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(54) **SANITARY FITTING AND SEALING GASKET FOR MOUNTING IN A THROUGH HOLE OF A SANITARY INSTALLATION**

(57) A sanitary fitting (10) comprises a housing base (18) having a contact surface (20) and a mounting stud bolt (26) configured to be inserted into a mounting through hole (14) of a sanitary installation (12), wherein the mounting stud bolt (14) is arranged eccentrically with respect to the contact surface (20) at the housing base (18). The sanitary fitting (10) further comprises a sealing gasket (34) configured to be interposed between the contact surface (20) of the housing base (18) and a support surface (16) around the mounting through hole (14) and a retaining element (28) configured to be fastened on the mounting stud bolt (26) on a side of mounting through hole (14) of the sanitary installation (12) opposite to the housing base (18) in order to fasten the sanitary fitting (10) at the sanitary installation (12). In order to facilitate the mounting of the sanitary fitting (10) the sealing gasket (34) is asymmetric such that a first part (46) of the sealing gasket (34) yields to a lesser extent than a second part (48) of the sealing gasket (34) under the load of forces exerted by the contact surface (20) and the support surface (28) on the sealing gasket (34) when the retaining element (28) is fastened on the mounting stud bolt (26).

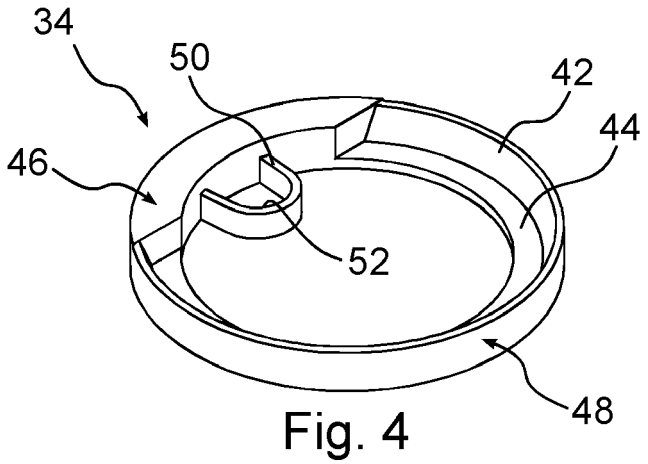


Fig. 4

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention relates to a sanitary fitting comprising

a) a housing base having a contact surface;

b) a mounting stud bolt configured to be inserted into a mounting through hole of a sanitary installation, wherein the mounting stud bolt is arranged eccentrically with respect to the contact surface at the housing base;

c) a sealing gasket configured to be interposed between the contact surface of the housing base and a support surface around the mounting through hole;

d) a retaining element configured to be fastened on the mounting stud bolt on a side of mounting through hole of the sanitary installation opposite to the housing base in order to fasten the sanitary fitting at the sanitary installation.

[0002] The invention further relates to a sealing gasket for a sanitary fitting, wherein the sealing gasket is configured to be interposed between a contact surface of a housing base of the sanitary fitting and a support surface around a mounting through hole of a sanitary installation.

2. Description of the Prior Art

[0003] A sanitary fitting usually comprises water connections protruding from a housing base of the sanitary fitting for connection of the sanitary fitting to the domestic plumbing lines. Furthermore such a sanitary fitting comprises a mounting stud bolt, which has a male screw thread and protrudes from the housing base for mounting purposes.

[0004] During the installation of such a sanitary fitting, the mounting stud bolt and the water connections are inserted into a through hole of a sanitary installation like e.g. a washing table, a washbasin, a washstand, a wall installation or a pedestal installation. In a next step, a retaining element is fastened on the mounting stud bolt on the opposite side of the mounting through hole. Due to the fastening of the retaining element a contact surface of the housing base is pressed against a support surface around the mounting through hole and the sanitary fitting gets fixed at the sanitary installation.

[0005] In order to prevent splash water from flowing in between the contact surface of the sanitary fitting and the support surface of the sanitary installation and onward through the mounting through hole a sealing gasket is interposed between the contact surface and the support surface. Such a sealing gasket also compensates for any unevenness of the support surface of the sanitary installation which is necessary because the sanitary installations are usually made of ceramics having a rather undefined surface flatness.

[0006] The sealing gaskets used for this purpose are usually rotationally symmetric rings or the like. However, it turned out that it is sometimes difficult to properly fix the sanitary fitting using such rotationally symmetric sealing gaskets.

SUMMARY OF THE INVENTION

[0007] It is therefore an object of the present invention to provide a sanitary fitting and a corresponding sealing gasket which allows a better fastening of the sanitary fitting. In particular, it is an object of the invention to provide a way to more uniformly distribute the forces exerted on the sealing gasket throughout the fastening of the retaining element.

[0008] This object is achieved by a sanitary fitting as mentioned in the beginning, wherein

e) the sealing gasket is asymmetric such that a first part of the sealing gasket yields to a lesser extent than a second part of the sealing gasket under the load of forces exerted by the contact surface and the support surface on the sealing gasket when the retaining element is fastened on the mounting stud bolt.

[0009] The inventor has realized that the mounting stud bolt is usually arranged eccentric with respect to the contact surface of the housing base in order to provide sufficient space for the connection of the water connections inside the housing base. However, due to the eccentric arrangement of the mounting stud bolt the distribution of forces exerted on the sealing gasket between the contact surface and the support is imbalanced, because the distribution of the exerted forces is defined by a system of lever arms of different lengths. Therefore, the part of the sealing gasket contacting the side of the housing base corresponding to the shorter lever arm (usually the side pointing to the backside of the sanitary fitting) is compressed stronger than the remaining part corresponding to the longer lever arm. Accordingly, the sanitary fitting tilts to the side of the short lever arm and the housing base finally contacts the sanitary installation in a single point and exerts a high point load on the sanitary installation usually made of ceramics.

[0010] By using a asymmetric sealing gasket one may counteract on this imbalance by providing a larger reaction force for the smaller lever arm and a smaller reaction force for the longer lever arm. Generally speaking, a first part of the sealing gasket yields to a lesser extent than a second part of the sealing gasket under the load of forces exerted by the contact surface and the support surface on the sealing gasket.

[0011] Or otherwise stated, the first part of the sealing gasket is stiffer than the second part.

[0012] Thereby, the sanitary fitting does not tilt during fastening and the housing base and the contact surface are flatly pressed on the sealing gasket. This results in a reduced point load on the sanitary installation which may prevent cracking of any ceramic parts. Furthermore, this results in a higher resistance against twisting of the sanitary fitting, because the sanitary fitting mainly resides on the sealing gasket generally having a higher friction coefficient than only a small metallic backside edge of the housing base.

[0013] Because the general shape of the sealing gasket depends on the shape of the housing base of the sanitary fitting, the sealing gasket may have any usually used general shape like substantially a ring shape, an elliptical shape, a rectangular shape or the like. Even asymmetric shapes may be used, although in the context of this invention an asymmetric sealing gasket mainly refers to the distribution of the counterforces exerted by the sealing gasket when interposed between the contact surface and the support surface.

[0014] The sealing gasket may or may not include further parts which are not relevant for the distribution of the forces.

[0015] Furthermore, the first part of the sealing gasket may have a different cross section than the second part. A different cross section provides a different stiffness even if the same material is used for both parts of the sealing gasket.

[0016] Furthermore, the cross section of the first part may have a larger area than the cross section of the second part. Therefore, the first part of the sealing gasket is more massive than the second part of the sealing gasket and consequently is stiffer if made from the same material.

[0017] Furthermore, the first part of the sealing gasket comprises a strengthening element, in particular ribs or beadings. The stiffness of the different parts of the sealing gasket is not only influenced by the overall area of the cross section but also by its shape. Therefore, the first part of the sealing gasket may be stiffened by providing strengthening elements which add additional area to the cross section area or which are provided by a reshaped cross section having the same cross section area than the second part.

[0018] Furthermore, the sealing gasket may have a substantially rotational symmetric geometry but the first part is made of a material with a lower elasticity than the material of the second part. In particular, the sealing gasket may be provided with different shore hardness on the first and the second parts. This may be achieved for example by a subsequent thermal hardening of the first part of an originally symmetric sealing gasket.

[0019] The eccentric arrangement of the mounting stud bolt with respect to the contact surface defines two lever arms having different lengths. Therefore, it is advantageous if the stiffness of the first part and the stiffness of the second part of the sealing gasket are chosen such that counter forces exerted by the first and the second part compensate for the different lengths of the lever arms. This can be achieved by using the ratio of the lever arm lengths to determine the ratio of the stiffness values of the first and second parts.

[0020] Furthermore, the sealing gasket comprises an orientation element which allows to properly orientate the sealing gasket with respect to the eccentric arrangement of the mounting stud bolt. Such an orientation element may for example be a lug having a through hole for the mounting stud bolt and protruding inwards from the sealing gasket.

[0021] Furthermore, the first part of the sealing gasket circumferentially runs along an angle of less than approximately 120°, in particular 90°, in particular 40°, and the second part respectively runs along an angle of at least approximately 240°, in particular 270°, in particular 320°.

[0022] Regarding the sealing gasket the object of the invention is achieved by a sealing gasket configured to be interposed between a contact surface of a housing base of a sanitary fitting and a support surface around a mounting through hole of a sanitary installation, wherein the sealing gasket is asymmetric such that a first part of the sealing gasket yields to a lesser extent than a second part of the sealing gasket under the load of forces exerted by the contact surface and the support surface on the sealing gasket when a retaining element is fastened on a mounting stud bolt of the sanitary fitting. The advantageous features mentioned above for the sanitary fitting also apply correspondingly to the sealing gasket.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Various features and advantages of the invention may be more readily understood with reference to the following detailed description which refers to the following drawings in which:

Figure 1 shows a side view of a sanitary fitting mounted on a sanitary installation by interposition of a sealing gasket;

Figure 2 shows a side view of a sanitary fitting having a sealing gasket according to the state of the art when a retaining element is fastened;

Figure 3 shows a perspective top view of a sealing gasket according to the invention;

Figure 4 shows a perspective bottom view of the sealing gasket according to the invention;

Figure 5 shows a bottom view of the sealing gasket;

Figure 6 shows a section along cut line A-A shown in Figure 5;

Figure 7 shows a perspective top view of a sealing gasket according to a second embodiment;

Figure 8 shows a perspective bottom view of the sealing gasket of Figure 7;

Figure 9 shows a bottom view of the sealing gasket of Figure 7;

Figure 10 shows a section along cut line A-A shown in Figure 9;

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0024] Figure 1 shows sanitary fitting 10 mounted to a mounting plate 12 of washing basin as an exemplary sanitary installation.

[0025] For this purpose the mounting plate 12 of the washing basin comprises a mounting through hole 14. The region adjacent to the mounting through hole 14 defines a support surface 16, which substantially supports a housing base 18 of the sanitary fitting 10.

[0026] The housing base 18 of the sanitary fitting 10 often has a sleeve shape comprising an inner shoulder recessing slightly in axial direction and thereby providing a contact surface 20 which is oriented towards the mounting plate 12 and configured to receive a sealing gasket 34. The contact surface 20 has a substantially ring shaped foot print in accordance with the general layout of the housing base 18.

[0027] For connection of the sanitary fitting 10 to domestic plumbing lines the sanitary fitting 10 comprises water connection lines 22 and 24 protruding from the housing base 18.

[0028] Furthermore, the sanitary fitting 10 comprises a mounting stud bolt 26 protruding from the housing base 18 as an integrated part of the sanitary fitting 10 or screwed into the sanitary fitting 10. The mounting stud bolt 26 comprises a male screw thread on which a retaining element 28 may be fastened against the mounting plate 12 using a securing nut 30.

[0029] However, because of the space needed for the water connection lines 22, 24 the mounting stud bolt 26 is arranged eccentrically with respect to the contact surface 20 of the housing base 18. In particular, the mounting stud bolt 26 is radially shifted towards the backside of the sanitary fitting 10, namely the side opposite to a protruding water outlet 32.

[0030] In order to prevent spray water from flowing in between the housing base 18 and the mounting plate 12, the sealing gasket 34 is interposed between the contact surface 20 of the housing base 18 and the support surface 16 around the mounting through hole 14 of the mounting plate 12.

[0031] As it can be seen from Figure 2 which shows the use of a sealing gasket 34 according to the state of the art, the forces, which are exerted by the contact surface 20 and the support surface 16 on the sealing gasket 34 when the retaining element 28 is fastened, are distributed unequally because of the different lengths of the lever arms A and B with respect to the mounting stud bolt 26.

[0032] Therefore, the sealing gasket 34 gets compressed stronger by a backside edge 36 of the housing base 18 than by a front edge 38 of the housing base 18. Consequently, the backside edge 36 contacts the mounting plate 12 long before the front edge 38 resulting in a tilt of the sanitary fitting 10 towards the backside edge 34 and in a difficult fastening of the sanitary fitting 10 using a sealing gasket 34 according to the state of the art.

[0033] Therefore, Figures 3-7 show an exemplary sealing gasket 34 according to the present invention having a substantially round ring shape with a flat top surface 40 from which a circumferential sleeve 42 projects axially on the outer circumference. Thereby, a free shoulder 44 is provided pointing towards the inside, which runs along the circumference in an angular section of approximately 320°.

[0034] Along the remaining 40° angular section of the sealing gasket 34 the sealing gasket 34 is more massive such that the space above the shoulder 44 next to the circumferential sleeve 42 is filled. This can be best seen from Figure 6 showing a cross section of the sealing gasket 34. The radial cross section of the sealing gasket 34 within the 40° angular section, which defines a first part 46 of the sealing gasket 34, has an approximately rectangular, in particular quadratic, shape. In contrast, the cross section within the other 320° angular section, which defines a second part 48 of the sealing gasket 34, has substantially an L-shape. Therefore, the area of the cross section of the first part 46 is larger than the cross section of the second part 48. Consequently, the first part 46 is stiffer than the second part 48.

[0035] Furthermore, the sealing gasket 34 comprises a lug 50 which radially protrudes inwards from the general ring shape and which provides a through hole 52 for receiving the mounting stud bolt 26 of the sanitary fitting 10.

[0036] When mounting the sanitary fitting 10 with the sealing gasket 34 according to the invention, the first part 46 of the sealing gasket 34 yields to a lesser extent than a second part 48 of the sealing gasket 34 under the load of forces exerted by the contact surface 20 and the support surface 16 when the retaining element 28 is fastened on the mounting stud bolt 26. Accordingly, the sealing gasket 34 is more evenly compressed even though the mounting stud bolt 26 is arranged eccentric with respect to the contact surface 20 of the housing base 18.

[0037] Figures 7-10 show a second embodiment of the sealing gasket 34, wherein elements having the same structural function have the same reference number.

[0038] As can be seen from Figures 7 and 10 the sealing gasket 34 according to the second embodiment comprises a frustoconical centering shoulder 80 recessing inwards from the flat top surface 40. Furthermore, the top surface 40 is surrounded on its circumference by a

small sealing lip 81 protruding axial upwards from the top surface 40.

[0039] Furthermore, the sealing gasket 34 comprises a centering apron 82 provided on radially inwards and protruding downwards for centering the sealing gasket 34 inside the mounting through hole 14.

[0040] In this embodiment of the sealing gasket 34 the first part 46 is formed by a filled space between the centering apron 82 and the circumferential sleeve 42.

Claims

1. A sanitary fitting (10) comprising

a) a housing base (18) having a contact surface (20);
b) a mounting stud bolt (26) configured to be inserted into a mounting through hole (14) of a sanitary installation (12), wherein the mounting stud bolt (14) is arranged eccentrically with respect to the contact surface (20) at the housing base (18);
c) a sealing gasket (34) configured to be interposed between the contact surface (20) of the housing base (18) and a support surface (16) around the mounting through hole (14);
d) a retaining element (28) configured to be fastened on the mounting stud bolt (26) on a side of mounting through hole (14) of the sanitary installation (12) opposite to the housing base (18) in order to fasten the sanitary fitting (10) at the sanitary installation (12);

characterized in that

e) the sealing gasket (34) is asymmetric such that a first part (46) of the sealing gasket (34) yields to a lesser extent than a second part (48) of the sealing gasket (34) under the load of forces exerted by the contact surface (20) and the support surface (28) on the sealing gasket (34) when the retaining element (28) is fastened on the mounting stud bolt (26).

2. The sanitary fitting according to claim 1, wherein the first part (46) of the sealing gasket (34) is stiffer than the second part (48).

3. The sanitary fitting according to any of the preceding claims, wherein the first part (46) of the sealing gasket (34) has a different cross section than the second part (48).

4. The sanitary fitting according to claim 3, wherein the cross section of the first part (46) has a larger area than the cross section of the second part (48).

5. The sanitary fitting according to any of the preceding claims, wherein the first part (46) of the sealing gasket (34) comprises a strengthening element, in particular ribs or beadings.

6. The sanitary fitting according to claim 1, wherein the sealing gasket (34) has a substantially rotational symmetric geometry but the first part (46) is made of a material with a lower elasticity than the material of the second part (48).

7. The sanitary fitting according to any of the preceding claims, wherein the eccentric arrangement of the mounting stud bolt (46) with respect to the contact surface (20) defines two lever arms (A, B) having different lengths and wherein the stiffness of the first part (46) and the stiffness of the second part (48) of the sealing gasket (34) are chosen such that counter forces exerted by the first part (46) and the second part (48) compensate for the different lengths of the lever arms (A, B).

8. The sanitary fitting according to any of the preceding claims, wherein the sealing gasket (34) comprises an orientation element (50) which allows to properly orientate the sealing gasket (34) with respect to the eccentric arrangement of the mounting stud bolt (26).

9. The sanitary fitting according to any of the preceding claims, wherein the first part (46) of the sealing gasket (34) circumferentially runs along an angle of less than approximately 120°, in particular 90°, in particular 40°, and the second part (48) respectively runs along an angle of at least approximately 240°, in particular 270°, in particular 320°.

10. A sealing gasket (34) for a sanitary fitting (10), wherein the sealing gasket (34) is configured to be interposed between a contact surface (20) of a housing base (18) of the sanitary fitting (10) and a support surface (16) around a mounting through hole (14) of a sanitary installation (12),
characterized in that

a) the sealing gasket (34) is asymmetric such that a first part (46) of the sealing gasket (34) yields to a lesser extent than a second part (48) of the sealing gasket (34) under the load of forces exerted by the contact surface (20) and the support surface (16) on the sealing gasket (34) when a retaining element (28) is fastened on a mounting stud bolt (26) of the sanitary fitting (10).

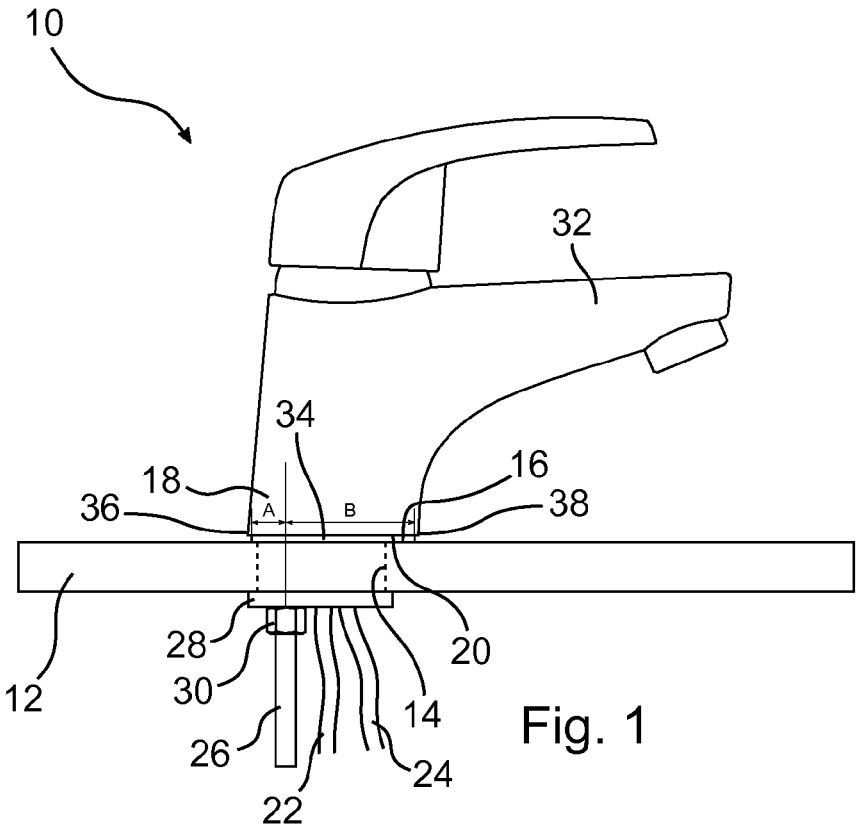


Fig. 1

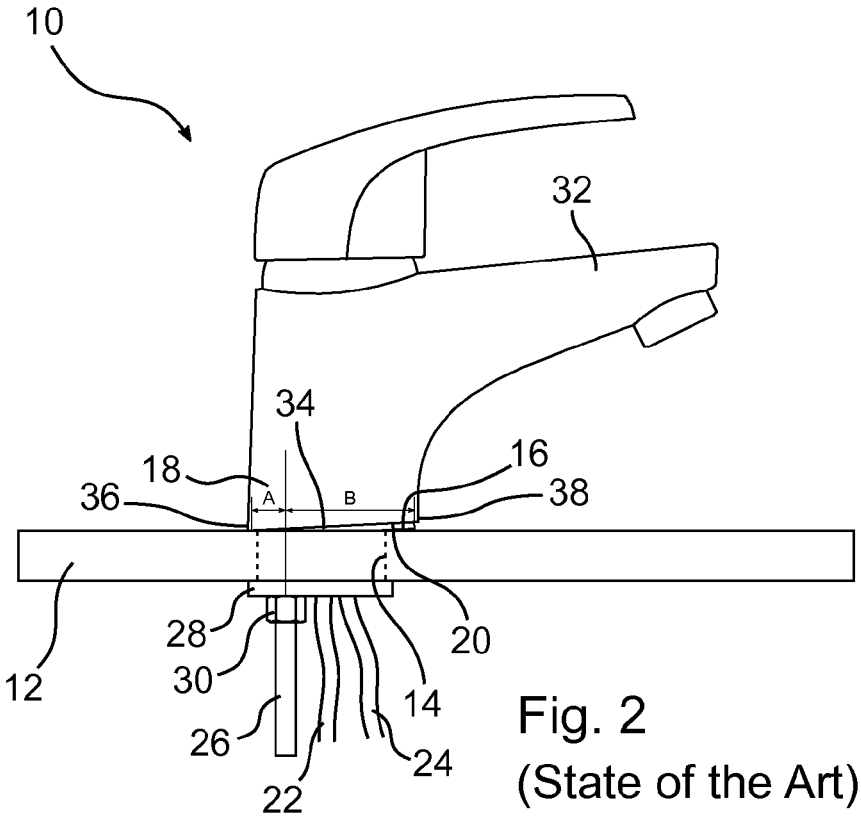


Fig. 2
(State of the Art)

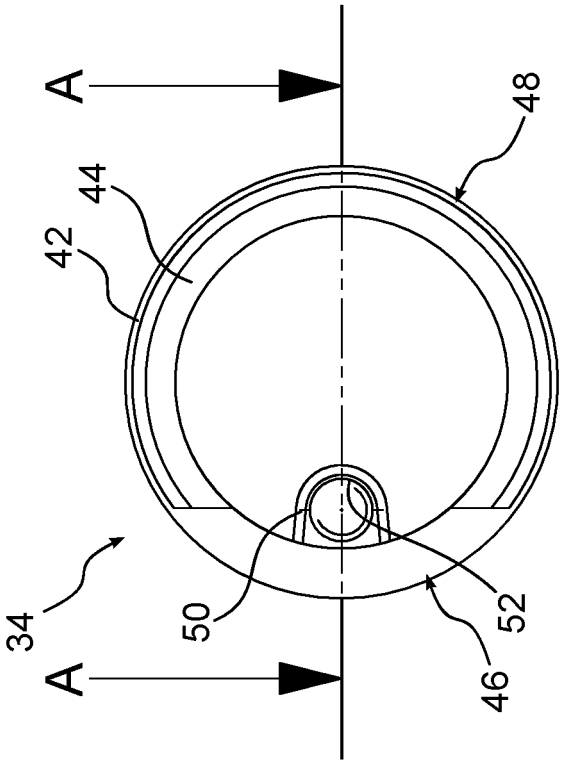


Fig. 5

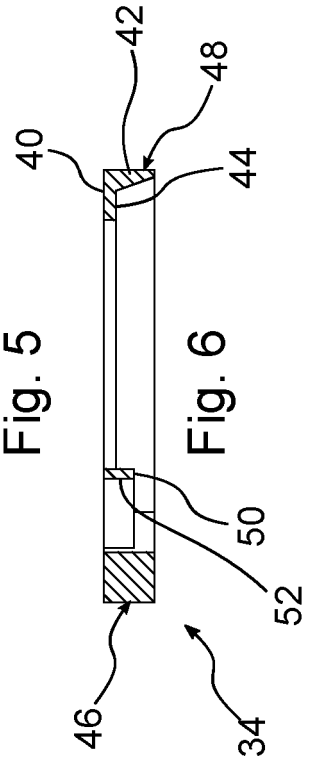


Fig. 6

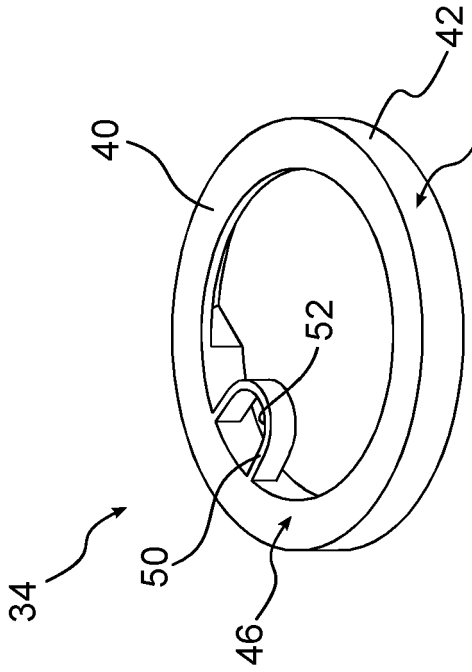


Fig. 3

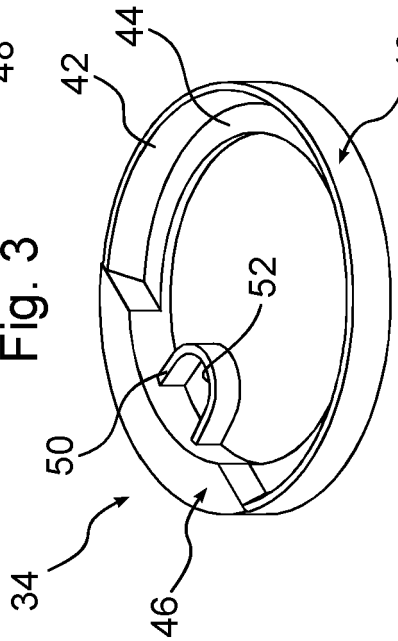


Fig. 4

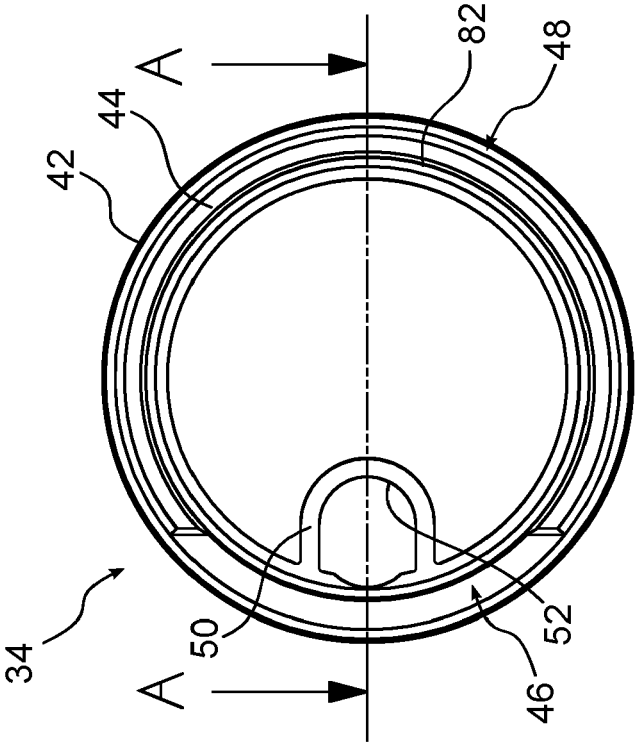


Fig. 9

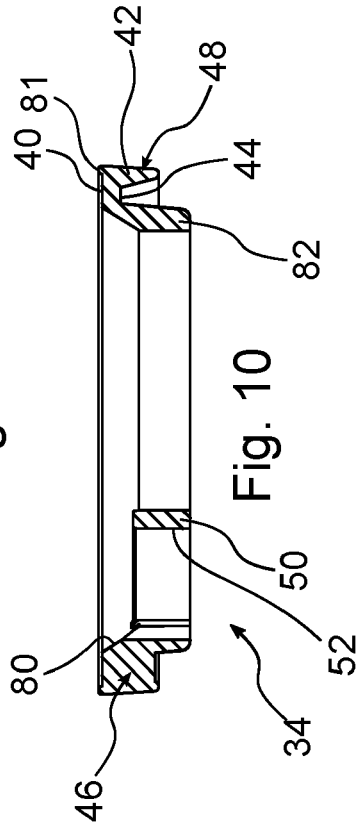


Fig. 10

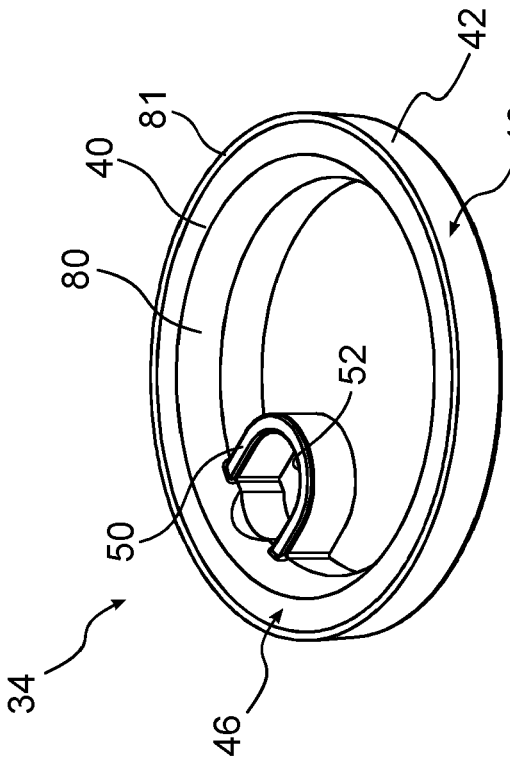


Fig. 7

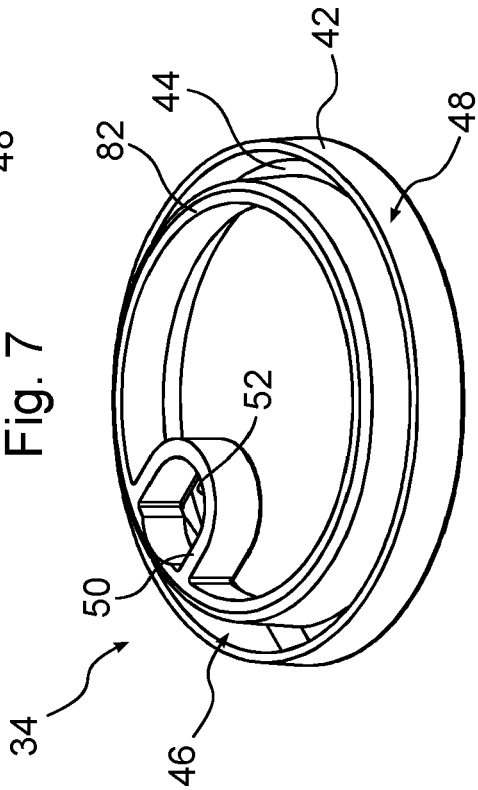


Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 18 15 2215

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 10 2010 044420 A1 (HANSA METALLWERKE AG [DE]) 8 March 2012 (2012-03-08) * figures 1, 2, 5 * -----	1-6,8,10	INV. E03C1/04
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			TECHNICAL FIELDS SEARCHED (IPC) E03C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 May 2018	Schikhof, Arnout

CATEGORY OF CITED DOCUMENTS

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