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(54) **Fixing device for coupling to a support rail a terminal unit for dispensing medical gases**

(57) A fixing device (3, 5) for connecting a terminal unit (11, 12, 13, 14) for dispensing medical gases to a support rail (21), the terminal unit (11, 12, 13, 14) being selectable from terminal units of different types, the fixing device (3, 5) comprising:

- a base support (3) comprising hooking members (31, 33) adapted to cooperate with the support rail (21) to hook the fixing device to the support rail (21), the base support (3) further comprising fixing members (34) adapted to allow fixing a terminal unit (11) of a first type to the base support (3);

- at least one adapter (5), suitable to be fixed to the base support (3) to allow fixing thereto a terminal unit (12) of a second type alternatively to the terminal unit of the first type, the adapter (5) being operatively interposable between the base support (3) and the terminal unit (12) of the second type, so as to be tightened between the base support (3) and the terminal unit 12 of the second type to space the terminal unit 12 of the second type 12 from the base support (3), and being so shaped as to allow fixing the terminal unit (12) of the second type to the fixing members (54) of the base support (3).

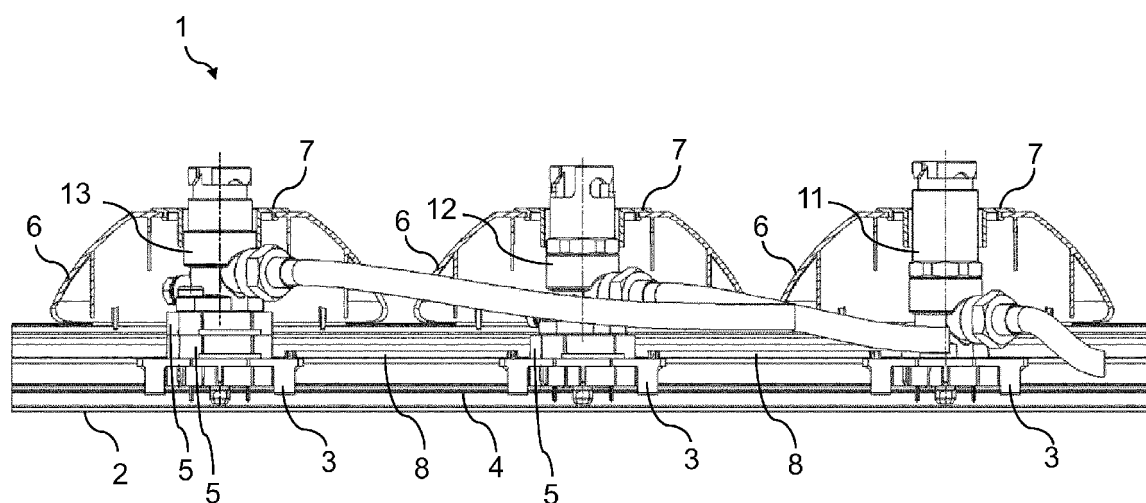


FIG. 1

Description

[0001] The present disclosure relates to the technical field of systems for distributing and dispensing medical gases, and more particularly it relates to a fixing device for connecting a terminal unit for dispensing medical gases to a support rail.

[0002] The terminal units for dispensing medical gases represent the final part of a distribution system of compressed gases, on which the user operates to draw the gases to be used, through corresponding fittings or equipment. Such compressed gases comprise, as a way of non-limiting example: medical oxygen, nitrous oxide, medical compressed air.

[0003] Installation solutions that provide for the application of the above-mentioned units terminal to a wall-mounted support device comprising a support rail, for example of the DIN type, belong to the state of the art.

[0004] Such wall-mounted support device is generally referred to as bed head unit, and it is intended to be wall-mounted above a bed, for example in hospitals, in order to allow the dispensing of one or more gases to a patient undergoing medical cares or a surgical procedure.

[0005] The above-mentioned terminal units are currently manufactured according to different standards (the commonest among which are referred to as UN19507 and AFNOR). Both for this reason, and for design differences introduced by each manufacturer in the different models, all of which in any case relating to the same standard, such terminal units have different shapes and dimensions, and in particular they may have different heights. The employees in this field employ specific fixing devices that are selected based on the particular type of terminal unit to be connected to the bed head unit. This represents a drawback, due to the fact of having to provide for the production of different types of fixing devices. Such drawback also affects installers, who must carefully select the specific fixing devices required. Further, if the replacement is desired of a terminal unit already installed and built according to a standard with a new terminal unit built according to another standard, the fixing devices to the support rail are also to be replaced.

[0006] The object of the present disclosure is to provide a fixing device that is flexible to use and such as to obviate the drawbacks described above with reference to the state of the art.

[0007] Such an object is achieved by a fixing device as generally defined in claim 1. Preferred and advantageous embodiments of the above-mentioned fixing device are defined in the annexed dependant claims.

[0008] The invention will be more clearly understood from the following detailed description of a particular embodiment, given by way of example and therefore in no way limiting, in reference to the accompanying drawings, in which:

- Fig. 1 shows a partial longitudinal cross-sectional view of an equipped bed head unit comprising a wall-

mountable duct and three terminal units for dispensing medical gases connectable to the fixing duct through a corresponding fixing device 3,5;

- Fig. 2 shows a plan view in partial cross-section of the bed head unit of Fig 1;
- Fig. 3 shows a top perspective view of a first component of the fixing device of Fig. 1;
- Fig. 4 shows a bottom perspective view of the component of Fig. 3;
- Fig. 5 shows a top perspective view of a second component of the fixing device;
- Fig. 6 shows a bottom perspective view of a second component of the fixing device;
- Fig. 7 shows a perspective view of an accessory component of the fixing device;
- Fig. 8 shows a cross-sectional view similar to that shown in Fig. 2.

[0009] In the figures, equal or similar elements will be indicated by the same reference numerals.

[0010] With reference to the annexed figures, a non-limiting embodiment of an equipped bed head unit 1 for dispensing medical gases is shown.

[0011] With particular reference to Fig. 2, the bed head unit 1 comprises a wall-mountable duct 2, for example, implemented as an extruded aluminium section. The wall-mountable duct 2 comprises a bottom wall 27 and two side walls 28. A support rail 21 is provided within the duct 2, comprising two fixing bars 21 parallel and mutually spaced so as to define a channel 22 therebetween. The two fixing bars 21 project from the bottom wall 27 of the duct 2, and, in the particular example illustrated, have an asymmetric T-shaped cross section.

[0012] With reference to Fig. 1, in the particular example shown, the equipped bed head unit 1 comprises three terminal units 11, 12, 13 for dispensing medical gases connected to the support rail 21 of the duct 2 through corresponding fixing devices 3, 5. In the particular example shown, the terminal units 11, 12, 13 are of three different types, differing one from the other in shape and dimensions, and, in the example shown, differing one from the other specially in that they have different heights. In particular, the terminal unit 11 is a terminal unit of a first type, and it is characterized by a higher height than the heights of the two remaining terminal units 12, 13. The terminal unit 12 belongs to a second type, and it is characterized by an intermediate height. Finally, the terminal unit 13 is of a third type, and it is **characterized in that it has a lower height than the height of the terminal units 11 and 12.**

[0013] With reference to Fig. 2, the fixing device 3, 5 comprises a base support 3 comprising hooking members 31, 32 adapted to cooperate with the support rail 21 so that the fixing device 3, 5 can be connected to the support rail 21. With reference to Fig. 3, the base support 3 further comprises fixing members 34 adapted to allow fixing a terminal unit 11 of the first type to the base support 3. In accordance with an embodiment, the fixing mem-

bers 34 comprise at least one pair of fixing holes 34 and, in the particular example described, they comprise two pairs of fixing holes 34. The two pairs of holes 34 are advantageously provided to be used in a mutually exclusive manner to allow fixing a terminal unit 11, 12, 13 to the base support 3 according to different orientations.

[0014] In accordance with an embodiment, the fixing holes 34 are internally provided with threaded members, for example, being such as to house a threaded bush 44 therein (visible in Fig. 4), which is interlocked in the hole, and for example made of a metal material, the remaining part of the base support 3 being for example made of a plastic material, for example, by moulding. In this way, it is possible to fix the terminal unit 11 of the first type to the base support 3, for example, by employing a pair of pins or of screws 9 (Fig. 2).

[0015] In order to allow fixing terminal units 12, 13 of different types to the rail 21, the fixing device 3, 5 comprises at least one adapter 5, adapted to be fixed to the base support 3. With reference to Fig. 3, by employing an adapter 5 it is possible to fix a terminal unit 12 of a second type to another base support 3 of the same type as that described above for the terminal unit 11, the adapter 5 being operatively interposable between the base support 3 and the terminal unit 12 of the second type, and being so shaped as to allow fixing the terminal unit 12 of the second type by using the fixing members 34 of the base support 3, so as to be tightened between the base support 3 and the terminal unit 12 of the second type to space the terminal unit 12 of the second type and the base support 3 apart. In other words, the adapter 5, being interposable and fixable between the base support 3 and the terminal unit 12 of the second type, is adapted to affect the fixing distance between the base support 3 and the terminal unit 12 of the second type, while allowing to fix the terminal unit 12 of the second type to the base support 3 by using the same fixing members 34 of the base support 3 that can be used for the application to the base support 3 of a terminal unit of the first type.

[0016] In the particular example described, in order to achieve the above-mentioned fixing, screws or pins 9 adapted to cooperate with the fixing holes 34 and having a greater length than those used for fixing the terminal unit 11 of the first type are preferably used.

[0017] With reference to Figs. 5 and 6, it should be noted that the adapter 5 comprises a first face 55 and an opposite second face 56, which, when the adapter 5 is interposed between the base support 3 and the terminal unit 12 of the second type, they respectively abut against the base support 3 and the terminal unit 12 of the second type. The distance between the above-mentioned faces 55, 56 represents the fixing distance between the terminal unit 12 of the second type and the base support 3.

[0018] With reference to Figs. 1 and 2, in order to fix a terminal unit 13 of the third type to a further base support 3, the terminal unit having an overall height further reduced compared to the overall height of the terminal unit 12, it is possible to provide two adapters 5 in the fixing device

3, 5, which are adapted to be arranged overlaying, i.e., stacked, one to the other. In this case, in the particular example described it is necessary to provide for screws or pins 9 having a greater length than those that can be used to fix the terminal units 11 and 12 to the base support 3.

[0019] Based on what has been described above, it is clear that, advantageously, by providing the fixing device 3, 5 with a specific number of adapters 5 (or not employing any adapters 5, as in the case of the terminal unit 11 of the first type), it is possible to use base supports 3 that are the same for connecting three types of different terminal units 11, 12, 13 to the fixing rail 21.

[0020] With reference to Figs. 2 to 4, in accordance with an embodiment, the hooking members 31-33 to the rail 21 of the base support 3 comprise a locking device 31, 33 comprising a bolt 31 rotatably pivoted to the base support 3, suitable to be interposed between the bars 21 to project to the channel 22 and suitable to be rotated between an operating locking position and an operating release position. In the operating locking position, visible in Fig. 2, the bolt 31 is such as to abut against surface portions of the bars 21 facing inwardly to the channel 22. Preferably, the locking device 31, 33 further comprises an actuating member 33 of the bolt 31, for example a pawl 33 provided with a notch, for example to be rotated by the blade of a tool. More preferably, the bolt 31 is such as to be rotated via the pawl 33 to rotate between the operating release position and the operating locking position, following a 90 degree rotation-of the pawl 33.

[0021] In accordance with an embodiment, the hooking members 31-33 to the rail 2 of the base support 3 comprise at least one pair of elastic coupling teeth 32 adapted to cooperate operatively with surface portions of the bars 21 facing outwardly to the channel 22. The bolt 31 is interposed between the pair of elastic coupling teeth 32. In the particular example illustrated, in particular two pairs of elastic coupling teeth 32 are provided, and the bolt 31 occupies a substantially centered position with respect to the above-mentioned elastic coupling teeth 32.

[0022] In accordance with an embodiment, the base support 3 comprises a plate-shaped main body 35 having a face 37 intended to face the terminal unit 11, 12, 13 and within which a substantially central recess 30 is defined. With reference to Figs. 5 and 6, in such embodiment the adapter 5 comprises a central appendix 50, for example a conical one, adapted to be engaged within the recess 30. Furthermore, in such embodiment it is possible to provide for the actuating member 33 of the bolt 31 to be seated within the recess 30 and for the central appendix 50 not to be interfering with the actuating member 33 when the appendix 50 is seated within the recess 30. Furthermore, it should be noticed that in the particular example illustrated, fixing holes 34 of one pair occupy positions that are diametrically opposite to the recess 30.

[0023] Again, with reference to Figs. 5 and 6, in accordance with an embodiment, the adapter 5 is so shaped

as to include at least one pair of through holes 53 so as to be able to be crossed by a pair of fixing pins or screws 9 adapted to cooperate with a corresponding pair of fixing holes 34 of the base support 3 in order to fix a terminal unit 12, 13 of the second or third type to the base support 3 in such a manner as that the adapter 5 is clamped between the base support 3 and the terminal unit 12, 13. In the particular example illustrated, two pairs of through holes 53 are provided for in the adapter 5, each pair being intended to be aligned with a corresponding pair 34 of fixing holes 34 of the base support 5.

[0024] With reference to Figs. 5 and 7, in accordance with an embodiment, the adapter comprises an abutment plate 51 adapted to cooperate in abutment with the face 37 of the plate-shaped body 35 of the base support 5, a collar 52 perpendicular to the abutment plate 51, an appendix 50 and tubular members 54 integral to the collar 52 and within which the through holes 53 are defined.

[0025] With reference to Figs. 2 and 8, in accordance with an embodiment, the fixing device further comprises a cover plate 6, which is connectable to the wall-mountable duct 2. An opening 60 is defined within the cover plate 6, having an opening axis 61 and adapted to be axially crossed by a terminal unit 13, 14. In such embodiment, the cover plate 60 advantageously comprises a removable portion 7 connectable to the plate 60 to partially close the opening 60 in order to fit its dimensions to a section of the terminal unit that is traversal to the opening axis 61. In particular, it can be noted that, in Fig. 2, the removable portion 7, for example, interlocked to the plate 6, allows fitting the opening 60 dimensions to the transversal section (at said opening 60) of the terminal unit 13. Looking at Fig. 8, it should be apparent that how, upon removing the removable portion 7, it is possible to use the same plate 6 in the event that a terminal unit 14 is fixed to the rail 21, belonging to a fourth type of terminal units, having, at the opening 60, a cross-section relatively larger than the cross-section of the terminal unit 13. Therefore, by comparing the Figs. 2 and 8, it is assumed that in this embodiment the fixing device can advantageously allow coupling terminal units 13, 14 differing in section and height to the rail 21.

[0026] With reference to Figs. 1, 3, and 7, in accordance with a further embodiment, the fixing device further comprises a spacer 8 having an end portion 88 securable to the base support 3 and having an opposite end portion 88 securable to a further base support 3 for connecting the rail 21 to two adjacent base supports 3 in such a manner as that said base supports 3 are mutually spaced according to a predetermined distance. In this regard, it is possible to provide for the end portions 88 of the spacer 8 to interlock to the base supports 3. For example, it is possible to provide two coupling recesses 38 in each base support 3, suitable to house at least partially a corresponding end portion 88 of a corresponding spacer 8. Such recesses 38 are, for example, provided with hooking members 39 (for example, recesses) that are adapted to cooperate with conjugated hooking members 89 (for

example, small projecting teeth) provided on the end portions 88 of the spacer 8.

[0027] From the just given description, it is possible to understand how a fixing device of the type described above totally achieves the preset objects, since such device allows coupling terminal units of different types to a support rail, thus overcoming the drawbacks described above with reference to the fixing devices of the prior art.

[0028] Of course, to the fixing device described above, those of ordinary skill in the art, with the aim of meeting contingent, specific needs, will be able to make a number of modifications and variations, all of which falling within the protection scope of the invention, as defined by the following claims.

Claims

1. Fixing device (3,5) for connecting a terminal unit (11,12,13,14) for dispensing medical gases to a support rail (21), the terminal unit (11,12,13,14) being selectable among terminal units of different types, the fixing device (3,5) comprising:

- a base support (3) comprising hooking elements (31,33) adapted to cooperate with the support rail (21) for hooking the fixing device to the support rail (21), the base support (3) further comprising fixing elements (34) adapted to fix to the base support (3) a terminal unit (11) of a first type;
- at least an adapter (5), adapted to be fixed to the base support (3) to allow to fix to the latter a terminal unit (12) of a second type as an alternative to the terminal unit of the first type, the adapter (5) being operatively interposable between the base support (3) and the terminal unit (12) of the second type, so as to be able to be fixed between the base support (3) and the terminal unit (12) of the second type, to space the terminal unit (12) of the second type and the base support (3) apart; and being so shaped as to allow fixing the terminal unit (12) of the second type to the fixing members (34) of the base support (3).

2. Fixing device (3,5) according to claim 1, wherein the terminal unit (11) of the first type and the terminal unit (12) of the second type have overall heights differing from one another.

3. Fixing device (3,5) according to claims 1 or 2, wherein the rail (21) comprises two fixing bars (21) parallel and spaced so as to define a channel (22) therebetween and wherein the hooking means (31,33) comprise a locking device comprising a bolt (31) rotatably pivoted to the base support (3), adapted to be interposed between the bars (21) for projecting in said

channel (22) and adapted to be rotated between an operating locking position and an operating release position, in the operating locking position the bolt (31) being such as to interfere in abutment with surface portions of said bars (21) facing inwards of said channel (22).

4. Fixing device (3,5) according to claim 3, wherein the hooking elements comprise at least one pair of elastic locking teeth (32) adapted to operatively cooperate with surface portions of said bars (21) facing outwards of the channel (22), the bolt (31) being interposed between said pair of elastic teeth (32). 5 10
5. Fixing device (3,5) according to claims 3 or 4, wherein the base support (3) comprises a main plate-shaped body (35) having a face (37) intended to face the terminal unit (11,12,13,14) and inside which a recess (30) is defined and wherein the adapter (5) comprises a central appendix (50) adapted to be engaged within the recess (30). 15 20
6. Fixing device (3,5) according to claims 4 and 5, wherein the locking device comprises an actuating element (33) of the bolt (31) seated within said recess (30). 25
7. Fixing device (3,5) according to claim 6, wherein said central appendix (50) does not interfere with said actuating element (32). 30
8. Fixing device (3,5) according to any one of the previous claims, wherein the fixing elements (34) comprise at least one pair of fixing holes and wherein the adapter (3) is provided with a pair of holes or recesses (53) so as to be crossed by a pair of fixing pins or screws (9) adapted to cooperate with said pair of fixing holes (34) for fixing said terminal unit (12) of the second type to the base support (3) so that said adapter (5) is tightened between said base support (3) and said terminal unit (12) of the second type. 35 40
9. Fixing device (3,5) according to claim 8, wherein said at least one pair of fixing holes (34) comprises two pairs of fixing holes, said pairs being provided for being used in a mutually exclusive manner for allowing the fixing of said terminal unit according to different orientations with respect to said base support. 45
10. Fixing device (3,5) according to any one of the previous claims, comprising two of said adapters (5) adapted to be arranged superimposed on one another for allowing a terminal unit (13) of a further type to be fixed to said base support. 50 55
11. Fixing device (3,5) according to any one of the previous claims, wherein the rail is comprised in a wall mountable duct (2) and wherein said fixing device

further comprises a cover plate (6) fixable to the duct (2) inside which there is defined an opening (60) having an opening axis (61) and adapted to be axially crossed by a terminal unit, wherein the cover plate (6) comprises a portion (7) removably connectable to said plate for partly closing said opening (60) so as to adapt the size thereof to a section of said terminal unit crosswise with respect to said opening axis.

12. Fixing device (3,5) according to any one of the previous claims, further comprising a spacer (8) having an end portion (88) fixable to the base support (3) and having an opposite end portion (88) fixable to a further base support (3) for fixing said base supports to said rail (21) so that said supports are spaced from one another according to a predetermined distance.
13. Fixing device (3,5) according to any one of the previous claims, wherein the adapter (5) comprises a first face (55) and an opposite second face (56) that, when the adapter (5) is interposed between the base support (3) and the terminal unit (12) of the second type, are in abutment against the base support (3) and the terminal unit (12) of the second type, respectively, the distance between the above-mentioned faces (55,5) representing the fixing distance between the terminal unit (12) of the second type and the base support (3).
14. Equipped bed head unit (1) comprising said support rail (21), at least one fixing device (3,5) according to any one of the previous claims and at least one corresponding terminal unit (11,12,13,14) connected to the bed head unit (1) through said fixing device (3,5).

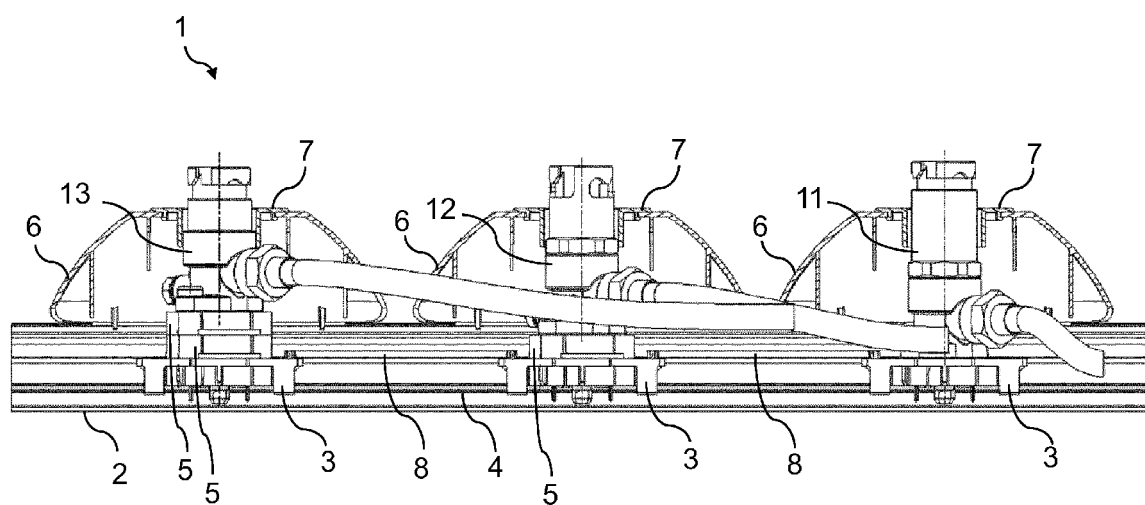


FIG. 1

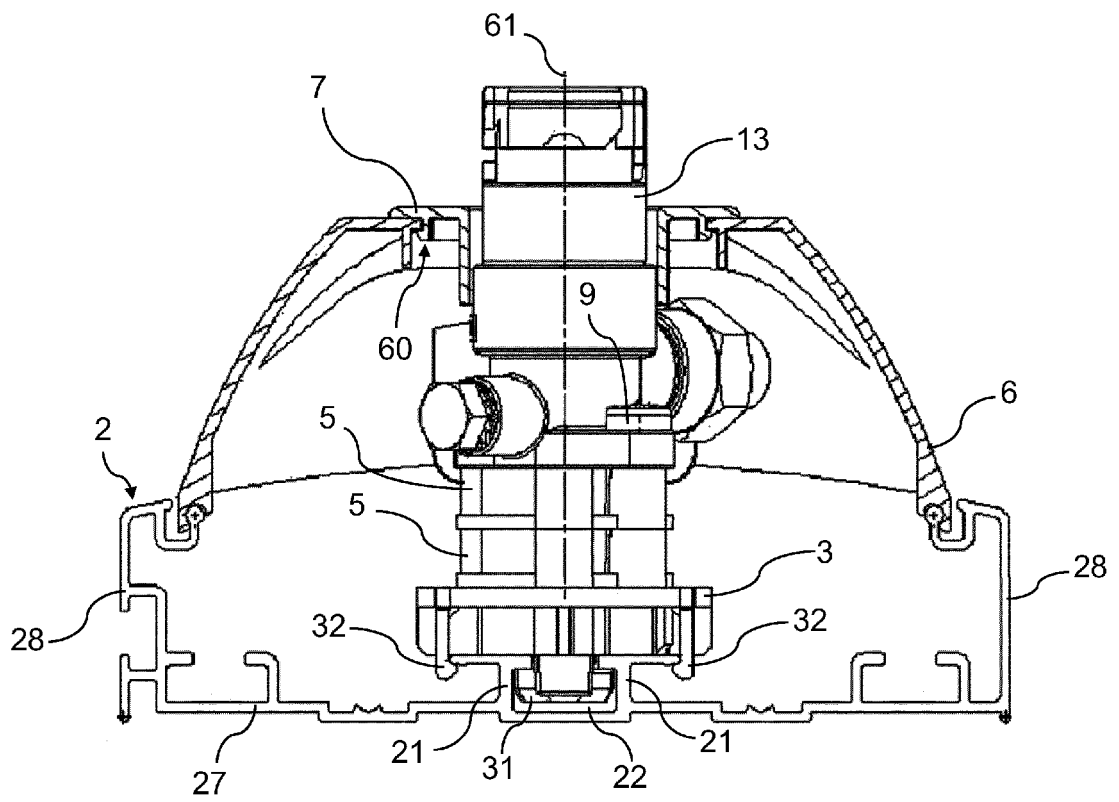


FIG. 2

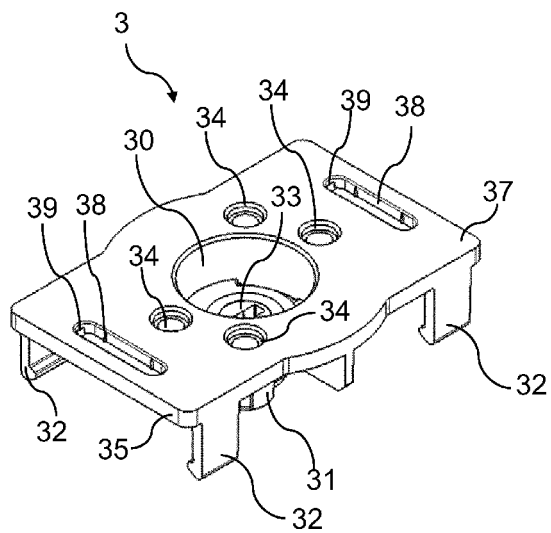


FIG. 3

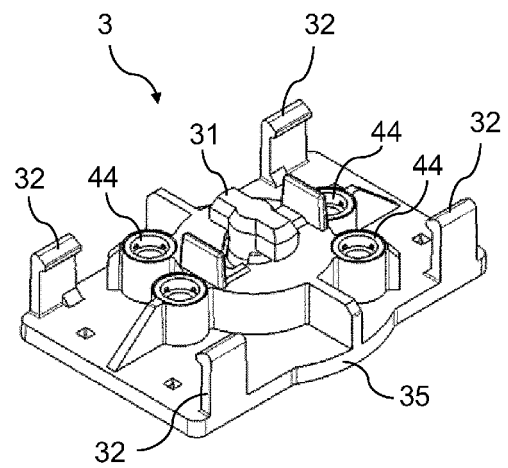


FIG. 4

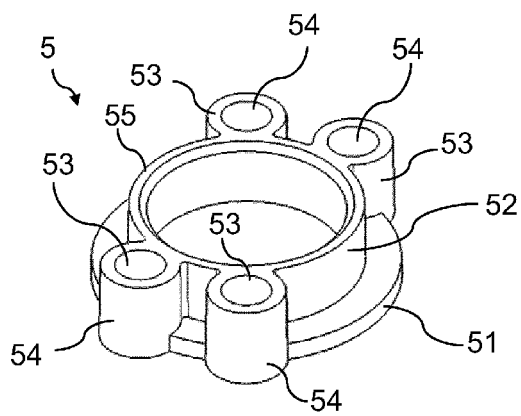


FIG. 5

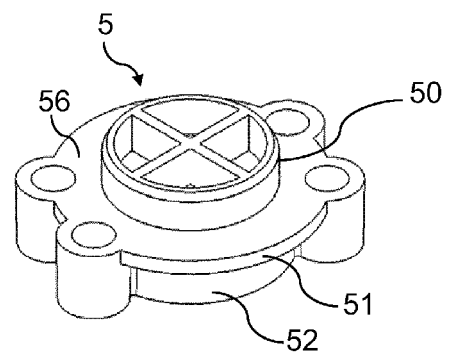


FIG. 6

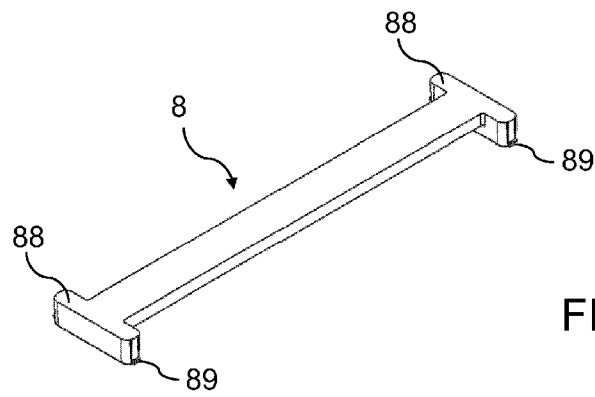


FIG. 7

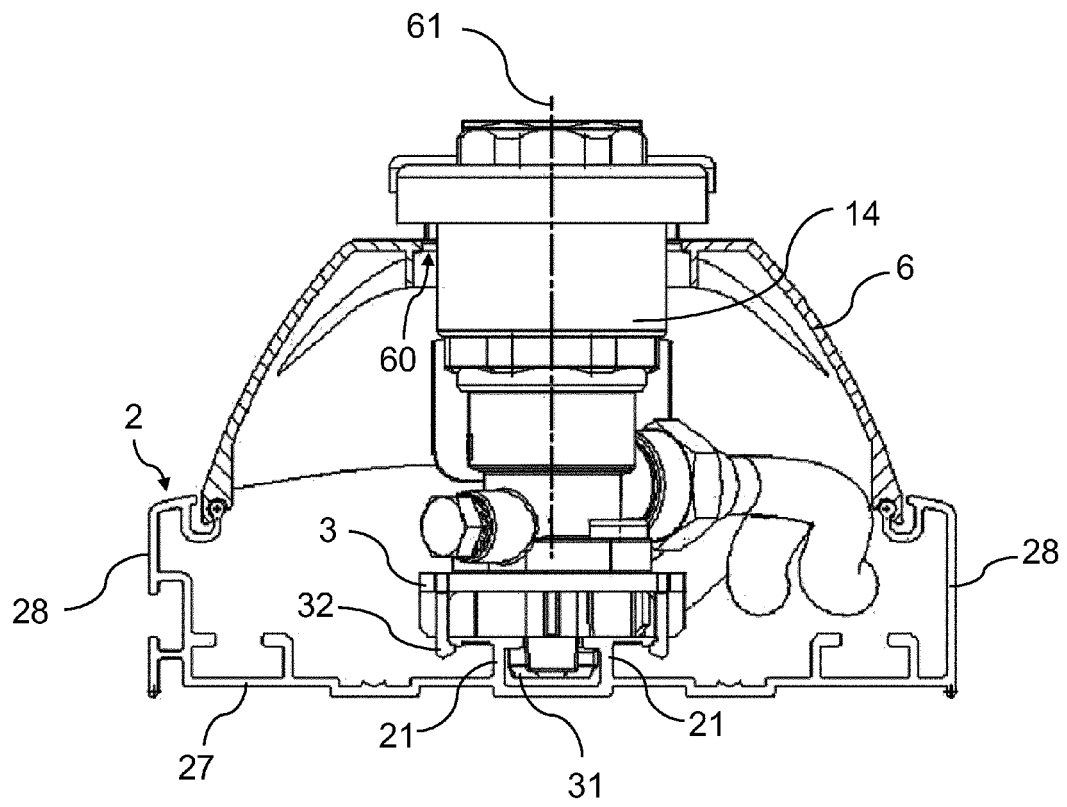


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 12 17 2689

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 102 36 076 A1 (OPEL ADAM AG [DE]) 19 February 2004 (2004-02-19) * paragraph [0023] - paragraph [0036]; figures 1-8 *	1-14	INV. F16B21/02 F16B37/04
X	US 2004/079851 A1 (BERARDI PHILIP [US]) 29 April 2004 (2004-04-29) * paragraph [0019] - paragraph [0053]; figures 1-4 *	1-14	
A	EP 2 306 257 A1 (MD S R L [IT]) 6 April 2011 (2011-04-06) * the whole document *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			F16B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 October 2012	Examiner Comel, Ezio
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 17 2689

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11-10-2012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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