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

Stütze für Doppelböden im Aussenbereich

Support pour planchers surélevés extérieurs

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(73) Proprietor: **Maspe S.r.L.**  
**36022 Cassola (VI) (IT)**

(72) Inventor: **Dissegna, Roberto**  
**36028 Rossano Veneto (VI) (IT)**

(74) Representative: **Bonini, Ercole**  
**Studio Bonini Srl**  
**Corso Fogazzaro, 8**  
**36100 Vicenza (IT)**

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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 sub-floor coated with waterproof sheeting.

**[0009]** Said distance creates a cavity between the sub-floor 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. The document DE 42 16 615 A1 refers to a process for covering water outlets with tiles without disturbing discontinuities in the flagging. But the height-adjustable pedestals used therein do not include spacer elements for separating the tiles from each other.

15 **[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.

20 **[0017]** Said body of the support is typically produced by the moulding of plastic materials, usually polypropylene.

25 **[0018]** The WO 01/59231 A describes a spacer for floor tiles which can be adapted to laying of tiles with and without gaps. The document DE 19 30 438 A1 discloses a spacer for tiles which enables the laymen to realize flagging with regular gaps between the tiles, but is not referred to raised floors. The CH 569 842 A5 refers to tiles containing heating wires to melt snow or ice present on the tiles. 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. The impracticality, instability and approximation characteristic of such a solution are self-evident.

30 **[0019]** 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. The US 7 140 156 B1 describes decking tile connectors for wood tiles that permit hardwood decking material to be easily and quickly secured on a base without the need of nails or screws.

35 **[0020]** 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.

40 **[0021]** The present invention aims primarily to overcome the above-explained drawbacks relating to the known state of the art.

45 **[0022]** 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.

**[0023]** 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.

**[0024]** The above-stated main object is achieved by a support designed preferably but not exclusively for the construction of outdoor raised floors, the main features of which are in accordance with the content of the first claim. Preferred embodiments are defined in the dependent claims.

**[0025]** According to the invention, using a support that has a housing in line with each of the four corner portions of the four tiles, that can be coupled, if necessary, with 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.

**[0026]** Moreover, another advantage for the stability of the single tiles resting on the support thus designed is achieved 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.

**[0027]** Finally, an additional advantage is achieved, 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.

**[0028]** 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.

**[0029]** 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.

5 **[0030]** 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.

10 **[0031]** 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.

15 **[0032]** 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.

20 **[0033]** 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.

25 **[0034]** 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.

30 **[0035]** The thickness of said spacer elements 4 defines the width of the "grout joints" between the single tiles.

35 **[0036]** 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.

40 **[0037]** The housing 5 and the coupling means 6 are 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.

45 **[0038]** 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.

50 **[0039]** 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.

55 **[0040]** The screw cap 6 also has a wide flat base 63 suitable for resting stably on the subfloor.

**[0041]** 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.

**[0042]** 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.

**[0043]** 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.

**[0044]** 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**.

**[0045]** 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**.

**[0046]** 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.

**[0047]** 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**.

**[0048]** 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**.

**[0049]** 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.

**[0050]** 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.

**[0051]** Said recess **8** is preferably circular in shape and is located advantageously between the threaded hole **5** and the centre of the body **1**.

**[0052]** The adhesive placed in said recess assures a greater stability for the tile resting on the corresponding portion of the body of the support.

**[0053]** 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.

**[0054]** Said portions are in the form of lobes and are always identified in the attached figures as **11**, **12**, **13** and **14**.

**[0055]** 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.

**[0056]** 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.

**[0057]** 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.

**[0058]** 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.

**[0059]** These areas are consequently critical and it is in these areas that the tiles are most likely to break.

**[0060]** 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.

**[0061]** 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.

**[0062]** 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.

**[0063]** 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.

**[0064]** 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** the support comprises a housing (5), which is in line with each of said four portions

(11; 12; 13 and 14), is forming part of said body (1) of said support and is 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, wherein 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, and wherein the screw cap (6) has a height equal to or less than the depth of said hole (5).

2. A support according to claim 1, **characterized in that** said screw cap (6) has a flat base (63) and includes an operating member (62).
3. A support according to claim 1, **characterized in that** said body (1) has its underside (2) consisting of a smooth, flat supporting surface.
4. 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.
5. A support according to claim 4, **characterized in that** said recess (8) comes between said threaded hole (5) and the centre of said body (1).
6. A support according to claim 5, **characterized in that** said recess (8) is circular in shape.
7. 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.
8. A support according to claim 7, **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.

#### Patentansprüche

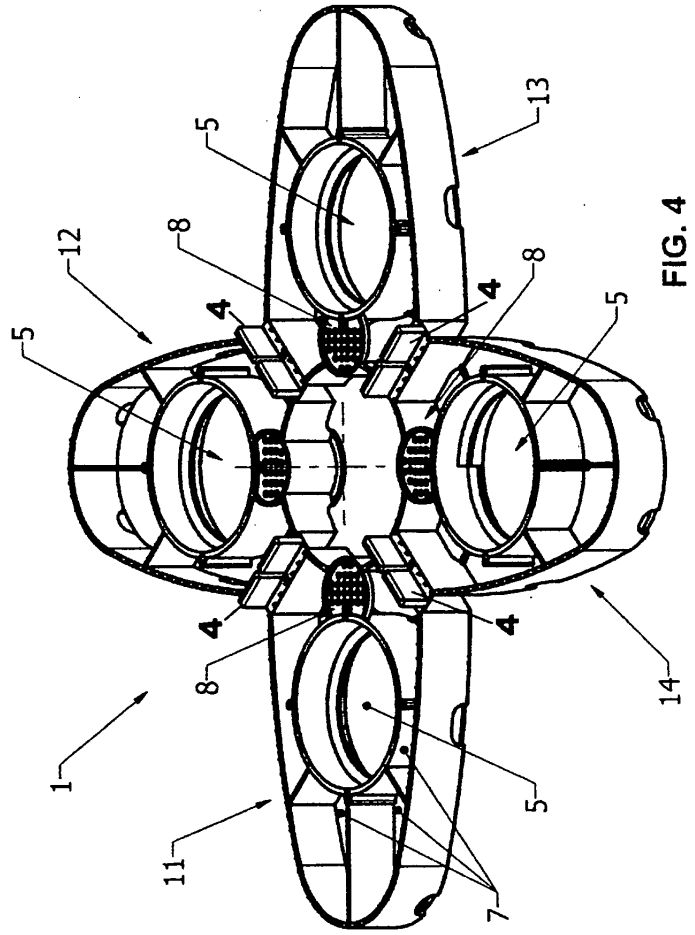
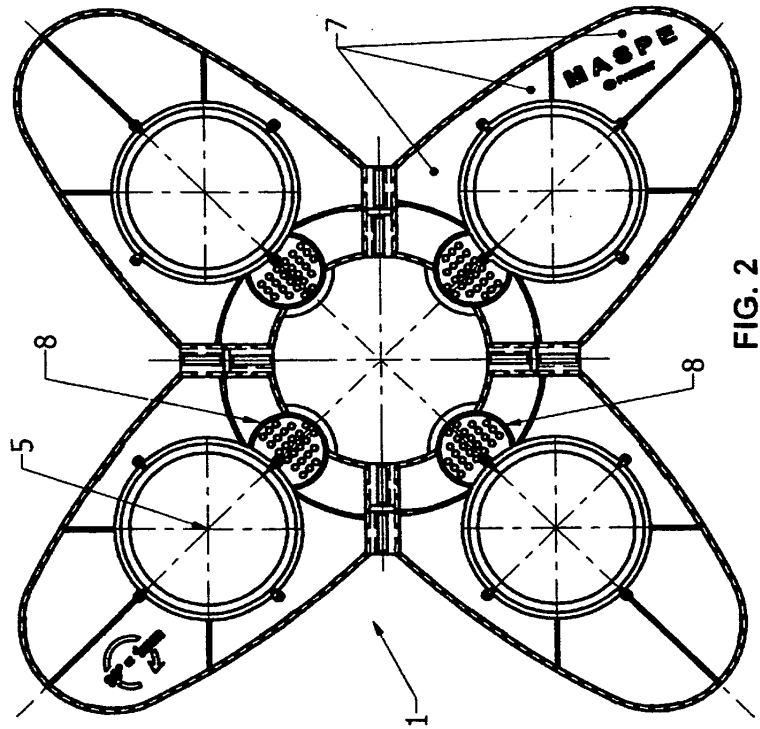
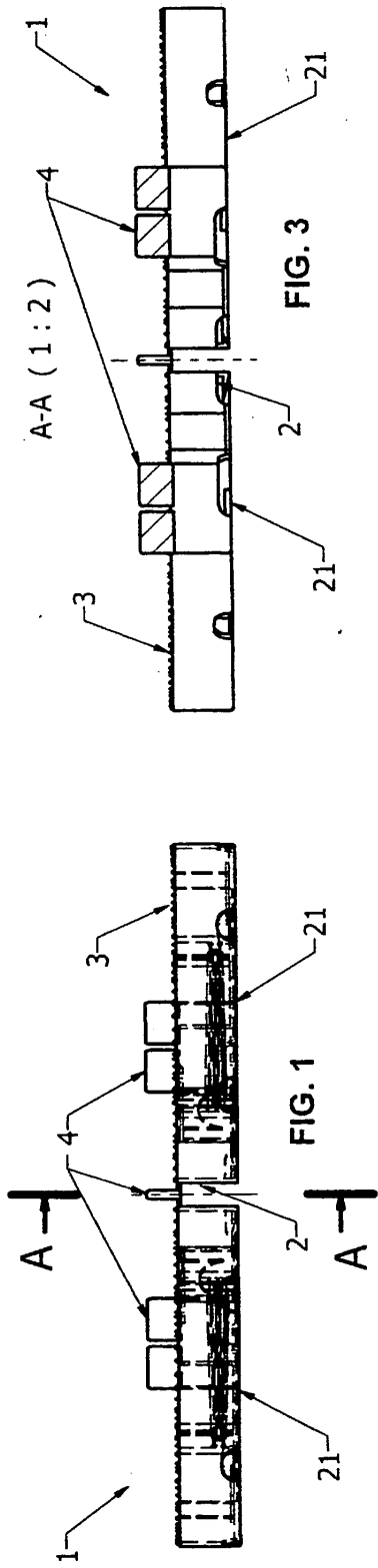
1. Erhöhte Tragkonstruktion für Bodenbeläge, einen Körper (1) umfassend mit einer Unterseite (2), welche geeignet ist, auf einem Unterboden zu stehen, sowie eine obere Fläche (3) umfassend, die geeignet ist, die Fliesen des besagten Bodenbelags zu tragen, wobei die besagte obere Fläche hervorstehende Distanzstücke (4) umfasst, welche vier Quadranten definieren, die vier Abschnitten (11; 12; 13 und 14) des besagten Körpers entsprechen, wobei die besagten vier Abschnitte geeignet sind, die nebeneinanderliegenden Ecken der besagten Fliesen zu ent-

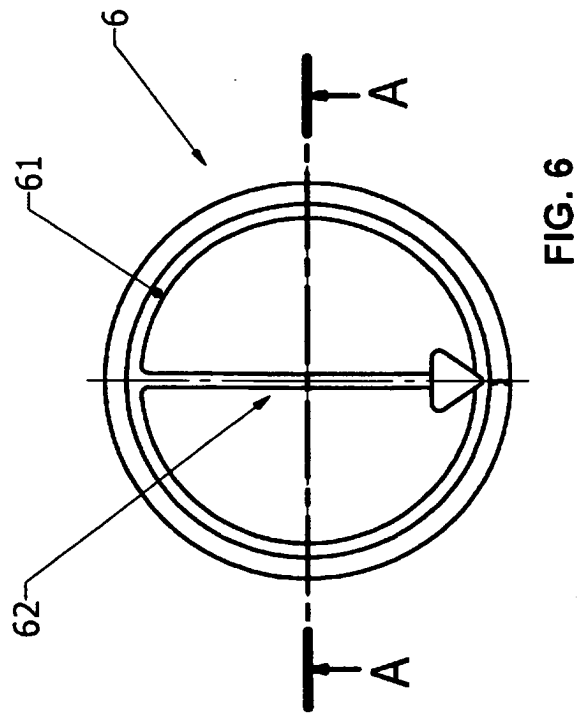
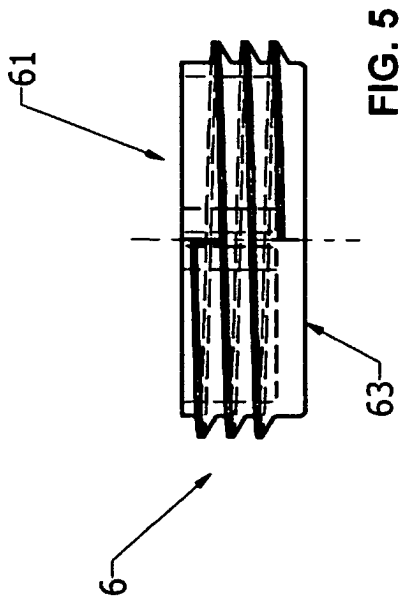
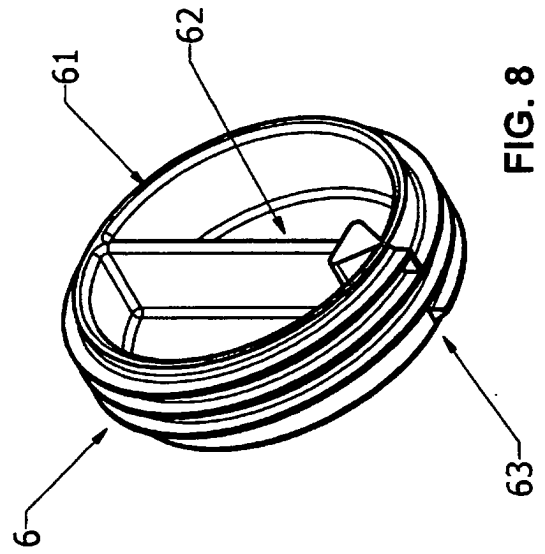
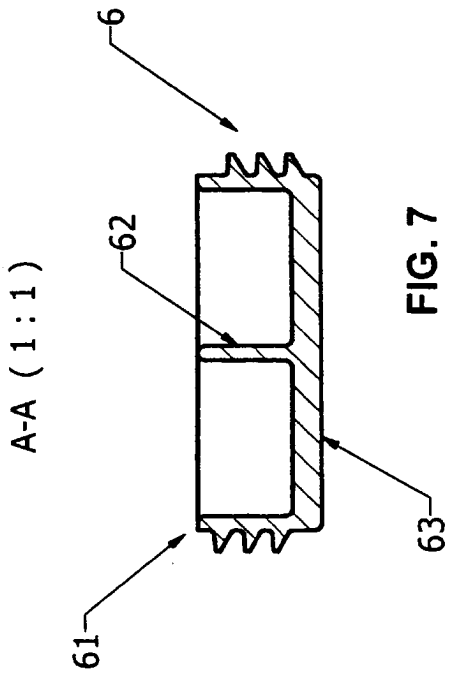
halten, **dadurch gekennzeichnet, dass** die Tragkonstruktion eine Aufnahme (5) umfasst, welche auf jeden der vier besagten Abschnitte (11; 12; 13 und 14) ausgerichtet und Bestandteil des besagten Körpers (1) der besagten Tragkonstruktion ist und entsprechende Kupplungsmittel (6) enthält, deren Position bezüglich der besagten Aufnahme höhenverstellbar ist, so dass die besagten Mittel mit dem Unterboden in Berührung kommen können, wobei die besagte Aufnahme eine Gewindebohrung (5) ist, welche durch den besagten Körper (1) verläuft, und die besagten Kupplungsmittel eine Schraubkappe (6) umfassen, die geeignet ist, mit der besagten Gewindebohrung zusammenzupassen, und wobei die Schraubkappe (6) genauso so hoch oder niedriger ist als die Tiefe der besagten Bohrung (5).

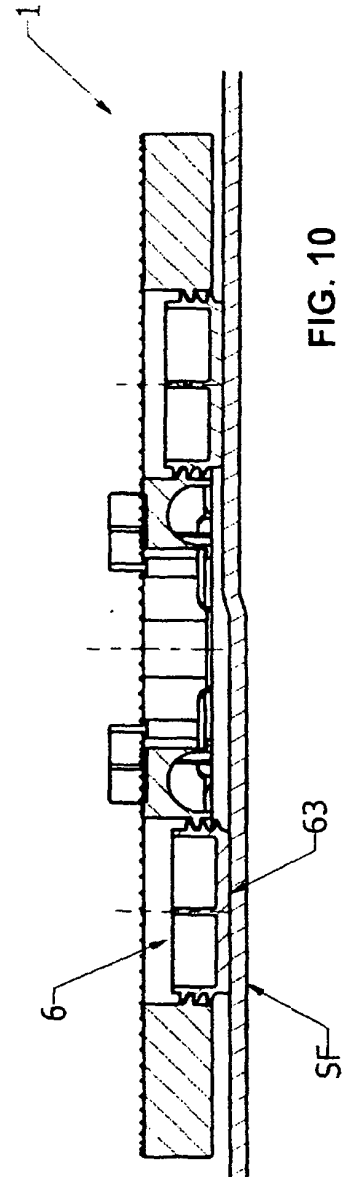
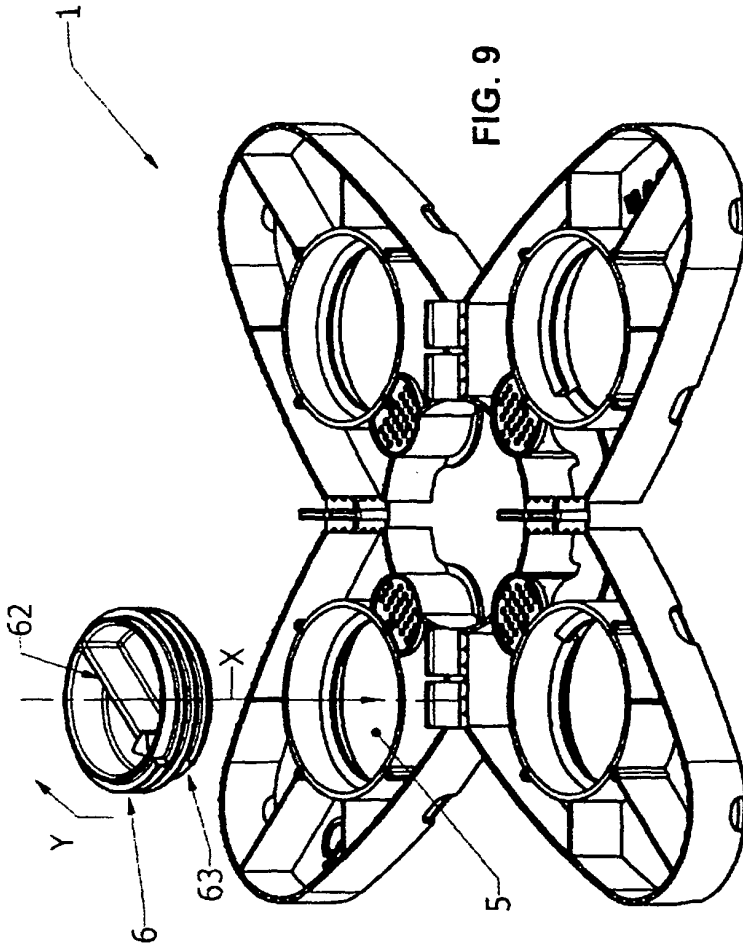
2. Tragkonstruktion gemäß Patentanspruch 1, **dadurch gekennzeichnet, dass** die besagte Schraubkappe (6) eine flache Basis (63) aufweist und ein Bedienelement (62) umfasst.
3. Tragkonstruktion gemäß Patentanspruch 1, **dadurch gekennzeichnet, dass** die Unterseite (2) des besagten Körper (1) aus einer glatten, flachen Auflagefläche besteht.
4. Tragkonstruktion gemäß Patentanspruch 1, **dadurch gekennzeichnet, dass** jeder der vier Abschnitte (11; 12; 13 und 14) des Körpers (1) eine Vertiefung (8) aufweist, die geeignet ist, Kleber zu enthalten.
5. Tragkonstruktion gemäß Patentanspruch 4, **dadurch gekennzeichnet, dass** die besagte Vertiefung (8) sich zwischen der Gewindebohrung (5) und der Mitte des besagten Körpers (1) befindet.
6. Tragkonstruktion gemäß Patentanspruch 5, **dadurch gekennzeichnet, dass** die Vertiefung (8) kreisförmig ist.
7. Tragkonstruktion gemäß Patentanspruch 1, **dadurch gekennzeichnet, dass** der besagte Körper (1) die besagten vier Abschnitte in Form von Nasen (11; 12; 13 und 14) aufweist, wobei sich die besagten Nasen entlang der vier jeweiligen Symmetrieachsen über eine Länge von maximal jener der halben Diagonalen der besagten Fliesen erstrecken.
8. Tragkonstruktion gemäß Patentanspruch 7, **dadurch gekennzeichnet, dass** der Abstand zwischen der Unterseite (2) und der oberen Fläche des besagten Körpers (1) ausreicht, um einen Hohlraum für die Installation technischer Systeme zu erlauben.

## Revendications

1. Support surélevé pour planchers comprenant un corps (1) avec un plan inférieur (2) apte à s'appuyer sur un sous-sol et une surface supérieure (3) apte à supporter les carreaux du dit plancher, la dite surface supérieure comprenant des pièces-entretoises (4) en relief qui définissent quatre cadrans correspondant à quatre portions (11; 12; 13 et 14) dudit corps, lesdites quatre portions étant indiquées pour contenir les angles juxtaposés desdits carreaux, **caractérisé en ce que** le support comprend un logement (5) qui se trouve à hauteur avec chacune desdites quatre portions (11; 12; 13 et 14), forme une partie dudit corps (1) dudit support et contient des moyens d'accouplement correspondants (6), dont la position par rapport audit logement est réglable en hauteur, de façon à ce que lesdits moyens puissent entrer en contact avec le dit sous-sol, où ledit logement est un trou fileté (5) passant à travers ledit corps (1) et lesdits moyens d'accouplement comprennent un bouchon à vis (6) pouvant être accouplé avec ledit trou fileté, et où le bouchon à vis (6) présente une hauteur égale ou inférieure à la profondeur dudit trou (5). 5  
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2. Support selon la revendication 1, **caractérisé en ce que** ledit trou à vis (6) présente une base plate (63) et comprend un élément de manoeuvre (62). 30
3. Support selon la revendication 1, **caractérisé en ce que** ledit corps (1) présente son plan inférieur (2) formé par une surface lisse et plate. 35
4. Support selon la revendication 1, **caractérisé en ce que** chacune desdites quatre portions (11; 12; 13 et 14) du corps (1) comprend une cavité (8) apte à contenir de l'adhésif. 40
5. Support selon la revendication 4, **caractérisé en ce que** ladite cavité (8) se trouve entre ledit trou fileté (5) et le centre dudit corps (1). 45
6. Support selon la revendication 5, **caractérisé en ce que** ladite cavité (8) présente une forme circulaire. 50
7. Support selon la revendication 1, **caractérisé en ce que** ledit corps (1) présente quatre portions de forme de lobes (11; 12; 13 et 14), lesdits lobes s'étendant le long des quatre axes de symétrie correspondants pour une longueur non supérieure à la demi-diagonale desdits carreaux. 55
8. Support selon la revendication 7, **caractérisé en ce que** la distance entre le plan inférieur (2) et la surface supérieure dudit corps (1) est suffisante pour créer une cavité qui permet l'installation de systèmes technologiques. 60







**REFERENCES CITED IN THE DESCRIPTION**

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