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(54) GAS BOTTLE INCLUDING A SAFETY VALVE

GASFLASCHE MIT EINEM SICHERHEITSVENTIL

BOUTEILLE DE GAZ COMPRENANT UNE VALVE DE SÉCURITÉ

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian patent application no. 102018000009658 filed on 22/10/2018.

TECHNICAL FIELD

[0002] The present invention relates to a gas bottle, in particular of portable-type and designed to be used to supply gas to an external user device, such as barbecues, stoves, lamps and similar devices, including a safety valve for limiting outflows of gas following the disconnection of the bottle itself, when not yet empty, from the external user device.

BACKGROUND ART

[0003] Gas bottles of the type indicated above are known, essentially comprising:

- a sealed container, filled with pressurised gas, for example butane gas or a mixture of butane and propane gas, and provided, on its upper wall, with a pierceable portion for allowing the supply of gas to the external user device; and
- a leakage-limiter or safety valve positioned inside the container so as to at least limit the outflow of gas in the case in which the pierceable portion has been pierced and the bottle itself is not connected to the external user device.

[0004] In particular, the valve is usually fixed inside the container of the bottle by means of a support structure wedged between the upper wall of the container itself and its lateral wall, on which it rests at a specific internal annular shoulder. This solution is somewhat complex and above all costly in relation to the total cost for marketing bottles of this type.

[0005] Therefore the need to find alternative valve fixing systems, which are simpler and less costly than those currently available, is keenly felt.

[0006] WO 2015/092447 discloses a safety valve for a gas bottle fixed, by means of an adhesive substance or by means of a support frame, around the pierceable portion of the upper wall of the container of the gas bottle.

[0007] In particular, the valve is made entirely of an elastically flexible material and comprises a fixed part, connected in one piece, in use, to the upper wall of the container with the exception of a plurality of gas passages, and a cap-like movable part, which is normally concave towards the pierceable portion of the container and is thrust downwards, in use, by a portion of the external user device after piercing of the pierceable portion of the gas bottle so as to widen the gas passages.

[0008] In the case of detachment of the external user device from the bottle, the movable part, thrust by the pressure of the gas, tends to bend upwards changing its concavity into convexity and closing the hole made in the pierceable portion of the bottle. However, it has been found that the pressure of the gas inside the container of the bottle is not generally sufficient to cause the movable part to obstruct the hole of the pierceable portion, as the movement required of the movable part is considerable.

[0009] GR1008914B and EP1406041A2 disclose gas bottles as defined in the preamble of claim 1.

DISCLOSURE OF INVENTION

[0010] Therefore, the object of the present invention is to make a gas bottle, which satisfies the aforesaid requirements and at the same time overcomes the drawbacks of the prior art solutions specified above, in particular allowing, in use, an effective and reliable closing following the detachment of the external user device.

[0011] The aforesaid object is achieved by the present invention, as it relates to a gas bottle, as defined in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] For a better understanding of the present invention, a preferred embodiment thereof is described below, purely by way of non-limiting example and with reference to the accompanying drawings, wherein:

- Fig. 1 illustrates, in a partial cross-sectional perspective view, a gas bottle provided with a safety valve made according to the dictates of the present invention;
- Figs. 2 and 3 are perspective views, on an enlarged scale and from opposite sides, of the safety valve of Fig. 1; and
- Figs. 4, 5 and 6 illustrate, on an enlarged scale, a detail of the bottle of Fig. 1, in three different operating configurations.

BEST MODE FOR CARRYING OUT THE INVENTION

[0013] With reference to Fig. 1, the reference numeral 1 indicates as a whole a gas bottle comprising a sealed container 2 filled with pressurised gas, preferably butane gas or a mixture of butane and propane gas, and provided, on its wall 3, namely on its upper wall, with a pierceable portion 4 (also visible in Figs. 4, 5 and 6) for allowing the supply of gas to an external user device 5 (known and illustrated schematically in Fig. 5), for example barbecues, stoves or lamps.

[0014] As can be seen in Fig. 1, the container 2 preferably has a more or less cylindrical configuration having an axis A. More precisely, the container 2 is delimited, as well as by the upper wall 3, having a circular profile, by a lower wall 6, substantially disc-shaped, and by a

more or less cylindrical lateral wall 7.

[0015] The upper wall 3 is slightly convex outwardly and has a central circular impression, convex towards the inside of the container 2 and defining the pierceable portion 4.

[0016] The bottle 1 further comprises a safety valve 10 (visible in all of the accompanying figures), made according to the dictates of the present invention and positioned inside the container 2 so as to limit at least the outflow of gas in the case in which the pierceable portion 4 has been pierced and the bottle 1 itself is not connected to the user device 5.

[0017] The valve 10 is fixed, solely by means of an adhesive substance (not visible in the accompanying figures), to the wall 3 of the container 2 around the pierceable portion 4.

[0018] It should be noted that in the present description and in the claims the term "around" is used both to indicate the peripheral edge of the pierceable portion 4 and the annular area immediately surrounding the pierceable portion 4 itself.

[0019] In the embodiment illustrated in Fig. 1, the adhesive substance is applied around the pierceable portion 4 and is interposed between the valve 10 and the wall 3. Preferably, the adhesive substance is applied to several points spaced from each other.

[0020] The adhesive substance used is preferably an acrylic glue that, following various experiments conducted by the Applicant, has proved suitable to create a particularly long-lasting connection in the dry environment defined by the butane gas or by the mixture of butane and propane gas.

[0021] The valve 10 is made entirely of an elastically deformable material, such as rubber, and is fixed to the container 2 with its central axis coaxial to the axis A (Figs. 1, 4, 5 and 6).

[0022] The following description of the valve 10 will be made, for reasons of simplicity and clarity, with reference to the position of mounting of the valve 10 itself inside the container 2, but this should not be considered as limiting.

[0023] With reference to the accompanying figures, the valve 10 comprises a fixed part 11 and a movable part 12 both being together a single component.

[0024] The fixed part 11 comprises an annular flange 13 with an axis A fixed in use to the inside of the container 2 around the pierceable portion 4. In the example illustrated, the flange 13 extends substantially along a plane orthogonal to the axis A.

[0025] The movable part 12 of the valve 10 extends in a cantilever fashion from the flange 13 and is elastically mobile with respect thereto along the axis A.

[0026] Advantageously, the movable part 12 comprises a sealing portion 14, which is arranged in a radially innermost position with respect to the flange 13 with reference to the axis A and is elastically loaded in a first direction R along the axis A itself for cooperating, in use, against the wall 3 of the container 2 around the pierceable portion 4 so as to define a normal sealing condition (Figs. 1, 4 and 6), wherein at least the outflow of gas towards the pierceable portion 4 itself is limited; the sealing portion 14 is also movable, in use, by the action of an external thrust, exerted in this case by the user device 5, in a second direction T along the axis A, opposite to the direction R, to define a condition of opening (Fig. 5), wherein the sealing portion 14 itself is axially spaced from the wall 3.

[0027] The movable part 12 further comprises a plurality of petals 15 equally spaced angularly from one another around the axis A, delimiting respective through windows 16 between one another and connecting the flange 13 to the sealing portion 14.

[0028] In particular, the sealing portion 14 comprises a solid central region 18, in the embodiment illustrated consisting of a flat disc orthogonal to the axis A, and a tubular element 19 protruding in a cantilever fashion from the periphery of the central region 18 along the axis A and configured to cooperate in contact, at its free end portion 20, with the wall 3 of the container 2.

[0029] It should be noted that, in the present description and in the claims, the terms "annular" and "tubular" are intended in their broadest sense, i.e., to designate endless elements or portions, not necessarily circular but also oval, polygonal, etc.

[0030] As can be seen in particular in Figs. 4 to 6, each petal 15 and the portion of the flange 13 on which this petal 15 rests, have, as a whole, a substantially S-shaped configuration in a cross-section taken along a plane passing through the axis (A) .

[0031] In practice, each petal 15 extends starting from an area of the sealing portion 14, which is spaced from the free end portion 20 along the axis A.

[0032] In detail, each petal 15 connects a peripheral edge 21 of the central region 18 with a peripheral radially innermost edge 22 of the flange 13.

[0033] Each petal 15 further comprises an end section 23, protruding in a cantilever fashion from the opposite side of the central region 18 with respect to the tubular element 19 and having a curvilinear configuration, and a substantially rectilinear main section 24, having an oblique trend with respect to the axis A.

[0034] In use, the bottle 1 must be pierced at the pierceable portion 4 to be able to supply the user device 5 with gas; this device has a tubular end spout 8 that penetrates inside the container 2 after piercing and has a thrust action along the axis A in the direction T on the central region 18 of the valve 10. In this way, the movable part 12 translates along the axis A towards the inside of the container 2 in the direction T causing the detachment of the free end portion 20 of the tubular element 19 from the wall 3; at the same time, the petals 15 tend to open with respect to one another widening the windows 16. The gas inside the container 2 can then flow towards the tubular spout 8 of the user device 5 passing first through the windows 16 and then into the space between the free end portion 20 of the tubular element 19 and the wall 3.

[0035] In the case in which the container 2, already pierced but still at least partially full of gas, is detached from the user device 5, the valve 10 allows to at least limit the outflow of gas from the bottle 1.

[0036] In fact, in this case the movable part 12, no longer maintained in the condition of opening by the tubular spout 8, returns towards the wall 3 along the direction R by the effect of its elasticity and under the thrust of the residual pressure of the gas inside the container 2, greater with respect to the atmospheric pressure.

[0037] From an examination of the characteristics of the valve 10 and of the bottle 1, made according to the present invention, the advantages that can be obtained therewith are evident.

[0038] In particular, the fixing of the valve 10 to the upper wall 3 of the container 2 of the bottle 1 can take place through the simple application of traces of adhesive substance on the flange 13, without the need for additional devices to be inserted inside the container 2 itself. Moreover, as the gas sealing function is implemented by the tubular element 19, arranged in a radially innermost position with respect to the flange 13 with respect to the axis A, it is not necessary to apply an endless ring of adhesive substance on the flange 13 itself.

[0039] Finally, due to the structure of the valve 10, the passing from the condition of opening to the normal sealing condition requires a small movement of the movable part 12, and in particular of the tubular element 19, along the axis A; as this small movement can be guaranteed solely by the intrinsic elasticity of the material forming the movable part 12, the presence of a residual pressure inside the container 2, greater than the atmospheric pressure, has the sole effect of furthermore increasing the effectiveness of the seal.

[0040] Therefore, in the case of detachment of the bottle 1 from the user device 5 when it is still full, the valve 10, is able to effectively and reliably control the outflow of the residual gas from the container 2.

[0041] It is clear that modifications and variants can be made to the valve 10 and to the bottle 1 described and illustrated herein without departing from the scope defined by the claims.

Claims

1. A gas bottle (1) comprising:

- a sealed container (2), filled with said gas and provided, on its upper wall (3), with a pierceable portion (4) for allowing the supply of gas to an external user device (5); and
- a safety valve (10) positioned inside said container (2) so as to at least limit the outflow of gas towards said pierceable portion (4) when said container (2) is not connected to said user device (5);

said valve (10) being made entirely of an elastically deformable material, having a longitudinal axis (A) and comprising a fixed part (11) and a movable part (12) both being together a single component;

said fixed part (11) comprising an annular flange (13) fixed to the inside of said container (2); said movable part (12) extending in a cantilever fashion from said flange (13) and being elastically mobile in respect thereto along the said axis (A);

said movable part (12) comprising:

- a sealing portion (14) arranged in a radially innermost position in respect to said flange (13), elastically loaded in a first direction (R) along said axis (A) for cooperating, in use, against said upper wall (3) of said container (2) around said pierceable portion (4) so as to define a normal sealing condition, wherein at least the outflow of gas towards the pierceable portion (4) itself is limited, and movable, in use, upon the action of an external thrust exerted by said user device (5), in a second direction (T) along said axis (A), opposite to said first direction (R), to define a condition of opening, wherein said sealing portion (14) is axially spaced from said upper wall (3) of said container (2); and
- a plurality of petals (15) equally spaced angularly from one another around said axis (A), delimiting respective through windows (16) between one another and connecting said flange (13) to said sealing portion (14);

characterized in that said flange (13) of said valve (10) is fixed to said upper wall (3) of said container (2) around said pierceable portion (4) at the peripheral edge of said pierceable portion (4) or at the annular area immediately surrounding the pierceable portion (4) itself.

2. The bottle according to claim 1, wherein said sealing portion (14) comprises a solid central region (18) and a tubular element (19) protruding in a cantilever fashion from said central region (18) along said axis (A) and configured to cooperate, at its free end portion (20), with said upper wall (3) of said container (2).

3. The bottle according to claim 2, wherein each of said petals (15) and the flange portion (13) on which said petal (15) rests, have, in a cross section taken along a plane passing by said axis (A), a substantially S-shaped configuration.

4. The bottle according to claim 2 or 3, wherein each of said petals (15) extends from an area of said sealing portion (14), which is spaced from said free end portion (20) along said axis (A).

5. The bottle according to any one of the claims 2 to 4, wherein each of said petals (15) connects a peripheral edge (21) of said central region (18) to said flange (13).

6. The bottle according to claim 5, wherein each of said petals (15) protrudes from a peripheral radially innermost edge (22) of said flange (13).

7. The bottle according to claim 6, wherein each of said petals (15) comprises an end section (23) protruding in a cantilever fashion from the opposite side of said central region (18) in respect to said tubular element (19).

8. The bottle according to claim 7, wherein said end section (23) of each of said petals (15) has a curvilinear configuration, preferably U-shaped in its position of use, and converges in a main section (24) of the petal (15) itself, having an oblique trend in respect to said axis (A).

9. The bottle according to any of the foregoing claims, wherein said flange (13) is fixed to said upper wall (3) of said container (2) solely by means of an adhesive substance, in particular applied in several points spaced from each other.

Patentansprüche

1. Gasflasche (1), umfassend:

- einen abgedichteten Behälter (2), der mit dem Gas gefüllt ist und an seiner oberen Wand (3) mit einem durchstechbaren Abschnitt (4) versehen ist, um die Zufuhr von Gas zu einer externen Benutzervorrichtung (5) zu ermöglichen; und
- ein Sicherheitsventil (10), das innerhalb des Behälters (2) angeordnet ist, um den Gasausfluss in Richtung der durchstechbaren Abschnitt (4) zumindest zu begrenzen, wenn der Behälter (2) nicht an der Benutzervorrichtung (5) angeschlossen ist;

wobei das Ventil (10) vollständig aus einem elastisch verformbaren Material hergestellt ist, eine Längsachse (A) hat und ein feststehendes Teil (11) und ein bewegliches Teil (12) umfasst, die beide zusammen eine einzige Komponente sind;

wobei das feststehende Teil (11) einen ringförmigen Flansch (13) umfasst, der an der Innenseite des Behälters (2) befestigt ist; wobei sich das bewegliche Teil (12) in einer auskragenden Art von dem Flansch (13) erstreckt und in Bezug dazu entlang der Achse (A) elastisch beweglich ist;

wobei das bewegliche Teil (12) umfasst:

- einen Dichtungsabschnitt (14), der in Bezug auf den Flansch (13) in einer radial innersten Position angeordnet ist, in einer ersten Richtung (R) entlang der Achse (A) elastisch vorgespannt ist, um im Gebrauch gegen die obere Wand (3) des Behälters (2) um den durchstechbaren Abschnitt (4) herum zusammenzuarbeiten, um einen bestimmungsgemäßen Dichtungszustand zu definieren, wobei zumindest das Ausströmen von Gas in Richtung des durchstechbaren Abschnitts (4) selbst begrenzt wird und im Gebrauch bei der Einwirkung einer äußeren Schubkraft, die von der Benutzervorrichtung (5) ausgeübt wird, in einer zweiten Richtung (T) entlang der Achse (A), entgegengesetzt zu der ersten Richtung (R), beweglich ist, um einen Öffnungszustand zu definieren, wobei der Dichtungsabschnitt (14) axial von der oberen Wand (3) des Behälter (2) beabstandet ist; und
- eine Vielzahl von Blättern (15), die um die Achse (A) in gleichen Winkelabstand zueinander angeordnet sind, die jeweils Durchgangsfenster (16) zwischen sich begrenzen und dem Flansch (13) mit dem Dichtungsabschnitt (14) verbinden;

dadurch gekennzeichnet, dass

der Flansch (13) des Ventils (10) an der oberen Wand (3) des Behälters (2) um den durchstechbaren Abschnitt (4) herum am Umfangsrand des durchstechbaren Abschnitts (4) oder in dem ringförmigen Bereich, der den durchstechbaren Teil (4) selbst unmittelbar umgibt, befestigt ist.

2. Flasche nach Anspruch 1, wobei der Dichtungsabschnitt (14) einen massiven zentralen Bereich (18) und ein röhrenförmiges Element (19) umfasst, das in einer auskragenden Art von dem zentralen Bereich (18) entlang der Achse (A) vorsteht und konfiguriert ist, an seinem freien Endabschnitt (20) mit der oberen Wand (3) des Behälters (2) zusammenwirkt.

3. Flasche nach Anspruch 2, wobei jedes der Blätter (15) und der Flanschabschnitt (13), auf dem das Blatt (15) ruht, in einem Querschnitt vorgenommen entlang einer Ebene, die durch die Achse (A) verläuft, eine im Wesentlichen S-förmige Struktur aufweisen.

4. Flasche nach Anspruch 2 oder 3, wobei sich jedes der Blätter (15) von einem Bereich des Dichtungsabschnitts (14) erstreckt, der von dem freien Endabschnitt (20) entlang der Achse (A) beabstandet ist.

5. Flasche nach einem der Ansprüche 2 bis 4, wobei

jedes der Blätter (15) eine Umfangskante (21) des zentralen Bereichs (18) mit dem Flansch (13) verbindet.

6. Flasche nach Anspruch 5, wobei jedes der Blätter (15) von einer radial innersten Umfangskante (22) des Flansches (13) vorsteht.

7. Flasche nach Anspruch 6, wobei jedes der Blätter (15) einen Endabschnitt (23) aufweist, der in einer auskragenden Art von der gegenüberliegenden Seite des zentralen Bereichs (18) in Bezug auf das röhrenförmige Element (19) vorsteht.

8. Flasche nach Anspruch 7, wobei der Endabschnitt (23) jedes der Blätter (15) eine krummlinige, in seiner Gebrauchsposition vorzugsweise U-förmig Struktur hat und in einem Hauptabschnitt (24) des Blatts (15) selbst, der einen schrägen Verlauf in Bezug auf die Achse (A) hat, zusammenläuft.

9. Flasche nach einem der vorhergehenden Ansprüche, wobei der Flansch (13) an der oberen Wand (3) des Behälters (2) nur mittels einer klebenden Substanz befestigt wird, aufgetragen insbesondere in mehreren voneinander beabstandeten Punkten.

Revendications

1. Bouteille de gaz (1) comprenant :

- un récipient étanche (2), rempli dudit gaz et pourvu, sur sa paroi supérieure (3), d'une portion pouvant être percée (4) afin de permettre d'alimenter en gaz un dispositif externe d'un utilisateur (5) ; et
- une valve de sécurité (10) positionnée à l'intérieur dudit récipient (2) de manière à au moins limiter l'écoulement de gaz vers ladite portion pouvant être percée (4) lorsque ledit récipient (2) n'est pas connecté audit dispositif d'un utilisateur (5) ;

ladite valve (10) étant entièrement en un matériau élastiquement déformable, ayant un axe longitudinal (A) et comprenant une partie fixe (11) et une partie mobile (12), les deux parties formant ensemble un seul composant ;
ladite partie fixe (11) comprenant une collerette annulaire (13) fixée à l'intérieur dudit récipient (2) ; ladite partie mobile (12) s'étendant en porte-à-faux depuis ladite collerette (13) et étant élastiquement mobile par rapport à celle-ci le long dudit axe (A) ;
ladite partie mobile (12) comprenant :

- une portion d'étanchéité (14) disposée selon une position radialement la plus à l'intérieur par rapport à ladite collerette (13), sollicitée élastiquement selon une première direction (R) le long dudit axe (A) pour coopérer, lors de l'utilisation, contre ladite paroi supérieure (3) dudit récipient (2) autour de ladite portion pouvant être percée (4) de manière à définir une condition normale d'étanchéité, dans laquelle l'écoulement de gaz vers la portion pouvant être percée (4) est au moins lui-même limité, et mobile, lors de l'utilisation, sous l'action d'une poussée extérieure exercée par ledit dispositif d'un utilisateur (5), selon une seconde direction (T) le long dudit axe (A), opposée à ladite première direction (R), afin de définir une condition d'ouverture, dans laquelle ladite portion d'étanchéité (14) est espacée axialement de ladite paroi supérieure (3) dudit récipient (2) ; et
- une pluralité de pétales (15) régulièrement espacés les uns par rapport aux autres de façon angulaire autour dudit axe (A), délimitant des fenêtres traversantes respectives (16) entre eux et reliant ladite collerette (13) à ladite portion d'étanchéité (14) ;

caractérisée en ce que ladite collerette (13) de ladite valve (10) est fixée à ladite paroi supérieure (3) dudit récipient (2) autour de ladite portion pouvant être percée (4) à l'emplacement du bord périphérique de ladite portion pouvant être percée (4) ou à l'emplacement de la zone annulaire entourant immédiatement la portion pouvant être percée (4) elle-même.

2. Bouteille selon la revendication 1, dans laquelle ladite portion d'étanchéité (14) comprend une zone centrale pleine (18) et un élément tubulaire (19) dépassant en porte-à-faux de ladite zone centrale (18) le long dudit axe (A) et configuré pour coopérer, à sa portion d'extrémité libre (20), avec ladite paroi supérieure (3) dudit récipient (2).

3. Bouteille selon la revendication 2, dans laquelle chacun desdits pétales (15) et la collerette (13) sur laquelle ledit pétale (15) repose, ont, selon une coupe transversale prise le long d'un plan passant par ledit axe (A), une configuration sensiblement en forme de S.

4. Bouteille selon la revendication 2 ou 3, dans laquelle chacun desdits pétales (15) s'étend depuis une zone de ladite portion d'étanchéité (14), qui est espacée de ladite portion d'extrémité libre (20) le long dudit axe (A).

5. Bouteille selon l'une quelconque des revendications 2 à 4, dans laquelle chacun desdits pétales (15) relie

un bord périphérique (21) de ladite zone centrale (18) à ladite collerette (13).

6. Bouteille selon la revendication 5, dans laquelle chacun desdits pétales (15) dépasse d'un bord périphérique radialement le plus à l'intérieur (22) de ladite collerette (13).

7. Bouteille selon la revendication 6, dans laquelle chacun desdits pétales (15) comprend une section d'extrémité (23) dépassant en porte-à-faux depuis le côté opposé de ladite zone centrale (18) par rapport audit élément tubulaire (19).

8. Bouteille selon la revendication 7, dans laquelle ladite section d'extrémité (23) de chacun desdits pétales (15) a une configuration curviligne, de préférence en forme de U dans sa position d'utilisation, et converge dans une section principale (24) du pétale (15) lui-même, ayant une direction oblique par rapport audit axe (A).

9. Bouteille selon l'une quelconque des revendications précédentes, dans laquelle ladite collerette (13) est fixée à ladite paroi supérieure (3) dudit récipient (2) uniquement au moyen d'une substance adhésive, notamment appliquée en plusieurs points espacés les uns des autres.

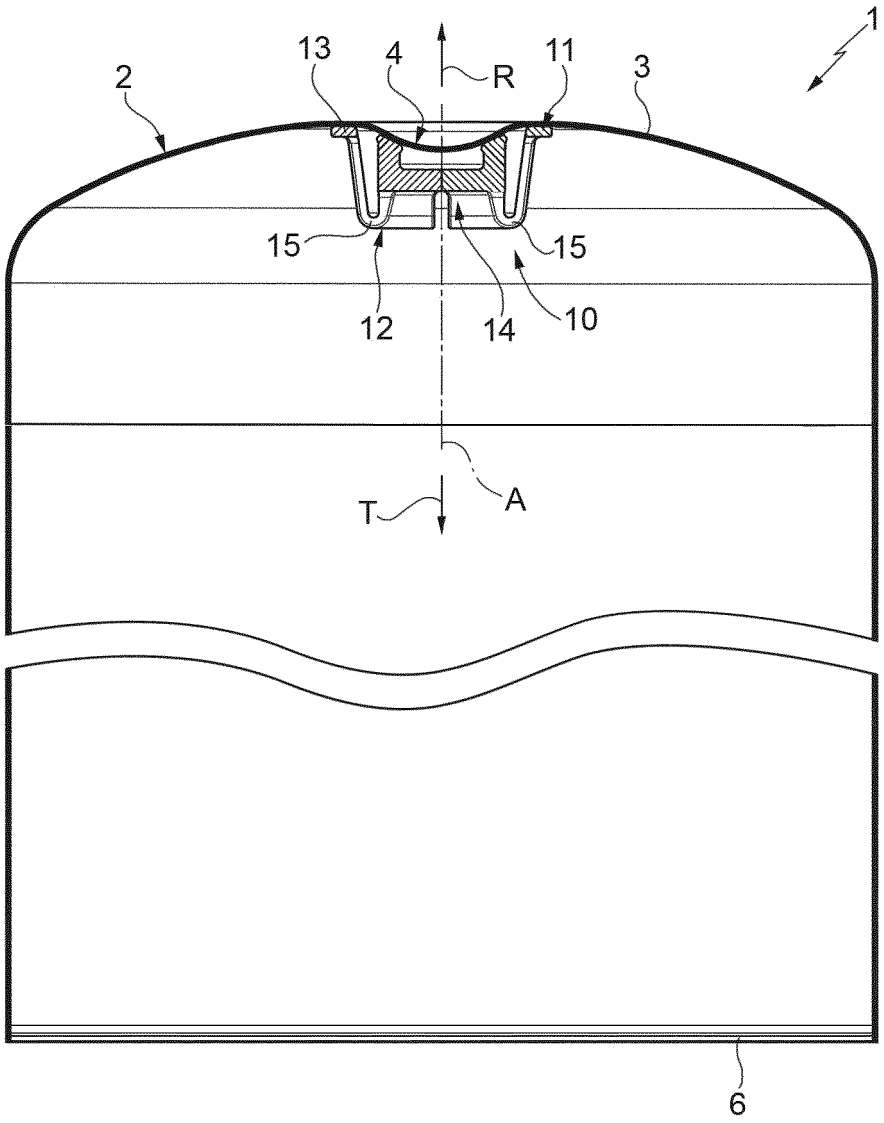

FIG. 1

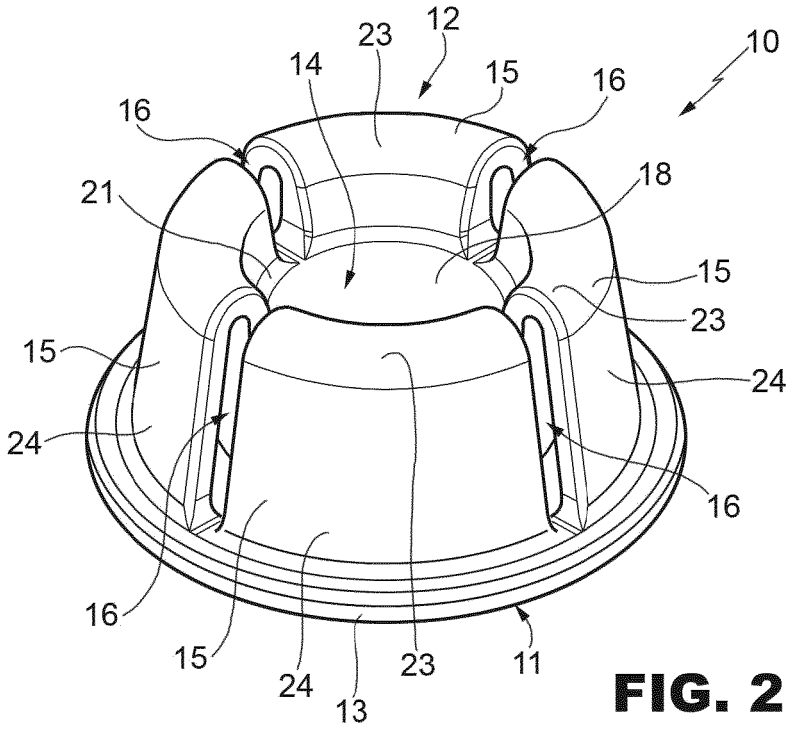
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FIG. 2

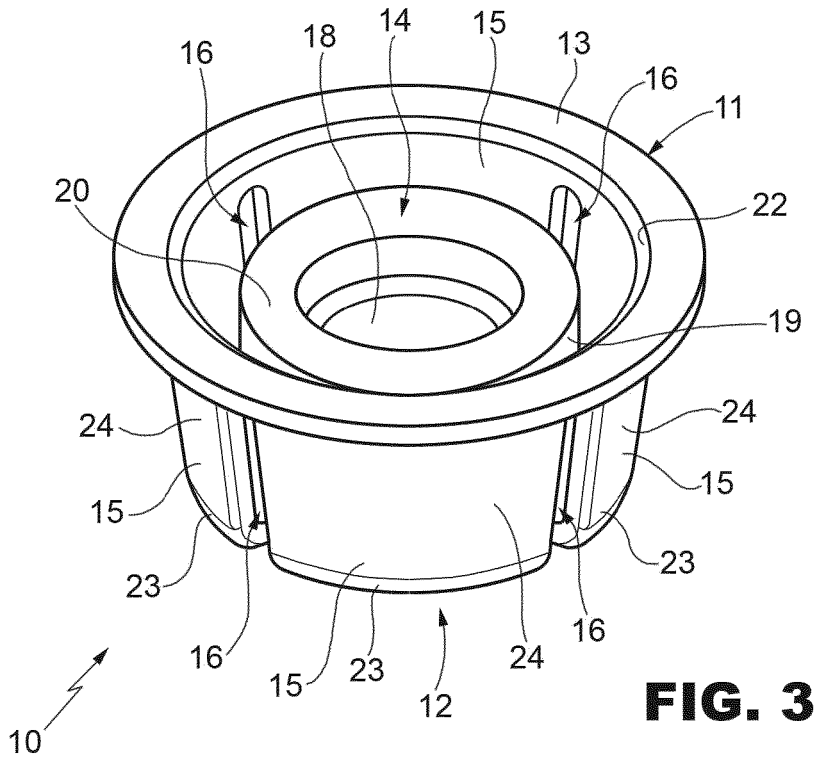
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FIG. 3

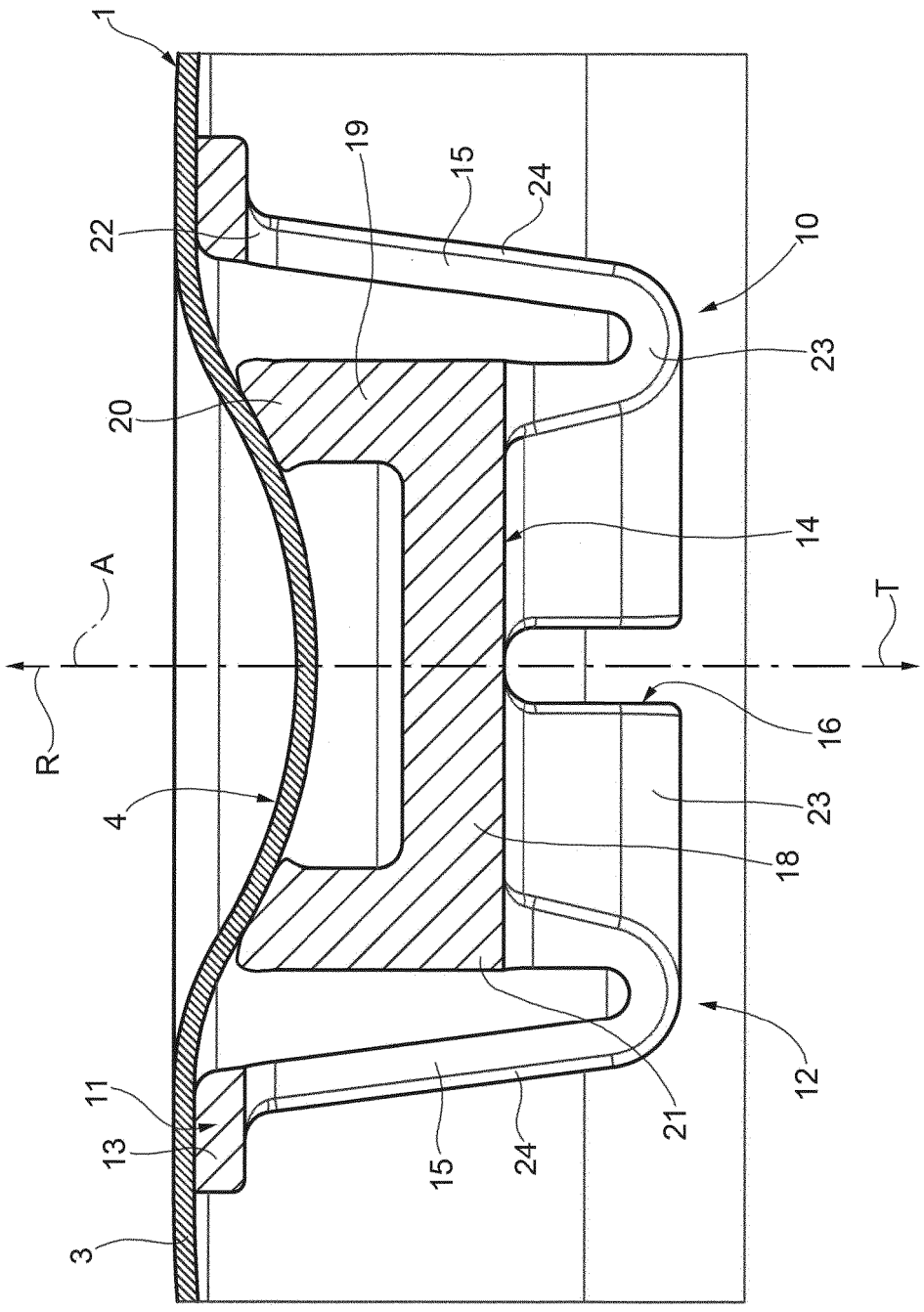

FIG. 4

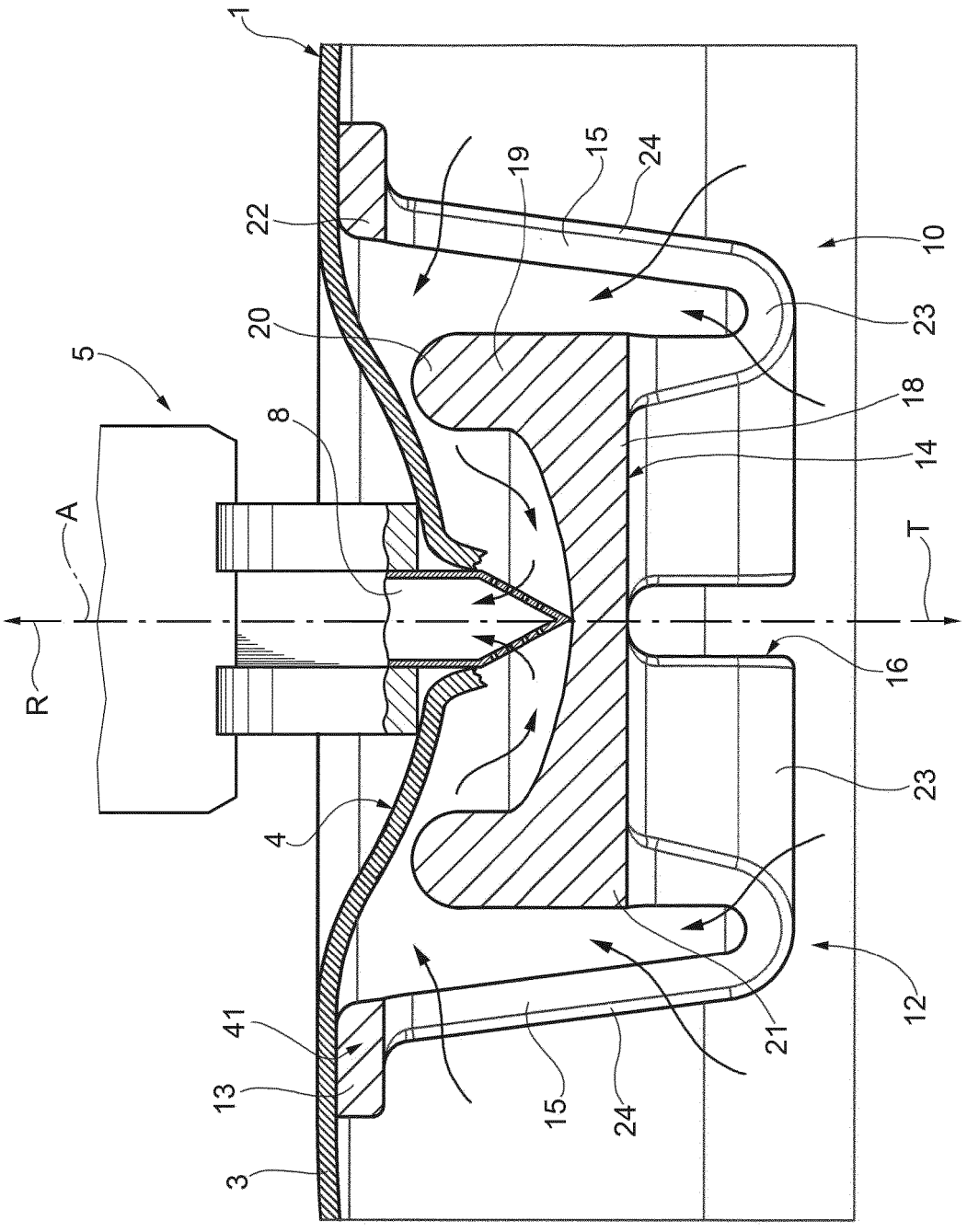

FIG. 5

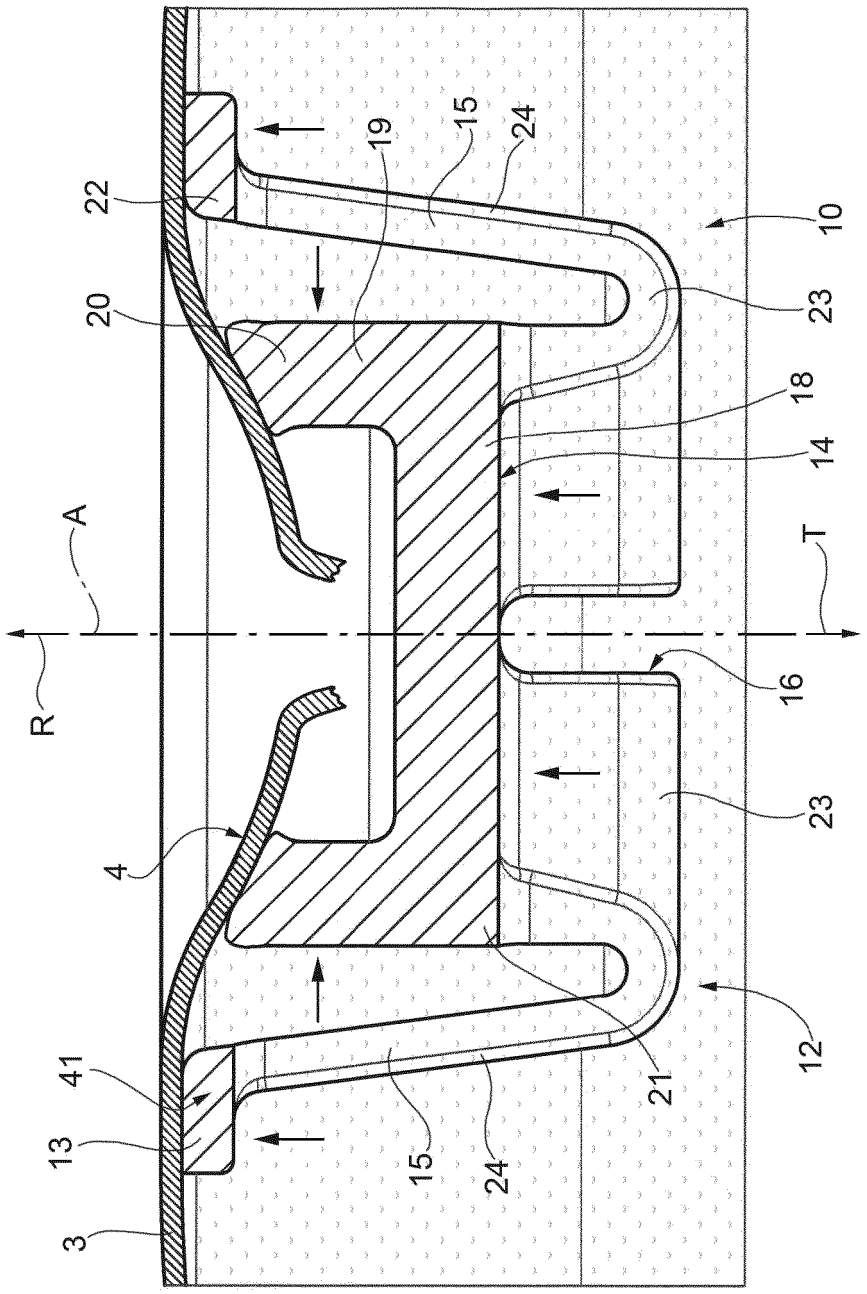

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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