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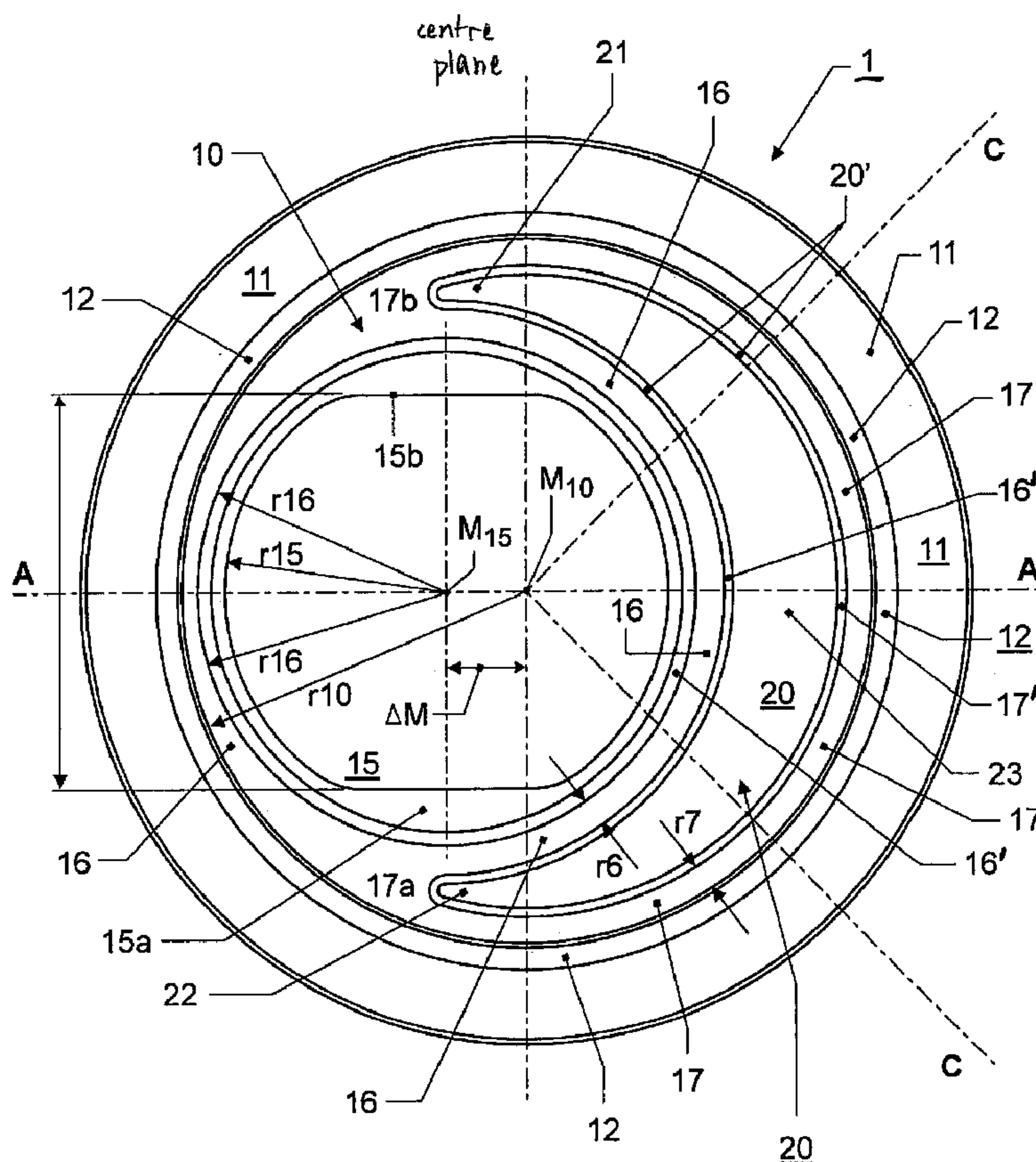
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(54) Titre : COUVERCLE DE TOLE COMPORTANT UN ORIFICE DE GRANDE DIMENSION POUR BOITE DE BOISSON

(54) Title: SHEET METAL COVER FOR A BEVERAGE CAN, PROVIDED WITH A LARGE PERFORATION



(57) Abrégé/Abstract:

A sheet metal cover for sealing the body of a beverage enabling a high internally pressurized beverage can to be formed, wherein said cover is embodied in such a way that it is possible to mount an initially separate re-sealable device. The sheet metal cover can



(57) **Abrégé(suite)/Abstract(continued):**

also be configured in such a way as to maintain pressure stability. It maintains stackability and it resembles as close as possible a standard shell, at least in the external edge design thereof, such that modifications in the filling line can be kept to a minimum. The sheet metal cover is also provided with a cover panel (10) and a folding edge (11) which surrounds said panel and which is adapted such that it can be folded onto a peripheral edge of the body of the container and is suitable therefor. The panel has a large dimensioned opening (15) which is surrounded by an encircling strip (15) which is axially offset in relation to a plane (E) of the surface of the opening. A reinforcement plate (20; 21, 22, 23) extending in an extensive and radial manner is provided along at least one peripheral section of the encircling strip (16).

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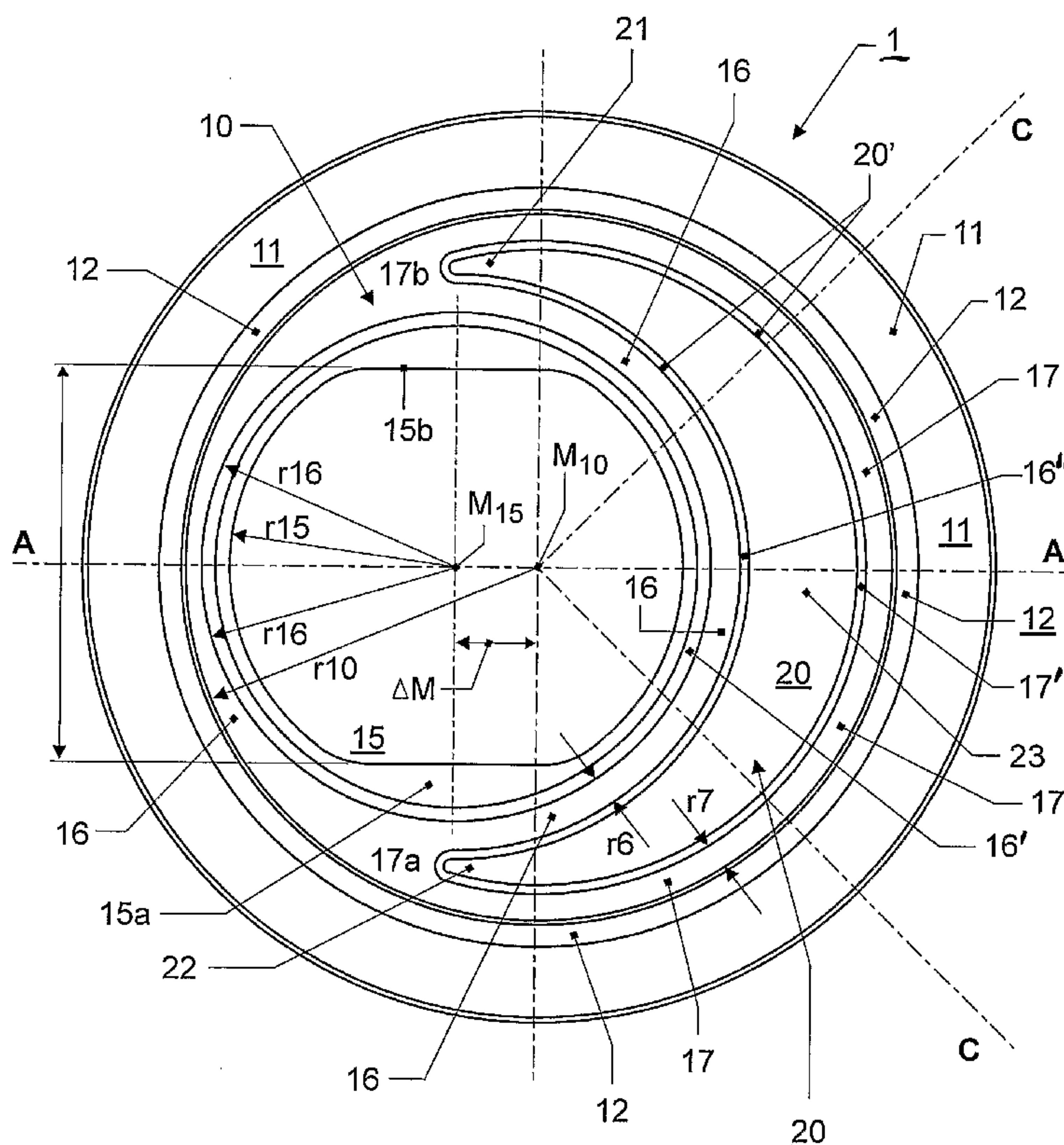
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[Fortsetzung auf der nächsten Seite]

(54) Title: SHEET METAL COVER FOR A BEVERAGE CAN, PROVIDED WITH A LARGE PERFORATION

(54) Bezeichnung: BLECHDECKEL MIT EINER GROSSEN LOCHUNG FÜR EINE GETRÄNKEDOSE

(57) Abstract: A sheet metal cover for
sealing the body of a beverage enabling
a high internally pressurized beverage
can to be formed, wherein said cover
is embodied in such a way that it is
possible to mount an initially separate
re-sealable device. The sheet metal cover
can also be configured in such a way as to
maintain pressure stability. It maintains
stackability and it resembles as close as
possible a standard shell, at least in the
external edge design thereof, such that
modifications in the filling line can be
kept to a minimum. The sheet metal cover
is also provided with a cover panel (10)
and a folding edge (11) which surrounds
said panel and which is adapted such
that it can be folded onto a peripheral
edge of the body of the container and
is suitable therefor. The panel has a
large dimensioned opening (15) which
is surrounded by an encircling strip (15)
which is axially offset in relation to a
plane (E) of the surface of the opening.
A reinforcement plate (20; 21, 22, 23)
extending in an extensive and radial
manner is provided along at least one
peripheral section of the encircling strip
(16).

[Fortsetzung auf der nächsten Seite]

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WO 2006/035033 A1**Erklärung gemäß Regel 4.17:**

— *Erfindererklärung (Regel 4.17 Ziffer iv)*

Veröffentlicht:

- *mit internationalem Recherchenbericht*
- *vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eintreffen*

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(57) Zusammenfassung: Ein Blechdeckel für das Verschließen eines Getränkedosenrumpfs zur Bildung einer - unter einem erhöhtem Innendruck stehenden - Getränkedose ist zur Ermöglichung einer Montage einer zunächst gesonderten Wiederverschluss-Einrichtung vorzubereiten und deren Montage am Blechdeckel ist zu ermöglichen. Der Blechdeckel ist außerdem so auszugestalten, dass er seine Druckstabilität beibehält, dass er die Stapelfähigkeit nicht verliert und möglichst nahe an einem Standardshell zumindest in seinem randäußeren Design liegt, um Änderungen der Abfülllinie so gering als möglich zu halten. Dazu hat der Blechdeckel ein Deckelpanel (10) und einen den Panel umgebenden Falzrand (11), der zum Anfalzen an einen umlaufenden Rand des Behälterrumpfs angepasst und geeignet ist. Das Panel weist eine groß dimensionierte Öffnung (15) auf, die von einem Umfassungstreifen (16) umgeben ist, welcher gegenüber einer Ebene (E) der Öffnungsfläche axial versetzt ist. Entlang zumindest eines Umfangsabschnitts des Umfassungstreifens (16) ist ein - sich umfänglich und radial erstreckendes - Versteifungsplateau (20; 21, 22, 23) vorgesehen.

SHEET METAL COVER FOR A BEVERAGE CAN, PROVIDED WITH A LARGE PERFORATION

5 The invention relates to a lid made from sheet metal for closing container bodies, the content of which is under increased internal pressure, as is known from cans for drinks containing carbonic acid.

10 In order to be able to easily open such containers, it is conventional to provide a defined region in the lid panel (panel) of the sheet metal lid, which may be broken and hence exposed to the removal opening by external pressure. Various designs of the break-open region and various ways of applying the opening pressure are thus known, inter alia from **US-A-3,361,261** (Fraze) having a trapezium-shaped rip-open region within a substantially oval area limited by folded lines (there 16, 18) at the edges. This rolled-in
15 folded line stabilizes the panel. The oval area within the folded lines is significantly smaller than 30% of the overall panel.

Also in other lids, a limited region is originally closed by sheet metal and is then separated off by the action of a lever flap (tab) at a weakened line and pressed into the
20 closed container. If one would like to design the can, and thus expressly the lid, to be reclosable, both solutions mentioned are not applicable.

Many other solutions in the state of the art are concerned with the recloseability of drinks cans, in particular under external (political) pressure and under internal excess
25 pressure of the closed container. The pressure stress from both sides requires from the solution of a sheet metal lid a number of properties which cannot be easily harmonised and cannot be made available on a small surface. Many solutions of the state of the art which suggest recloseability, achieve this only by losing the stackability of a can. However, the stackability is an original property of a closed can which cannot be lost. A
30 can must remain stackable over many layers without additional elements having to be added. The can may experience as few as possible modifying interventions during closing, in particular in the region of the sheet metal lid, in order to make it easier for the filler to get involved with a kind or a new type of can lid. Basically, the principle of recloseability must thus be different **without** a tab (mostly SOT) being arranged on the
35 lid panel. Thus additional free space is available which was hitherto occupied by the tab. This additional space is situated directly in the lid plane (slightly thereabove).

It is the **object of the invention** to prepare a sheet metal lid for closing a drinks can to facilitate assembly of an initially separate reclosing device and to facilitate its assembly on the sheet metal lid. The sheet metal lid should also be designed so that it retains its pressure stability, that it does not lose the stackability and lies as close as possible to a standard shell in its at least external edge design in order to keep changes on a filling line as low as possible. The recloseability of the container should however be facilitated by the lid, since the ironed (by DWI) one-part can body cannot contribute anything to this solution (recloseability) due to its original properties.

This object is achieved by claim 1, claim 2 or claim 32 or 33. This lid is manufactured by a method (claim 31).

The invention adds to a solution in which an additional part (a reclosing device) is inserted in a "large opening" in the lid panel. This additional part is not to be an object of this description and be claimed, but only the sheet metal lid which as such brings with it the suitability, property and precondition of being combined with such a reclosing device in order to then be mounted and rebated on a filled body as a closure lid by the filler.

The large-dimension opening in the panel (the lid surface) should be understood so that it provides a significantly larger opening than is the case for the regions which can be broken described in the introduction (claim 1, claim 26). They have only relatively small dimensions in order to be able on the whole to keep the stability of the panel.

Indeed LOE closure lids are known (Large opening end), which provide an enlarged opening particularly for Gulp-drinks, which is orientated transversely and designed to be reniform, nevertheless not circular due to the necessity which continues to exist of attaching a tab to the lid sheet metal externally (via a rivet), and also this reniform shape lies only on one side of the axial centre plane of the lid, see **WO 97/30902 (ANCC)**, there Figure 9.

Using the invention, the opening surface area becomes large. A perforation is preferably introduced into the lid, the opening dimension of which goes beyond the lid centre (claim 2). The large-dimension perforation is not closed by a sheet metal section and also cannot be broken open via a scored or weakened line, but remains open in order to be closed later by the reclosing device which has adapted geometry. It permits the opening and closing of the flow path in the opened region (the perforation) so that here a "large-dimension opening" will be discussed further on, which is free for the flow of the

drink, controlled by the reclosing device, but which is not to be illustrated here, see for this in detail **PCT/NL2004/00024**, filed on 13th January 2004 (WO-A 2005/068312).

5 The sheet metal lid as such is now as before a finally shaped sheet metal lid originating from a manufacturing method (claim 31). It is more than a shell (the crude form), it is ready to be combined with the reclosure in order then in this combination to replace a conventional SOT closure lid which is normal today by a scored line and to close in reclosable manner the bodies closed by it, which are likewise not illustrated here, because they are available according to standard.

10 An enclosing strip, which is offset in one plane, is provided around the large-dimension opening. It serves for stabilisation (claim 1). A stiffening plateau placed radially further outwards, which contributes additionally to the stiffening of the sheet metal lid, is provided along at least one peripheral section of this enclosing strip. Due to the large-
15 dimension opening, a considerably loss of strength can be expected in the panel, which is compensated by the enclosing strip and the stiffening surface (stiffening plateau) extending partly peripherally around the enclosing strip (claim 33). This is obtained by a staggered group (sequence) of geometric shapes extending clearly in peripheral direction.

20 The stiffening plateau preferably extends not further than partly peripherally and in radial direction, wherein it is orientated to be flat, designed in particular to be part moon-shaped or arc segment-shaped (claim 3). It may also be described so that it has a bulge section with greater radial dimension and two arm sections which extend peripherally
25 (claim 11). The plateau thus extends in a peripheral angle of more than 180° (claim 12).

Due to a preferably centrally offset arrangement of the large opening (claim 2, 30, 24), there is more remaining lid panel on one side of the opening than on the other side, where the opening extends closer to the peripheral groove. The central offsetting may
30 be in the range between 5% and 25% of the diameter of the lid panel (in each case in the non-perforated state) depending on the dimensions of the main opening designed to be large and intended in most cases to be circular (claim 24, 21). A range between 10% and 15% is preferred, relative to the said diameter of the panel (lid panel) within the peripheral groove.

35 This offsetting towards one side (as seen from the centre) makes it possible to attach the additional stiffening on the other side due to the stiffening plateau in part moon-

shaped or arc segment-shaped design (in short 'half-moon-like'). It includes at least 90°, preferably approximately 180° of the opening and – relative to the lid panel – is designed to be encompassing more than 180° (claim 12). Due to the central offsetting, space is provided between the one edge of the opening and the peripheral groove to
5 arrange this stiffening.

On the other side remains less sheet metal area than the opening area defined by the perforation (claim 30).

10 To outline a large opening, it is possible to start from more than 30% of the surface of the as yet non-perforated lid panel. This dimension relates to the surface area which is the square of the radius. If the size of the opening is related to diameter, the diameter of the opening (for substantially circular design) is greater than 50% of the diameter of the panel, the same also applies to the dimensions of the radii. A range between 55% and
15 65% is preferred (claim 5). The opening is at least essentially round (claim 28) or at least approximately oval. It has a free inner edge (claim 36).

Further details regarding the flat extension - seen in radial direction of the lid panel - lie in the peripheral strip which surrounds the large-dimension opening and leaves between
20 the edge of the opening and the start of the peripheral strip, a further edge strip which also surrounds the opening. This edge strip and the previously mentioned peripheral strip lie in axial direction (vertically to the radial extension) on two different levels, also called height or height level or height position. The axial direction defines the direction vertically to the radials in cylindrical coordinates.

25 Speaking of "inner" and "outer" is avoided for a lid panel, since it is to be described and to be claimed in the state not arranged on the body.

When looking at the figures, it may be assumed that "outer" appears as "top" in the
30 figures, but which is not a restriction with regard to the description of the axial height relationships.

By attaching the stiffening plateau partly peripherally to the opening, which is enclosed by the at least one peripheral strip, further partly peripheral strip geometry is possible,
35 which is designated as a "further intermediate strip" (claim 15). It is situated between the outer edge of the stiffening plateau and the peripheral groove.

The further intermediate strip and the peripheral strip preferably have on their peripheral extension, a constant width (claim 16). Due to the structures extending peripherally and arranged differently, it is possible to provide changing heights of these structures, which now refers to the axial direction of the geometries previously mainly described in radial direction (claim 18, 19).

Observed in cross-section, an up-and-down may be formed, which due to changing height levels ensures that stiffening occurs which in spite of the large-dimension perforation (opening) can extend to the entire lid panel. A step is thus produced between in each case two adjacent areas. The step may have a piece running diagonally at least in sections, which leads into the particular next structure via particular radii (claim 20).

For the height positions, a datum plane may be defined as a reference (claim 4), which is placed on the plane of the perforation, that is, is placed in the plane of the opening. Other geometries may be defined in the other height positions relative to this datum plane (claim 4, claim 33).

In such a design, the lid panel, in spite of the destabilising "large opening", has high pressure stability and in addition surprisingly controlled 'buckling', which corresponds to bulging of the lid at excessive internal pressure. Up to normal pressure and several times normal pressure, the lid however remains stable so that a safe sealing on the first peripheral strip may be achieved by the reclosing device (claim 22). It lies reliably at the same height position (at the same level along its entire periphery), to ensure a sealing function with respect to a sealing lip of the reclosing device. In its closing and sealing position the lip presses onto the peripheral strip.

The loss of strength may be reliably compensated. The combination of all stiffening geometries, in particular the features pointed out according to claim 1, 2 also achieve controlled 'buckling' in the sense of head space enlargement by increased internal pressure in the closed can. All requirements of the lid, the pressure stability, the considerable dependence on standard closures, the stackability and the possibility of facilitating reclosure, indicated in the introduction, are achieved.

The further edge strip may lie at a different height position (claim 7) than the first peripheral strip, preferable deeper (claim 8). The opening for the said device may

contain two opposing flat sections to improve assembly (claim 10). The flat sections extend radially inwards (claim 10).

The plateau height may preferably be placed above the datum plane (claim 13, 4). If the plateau is defined radially inwards and radially outwards by the two peripheral strips (intermediate strip and enclosing strip), different height levels of these three regions achieve improved stabilisation (claim 14, 18). Enclosing strip and further intermediate strip (claim 15) may preferably be placed at the same height (claim 18).

Leading-in of the said further intermediate strip, which does not extend fully peripherally, but only partly peripherally, just like the stiffening plateau, takes place at the arm ends of the stiffening plateau (claim 17). A leading-in surface, which is designed to be V-shaped or Y-shaped, is formed here.

The surface of the or part moon-shaped stiffening (claim 11) preferably has no additional beads on its flat extension (claim 23).

It remains to be said that the modified shell, that is the finished product, which is prepared to receive the reclosing device, has a constant opening, which is also called perforation, but is not covered by sheet metal (claim 21). It has no scored or weakened lines (claim 4c). Further, no tab (rip-open flap) is attached to the sheet metal (claim 4a).

To compensate for the loss in stiffening in the panel peripherally extending geometries are used. In the radial direction an up-and-down occurs along a ray, i.e. a change of height positions (change of levels), in particular in that region of the lid from which the large opening is offset (centrally offset) and in which the sickle-shaped plateau area is introduced without additional stiffenings or beads.

The staggered change in height levels occurs from radially inward to radially outward, beginning with the inner edge strip (around the large opening) to the first enclosing strip, to the stiffening plateau, to the further intermediate strip and finally via the peripheral groove to the folding or mounting edge. Between the stiffening regions which extend peripherally over at least 90° preferably diagonal steps are arranged.

The invention is illustrated and supplemented below using **exemplary** embodiments.

Figure 1 is a plan view of a lid as one of several first examples.

Figure 2 is an axial section A-A through the lid according to Figure 1.

Figure 3 is a further example with two axial sections A-A, B-B through the lid offset by 90°.

The lid 1 shown in **Figures 1 and 2** as a first example of the invention is intended for a conventional drinks can body, which is not shown. The lid is made from sheet metal having a thin wall thickness, as generally conventional.

It has a lid panel 10 (as a panel) and a folded edge 11 for connection with an appropriate container. A damping bead 12 (peripheral groove), which defines the lid panel 10 radially outwards, runs along the folded edge. An ironed body is generally known and does not need to be described. It has an upper body edge, which is formed radially outwards as a flange and is closed by the folded edge 11 by a folding device (flanging roller) to form a multiple fold, mostly by the filler.

The folded edge 11 is arranged radially outside of the damping bead 12, which is also called "peripheral groove", and projects beyond the lid panel 10 at axial height. The lid panel 10, itself also called a "panel", is designed to be circular overall, but due to the opening 15 emerging significantly in size, which forms a cutout, essentially circular perforation in the lid panel, is still only partly present.

The cylindrical coordinates are used for the description, in radial direction (horizontal direction), the extension of the lid panel and in vertical or height direction, vertically to the plane E according to Figure 2, the axial direction.

The body itself is not shown, also the reclosing device 90 to be introduced into the opening 15 and to be assembled there on the edge, is not shown separately.

The opening 15 in Figure 1 is shown with large dimensions in plan view. It is arranged off-centre, relative to its central point M15, which is offset with respect to the central

point M10 of the panel 10 by ΔM . Offsetting is selected to be between 5% and 25% in several exemplary embodiments, in the exemplary embodiment shown, it is in the range between 10% and 12% to 15%, in each case relative to the diameter d10 of the panel 10, which extends within the peripheral groove 12. As shown d10 is $2 \cdot r_{10}$.

The diameter as an example of an opening dimension d15 with $2 \cdot r_{15}$ of the perforation shown here in the example to be essentially circular is smaller than the diameter d10 of the panel 10, but greater than 50% of this opening dimension, which underlines the significant size of the opening 15.

A first and a second peripheral strip surround the opening 15. The first peripheral strip 16a borders directly on the edge of the opening and has two segment-like flat sections 15b, 15a at the inner side, which are opposite. They serve to improve assembly of the reclosing device 90. The second peripheral strip 16 has a radial dimension r16, which is greater than that of the first peripheral strip. It is formed in height direction above the plane E.

The plane E is placed in the opening 15 in horizontal direction and forms the comparison standard for height comparisons. It is the plane of the opening 15, a two-dimensional extension within the plane is the opening surface. It describes the dimension of the opening 15.

The peripheral strip 16 transfers via a gentle, in particular diagonally placed step 16' into the inner peripheral strip 16a. The elevated peripheral ring 16 forms an annular pressure and support surface for a sealing and closing lip of the reclosing device 90 lying entirely at the same level.

The enclosing strip 16 runs completely around the opening 15 and delimits with respect to the peripheral groove on the left-hand side in Figure 1. On the right-hand side in Figure 1, it forms the limit to a plateau 20 designed to be sickle-shaped or part moon-shaped, which extends only partly peripherally around the perforation 15. It is placed in that region of the lid panel, from which the opening 15 has been displaced in centre-offset manner. It is on the right side of the first axial centre plane extending vertically to A-A and through M10.

The partial enclosure is essentially 180° for circular design relative to the opening 15.

The peripheral extension of the sickle-shaped plateau 20 is greater than 180° , in particular in the range between 200° and 240° , in particular in the region of $210^\circ \pm 3\%$, relative to the periphery of the lid panel and the peripheral groove 12.

5 This is produced from two arms 21, 22 extending peripherally, which form the ends of the stiffening plateau. The stiffening plateau has between these two ends 21, 22, a bulge 23, which has its greatest radial extension in the central plane A-A and is tapered like an arc towards the ends 21, 22.

10 A further intermediate strip 17, which has essentially the same width on its peripheral extension, is provided between the plateau 20 and the peripheral groove 12. The peripheral extension corresponds to the extension of the arc of the plateau 20 and is in any case greater than 90° .

15 The two peripheral strips 16 and 17 have essentially the same width, designated in Figure 1 by r6 and r7. They also have essentially the same height position, easily seen in Figure 2 with respect to the plane E.

Both the peripheral strip 16 and the peripheral strip 17 transfers via a preferably
20 diagonal step 16" and 17" into the plateau region 20, which lies at a deeper level, preferably slightly above the plane E in Figure 2.

An edge 20' of the arc-shaped plateau 20 corresponds to these steps 16" and 17" and is designed as a preferably diagonal step in each case with at least one short diagonal
25 section and two radii to pass over into the in each case adjacent region. These diagonals 20' form stiffenings. Also the change between higher and lower positions (relative to a height direction), observed in a radial direction, on a "radius vector" (ray) from the centre M15, forms a stiffening.

30 Leading-in of the outer peripheral strip 17 into the inner peripheral strip 16 takes place in the two lead-in zones 17b, 17a, which are directly adjacent the arm ends 21, 22 of the plateau 20. Y-shaped or V-shaped zones are formed here, which are wider than the particular strip shape of the peripheral strips 16, 17.

35 To illustrate the dimension of the opening 15, reference should be made to the radii. The internal radius r15 of the opening is shown in comparison to the radius r10 of the lid panel. The one or the other radius starts in each case from the centre M15 or M10. The

radius r15 is thus greater than half the radius of r10, in particular in the range above 60% between 60% and 65% of the main radius of the lid panel. This describes a large opening. The man skilled in the art will understand "large" here in an optical relation to the size of break-open regions of drinks can lids normally expected to the priority date.
5 When the man skilled in the art of cans compares the lengths of the radii, he would immediately say concerning r15: "This has been chosen quite large".

Relative to surfaces, it is possible to convert to the surfaces via the radii, (quadratic influence), wherein the surface of the opening 15 is greater than 30% of the panel surface 10, relative to the original size (without perforation 15). Here too, a large design of the opening is round about 40%, preferably between 35% and 45% of the non-perforated panel surface.

These dimension details are also maintained within the framework of ΔM central offsetting, which can be seen from the central points M10 and M15. Here, a reference to the diameter d10 (double main radius) is helpful regarding the size detail.

The central offset ΔM in various exemplary embodiments, which are not all shown separately, lies between 5% and 25%. They change inasmuch as the size of the opening 15 also has a clearance and range, and the shape of the opening also has a clearance and range, which may deviate from the exact circular shape, for example polygonal or oval. It is at least approximately polygonal or oval.

In a preferred range, the ΔM central offset lies between 10% and 15%.

All these measures express that it is – as understood by the man skilled in the art - a large opening 15 relative to such openings which are provided or "expected" by the man skilled in the art in normal drinks can lids.

To compensate the stiffening loss, the geometric shapes are used which have been described previously. An up-and-down is produced in radial direction, that is a change in height positions (level change), in particular in that region of the lid the opening 15 is displaced (centre-offset) from and in which the sickle-shaped plateau surface 20 is introduced without further additional stiffenings or additional beads.

The change of height positions takes place from radially inwards to radially outwards (in a staggered form), starting from the inner edge strip 16a (around the opening 15), to the

first enclosing strip 16, to the stiffening plateau 20, to the further intermediate strip 17 and finally via the peripheral bead 12 to the peripheral edge 11. Diagonally running steps are preferably arranged between these areas, as previously described using the step 20' of the stiffening plateau 20 (as an essentially flat surface having a large extension).

The change of height levels of the geometric stiffening shapes 16a, 16, 20, 17, 12, 11 can be seen in section in Figure 2. Each of the stiffening geometries extends peripherally over at least 90°, as subsidiary lines C-C in Figure 1 illustrate. They define an angle of 90° and all stiffenings extend far beyond it in peripheral direction, reaching 180° and even 360° for individual peripheral stiffenings.

The opening 15 is not covered by sheet metal, but is open. It has a free inner edge 15a. It is centre-offset (relative to the diameter of the panel) between 5% and 25% and the first enclosing strip 16 surrounding it reliably retains the same height position to facilitate a sealing function.

The further exemplary embodiment according to **Figure 3** follows the first exemplary embodiment with two sections A-A, B-B.

It is shown here that in the transverse direction B-B (the central plane), a change in height level also takes place from radially inwards to radially outwards, as far as the sickle 20 extends. Otherwise than relative to the central plane A-A, the opening 15 is symmetrical in transverse direction, so that left and right edge have the same distance to the peripheral groove 12. Relative to the central plane B-B, however, there is asymmetrie. The perforation 15 with its free edge 15a is offset to a large extent towards the first side (this side) of the central plane so that on the other side (the other side) there is large space for extensive stiffening geometries.

The remaining descriptions regarding Figure 3 may be assumed from the preceding exemplary embodiment.

The height difference h1 of outer peripheral strip 17 and inner peripheral strip 16 is measured with respect to the deeper-lying sickle-shaped plateau surface 20 according to the section A-A.

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CLAIMS:**I claim:**

- 5 **1. Sheet metal lid (1)** for closing a container, such as a drinks can body, under increased internal pressure in the closed state, which sheet metal lid has a panel (10) and a folded edge (11) surrounding the panel, which is adapted and suitable for rebating on an annular edge of the container body; wherein

 - 10 (a) the panel (10) has a large-dimension opening (15), which is surrounded by an enclosing strip (16), which is axially offset with respect to a plane (E) of the opening surface;
 - (b) a stiffening plateau (20; 21, 22, 23) – extending peripherally and radially – is provided along at least one peripheral section of the enclosing strip (16).

- 15 **2. Sheet metal lid** for closing a container, such as a drinks can body, under increased internal pressure in the closed state, and for mounting or for assembly of a reclosing device (90), but not containing this;

 - 20 (c) wherein the sheet metal lid has a panel or a lid surface (10) radially within a peripheral groove (12) and an assembly edge (11) outside of the peripheral groove (12);
 - (d) wherein the panel has an off-centre - relative to the panel - opening (15, ΔM), the opening dimension (d15, r15) of which being greater than 50% of a diameter (d10, r10) of the panel (10).

- 25 **3. Sheet metal lid** according to claim 2, wherein a part moon-shaped or arc segment-shaped stiffening surface (20, 21, 22, 23) is arranged on one side of the opening (15), which is further away from the peripheral groove (12) due to the off-centre arrangement than an opposite side of the opening (15).

- 30 **4. Sheet metal lid** according to claim 1 or 2, wherein the opening (15) establishes a datum plane (E) of the lid panel (10), with respect to which the folded edge or assembly edge (11) is raised axially and with respect to which the peripheral groove (12) is lying axially deeper.

- 35 **5. Sheet metal lid** according to claim 1 or 2, wherein the size of the opening occupies more than 30% of the surface of the lid panel (10) within the peripheral groove (12), in particular its diameter has dimensions between 55% and 65% of a diameter of the lid panel.

6. Sheet metal lid according to claim 1 or 4, wherein the enclosing strip (16) has an inner edge portion, which has a radial distance from an outer edge of the opening (15), to form a further inner edge strip (16a).
- 5 7. Sheet metal lid according to claim 6, wherein the further edge strip (16a) lies at a different height position or plane than the first peripheral strip (16).
8. Sheet metal lid according to claim 1, 2 or 7, wherein the first peripheral strip (16) lies axially higher than the datum plane (E) of the opening surface.
- 10 9. Sheet metal lid according to claim 8 or 6, wherein the first enclosing strip (16) runs on a peripheral angle of 360°.
- 15 10. Sheet metal lid according to claim 6, wherein at least two opposing surface regions in the further edge strip (16a) are flattened (15a, 15b) inwards.
11. Sheet metal lid according to claim 1, wherein the stiffening plateau (20) is designed like a sickle, having a central bulge (23) and two peripherally extending arms (21, 22).
- 20 12. Sheet metal lid according to claim 1, wherein the stiffening plateau (20) extends on more than 180° peripheral angle, in particular on a peripheral angle greater than 200°, relative to the periphery of the panel (10).
- 25 13. Sheet metal lid according to claim 1 or 4, wherein the stiffening plateau (20), observed in axial direction, is placed above the datum plane (E).
14. Sheet metal lid according to claim 1 or 13, wherein the stiffening plateau (20) has a height position, which lies axially deeper than that of the enclosing strip (16).
- 30 15. Sheet metal lid according to claim 1, 2 or 11, wherein the or a stiffening plateau (20) borders
 - (i) on the or a first enclosing strip (16) towards the opening (15);
 - (ii) borders on a further intermediate strip (17) towards the peripheral groove (12).
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16. Sheet metal lid according to claim 15, wherein the further intermediate strip (17) has essentially the same width along its peripheral extension.
17. Sheet metal lid according to claim 16 or 15, wherein the further intermediate strip (17) on each peripheral end (21, 22) of the stiffening plateau (20) leads (17a, 17b) into the first enclosing strip (16).
18. Sheet metal lid according to claim 15, wherein the further intermediate strip (17) and the first enclosing strip (16) are placed in each case at a different axial height position than the stiffening plateau (20), in particular are both placed axially higher than the datum plane (E) of the opening (15).
19. Sheet metal lid according to claim 1 or 2, wherein in radial direction, axial height levels of in each case adjacent areas extending at least partially in peripheral direction (16a, 16, 20, 17, 12) are different, in particular radially inwards to radially outwards starting from a further edge strip (16a) around the opening (15), over the first enclosing strip (16), the stiffening plateau (20) or the part moon-shaped stiffening surface (20), a further intermediate strip (17) and the peripheral groove (12), wherein the height levels have an up-and-down.
20. Sheet metal lid according to claim 18 or 19, wherein a transition zone, in particular in the form of a diagonally running step (20') in each case, is arranged between in each case two adjacent areas (16, 20; 20, 17).
21. Sheet metal lid according to claim 1 or 2, which has the opening as a pre-punched opening (15) in the lid which is not covered by sheet metal for mounting or assembly of a reclosing device (90), wherein the enclosing strip (16) is adapted or provided for sealing using the device.
22. Sheet metal lid according to claim 1 or 2, wherein the enclosing strip (16) has a constant height position along its periphery.
23. Sheet metal lid according to claim 1 or 2, wherein the stiffening plateau or a stiffening surface (20) has no further beads or depressions on its flat extension.

24. Sheet metal lid according to claim 2, wherein the off-centre mounting (ΔM); M10, M15) of the opening (15) is between 5% to 25%, in particular in the range of 10% to 15%, relative to the diameter (d10) of the lid panel (10).

5 25. Sheet metal lid according one of the preceding claims, wherein the reclosing device (90) is definitely disclaimed.

10 26. Sheet metal lid according to claim 1, wherein the large opening - as understood by the man skilled in the art – is evaluated in relation to the "size normally expected in drinks can lids" and is in particular more than 30% of the surface of the as yet non-perforated overall surface of lid panel.

15 27. Sheet metal lid according to claim 1 or 2, wherein no rip-open flap is attached to the lid panel (10) to break open an opening region.

28. Sheet metal lid according to claim 1 or 2, wherein the opening (15) is at least approximately circular or oval, in particular neither rectangular nor trapezoidal.

20 29. Sheet metal lid according to claim 1 or 2, not comprising a scored or weakened line surrounding an opening region which can be broke open in a portion.

25 30. Sheet metal lid according to claim 1 or 2, wherein the size of the opening (15) is dimensioned such that it extends beyond the centre of the panel, the opening surface on this side of the centre (M10) being greater than the remaining panel surface on this side of the centre (M10).

30 31. **A method for producing** a sheet metal lid for closing a container body, such as a drink can body, under increased internal pressure in the closed state, which sheet metal lid has a lid panel (10) and a folded edge (11) surrounding the panel, which is adapted and suitable for rebating on an edge of the container body; wherein

(a) the lid panel (10) is arranged radially within a peripheral groove (12) and a free opening (15) extending beyond its axial central plane (B-B) is provided;

35 (b) a stiffening plateau (20; 21, 22, 23) - extending peripherally and radially - is stamped radially within the peripheral groove (12) between the peripheral groove and the free opening (12, 15) along at least a peripheral section.

32. Sheet metal lid (1) for closing a container body, such as a drinks can body, under increased internal pressure in the closed state, which sheet metal lid has a lid panel (10) and a folded edge (11) surrounding the panel, which is adapted and suitable for rebating on an circumferential edge of the container body;

- (a) wherein the panel has an opening (15) extending beyond both central planes (A-A, B-B) which are vertical to each other, the opening being surrounded by an enclosing strip (16) which is axially offset in relation to a plane (E) and has a height level remaining the same over its entire periphery for sealing and pressing purposes;
- (b) comprises along at least a peripheral section of the enclosing strip (16) a stiffening plateau (20; 21, 22, 23) extending peripherally and radially, the peripheral extension being greater than 90° (C-C) and reaching in particular to at least 180°.

33. Sheet metal lid for closing a container body, in particular a drinks can body, under increased internal pressure in the closed state, and for mounting or for assembly of a reclosing device (90), but not containing this;

- (c) wherein the sheet metal lid has a panel (10) radially within a peripheral groove (12) and a rebatable assembly edge (11) is provided radially outside of the peripheral groove (12);
- (d) wherein the panel (10) has an off-centre - relative to the panel - opening (15, ΔM), the opening dimension (d_{15} , r_{15}) of which being considerable;
- (e) the weakening in the panel region with a greater extent of remaining lid sheet metal caused by the considerable size of the opening (15, r_{15} , d_{15}) being counteracted by a staggered group of stiffenings (16a, 16, 20, 17) extending in peripheral direction, which have from inside to outside a change of height positions so as to form an up-and-down along a radial ray.

34. A method according to claim 31, wherein the opening (15) is provided by cutting perforation.

35. A method according to claim 31 or 34, wherein the opening is essentially round.

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17

36. A method according to claim 31, wherein around the opening (15) an enclosing strip (16) is stamped, which strip has a height position remaining the same over the periphery.

5 37. Sheet metal lid according to claim 1 or claim 2, wherein the free opening (15) has a free inner edge (15a), in particular without a buckled web projecting downward from the inner edge.

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2/2

Fig. 3

