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

(11) **EP 3 287 686 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.02.2018 Bulletin 2018/09

(51) Int Cl.:
F17C 1/00 *(2006.01)*

(21) Application number: **17184130.7**

(22) Date of filing: **31.07.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **24.08.2016 IT 201600086921**

(71) Applicant: **Special Components S.r.l.**
10040 Caselette (IT)

(72) Inventor: **HERNANDEZ MERIDA, Viviana**
10040 CASELETTE (IT)

(74) Representative: **D'Angelo, Fabio et al**
Studio Torta S.p.A.
Via Viotti, 9
10121 Torino (IT)

(54) **GAS BOTTLE**

(57) The invention relates to a gas bottle (1) provided with: a sealed container (2) filled with a gas under pressure and provided, on an upper wall (3) thereof, with a perforable portion (4) to allow gas to be fed to an external user device; and a valve (5, 5', 5", 5''') manufactured as one single piece and positioned inside the container (2) so as to prevent or limit the flow of gas to the perforable portion (4) when the container (2) is not connected to the external user device; the valve (5, 5', 5'', 5''') is fixed, exclusively by means of a layer of adhesive substance (9), to the upper wall (3) of the container (2) around the perforable portion (4); the valve (5, 5', 5", 5''') has, in use, on a delimitation wall thereof toward the inside of the container (2), a slot (15, 15') made prior to or during the perforation of the perforable portion (4) and laterally delimited by material flaps (15a, 15a'), which can be spread apart due to the connection to the external user device and can be closed back against one another along the aforesaid wall (14) in the absence of a connection to the external user device and due to the pressure exerted upon the flaps (15a, 15a') by the gas contained in the container (2).

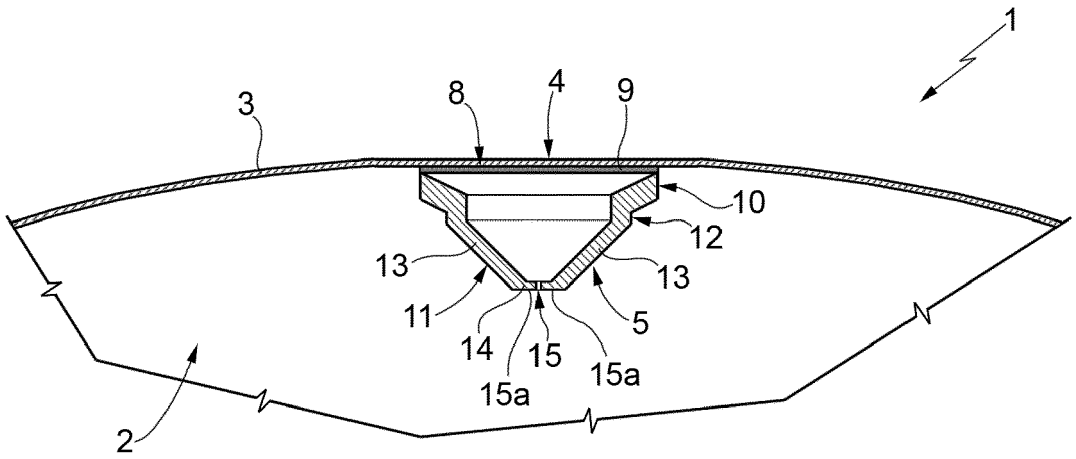

FIG. 2

EP 3 287 686 A1

Description

[0001] The invention relates to a gas bottle, in particular a portable one, which is preferably going to be used to feed gas to an external user device, for example a barbecue, cookers, lamps and similar devices.

[0002] Bottles of the above-mentioned type are known, which basically comprise:

- a sealed container, which is filled with a gas under pressure, for example butane gas or a mixture of butane and propane gas, and is provided, on an upper wall thereof, with a perforable portion to allow gas to be fed to the external user device; and
- an outflow limiting valve, or safety valve, which is positioned inside the container so as to limit or prevent the outflow of gas in case the perforable portion gets perforated and the gas bottle is not connected to the external user device.

[0003] In particular, the valve is usually fixed on the inside of the container of the bottle by means of a support structure fitted between the upper wall of the container and its side wall, on which it abuts in the area of a suitable annular inner shoulder.

[0004] This solution is quite complicated and, especially, expensive in terms of total selling cost of this type of gas bottles.

[0005] Therefore, the need is felt in the industry for alternative valve fixing systems, which should be more simple and less expensive compared to known ones.

[0006] WO 2015/092447 shows an outflow limiting valve for a gas bottle, which is fixed, by means of an adhesive substance or by means of a support frame, around the perforable portion of the upper wall of the container of the gas valve.

[0007] In particular, the valve is entirely made of an elastically flexible material and comprises a main body, which is fixed to the upper wall of the container, and a movable part, which is perforated, in use, together with the perforable portion when the gas bottle is connected to the external user device.

[0008] In case the external user device is detached from the gas bottle, the movable part, pushed by the pressure of the gas, should bend upwards, thus closing the hole made in the perforable portion of the gas bottle. However, it has been proven that the pressure of the gas inside the container of the bottle is not usually sufficient to cause the movable part to obstruct the hole of the perforable portion.

[0009] Therefore, the object of the invention is to provide a gas bottle, which fulfils the aforesaid need and, at the same time, allows to overcome the drawbacks of the known solutions mentioned above, in particular ensuring, in use, an effective and reliable closing of the gas bottle after the detachment of the external user device.

[0010] The aforesaid object is reached by the present invention, as it relates to a gas bottle according to claim 1.

[0011] The invention will be best understood upon perusal of the following description of two embodiments, which is provided by mere way of non-limiting example and with reference to the accompanying drawings, wherein:

- figure 1 shows a perspective view of a gas bottle according to the invention;
- figure 2 is a cross section, on a larger scale, according to line II-II of figure 1;
- figure 3 shows, in a perspective view and on a larger scale, an outflow limiting valve of the gas bottle of figures 1 and 2; and
- figures 4 to 6 are similar to figure 3 and show three different possible variants of the valve of figure 3.

[0012] With reference to figures 1 and 2, number 1 indicates, as a whole, a gas bottle manufactured according to the present invention.

[0013] The bottle 1 comprises a sealed container 2, which is filled with a gas under pressure, preferably butane gas or a mixture of butane and propane gas, and is provided, on an upper wall 3 thereof, with a perforable portion 4 to allow gas to be fed to an external user device (known per se and not shown), for example a barbecue, cookers or lamps.

[0014] The bottle 1 further comprises an outflow limiting valve, or safety valve 5, which is positioned inside the container 2 so as to limit or prevent the outflow of gas in case the perforable portion is perforated and the gas bottle 1 is not connected to the external user device.

[0015] In particular, with reference to figure 1, the container 2 preferably has an approximately cylindrical shape with an axis A. More precisely, the container 2 is delimited, besides by the upper wall 3 having a circular profile, by a lower wall 6, which is substantially shaped like a disc, and by a side wall 7, which is approximately cylindrical.

[0016] The upper wall 3 is slightly convex toward the outside and has a central circular impression, which is convex toward the inside of the container 2 and defines the perforable portion 4.

[0017] The valve 5 is manufactured as one single piece and is fixed, exclusively by means of a layer of adhesive substance 9, to the upper wall 3 of the container 2 around the perforable portion 4.

[0018] It is specified that, in the present description and in the claims, the term "around" is used to indicate both the peripheral edge of the perforable portion 4 and the annular area immediately surrounding the perforable portion 4.

[0019] In the embodiment shown in figures 1 and 2, the layer of adhesive substance 9 is applied around the perforable portion 4 and is interposed between the valve 5 and the upper wall 3.

[0020] The adhesive substance preferably is an acrylic adhesive, which, following different experiments carried out by the Applicant, has been proved to be suitable to

crate a particularly long-lasting connection in the dry environment defined by butane gas or by the mixture of propane and butane gas.

[0021] With reference to figures 1, 2 and 3, the valve 5 preferably is similar to the one commonly known as "single duckbill valve", is made of an elastically deformable material and integrally comprises:

- a ring portion 10, which is fixed to the upper wall 3 by means of the layer of adhesive substance 9; and
- an opening/closing portion 11, which is shaped like a duck's bill and projects toward the inside of the container 2 starting from the ring portion 10.

[0022] The ring portion 10 defines an external annular shoulder 12 with the closing/opening portion 11 and is connected, at its opposite axial end, to the upper wall 3 by means of the layer of adhesive substance 9.

[0023] The closing/opening portion 11 is delimited by two flat walls 13, which are inclined and converge toward one another staring from the ring portion 10, so as to form a flat, free end wall 14, which is provided with a linear slot 15.

[0024] The closing/opening portion 11 is further delimited, on opposite sides, by respective curved walls 16 with an approximately trapezoidal profile, which connect the corresponding side edges of the flat walls 13 to one another.

[0025] In particular, the end wall 14, the flat walls 13 and the curved walls 16 delimit the closing/opening portion 11 of the valve 5 toward the inside of the container 2.

[0026] Advantageously, the slot 15 is laterally delimited by material flaps 15a, which can be spread apart in an opening configuration due to the connection to the external user device, and can be closed back against one another along the wall 14 in the absence of a connection to the external user device and due to the pressure exerted upon the flaps 15a themselves by the gas contained in the container 2. Figures 4, 5 and 6 show three possible variants of the valve 5, indicated with numbers 5', 5", 5"', respectively, which will be described hereinafter only in their differences from the valve 5, thus indicating with the same reference numbers those parts that are equal or equivalent to the ones already described.

[0027] In particular, the valve 5' of figure 4 basically differs from the aforesaid valve 5 because it is a double duckbill valve; in this case, in practice, the valve 5' comprises a closing/opening portion 11', which is formed by two duck's bills, which intersect one another so as to form a cross-shaped, free end wall 14', which is provided with a cross-shaped slot 15'.

[0028] The valve 5" of figure 5 basically differs from the aforesaid valve 5 because it does not comprise a slot along the end wall 14; in this case, therefore, the opening/closing portion 11 is closed and it can be perforated, in use, together with the perforable portion 4 of the upper wall 3 of the container 2.

[0029] Similarly, the valve 5"' of figure 6 is of the same type as the valve 5' of figure 5 and basically differs from it because it does not comprise a slot along the end wall 14'; in this case, therefore, the opening/closing portion 11 is closed, as well, and it can be perforated, in use, together with the perforable portion 4 of the upper wall 3 of the container 2.

[0030] In use, the bottle 1 must be perforated in the area of the perforable portion 4 before being connected to the external user device.

[0031] In case the bottle 1 is fitted with one of the valves 5" or 5"', the perforating operation must be extended to the valves 5", 5"' so as to allow gas to be fed to the external user device.

[0032] The presence of the valves 5, 5', 5", 5"' prevents or limits the outflow of gas from the relative bottle 1 in case the latter was perforated but is not connected to the external user device.

[0033] In this case, indeed, the flaps 15a close back against one another along the lying plane of the end wall 14 due to the pressure of the gas contained in the bottle 1.

[0034] The features of the bottle 1 according to the present invention lead to evident advantages that can be obtained using it. In particular, in both solutions, the fixing of the valve 5, 5', 5", 5"' to the upper wall 3 of the container 2 is carried out in a simple and economic manner.

[0035] The duckbill valves 5, 5', 5", 5"' used, following the perforating action that allows the bottle 1 to be used, are kept in the closed condition in a "natural" manner and by means of limited movements of the flaps 15a along the lying plane of the end wall 14, which are generated due to the pressure of the gas inside the container 2. Therefore, in case a still full bottle 1 is detached from the external user device, the valve 5, 5', 5", 5"' is capable of controlling, in an effective and reliable manner, the outflow of the remaining gas from the container 2.

[0036] It is clear that the gas bottle 1 described and shown herein can be subjected to changes and variations, without for this reason going beyond the scope of protection set forth in the appended claims.

Claims

1. Gas bottle (1) comprising:

- a sealed container (2) filled with said gas and provided, on an upper wall (3) thereof, with a perforable portion (4) to allow gas to be fed to an external user device; and
- a valve (5, 5', 5", 5"') manufactured as one single piece and positioned inside said container (2) so as to prevent or limit the flow of gas to said perforable portion (4) when said container (2) is not connected to the external user device;

wherein said valve (5, 5', 5", 5"') is fixed, exclusively by means of a layer of adhesive substance (9), to

said upper wall (3) of said container (2) around said perforable portion (4);
characterized in that said valve (5, 5', 5", 5''') has, in use, on a delimitation wall thereof toward the inside of said container (2), a slot (15, 15') made prior to or during the perforation of said perforable portion (4) and laterally delimited by material flaps (15a, 15a'), which can be spread apart due to the connection to the external user device and can be closed back against one another along said wall (14) in the absence of a connection to said external user device and due to the pressure exerted upon the flaps (15a, 15a') by the gas contained in said container (2).

2. Bottle according to claim 1, wherein said valve (5, 5', 5", 5''') comprises a ring portion (10), fixed to said upper wall (3) by means of said connection means (8), and a closing/opening portion (11, 11') projecting toward the inside of said container (2) starting from said ring portion (10) and defining the wall (14) provided with said slot (15, 15').

3. Bottle according to claim 1 or 2, wherein said valve (5, 5', 5", 5''') is made completely of an elastically deformable material.

4. Bottle according to any one of the preceding claims, wherein said valve (5, 5', 5", 5''') is of the duckbill type, and wherein said closing/opening portion (11, 11') has a single or double duckbill configuration.

5. Bottle according to any one of the preceding claims, wherein said slot (15, 15') is a linear or cross slot.

6. Bottle according to any one of the preceding claims, wherein said layer of adhesive substance (9) is applied around said perforable portion (4) and is interposed between said valve (5, 5', 5", 5''') and said upper wall (3).

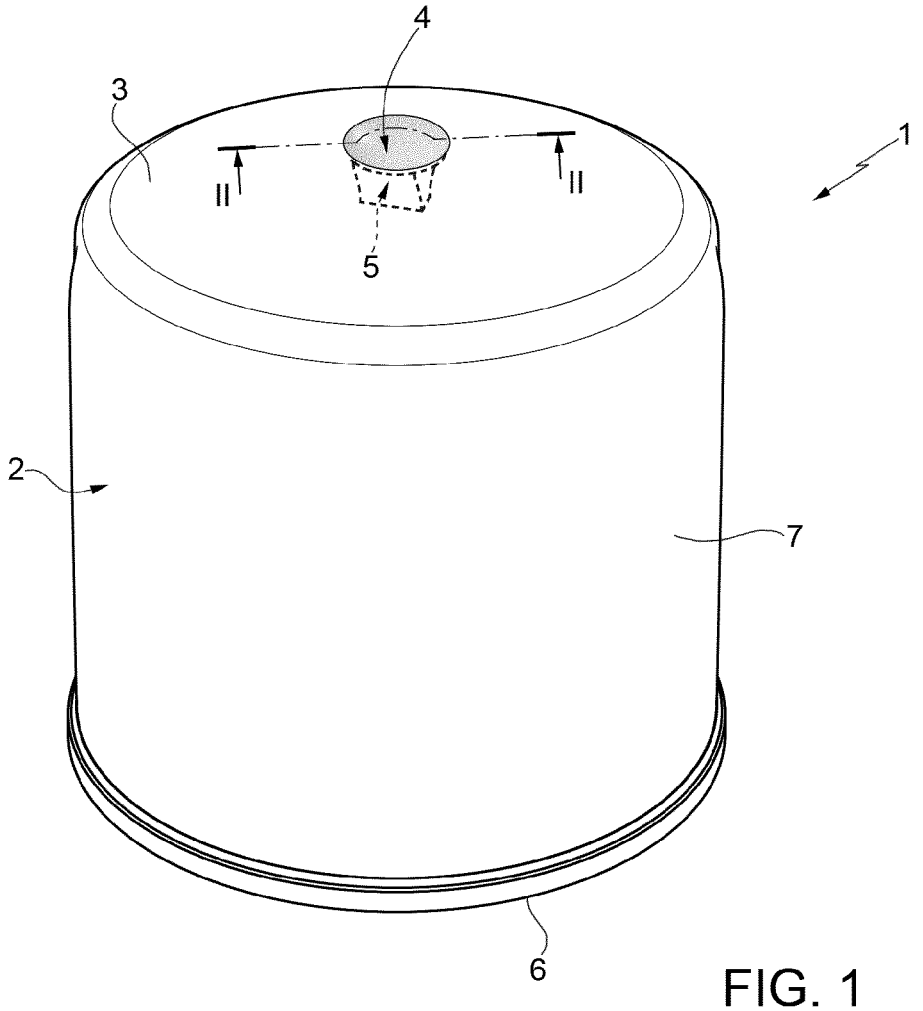

FIG. 1

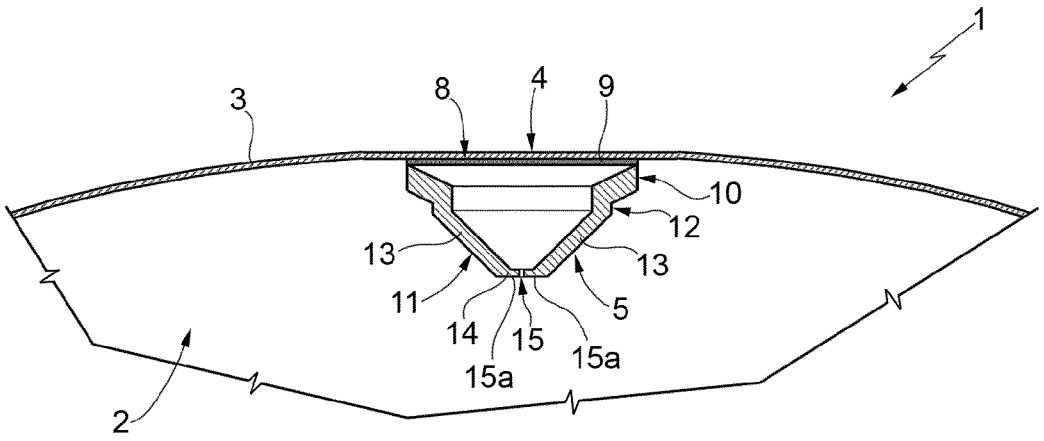

FIG. 2

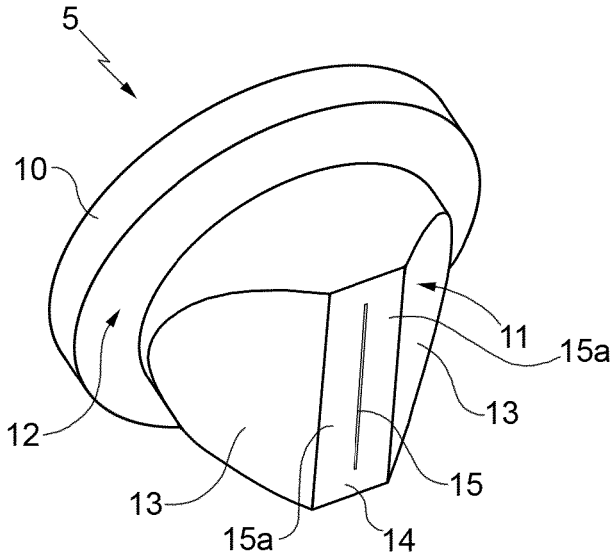

FIG. 3

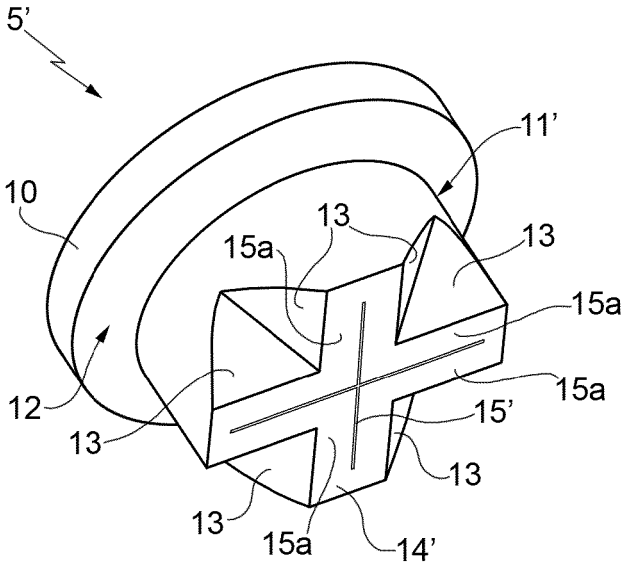

FIG. 4

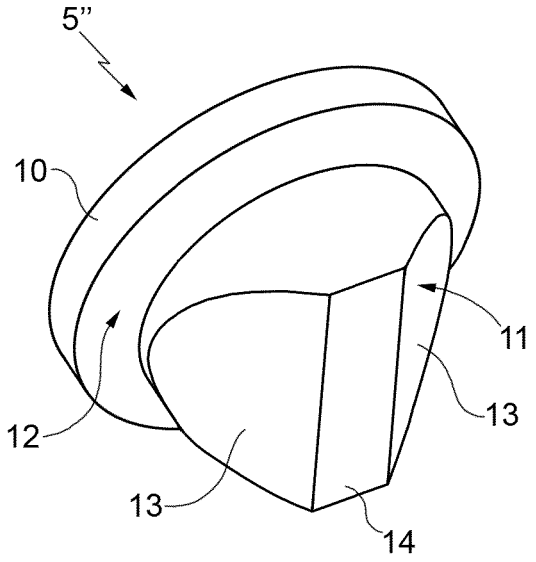

FIG. 5

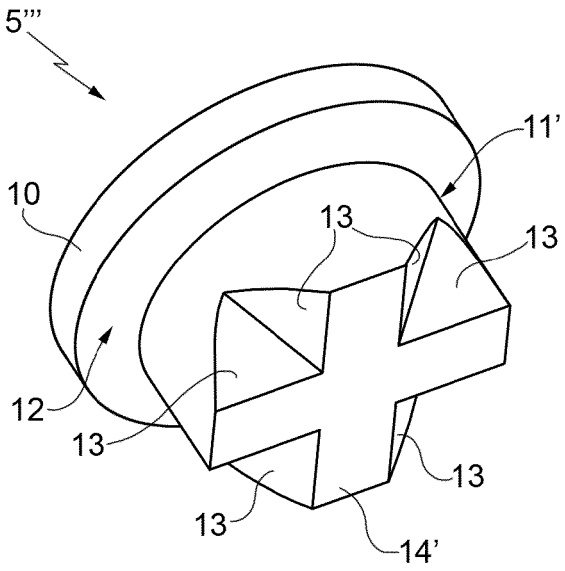

FIG. 6

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 18 4130

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2015/092447 A1 (CORAL GAS A E B E Y [GR]) 25 June 2015 (2015-06-25) * pages 3,4; claims 1,4; figures 1-4 *	1-6	INV. F17C1/00
X	DE 15 29 102 A1 (APPLIC GAZ SA) 4 December 1969 (1969-12-04) * page 5, line 24 - line 29; figures 14-15 *	1-6	
A	FR 2 901 863 A1 (APPLIC DES GAZ SOC PAR ACTIONS [FR]) 7 December 2007 (2007-12-07) * pages 3,4; figures 1,2 *	1	
A	EP 1 406 041 A2 (GUILBERT EXPRESS SA [FR]) 7 April 2004 (2004-04-07) * paragraphs [0075], [0076], [0083], [0087]; figures 11,14,15 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

F17C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 January 2018	Nicol, Boris

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 18 4130

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-01-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2015092447 A1	25-06-2015	EP 3084283 A1	26-10-2016
		WO 2015092447 A1	25-06-2015
DE 1529102 A1	04-12-1969	DE 1529102 A1	04-12-1969
		GB 1070715 A	01-06-1967
FR 2901863 A1	07-12-2007	AT 523729 T	15-09-2011
		EP 2024676 A1	18-02-2009
		ES 2371884 T3	11-01-2012
		FR 2901863 A1	07-12-2007
		HK 1127115 A1	02-12-2011
		JP 5101608 B2	19-12-2012
		JP 2009540255 A	19-11-2009
		PT 2024676 E	21-12-2011
		US 2011017752 A1	27-01-2011
		WO 2007141400 A1	13-12-2007
EP 1406041 A2	07-04-2004	AT 461397 T	15-04-2010
		DK 1406041 T3	28-06-2010
		EP 1406041 A2	07-04-2004
		ES 2342882 T3	16-07-2010
		FR 2845456 A1	09-04-2004
		PT 1406041 E	25-05-2010

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2015092447 A **[0006]**