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

(11) **EP 3 138 967 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
08.03.2017 Bulletin 2017/10

(51) Int Cl.:
E03C 1/28 *(2006.01)* ***E03F 5/04*** *(2006.01)*

(21) Application number: **15190618.7**

(22) Date of filing: **20.10.2015**

(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

(30) Priority: **07.09.2015 TW 104214492**

(71) Applicant: **Sie, Shuci-Tian**
Kaohsiung City (TW)

(72) Inventor: **Sie, Shuci-Tian**
Kaohsiung City (TW)

(74) Representative: **Beck & Rössig**
European Patent Attorneys
Cuvilliésstraße 14
81679 München (DE)

(54) **DRAIN STRUCTURE**

(57) A drain structure used for mounting in a pipe includes a ring wall, a bottom plate and a chamber, wherein at least one overflow hole mounted on the ring wall communicates with an inner ring wall and an outer ring wall. The overflow hole comprises a first opening and a second opening, wherein the first opening comprises a top edge, and the second opening comprises a bottom edge. A first horizontal surface passes through the top edge of the first opening, and a second horizontal surface passes through the bottom edge of the second opening, wherein the first horizontal surface is not higher than the second horizontal surface to form a first water tank between the second horizontal surface and the bottom plate. Liquid accumulated in the first water tank is able to prevent insects and gases in outdoors from entering indoors via the pipe.

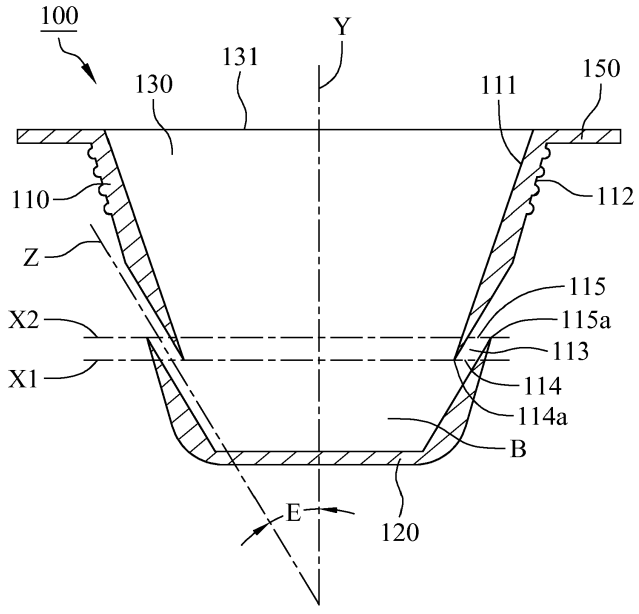

FIG. 3

EP 3 138 967 A1

Description

[0001] The present invention relates to a drain structure, and in particular to a drain structure that prevents insects or gases from entering indoors.

[0002] Conventional pipe is used to guide water flow usually, for instance, water in bathroom is able to be guided to flow toward outdoors or sewage tank by the pipe when the pipe is installed in bathroom. However, owing to the pipe connects with bathroom and outdoors (or sewage tank), thus insects or gases in outdoors or sewage tank enable enter indoors or bathroom via the pipe.

[0003] Therefore, insecticide is sprayed in indoors or bathroom usually for preventing insects from entering indoors or bathroom. Or use a plug to plug up the pipe opening, but it is inconvenience for usage.

[0004] The primary object of the present invention is to provide a drain structure installed in a pipe used for preventing insects or gases in outdoors or sewage tank from entering indoors or bathroom via the pipe.

[0005] A drain structure of the present invention includes a ring wall, a bottom plate coupled with the ring wall and a chamber located above the bottom plate, the ring wall surrounds the chamber and comprises an inner ring wall and an outer ring wall, the chamber comprises an opening used for liquid flow into the chamber, wherein at least one overflow hole mounted on the ring wall communicates with the inner ring wall and the outer ring wall, a liquid flow passage is formed by the opening, the chamber and the overflow hole. The overflow hole comprises a first opening located on the inner ring wall and a second opening located on the outer ring wall, the first opening communicates with the chamber and comprises a top edge, and the second opening comprises a bottom edge. A first horizontal surface passes through the top edge of the first opening, and a second horizontal surface passes through the bottom edge of the second opening, wherein the first horizontal surface is not higher than the second horizontal surface to form a first water tank between the second horizontal surface and the bottom plate.

[0006] Liquid accumulated in the first water tank enables to prevent insects or gases in outdoors or sewage tank from entering indoors via the pipe.

[0007] In the drawings:

Fig. 1 is a perspective partial section view illustrating a drain structure in accordance with a first embodiment of the present invention.

Fig. 2 is a section view illustrating the drain structure in accordance with the first embodiment of the present invention.

Fig. 3 is a section view illustrating the drain structure in accordance with the first embodiment of the present invention.

Fig. 4 is a schematic view illustrating the drain structure in accordance with the first embodiment of the present invention.

Fig. 5 is a schematic view illustrating the drain structure in accordance with the first embodiment of the present invention.

Fig. 6 is a schematic view illustrating the drain structure in accordance with the first embodiment of the present invention.

Fig. 7 is a perspective partial section view illustrating a drain structure in accordance with a second embodiment of the present invention.

Fig. 8 is a section view illustrating the drain structure in accordance with the second embodiment of the present invention.

[0008] With reference to Figs. 1, 2 and 3, a drain structure 100 in accordance with a first embodiment of the present invention includes a ring wall 110, a bottom plate 120 and a chamber 130, wherein the ring wall 110 is coupled with the bottom plate 120 and surrounds the chamber 130, and the chamber 130 is located above the bottom plate 120. Preferably, the ring wall 110 is formed as one piece with the bottom plate 120. In this embodiment, the ring wall 110 is a conical ring wall.

[0009] With reference to Figs. 1, 2 and 3, the ring wall 110 of the drain structure 100 comprises an inner ring wall 111 and an outer ring wall 112, and the chamber 130 comprises an opening 131 for liquid flow into the chamber 130. At least one overflow hole 113 is mounted on the ring wall 110 and communicates with the inner ring wall 111 and the outer ring wall 112, wherein a liquid flow passage A is formed by the opening 131, the chamber 130 and the overflow hole 113. The overflow hole 113 comprises a first opening 114 located on the inner ring wall 111 and a second opening 115 located on the outer ring wall 112, wherein the first opening 114 communicates with the chamber 130 and comprises a top edge 114a, and the second opening 115 comprises a bottom edge 115a.

[0010] With reference to Figs. 1 and 3, a first horizontal surface X1 passes through the top edge 114a of the first opening 114, and a second horizontal surface X2 passes through the bottom edge 115a of the second opening 115, wherein the first horizontal surface X1 is not higher than the second horizontal surface X2 to form a first water tank B between the second horizontal surface X2 and the bottom plate 120. In this embodiment, the first horizontal surface X1 is lower than the second horizontal surface X2, and the top edge 114a of the first opening 114 is located in the first water tank B.

[0011] With reference to Figs. 1, 2 and 3, the overflow hole 113 is a non-curved hole in this embodiment, and the overflow hole 113 is a straight through hole substantially. An included angle E is defined between a vertical

line Y passed through the first horizontal surface X1 and a center line Z passed through the overflow hole 113, wherein the included angle E is an acute angle.

[0012] With reference to Figs. 1, 2 and 3, preferably, the drain structure 100 further includes a supporting ring 150 coupled with the outer ring wall 112 of the ring wall 110. In this embodiment, the supporting ring 150 is formed as one piece with the ring wall 110.

[0013] With reference to Figs. 2 and 4, a pipe 200 is mounted within a floor 300, wherein one end of the pipe 200 is located on floor (such as bathroom floor or kitchen floor). Illustrated by the example of bathroom, a supporting member 400 is usually mounted on one end of the pipe 200 and covered with a cover 500, wherein the cover 500 comprises a plurality of penetrating holes 510 communicating with the pipe 200. After opening the cover 500, the drain structure 100 is mounted on the supporting member 400, and the chamber 130 communicates with the pipe 200 by the overflow hole 113.

[0014] With reference to Figs. 2, 4 and 5, liquid in bathroom is able to flow toward the chamber 130 via the penetrating holes 510 when covering the cover 500, and able to flow toward the pipe 200 via the liquid flow passage A formed by the chamber 130 and the overflow hole 113. In another situation, the drain structure 100 is able to mount on the pipe 200 directly when the pipe 200 without the supporting member 400 and the cover 500.

[0015] With reference to Figs. 3 and 5, the liquid will accumulate in the first water tank B between the second horizontal surface X2 and the bottom plate 120 when the liquid stops flowing. In this embodiment, the top edge 114a of the first opening 114 lodged in the liquid accumulated in the first water tank B makes the overflow hole 113 being sealed by the liquid in the first water tank B, thus the liquid in the first water tank B is able to prevent insects and gases in outdoors or sewage tank from entering indoors via the pipe 200.

[0016] With reference to Figs. 2 and 6, the drain structure 100 is also able to be mounted in a bleed hole 610 of a bathtub 600 (or water tank). The bleed hole 610 communicates with a tube 700, and the drain structure 100 is mounted in the bleed hole 610. The opening 131 of the chamber 130 is covered with a sealing lid 800 for preventing water lost from the liquid flow passage A of the drain structure 100 when water accumulates in the bathtub 600.

[0017] A second embodiment of the present invention is illustrated in mentioned Figs 7 and 8, the primary difference between the first and second embodiments is that the drain structure 100 further includes an external ring wall 140 coupled with the ring wall 110 in the second embodiment. A second water tank C is formed between the external ring wall 140 and the ring wall 110. The external ring wall 140 comprises an exposing terminal 141, and an overflow opening D is formed between the exposing terminal 141 and the ring wall 110. In this embodiment, the ring wall 110 is formed as one piece with the external ring wall 140.

[0018] With reference to Figs. 7 and 8, a third horizontal surface X3 passed through the exposing terminal 141 is not lower than the second horizontal surface X2. In this embodiment, the second horizontal surface X2 is lower than the third horizontal surface X3. The liquid will accumulate in the first water tank B between the second horizontal surface X2 and the bottom plate 120 and accumulate in the second water tank C between the external ring wall 140 and the ring wall 110 when the liquid stops flowing. Owing to the third horizontal surface X3 is not lower than the second horizontal surface X2, thus the overflow hole 113 is able to be sealed by the liquid in the first water tank B and the second water tank C to prevent insects and gases in outdoors or sewage tank from entering indoors via the pipe 200.

[0019] In a very basic embodiment the drain structure includes a ring wall 110 having an overflow channel 113 above a bottom plate 120, said overflow channel 113 having a lower inner opening 114 and upper outer opening 115. A first horizontal plane X1 passes through the lower inner opening 114 and a second horizontal plane X2 passes through the upper outer opening 115 while the second horizontal plane X2 is above the first horizontal plane X1 to thereby form a water tank between the bottom plate 120 and the second horizontal plane X2. This very basic embodiment may be supplemented by one or more of the features as described above.

[0020] While this invention has been particularly illustrated and described in detail with respect to the preferred embodiments thereof, it will be clearly understood by those skilled in the art that is not limited to the specific features shown and described and various modified and changed in form and details may be made without departing from the scope of the claims.

Claims

1. Drain structure (100) including a ring wall (110), a bottom plate (120) coupled with the ring wall (110) and a chamber (130) located above the bottom plate (120), the ring wall (110) surrounds the chamber (130) and comprises an inner ring wall (111) and an outer ring wall (112), the chamber (130) comprises an opening (131) for liquid flow into the chamber (130), wherein at least one overflow hole (113) mounted on the ring wall (110) communicates with the inner ring wall (111) and the outer ring wall (112), a liquid flow passage (A) is formed by the opening (131), the chamber (130) and the overflow hole (113), wherein the overflow hole (113) comprises a first opening (114) located on the inner ring wall (111) and a second opening (115) located on the outer ring wall (112), the first opening (114) communicates with the chamber (130) and comprises a top edge (114a), the second opening (115) comprises a bottom edge (115a), wherein a first horizontal surface (X1) passes through the top edge (114a) of the first opening (114),

and a second horizontal surface (X2) passes through the bottom edge (115a) of the second opening (115), and the first horizontal surface (X1) is not higher than the second horizontal surface (X2) to form a first water tank (B) between the second horizontal surface (X2) and the bottom plate (120).

2. Drain structure (100) according to claim 1 further including an external ring wall (140) coupled with the ring wall (110), wherein a second water tank (C) is formed between the external ring wall (140) and the ring wall (110), the external ring wall (140) comprises an exposing terminal (141), an overflow opening (D) is formed between the exposing terminal (141) and the ring wall (110), wherein a third horizontal surface (X3) passed through the exposing terminal (141) is not lower than the second horizontal surface (X2).

3. Drain structure (100) according to claim 1 or 2, wherein the top edge (114a) of the first opening (114) is located in the first water tank (B).

4. Drain structure (100) according to one of claims 1 to 3, wherein the ring wall (110) is a conical ring wall.

5. Drain structure (100) according to one of claims 1 to 4, wherein an included angle (E) is defined between a vertical line passed (Y) through the first horizontal surface (X1) and a center line (Z) passed through the overflow hole (113), and the included angle (E) is an acute angle.

6. Drain structure (100) according to one of claims 1 to 5 further including a supporting ring (150), wherein the supporting ring (150) is coupled with the outer ring wall (112) of the ring wall (110).

7. Drain structure (100) according to one of claims 1 to 6, wherein the ring wall (110) is formed as one piece with the bottom plate (120).

8. Drain structure (100) according to one of claims 1 to 6, wherein the ring wall (110) is formed as one piece with the external ring wall (140).

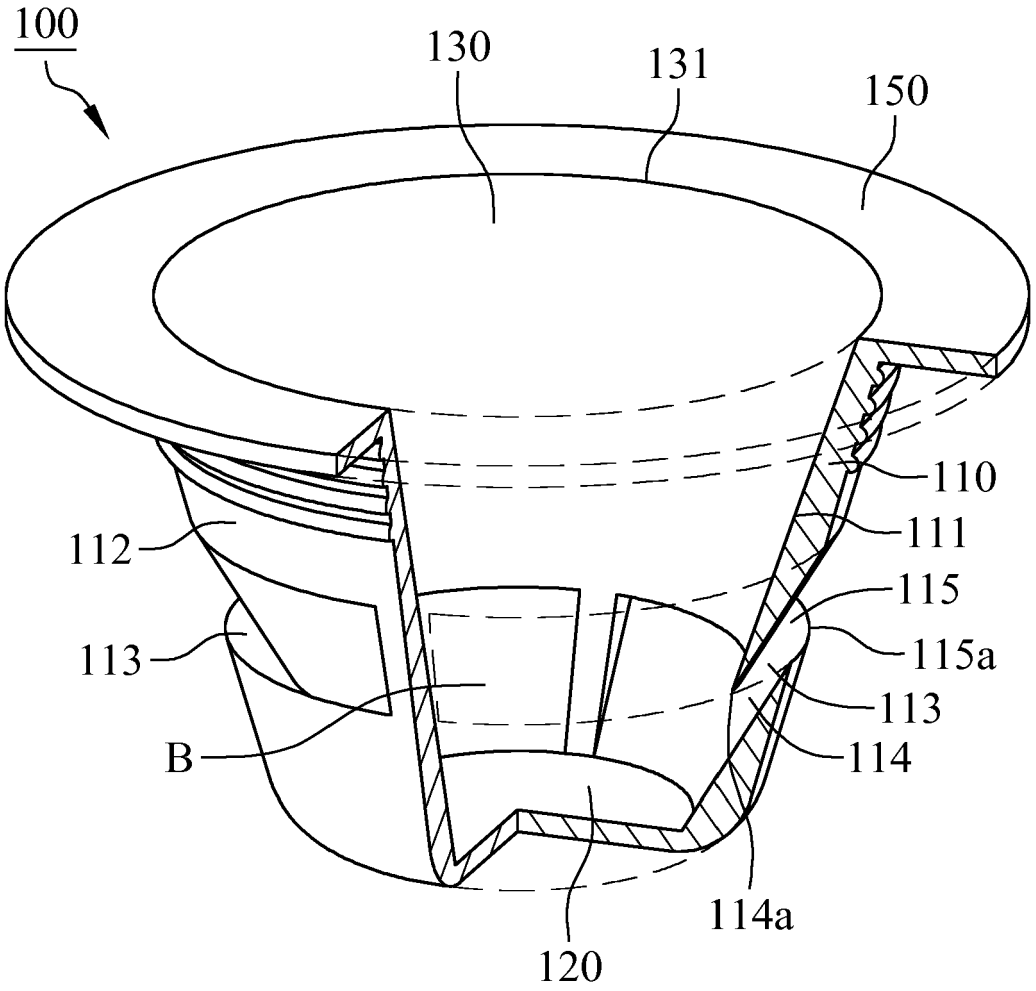

FIG. 1

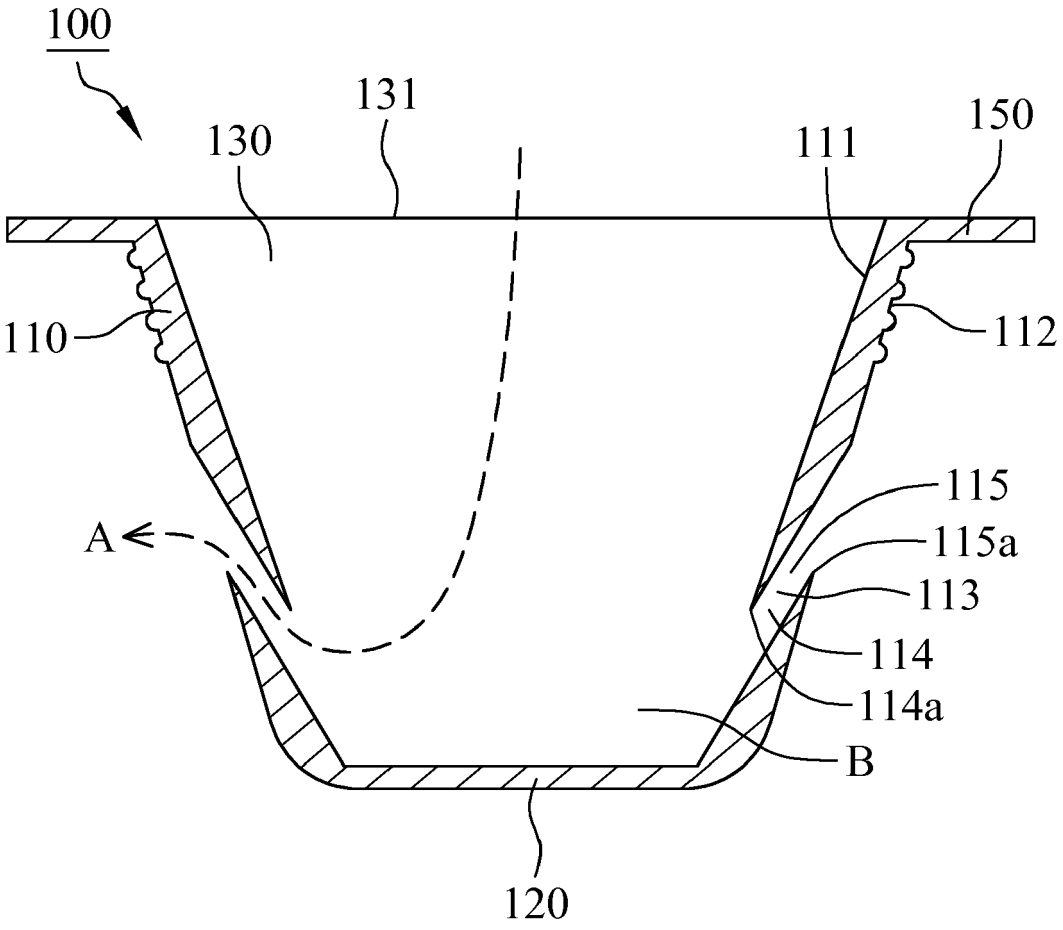

FIG. 2

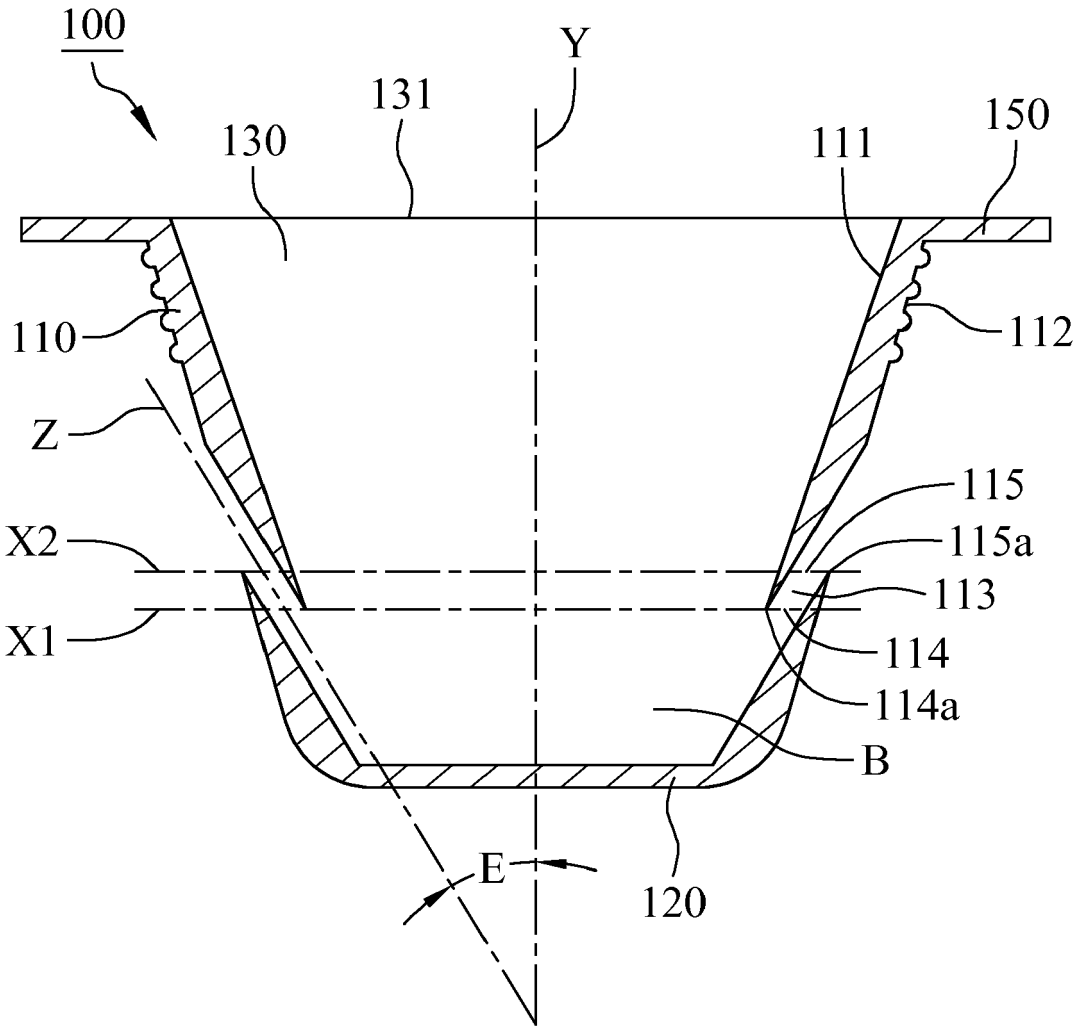

FIG. 3

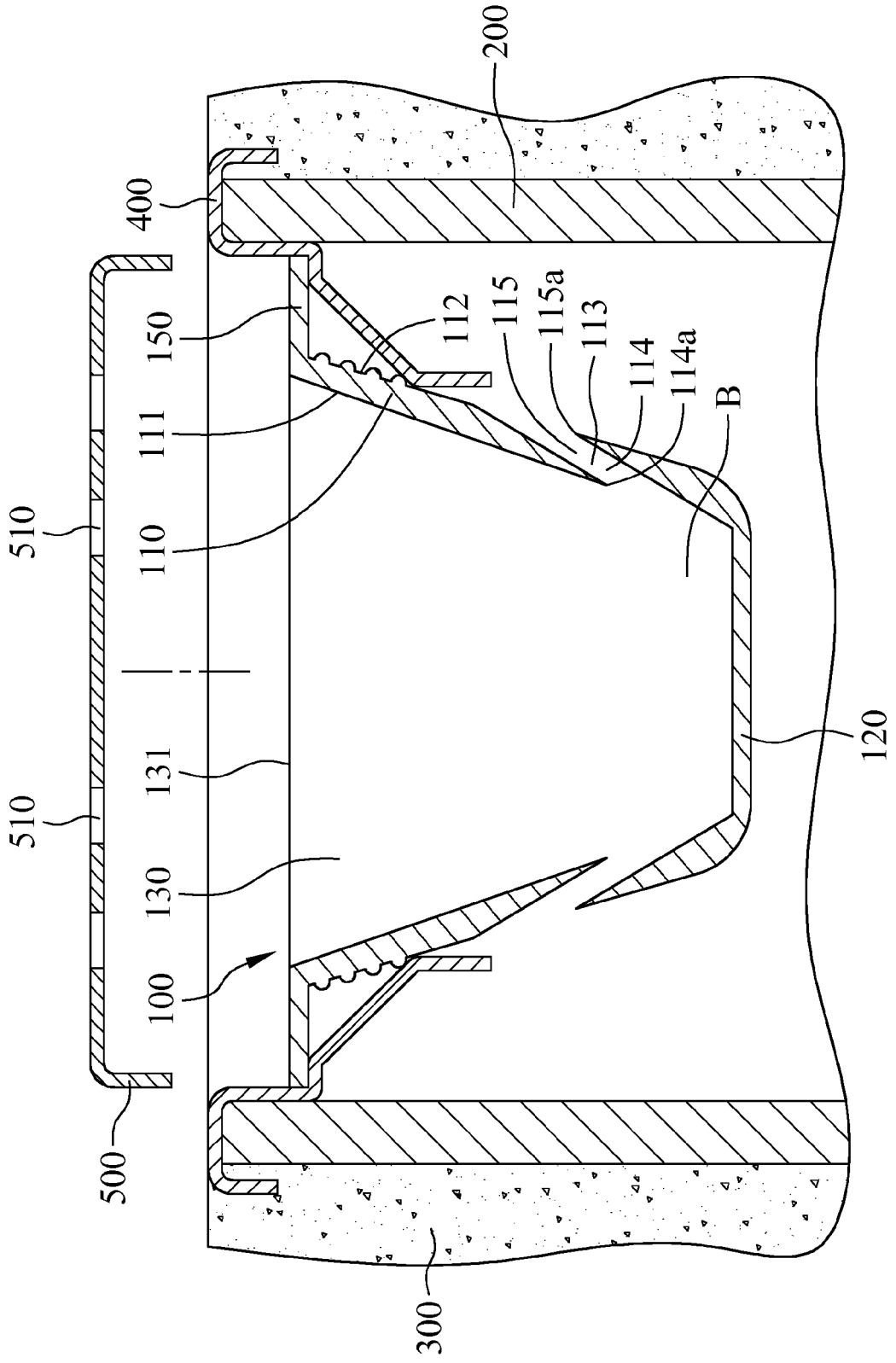
200
400
150
111
110
510
510
131
130
100
500
300
112
115
115a
113
114
114a
B
120

FIG. 4

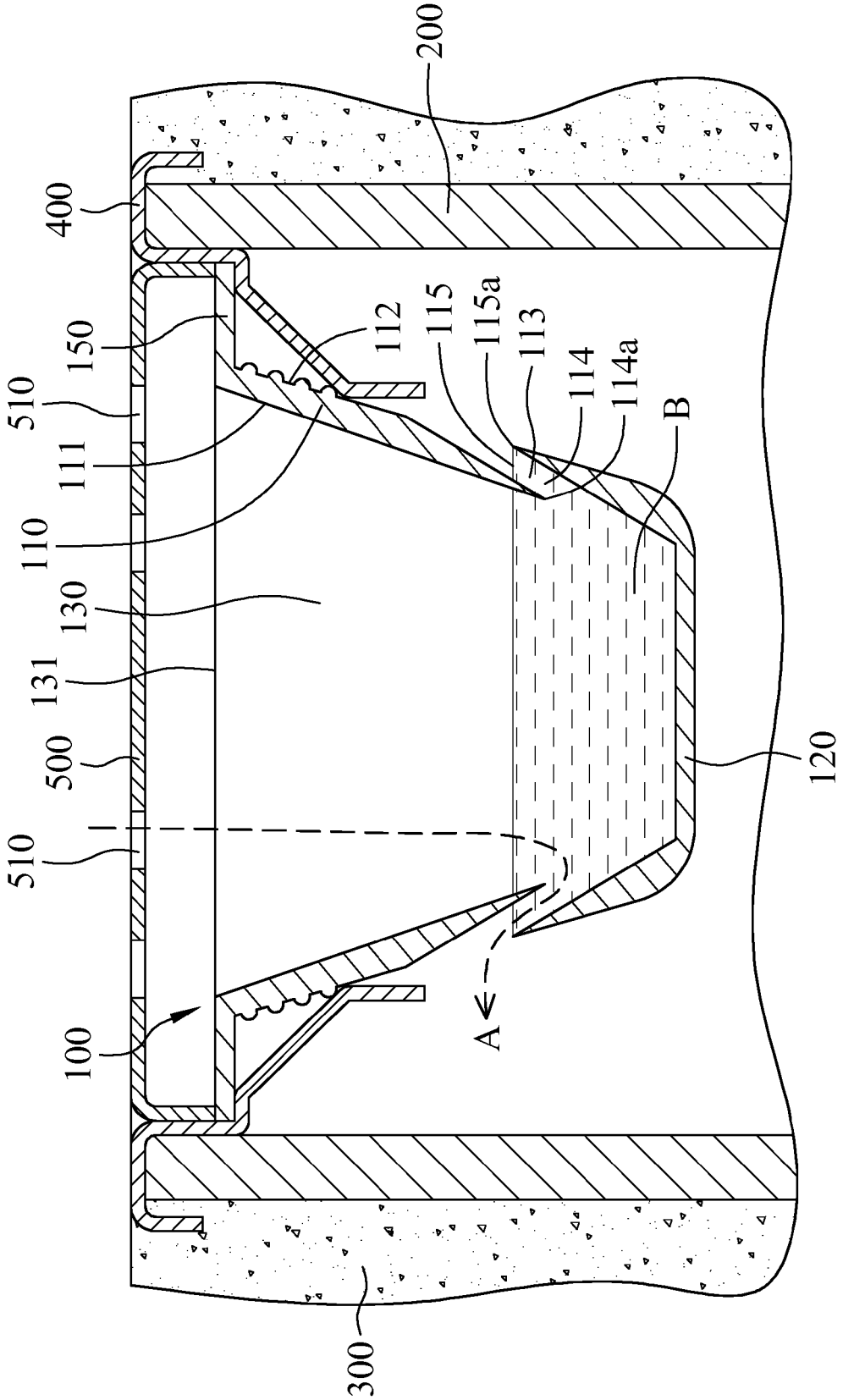
200
400
150
510
111
110
130
131
500
510
100
300
112
115
115a
113
114
114a
B
120
A

FIG. 5

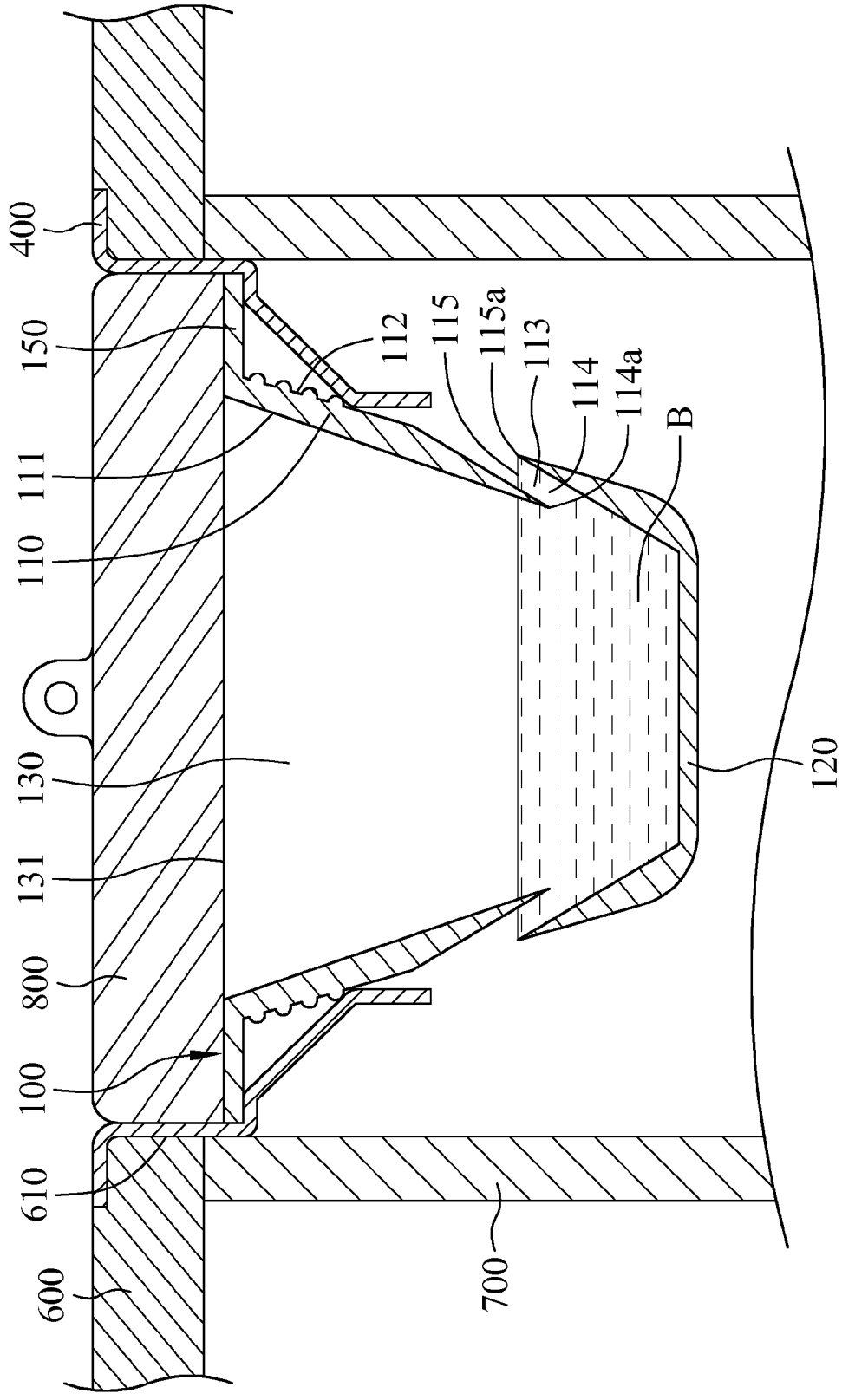
400
150
111
110
130
131
800
100
610
600
112
115
115a
113
114
114a
B
120
700

FIG. 6

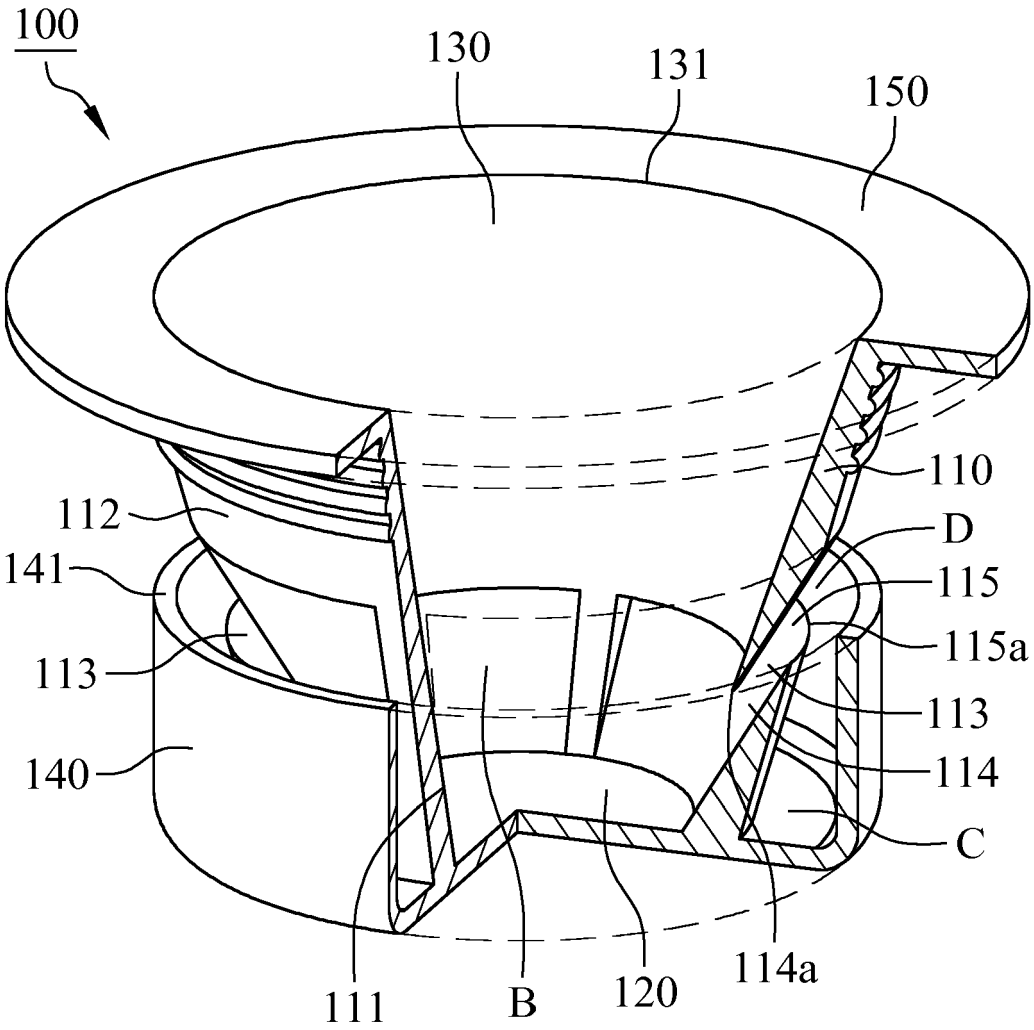
100
130
131
150
110
112
D
141
115
115a
113
113
140
114
C
111
B
120
114a

FIG. 7

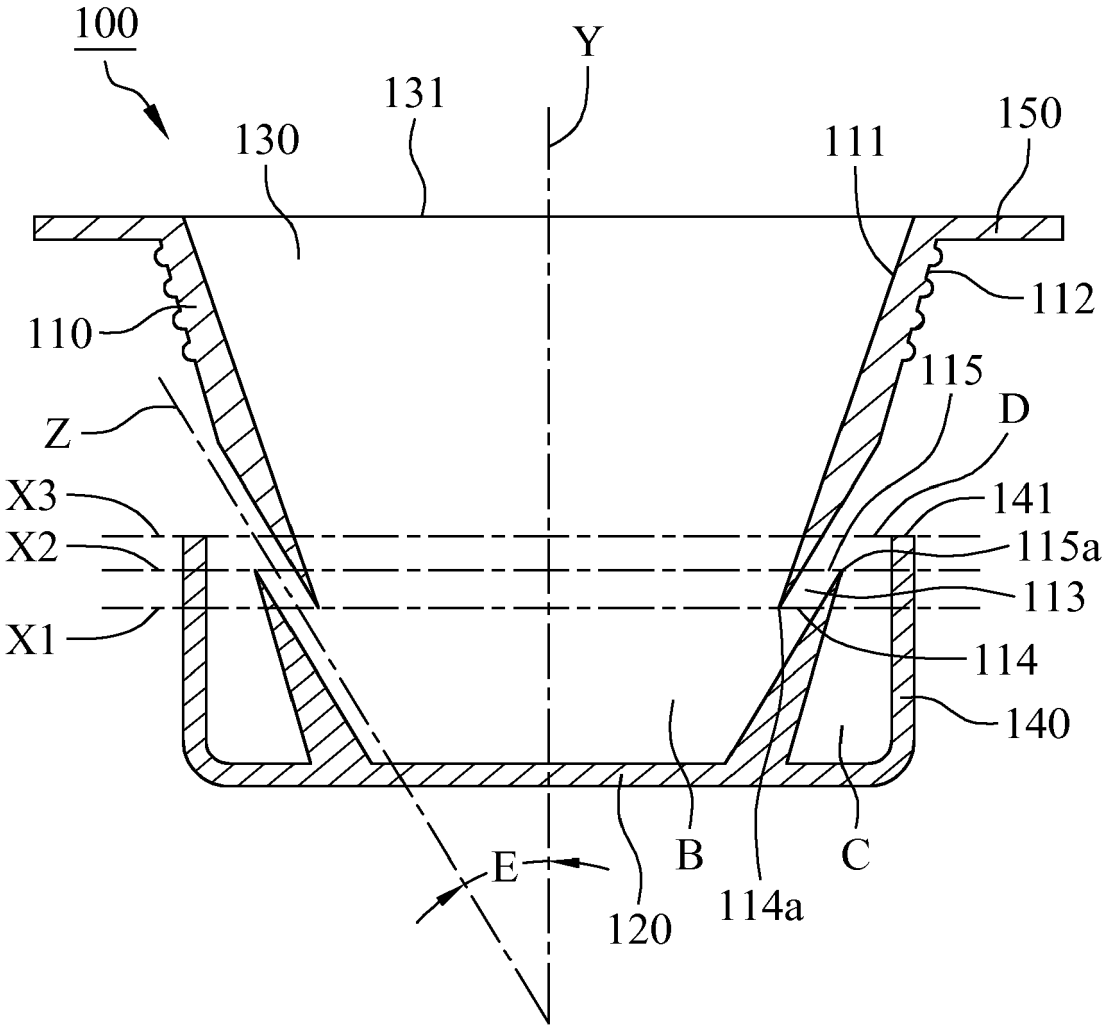
100
Y
131
130
111
150
112
110
115
D
Z
141
X3
X2
115a
113
X1
114
140
E
B
C
120
114a

FIG. 8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 15 19 0618

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	DE 19 22 160 A1 (WIFA VERKEN AB) 5 November 1970 (1970-11-05) * figure 1 * -----	1-8	INV. E03C1/28 E03F5/04
X	DE 35 36 616 A1 (BLUM ALBERT [DE]) 16 April 1987 (1987-04-16) * figures 1,2 * -----	1,3-7	
X	CN 2 337 205 Y (FAN DAOTONG [CN]) 8 September 1999 (1999-09-08) * figure 1 * -----	1-8	
X	EP 1 319 764 A2 (GHISAFON S N C DI ADAMI GIOVAN [IT]) 18 June 2003 (2003-06-18) * figure 3 * -----	1,3-7	
			TECHNICAL FIELDS SEARCHED (IPC) E03C E03F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 December 2015	Isailovski, Marko

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 15 19 0618

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.

18-12-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1922160 A1	05-11-1970	NONE	
DE 3536616 A1	16-04-1987	NONE	
CN 2337205 Y	08-09-1999	NONE	
EP 1319764 A2	18-06-2003	AT 361399 T	15-05-2007
		DE 60219875 T2	20-12-2007
		EP 1319764 A2	18-06-2003
		ES 2286220 T3	01-12-2007
		IT RM20010224 U1	10-06-2003

EPO FORM P0459

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