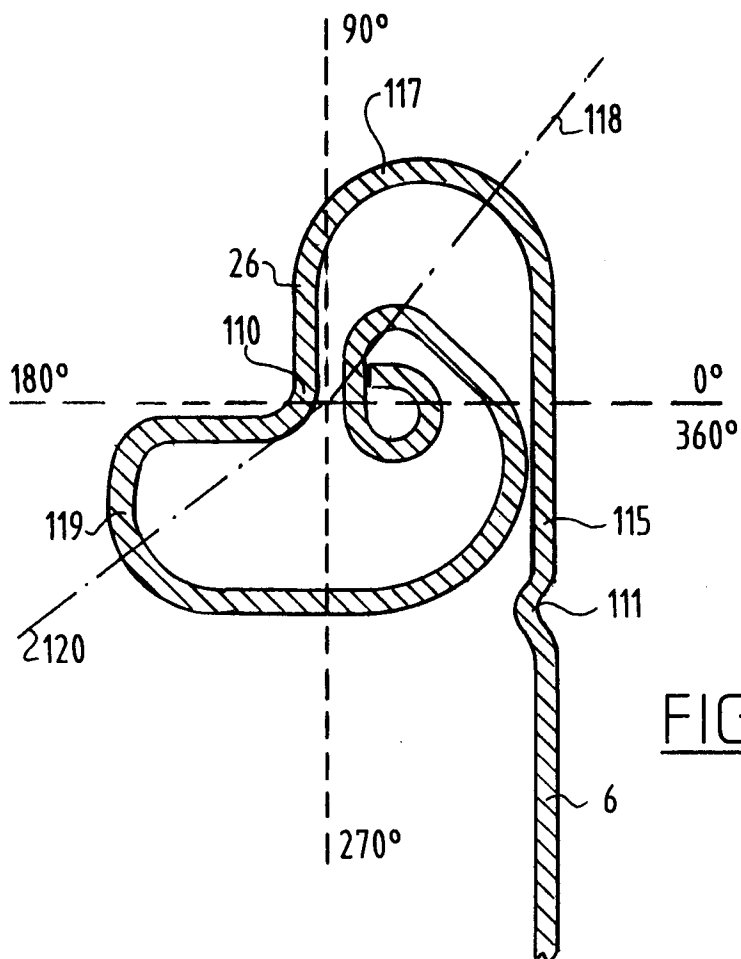
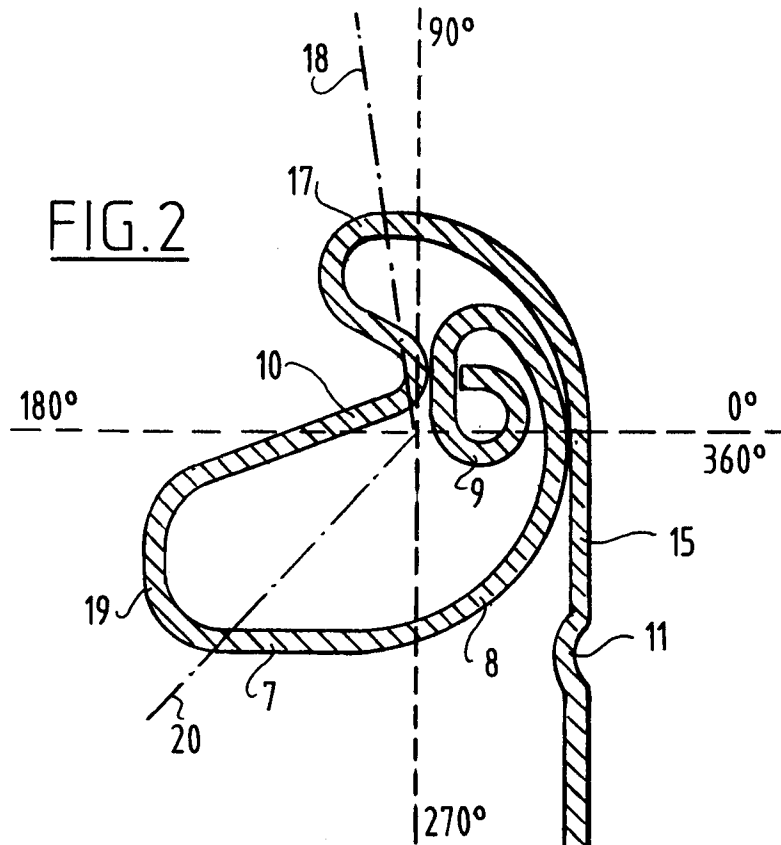


FIG.4



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EUROPEAN SEARCH REPORT

Application Number
EP 96 20 0944

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.6)
X	FR-A-2 535 687 (CARNAUD EMBALLAGE)	1,2,5-7, 9	B65D43/04
Y	* claims 1-5; figures 2-4 *	3,8	B65D43/06
	---		B65D45/30
Y	DE-C-906 075 (MAUSER) * page 2, line 8 - line 16 * * figure 3 *	3,8	

X	FR-A-2 669 896 (FEREMBAL)	1,2,5-7, 9	
	* page 6, line 2 - line 31 *		
Y	* figures *	8	

Y	FR-A-2 658 483 (LABRY) * abstract; figure 2 *	8	

A,D	EP-A-0 516 204 (THOMASSEN & DRIJVER-VERBLIFA) * column 3, line 7 - line 38 * * abstract; figures 3-6 *	1	

A	GB-A-2 119 343 (SCHMALBACH-LUBECA)		

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 July 1996	Examiner Leitner, 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	

EPO FORM 1503 01.82 (P4/C01)