(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 939 938 A1

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**04.11.2015 Bulletin 2015/45**

(21) Application number: **15167083.3**

(22) Date of filing: **31.10.2008**

(51) Int Cl.:
***B65D 1/16*** *(2006.01)* ***B65D 43/02*** *(2006.01)*
***B65D 45/30*** *(2006.01)* ***B65D 25/28*** *(2006.01)*

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR**

(30) Priority: **01.11.2007 BR PI0705211**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
**08844553.1 / 2 203 355**

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Remarks:
This application was filed on 11-05-2015 as a divisional application to the application mentioned under INID code 62.

## (54) Metal can with lid and retaining ring

(57) Improvement in a can of the type which comprises: a body portion (11); a neck portion (13) of reduced contour and having an upper end edge (13b) provided with an outer peripheral projection (13c) and defining the contour of an upper opening (A); a transition portion (14) joining the body portion (11) and the neck portion (13); and a lid (20) having a peripheral tubular portion (22) to be fitted in the interior of the upper opening (A) of the neck portion (13) and having a free upper edge (22b) carrying an outer circumferential rib (22c) under which is applied an annular gasket (30) to be seated onto the upper outer edge (13b) of the neck portion (13) upon the fitting of the lid (20) in the upper opening (A). The transition portion (14) may externally incorporate, in a single piece, a plurality of spaced apart longitudinal ribs (15) joining the transition portion (14) to an adjacent lower region (13a) of the neck portion (13).

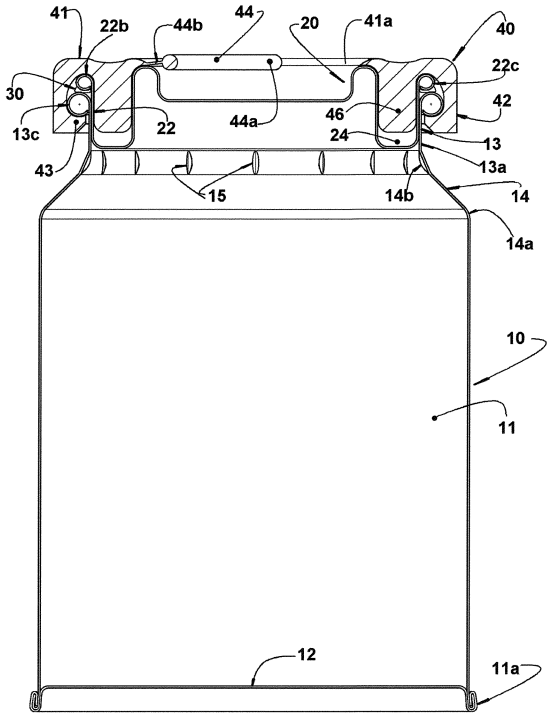



FIG. 5

EP 2 939 938 A1

## Description

### Field of the Invention

**[0001]** The present invention refers to an improvement applied to a can formed in metallic sheet and comprising a tubular body portion, generally presenting a circular section and carrying a bottom wall, an upper neck portion with a contour smaller than that of the body portion, and a transition portion joining the body portion and neck portion and having an end edge which defines the contour of an upper opening for the can, on which is fitted a removable lid.

### Prior Art

**[0002]** There are well known from the prior art the tubular cans obtained in metallic sheet and comprising a body portion, of circular or polygonal cross-section and carrying a bottom wall and an annular upper wall which are peripherally attached, generally by double-seaming, to the lower end edge and upper end edge of the can. This type of construction, which is well known in the art, allows the bottom wall and the annular upper wall to exert a function of structuring the body portion of the can, without requiring the incorporation of additional stiffening structural elements. This type of can has the body portion presenting a cross-section which is constant or progressively reduced from the bottom wall to the annular upper wall, the thickness of the metallic sheet being dimensioned as a function of this structural configuration of the can.

**[0003]** There are also known cans which present a body portion of tubular section inferiorly carrying the bottom wall and which is superiorly joined, through a transition portion, to a neck portion of smaller contour, in whose free upper end edge is double-seamed the peripheral edge of an annular upper wall.

**[0004]** In the can construction in which the body portion extends from one end edge to the other with the same cross-section, the provision of the annular upper wall is fundamental for obtaining the adequate structural resistance of the can, through a metallic sheet of adequate minimum thickness. Without the annular upper wall, the thickness of the metallic sheet of the body portion would have to be considerably increased, with the consequent increase in the cost of the raw material and in the weight of the can.

**[0005]** On the other hand, in cans comprising a body portion and a neck portion of reduced cross-section and height, joined by a frusto-conical or frusto-pyramidal transition portion only slightly spaced from the upper end edge of the can, the provision of the transition portion in the upper region of the can provides a substantial increase in the structural resistance of the latter, allowing eliminating the annular upper wall, with the upper opening of the can corresponding to the inner cross-section of the neck portion. In this construction, it is enough that the upper end edge of the can, i.e., of the neck portion, be bent or otherwise worked to form a curl or outer peripheral projection, surrounding the upper opening of the can and defining, jointly with the upper end edge of the latter, a seat for seating a removable lid, comprising a panel portion which incorporates a peripheral tubular portion to be tightly fitted, with interference, in the upper opening, in the interior of the neck portion, said peripheral tubular portion having a free upper edge which is bent, or otherwise worked, to form a curl or outer circumferential rib, to be seated onto the upper end edge of the can, upon the closing of the lid.

**[0006]** This prior art construction allows eliminating the annular upper wall and forming an initial tubular body, with a metallic sheet of usual thickness, for example from about 0.21mm to about 0.27mm for 3.6 liter cans, and presenting a cross-section corresponding to that of the neck portion. Subsequently, said tubular body is submitted to an expansion operation, through which are formed the transition portion and the body portion, the latter presenting a concentric cross-section, similar and larger than that of the neck portion. Thus, it is possible to obtain a can with less metallic sheet consumption.

**[0007]** In spite of the above-mentioned advantages for cans provided with a neck portion of reduced section and without an annular upper wall, this prior art construction presents the drawback of not guaranteeing a high and reliable tightness degree in the closure of the lid.

**[0008]** Another inconvenience of the can with a neck of the type cited above results from the fact that the transition portion, particularly the junction region of the latter with the neck, which presents a cross-section in the form of a radially outward-facing concave arc, reduces the can resistance to the compression axial forces, in the filling line, upon the closure of the lid or the mounting of a seal and suspension ring, in the cases in which the latter is provided. The more the cross-section contour of the neck portion is reduced in relation to the body portion, for a given height of the transition portion, the more accentuated will be the structural fragility of the can against compression axial forces. This deficiency also restrictively affects the structural resistance upon stacking.

### Summary of the Invention

**[0009]** On account of the drawbacks above, it is desired to obtain a can of the type considered above which, according to an object of the present invention, presents a high tightness degree in the lid closure, even admitting higher dimensional tolerances in the formation of the upper opening of the neck portion and of the lid.

**[0010]** A complementary object of the invention is to provide a can as defined above which presents by using a metallic sheet of an adequate minimum thickness for the body portion, the transition portion and the neck portion, a higher resistance against compression axial forces.

**[0011]** A further object of the present invention is to

provide a can as defined above which, besides presenting a high tightness degree in the lid closure and having higher resistance against compression axial forces, can receive a seal ring that is capable to axially retain the lid closed until the occurrence of an evidenced first opening, as well as to carry a retractable suspension handle.

**[0012]** These and other objects of the invention are attained by the provision of a can of the above-defined type, comprising: a body portion carrying a bottom wall; a neck portion, with a reduced section and having an upper edge incorporating an outer peripheral projection defining the contour of an upper opening of the can; a transition portion joining the tubular body portion and the neck portion; and a lid formed by a panel portion incorporating a peripheral tubular portion to be tightly fitted, with interference, in the upper opening of the can, in the interior of the neck portion, and having a free upper edge provided with an outer circumferential rib, to be seated onto the upper end edge of the neck portion.

**[0013]** According to the improvements, the outer circumferential rib of the lid inferiorly carries an annular gasket, for example a resin washer, to be seated onto the upper end edge of the neck portion upon the lid fitting on the upper opening.

**[0014]** Still according to the improvements, the transition portion can externally incorporate, in a single piece with the metallic sheet, a plurality of spaced apart longitudinal ribs joining the transition portion to an adjacent base region of the neck portion.

**[0015]** The construction generically defined above allows the lid closure, with the provision of the annular gasket, to present a high tightness degree, and the structural resistance in relation to the compression axial forces can be considerably increased by the provision of the longitudinal ribs in the transition portion.

## Brief Description of the Drawings

**[0016]** The invention will be described below, with reference to the enclosed drawings, given by way of example of a possible embodiment of the invention and in which:

Figure 1 represents a longitudinal sectional view of a can constructed according to the invention and having the lid in an open condition;

Figure 1A represents a view similar to that of figure 1, but with the lid in a closed condition;

Figure 2 represents an enlarged detail of part of figure 1, illustrating the formation of the longitudinal ribs in the transition portion;

Figure 3 represents a cross-sectional view of the neck portion of the can, taken according to line III-III in figure 1 and illustrating the arrangement of the longitudinal ribs;

Figure 4 represents a top plan view of a retaining ring to be applied to the can illustrated in figures 1 and 1A;

Figure 5 represents a partial sectional view of the retaining ring when mounted on a can with closed lid, taken according to line V-V in figure 4; and

Figure 6 represents a partial sectional view of the retaining ring when mounted on a can without the lid and with the suspension handle in the raised operative condition, taken according to line VI-VI in figure 4.

## Description of the Invention

**[0017]** As already previously described and illustrated in the enclosed drawings, the improvements proposed by the invention are applied to a can 10 formed in metallic sheet, generally tinplate, presenting a generally circular cross-section, but which can be polygonal, although not being illustrated in the drawings.

**[0018]** The tubular shaped can 10 comprises: a body portion 11, in whose lower end edge 11a is affixed, generally by double-seaming, the peripheral edge of a bottom wall 12; a neck portion 13 having a concentrical contour, which is similar and reduced in relation to that of the body portion 11, and an upper end edge 13b defining the contour of an upper opening A for the can 10; and a transition portion 14 with a profile inclined in relation to the axis of the can 10 and joining the body portion 11 and the neck portion 13. The upper end edge 13b of the neck portion 13 incorporates an outer peripheral projection 13c. In the illustrated condition, the outer peripheral projection 13c takes the form of a curl of tubular cross-section, obtained by bending the metallic sheet radially outwards in the region of the upper end edge 13b. In the drawings, the cross-section of the curl is circular, but it should be understood that a peripheral projection with different cross-sections, tubular or not, can be formed.

**[0019]** The formation of the body portion 11 is initiated by forming a tubular body with a cross-section corresponding to that of the neck portion 13, and which is then radially expanded along part of its height, to define the body portion 11 and the transition portion 14, under methods already known by the prior art, the transition portion 14 remaining inferiorly joined to the body portion 11 by a junction region in convex arc 14a and superiorly joined to the neck portion 13 by a junction region in concave arc 14b.

**[0020]** The can 10 further comprises a lid 20 formed in a single piece of stamped metallic sheet, presenting a panel portion 21 occupying great part of the cross-section area of the upper opening A and incorporating a peripheral tubular portion 22 that is configured and dimensioned to be tightly fitted, with interference, in the upper opening A, in the interior of the neck portion 13, this peripheral tubular portion 22 presenting a free upper edge 22b in which is incorporated an outer circumferential rib 22c configured to be seated onto the upper end edge 13b of the neck portion 13.

**[0021]** In the illustrated construction, the outer circumferential rib 22c takes the form of a curl of tubular cross-

section, obtained by bending radially outwards from the region of the free upper edge 22b of the peripheral tubular portion 22. Although the drawings illustrate only a curl of circular section, it should be understood that an outer circumferential rib 22 with different cross-sections, tubular or not, can be formed.

**[0022]** According to a first aspect of the invention, the outer circumferential rib 22c inferiorly carries an annular gasket 30, preferably in the form of a resin washer, for example "Plastisol", molded under the outer circumferential rib 22c of the lid 20. When the lid 20 is fitted in the upper opening A of the neck portion 13, the annular gasket 30 is seated and pressed onto the upper end edge 13b of the neck portion, considerably increasing the tightness degree of the closure of the lid 20.

**[0023]** As illustrated, the lid 20 is preferably constructed with its panel portion 21 incorporating a pending skirt 21a which forms, with the peripheral tubular portion 22, a peripheral channel 24, of rectangular section, radially separating the panel portion 21 from the peripheral tubular portion 22, the panel portion 21 lying in a plane higher than that of the bottom wall 24a of the peripheral channel 24.

**[0024]** According to a second aspect of the invention, the shaping of the can 10 is made so that the transition portion 14 externally incorporates, in a single piece, a plurality of longitudinal ribs 15, angularly spaced from each other and joining the transition portion 14 to an adjacent lower region 13a of the neck portion 13.

**[0025]** The longitudinal ribs 15 can be formed by localized bendings of the metallic sheet that forms the body portion 11, the neck portion 13 and the transition portion 14, upwardly and inclinedly extending, like a bracket, from a median region of the transition portion 14 to the adjacent lower region 13a of the neck portion 13.

**[0026]** In the illustrated embodiment, the longitudinal ribs 15 have their extension limited or only slightly larger than the longitudinal extension of the cross-section of the junction region, in concave arc 14b, which joins the transition portion 14 to the neck portion 13.

**[0027]** The improved construction described above allows a retaining ring 40 to be adapted to the can 10, which retaining ring 40 is formed in a single piece of plastic material and comprises: an upper annular portion 41, to be seated onto the free upper edge 22b of the peripheral tubular portion 22 of the lid 20; a peripheral skirt portion 42 pending from the upper annular portion 41, laterally tightly surrounding the outer circumferential rib 22c of the lid 20 and the outer peripheral projection 13c of the body portion 11 and incorporating an inner circumferential finger 43 to be seated and axially locked under the outer peripheral projection 13c of the body portion 11, preventing the lid from being removed, without evidencing the necessary use of a lever tool supported in the outer peripheral projection 13c.

**[0028]** The retaining ring 40 has its upper annular portion 41 internally incorporating the diametrically opposed ends of a suspension handle 44 which is displaced between a retracted inoperative position, coplanar or considerably coplanar to the upper annular portion 41 and having a median portion 44a connected to the upper annular portion 41 by breakable bridges 44b, and a raised operative position, obtained after the rupture of the breakable bridges 44b.

**[0029]** In the illustrated constructive form, the retaining ring 40 also incorporates, in its upper annular portion 41, a lower tubular projection 46 that is dimensioned to be fitted, with interference, in the interior of the peripheral channel 24 of the lid 20, forcing the peripheral tubular portion 22 of the latter against the neck portion 13, increasing the axial locking between the lid 20 and the neck portion 13 and also the tightness degree in this closure region.

**[0030]** For example, when applied to contain paints, varnishes and similar products, the upper annular portion 41 can radially inwardly prolong in relation to the position of the lower tubular projection 46, to form a flap 41a for scraping brushes and broaches when, after the withdrawal of the lid 20, the retaining ring is reconducted to its axially locked position under the outer peripheral projection 13c of the neck portion 13, so that the can 10 can be suspended by the suspension handle 44 and so maintained while its content is progressively removed in a continuous painting operation.

Further embodiments of the invention are:

**[0031]**

1. Improvement applied to a can of the type which comprises, in metallic sheet: a body portion (11) having a lower edge (11a) which carries a bottom wall (12); a neck portion (13) having a concentrical contour, similar and reduced in relation to that of the body portion (11), and an upper end edge (13b) which incorporates an outer peripheral projection (13c) and which defines the contour of an upper opening (A); a transition portion (14) with a profile that is inclined in relation to the axis of the can (10), joining the body portion (11) and the neck portion (13); and a lid (20) presenting a panel portion (21) which incorporates a peripheral tubular portion (22) to be tightly fitted, with interference, in the interior of the upper opening (A) of the neck portion (13) and having a free upper edge (22b) carrying an outer circumferential rib (22c) to be seated onto the upper end edge (13b) of the neck portion (13), characterized in that the outer circumferential rib (22c) inferiorly carries, an annular gasket (30) to be seated onto the upper outer edge (13b) of the neck portion (13) upon the fitting of the lid (20) on the upper opening (A).

2. Improvement, as set forth in claim 1, characterized in that the annular gasket (30) is defined by a resin washer molded under the outer circumferential rib (22c) of the lid (20).

3. Improvement, as set forth in any one of claims 1 or 2, characterized in that the transition portion (14) externally incorporates, in a single piece, a plurality of spaced apart longitudinal ribs (15) joining the transition portion (14) to an adjacent lower region (13a) of the neck portion (13).

4. Improvement, as set forth in claim 3, characterized in that the longitudinal ribs (15) have the extension limited to a junction region, in concave arc (14b), of the transition portion (14) with the neck portion (13).

5. Improvement, as set forth in claim 3, characterized in that the outer peripheral projection (13c) and the outer circumferential rib (22c) are defined by bending radially outwards, from the upper end edge (13b) of the neck portion (13) and from the free upper edge (22b) of the peripheral tubular portion (22) of the lid (20), respectively.

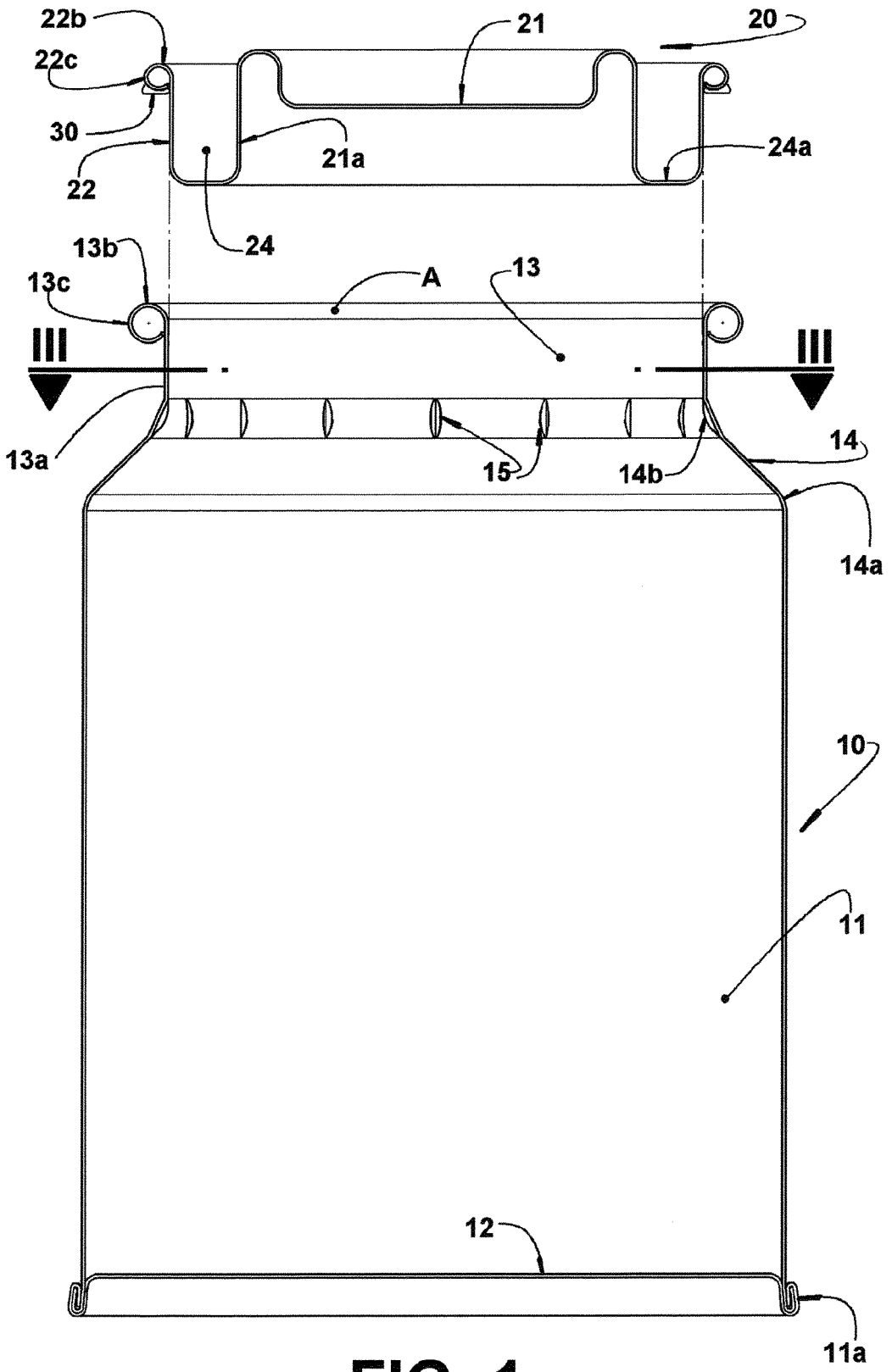
6. Improvement, as set forth in any one of claims 1, 2, 3, 4 or 5, characterized in that it further comprises a retaining ring (40), in a single piece of plastic material and having: an upper annular portion (41) to be seated onto the free upper edge (22b) of the lid (20); a peripheral skirt portion (42) pending from the upper annular portion (41), laterally tightly surrounding the outer circumferential rib (22c) of the lid (20) and the outer peripheral projection (13c) of the body portion (11) and incorporating an inner circumferential finger (43) to be seated and axially locked under the outer peripheral projection (13c) of the body portion (11); and at least one suspension handle (44) having opposite ends incorporated to the upper annular portion (41) and being displaceable between a retracted inoperative position, coplanar to the upper annular portion (41) and medianly connected thereto by breakable bridges 44b, and a raised operative position obtained by the rupture of the breakable bridges (44b).

7. Improvement, as set forth in claim 6, the panel portion (21a) of the lid (20) incorporating a pending skirt (21a) which forms, with the peripheral tubular portion (22) a peripheral channel (24), the improvement being characterized in that the upper annular portion (41) of the retaining ring (40) incorporates a lower tubular projection (46) to be fitted, with interference, in the interior of the peripheral channel (24) of the lid (20), forcing the peripheral tubular portion (22) of the latter against the neck portion (13) of the can (10).

## Claims

1. Improvement applied to a can of the type which comprises, in metallic sheet: a body portion (11) having a lower edge (11a) which carries a bottom wall (12); a neck portion (13) having a concentrical contour, similar and reduced in relation to that of the body portion (11), and an upper end edge (13b) which incorporates an outer peripheral projection (13c) and which defines the contour of an upper opening (A); a transition portion (14) with a profile that is inclined in relation to the axis of the can (10), joining the body portion (11) and the neck portion (13); and a lid (20) presenting a panel portion (21) which incorporates a peripheral tubular portion (22) to be tightly fitted, with interference, in the interior of the upper opening (A) of the neck portion (13) and having a free upper edge (22b) carrying an outer circumferential rib (22c) to be seated onto the upper end edge (13b) of the neck portion (13), whereby the outer circumferential rib (22c) inferiorly carries, an annular gasket (30) to be seated onto the upper outer edge (13b) of the neck portion (13) upon the fitting of the lid (20) on the upper opening (A) and
a retaining ring (40), in a single piece of plastic material and having: an upper annular portion (41) to be seated onto the free upper edge (22b) of the lid (20); a peripheral skirt portion (42) pending from the upper annular portion (41), laterally tightly surrounding the outer circumferential rib (22c) of the lid (20) and the outer peripheral projection (13c) of the body portion (11) and incorporating an inner circumferential finger (43) to be seated and axially locked under the outer peripheral projection (13c) of the body portion (11); and at least one suspension handle (44) having opposite ends incorporated to the upper annular portion (41) and being displaceable between a retracted inoperative position, coplanar to the upper annular portion (41) and medianly connected thereto by breakable bridges 44b, and a raised operative position obtained by the rupture of the breakable bridges (44b).

2. Improvement, as set forth in claim 1, the panel portion (21a) of the lid (20) incorporating a pending skirt (21a) which forms, with the peripheral tubular portion (22) a peripheral channel (24), the improvement being **characterized in that** the upper annular portion (41) of the retaining ring (40) incorporates a lower tubular projection (46) to be fitted, with interference, in the interior of the peripheral channel (24) of the lid (20), forcing the peripheral tubular portion (22) of the latter against the neck portion (13) of the can (10).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20
21a
24a
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III
III
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11a

FIG. 1

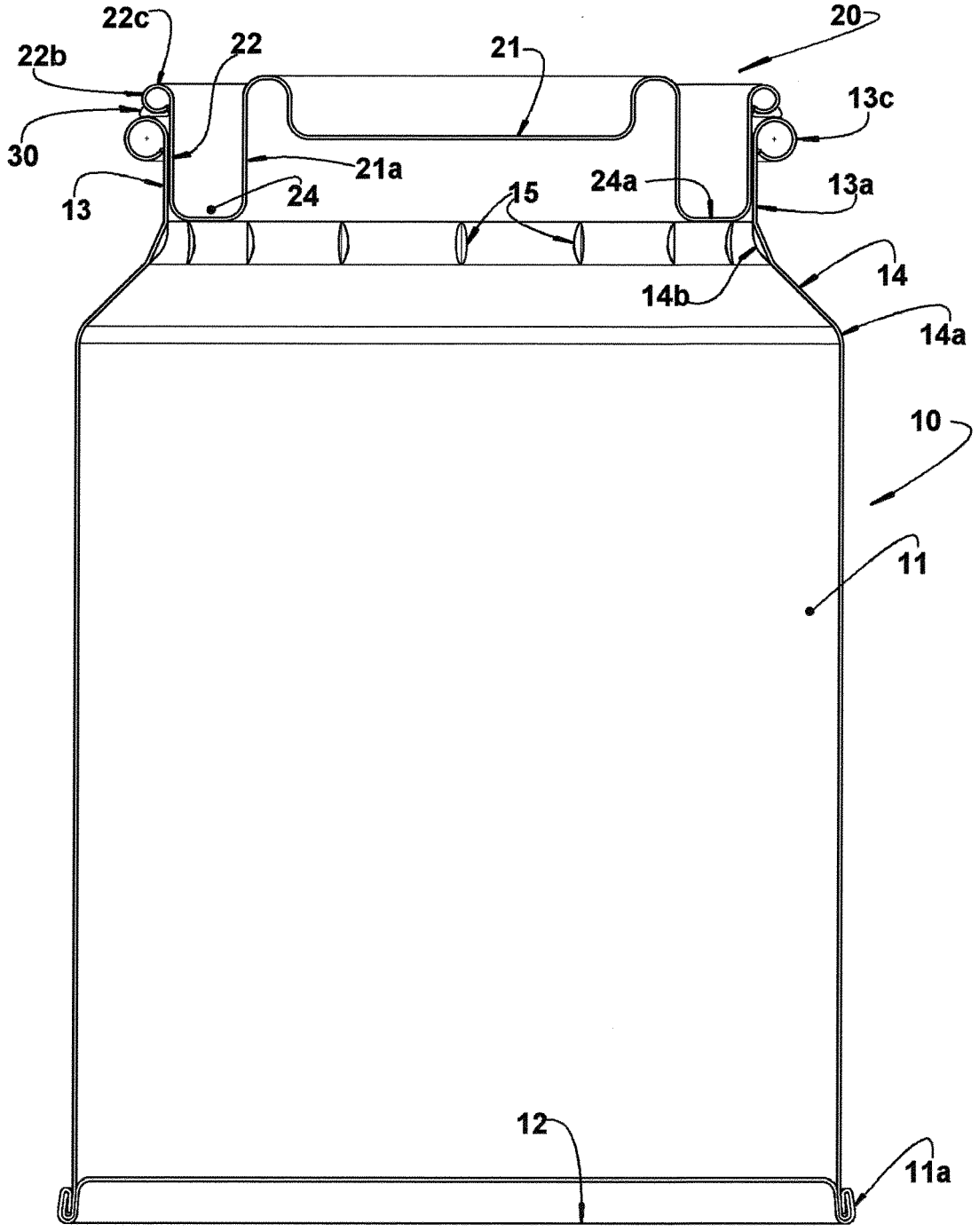



FIG. 1A

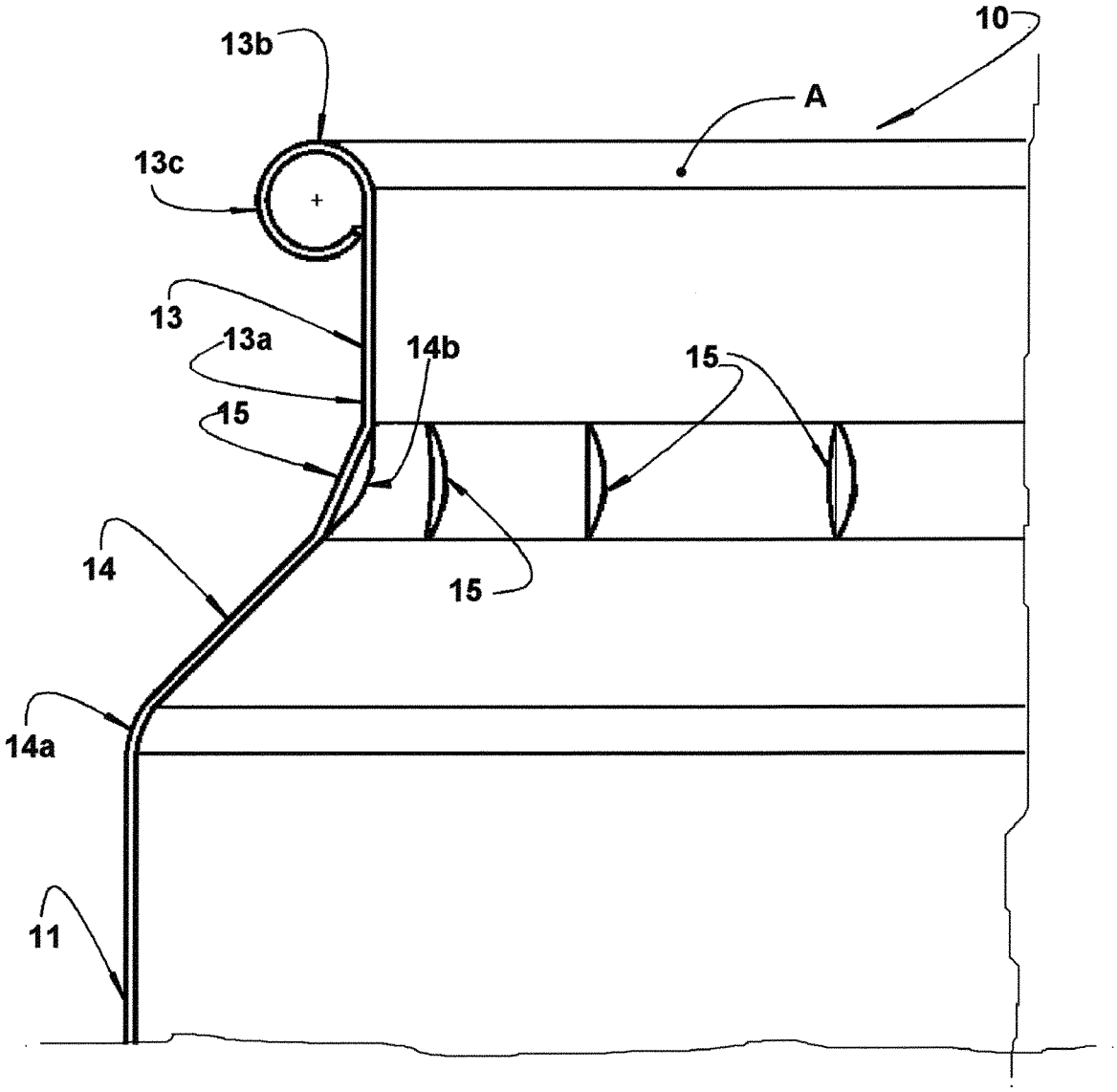



FIG. 2

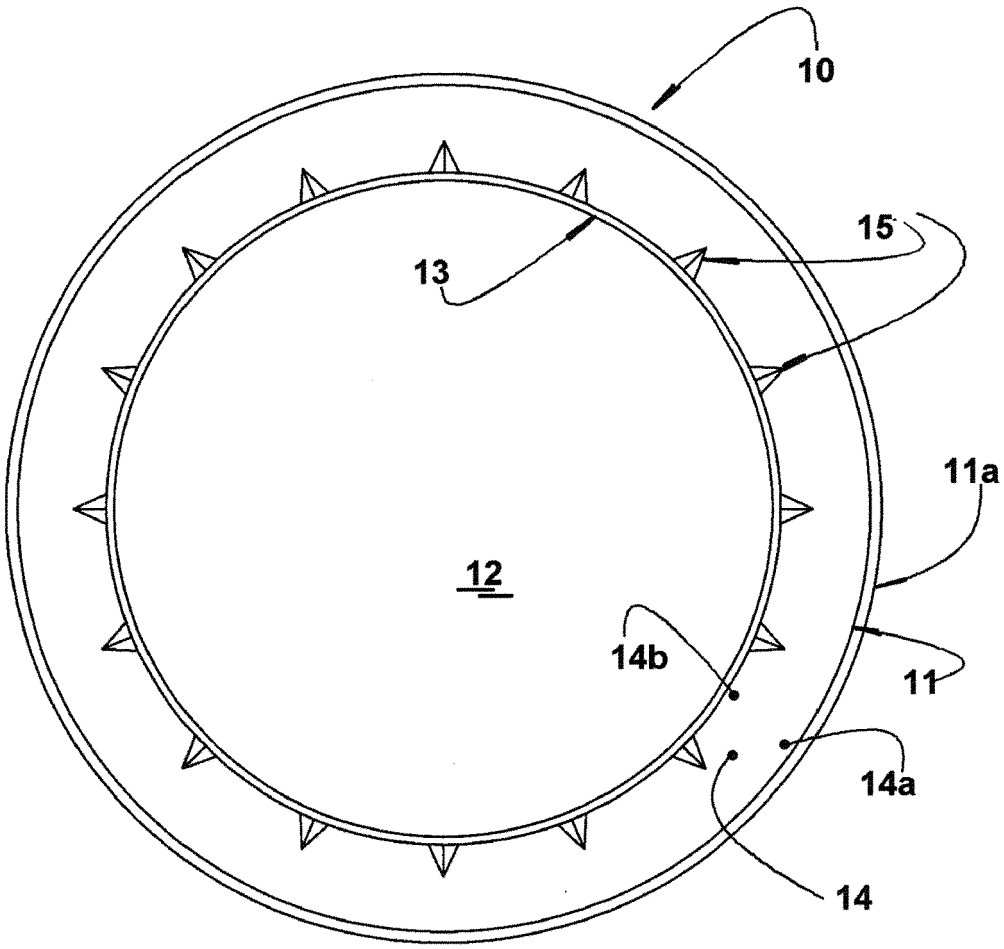



FIG. 3

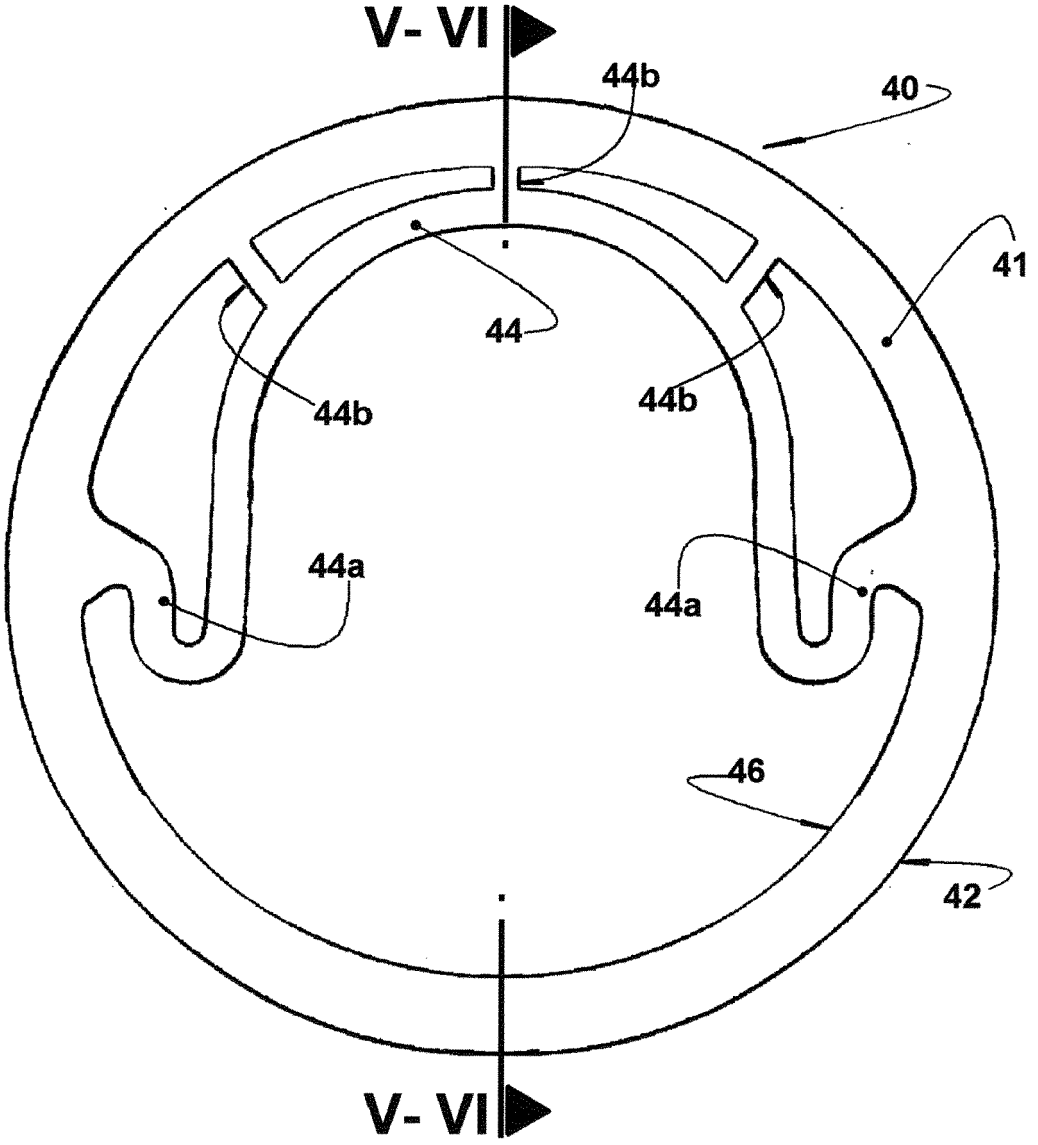
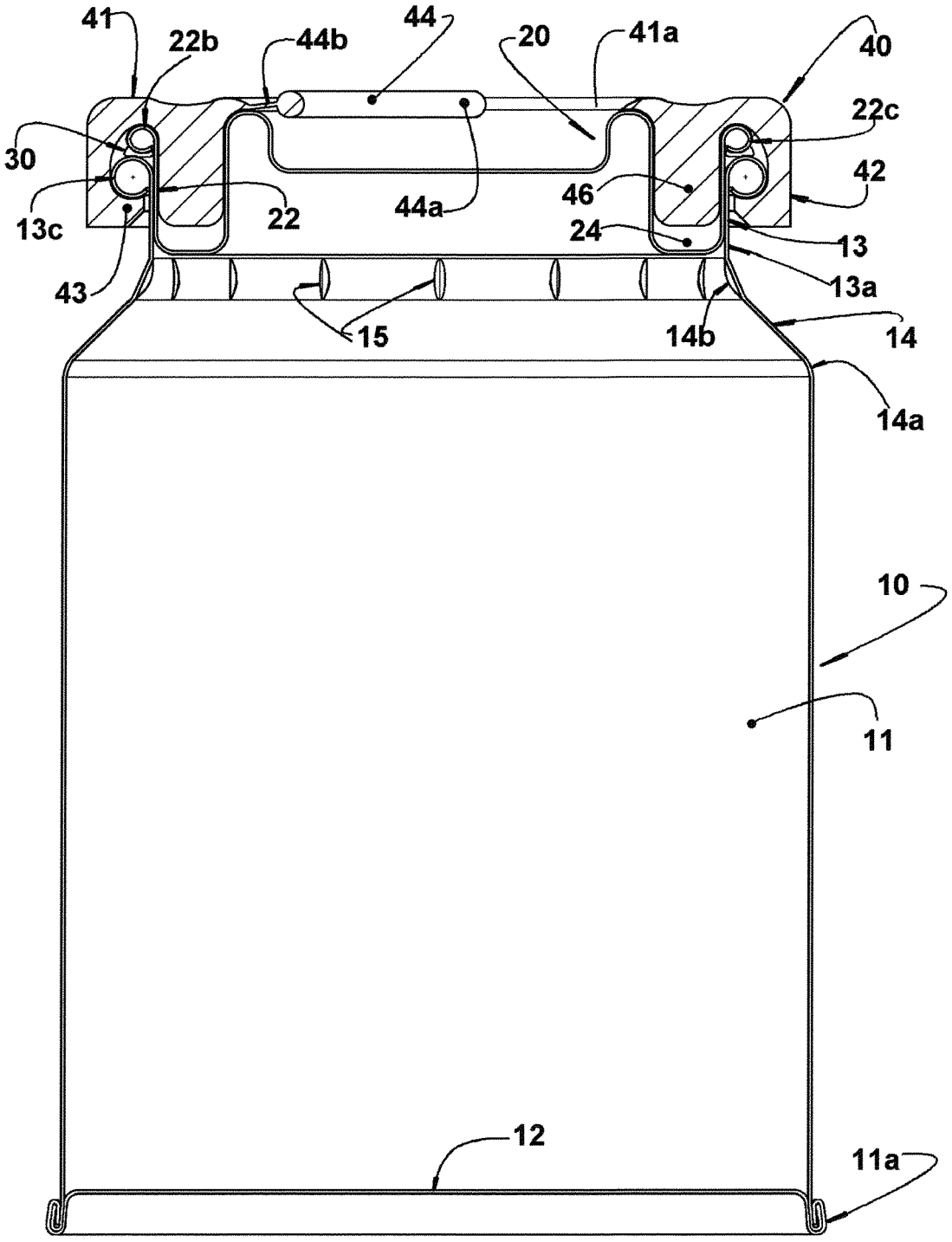



FIG. 4


41
22b
44b
44
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41a
40
22c
30
42
13c
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44a
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24
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15
14b
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14a
10
11
12
11a

FIG. 5

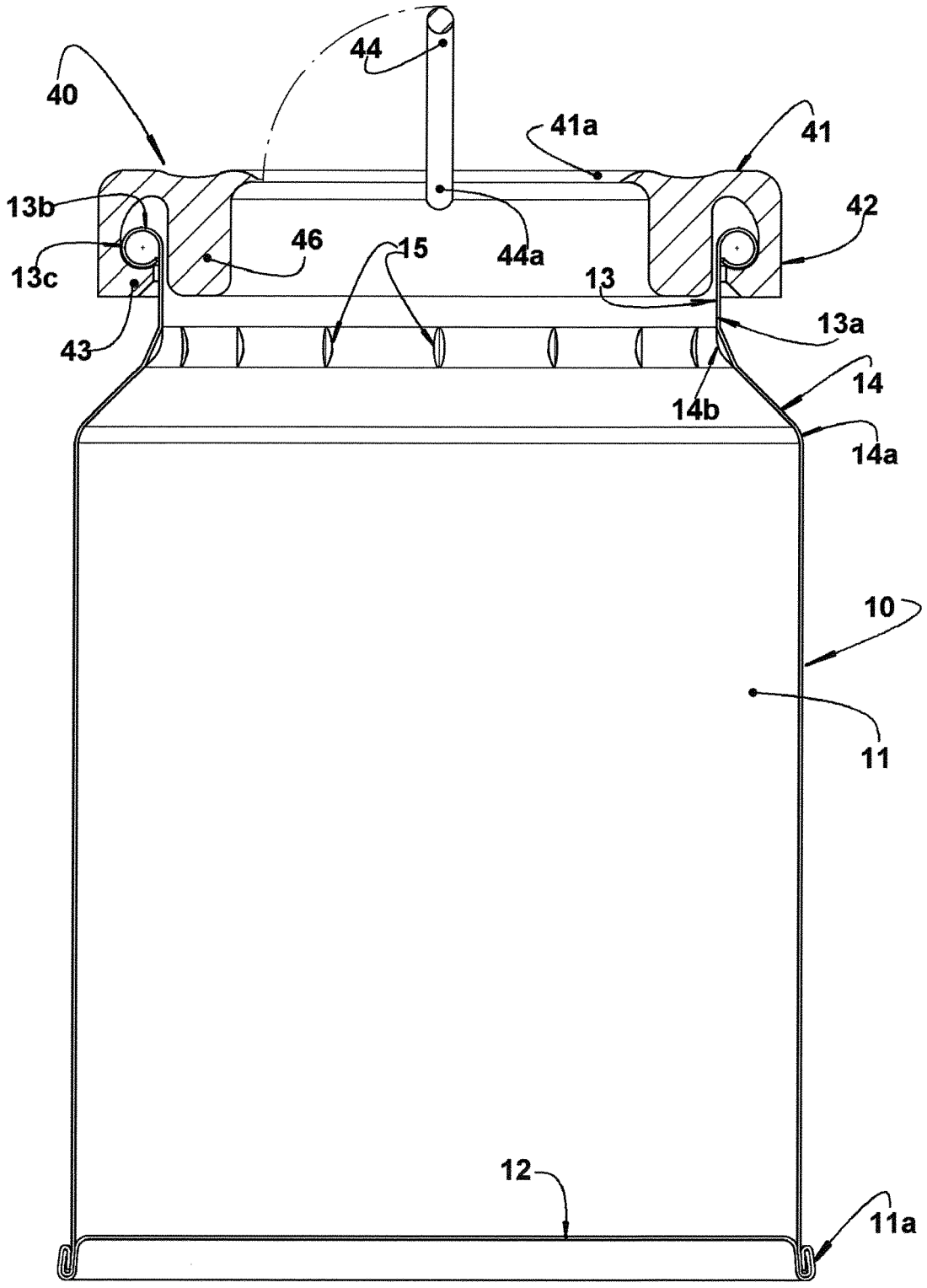


FIG. 6

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# EUROPEAN SEARCH REPORT

Application Number
EP 15 16 7083

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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 23 September 2015 | Newell, Philip |

CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 16 7083

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23-09-2015

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