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(71) Applicant: **Roca Sanitario, S. A.**
08029 Barcelona (ES)

(72) Inventor: **MUNAR SAURA, Miguel Angel**
08029 BARCELONA (ES)

(74) Representative: **Ponti & Partners, S.L.P**
Edifici PRISMA
Av. Diagonal núm. 611-613, Planta 2
08028 Barcelona (ES)

(54) **ECCENTRIC HINGE, LID SYSTEM AND TOILET INCLUDING SAID ECCENTRIC HINGE**

(57) Eccentric hinge (1) for a lid system (10) for a toilet (100), where the lid system (10) comprises a toilet (100) lid (11), a articulated shaft (12) and a cover (13) covering at least said articulated shaft (12), where the cover (13) comprises a through hole (14) through which a portion of the eccentric hinge (1) can pass when rotated around the articulated shaft (12), the eccentric hinge (1) comprising at least one tab (5) configured to close the through hole (14) of the cover (13) in at least one rotation position of the eccentric hinge (1) with respect to the articulated shaft (12). Fig.3.

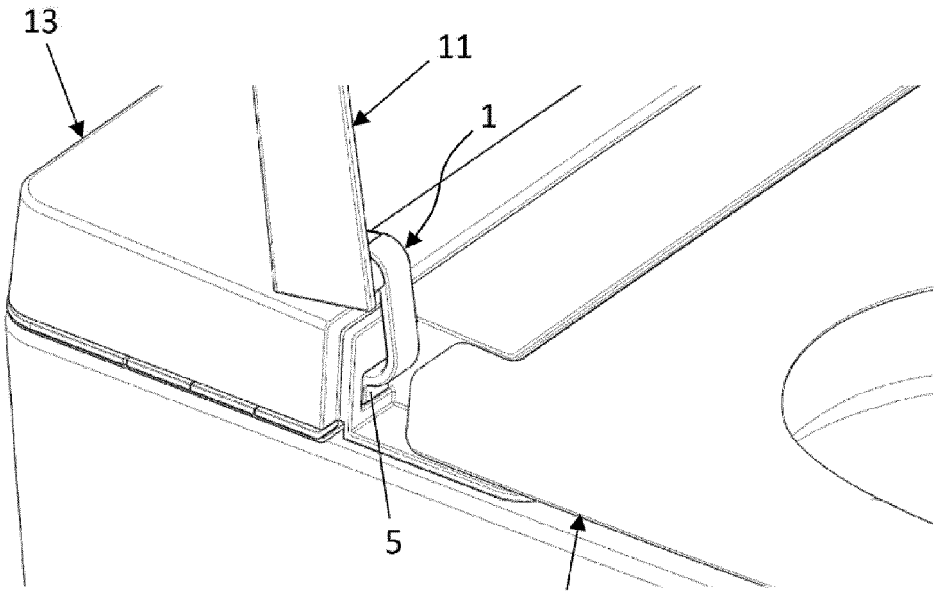

Fig. 3

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Description

[0001] The field of the present invention concerns that of hinges with eccentric geometry, in particular, that of those intended to be used in toilets with lid systems provided with a cover that houses the rotation shaft about which the hinges rotate.

BACKGROUND OF THE INVENTION

[0002] Toilets-bidets are known in the state of the art, where the lid of the toilet and the seat ring are linked to a rear cover where the mechanisms and electronic components that perform the hygienic cleaning functions are housed. This cover, moreover, covers part of the hinge which supports the lid rotatably around a stem. Examples of this type of lid system provided with a cover covering part of the hinge are found in EP2001347A1, US5450633A, CN216854540U and CN214284717U.

[0003] To reduce the height of said cover, some hinges comprise a straight section not concentric with the articulated shaft, which is configured to remain horizontal when the lid is closed and pass through an outlet hole of the cover when the hinge is rotated when a user lifts the lid. For the eccentric portion not to collide with the cover when being rotated, the section of the through hole must be greater than the section of the eccentric portion, whereby a part of the hole is uncovered. Due to this, dirt that generates unwanted odours (such as urine splashes) and that is difficult to clean can enter through the hole.

[0004] Therefore, there is a need for providing toilets with lid systems including rear covers of reduced heigh that are able to prevent dirt from entering the hole of the cover through which the hinge runs.

DESCRIPTION OF THE INVENTION

[0005] A first purpose of the invention is to provide an eccentric hinge for a lid system for a toilet, the lid system being of the type comprising:

- a toilet lid;
- an articulated shaft about which the eccentric hinge is hingeable; and
- a cover that covers at least said articulated shaft and which comprises a through hole through which a portion of the eccentric hinge can pass when rotating about the articulated shaft.

[0006] The claimed eccentric hinge comprises:

- a distal portion attachable to the toilet lid;
- a proximal portion configured to be coupled to the articulated shaft; and
- an intermediate portion extending between the proximal portion and the distal portion, and comprising at least one section configured to be arranged non-concentrically with respect to the articulated shaft, said intermediate portion being able to pass through the through hole of the cover when the eccentric hinge is rotated when a user lowers or lifts the lid.

[0007] The present eccentric hinge is characterised in that it comprises at least one tab arranged so as to protrude from the surface of the intermediate portion and which is configured to close the through hole of the cover in at least one rotation position of the eccentric hinge with respect to the articulated shaft.

[0008] In this way the through hole is no longer partly uncovered and no dirt that would be difficult to clean can enter it. Besides, the claimed eccentric hinge allows to extremely reduce the height of the cover such that the upper surface of the cover can remain substantially flush with the upper surface of the toilet lid while keeping the through hole of the cover protected from dirt.

[0009] The skilled person in the art will understand that for the intermediate portion to rotate without colliding with the cover, the section of the through hole must be greater than the section of the intermediate portion.

[0010] According to one embodiment, the eccentric hinge comprises at least one tab configured to close the through hole of the cover when the lid (and, therefore, the eccentric hinge) is in its final open position, which is when there is more risk of dirt entering the through hole. In this way, the tab closes the through hole in the final rotational position with the lid open.

[0011] For another embodiment, the eccentric hinge comprises a plurality of tabs configured and arranged to close the through hole of the cover in a plurality of rotational positions of the eccentric hinge to prevent dirt from entering the through hole in case the user keeps the lid half open when using the toilet.

[0012] The intermediate portion is advantageously configured so that the distance between the articulated shaft and the tab is equal to the distance between the articulated shaft and the through hole.

[0013] According to another embodiment, the intermediate portion is configured to be adjacent to or in contact with the upper apex of the through hole when the lid is in its final open position, and preferably configured to act as a stop in the eccentric hinge path when contacting the cover.

[0014] Preferably, the tab is configured so that its distal edge and its lateral edges are adjacent to or in contact with the lower apex and the lateral apexes respectively of the through hole, and preferably configured to act as a stop in the eccentric hinge path when contacting the cover.

[0015] In a preferred embodiment, the intermediate portion comprises a substantially straight section configured to be disposed horizontally when the intermediate portion is totally hidden under the cover for the closed position of the lid. In this way, the height of the eccentric hinge is the minimum possible, making the height of the cover and the volume occupied by the lid system also the minimum possible.

[0016] In an optional embodiment of the eccentric hinge, the proximal portion comprises an asymmetric cylinder with a geometry complementary to the articulated shaft, such that they can be integrally coupled to each other. In another optional embodiment, the distal portion comprises at least one hole through which to thread a screw to the cap fixing them to each other.

[0017] It is a second object of the present invention to provide a lid system for a toilet comprising:

- at least one eccentric hinge according to any of the embodiments described above;
- a lid attached to the distal portion of said at least one eccentric hinge;
- at least one articulated shaft about which said at least one eccentric hinge is articulated; and
- a cover covering said at least one articulated shaft and the proximal portion of said at least one eccentric hinge, the cover comprising at least one through hole through which the intermediate portion of the at least one eccentric hinge runs when rotating around the at least one articulated shaft.

[0018] The lid system of the present invention is characterized in that the at least one eccentric hinge comprises at least one tab arranged so as to protrude from the surface of the intermediate portion of said at least one eccentric hinge and configured to be able to close the at least one through hole of the cover in at least one rotational position of said at least one eccentric hinge with respect to said at least one articulated shaft.

[0019] On the other hand, the at least one articulated shaft can be fixed and allow the free rotation of the hinge, or it can be rotatable with respect to its own axial axis, either because it is linked to a damped closure system of the lid or to an automated system.

[0020] As is usual in lid systems, the one of the present invention may comprise a seat ring located under the lid and spaced from the cover a sufficient distance to allow rotation of the eccentric hinge without colliding with each other.

[0021] According to one embodiment, the upper apex of the seat ring located adjacent to the cover is provided with a rounding that allows to reduce the distance between the seat ring and the cover without the hinge colliding with the seat ring when being rotated.

[0022] Advantageously, the apex between the distal portion and the intermediate portion of the eccentric hinge is provided with a rounding which allows to reduce the distance between the seat ring and the cover. In this way, an extremely compact design lid system is obtained.

[0023] A third object of the present invention consists of a toilet characterized in that it comprises a lid system according to any of the embodiments described above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

Figure 1.- Is a perspective view of the preferred embodiments of the toilet, the lid system and two eccentric hinges according to the present invention.

Figure 2.- Is a perspective view of the preferred embodiment of one of the eccentric hinges shown in figure 1.

Figure 3.- Is an enlarged view of a part of figure 1.

Figure 4.- Is a sectional view of the toilet and of the lid system through the central plane of the eccentric hinge shown in figure 3, with the lid closed.

Figure 5.- Is a sectional view of the toilet and of the lid system through the central plane of the eccentric hinge shown in figure 3, with the lid half open.

Figure 6.- Is a sectional view of the toilet and of the lid system through the central plane of the eccentric hinge shown in figure 3, with the lid in its final open position.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0025] A preferred embodiment of the eccentric hinge and lid system and toilet of the present invention is described below with reference to figures 1 to 6.

[0026] Figure 1 shows an embodiment of a toilet (100) provided with an embodiment of the lid system (10) of the present invention. This embodiment of the lid system (10) comprises two eccentric hinges (1), a toilet lid (11), a seat ring (18), two articulated shafts (12) (one of them visible in figures 4 to 6) about which the eccentric hinges (1) articulate, and a cover (13) covering said articulated shafts (12) and part of the eccentric hinge (1).

[0027] As can be seen in detail in the figures 4 and 5, the cover (13) is of the type comprising a through hole (14) through which a portion of the eccentric hinge (1) runs when rotating about the articulated shaft (12), the section of the through hole (14) being larger than the section of the eccentric hinge (1).

[0028] Figure 2 shows an embodiment of the eccentric hinge (1) of the present invention, which is present in the lid system (10) of figure 1. This embodiment of the eccentric hinge (1) comprises:

- a distal portion (2) with two holes, such that it is capable of being attached to the lid (11) of the toilet (100) by means of screws (15), as shown in figures 4 to 6;
- a proximal portion (3) defined by an asymmetric cylinder of geometry complementary to the articulated shaft (12), such that they are coupled together integrally;
- an intermediate portion (4) extending between the proximal portion (3) and the distal portion (2) and comprising a straight section configured to be ar-

ranged non-concentrically with respect to the articulated shaft (12) (see figure 6); and

- a tab (5) disposed so as to protrude from the surface of the intermediate portion (4).

[0029] As can be seen in figures 4 to 6, the straight section of the intermediate portion (4) is configured to pass through the through hole (14) of the cover (13) when the eccentric hinge (1) is rotated between a closed position of the lid (11), shown in figure 4, and a final open position of the lid (11), shown in figure 6. In turn, said straight section of the intermediate portion (4) is configured to remain horizontal when the intermediate portion (4) is totally hidden under the cover (13) in the closing position of the lid (11), so that the height of the cover (13) is the minimum possible.

[0030] In addition, as can be seen in figures 3 and 6, the tab (5) is configured to close the through hole (14) of the cover (13) in at least one rotational position of the eccentric hinge (1), for example when the eccentric hinge (1) is in a final open rotational position of the lid (11). To this end, the intermediate portion (4) is configured so that the distance between the articulated shaft (12) and said tab (5) is equal to the distance between the articulated shaft (12) and the through hole (14).

[0031] Thus, in the present invention, when the user keeps the lid (11) raised during use of the toilet (100), the through hole (14) of the cover (13) through which the intermediate hinge portion (4) runs is fully covered and protected from the entry of dirt.

[0032] In the embodiment shown in figure 6, the tab (5) is further configured to act as a stop in the path of the eccentric hinge (1) when contacting the cover (13) when the lid (11) is in its final open position. In this embodiment of the toilet (100) and the lid system (10), the seat ring (16) is spaced from the cover (13) a sufficient distance to allow rotation of the eccentric hinges (1) without colliding with each other. Additionally, the upper apex of the seat ring (16) located adjacent to the cover (13) and the apex between the distal portion (2) and the intermediate portion (4) of the eccentric hinge (1) are provided with respective roundings (17, 18) that allow reducing the distance between the seat ring (16) and the cover (13) without the eccentric hinges (1) colliding with the seat ring (16) when rotated.

[0033] Although reference has been made to specific embodiments of the invention, it is evident to a person skilled in the art that the toilet seat with bidet functions described herein is susceptible to numerous variations and modifications, and that all the aforementioned details can be replaced by other technically equivalent details, without departing from the scope of protection defined by the attached claims. For example, although reference has been made to an embodiment of eccentric hinge including a single tab, it would be possible to provide one embodiment including a plurality of tabs configured and arranged to close the through hole of the cover in a plurality of rotational positions of the eccentric hinge.

Claims

1. Eccentric hinge (1) for a lid system (10) for a toilet (100), the lid system (10) being of the type comprising a toilet lid (11), an articulated shaft (12) about which the eccentric hinge (1) can be articulated and a cover (13) covering at least said articulated shaft (12), wherein the cover (13) is of the type comprising a through hole (14) through which a portion of the eccentric hinge (1) can pass when rotated about the articulated shaft (12), the eccentric hinge (1) comprising:

   - a distal portion (2) capable of being attached to the toilet lid (11),
   - a proximal portion (3) configured to be coupled to the articulated shaft (12), and
   - an intermediate portion (4) extending between the proximal portion (3) and the distal portion (2) and comprising at least one section configured to be arranged non-concentrically with respect to the articulated shaft (12), said intermediate portion (4) being the one that can pass through the through hole (14) of the cover (13) when the eccentric hinge (1) is rotated when a user lowers or lifts the lid (11),

   the eccentric hinge (1) being **characterized in that** it comprises at least one tab (5) arranged so as to protrude from the surface of the intermediate portion (4) and configured to close the through hole (14) of the cover (13) in at least one rotational position of the eccentric hinge (1) with respect to the articulated shaft (12).

2. Eccentric hinge (1) according to claim 1, **characterized in that** said at least one tab (5) is configured and arranged to close the through hole (14) of the cover (13) when the lid (11) is in its final open position.

3. Eccentric hinge (1) according to claim 2, **characterized in that** the intermediate portion (4) is configured so that the distance between the articulated shaft (12) and said at least one tab (5) is equal to the distance between the articulated shaft (12) and the through hole (14).

4. Eccentric hinge (1) according to claim 2 or 3, **characterized in that** the intermediate portion (4) is configured to be adjacent to or in contact with the upper apex of the through hole (14) when the lid (11) is in its final open position.

5. Eccentric hinge (1) according to claim 4, **characterized in that** the intermediate portion (4) of the hinge (1) is configured to act as a stop in the path of the eccentric hinge (1) when contacting the cover (13)

when the lid (11) is in its final open position.

6. Eccentric hinge (1) according to any of claims 2 to 5, **characterized in that** said tab (5) is configured so that its distal edge and its lateral edges are adjacent to or in contact with the lower apex and the lateral vertices respectively of the through hole (14) when the lid (11) is in its final open position.

7. Eccentric hinge (1) according to claim 6, **characterized in that** the tab (5) is configured to act as a stop in the path of the eccentric hinge (1) when contacting the cover (13) when the lid (11) is in its final open position.

8. Eccentric hinge (1) according to any of the preceding claims, **characterised in that** the intermediate portion (4) comprises a substantially straight section configured to be arranged horizontally when the intermediate portion (4) is totally hidden under the cover (13) for the closed position of the lid (11).

9. Eccentric hinge (1) according to any of the preceding claims, **characterised in that** the proximal portion (3) comprises an asymmetric cylinder with a geometry complementary to the articulated shaft (12) such that they are integrally engageable with each other.

10. Eccentric hinge (1) according to any of the preceding claims, **characterized in that** the distal portion (2) comprises at least one hole through which to thread a screw (15) to the lid (11) and be fixed thereto.

11. Lid system (10) for a toilet (100) comprising at least one eccentric hinge (1) according to any of the preceding claims, a lid (11) attached to the distal portion of said at least one eccentric hinge (1), at least one articulated shaft (12) about which said at least one eccentric hinge (1) is articulated and a cover (13) covering said at least one articulated shaft (12) and the proximal portion (3) of said at least one eccentric hinge (1), the cover (13) comprising at least one through hole (14) through which the intermediate portion (4) of said at least one eccentric hinge (1) passes when rotating about said at least one articulated shaft (12), the lid system (10) being **characterized in that** said at least one eccentric hinge (1) comprises at least one tab (5) arranged so as to protrude from the surface of the intermediate portion (4) of said at least one eccentric hinge (1) and configured to be able to close a through hole (14) of the cover (13) in at least one rotational position of said at least one eccentric hinge (1) with respect to said at least one articulated shaft (12).

12. A lid system (10) for a toilet (100) according to claim 11, **characterised in that** it comprises a seat ring (16) spaced from the cover (13) a sufficient distance to allow rotation of said at least one eccentric hinge (1) without colliding with each other.

13. Lid system (10) for a toilet (100) according to claim 12, **characterised in that** the upper apex of the seat ring (16) located adjacent to the cover (13) is provided with a rounding (17) that allows reducing the distance between the seat ring (16) and the cover (13) without said at least one eccentric hinge (1) colliding with the seat ring (16) when rotated.

14. Lid system (10) for a toilet (100) according to claim 12 or 13, **characterised in that** the apex between the distal portion (2) and the intermediate portion (4) of said at least one eccentric hinge (1) is provided with a rounding (18) that allows reducing the distance between the seat ring (16) and the cover (13) without said at least one eccentric hinge (1) colliding with the seat ring (16) when rotated.

15. A toilet (100) **characterized in that** it comprises a lid system (10) as claimed in any of claims 11 to 14.

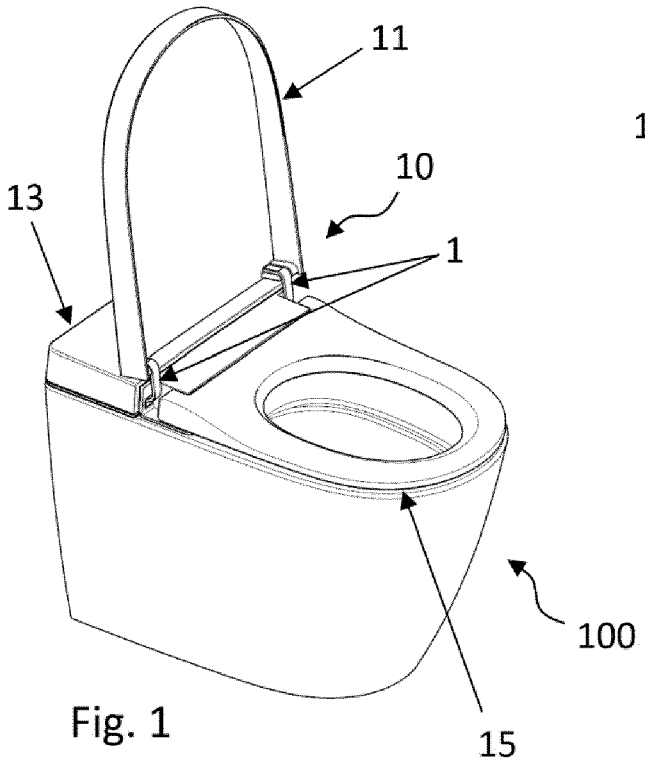

Fig. 1

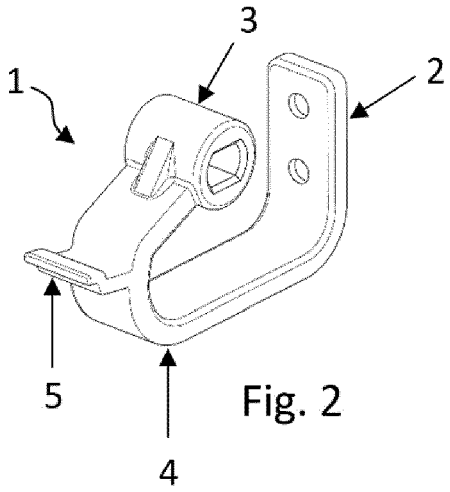

Fig. 2

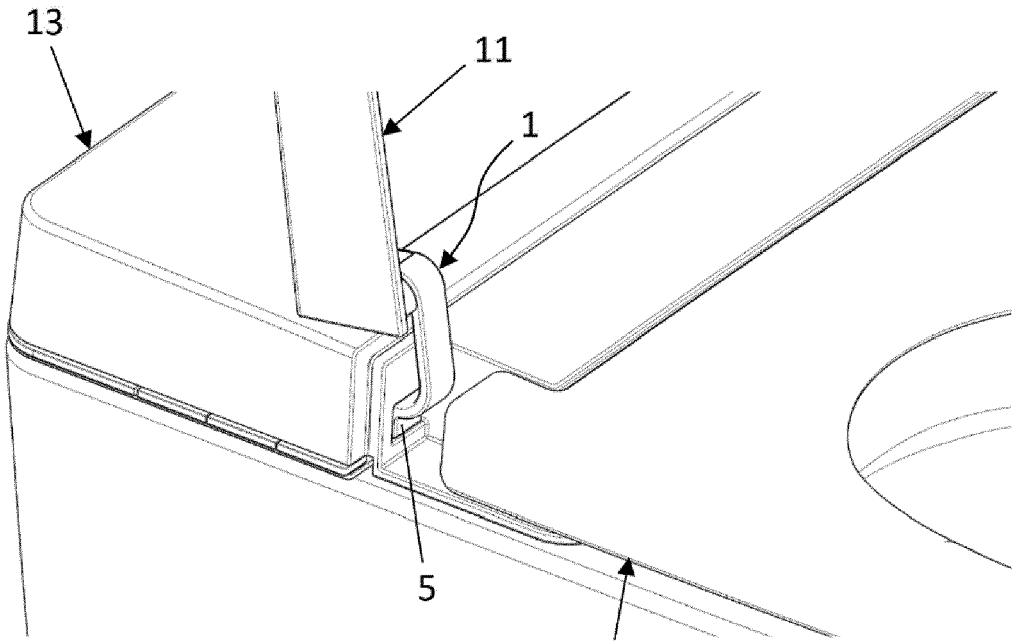

Fig. 3

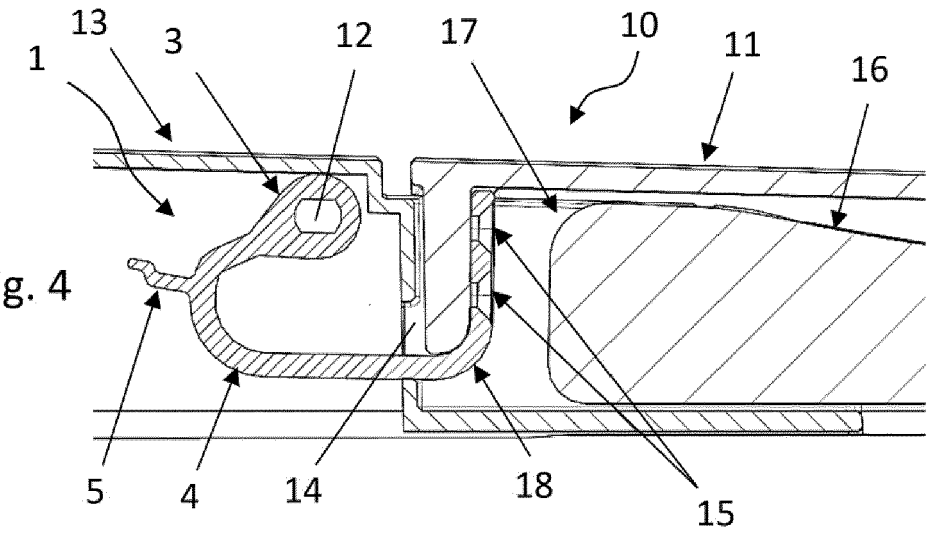

Fig. 4

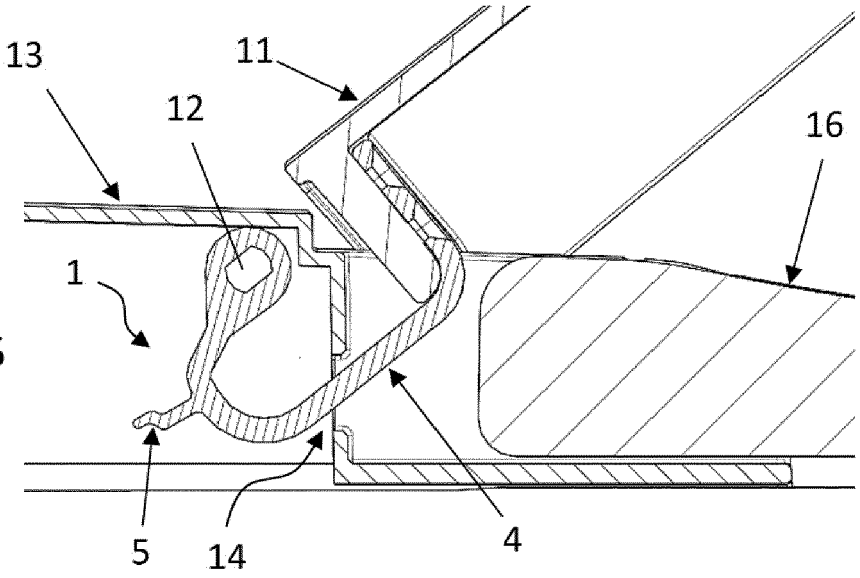

Fig. 5

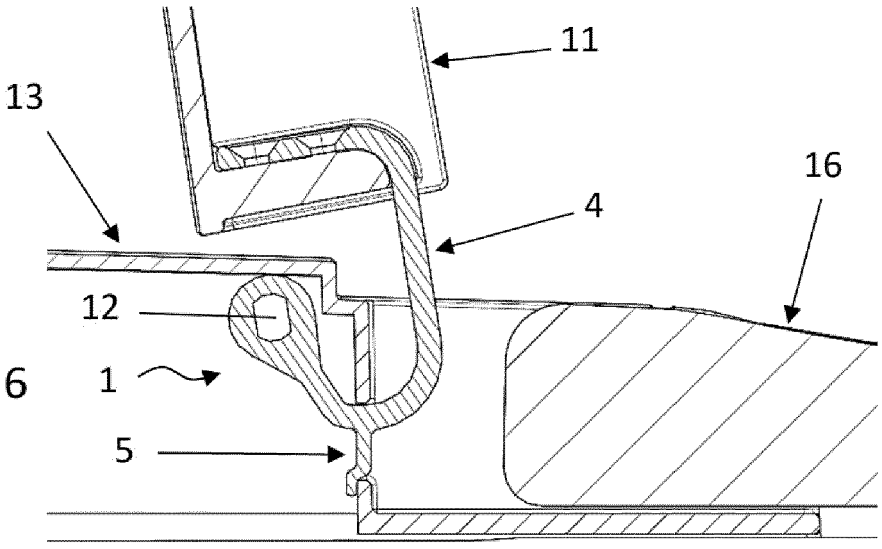

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 24 15 9237

DOCUMENTS CONSIDERED TO BE RELEVANT

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TECHNICAL FIELDS SEARCHED (IPC)

A47K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	25 June 2024	Oliveras, Mariana

CATEGORY OF CITED DOCUMENTS

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