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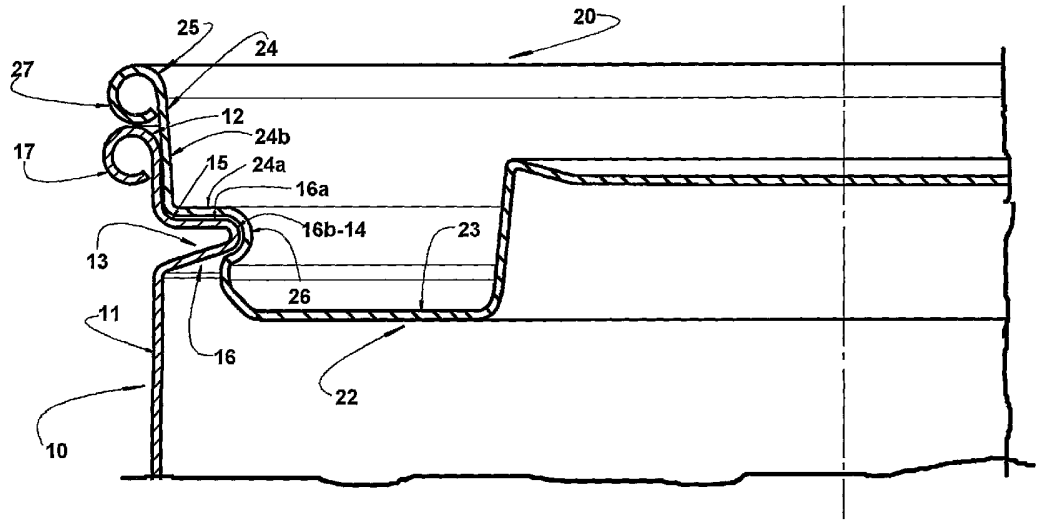

(57) Abstract: A closure arrangement for a can of the type presenting a tubular body (10), with a circular or polygonal cross section, which is inferiorly closed and comprises: a peripheral side wall (11) provided with an upper edge (12); and a structural ring (13) internal to the tubular body (10) and which is hermetically united to the peripheral side wall (11) in order to define an upper opening (14) of the can and a seat (15) for the seating of a sealing element (20), the structural ring (13) being defined by a circumferential rib (16), formed by a recess in the peripheral side wall (11) which is axially spaced back in relation to the upper end (12) of the latter and projecting radially into the tubular body (10).

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CLOSURE ARRANGEMENT FOR A CAN

Field of the Invention

The present invention refers to a closure arrangement to be applied to a can obtained in metallic sheet and of the type which comprises a tubular body presenting a peripheral side wall with a circular or polygonal contour and having a lower end portion, affixing or incorporating a bottom wall, and an upper end portion carrying, internally, a structural ring defining an opening to access the interior of the can, and a seat on which is seated and retained a sealing element, in the form of a removable and reclosable lid which is stamped in metallic sheet or molded in plastic material, or in the form of a generally metallic film which is peripherally glued on the structural ring and definitively removed upon the first opening of the can.

Background of the Invention

Determined products of progressive consumption and which are packaged in bulk, such as certain food products, paints and the like, should be submitted to hermetic storage and require the lid to be of the reclosable type, so that it may be reclosed as many times as needed during the progressive consumption of the stored product, in order to guarantee the tightness of the can and protect the remaining content thereof.

Prior art cans with a press-fit lid are well known, in which the lid is press-fitted in a structural ring which is externally double-seamed to an upper edge of the peripheral side wall of the tubular body of the can. The tightness is guaranteed when the lid is fitted in the seat defined in the structural ring. In some cases, particularly when food products are concerned, there is the need to provide a hermetic

taper evident seal until the first opening of the can and which is usually defined by a thin aluminum sheet, or other adequate material, which is double seamed to the upper edge of the peripheral side wall jointly with the structural ring.

In other known solutions, such as those described in Brazilian patent applications PI0203950-8 and PI0303833-5, the press-fit lid is constructed in plastic material and comprises a sealing portion which is removably seated and retained in the seat defined in the structural ring, and a manually breakable seal provided around the upper end portion of the tubular body of the can.

Another known solution comprises the provision of a structural ring, whose upper face defines an annular surface for the seating and gluing of the marginal portion of a seal, usually in aluminum foil and which is manually detached upon the first opening of the can. In this constructive solution, there is provided a plastic overlid or cover that is removably fitted over the upper edge of the peripheral side wall of the tubular body, in order to protect the content of the can after the seal has been removed.

In any of the three types of closure arrangements mentioned above, there is the need of providing a piece for defining the structural ring which, independently of the different shapes it may present, it has to be externally double seamed to the upper edge of the peripheral side wall of the tubular body of the can. The provision of the structural ring is mandatory to impart the necessary structural strength to the open upper end portion of the tubular body of the can and also to define the seat for the seating of the sealing element in the form of a metallic lid, plastic lid or seal.

However, in the known prior art constructions, the structural ring is defined as a separate piece in relation to the tubular body, consuming a respective quantity of tin plate for the formation thereof and requiring to be double seamed so as to be tightly affixed to the upper edge of the peripheral side wall of the can. Besides requiring the addition of more raw material, the operation of double seaming the known structural ring considerably limits the possibilities of reducing the manufacture costs of the cans.

Summary of the Invention

By reason of the inconveniences cited above and related to raw material and manufacture costs to provide the structural ring, it is an object of the present invention to provide a closure arrangement for cans of the type considered herein, which eliminates not only the provision of the structural ring as a metallic sheet piece different from that of the tubular body of the can, but also the operation of double seaming the structural ring to the upper edge of the peripheral side wall of the tubular body of the can, without however impairing the characteristics of structural strength of the can and formation of the seat for the sealing element.

It is a further object of the present invention to provide a closure arrangement as cited above, which allows the structural ring to be shaped to define different patterns for the seat onto which will be seated different elements for hermetically sealing the opening that gives access to the interior of the can.

The present closure arrangement is applied to a can of the type presenting a tubular body, of circular or polygonal cross section, which is inferiorly closed and comprises: a peripheral side wall provided with an upper edge; and a structural ring internal to the

tubular body and which is hermetically united to the peripheral side wall so as to define an upper opening of the can and a seat for the seating of a sealing element.

According to the invention, the structural ring is defined by a circumferential rib formed by a recess in the peripheral side wall which is axially spaced back in relation to the upper end of the latter and projecting radially into the tubular body.

The construction proposed by the present invention allows the structural ring of the can to be defined by deformation of the peripheral side wall of said can, saving not only the material that would be used for stamping the double seamed structural ring of the prior art, but also the double seaming operation of said ring to the structure of the tubular body of the can.

The circumferential rib that defines the new structural ring can be constructed so as to define a seat for the seating of a sealing element which can take the form of a press-fit lid stamped in metallic sheet or molded in plastic material or a tamper evident seal, which is peripherally and removably glued over the annular upper face of said circumferential rib.

Brief Description of the Drawings

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

Figure 1 is a partial perspective and exploded view of an assembly formed by a can, a sealing element and an overlid, presenting the closure arrangement of the present invention and in which the sealing element takes the form of a film that is removably glued on

the circumferential rib;

Figure 2 is a partial perspective and exploded view similar to that of figure 1, but illustrating another embodiment for the circumferential rib of the closure arrangement;

Figure 3 is a partial diametrical sectional view of the assembly illustrated in figure 1 and in the condition in which both the sealing element and the overlid are mounted to the tubular body of the can;

Figure 4 is a is a similar view to that of figure 3, but illustrating the closure arrangement with another embodiment for the circumferential rib;

Figure 5 is a partial diametrical sectional view of an assembly formed by a can and a press-fit lid in the mounted condition and using the closure arrangement of the present invention;

Figure 5a is an enlarged detail of figure 5 illustrating a possible constructive solution for a sealing gasket to be provided between the seat and the lid.

Figure 6 is a partial diametrical sectional view similar to that of figure 5, but illustrating another possible construction for the lid to be used in the closure arrangement of the present invention;

Figure 7 is a similar view to that of figure 6, but illustrating the closure arrangement applied to the upper portion of a can provided with a diametrical reduction in its upper region; and

Figure 8 is a partial diametrical sectional view of a can tubular body constructed according to another embodiment.

Detailed Description of the Invention

As illustrated in the appended drawings, the closure arrangement of the present invention is applied to a can generally made of tin plate and presenting a

tubular body 10 with a circular or polygonal cross-section and which is inferiorly closed by a bottom wall (not illustrated) and comprising: a peripheral side wall 11 provided with an upper edge 12, and a structural ring 13, internal to the tubular body 10 and which is hermetically joined to the peripheral side wall 11, in order to define an upper opening 14 for the can, as well as a seat 15 onto which will be seated a sealing element 20, which can present different constructions, as described ahead.

Figures 1-4 of the appended drawings are related to a closure arrangement in which the sealing element 20 is defined by a film 21, generally in impermeable material and preferably metalized, which is removably glued to the upper face 16a of a circumferential rib 16. This sealing element 20 is constructed in such a way as to be definitively removed by the user from its mounted position upon the first opening of the can so as to give access to the interior of the can.

In this type of construction, the circumferential rib 16 presents its upper face 16a usually flat and orthogonal to the axis of the can to facilitate the hermetic and secure gluing of the marginal portion of the film 21 on the circumferential rib 16.

In the embodiment illustrated in figures 1 and 3, the circumferential rib 16 presents a cross section in the approximate shape of a horizontal "U", with the lateral legs being parallel to each other and with the basic region defining the inner edge 16b of the circumferential rib 16 and whose shape can have different characteristics, depending on the construction used for the sealing element 20. In figures 2 and 4, the circumferential rib 16 presents a cross section in the approximate form of a horizontal "V", with a rounded vertex, defining the inner edge

16a of the circumferential rib 16 and having a lateral leg defining the upper face 16a of the circumferential rib 16 and which is preferably disposed orthogonally to the axis of the can when the sealing element 20 takes the form of the film 21 that hermetically seals the can.

Upon using a sealing element 20 in the form of a film 21 removably glued over the circumferential rib 16, the closure arrangement further comprises an overlid 30 which is formed in a single piece having a recessed median portion 31 to be housed in the interior of the tubular body 10, in a level higher than that of the circumferential rib 16 and by a peripheral portion 32 with a cross section in the approximate form of an inverted "U" and which is dimensioned to be tightly fitted over the upper edge 12 of the peripheral side wall 11 of the tubular body 10 of the can.

In the embodiment illustrated in figures 1-4, the upper edge 12 of the peripheral side wall 11 of the can is bent outwardly, downwardly and inwardly, in order to define a tubular rib 17 externally incorporated to said upper edge 12, collaborating in the structural stiffening of the latter and defining a peripheral salience in this region of the can which, besides operating as a seating means for the peripheral portion 32 of the overlid 30, operates as an axial retention stop for peripheral portions of other types of sealing elements that can be fitted in the seat 15 of the can. As illustrated in figures 1-7, the tubular rib 17 of the upper edge 12 of the peripheral side wall 11 of the can may present a circular or substantially circular cross section.

The axial retention of the overlid 30 to the upper edge 12 of the can is obtained by the fact that the peripheral portion 32 of said overlid 30 has a

radially internal wall 32a which is dimensioned and configured to be telescopically and relatively tightly seated against the inner face of a portion of the peripheral side wall 11 of the can defined between the circumferential rib 16 and the upper edge 12. Said peripheral portion 32 further has a basic wall 32b to be seated on said upper edge 12 of the can, and a radially external wall 32c to be seated against the tubular rib 17, surrounding the latter. The radially external wall 32c of the peripheral portion 32 of the overlid 30 presents a free lower end edge that incorporates an external tubular curl 33 that imparts a better structural strength to the marginal portion of the overlid 30, which is generally molded in plastic material or the like.

Figures 5, 6 and 7 illustrate a construction for a can similar to that illustrated in figures 1-4, but using another type of sealing element 20 that dispenses the use of the film 21 glued over the circumferential rib 16. In this way of carrying out the invention, the circumferential rib 16 presents its inner edge 16b configured to define a preferably circular convex arc, and the sealing element 20 is defined by a lid 22 that comprises, in a single piece of metal foil or plastic material, a basic wall 23 and a peripheral wall 24 that presents an upper edge 25, to be seated on a portion of the peripheral side wall 11 of the tubular body 10 which is defined above the upper opening 14 of the can, and a circumferential recess 26 whose cross section is in the form of a concave arc turned radially outwardly, preferably in a circular development and which is configured to fit, therewithin, the inner edge 16b of the circumferential rib 16 upon the seating of the lid 22 on the seat 15.

Also in this construction for the press-fit lid 22,

the circumferential rib 16 can present a cross section in any adequate form to define a seat for the seating and retention of the lid 22. In the illustrated embodiments, the circumferential rib 16 presents the cross section in the approximate form of a horizontal "U" or "V" and the inner edge 16b of the circumferential rib 16 is formed by the basic portion of the "U" shaped profile or by the vertex of the "V" shaped profile.

With this construction, when the lid 22 is fitted in the seat 15, the inner edge 16b of the circumferential rib 16 is fitted, by elastic deformation of at least one of the peripheral side wall 11 of the can and the peripheral wall of the lid 22, in the interior of the circumferential recess 26 of the latter, allowing to obtain not only a fitting that hermetically seals the lid 22 to the seat 15, but also an effective and secure axial retention of the lid 22 to the tubular body 10 of the can.

Considering that the tubular body 10 of the can is usually formed of a metal foil provided with a longitudinal seam, which is obtained by welding overlapping longitudinal edges of metal foil, there is the problem of obtaining an adequate sealing between the circumferential rib 16 and the circumferential recess 26 in the seaming region.

Thus, even taking into account the reduced thickness of the metal foil that forms the tubular body 10 of the can, it is desirable to provide, in the region between the lid 22 and the circumferential rib 16 of the tubular body 10, a sealing element 50 made of an elastically deformable material compatible with the canned product, in order to accommodate the superficial alteration of the circumferential rib 16 in the longitudinally seamed region of the tubular

body 10.

As illustrated in figure 5a, for a possible construction, the elastically deformable sealing element 50 takes the form of an annular gasket covering at least part of the radial extension of the inner surface of the circumferential recess 26 of the lid 22, and said gasket can be formed in any suitable material, resinous or not, such as plastisol. The sealing element 50 can be dimensioned to surround only the inner edge 16b of the circumferential rib 16 or also, additionally, the upper face 16a of the latter and even a certain extension of the peripheral wall 24 of the lid 22.

In the case of the lids 22 constructed in plastic material, as illustrated in figure 6, depending on the characteristics of the seaming, of the plastic material of the lid, and of the product to be stored, the provision of the sealing element 50 may not be needed.

As illustrated in figures, 5, 6 and 7, the peripheral wall 24 of the lid 22 can be configured to present an annular radial portion 24a to be seated on the upper face 16a of the circumferential rib 16, and an axial upper portion 24b to be seated against the inner face of a portion of the peripheral side wall 11 of the can, defined between the circumferential rib 16 and its upper edge 12. This construction allows obtaining an even more effective sealing between the lid 22 and the region of the seat 15 of the tubular body 10 of the can.

In the embodiment illustrated in figure 5, the upper edge 25 of the peripheral wall 11 of the lid 22 incorporates an external tubular rib 27 to be seated on the upper edge 12 of the peripheral side wall 11 of the tubular body 10 of the can upon the closing of the

lid 22, by fitting the inner edge of the circumferential rib 16 in the interior of the circumferential recess 26 of the peripheral wall 11 of the lid 22.

In the construction illustrated in figures 3-7, the external tubular rib 27 of the lid 22 is seated on the tubular rib 17 of the peripheral side wall 11 of the tubular body 10.

As illustrated in figure 6, the upper edge 25 of the peripheral wall 11 of the lid 22 may incorporate a seal 28 comprising a skirt 28a to be relatively tightly seated around the tubular body 10, immediately below the tubular rib 17 of its peripheral side wall 11, said lower skirt 28a being superiorly united to the upper edge 25 of the peripheral wall 11 of the lid 24 by means of bridges 28b to be manually broken when submitted to a certain force upon the first opening of the lid 22.

It should be noted that the lower skirt 28a of the seal 28 is positioned below the tubular rib 17 and operates as a stop, which prevents the lid 22 from being removed without breaking the bridges 28b and liberating the seal 28.

As illustrated in figure 7, the circumferential rib 16 can be provided in a region of the peripheral side wall 11 of the tubular body 10 presenting a diameter that is substantially inferior to the diameter of the remainder of the tubular body 10 of the can, in order to make the seal 28 of the lid 22 to remain contained in the interior of the axial projection of the remainder of the tubular body 10.

In the embodiments illustrated in figures 1-7, the tubular rib 17 is shaped and dimensioned so as to be maintained in a level above that in which the circumferential rib 16 is provided, allowing that the

circumferential recess which forms the latter and which is defined in the peripheral side wall 11, to be visible in a lateral visualization of the can.

Besides the problem related to the finishing operation of the can, the shape of the tubular rib 17, in the embodiments illustrated in figures 1-7, limits the structural reinforcement effect of the can, in the open upper portion of the tubular body 10, to the extension defined between the circumferential rib 16 and the upper edge 12.

Figure 8 illustrates a constructive alternative for the tubular body 10 of the can, according to which the tubular rib 17 operates as a esthetic finishing element for the can and as a structural reinforcement element for the open upper portion of the tubular body 10 of the can.

According to the present improvement, the tubular rib 17 continues to be externally incorporated to the upper edge 12 of the peripheral side wall 11, but extending downwardly, beyond the circumferential rib 16, in order to cover the recess that forms the latter in said peripheral side wall 11.

As illustrated, the tubular rib 17 is constructed to have its free lower end portion 17a inwardly and upwardly bent and disposed adjacent the peripheral side wall 11 of the tubular body 10, below the circumferential rib 16.

In the construction exemplified in figure 8, the free lower end portion 17a of the tubular rib 17 presents an end region 17b, which is upwardly bent and laterally seated against the peripheral side wall 11 of the tubular body 10 of the can.

The construction proposed herein allows the tubular rib 17 to completely cover the recess that forms the circumferential rib 16, giving an aspect of more

integrity to the can and producing a structural reinforcement of larger axial extension.

The tubular rib 17 is generally configured in an oblong shape in the direction of the can axis and presents a median extension 17c that is substantially parallel to the peripheral side wall 11 of the tubular body 10, in the region in which the circumferential rib 16 is incorporated, whereby the tubular rib 17 takes the form of a kind of strap surrounding the upper end portion of the can.

While only some embodiments of the present invention have been described and illustrated, it should be understood that changes as to the form and arrangement of the elements could be made without departing from the constructive concept defined in the appended claims.

CLAIMS

1. A closure arrangement for a can of the type presenting a tubular body (10) which is inferiorly closed and comprises: a peripheral side wall (11) provided with an upper edge (12); and a structural ring (13) internal to the tubular body (10) and which is hermetically united to the peripheral side wall (11) in order to define an upper opening (14) of the can and a seat (15) for the seating of a sealing element (20), characterized in that the structural ring (13) is defined by a circumferential rib (16) formed by a recess in the peripheral side wall (11) which is axially spaced back in relation to the upper end (12) of the latter and projecting radially into the tubular body (10).

2. The closure arrangement as set forth in claim 1, characterized in that the circumferential rib (16) presents an upper face (16a) which is flat and generally orthogonal to the can axis, the sealing element (20) being defined by a film (21) which is removably glued to the upper face (16a) of the circumferential rib (16).

3. The closure arrangement as set forth in claim 2, characterized in that the circumferential rib (16) has the cross section in the approximate form of a horizontal "U" with its lateral legs being parallel to each other.

4. The closure arrangement as set forth in claim 2, characterized in that the circumferential rib (16) has the cross section in the approximate form of a horizontal "V" with a rounded vertex and with a lateral leg defining the upper face (16a) of the circumferential rib (16), disposed orthogonal to the can axis.

5. The closure arrangement as set forth in claim 2,

characterized in that it comprises an overlid (30) which is formed in a single piece by a recessed median portion (31) to be housed in the interior of the tubular body (10) above the circumferential rib (16), and by a peripheral portion (32) which is dimensioned to be tightly fitted over the upper edge (12) of the peripheral side wall (11) of the tubular body (10) of the can

6. The closure arrangement as set forth in claim 5, characterized in that the upper edge (12) of the peripheral side wall (11) is bent outwardly, downwardly and inwardly, so as to define a tubular rib (17) externally incorporated to the upper edge (12) of the peripheral side wall (11) of the tubular body (10) of the can.

7. The closure arrangement as set forth in claim 6, characterized in that the tubular rib (17) has a circular cross section.

8. The closure arrangement as set forth in claim 6, characterized in that the peripheral portion (32) of the overlid (30) presents the cross section in the approximate form of an inverted "U", having a radially internal wall (32a) to be seated against the inner face of a portion of the peripheral side wall (11) defined between the circumferential rib (16) and the upper edge (12), a basic wall (32b) to be seated on said upper edge (12) and a radially external wall (32c) to be seated against the tubular rib (17).

9. The closure arrangement as set forth in claim 8, characterized in that the radially external wall (32c) of the peripheral portion (32) of the overlid (30) has a free lower end edge incorporating an external tubular curl (33).

10. The closure arrangement as set forth in claim 1, characterized in that the circumferential rib (16) has

an inner edge (16b) configured to define a convex arc, the sealing element (20) being defined by a lid (22) which comprises, in a single piece, a basic wall (23) and a peripheral wall (24) presenting an upper edge (25) to be seated on a portion of the peripheral side wall (11) of the tubular body (10) defined above the upper opening (14) of the can, and a circumferential recess (26) having the cross section in the form of a concave arc turned radially outwardly and configured to fit, therewithin, the inner edge (16b) of the circumferential rib (16) upon the seating of the lid (22) in the seat (15).

11. The closure arrangement as set forth in claim 10, characterized in that the inner edge (16b) of the circumferential rib (16) is configured in a circular convex arc and the cross section of the circumferential recess (26) is defined by a circular concave arc.

12. The closure arrangement as set forth in claim 10, characterized in that the circumferential rib (16) presents the cross section in the approximate form of any one of the flat "U" and "V" profiles and the inner edge (16b) of the circumferential rib (16) is formed in one of the basic portion of the "U" profile and the vertex of the "V" profile.

13. The closure arrangement as set forth in claim 10, characterized in that the circumferential rib (16) has an annular upper face (16a) and the peripheral wall (24) of the lid (22) has an annular radial portion (24a) to be seated against the upper face (16a) of the circumferential rib (16) and an axial upper portion (24b) to be seated against the peripheral side wall (11) defined between the circumferential rib (16) and its upper edge (12).

14. The closure arrangement as set forth in claim 10,

characterized in that it comprises a sealing element (50), in an elastically deformable material, which is mounted between the circumferential rib (16) of the tubular body (10) and the circumferential recess (26) of the lid (22).

15. The closure arrangement as set forth in claim 10, characterized in that the sealing element (50) is in the form of an annular gasket covering at least part of the radial extension of the circumferential recess (26) of the lid (22)

16. The closure arrangement as set forth in claim 13, characterized in that the upper edge (12) of the peripheral wall (24) of the lid (22) incorporates an external tubular rib (33) to be seated on the upper edge (12) of the peripheral side wall (11) of the tubular body (10) of the can.

17. The closure arrangement as set forth in claim 16, characterized in that the upper edge (12) of the peripheral side wall (11) of the tubular body (10) incorporates, externally, a tubular rib (17) onto which is seated the external tubular rib (33) of the peripheral wall (24) of the lid (22).

18. The closure arrangement as set forth in claim 13, characterized in that the upper edge (12) of the peripheral side wall (11) of the tubular body (10) incorporates, externally, a tubular rib (17) and the upper edge (12) of the peripheral wall (24) of the lid (22) incorporates an extension of a seal (28) comprising a lower skirt (28a) to be tightly seated around the tubular body (10) immediately below the tubular rib (17) of its peripheral side wall (11) and being superiorly united to the upper edge (12) of the peripheral wall (24) of the lid (22) by means of bridges (28b) to be manually broken when submitted to a certain force upon the first opening of the lid

(22).

19. The closure arrangement as set forth in claim 1, characterized in that the upper wall (12) of the peripheral side wall (11) of the tubular body (10) is outwardly, downwardly and inwardly bent so as to define a tubular rib (17) externally incorporated to the upper edge (12) of the peripheral side wall (11) and downwardly extending beyond the circumferential rib (16), covering the recess that forms the latter.

20. The closure arrangement as set forth in claim 19, characterized in that the tubular rib (17) presents a free lower end portion (17a) which is bent inwardly and upwardly and disposed adjacent to the peripheral side wall (11) of the tubular body (10) below the circumferential rib (16).

21. The closure arrangement as set forth in claim 19, characterized in that the free lower end portion (17a) of the tubular rib (17) presents an end region (17b) which is upwardly bent and laterally seated against the peripheral side wall (11) of the tubular body (10).

22. The closure arrangement as set forth in claim 19, characterized in that the tubular rib (17) is oblong in the direction of the can axis.

23. The closure arrangement as set forth in claim 19, characterized in that the tubular rib (17) presents a median extension (17c) substantially parallel to the peripheral side wall (11) of the tubular body (10) in the region of the latter in which the circumferential rib (16) is incorporated.

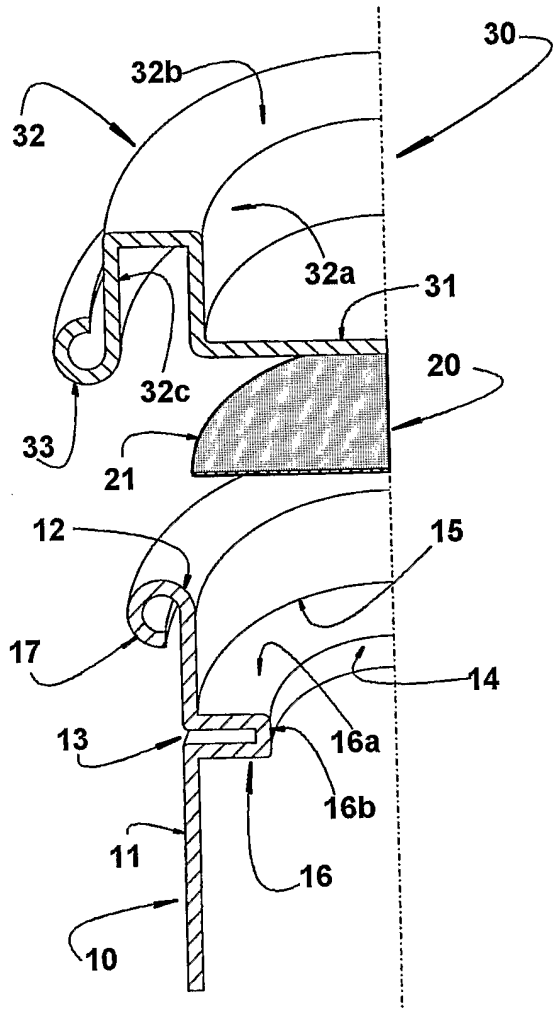
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FIG. 1

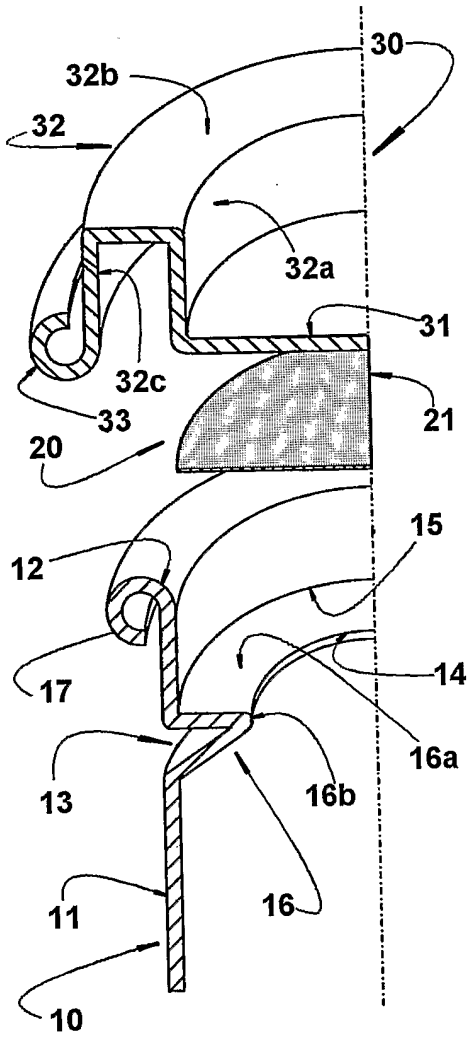
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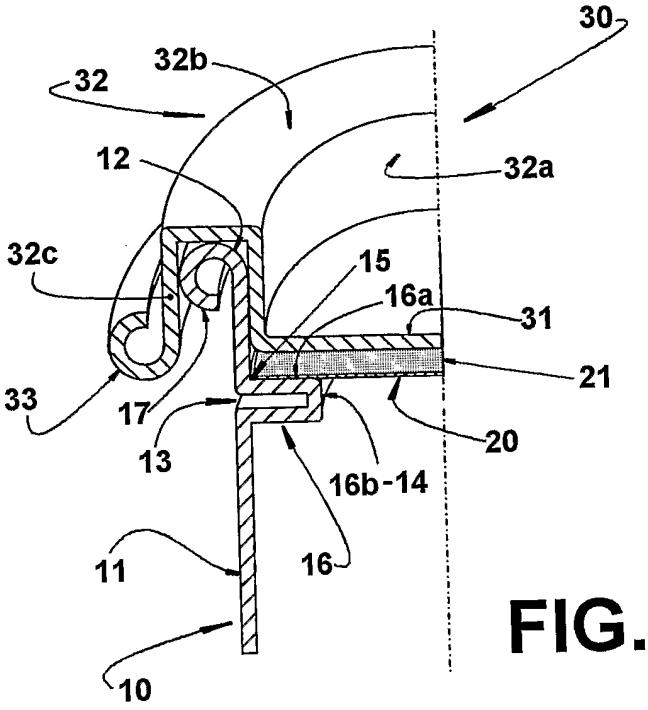
FIG. 2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32b
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16b-14
11
16
10

FIG. 3

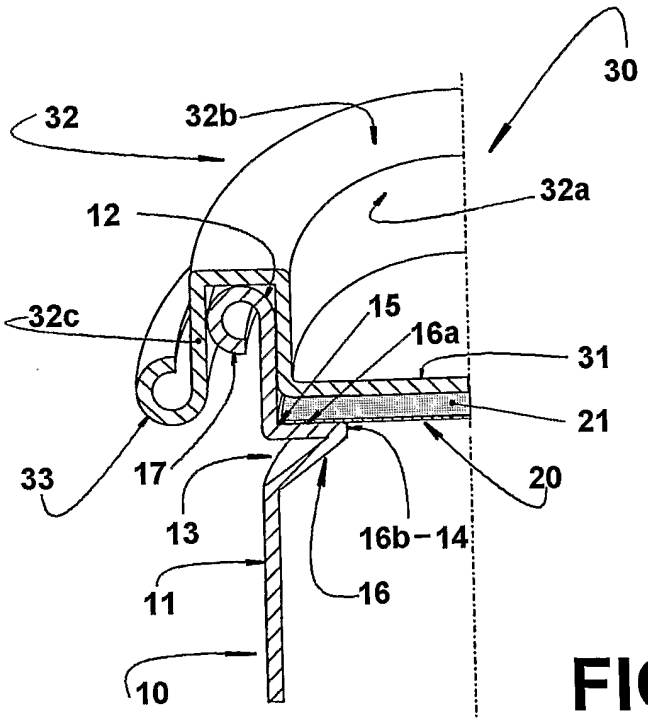
30
32
32b
12
32a
32c
15
16a
31
21
33
17
20
13
16b-14
11
16
10

FIG. 4

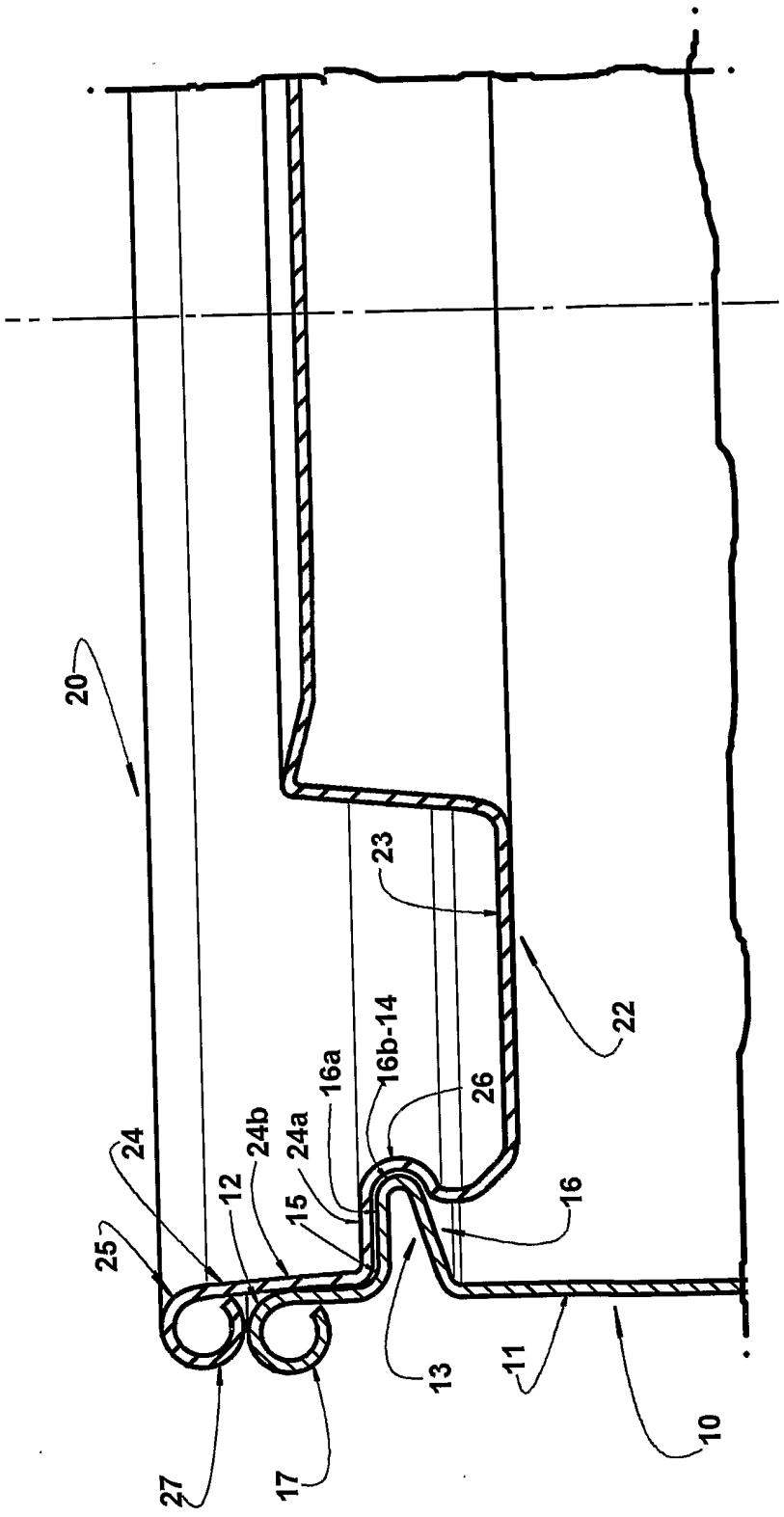

FIG. 5

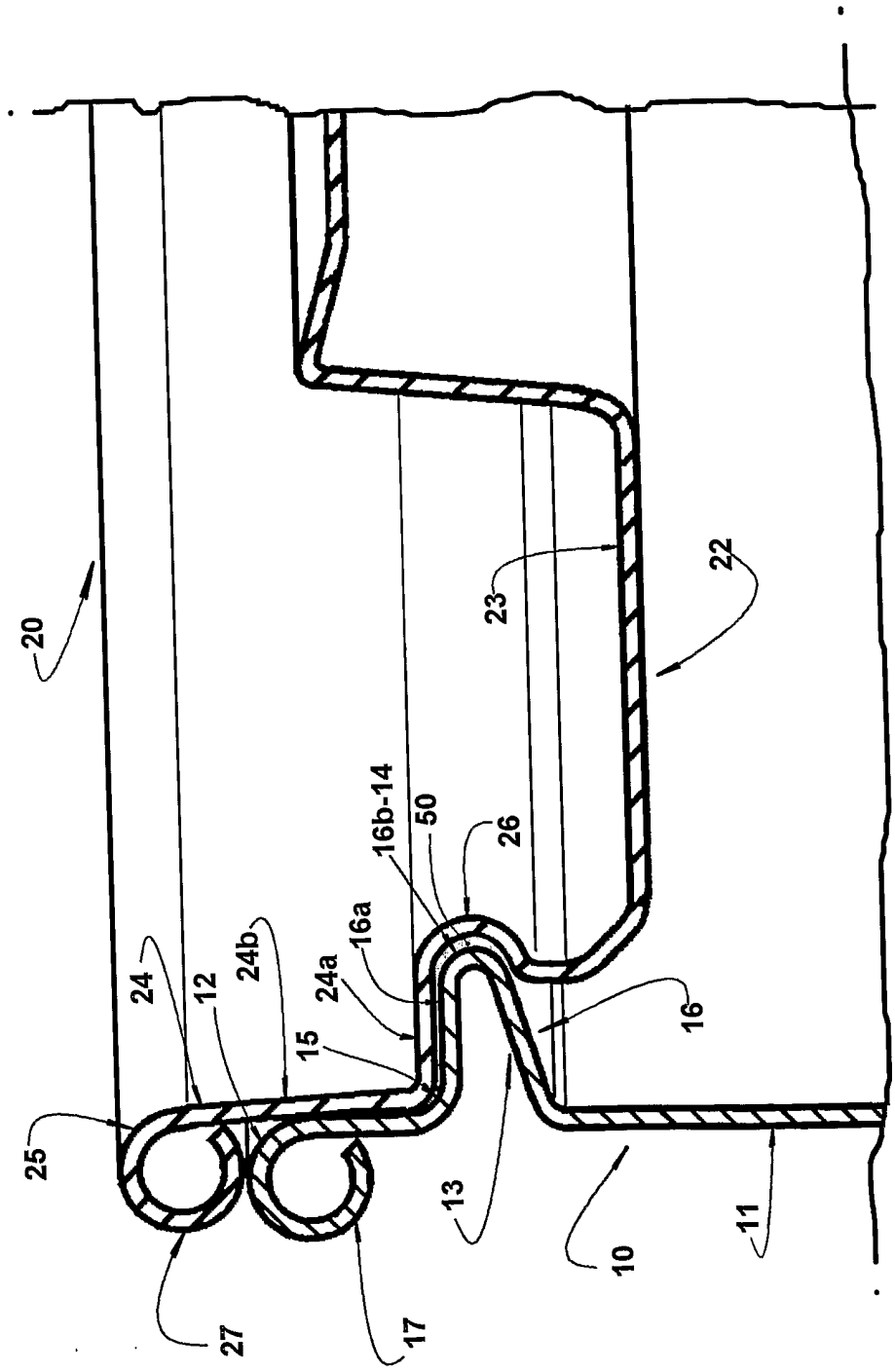

FIG. 5a

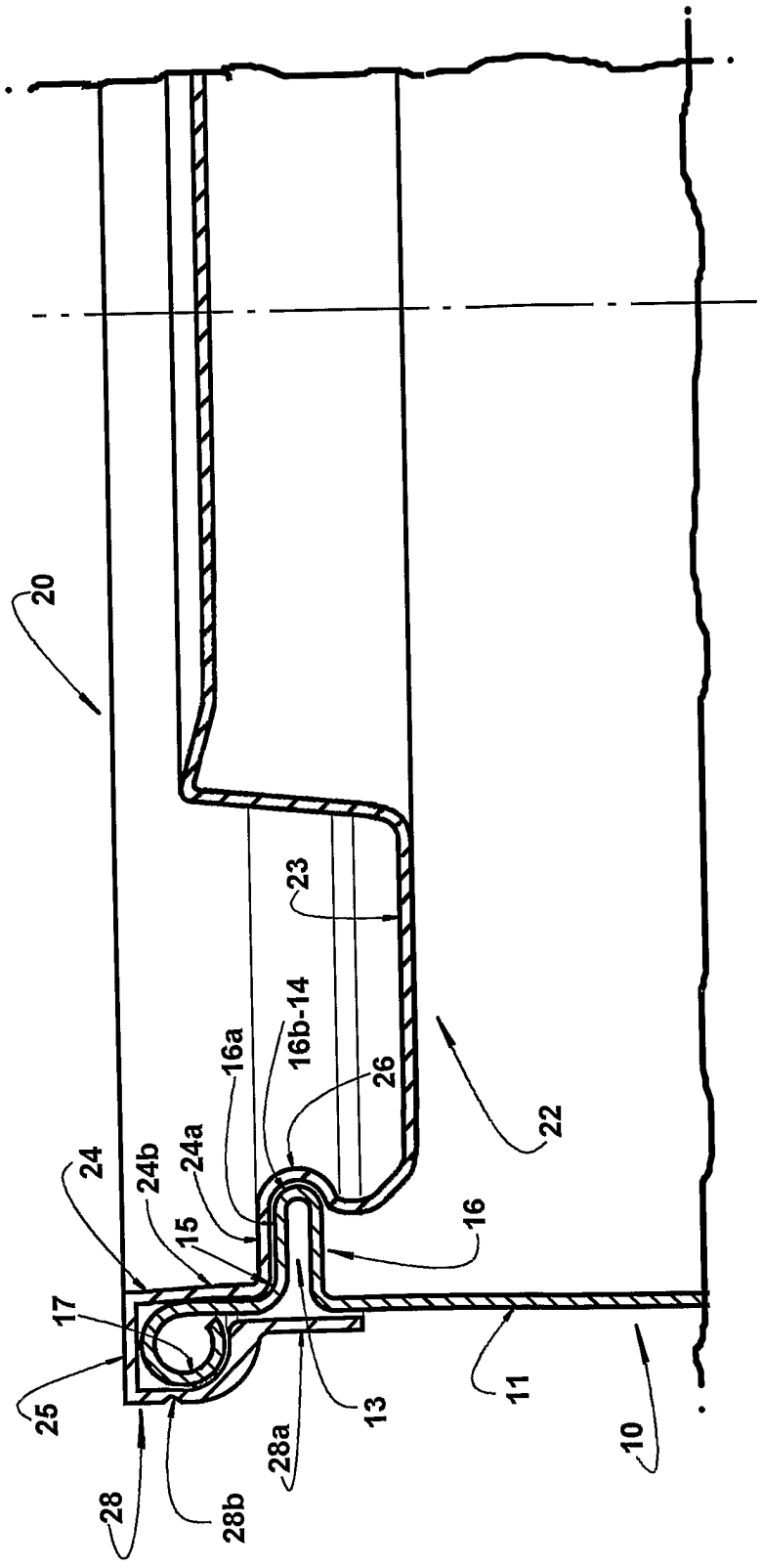

FIG. 6

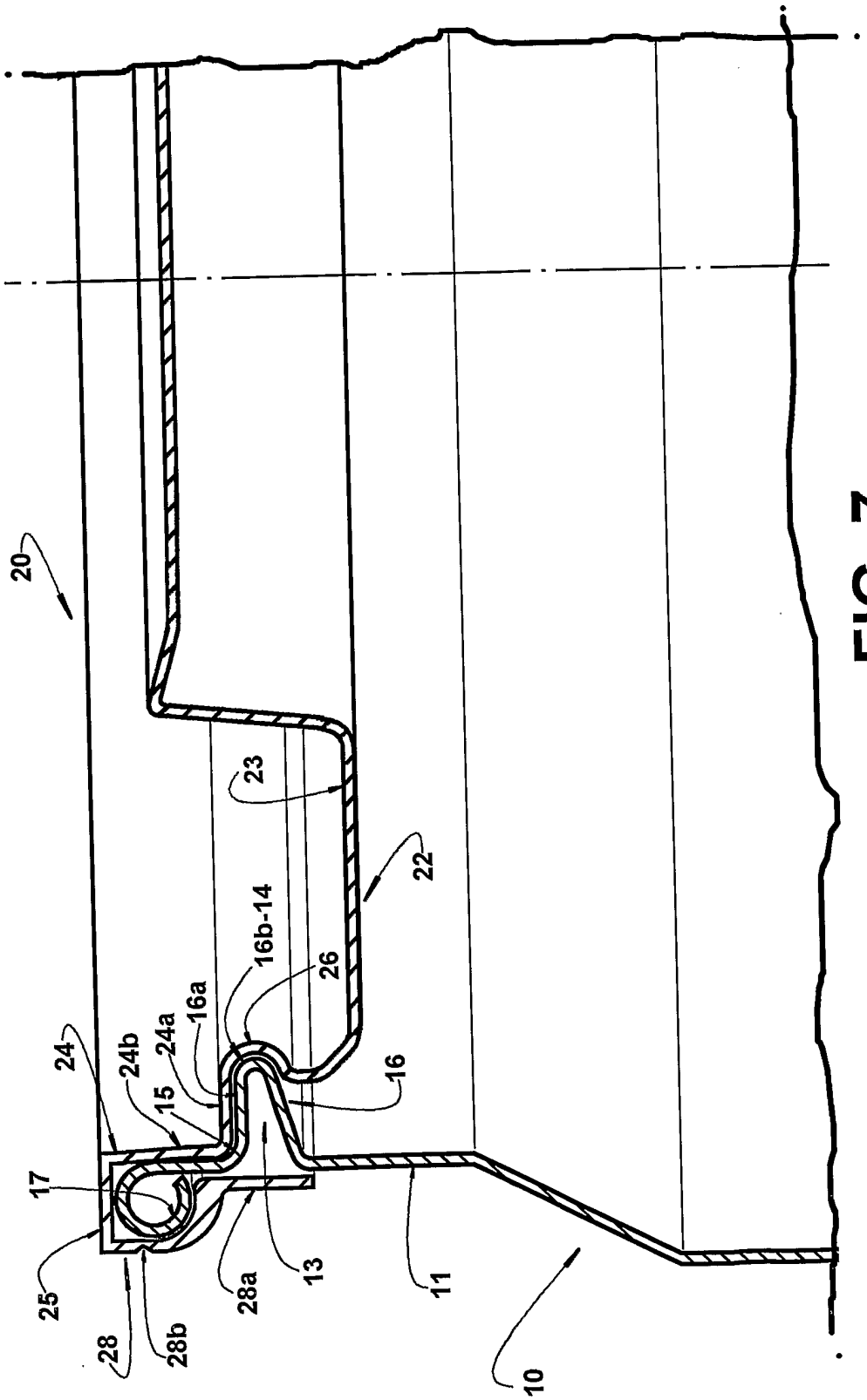

FIG. 7

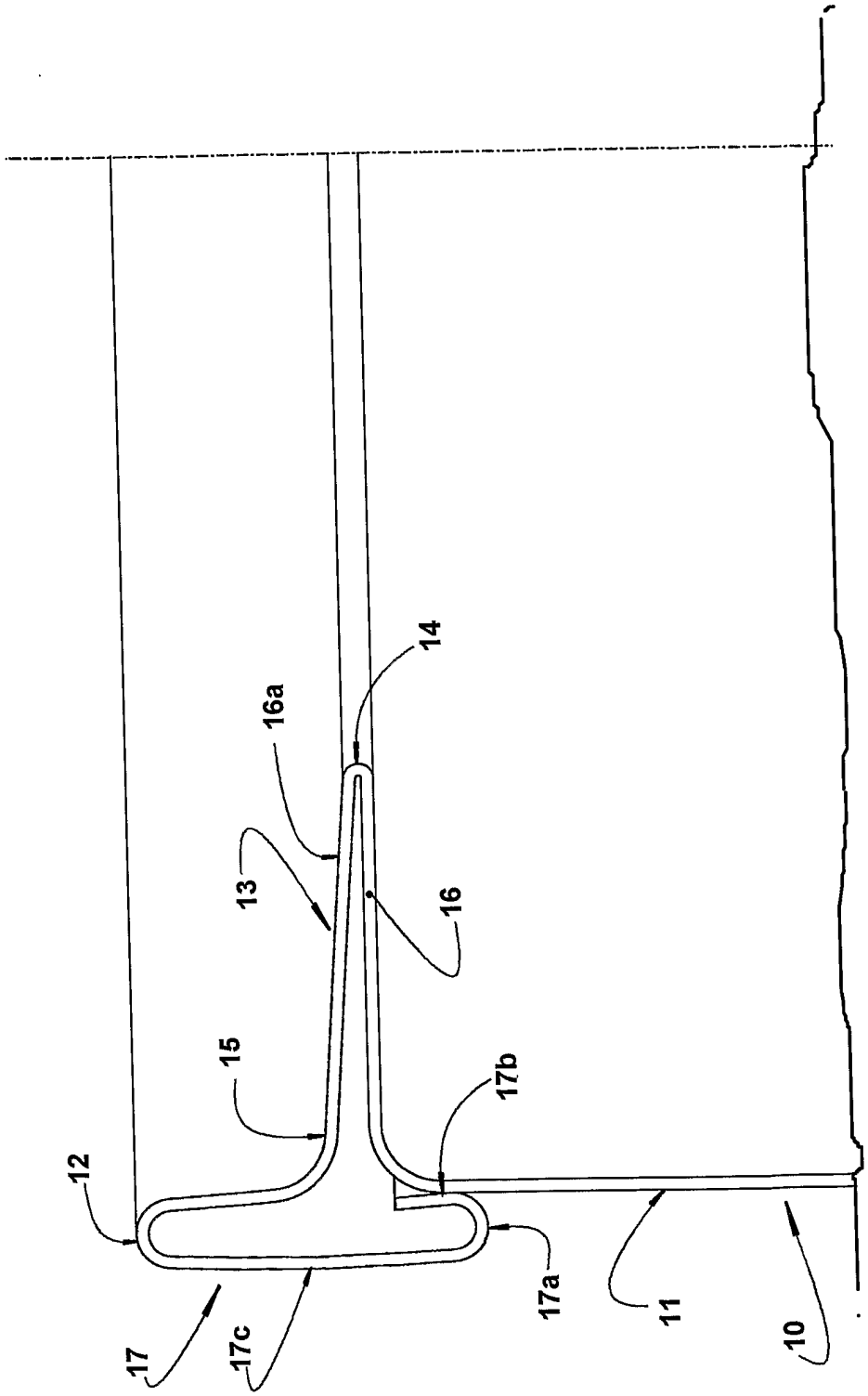

FIG. 8