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(71) Applicant: **Easytech Packaging S.p.A.**
84084 Fisciano (SA) (IT)

(72) Inventors:
• **BOVE, Fabio**
84084 Fisciano (SA) (IT)
• **SCAROLA, Vito Giuseppe**
84084 Fisciano (SA) (IT)

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(74) Representative: **Perani & Partners S.p.A.**
Piazza Armando Diaz, 7
20123 Milano (IT)

(54) **REMOVABLE CLOSURE DEVICE FOR METAL CONTAINERS**

(57) Removable closure device (1) for metal containers comprising a lid (2) delimited by a peripheral edge (20); a tab (3) having a connecting end (31) connected to the lid (2) near a first portion (21) of the peripheral edge (20) and extending along a longitudinal direction (X-X) towards a second portion (22) of the peripheral edge (20) opposite the first portion (21), and having a grip end (32) opposite the connecting end (31) located between the first and the second portions (21,22) of the peripheral edge (20); two stiffening elements (4) placed on the lid (2) on opposite sides with respect to the tab (3), each of which comprises: an inner wall (4a) having a first curved section (41) closely surrounding the grip end (32) of the tab (3) and having the concavity facing the tab (3), and an outer wall (4b) extending along the longitudinal direction (X-X) between a first and a second tip (44), respectively facing the first and the second portions (21,22) of the peripheral edge (20). The tangents (T-T) to the outer walls (4b) of each stiffening element (4) at the second tip (45) converge near the second portion (22) of the peripheral edge (20).

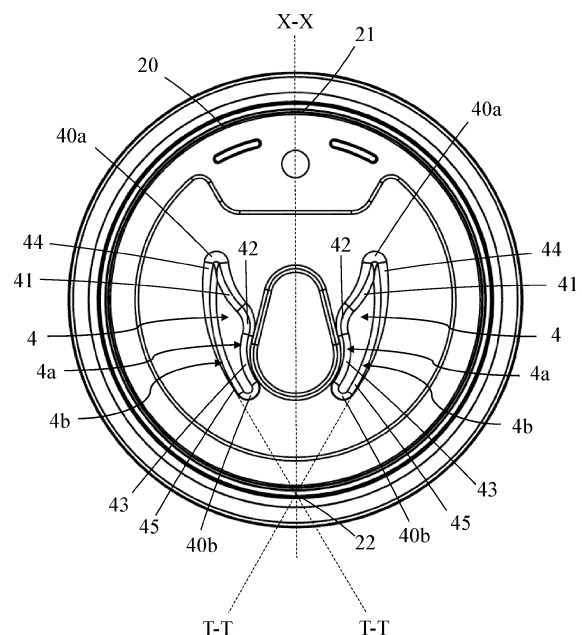


Fig. 2

Description

Technical Field

[0001] The present invention relates to a removable closure device for metal containers.

[0002] Such a removable closure device is used in the packaging sector, in particular in food products such as tuna, sardines, jellied meat, tomato puree, beans and peas.

Background art

[0003] Canned food products such as tuna, sardines, and jellied meat have long been known in the state of the art.

[0004] The boxes or cans enclosing such food products are typically made of metal material, and comprise a hollow main body closed at the top by a lid.

[0005] Such a lid is removably connected to the main body of the can by means of a weakening zone, which breaking, allows the can to be opened.

[0006] The cans of the known type comprise a riveted pull tab on the lid, and having a ring termination configured to be grasped by a user.

[0007] To open the can, the user exerts a pulling force on the lid by means of the tab, thus generating the progressive breakage of the weakening zone until the lid is completely separated from the main body of the can.

[0008] Before exerting the pulling force to open the can correctly, the user must ensure that the tab is properly oriented along a predetermined opening direction, as external bodies may accidentally strike the tab, rotating it with respect to the plane of the lid. If this occurs, before exerting the pulling force the user must appropriately rotate the tab, realigning it along the opening direction, in order to avoid opening failure and/or the detachment of the tab.

[0009] In the state of the art, there are known lids for cans comprising locking elements adapted to prevent the tab from accidentally rotating with respect to the plane of the lid.

[0010] For example, EP 2 607 255 B1 discloses a lid for cans having a pair of ribs arranged near the ring termination of the tab to prevent the accidental rotation thereof.

[0011] In order to facilitate the opening of the can, it is essential that during the pulling step the lid does not form sharp folds on its surface, as they result in a significant increase in the pulling force necessary to open the can.

[0012] Disadvantageously, the pair of ribs arranged near the ring termination of the tab, concentrate the efforts generated by the user's pulling in the central area of the lid, thus leading to the formation of net folds during the opening procedure.

[0013] In the state of the art, metal containers are also known comprising lids having a series of protrusions and/or indentations adapted to locally increase the rigid-

ity thereof, to reduce the risk of net folds during the opening step of the cans.

[0014] For example, US 4 406 378 comprises a pair of straight stiffening bands adapted to increase the stiffness of the lid.

[0015] Disadvantageously, in practice, such straight stiffening bands are very often ineffective, as they stiffen certain areas of the lid and weaken others. In fact, in doing so, during the opening procedure, the efforts generated by the user's pulling will tend to concentrate in the weakened areas, thus leading to the formation of net folds on the lid.

Object of the invention

[0016] In this context, the technical task underlying the present invention is to propose a removable closure device for metal containers which overcomes the drawbacks of the prior art mentioned above.

[0017] In particular, it is an object of the present invention to provide a removable closure device for metal containers which facilitates the user in opening the latter, in particular by reducing the pulling force necessary for opening the containers.

SUMMARY OF THE INVENTION

[0018] The mentioned technical task and the specified objects are substantially achieved by a removable closure device for metal containers which overcomes the drawbacks of the prior art mentioned above.

[0019] In particular, such removable closure device for metal containers comprises a lid adapted to close an upper opening of a metal container.

[0020] The lid has a peripheral edge connected to the metal container by means of a weakened zone configured to break when a user exerts a pulling force on the lid.

[0021] The closure device further comprises a tab having a connecting end riveted to the lid near a first portion of the peripheral edge, and extending along a longitudinal direction towards a second portion of the peripheral edge opposite the first portion.

[0022] The tab has a grip end opposite the connecting end which is configured to be grasped by a user to exert a pulling force on the lid to open the metal container.

[0023] The closure device further comprises a pair of stiffening elements, arranged on the lid on opposite sides with respect to the tab.

[0024] Each stiffening element in turn comprises an inner wall having a first curved section adapted to closely surround the grip end of the tab to prevent accidental rotation, and an outer wall extending along the longitudinal direction between a first and a second tip respectively facing the first and the second portions of the peripheral edge.

[0025] In order to prevent the stresses generated by the user's pulling from concentrating in particular areas of the lid thereby leading to the formation of net folds, the

outer walls of the stiffening elements have a particular shape configured to direct such stresses towards the second portion of the peripheral edge of the lid.

[0026] In detail, the tangents to the outer walls of each stiffening element, traced at the second tip, converge near the second portion of the peripheral edge.

[0027] Advantageously, by concentrating the stresses generated by the user's pulling on the second portion of the peripheral edge, i.e., the last portion of the peripheral edge, to fracture during the opening of the metal container, the present invention makes it possible to avoid the formation of net folds which significantly increase the pulling force necessary to open the metal container.

LIST OF FIGURES

[0028] Further features and advantages of the present invention will become more apparent from the description of an exemplary, but not exclusive, and therefore non-limiting preferred embodiment of a removable device for metal containers as illustrated in the appended drawings, in which:

- Figure 1 shows a top view of a removable device for metal containers in accordance with the present invention;
- Figure 2 shows a top view of the closure device of figure 1 without the tab;
- Figure 3 shows a perspective view of the closure device of Figure 1;
- Figure 4 shows a partially sectional view taken from the side of the closure device of Figure 1.

DETAILED DESCRIPTION

[0029] Even if not explicitly highlighted, the individual features described with reference to the specific embodiments shall be understood as accessory and/or interchangeable with other features, described with reference to other embodiments.

[0030] With reference to the appended drawings, the present invention relates to a removable closure device 1 for metal containers (not shown in the figures).

[0031] Typically, such metal containers are used to preserve the freshness of long-life food products such as tuna, sardines, jellied meat, tomato puree, beans and peas.

[0032] However, it is not excluded that the closure device 1 object of the present invention cannot be used to close other types of containers.

[0033] Such a closure device 1 comprises a lid 2 configured to close an opening of a metal container from above.

[0034] In greater detail, the lid 2 is delimited by a peripheral edge 20 which is connectable to the metal container by means of a weakened zone configured to progressively break when a user exerts a pulling force on the lid to open the metal container.

[0035] As shown in figure 1, the closure device 1 comprises a pull tab 3 which the user grasps and pulls to open the metal container, progressively breaking the weakened zone.

[0036] Such a tab 3 has a connecting end 31 connected to the lid 2 near a first portion 21 of the peripheral edge 20. Preferably, the connecting end 31 is constrained to the lid 2 by means of a riveted connection, which allows the tab 3 to lift with respect to the lid 2 to open the metal container, as shown in figure 4.

[0037] The tab 3 extends along a longitudinal direction X-X from the connecting end 31, arranged at the first portion 21 of the peripheral edge 20, towards a second portion 22 of the peripheral edge 20, opposite the first portion 21.

[0038] The tab 3 further comprises a grip end 32 opposite the connecting end 31 and arranged between the first and the second portion 21, 22 of the peripheral edge 20. The grip end 32, preferably in the form of a ring, is configured to be grasped and pulled by the fingers of a user to open the container.

[0039] It is important to emphasize that, during the opening of the metal container, the first and the second portions 21, 22 of the peripheral edge 20 are respectively the first and the last portion of the peripheral edge 20 to detach from the container.

[0040] As shown in figures 1 and 2, the closure device 1 comprises two stiffening elements 4 adapted to prevent the formation of net folds on the lid 2 during the procedure of opening the container.

[0041] In detail, such stiffening elements 4 are arranged on the lid 2 on opposite sides with respect to the tab 3 and each of them comprises an inner wall 4a and an outer wall 4b.

[0042] The inner wall 4a of each stiffening element 4 has a first curved section 41 closely surrounding the grip end 32 of the tab 3, to prevent the tab 3 from rotating with respect to a plane containing the lid 2. The curved section 41 of each stiffening element 4 has the concavity facing the tab 3 to closely surround the grip end 32.

[0043] The outer wall 4b of each stiffening element 4 extends along a curvilinear path mainly along the longitudinal direction X-X between a first tip 44 facing the first portion 21 of the peripheral edge 20, and a second tip 45 facing the second portion 22 of the peripheral edge 20.

[0044] With particular reference to figure 2, the curvilinear path of the outer walls 4b is such that the tangent lines T-T to the outer walls 4b of each stiffening element 4, traced at the second tip 45, converge near the second portion 22 of the peripheral edge 20.

[0045] For the sake of clarity, it is important to underline that such tangent lines are traced at the second tip 45, i.e., the end point of each outer wall 4b which is closest to the second portion 22 of the peripheral edge 20.

[0046] Advantageously, this particular geometry of the outer walls 4b makes it possible to direct the forces deriving from the pulling force exerted by the user towards the peripheral edge 20, in particular towards the second

portion 22. In other words, this particular geometry of the outer walls 4b significantly reduces the risk of the lid 2 forming sharp folds during the opening of the container.

[0047] Preferably, the outer wall 4b of each stiffening element 4 is curved and has the concavity facing the tab 3.

[0048] In accordance with what is shown in the figures, preferably, each stiffening element 4 extends mainly along the longitudinal direction X-X between a first and a second coupling end 40a, 40b.

[0049] The first and second coupling ends 40a, 40b of each stiffening element 4 are arranged on opposite sides of the corresponding stiffening element 4, i.e., the first and the second coupling ends 40a, 40b delimit the extension of the stiffening elements 4 along the longitudinal direction X-X.

[0050] In greater detail, the first and the second coupling ends 40a, 40b respectively face the first and the second portion 21, 22 of the peripheral edge 20, and are connected to the outer wall 4b respectively at the first and second tips 44, 45.

[0051] Preferably, the inner and outer wall 4a, 4b of each stiffening element 4 are respectively connected by the first and second coupling end 40a, 40b so as to form a closed path. In other words, in a preferred embodiment, each stiffening element 4 is peripherally limited by the corresponding inner wall 4a and outer wall 4b, mutually connected to form a closed path of the first and second coupling ends 40a, 40b.

[0052] The lid 2 further comprises a central cavity 6 arranged between the stiffening elements 4 along a transverse direction perpendicular to the longitudinal direction X-X, and arranged between the first and the second portion 21, 22 of the peripheral edge 20 along the longitudinal direction X-X.

[0053] The central cavity 6 extends along the longitudinal direction X-X, at least in part at the grip end 32 of the tab 3, so as to create a gap between the lid 2 and the grip end 32 which facilitates the user in grasping the latter.

[0054] Preferably, the inner wall 4a of each stiffening element 4, comprises a second curved section 43 which extends entirely beyond the grip end 32 of the tab 3 along the longitudinal direction X-X, and is located at the central cavity 6.

[0055] The second curved section 43 of each inner wall 4a has the concavity facing the central cavity 6 and surrounds it in an approachable manner. In this manner, a central part of the lid 2 can be stiffened, to avoid the formation of sharp folds during the opening of the container.

[0056] The inner wall 4a of each stiffening element 4 further comprises a coupling portion 42 configured to connect the first and the second curved section 41, 43.

[0057] In order to allow the first and the second curved sections 41, 43 to surround the grip end of the tab 32 and the central cavity 6 in an approachable manner, respectively, the coupling portion 42 of each inner wall 4a has the concavity facing the corresponding outer wall 4b, i.e.,

a concavity opposite that of the first and second curved sections 41, 43 to which it is connected.

[0058] Preferably, each stiffening element 4 comprises ribs protruding from the lid 2. In detail, each stiffening element lifts higher with respect to the plane in which the lid 2 is contained, along a direction perpendicular to the latter, in particular at the first tip 44 of the outer wall 4b.

[0059] In a preferred embodiment, the peripheral edge 20 of the lid 2 is circular in shape, the first and the second portions 21, 22 are arranged on diametrically opposite parts of the peripheral edge, and the central cavity 6 is arranged at a central area of the lid 2 interposed between the first and the second portions 21, 22 of the peripheral edge 20.

[0060] It is also an object of the present invention a metal container (not shown in the figures) comprising the closure device 1 described above.

[0061] In particular, the metal container object of the present invention comprises a container body defining an internal volume accessible above by means of an opening. The closure device 1 is configured to be positioned to close such an upper opening of the container body.

[0062] In accordance with what has been described above, the closure device 1 comprises a lid 2 delimited by a peripheral edge 20.

[0063] When the metal container is closed, the peripheral edge 20 is connected to the container body, closing the upper opening by means of a weakened zone 24 configured to progressively break when the user exerts a pulling force on the tab 3 to open the metal container.

[0064] In a preferred embodiment, the container body of the metal container is cylindrical in shape, and the peripheral edge 20 of the lid 2 is circular.

Claims

1. A removable closure device (1) for metal containers comprising:

- a lid (2) delimited by a peripheral edge (20) and adapted to close a metal container;
- a pull tab (3) having a connecting end (31) connected to the lid (2) near a first portion (21) of the peripheral edge (20) and extending in a longitudinal direction (X-X) toward a second portion (22) of the peripheral edge (20) opposite to the first portion (21), the tab (3) having a grip end (32) opposite the connecting end (31), located between the first and second portions (21, 22) of the peripheral edge (20);
- two stiffening elements (4) placed on the lid (2) on opposite side of the tab (3), each stiffening element (4) comprising:

- an inner wall (4a) having a first curved section (41) closely surrounding the grip end

(32) of the tab (3) to prevent the tab (3) from rotating relative to a plane containing the lid (2), the concavity of the first curved section (41) facing the tab (3),

- an outer wall (4b) extending along a curvilinear path mainly in the longitudinal direction (X-X) between a first tip (44) facing the first portion (21) of the peripheral edge (20) and a second tip (45) facing the second portion (22) of the peripheral edge (20)

characterized in that:

- the second tip (45) is the end point of each outer wall (4b) which is closest to the second portion (22) of the peripheral edge (20),

- the tangents (T-T) to the outer walls (4b) of each stiffening element (4) at the second tip (45) converge proximate the second portion (22) of the peripheral edge (20),

- each stiffening element (4) extends in the longitudinal direction (X-X) between a first coupling end (40a) facing the first portion (21) of the peripheral edge (20) and a second coupling end (40b) facing the second portion (22) of the peripheral edge (20), the outer wall (4b) being connected to the first coupling end (40a) at the first tip (44) and being connected to the second coupling end (40b) at the second tip (45).

2. A closure device (1) as claimed in any one of the preceding claims, in which the outer wall (4b) of each stiffening element (4) is curved and has a concavity facing the tab (3).

3. A closure device (1) as claimed in any of the preceding claims, wherein the inner wall (4a) and the outer wall (4b) of each stiffening element (4) are mutually connected by the first and second coupling ends (40a, 40b) to form a closed path.

4. A closure device (1) as claimed in any of the preceding claims, wherein the lid (2) comprises a central cavity (6) arranged between the stiffening elements (4) and between the first and second portions (21, 22) of the peripheral edge (20), the inner wall (4a) of the stiffening elements (4) comprising a second curved section (43) extending entirely beyond the grip end (32) of the tab (3) in the longitudinal direction (X-X).

5. A closure device (1) as claimed in claim 4, wherein the second curved section (43) of the inner wall (4a) closely surrounds the central cavity (6), and its concavity faces the central cavity (6).

6. A closure device (1) as claimed in Claim 4 or 5, wherein the inner wall (4a) comprises a coupling por-

tion (42) connected to the first and second curved sections (41, 43) and whose concavity faces the outer wall (4b) of the stiffening elements (4).

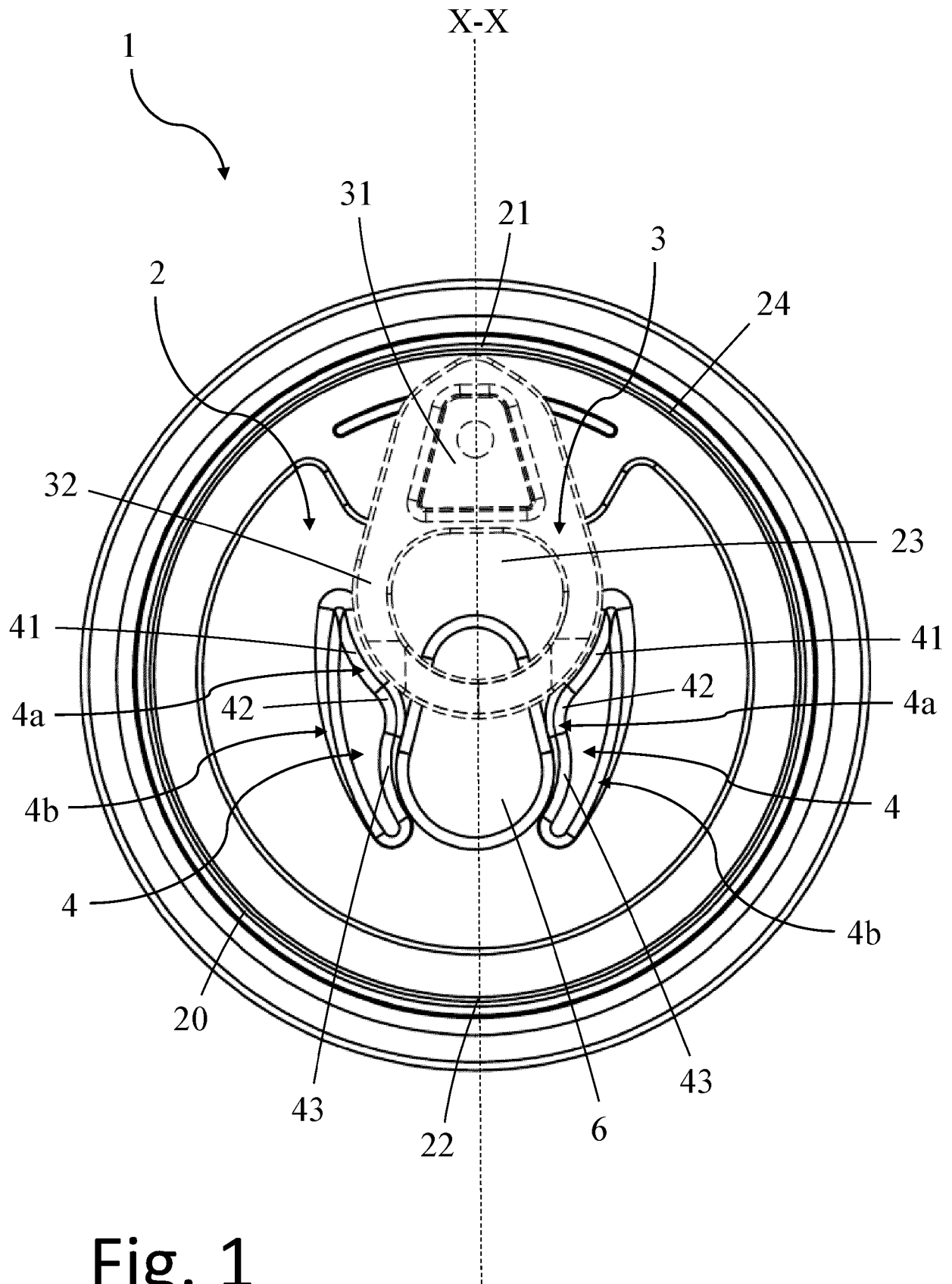
7. A closure device (1) as claimed in any of the preceding claims, wherein the peripheral edge (20) is circular in shape.

8. A closure device (1) as claimed in any of the preceding claims, wherein each stiffening element (4) comprises ribs projecting out of the lid (2), each stiffening element (4) rising to a greater extent in a direction perpendicular to the plane of the lid at the first tip (44) of the outer wall (4b).

9. A metal container comprising the removable closure device (1) as claimed in any of the preceding claims, and a container body defining an internal volume adapted to be accessed via an opening, the closure device (1) being located in a position in which it closes the opening.

10. A metal container as claimed in the preceding claim, wherein the peripheral edge (20) of the lid (2) is connected to the container body to close the opening, the lid (2) being connected to the container body via a weakened region (24) which is configured to fail when a user exerts a pulling force on the tab (3) of the lid (2).

11. A metal container as defined in claim 9 or 10, wherein the container body has a cylindrical shape.



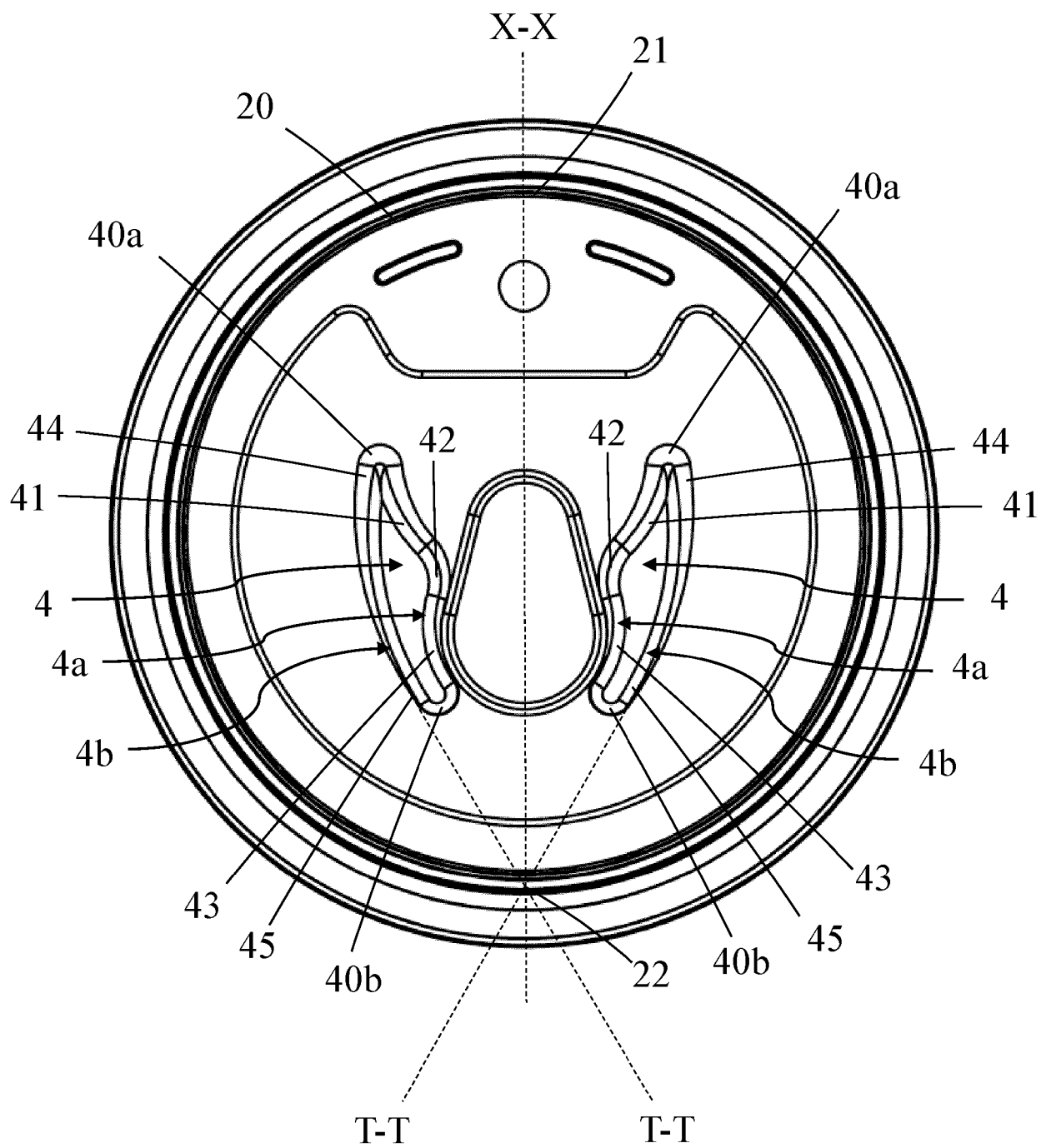


Fig. 2

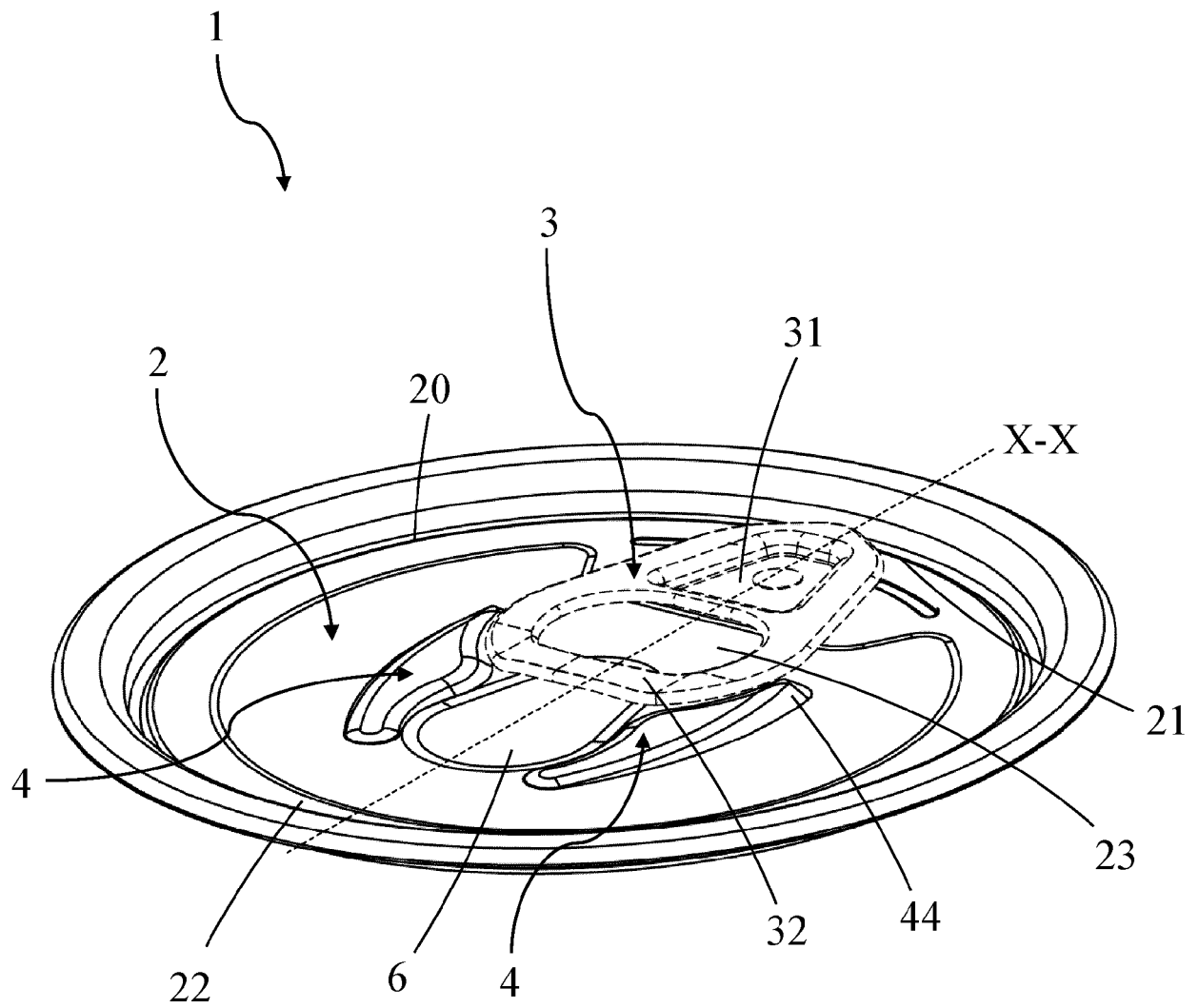


Fig. 3

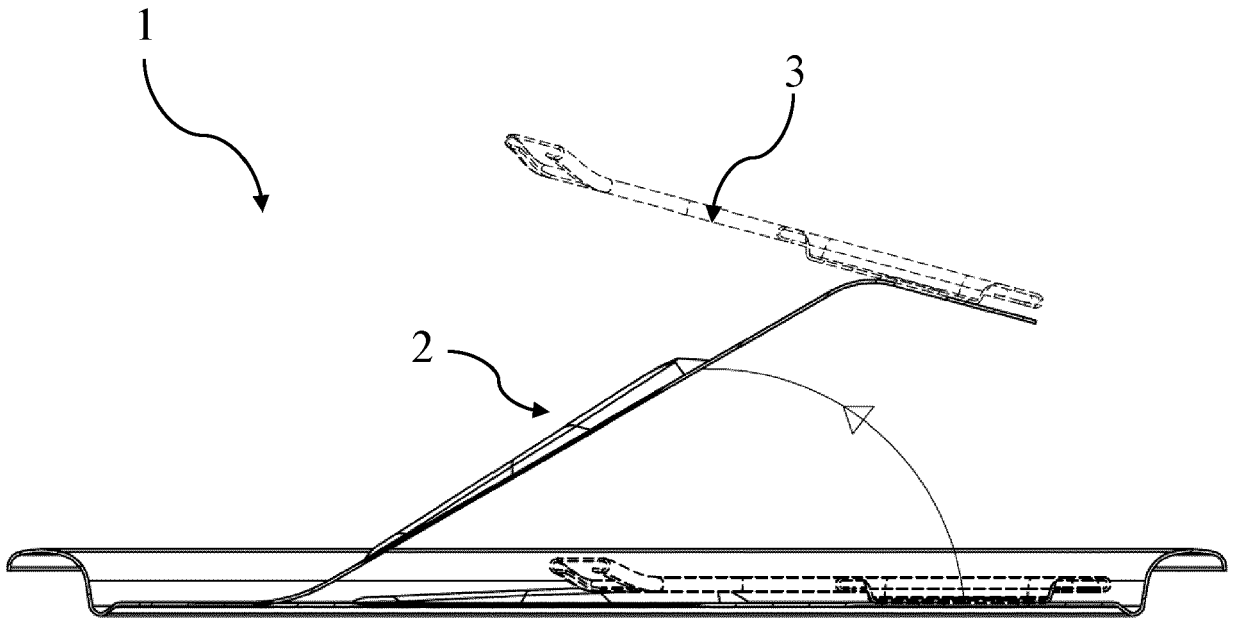


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 21 20 7458

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 April 2022	Examiner Sundell, Olli
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