



(11) **EP 2 017 404 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.01.2009 Bulletin 2009/04

(51) Int Cl.:
E04F 15/024 ^(2006.01) **E04D 11/00** ^(2006.01)
E01C 5/00 ^(2006.01)

(21) Application number: **08160362.3**

(22) Date of filing: **14.07.2008**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
RO SE SI SK TR**
Designated Extension States:
AL BA MK RS

(30) Priority: **16.07.2007 IT VI20070200**

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(54) **Support for outdoor raised floors**

(57) A support for use in outdoor raised floors comprising a body (1) with an underside (2) for standing on the subfloor and an upper surface (3) for supporting the flooring tiles, the upper surface having spacer elements (4) in relief and defining four quadrants corresponding to four portions (11; 12; 13 and 14) of the body, the four portions being designed to support the corners of the

tiles. In line with each of the four portions (11; 12; 13 and 14), there is a housing (5) forming part of the body (1) of the support and designed to contain corresponding coupling means (6), whose position with respect to the housing can be adjusted in height so that they can come into contact with the underside.

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Description

[0001] The present invention relates to supporting means particularly suitable for supporting the corners of tiles in the installation of raised floors.

[0002] In technical jargon, no particular distinction is generally made between raised floors for use in indoor and outdoor installations.

[0003] In the description that follows, however, a distinction is drawn between the former and the latter, wherein "raised floor" is used to mean those floors in which the flooring panels are laid on a usually metallic structure consisting of columns and sometimes also of cross-members that transmit both the weight of the flooring itself and any loads coming to bear thereon to the subfloor below.

[0004] The most straightforward metal structures for this purpose consist simply of columns, generally made of galvanised steel and adjustable in height, and usually no more than 15 cm high.

[0005] The raised floor has become a widely-adopted construction method. Its modularity and facility of installation fully respond to the needs of flexibility typical of modern working environments.

[0006] Being raised off the ground, the flooring creates a cavity suitable for containing networks for distribution (electricity, lighting, air conditioning), transmission (computer systems, telephone systems) and automation (building management, security alarms and fire-fighting systems).

[0007] The ease with which the modular panels comprising the raised flooring can be removed enables rapid and effective servicing, adaptation, and repositioning procedures without the need for any masonry works, thus containing the related costs and times.

[0008] Herein, the term "outdoor raised floor" is used specifically to indicate a raised floor for installations out of doors, which is usually placed just a few centimetres, but sometimes several dozen centimetres above a subfloor coated with waterproof sheeting.

[0009] Said distance creates a cavity between the subfloor and the raised flooring, the height of which depends on the thickness of a plurality of substantially flat supports that sustain the corners of the flooring tiles.

[0010] Said corners, of which there are generally up to four in number, thus converge towards the centre of the support.

[0011] It is worth adding that there are normally lines of spacer elements on the upper surface of the support, arranged crosswise and projecting from said surface, against which the tiles resting on said surface abut.

[0012] Although it is generally lower than in the previously-described case of indoor raised floors, in addition to the already-mentioned advantages concerning assembly and maintenance, the presence of the cavity underneath these outdoor raised floors also enables the installation of a raised system that allows for the drainage of run-off water, while also affording the underlying wa-

terproof sheet a valid resistance to frost and weather.

[0013] Outdoor raised floors are consequently ideal for use on balconies and terraces, for walkways, in hanging gardens and the like.

5 **[0014]** One of the problems that installers face when installing raised floors, and outdoor raised floors in particular, concerns the opportunity, not to say the need, to compensate for frequent differences in the level of the subfloor on which the supports for sustaining the flooring tiles are to stand.

10 **[0015]** There are various types and shapes of such supporting means on the market.

[0016] The most straightforward type generally comprises a substantially flat body with a circular base and an upper surface complete with the above-mentioned four lines of spacer elements against which the tiles resting on said surface abut.

15 **[0017]** Said body of the support is typically produced by the moulding of plastic materials, usually polypropylene.

20 **[0018]** The main drawback of the above type of support is that it is impossible to compensate for any differences in the level of the subfloor without resorting to the use (as is often the case in current practice) of overlapping shims for inserting locally beneath the underside of each support in order to compensate, where necessary, for any such level differences and thus enable the supports to "work on a level", which may be horizontal or slightly sloping.

25 **[0019]** The impracticality, instability and approximation characteristic of such a solution are self-evident.

[0020] There is also a type of support that involves the use of an adjustment device with a central column suitable for adjusting the height of the whole tile-supporting body.

30 **[0021]** This device is only used in taller supports, however, and it has the drawback of not allowing for a selective height adjustment for one or more of the corner seats on the support.

35 **[0022]** The present invention aims primarily to overcome the above-explained drawbacks relating to the known state of the art.

[0023] Moreover, the invention aims to improve the stability at the interface between the tiles and the supports by comparison with the types of support in current use.

40 **[0024]** In addition, the invention aims to increase the ultimate bending load-bearing capacity of the single tiles, particularly in the central portion of each tile, where they do not rest on the upper surface of the support.

45 **[0025]** The above-stated main object is achieved by a support designed preferably but not exclusively for the construction of outdoor raised floors that, in accordance with the content of the first claim, comprises a body that has an underside suitable for resting on a subfloor and an upper surface suitable for supporting the tiles of said raised flooring, said upper surface including spacer elements in relief that define four quadrants, corresponding

to four portions of said body, said four portions being suitable for containing the corner portions of said juxtaposed tiles, characterised in that there is a housing in line with each of said four portions that is designed to contain corresponding coupling means whose position is adjustable in height with respect to said housing, so that it can come into contact with said subfloor.

[0026] Advantageously according to the invention, using a support that has the aforesaid housing in line with each of the four corner portions of the four tiles, that can be coupled, if necessary, with the above-mentioned coupling means, enables any differences in the level of the subfloor to be compensated locally so that the support can stand stable and flat on said subfloor.

[0027] Moreover, another advantage for the stability of the single tiles resting on the support thus designed is achieved, according to the content of claim 5), by providing for each of the aforesaid four portions of the body of the support to include a recess suitable for containing an adequate quantity of adhesive for attaching the corner of the corresponding tile to said body.

[0028] Finally, an additional advantage is achieved, according to the content of claim 6), by providing for the body of the support thus designed to have the aforesaid four portions in the form of lobes, extending along four respective radii of symmetry over a length no greater than half the diagonal length of the tiles to be supported thereon.

[0029] This enables a considerable extension, with respect to the known supports, of the area of the corners of the tiles that is supported on the supports, virtually zeroing the risk of the tiles breaking in the middle when submitted to the maximal bending loads.

[0030] The above-explained objects and advantages will become more clear from the description of a preferred embodiment of the present invention, given below as a non-limiting example and illustrated in the attached drawings, wherein:

- figure 1 shows the substantially flat body of the support of the invention in a front view;
- figure 2 shows the same body seen from above;
- figure 3 shows a midline cross-section through the same object, taken along a plane normal to the upper and lower surfaces of said body;
- figure 4 shows the same body in an isometric view from above;
- figure 5 shows the previously-described coupling means in a front view;
- figure 6 shows the same means seen from above;
- figure 7 shows an axial cross-section through said object;
- figure 8 shows the coupling means in a perspective view;
- figure 9 shows the method for inserting the coupling means in the corresponding housing on the body of the support; and
- figure 10 shows how any local differences in the level

of the subfloor are compensated.

[0031] The support described herein comprises a body, the preferred shape of which is visible particularly in figures 1 to 4, where said body is identified by the numeral 1.

[0032] Said body 1 is flat in shape, with an underside 2 suitable for resting on a subfloor and an upper surface 3 suitable for supporting flooring tiles.

[0033] In the embodiment illustrated in figures 1 to 4, the underside 2 has a smooth, flat surface and this is to avoid it damaging the waterproof sheet when said support is placed thereon and carries the weight of the tiles.

[0034] The upper surface 3 on which the tiles are placed comprises spacer elements 4 projecting from said surface and arranged in lines that meet at the centre of the body 1, as shown in figures 2 and 4.

[0035] These lines define four quadrants on the upper surface 3, which divide the body 1 into four portions, identified in the previously-mentioned figures by the numerals 11, 12, 13, and 14, and designed to contain the juxtaposed corners of four tiles.

[0036] The thickness of said spacer elements 4 defines the width of the "grout joints" between the single tiles.

[0037] Figures 2 and 4 show more clearly that there is a housing 5 in line with each of said four portions 11, 12, 13, and 14, suitable for containing corresponding coupling means, as shown in the subsequent figures 5, 6, 7 and 8 and indicated therein by the numeral 6.

[0038] The housing 5 and the coupling means 6 are advantageously represented respectively by a threaded through hole, again indicated by the numeral 5, and a screw cap, again indicated by the numeral 6, that can engage in said threaded hole, being inserted gradually from above as explained in greater detail later on.

[0039] In the solution considered herein, the underside 2 resting on the subfloor is defined by four circular rings 21 comprising the bottom of said threaded hole 5. Said four rings 21 have a diameter large enough to ensure that the body 1 can stand firmly and stably on a substantially flat subfloor.

[0040] As shown in the previously-mentioned figures, the screw cap 6 has a cup-shaped head surrounded by a flat rim 61 and comprising a manually-operated central element 62 for screwing the cap inside the corresponding threaded through hole 5.

[0041] The screw cap 6 also has a wide flat base 63 suitable for resting stably on the subfloor.

[0042] As mentioned previously, figure 9 shows one of the screw caps 6 placed over a threaded hole 5 ready to be inserted from above, in a direction along the arrow X, inside said hole.

[0043] Then it is sufficient to take action on the central element 62 of the screw cap 6, by means of a manual rotation in the direction of the arrow Y, to make the cap descend gradually inside the threaded hole 5.

[0044] As mentioned earlier, this threaded hole 5 is a through hole, i.e. it passes completely through the body

1 of the support and thus enables the screw cap 6 to emerge from the flat base 63 of the underside 2 of said body.

[0045] More precisely, as shown in figure 10, which refers to the preferred embodiment of the invention described herein, the flat base 63 of the screw cap 6 emerges from the plane of the circular rings 21 at the bottom of each of the threaded holes 5.

[0046] The cap can simply be screwed down enough to ensure that the flat base 63 of the cap comes into contact with the subfloor SF in order to compensate locally for any level differences of the subfloor, so that the support rests stably in line with all four portions of the body 1.

[0047] Such a compensation for any level differences is particularly necessary in line with the areas of overlap in the insulating sheet, as shown for instance in the same figure 10.

[0048] It goes without saying that, for each support according to the invention, up to a maximum of four screw caps 6 can be used, each contained in a respective threaded hole 5.

[0049] It is likewise self-evident that the height of each screw cap 6 must be equal to or less than the depth of the threaded hole 5, so as to avoid it extending with the flat rim 61 on the head of the screw cap beyond the upper surface 3 of the body 1 when the base 63 of the screw cap begins to emerge from the plane of the circular rings 21.

[0050] Obviously, the height of the screw cap 6 and the consequent distance between said underside 2 and upper surface 3 of the body 1, must be greater than the maximum level difference encountered in the subfloor.

[0051] Another novel characteristic of the support described herein is clearly visible from figures 2, 4 and 9, and concerns the presence, in line with each of the above-mentioned four portions 11, 12, 13 and 14 of the body 1 of the support, of a recess 8 suitable for containing an adequate quantity of adhesive.

[0052] Said recess 8 is preferably circular in shape and is located advantageously between the threaded hole 5 and the centre of the body 1.

[0053] The adhesive placed in said recess assures a greater stability for the tile resting on the corresponding portion of the body of the support.

[0054] Finally, a further novel characteristic of the support according to the invention lies in the shape of the four equal portions of the body 1, a shape that is clearly visible, for instance, in figure 4.

[0055] Said portions are in the form of lobes and are always identified in the attached figures as 11, 12, 13 and 14.

[0056] The extension of each lobe along its own axis of symmetry is such as to avoid it interfering with the corresponding lobes of adjacent supports placed in an orderly arrangement on the subfloor.

[0057] For said purpose, said lobes advantageously extend along their respective four axes of symmetry over

a length that is greater than a quarter, but no more than half of the diagonal length of the tiles.

[0058] The above-described novel shape serves the purpose of increasing the area on which each four-cornered tile is supported in the direction of each of its diagonal lengths.

[0059] In fact, the central portion of the tiles is the area most liable to bending stress as a consequence of loading on the tiled floor, and this is because there are large central areas of each tile without any support, especially when the normal circular supporting means are used.

[0060] These areas are consequently critical and it is in these areas that the tiles are most likely to break.

[0061] Concerning the above-mentioned distance between the two upper and lower surfaces of the support, it should be noted that this may be sufficient to enable the creation of a cavity to allow for the installation of technological systems underneath the floor surface, particularly when the support according to the invention is used for the installation of raised floors.

[0062] As shown in figures 2 and 4, the body 1 of the support is substantially flat, but made lighter by suitable cavities, some of which are identified by the numeral 7 in the figures, and this is mainly for the purpose of saving material.

[0063] In conclusion, it should be noted that it is easy to imagine possible variants of the embodiment of the invention described herein, which may concern the presence or absence of the recesses 8 for the adhesive, or the shape and extension of the four portions, 11, 12, 13 and 14 of the body 1 of the support.

[0064] The most significant variant, however, could concern the type and shape of the housing 5 and of the corresponding coupling means 6, since any type and shape may be suitable providing they achieve the same purpose.

[0065] Should such variants, which are not shown in the attached drawings, come within the scope of the following claims, they shall nonetheless be protected by the present patent.

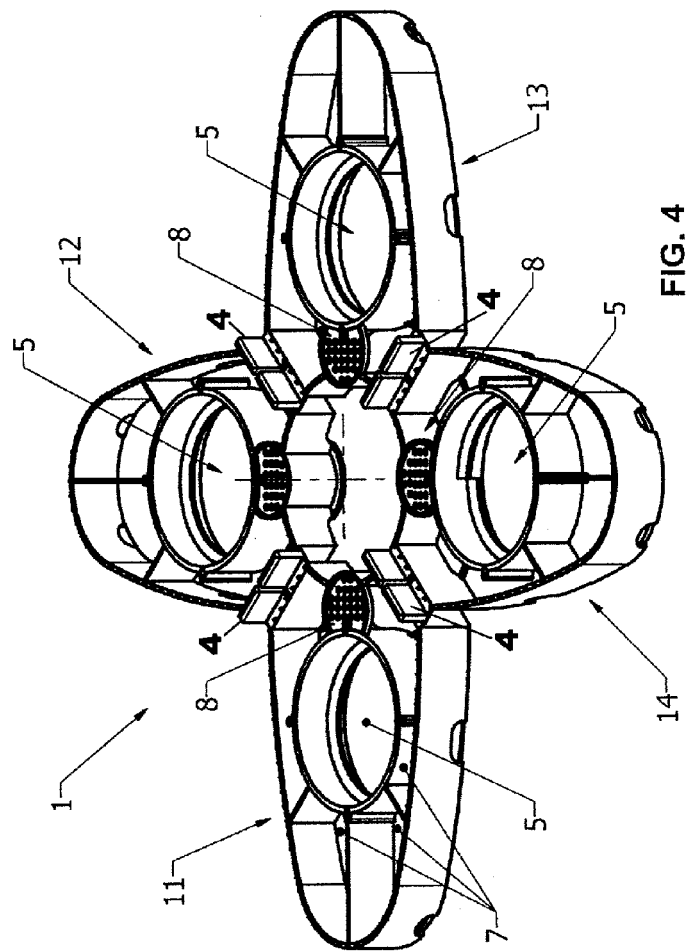
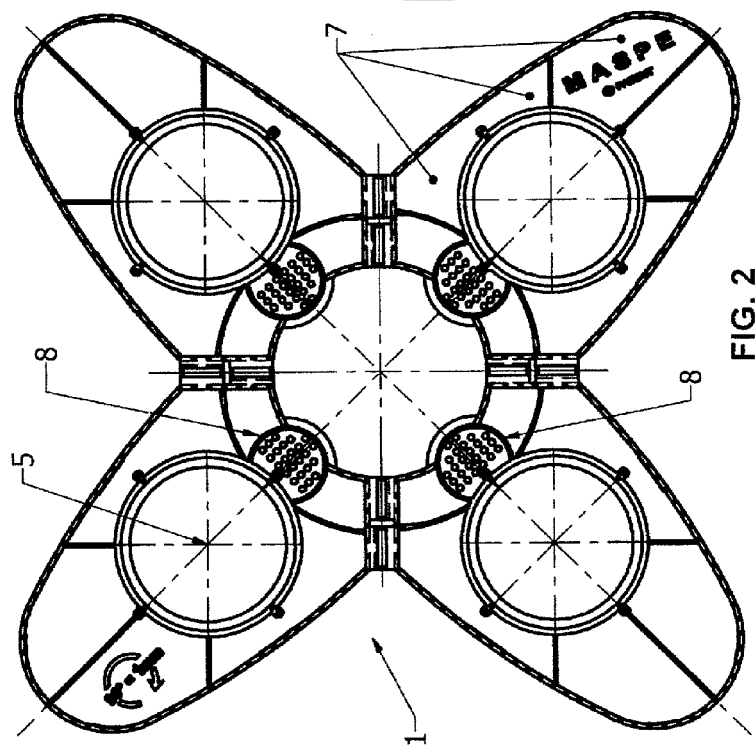
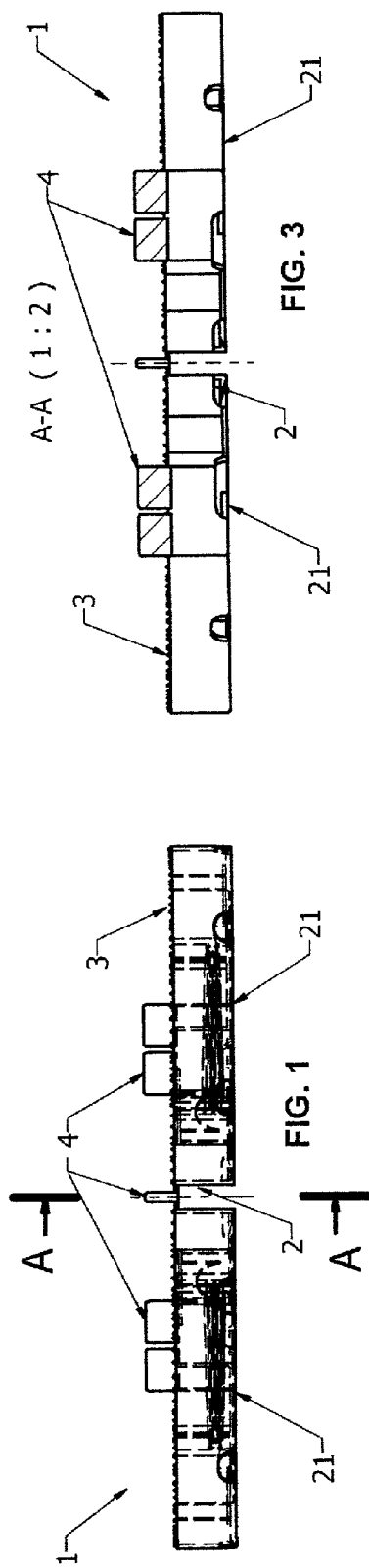
[0066] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A raised flooring support comprising a body (1) with an underside (2) suitable for standing on a subfloor and an upper surface (3) suitable for supporting the tiles of said flooring, said upper surface including spacer elements (4) in relief that define four quadrants, corresponding to four portions (11; 12; 13 and 14) of said body, said four portions being suitable for

containing the juxtaposed corners of said tiles, **characterized in that** there is a housing (5) in line with each of said four portions (11; 12; 13 and 14) and forming part of said body (1) of said support that is suitable for containing corresponding coupling means (6), whose position with respect to said housing is adjustable in height, so that said means can come into contact with said subfloor. 5

2. A support according to claim 1), **characterized in that** said housing is a threaded hole (5) passing through said body (1), and said coupling means comprise a screw cap (6) suitable for engaging in said threaded hole. 10
15
3. A support according to claim 2), **characterized in that** said screw cap (6) has a height equal to or less than the depth of said threaded hole (5).
4. A support according to claims 2) or 3), **characterized in that** said screw cap (6) has a flat base (63) and includes an operating member (62). 20
5. A support according to claim 1), **characterized in that** said body (1) has its underside (2) consisting of a smooth, flat supporting surface. 25
6. A support according to claim 1), **characterized in that** each of said four portions (11; 12; 13 and 14) of the body (1) comprises a recess (8) suitable for containing adhesive. 30
7. A support according to claims 2) or 6), **characterized in that** said recess (8) comes between said threaded hole (5) and the centre of said body (1). 35
8. A support according to claim 7), **characterized in that** said recess (8) is circular in shape.
9. A support according to claim 1), **characterized in that** said body (1) has said four portions in the shape of lobes (11; 12; 13 and 14), said lobes extending along the respective four axes of symmetry over a length no greater than half the diagonal length of said tiles. 40
45
10. A support according to claim 9), **characterized in that** the distance between the underside (2) and the upper surface of said body (1) is sufficient to create a cavity to allow for the installation of technological systems. 50
55



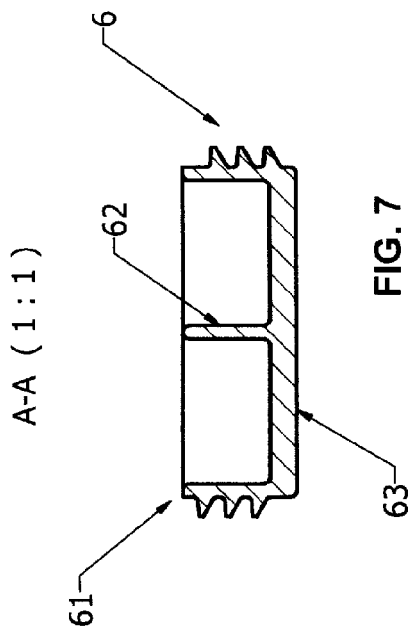


FIG. 7

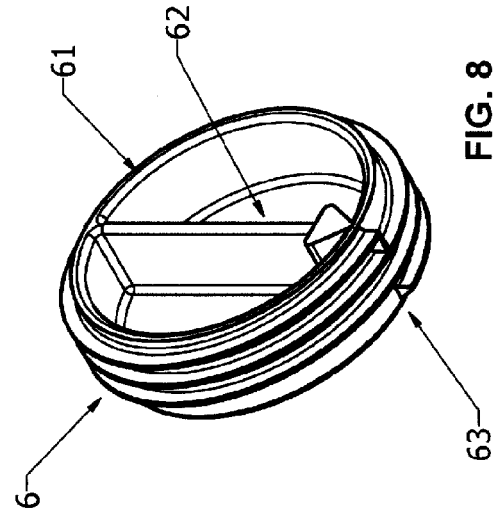


FIG. 8

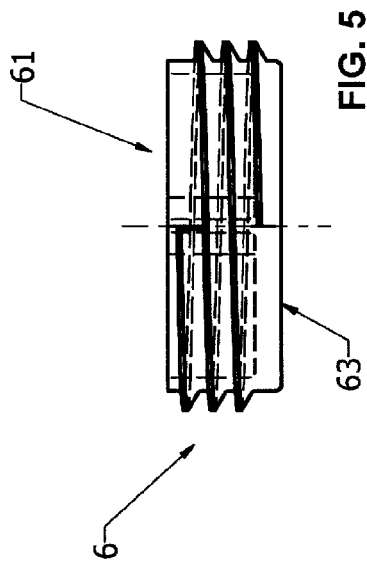


FIG. 5

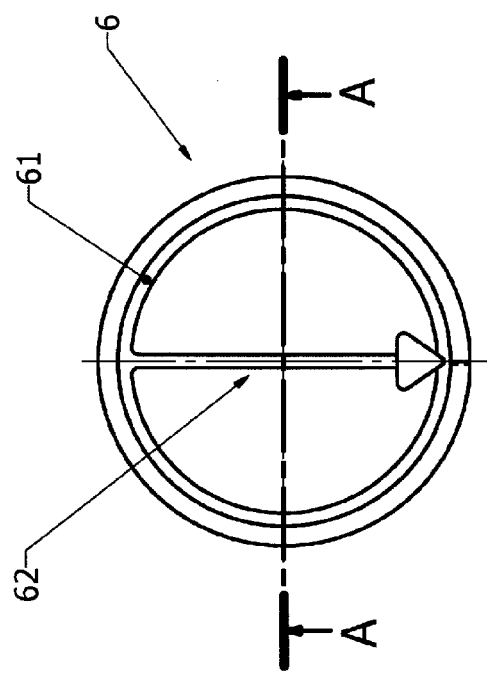
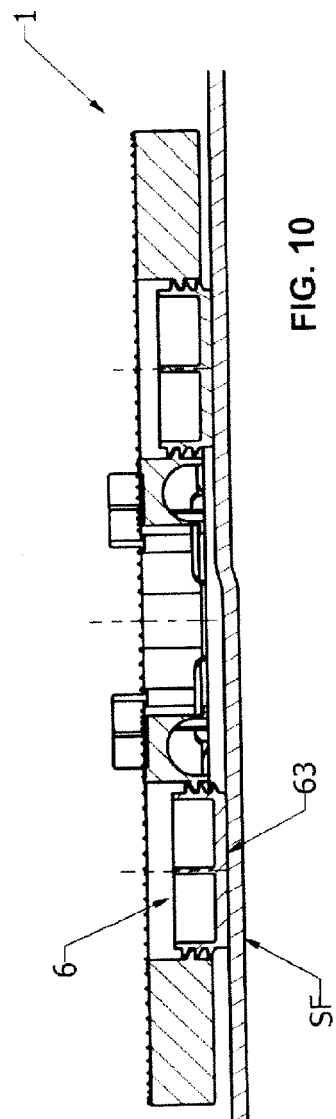
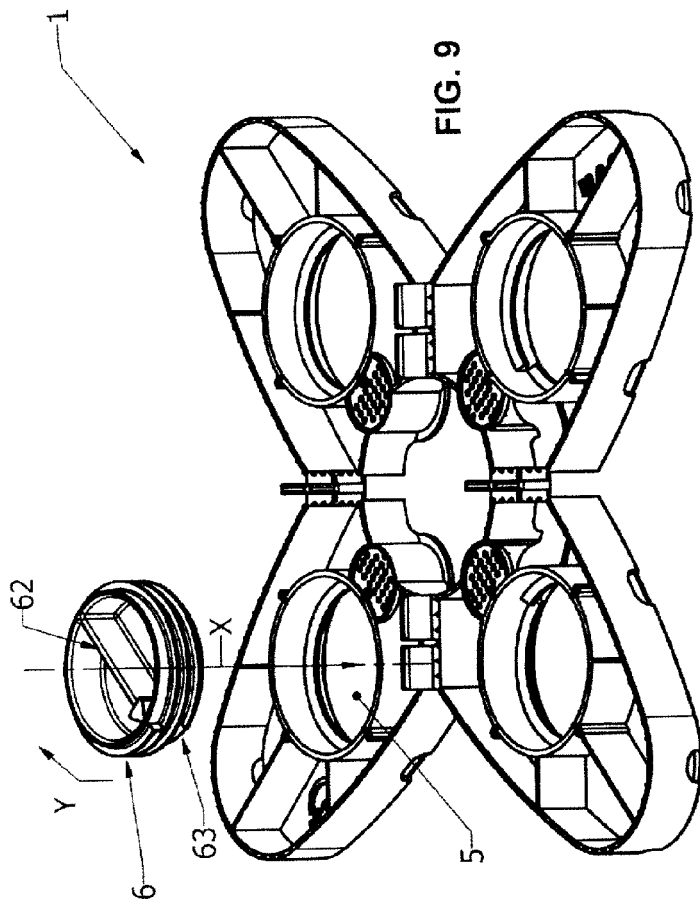


FIG. 6





EUROPEAN SEARCH REPORT

Application Number
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Place of search Munich		Date of completion of the search 21 October 2008	Examiner Bouyssy, Vincent
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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

EP 08 16 0362

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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