

METALLIC LID FOR A CAN

Field of the Invention

The present invention refers to a metallic lid of the type which presents a peripheral side wall provided with a free upper edge and designed to be frictionally seated and axially retained in the interior of a seat defined in an upper opening of the can, the lid being optionally provided, in its central region, with an inspection opening to receive an auxiliary lid generally in a transparent plastic material.

Prior Art

Metallic lids of the type mentioned above are well known. They are formed in a single piece of metal sheet and comprise a generally disk-shaped bottom wall, whose peripheral edge incorporates a side wall projecting upwardly, so as to be removably press fitted and axially retained inside a seat defined in an upper opening of a can. Said seat can be defined by a pending tubular projection which is superiorly incorporated to a median opening of the upper wall of a can with a circular or polygonal cross section.

Metallic lids of the type mentioned above are described and illustrated in patents US2,074,231, US3,347,408, BR-8002622-2, BR8002618-4 and also in patents BR9408643-5 and BR601221-2, the last two pertaining to the same applicant of the present patent application.

In these prior art constructions, the lid structure comprises only the bottom wall and a peripheral side wall, the axial retention of the lid in the seat, defined in the upper opening of the can, being usually achieved through engaging means provided in at least one of the parts of lid side wall and seat in the upper opening, in order to cooperate with the other of said parts.

In the construction of the type cited above, even when the bottom wall of the lid presents a drawn or raised median portion, as taught in the solution disclosed in patents BR7601221-2 and US3,347,4-8, the lid structure

requires certain cares to be taken when closing forces are applied, which forces can irremediably damage said lid, impeding a tight and secure closure of the can to be obtained.

5 The structural deficiency mentioned above is due to the fact that said lid construction does not present the usual peripheral strength guaranteed in the metallic lids provided with a peripheral annular recess, generally having a cross section with a substantially trapezoidal
10 and inverted form, to be frictionally seated in the interior of a recess with a complementary cross section which defines a seat incorporated to the annular upper wall of a can body, such as in the construction known for decades and which is disclosed and illustrated in patent
15 US795,126, filed in 1904.

In view of increasing the structural strength of the known lids, which present only the bottom wall and a peripheral side wall formed to be seated and axially retained in an upper opening of the can, there was
20 proposed a constructive solution, which is disclosed and claimed in the Brazilian patent application PI0405458-0 of the same applicant, according to which the bottom wall of the lid comprises a peripheral annular portion and a median portion which are interconnected by an annular rib
25 portion having the approximate form of an inverted U. This previous construction provides the lid, which is formed in a determined metal sheet thickness, with an increased structural strength, overcoming the deficiency of these known lids, without requiring the metal sheet
30 thickness to be increased. The provision of the annular rib portion in the bottom wall, as proposed in BR0405458-0, leads to a higher structural strength of the lid.

However, even incorporating the annular rib portion in
35 the bottom wall of the lid, the structural strength necessary for an adequate and secure operational behavior of the lid still requires the metal sheet to have a

certain minimum thickness.

Summary of the Invention

As a function of the exposed above in relation to the prior art, the present invention has as one of its
5 objects to provide a metallic lid of the type commented above, which is provided with the annular rib portion in the bottom wall and which has increased strength to the extent of allowing said lids to be constructed in metal sheet with a reduced thickness, without reducing the
10 structural strength to values lower than those expected or desired to allow closing and opening the lid by the usual proceedings, with no risks of producing plastic deformations which can make said lid become useless.

This and other objects of the present invention are
15 attained by providing a metallic lid of the type which has its bottom wall comprising a peripheral annular portion, adjacent to the side wall of the lid, a median portion, and an annular rib portion presenting its cross section with the approximate form of an inverted U, whose
20 lateral legs are inferiorly and respectively incorporated to the adjacent edges of the peripheral annular portion and the median portion of the bottom wall.

According to the invention, the median portion of the bottom wall comprises an annular panel and a central
25 panel joined by an axial step portion, an outer peripheral edge of the annular panel being incorporated to the adjacent lateral leg of the annular rib portion, said axial step portion being constituted by a material that is plastically deformed from the adjacent annular
30 panel portion and from the central panel portion.

With the construction generically defined above, besides the fact that the median portion and the peripheral annular portion of the bottom wall of the can are joined to each other by said annular rib portion, the median
35 portion incorporates the axial step in its radially median region, which axial step defines one more structural element incorporated to the bottom wall and

spaced from the side wall of the lid.

The provision of the auxiliary axial step, additionally to the provision of the annular rib portion, imparts to the lid a structural strength that is substantially greater than that achieved with the prior art constructions mentioned above, allowing obtaining lids having adequate structural strength and formed in a metal sheet with a smaller thickness, that is, with less material consumption.

Furthermore, the construction of the lid object of the present invention can be made so that the central panel of the median portion of the bottom wall presents an inspection opening defining a seat for seating and axially retaining an auxiliary lid in a transparent plastic material.

Brief Description of the Drawings

The invention will be described below, with reference to the enclosed drawings, given by way of example of possible constructions for the present lid and in which:

Figure 1 represents a partial diametrical sectional view of the upper region of a can, in whose discharge end opening is fitted a lid constructed according to one of the known prior art solutions;

Figure 2 represents a top plan view of a lid of the type illustrated in figure 1, but incorporating the axial step according to a first embodiment of the invention;

Figure 3 represents a partial diametrical sectional view of the lid, when mounted in the discharge end opening of a can, said view taken according to line III-III in figure 2;

Figure 4 represents a top plan view of a lid of the type illustrated in figure 2, but incorporating radial extensions of the central panel, according to a second embodiment of the invention;

Figures 5 and 6 represent partial diametrical sectional views of the lid when mounted in the discharge end opening of a can, said views taken according to lines V-V

and VI-VI, respectively, in figure 4;

Figure 7 represents a top plan view of a third embodiment of the lid of the present invention; and

Figure 8 represents a partial diametrical sectional view of the lid when mounted in the discharge end opening of a can, said view taken according to line VIII-VIII in figure 7.

Detailed Description of the Invention

As illustrated in the enclosed drawings, the lid of the present invention is applied to a can 10, which is graphically represented only by the upper portion of its side wall 11, to whose upper edge is affixed, usually by means of a double-seaming 12, an outer peripheral edge of an annular upper wall 13 in whose median region is provided an opening 14 to whose edge is incorporated a pending tubular projection 15 which defines a seat "S" for seating the lid of the can.

In the prior art construction exemplified in figure 1 of the drawings and which is object of patent BR9408643-5 of the applicant of the present patent application, the pending tubular projection 15 is provided with a lower end portion which is bent inwardly of the opening 14, upwardly and against the pending tubular projection 15, so as to form a continuous tubular rib 16, which has a generally circular shape, as described in said prior art patent.

However, it should be understood that the construction of the pending tubular projection 15 of the annular upper wall 13 of the can 10 may have different constructive arrangements, as illustrated and discussed in the prior art documents mentioned above, without said constructive modifications altering the constructive and functional objectives of the present invention.

As already previously mentioned, the lid of the present invention is formed in a single piece of metal sheet, comprising a bottom wall 21 usually in the form of a flat disk and which superiorly and peripherally

incorporates a side wall 22 provided with a free upper edge 22a and designed to be frictionally seated and axially retained inside the seat "S" defined by the pending tubular projection 15 of the opening 14 provided
5 in the annular upper wall 13.

In the exemplary construction illustrated in the drawings, the lid 20 has its side wall 22 provided with a continuous peripheral recess 22b, inside which is sealingly fitted and axially retained the continuous
10 tubular rib 16 of the pending tubular projection 15.

In the illustrated construction, both the continuous tubular rib 16 of the pending tubular projection 15 and the continuous peripheral recess 22b of the side wall 22 of the lid 20 present a contour which is at least
15 partially circular and complementary, so that the mutual seating of said parts promotes not only the axial retention of the lid 20 in the opening 14 of the can 10, but also a sealing effect in this frictional seating region. It should be understood, however, that the
20 continuous tubular rib 16 and the continuous peripheral recess 22b might present configurations other than that tubular circular illustrated in the drawings, as can be observed in the prior art documents cited in the beginning of the present description.

Still according to the embodiment illustrated in the drawings, the lid 20 has its free upper edge 22a bent outwardly, downwardly and against the side wall 22, so as to define a tubular upper rib 22c to be seated on the annular upper wall 13 of the can 10, in the region that
30 surrounds the opening 14. Accordingly, it should be understood that the free upper edge 22a of the side wall 22 of the lid 20 can present different constructive forms, as illustrated in the prior art documents previously cited, without said modifications of form and
35 arrangement of the upper region of the side wall 22 of the lid 20 altering the functional characteristics of the invention proposed herein.

According to the invention, the bottom wall 21 of the lid 20 comprises a peripheral annular portion 23 adjacent to the side wall 22, a median portion 24 and an annular rib portion 25 presenting a cross section with the approximate form of an inverted U, whose lateral legs are inferiorly and respectively incorporated to adjacent edges of the peripheral annular portion 23 and median portion 24 of the bottom wall 21.

The annular rib portion 25 is stamped jointly with the remainder of the lid 20, in order to project preferably upwardly from the peripheral annular portion 23 and from the median portion 24 of the bottom wall 21, the annular rib portion 25 remaining spaced from said side wall 22 by an adequate distance, so as to provide to the marginal region of the lid 20 the necessary structural strength to resist the compression forces to be applied over the lid 20, upon fitting the latter in the opening 14 of the can 10.

Still according to the preferred embodiment, the median portion 24 of the bottom wall 21 is disposed in a higher plane in relation to a plane which contains the peripheral annular portion 23 of said bottom wall 21. This constructive arrangement allows the median portion 24 of the bottom wall 21 to operate jointly with the annular rib portion 25 to define seating means to place one lid over the other, upon stacking said lids in a lid feeding device in an automatic can closing machine, or to allow the lids 20 to be automatically fitted in respective annular upper walls 13, before they are double-seamed to the side wall 11 of the cans 10.

The annular rib portion 25 is further constructed and dimensioned in such a way as to be disposed inferiorly to a plane Ps containing the free upper edge 22a of the side wall 22 of the lid 20, this relative dimensioning of the lid parts being made as a function of the stacking characteristics cited above and discussed in BR0405458-0. According to the present invention, the median portion 24

of the bottom wall 21 comprises a generally flat annular panel 24a having an outer peripheral edge which is incorporated to the adjacent lateral leg of the annular rib portion 25 and an inner peripheral edge incorporated, by an axial step portion 24c, to an outer peripheral edge of a central panel 24b, which is also generally flat and disposed in a plane slightly superior to that of the annular panel 24a.

In order that the lid 20 presenting the axial step portion 24c can be formed from a metal sheet blank with the same dimensions as those necessary for producing the lid defined in figure 1 and provided with the annular rib portion 25, the axial step portion 24c is constituted by a material that is plastically deformed from the adjacent annular panel portion 24a and from the central panel portion 24b.

The provision of the axial step portion 24c increases the structural strength of the lid 20, particularly of its bottom wall 21, in a sufficient degree to allow the usual thickness of the metal sheet of the lid to be reduced, without the structural strength of the lid reaching values which are unacceptable or harmful to the correct and secure closing and opening operations of the can by means of the lid.

In the embodiment illustrated in figures 2 and 3, the central panel 24b is completely closed and deprived of any opening, having a radius R which corresponds to about the double of the radial width RL of the annular panel 24a.

The height of the axial step portion 24c should be only sufficient to produce the desired effect of increasing the structural strength of the lid 20, generally with a value approximately equal to the thickness of the metal sheet used to form the lid 20, so that the material used to form the lid results exclusively from the material that is plastically deformed from the adjacent annular panel portion 24a and from the central panel portion 24b

during the stamping operation of the lid.

In the second embodiment illustrated in figures 4, 5 and 6, the central panel portion 24b of the median portion 24 of the lid 20 incorporates a plurality of radial extensions 24d, coplanar to said central panel portion 24b and which extend until the adjacent lateral leg of the annular rib portion 25, to which they are incorporated. In the illustrated embodiment, the radial extensions 24d are in the number of four, but they can vary above or below this number. However, it is desirable that said radial extensions 24d be equally and angularly spaced from each other. It is further possible to stamp the lid 20, so as to allow the radial extensions 24d of the central panel 24b to be disposed in a plane slightly axially offset from the plane of said central panel 24b.

In the embodiment illustrated in figures 7 and 8, the central panel 24b is provided with an inspection opening 26 radially spaced from the axial step portion 24c, defining a seat for seating and axially retaining a peripheral side wall 31 of an auxiliary lid 30 in a transparent plastic material, said inspection opening 26 comprising a pending skirt 27 formed to incorporate an inner circumferential rib 28 to be fitted in a corresponding circumferential recess 33 provided in the peripheral side wall 31 of the auxiliary lid 30. The construction of the inspection opening 26 and of the auxiliary lid 30 can follow the same proceedings applied to the lid 20, maintaining the dimensions of the involved parts proportionally adequate to the smallest diameter of the auxiliary lid 30. It should be understood that the radial extensions 24d of the central panel 24b, in this case being also annular, may be also provided in the embodiment illustrated in figures 7 and 8.

In the embodiment illustrated in the drawings, the peripheral annular portion 23 and the median portion 24 of the bottom wall 21 of the lid 20 are flat.

While only some constructive forms for the lid, jointly

with a seat construction, have been illustrated herein,
it should be understood that alterations can be made in
the form of the component parts, without departing from
the constructive concept defined in the claims that
5 accompany the present specification.

CLAIMS

1. A metallic lid to be applied in a can (10) having an opening (14) which defines a seat (S), said lid (20) comprising, in a single piece of metal sheet, a bottom wall (21) which superiorly and peripherally incorporates a side wall (22) provided with a free upper edge (22a) and to be frictionally seated and axially retained in the interior of the seat (S), said bottom wall (21) comprising a peripheral annular portion (23) adjacent to the side wall (22), a median portion (24) and an annular rib portion (25) presenting a cross section with the approximate form of an inverted U, whose lateral legs are inferiorly and respectively incorporated to adjacent edges of the peripheral annular portion (23) and median portion (24) of the bottom wall (21), said lid (20) being characterized in that the median portion (24) comprises an annular panel (24a) and a central panel (24b) joined by an axial step portion (24c), an outer peripheral edge of the annular panel (24a) being incorporated to the adjacent lateral leg of the annular rib portion (25), said axial step portion (24c) being constituted by a material that is plastically deformed from the adjacent annular panel portion (24a) and from the central panel portion (24b).
2. The metallic lid, as set forth in claim 1, characterized in that the radial width (RL) of the annular panel (24a) corresponds to about half the radius (R) of the central panel (24b).
3. The metallic lid, as set forth in any of claims 1 or 2, characterized in that the axial step portion (24c) presents a height approximately equal to the thickness of the metal sheet used to form the lid.
4. The metallic lid, as set forth in any of claims 1, 2 or 3, characterized in that the annular rib portion (25) projects upwardly from the peripheral annular portion (23) and from the median portion (24) of the bottom wall (21).

5. The metallic lid, as set forth in claim 4, characterized in that the median portion (24) of the bottom wall (21) is disposed in an elevated plane in relation to a plane which contains the peripheral annular portion (23) of said bottom wall (21).

6. The metallic lid, as set forth in claim 4, characterized in that the annular rib portion (25) is disposed inferiorly to a plane (Ps) containing the free upper edge (22a) of the side wall (22) of the lid (20).

7. The metallic lid, as set forth in any of claims 1 to 6, characterized in that the annular panel (24a) and the central panel (24b) are flat, the latter being disposed in a plane slightly superior to that of the annular panel (24a).

8. The metallic lid, as set forth in any of claims 1 to 7, characterized in that the central panel (24b) is provided with an inspection opening (26) spaced from the axial step portion (24c), defining a seat for seating and axially retaining a peripheral side wall (31) of an auxiliary lid (30) in a transparent plastic material, said inspection opening (26) comprising a pending skirt (27) formed to incorporate an inner circumferential rib (28) to be fitted in a corresponding circumferential recess (33) provided in the peripheral side wall (31) of the auxiliary lid (30).

9. The metallic lid, as set forth in any of claims 1 to 8, characterized in that the central panel (24b) of the median portion (24) of the lid (20) incorporates a plurality of radial extensions (24d), angularly spaced from each other and which extend till the adjacent lateral leg of the annular rib portion (25) to which they are incorporated.

10. The metallic lid, as set forth in claim 9, characterized in that the radial extensions (24d) are coplanar to the central panel (24b).