



US 20220144485A1

(19) **United States**

(12) **Patent Application Publication**
BOVE et al.

(10) **Pub. No.: US 2022/0144485 A1**

(43) **Pub. Date: May 12, 2022**

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

(52) **U.S. Cl.**
CPC .. **B65D 17/4011** (2018.01); **B65D 2517/0071** (2013.01); **B65D 2517/0013** (2013.01); **B65D 17/02** (2013.01)

(71) Applicant: **Easytech Closures S.p.A.**, Fisciano (SA) (IT)

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

(21) Appl. No.: **17/524,005**

(22) Filed: **Nov. 11, 2021**

(30) **Foreign Application Priority Data**

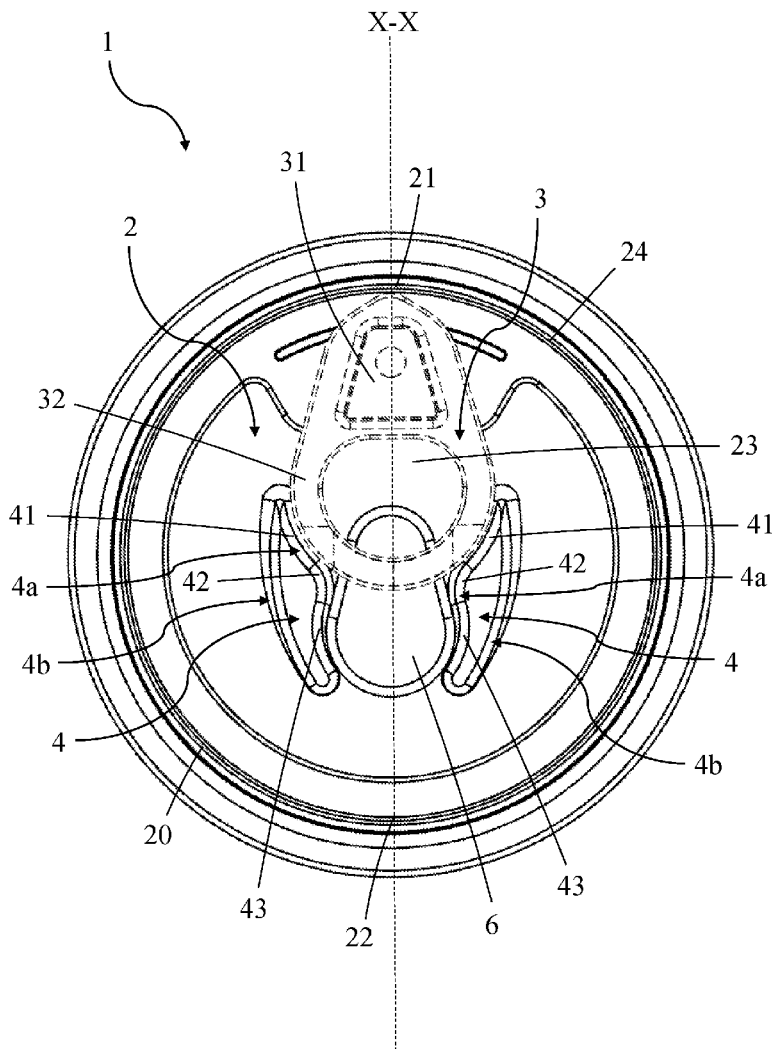
Nov. 11, 2020 (IT) 102020000026909

Publication Classification

(51) **Int. Cl.**
B65D 17/28 (2006.01)
B65D 17/00 (2006.01)

(57) **ABSTRACT**

Removable closure device for metal containers comprising a lid delimited by a peripheral edge; a tab having a connecting end connected 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, and having a grip end opposite the connecting end located between the first and the second portions of the peripheral edge; two stiffening elements placed on the lid on opposite sides with respect to the tab, each of which comprises: an inner wall having a first curved section closely surrounding the grip end of the tab and having the concavity facing the tab, 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. The tangents to the outer walls of each stiffening element at the second tip converge near the second portion of the peripheral edge.



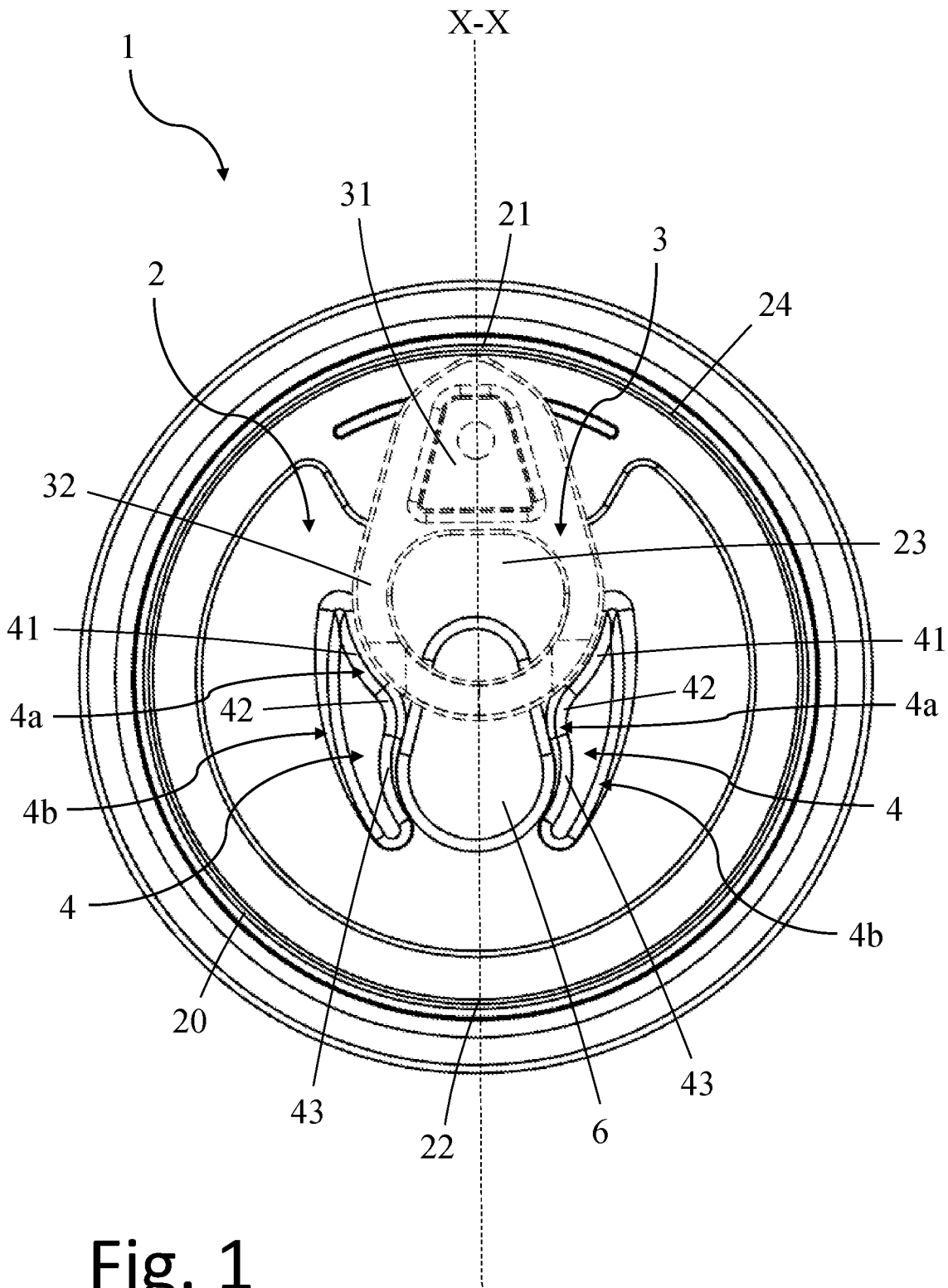


Fig. 1

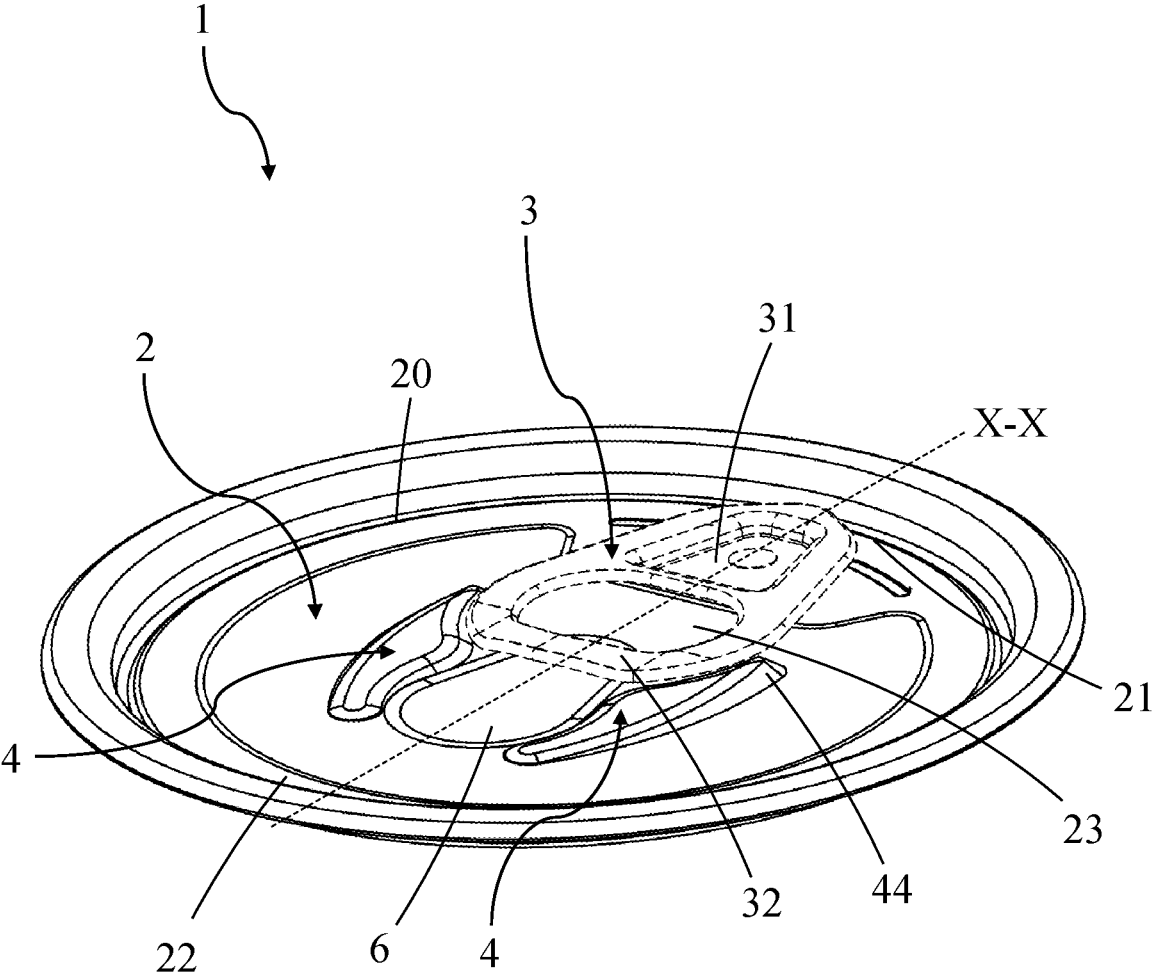


Fig. 3

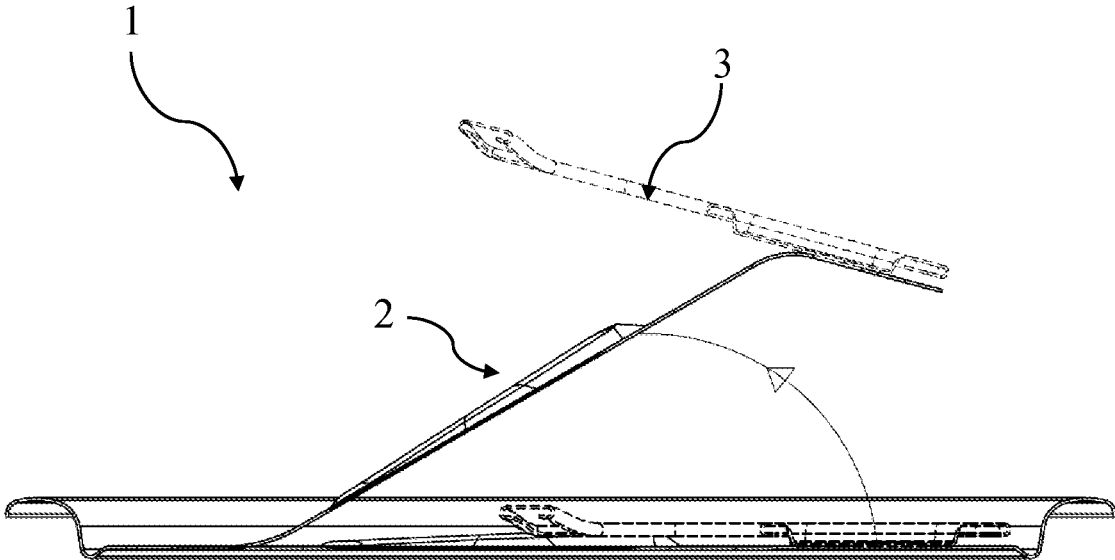


Fig. 4

REMOVABLE CLOSURE DEVICE FOR METAL CONTAINERS

TECHNICAL FIELD

[0001] The present invention relates to a removable closure device for metal containers. Such a removable closure device is used in the packaging sector, in particular in food products such as tuna, sardines, jellied meat, tomato purée, beans and peas.

BACKGROUND ART

[0002] Canned food products such as tuna, sardines, and jellied meat have long been known in the state of the art.

[0003] 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.

[0004] 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.

[0005] 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.

[0006] 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.

[0007] 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.

[0008] 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.

[0009] 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.

[0010] 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.

[0011] 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.

[0012] 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 rigidity thereof, to reduce the risk of net folds during the opening step of the cans.

[0013] For example, U.S. Pat. No. 4,406,378 comprises a pair of straight stiffening bands adapted to increase the stiffness of the lid.

[0014] 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

[0015] 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.

[0016] 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

[0017] 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.

[0018] In particular, such removable closure device for metal containers comprises a lid adapted to close an upper opening of a metal container.

[0019] 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.

[0020] 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.

[0021] 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.

[0022] The closure device further comprises a pair of stiffening elements, arranged on the lid on opposite sides with respect to the tab.

[0023] 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.

[0024] 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.

[0025] 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.

[0026] 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

[0027] 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:

[0028] FIG. 1 shows a top view of a removable device for metal containers in accordance with the present invention;

[0029] FIG. 2 shows a top view of the closure device of FIG. 1 without the tab;

[0030] FIG. 3 shows a perspective view of the closure device of FIG. 1;

[0031] FIG. 4 shows a partially sectional view taken from the side of the closure device of FIG. 1.

DETAILED DESCRIPTION

[0032] 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.

[0033] With reference to the appended drawings, the present invention relates to a removable closure device 1 for metal containers (not shown in the figures).

[0034] Typically, such metal containers are used to preserve the freshness of long-life food products such as tuna, sardines, jellied meat, tomato purée, beans and peas.

[0035] However, it is not excluded that the closure device 1 object of the present invention cannot be used to close other types of containers.

[0036] Such a closure device 1 comprises a lid 2 configured to close an opening of a metal container from above.

[0037] 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.

[0038] As shown in FIG. 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.

[0039] 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 FIG. 4.

[0040] 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.

[0041] 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.

[0042] 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.

[0043] As shown in FIGS. 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.

[0044] 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.

[0045] 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.

[0046] 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.

[0047] With particular reference to FIG. 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.

[0048] 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.

[0049] 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.

[0050] Preferably, the outer wall 4b of each stiffening element 4 is curved and has the concavity facing the tab 3.

[0051] 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.

[0052] 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.

[0053] 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.

[0054] 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.

[0055] 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.

[0056] 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.

[0057] 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.

[0058] 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.

[0059] 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**.

[0060] 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.

[0061] 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**.

[0062] 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**.

[0063] It is also an object of the present invention a metal container (not shown in the figures) comprising the closure device **1** described above.

[0064] 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.

[0065] In accordance with what has been described above, the closure device **1** comprises a lid **2** delimited by a peripheral edge **20**.

[0066] 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.

[0067] 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.

1. A removable closure device for metal containers, the removable closure device comprising:

a lid delimited by a peripheral edge and configured to close a metal container;

a pull tab having a connecting end connected to the lid near a first portion of the peripheral edge and extending in a longitudinal direction toward a second portion of the peripheral edge opposite to the first portion, the tab having a grip end opposite the connecting end, located between the first and second portions of the peripheral edge;

two stiffening elements placed on the lid on opposite side of the tab, each stiffening element comprising:

an inner wall having a first curved section closely surrounding the grip end of the tab to prevent the tab from rotating relative to a plane containing the lid, the concavity of the first curved section facing the tab,

an outer wall extending along a curvilinear path mainly in the longitudinal direction between a first tip facing the first portion of the peripheral edge and a second tip facing the second portion of the peripheral edge, wherein tangents lines to the outer walls of each stiffening element at the second tip converge proximate the second portion of the peripheral edge.

2. The closure device as claimed in claim 1, wherein each stiffening element extends in the longitudinal direction between a first coupling end facing the first portion of the peripheral edge and a second coupling end facing the second portion of the peripheral edge, the outer wall being connected to the first coupling end at the first tip and being connected to the second coupling end at the second tip.

3. The closure device as claimed in claim 1, in which the outer wall of each stiffening element is curved and has a concavity facing the tab.

4. The closure device as claimed claim 1, wherein the inner wall and the outer wall of each stiffening element are mutually connected by the first and second coupling ends to form a closed path.

5. The closure device as claimed in claim 1, wherein the lid comprises a central cavity arranged between the stiffening elements and between the first and second portions of the peripheral edge, the inner wall of the stiffening elements comprising a second curved section extending entirely beyond the grip end of the tab in the longitudinal direction.

6. The closure device as claimed in claim 5, wherein the second curved section of the inner wall closely surrounds the central cavity, and its concavity faces the central cavity.

7. The closure device as claimed in claim 5, wherein the inner wall comprises a coupling portion connected to the first and second curved sections and whose concavity faces the outer wall of the stiffening elements.

8. The closure device as claimed in claim 1, wherein the peripheral edge is circular in shape.

9. The closure device as claimed in claim 1, wherein each stiffening element comprises ribs projecting out of the lid, each stiffening element rising to a greater extend in a direction perpendicular to the plane of the lid at the first tip of the outer wall.

10. A metal container comprising a removable closure device and a container body defining an internal volume adapted to be accessed via an opening, the closure device being located in a position in which it closes the opening, the removable closure device comprising:

a lid delimited by a peripheral edge and closing the container body;

a pull tab having a connecting end connected to the lid near a first portion of the peripheral edge and extending in a longitudinal direction toward a second portion of the peripheral edge opposite to the first portion, the tab having a grip end opposite the connecting end, located between the first and second portions of the peripheral edge;

two stiffening elements placed on the lid on opposite side of the tab, each stiffening element comprising:

an inner wall having a first curved section closely surrounding the grip end of the tab to prevent the tab from rotating relative to a plane containing the lid, the concavity of the first curved section facing the tab,

an outer wall extending along a curvilinear path mainly in the longitudinal direction between a first tip facing

the first portion of the peripheral edge and a second tip facing the second portion of the peripheral edge, wherein tangents lines to the outer walls of each stiffening element at the second tip converge proximate the second portion of the peripheral edge.

11. The metal container as claimed in claim **10**, wherein the peripheral edge of the lid is connected to the container body to close the opening, the lid being connected to the container body via a weakened region which is configured to fail when a user exerts a pulling force on the tab of the lid.

12. The metal container as defined in claim **10**, wherein the container body has a cylindrical shape.

* * * * *