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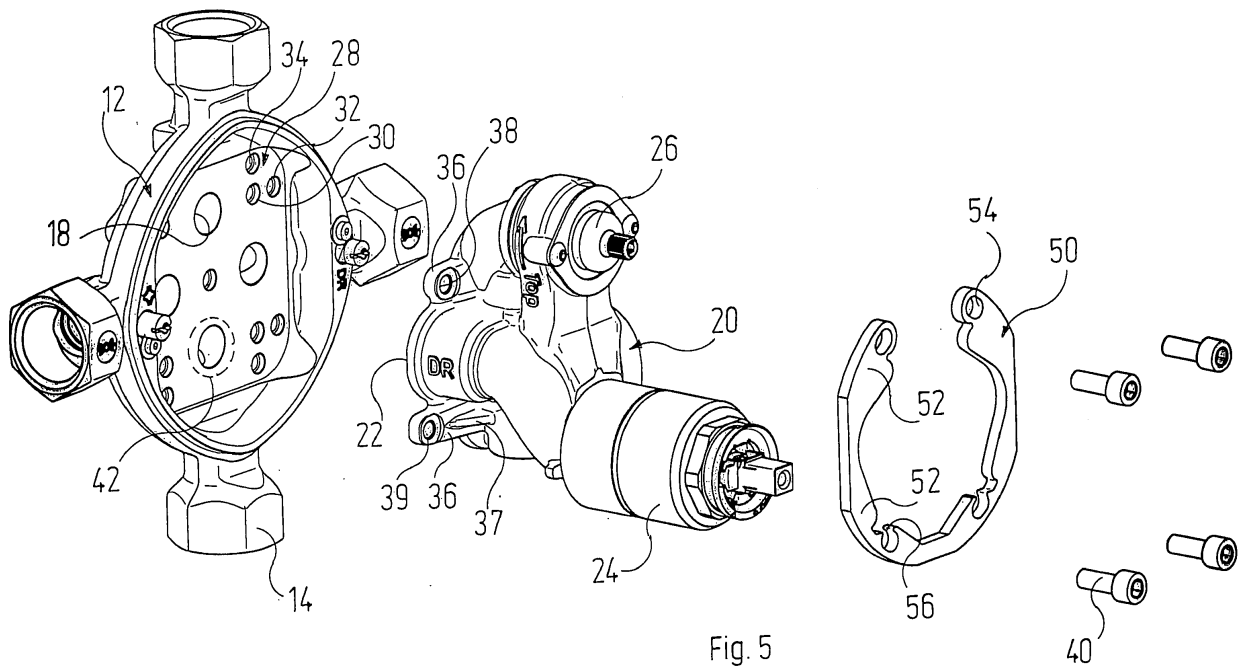
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(54)

ASSEMBLY FOR A CONCEALED SANITARY FITTING

(57)

An assembly for a concealed sanitary fitting (10) comprises a connecting member (12) configured to be installed in an installation recess and comprising at least two first mounting means (28, 32, 34), a valve function unit (20) comprising at least one abutment portion (36, 39), and a clamp element (50; 150). The clamp element (50; 150) comprises at least two second mounting means (54; 154) cooperating with the first mounting means (28, 32, 34) and a pressing portion (52; 152), wherein the pressing portion (52; 152) is pressed against the abutment portion (36, 39) of the valve function unit (20) when the clamp element (50; 150) is fixed to the connecting member (12) with the help of the first and second mounting means (28, 32, 34, 54; 154), thereby clamping the valve function unit (20) against the connecting member (12).



Description

BACKGROUND OF THE INVENTION

1. Field of the invention

[0001] The invention relates to an assembly of a concealed sanitary fitting and a sanitary fitting assembled from this assembly, which may be used for sanitary installations like bathrooms, toilets or kitchens for a controlled release of water.

[0002] In a concealed sanitary fitting, the valve function unit used to control the water flow is accommodated in an installation recess that is provided in a wall or another building structure. In this way, the bulky valve function unit of the sanitary fitting may be concealed under a rosette from the user's vision and only operating elements project from the wall. For the purpose of this invention the term concealed sanitary fitting may or may not comprise the operating elements and the rosette. Therefore the assembly may or may not comprise these elements.

2. Description of the prior art

[0003] Recently, increasing use has been made of concealed sanitary fittings, where the building owner can postpone his decision on the precise type of concealed sanitary fitting he desires until the final phase of interior works on a building. For this purpose, a universally usable connecting member having a connection interface for connection with a valve function unit is installed in a first step in an installation recess of the building wall and is connected to the pipework laid in the building wall, thus in particular the domestic cold water pipe, the domestic hot water pipe and optionally one or more mixed-water-discharging pipes. The installation recess thus equipped is then covered until the interior works on the building, such as tiling for example, have been largely completed. Only then the covering of the installation recess is removed again. The building owner now decides which specific type of concealed fitting he desires, for example a single-lever mixer valve, a thermostatic valve or the like. The manufacturer of the concealed fitting has a complete set of valve function units available which are standardized such that they can all be connected to the same universal connecting member, but contain different valve elements. The specific valve function unit desired by the building owner is then connected to the connecting member. Finally, all that given, a rosette is fitted, which covers the valve function unit inside the installation recess while providing through holes for the operating elements.

[0004] In a bathroom, a toilet or a kitchen, the tiles covering the wall are usually arranged such that the tile edges form joints. These joints run typically in the vertical and in the horizontal direction. Often an alignment of the operating elements and/or the rosette is desired, which harmonizes with the joint structure of the wall. E.g. if the rosette used has a rectangular shape, it is desired that

the edges of the rosette run parallel to the joints in the wall and/or parallel to the vertical and horizontal directions. In order to achieve such alignment of the operating elements and/or the rosette, the valve function unit that carries the operating valves needs to be aligned accordingly.

[0005] For known concealed sanitary fittings, the alignment may only be conducted in a very narrow range because usually cylindrical through holes on the valve function unit and fixing screws are used as mounting means for fixing the valve function unit in the connecting member. The clearance between the through holes and the fixing screws therefore defines the range for shifts and/or rotations achievable for alignment of the valve function unit.

SUMMARY OF THE INVENTION

[0006] It is therefore an object of the invention to provide an assembly for a concealed sanitary fitting which allows for larger ranges for shifts and/or rotations of the valve function unit with respect to the connecting member.

[0007] This object is achieved by an assembly for a concealed sanitary fitting comprising:

- a. a connecting member configured to be installed in an installation recess and comprising at least two first mounting means,
- b. a valve function unit comprising at least one abutment portion,
- c. a clamp element comprising
 - i. at least two second mounting means cooperating with the first mounting means and
 - ii. a pressing portion,

wherein the pressing portion is pressed against the abutment portion of the valve function unit when the clamp element is fixed to the connecting member with the help of the first and second mounting means, thereby clamping the valve function unit against the connecting member.

[0008] The present invention is based on the conception that by providing a clamp element for clamping the valve function unit which comprises a pressing portion which presses against an abutment portion of the valve function unit one may provide a larger range for shifts and/or rotations of the valve function unit. Therefore, the pressing portion of the clamp element and the abutment portion of the valve function unit may be configured such that the clamping is a force-locked connection and not a form-locked connection with respect to the shifts and/or rotations. Alternatively or additionally, the first and second mounting means may comprise a clearance allowing

a larger range than the known combinations of a cylindrical hole and a fixing screw.

[0009] The fact that the clamp element is mounted to the connecting member using at least two first and second mounting means provides for a better distribution of the clamping forces and for a simplified handling. Advantageously, the clamp element is configured such that it is universally usable for different types of valve function units.

[0010] If the connecting member was installed in the installation recess in an already aligned manner, using a clamp element is not necessary because handling an additional clamp element and the valve function unit during the mounting step might be too cumbersome. Therefore, the connecting member may comprise at least two third mounting means, and the valve function unit may comprise at least two fourth mounting means which are configured to cooperate with the third mounting means so as to fix the valve function unit to the connecting member if the clamp element is not used.

[0011] In this case, at least a part of each of the fourth mounting means may form the abutment portion. This means that the fourth mounting means of the valve function unit which are used if the connecting member is already aligned properly are configured to be pressed on by the pressing portion if the clamp element has to be used. Accordingly, both functions, namely providing the fourth mounting means and providing the abutment portion are realized in one common feature of the valve function unit. This reduces manufacturing costs.

[0012] Preferably, each of the fourth mounting means may comprise a mounting lug having a cylindrical through hole, and the abutment portion may be formed by an annular surface surrounding the through hole. For a fixation of the valve function unit without the clamp element a fixing screw or another type of bolt may be inserted in the cylindrical through hole. At the same time the in particular plane surface around the through hole of the mounting lug may be used as an abutment portion for the clamp element, if a larger range for alignment movements is needed.

[0013] Preferably, each of the first mounting means comprises a threaded hole and each of the second mounting means comprises a long hole in the clamp element, wherein the threaded hole and the long hole are configured to receive a fixing screw. In this case the position of the fixing screw at the connecting member is precisely defined and the long hole allows for shifts and/or rotations of the clamp element and consequently the valve function unit.

[0014] For clamping the valve function unit at opposing sides two clamp elements, for each side one clamp element, may be used. However, handling of a plurality of clamp elements is cumbersome. Therefore, the clamp element preferably comprises at least four second mounting means distributed around the circumference of the valve function unit and cooperating with at least four first mounting means of the connecting member

when the clamp element is fixed to the connecting member. In this case the clamping force exerted on the valve function unit may be distributed such that seals between the valve function unit and the clamp element loaded uniformly.

[0015] Preferably, the clamp element is substantially u-shaped. In particular the clamp element comprises four long holes near end portions and corners of the u-shape. A u-shaped clamp element may be placed more easily around the valve function unit than a closed ring.

[0016] Preferably, the pressing portion of the clamp element comprises a nose projecting inwards. An inwardly projecting pressing portion may press on an abutment portion of the valve function unit which is arranged in a niche with respect to the circumference of the valve function unit.

[0017] Preferably, the clamp element has two symmetry planes. This allows to mount the clamp element in opposed orientations and the user does not have to worry about a given mounting orientation.

[0018] Preferably, the clamp element is made of a plastic material and comprises a strengthening portion around each of the second mounting means, wherein the strengthening portion is thicker than a bridge portion which connects both second mounting means. This reduces manufacturing costs.

[0019] Preferably, the invention provides an assembly wherein

- a. the connecting member comprises a connection interface
- b. the valve function unit comprises a counter-connection interface
- c. wherein the connection interface and the counter-connection interface define
 - i. a mounting plane in which the valve function unit may be shifted and
 - ii. a central axis transversal to the mounting plane around which the valve function unit may be rotated

during an adjustment step in which the valve function unit is in abutment at the connecting member and before the valve function unit is fixedly clamped against the connecting member using the clamp element, and

- d. wherein the valve function unit cannot be rotated if the third and fourth mounting means are used to fix the valve function unit.

[0020] According to another aspect of the invention, a concealed sanitary fitting assembled from the assembly described above is provided.

[0021] According to another aspect, the invention provides a connecting member of a concealed sanitary fitting for fixation in an installation recess, wherein the connecting member comprises

- a. at least two first mounting means configured to cooperate with at least two second mounting means of a clamp element of the sanitary fitting and
- b. at least two third mounting means configured to cooperate with at least two fourth mounting means of a valve function unit of the concealed sanitary fitting.

[0022] According to another aspect, the invention provides a valve function unit of a concealed sanitary fitting, wherein the valve function unit comprises at least one abutment portion and wherein the abutment portion is configured to be pressed on by a clamp element of the concealed sanitary fitting. In particular, the valve function unit comprises a housing having mounting lugs, wherein the mounting lugs are configured to be pressed on by a clamp element.

[0023] According to another aspect, the invention provides a clamp element for mounting of a valve function unit of a concealed sanitary fitting in a connecting member of the concealed sanitary fitting, wherein the clamp element comprises

- a. at least two second mounting means cooperating with at least two first mounting means of the connecting member and
- b. a pressing portion,

wherein the pressing portion is pressed against an abutment portion of the valve function unit when the clamp element is fixed to the connecting member with the help of the first and second mounting means, thereby clamping the valve function unit against the connecting member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Various features and advantages of the present invention may be more readily understood from the following detailed description referring to accompanying drawings in which:

- Fig. 1 is a perspective view of a concealed sanitary fitting assembled from an assembly according to the invention;
- Fig. 2 is a front view of a connecting member of the concealed sanitary fitting;
- Fig. 3 is a top view of a clamp element of the concealed sanitary fitting;
- Fig. 4 is a side view of a clamp element of the concealed sanitary fitting;

- Fig. 5 is an exploded view of the concealed sanitary fitting;
- Fig. 6 is a front view of the concealed sanitary fitting;
- Fig. 7 is a top view of a clamp element according to a second embodiment;
- Fig. 8 is a front view of the clamp element according to the second embodiment;
- Fig. 9 is a back view of the clamp element according to the second embodiment;
- Fig. 10 is a side view of the clamp element according to the second embodiment;
- Fig. 11 is a perspective view of the clamp element according to the second embodiment.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0025] Figure 1 shows a perspective view of the main parts of a concealed sanitary fitting 10.

[0026] The concealed sanitary fitting 10 comprises a connecting member 12 configured to be arranged in an installation recess provided in a wall or another building structure of sanitary installation like a bathroom, a toilet or a kitchen. The connecting member 12 comprises connection pieces 14 for connecting the connecting member 12 to the pipe work of the sanitary installation.

[0027] As can be seen from figure 2 the connecting member 12 provides a universal connection interface 16 in form of a substantially quadratic plane surface 15 having a predefined arrangement of connection holes 18 each being connected by an internal channel to the corresponding connecting pieces 14. In this embodiment four connection holes 18 are arranged on the main axes of the quadratic surface 15 and fall in line with the connection pieces 14.

[0028] The concealed sanitary fitting 10 further comprises a valve function unit 20 which is configured to be mounted at the universal connection interface 16 of the connecting member 12. To this purpose the valve function unit 20 comprises a counter-connection interface 22 (figure 5) having counter-connection holes (not visible in the figures) which align with the connection holes 18 of the connection interface 16. Depending on the type of valve function unit 20 different valve elements may be provided for the concealed sanitary fitting 10. In the present embodiment, the valve function unit 20 comprises a single-lever mixer valve 24 combined with a switch valve 26 for switching between a shower outlet or a bathtub outlet.

[0029] For mounting purposes, the connecting interface 16 of the connecting member 12 comprises an arrangement 28 of threaded holes in each corner of the substantially quadratic connection plane 16. The threaded hole arrangement 28 comprises in each corner an inner threaded hole 30 and two outer threaded holes 32 and 34. The outer threaded holes 32 and 34 are arranged outwardly in relation to the inner threaded hole 30, in particular outwardly parallel to the two main axes of the

quadratic plane surface 15.

[0030] The valve function unit 20 comprises mounting lugs 36 having a cylindrical through hole 38 and projecting outwardly from a circumference of the valve function unit 20. For all different types of valve function units 20 a mounting lug 36 is arranged such that only the inner threaded hole 30 or one of the outer threaded holes 32 and 34 is covered by the mounting lug 36 with the cylindrical through hole 38 falling in line with the respective threaded hole 30, 32 or 34. Furthermore, the other parts of the valve function unit 20, in particular its circumference, are configured such that always one of the outer threaded holes 32 and 34 is not covered by the valve function unit 20 when it is abutted against the connection interface 16.

[0031] If the main axes of the connecting member 12 are aligned probably in the installation recess of the wall the valve function unit 20 may then be mounted at least indirectly to the connecting interface 16 with the use of fixing screws 40 each cooperating with the cylindrical through hole 38 of one of the mounting lugs 36 and with a respective threaded hole 30, 32 or 34 provided at the connecting member 12.

[0032] In case the connecting member 12 has been placed in the wall recess in a misaligned manner the valve function unit 20 may be shifted in the quadratic plane 15 of connection interface 16 and/or rotated around a central axis perpendicular to the quadratic plane 15 to compensate the misalignment.

[0033] To this end, the valve function unit 20 comprises sealing rings on its counter-connection interface 22 which surround the through holes 38 of the connection interface 16 with a clearance of more than about 2 mm (compare the dashed projection line 42 of the sealing rings on the connection interface 16). The clearance allows for a tight connection even if the valve function unit 20 and the connecting member 12 are shifted and/or rotated from an ideal connection position.

[0034] For a smaller alignments during the assembly, the user may still use the fixing screws 40 in combination with the cylindrical through hole 38 of the mounting lug 36 because of the clearance between the fixing screws 40 and the cylindrical through hole 38.

[0035] However, for larger misalignments the assembly of the concealed sanitary fitting 10 comprises a mounting ring 50 as a clamp element (see figures 3 and 4). The mounting ring 50 is substantially u-shaped and is configured such that the valve function unit 20 or various corresponding valve function units 20 may be surrounded by the mounting ring 50.

[0036] Furthermore, the mounting ring 50 comprises noses as pressing portions 52 projecting inwardly from the u-shape. Those pressing portions 52 are arranged such that when the mounting ring 50 is placed upon the valve function unit 20, the pressing portions 52 abut against the mounting lug 36 of the valve function unit 20. In particular the pressing portions 52 press against the annular surface 39 surrounding the cylindrical through

hole 38 which forms an abutment portion of the valve function unit 20.

[0037] Furthermore, the mounting ring 50 provides through long holes 54 which are arranged at positions on the mounting ring 50 which fall in line with one of the outer threaded holes 32 or 34 of the threaded holes arrangement 28 of the connecting member 12. The orientation of the through long holes 54 in the mounting ring 12 is substantially diagonal to the main axes of the connecting member 12 when assembled.

[0038] As shown in figure 3 some of the through long holes 54 may be provided with opening gaps 56 which may receive a rib 37 arranged on the respective mounting lug 36 of the valve function unit 20.

[0039] As can be seen from figure 6 the fixing screws 40 (if necessary with a longer thread portion) are inserted in the through long holes 54 and cooperate with the uncovered outer threaded holes 34 of the thread hole arrangement 28. Due to the clearance provided by the through long holes 54 and the seals 42 the valve function unit 20 may then be aligned with an maximum angle α of about $\pm 4^\circ$ with respect to the main axes of the connecting member 12. When tightening the fixing screws 40 the valve function unit 20 is then pressed to the connecting interface 16 of the connecting member 12 via the mounting ring 50.

[0040] Figures 7 to 11 show a modified mounting ring 150 made of a plastic material. To compensate the lesser stability of the material, the mounting ring 150 comprises strengthening portions 158 around the through long holes 154 near the noses 152 for pressing. These strengthening portions 158 are thicker than bridge portions 160 connecting the through long holes 154 in order to form a u-shape.

Claims

1. An assembly for a concealed sanitary fitting (10) comprising:

- a. a connecting member (12) configured to be installed in an installation recess and comprising at least two first mounting means (28, 32, 34),
- b. a valve function unit (20) comprising at least one abutment portion (36, 39), and
- c. a clamp element (50; 150) comprising

- i. at least two second mounting means (54; 154) cooperating with the first mounting means (28, 32, 34) and
- ii. a pressing portion (52; 152),

wherein the pressing portion (52; 152) is pressed against the abutment portion (36, 39) of the valve function unit (20) when the clamp element (50; 150) is fixed to the connecting member (12) with the help of the first and second

mounting means (28, 32, 34, 54; 154), thereby clamping the valve function unit (20) against the connecting member (12).

2. The assembly according to claim 1, **characterized in that** the connecting member (12) comprises at least two third mounting means (28, 30, 32, 34), and **in that** the valve function unit (20) comprises at least two fourth mounting (36, 38, 39) means which are configured to cooperate with the third mounting means (28, 30, 32, 34) so as to fix the valve function unit (20) to the connecting member (12) if the clamp element (50; 150) is not used. 5
3. The assembly according to claim 2, **characterized in that** at least a part of each of the fourth mounting means (36, 38, 39) forms the abutment portion (39). 10
4. The assembly according to one of claims 3, **characterized in that** each of the fourth mounting means (36, 38, 39) comprises a mounting lug (36) having a cylindrical through hole (38), and **in that** the abutment portion is formed by an annular surface (39) surrounding the through hole (38). 15
5. The assembly according to any of claims 2 to 4, **characterized in that** each of the first mounting means (28, 30, 32, 34) comprises a threaded hole (30, 32, 34) and each of the second mounting means (54; 154) comprises a long hole (54; 154) in the clamp element (50; 150), wherein the threaded hole (30, 32, 34) and the long hole (54; 154) are configured to receive a fixing screw (40). 20
6. The assembly according to any of the proceeding claims, **characterized in that** the clamp element (50; 150) comprises at least four second mounting means (54; 154) distributed around the circumference of the valve function unit (20) and cooperating with at least four first mounting means (28, 30, 32, 34) of the connecting member (12) when the clamp element (50; 150) is fixed to the connecting member (12). 25
7. The assembly according to any of the proceeding claims, **characterized in that** the clamp element (50; 150) is substantially u-shaped. 30
8. The assembly according to claim 7, **characterized in that** the pressing portion (52; 152) comprises a nose (52; 152) projecting inwards. 35
9. The assembly according to any of the proceeding claims, **characterized in that** the clamp element (50) has two symmetry planes. 40
10. The assembly according to any of claims 1 to 8, **characterized in that** the clamp element (150) is made 45

of a plastic material and comprises a strengthening portion (158) around each of the second mounting means (154), wherein the strengthening portion (158) is thicker than a bridge portion (160) which connects both second mounting means (154).

11. The assembly of claim 2, **characterized in that**

- a. the connecting member (12) comprises a connection interface (16)
- b. the valve function unit (20) comprises a counter-connection interface (22)
- c. wherein the connection interface (16) and the counter-connection interface (22) define

- i. a mounting plane (15) in which the valve function unit (20) may be shifted and
- ii. a central axis transversal to the mounting plane (15) around which the valve function unit (20) may be rotated

during an adjustment step in which the valve function unit (20) is in abutment at the connecting member (12) and before the valve function unit (20) is fixedly clamped against the connecting member (12) using the clamp element (50; 150), and

d. wherein the valve function unit (20) cannot be rotated if the third and fourth mounting means (28, 30, 32, 34, 36, 38) are used to fix the valve function unit (20).

12. A concealed sanitary fitting (10) assembled from the assembly according to any of the proceeding claims.

13. A connecting member (12) of a concealed sanitary fitting (10) for fixation in an installation recess, wherein the connecting member (12) comprises

- a. at least two first mounting means (28, 32, 34) configured to cooperate with at least two second mounting means (54; 154) of a clamp element (50; 150) of the sanitary fitting (10) and
- b. at least two third mounting means (28, 30, 32, 34) configured to cooperate with at least two fourth mounting means (36, 38) of a valve function unit (20) of the concealed sanitary fitting (10).

14. A valve function unit (20) of a concealed sanitary fitting (10), wherein the valve function unit (20) comprises at least one abutment portion (36, 39), wherein the abutment portion (36, 39) is configured to be pressed on by a clamp element (50; 150) of the concealed sanitary fitting (10).

15. A clamp element (50; 150) for mounting of a valve function unit (20) of a concealed sanitary fitting (10)

in a connecting member (12) of the concealed sanitary fitting (10), wherein the clamp element (50; 150) comprises

- a. at least two second mounting means (54; 154) cooperating with at least two first mounting means (28, 32, 34) of the connecting member (12) and
- b. a pressing portion (52; 152),

wherein the pressing portion (52; 152) is pressed against an abutment portion (36, 39) of the valve function unit (20) when the clamp element (50; 150) is fixed to the connecting member (12) with the help of the first and second mounting means (28, 32, 34, 54; 154), thereby clamping the valve function unit (20) against the connecting member (12).

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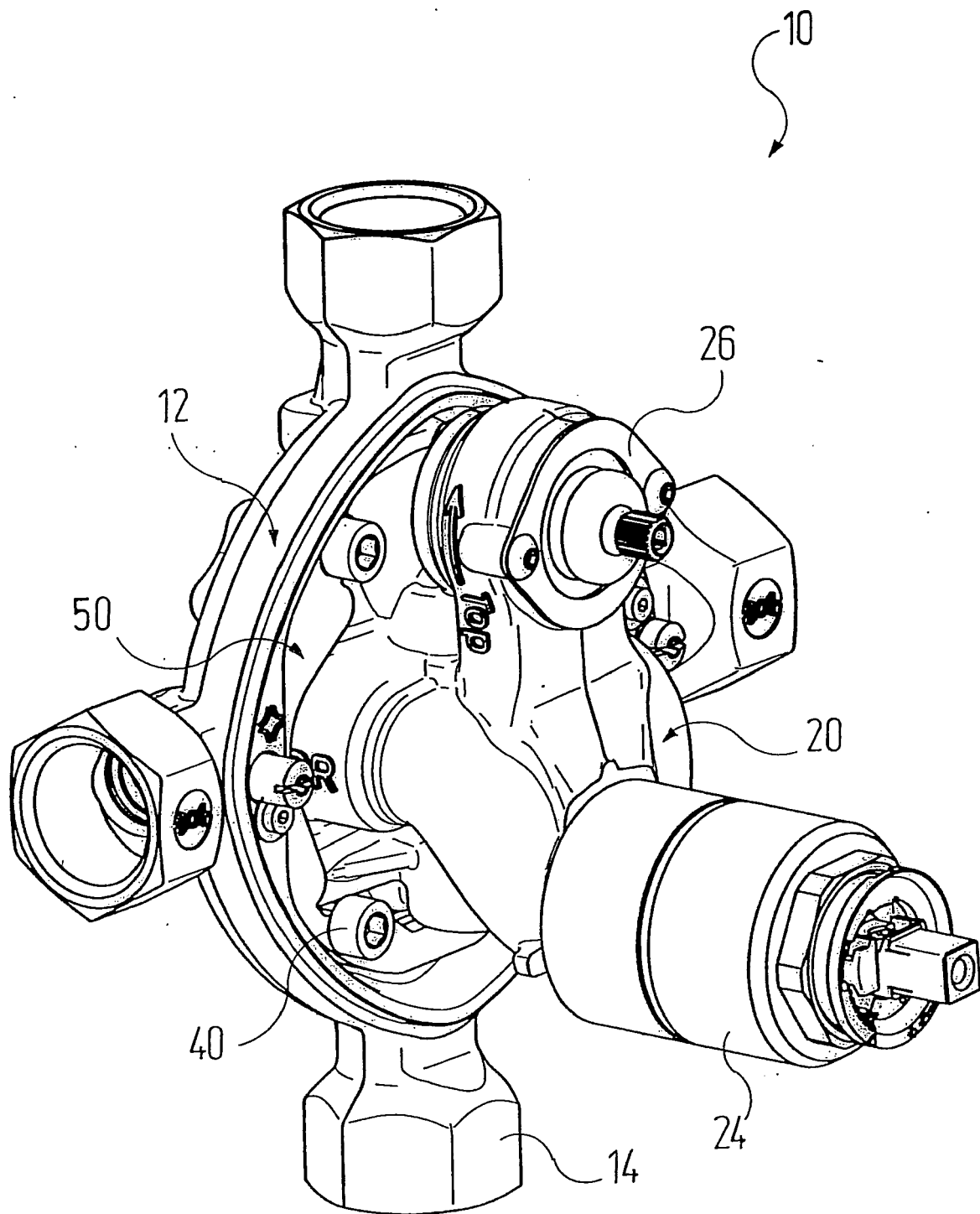


Fig. 1

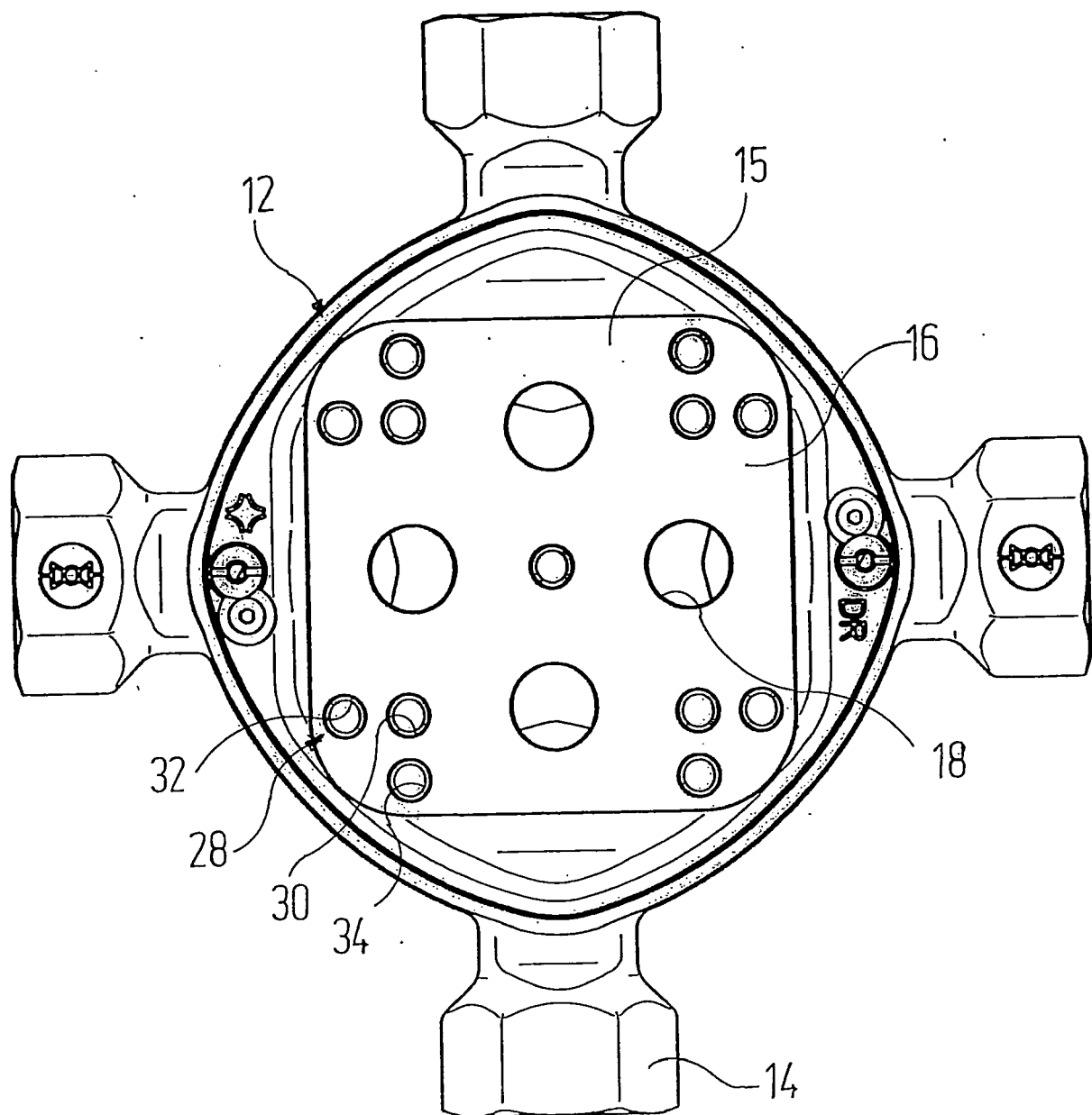


Fig. 2

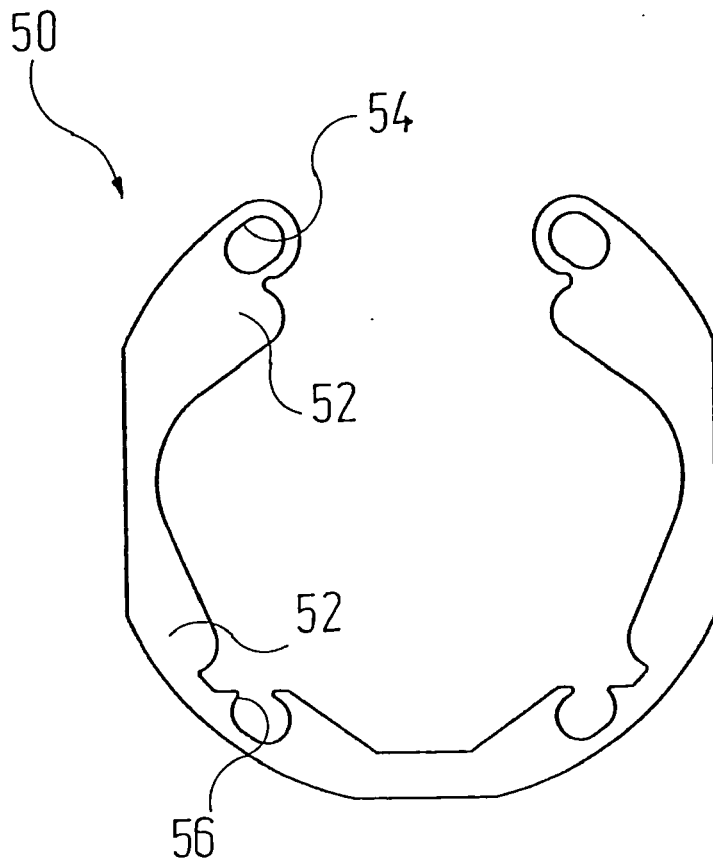


Fig. 3

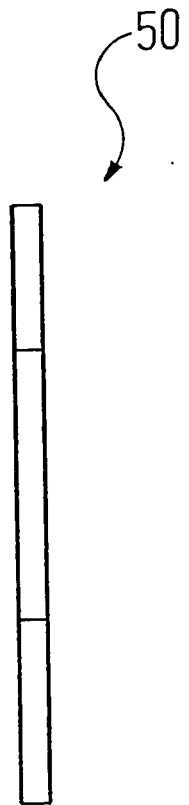


Fig. 4

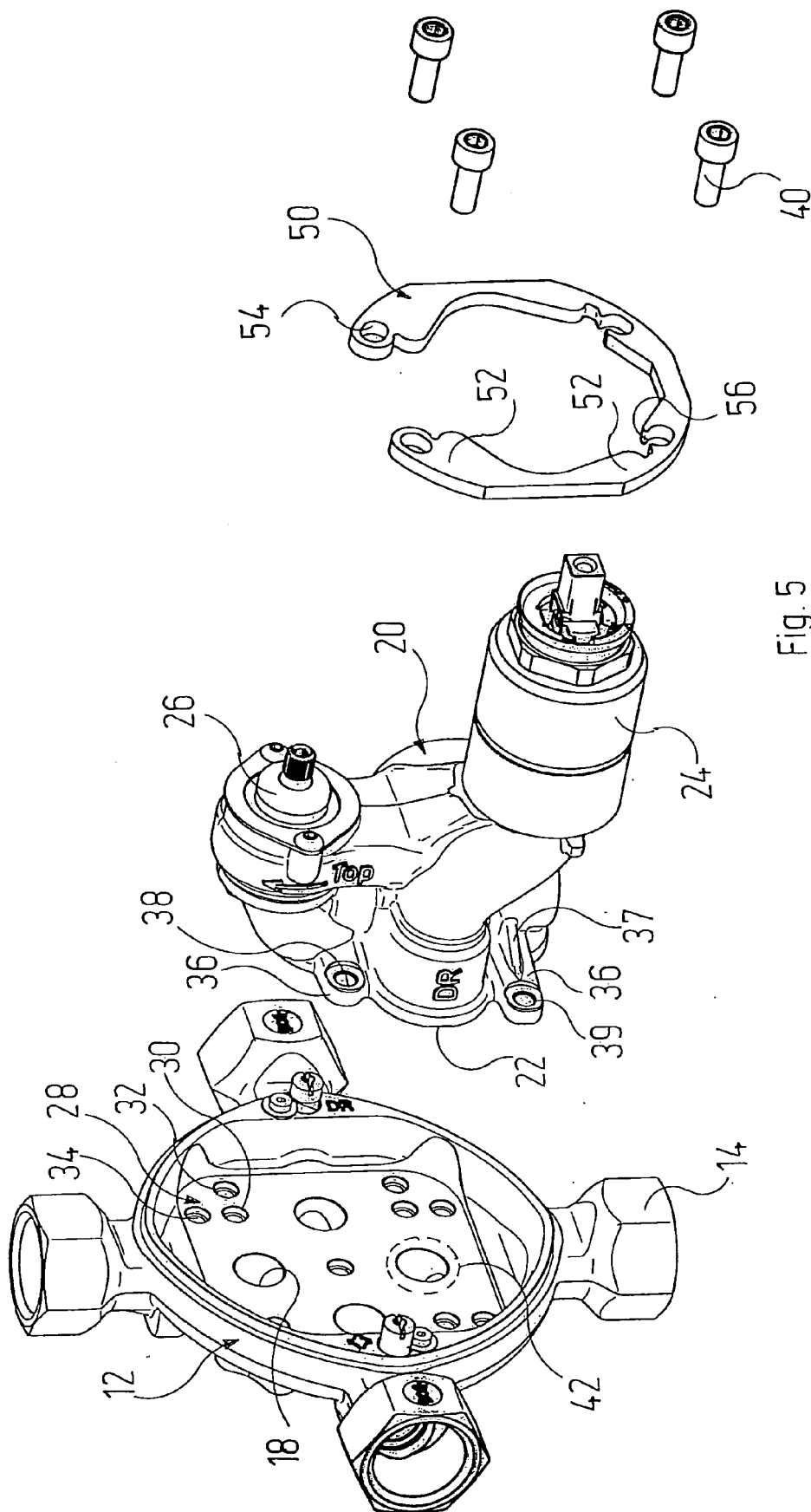


Fig. 5

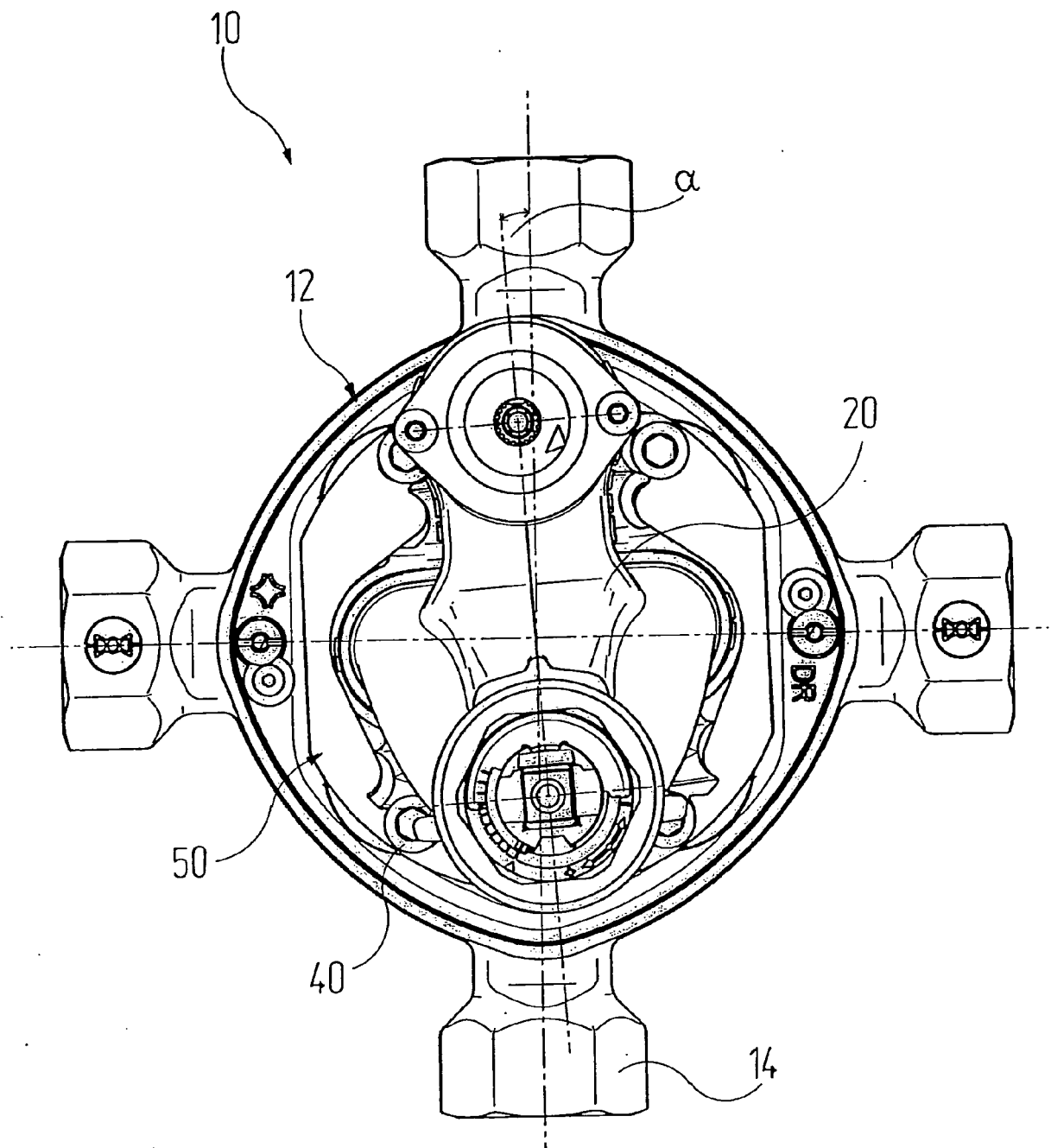


Fig. 6

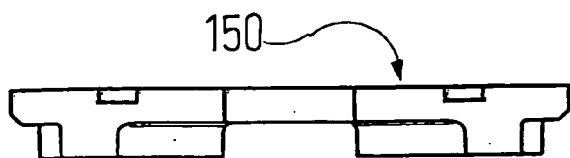


Fig. 8

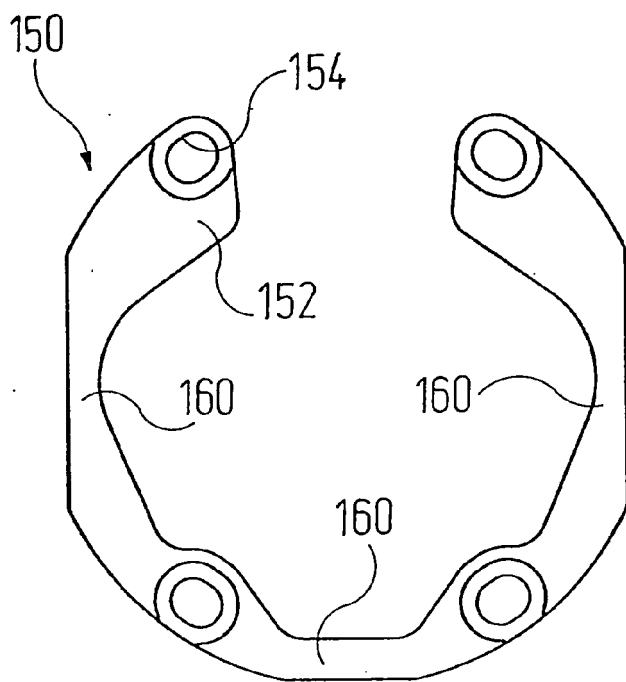


Fig. 7

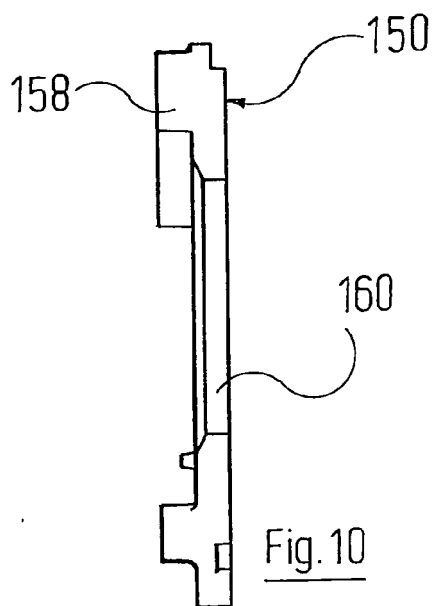


Fig. 10

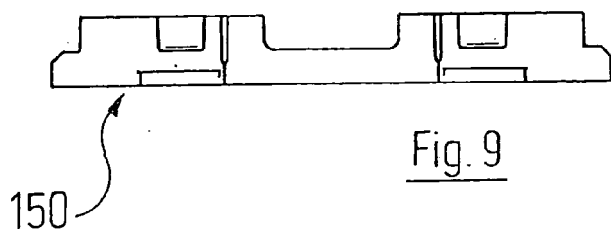


Fig. 9

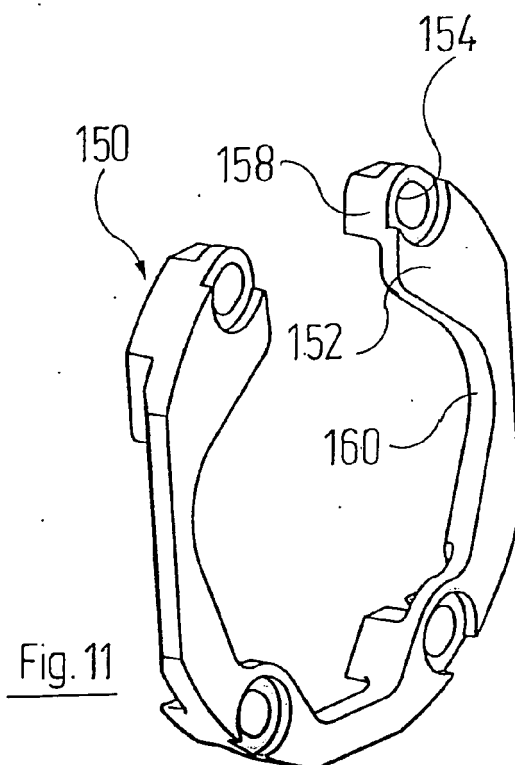


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 16 18 9634

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	DE 10 2011 051739 A1 (KLUDI GMBH & CO KG [DE]) 17 January 2013 (2013-01-17) * figure 1 *	13,15	
X	EP 2 105 541 A1 (COLOMBO RENATO [IT]) 30 September 2009 (2009-09-30) * claim 19; figures 1,5 *	1-3,7-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			E03C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 February 2017	Examiner Flygare, Esa
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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 18 9634

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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
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