(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 686 371 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.07.2020 Bulletin 2020/31

(51) Int Cl.:
E04F 15/024 *(2006.01)*

(21) Application number: **20154206.5**

(22) Date of filing: **28.01.2020**

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

(30) Priority: **28.01.2019 IT 201900001215**

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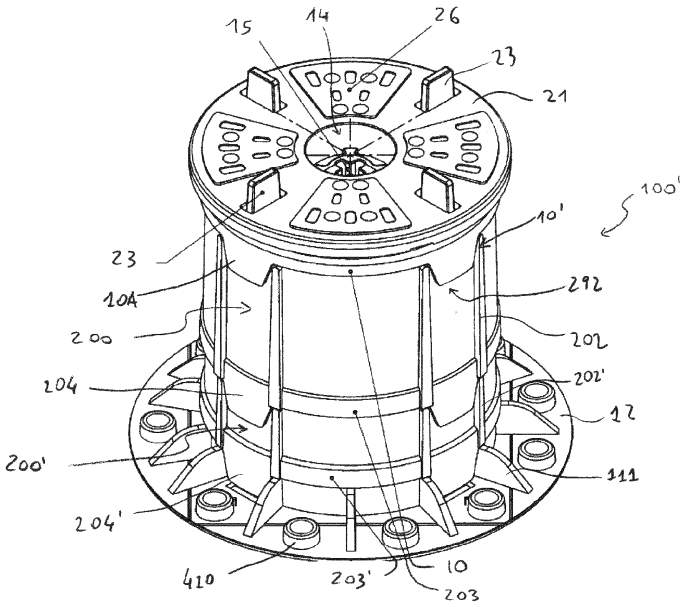
(54) **A SUPPORT FOR RAISED FLOOR**

(57) A support (100) for raised floors comprises a base element (1) having an annular member (10) and a base (11, 12) which is fixed to the annular member (10) and which is configured to be supported on a support surface (S) so as to define the base of the support (100), a support head (2) which is configured to receive in a supporting way a covering element (101) of the floor (102) to be supported, and having a support face (21) which defines the support base for the covering element (101) of the floor (102) to be supported and an opposite second face (22) which is directed in use towards the support surface (S), a support structure (3) which is configured to be interposed in use between the base element (1) and the support head (2), the support structure (3) being provided with connection elements (31) to connect the support structure (3) to the base element (1), the second face (22) being configured to be supported in use on the support structure (3), wherein the support head (2) is provided with a friction-producing device (25) comprising at least one a friction end-piece (27) which is defined on the second face (22) so as to abut against the support structure (3) which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure (3) and the support head (2).

FIG 10A



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Description

[0001] The invention relates to a support for raised floors, preferably of the height-adjustable type.

[0002] The invention further relates to a support head for supports for raised floors.

[0003] The invention further relates to a spacer member for supports for raised floors.

[0004] It is known to construct floors or coverings which are raised from the plane of the ground or of the ceiling in such a way that, between the floor and the ground, a space is defined where wires or service devices can be received.

[0005] In order to construct such floors, there are used cylindrical support elements having two opposite bases, a first base configured to be supported on the ground and a second base configured to receive in a supporting way the covering elements of the floor.

[0006] Usually, the support elements have a support member which can be screwed to the first and/or second base in order to adjust the height of the raised floor and, therefore, the dimensions of the space under it.

[0007] The upper base has a circular form when viewed from above and the support elements are positioned in such a way that angular portions are supported on each upper base, said angular portions being of four different covering elements which converge at the centre of the upper base.

[0008] In other words, the covering elements are positioned on the upper base so that each element occupies one of the four quadrants, into which the upper base can be ideally divided. A problem in relation to this covering system is that often, after installation, it is necessary to adjust the height of the various support elements in order to construct a flat floor, particularly if the ground on which the support elements are supported is irregular or inclined.

[0009] In order to address this requirement, the support elements are provided with an adjustment key which is accessible from the upper base in order to adjust the screwing of the support member.

[0010] Another problem in relation to this covering system is that often the covering elements of the floor tend to move on the upper base, particularly as a result of vibrations, excessive loads, etc.

[0011] In order to be able to mutually screw the support member to the base of the adjustable supports, these elements are constructed with a given dimensional tolerance. Therefore, clearances are defined between the support member and the base which allow a relative movement between the support member and the base during vibrations and impacts.

[0012] In order to overcome this disadvantage, it has been proposed by US8438805 to position on the upper base a damping mat which is configured to receive the covering elements in a supporting manner.

[0013] The mat is constructed from a rubber-like material which allows the vibrations and noise to be damped.

[0014] However, the vibrations and the settlements resulting from the use of the supports are not completely eliminated and are concentrated on the support structure, generating relative movements between the upper base, support member and lower base.

[0015] This causes undesirable movements and variations of height of the known supports.

[0016] Therefore, there are often required adjustment interventions to act on the support member in order to adjust the screwing thereof with respect to the upper and/or lower base. Alternatively, have been proposed supports where the support member is fixed at a predetermined position to the bases after having adjusted the desired height for the support.

[0017] In these supports, it is necessary to disassemble the raised floor in order to access the supports for adjusting their height, if desired.

[0018] Therefore, this solution has the disadvantage that it does not allow adjustment of the height of the support without disassembling the raised floor.

[0019] Therefore, remains the need to provide a support for raised floors which is stable and easy to install and which allows simple adjustment of the height of the support itself.

[0020] An object of the invention is to provide a support for raised floors which makes it possible to overcome the abovementioned disadvantages with reference to the known art.

[0021] Another object of the invention is to provide a support for raised floors which is configured to allow the adjustment of the height of the support with the floor installed.

[0022] Another object of the invention is to provide a support for raised floors which is dimensionally stable.

[0023] Another object of the invention is to provide an adjustable support for raised floors which is formed so that the weight of the raised floor is distributed avoiding excessive overloads in specific zones of the support surface on which the support itself is positioned.

[0024] This object and other objects are achieved by a support for raised floors constructed according to the independent claim 1.

[0025] According to a first aspect of the invention, there is provided an adjustable support for raised floors comprising a base element having an annular member and a base which is fixed to the annular member and which is configured to be supported on a support surface so as to define the base of the support, a support head configured to receive in a supporting way a covering element of the floor to be supported, and having a support face which defines the support base for the covering element of the floor to be supported and an opposite second face which is directed in use towards the support surface, a support structure which is configured to be interposed in use between the base element and the support head, the support structure being provided with adjustable connection elements to connect the support structure to the base element in an adjustable way in order to adjust the

spacing of the support face from the support surface, the second face being configured to be supported during use on the support structure, wherein the support head is provided with a friction-producing device comprising a friction end-piece which is defined on one among said second face and said abutment surface and which is positioned so as to abut against the other among said abutment surface and said second face which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure and the support head.

[0026] As a result of the invention, it is obtained an adjustable support for raised floors which is at the same time easy to adjust and which is dimensionally stable.

[0027] The support head is supported on the support structure in the region of the friction end-piece and so friction is generated between the support head and the support structure.

[0028] The presence of the friction end-piece at the interface between the support head and the support structure allows friction to be applied to the relative sliding actions between the support head and the support structure.

[0029] This prevents undesirable relative movements between the support head and the support structure and therefore undesirable height variations of the supports of the invention.

[0030] In another aspect of the invention, it is provided a support head for an adjustable support for raised floors, the support head being configured to receive in a supporting way a covering element of the floor to be supported and having a support face which defines the support base for the covering element of the floor to be supported and an opposite second face which is configured to be supported during use on a support structure of the adjustable support, wherein the support head is provided with a friction-producing device comprising a friction end-piece which is positioned on the second face so as to abut the support surface which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure and the support head.

[0031] This support head can be used in the construction of various adjustable supports and allows the construction of adjustable supports which have a stable connection between the support head and the support structure.

[0032] In another aspect of the invention, there is provided a support structure for an adjustable support comprising connection elements to connect the support structure to a base element of the adjustable support and an abutment surface which is configured to receive in a supporting way a face of a support head of the support, wherein it is provided a friction-producing device having a friction end-piece which is defined on the abutment surface and which is positioned so as to abut the second face which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure and the support head.

[0033] This support structure can be used in the construction of various adjustable supports and allows the construction of adjustable supports which have a stable connection between the support head and the support structure.

[0034] It is possible, with the support head and/or with the support structure of the invention, to construct adjustable supports for raised floors which are dimensionally stable and their height can readily be adjusted if necessary.

[0035] Furthermore, adjustable supports for raised floors are obtained which allow the impacts and vibrations generated during use of the floor itself to be damped.

[0036] In an embodiment, the adjustable support may be provided with one or more spacer members which are configured as extensions. The extension is configured to be interposed between the base element and the support head, the extension being provided at a first longitudinal end thereof with an engagement device for engaging the extension with the base element of the adjustable support, or with another extension of the adjustable support, and at an opposite longitudinal end with an additional engagement device which is configured to be connected to the engagement device of an additional extension or of the annular member of the base element.

[0037] According to another aspect of the invention, it is provided an adjustable support for raised floors comprising a base element having an annular member and a base which is fixed to the annular member and which is configured to be supported on a support surface so as to define the base of the support, a support head which is configured to receive in a supporting manner a covering element of the floor to be supported, and having a support face which defines the support base for the covering element of the floor to be supported and an opposite second face which is directed in use towards the support surface, a support structure which is configured to be interposed in use between the base element and the support head, the support structure being provided with adjustable connection elements to connect the support structure to the base element in an adjustable manner in order to adjust the spacing of the support face from the support surface, and an extension which is configured to be interposed between the base element and the support head provided at a first longitudinal end thereof with an engagement device for engaging the extension with the base element of the adjustable support, or with another extension of the adjustable support, and at an opposite second longitudinal end with an additional engagement device which is configured to be connected to the engagement device of an additional extension or of the annular member.

[0038] In an embodiment, the second face of the support head is configured to be supported during use on the support structure, the support head being provided with a friction-producing device comprising a friction end-

piece which is defined on one among said second face and said abutment surface and which is positioned so as to abut against the other among said abutment surface and said second face which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure and the support head.

[0039] The presence of the engagement device and the additional engagement device allows a stable engagement of the extension with the base element, with the annular member or a stable engagement between two extensions .

[0040] It is thereby possible to obtain adjustable supports with heights which are different from each other and to obtain stable and strong adjustable supports.

[0041] The extension has a substantially cylindrical member which is internally hollow and which is provided with a longitudinal cavity.

[0042] In an embodiment, the engagement device comprises a first engagement element and a second engagement element which project longitudinally from the extension and which are mutually spaced apart in a radial direction so that between the first element and the second element an engagement sleeve remains defined for engaging the extension with the base element or another extension.

[0043] Preferably, the first engagement element comprises an internal collar which projects from the extension and the second engagement element comprises an external collar which projects from the extension which is spaced apart from the internal collar.

[0044] In an embodiment, the external collar is provided with a plurality of fins which project from the external collar in a longitudinal direction and which are configured to be connected to the other engagement device of another extension or of the base element.

[0045] In an embodiment, the internal collar is provided with a plurality of fins which project from the internal collar in a longitudinal direction and which are configured to be connected to the other engagement device of another extension or of the base element. Each fin of the plurality of fins is provided with an engagement tooth which projects in a radial direction and which is configured to be received in a connection seat which is provided in the additional engagement device of another extension or on the base element.

[0046] The fins can be spaced apart circumferentially on the external surface of the extension, preferably in an equidistant way. In a preferred embodiment, four fins are provided.

[0047] The additional engagement device comprises a plurality of connection seats which are provided on the external or internal surface of the extension and which are configured to receive the engagement teeth of the fins of an additional extension or of the annular member.

[0048] Advantageously, the extension is further provided with a plurality of ribs which are defined on the external surface thereof.

[0049] The ribs are preferably longitudinal and act as reinforcement elements of the adjustable support. The ribs also act as guide elements for inserting the engagement elements.

[0050] It is defined between contiguous ribs of the plurality of ribs a guide seat for inserting the engagement elements of another extension or of the annular member.

[0051] The ribs are positioned in such a way that it is defined a guide seat in which the fins are received in a sliding manner and that it is substantially prevented any relative rotation between two consecutive extensions and/or between an extension and the annular member.

[0052] In a preferred embodiment, the extension further comprises a plurality of internal ribs which are defined on an internal wall of the extension and which extend in a substantially longitudinal direction.

[0053] The internal ribs extend over a longitudinal portion of the internal wall in such a way that an insertion portion without any ribs is defined in the region of the second longitudinal end of the extension.

[0054] This insertion portion is formed so as to receive an internal collar of another extension.

[0055] The internal collar and the support portion are formed in such a way that, by inserting the other extension in the extension, the internal collar of the extension is inserted in the insertion portion of the other extension and the external edge of the internal collar is supported on the internal ribs of the other extension. In a preferred embodiment, the base element is provided with a filler element which is inserted in the base element in order to increase the stability of the base element.

[0056] The features and advantages of the invention will be better appreciated from the following detailed description of a number of preferred embodiments thereof which are illustrated by way of non-limiting example with reference to the attached drawings, in which:

- Figure 1 is a perspective view of an adjustable support according to a first embodiment of the invention;
- Figure 2 is a perspective plan view of the support of Figure 1;
- Figure 3 is a front cross-section of the support of Figure 1 ;
- Figure 4 is a front view of a head element of the support of Figure 1;
- Figure 5 is a perspective plan view of the head element of Figure 4;
- Figure 6 is a perspective bottom view of the head element of Figure 4;
- Figure 7 is an enlarged perspective view of a detail of the head element of Figure 4;
- Figure 8 is a schematic view of a floor constructed with the support of the invention;
- Figures 9A, 9B, 9C and 9D are a perspective plan view, a perspective bottom view, a front view and a longitudinal section of an extension for an adjustable support according to the invention, respectively;
- Figure 9E is a front view of an additional embodiment

of an extension for an adjustable support according to the invention;

- Figures 10A and 10B are a perspective view and a longitudinal section of a second embodiment of an adjustable support according to the invention, respectively;
- Figures 11, 12 and 13 are perspective views of three different embodiments of an adjustable support according to the invention;
- Figures 14A and 14B are a perspective plan view and perspective bottom view of the base element provided with a closure insert.

[0057] With reference to Figures 1 to 8, it is shown an adjustable support 100 for raised floors according to the invention.

[0058] The adjustable support 100 is arranged to be positioned on a support surface "S", such as an external surface of a roof, the ground, etc., and is configured to receive covering elements 101 of a floor 102 in a supporting way.

[0059] The support surface "S" may also be an impermeable covering sheath which is applied to the surface to be covered.

[0060] A raised floor 102, which is schematically shown in Figure 8, comprises a plurality of covering elements 101 preferably having a rectangular shape which are placed side by side to form the floor 102.

[0061] These covering elements 101 are supported on a plurality of supports 100 so as to be spaced apart from the support surface "S" by a distance Z1 which almost corresponds to the height Z1 of the adjustable support 100.

[0062] In this way, it is defined between the floor 102 and the support surface S a gap for receiving pipes, wires and for the correct drainage of fluids, such as rain, etc.

[0063] Each covering element 101 can be constructed from any material which is suitable for the purpose and which has a quadrangular shape with four different angular portions 103, each one configured to be supported on a respective support 100, as described in greater detail below.

[0064] Each adjustable support 100, which can better be seen in Figures 1 to 3, has a substantially cylindrical shape and comprises a base element 1 which is configured to be supported in use on the support surface S and a support head 2 which is longitudinally opposite along a longitudinal axis Z' of the adjustable support 100 with respect to the base element 1.

[0065] The support head 2, which can better be seen in Figures 4 to 6, is configured to receive in a supporting way one or more covering elements 101 of the floor 102, as better explained below.

[0066] In an ideal positioning of the adjustable support 100, the longitudinal axis Z' of the adjustable support 100 coincides with the vertical axis Z.

[0067] It may be assumed below, considering a Cartesian reference system, that the longitudinal axis Z' of the adjustable support 100 corresponds to the vertical axis Z, while the support surface S is located in a plane XY perpendicular to the vertical axis Z.

[0068] The adjustable support 100 further comprises a support structure 3 which is configured to be interposed in use between the base element 1 and the support head 2, and which can be connected adjustably to at least one of the base element 1 and the support head 2 in order to adjust the height of the adjustable support 100.

[0069] In the embodiment shown, the support structure 3 comprises connection elements 31 for connecting the support structure 3 to the base element 1.

[0070] In the embodiment shown, the connection elements are configured as a spacer member 31 having an internally hollow cylindrical shape.

[0071] The spacer member 31 is delimited by a side wall 31A, by an abutment surface 32 which is provided at a longitudinal end of the spacer member 31 and which is configured to abut the support head 2, as better explained below.

[0072] The abutment surface 32 is concave towards the outer side of the spacer member 31 and is defined by a wall which slopes from an external edge 32A towards the centre 32B of the abutment surface 32 which is placed in the region of the longitudinal axis Z' of the spacer member 31.

[0073] In this manner, the abutment surface 32 projects inside the spacer member 31.

[0074] The spacer member 31 is internally hollow and is delimited at the side opposite the abutment surface 32 by a free edge 32C. At the centre 32B of the abutment surface 32, the spacer member 31 is provided with an adjustment head 15 which projects from the abutment surface 32 towards the support head 2 and which is configured to be actuated by a user to adjust the height of the support 100.

[0075] A slot 15A for an adjustment key is provided on the adjustment head 15.

[0076] The slot 15A has dimensions corresponding to those of the joints of the floor 102 so as to be accessible for a user even with the floor 102 assembled.

[0077] The side wall 31A is provided with an external thread 33 which is configured to be connected to an internal thread 13 which is provided on the base element 1 in order to mutually screw adjustably the spacer member 31 and the base element 1 in order to adjust the overall height Z1 of the adjustable support 100.

[0078] The presence of the external thread 33 and the internal thread 13 allows the support structure 3 to be connected in an adjustable way to the base element 1.

[0079] The overall height Z1 of the adjustable support 100 being defined as the distance between the support face 21 and the support surface S.

[0080] By rotating the spacer member 31 with respect to the base element 1, as indicated by the arrow F, the mutual screwing between the spacer member 31 and the base element 1 is varied, bringing about a variation of the height Z1 of the adjustable support 100.

[0081] In the embodiment shown, the external thread 33 extends over the entire longitudinal extent of the side wall 31A of the spacer member 31, it is thereby possible to maximize the possibility of adjusting the height "Z1" of the adjustable support 100.

[0082] This further allows the spacer member 31 to be fixed both to the base element 1 and to the support head 2.

[0083] In other embodiments which are not shown, however, the external thread is provided only on a portion of the side wall 31A of the spacer member 31.

[0084] In other embodiments which are not shown, the spacer member 31 is further provided with the external thread only at two different portions of the individual longitudinally opposite side wall 31A of the external thread.

[0085] It is thereby possible to fix the spacer member 31 both to the base element 1 and to the support head 2.

[0086] In other embodiments of the adjustable support which are not shown, the support structure 3 comprises a plurality of spacer members which are suitable to be positioned successively one above the other and configured so that adjacent spacer members can be connected to each other in order to vary the overall height Z1 of the adjustable support 100. The height of the spacer members may be different from each other and defined on the basis of needs for use.

[0087] In this case, each spacer member comprises an engagement sleeve which is provided at a longitudinal end of the spacer member and which is configured to be fitted on an additional spacer member so as to mutually connect a plurality of spacer members in series.

[0088] It is thereby possible to obtain a support structure 3 which is formed by a plurality of spacer members 31 which are connected to each other.

[0089] At least the two end spacer members of the series of spacer members are further suitable to be connected to the support head 2 and/or the base element 1 in order to connect the support structure 3 to the support head 2 and to the base element 1.

[0090] In this embodiment, one spacer member 31 of the plurality of spacer members is provided with the external thread, the other members may not have it.

[0091] These additional spacer members can be configured as described below.

[0092] In other embodiments which are not shown, the adjustable support is provided with connection elements which are different from the thread and which are suitable for connecting in a stable and adjustable way the support structure 3 and the base element 1 and the support head 2 and which are formed so as to be able to adjust the overall height Z1 of the adjustable support 100.

[0093] In another embodiment which is not shown, the support structure 3 is constructed integrally with the base element 1. The base element 1 has an annular member 10 which is provided with the internal thread 13 which is configured to be connected to the external thread 33 of the spacer member 31 in order to fix the spacer member 31 to the base element 1. In another embodiment which is not shown, the annular member may be provided with an external thread, the spacer member of the support structure being provided with an internal thread which can be connected with form-fitting connection to the external thread of the annular member.

[0094] The annular member 10 is provided with a blocking device which cannot be seen in the Figures in order to block the rotation of the spacer member 31 in order to prevent the removal of the spacer member 31 from the annular member 10.

[0095] The edge 10A of the annular member 10 directed towards the support head is folded so as to define an engagement sleeve 10' which is configured to be fitted on a vertical wall 101 of the base 11.

[0096] The edge 10A defines a circumferential seat for the vertical wall 101 of the base 11.

[0097] The base element 1 further comprises a base 11 which is fixed to the annular member 10 and which is configured to be supported in use on the ground in order to define the base of the support 100. The base 11 has a vertical wall 101 which is formed so as to define a longitudinal through-hole 11A.

[0098] The base 11 and the annular member 10 can be fixed in a removable way, preferably in a snap-fitting manner, in a longitudinal direction so as not to be able to rotate with respect to each other about the longitudinal axis of the support 100.

[0099] The base 11 is provided with a flange 12 which projects from the vertical wall 101 of the base 11 in a transverse plane XY relative to the longitudinal axis Z' and which has dimensions when viewed from above in a Cartesian reference system in which the longitudinal axis of the annular member corresponds to the vertical axis Z, in a plane XY, greater than the base 11.

[0100] The flange 12 is configured to be supported, in use, on the support surface S.

[0101] The flange 12 has a width D1 which depends on the dimensions of the support 100 and/or the characteristics of the floor to be supported and/or the use thereof.

[0102] The presence of the flange 12 allows an increase of the stability of the support 100 on the ground.

[0103] In an embodiment, the base 11 is further provided with a filling element 700 which is shown in detail in Figure 14B and which is inserted in the through-hole 11A of the base 11 and which is configured to be connected in a form-fitting way to the through-hole 11A so as to close it.

[0104] There is thereby defined a support base of the support 100 having a discoidal shape. This allows an increase in the stability of the base element 1. This further allows an increase in the stability of the adjustable support on the support surface S and more homogeneous distribution of the weight to be supported.

[0105] Localized overloads and undesirable damage to the support surface S are prevented, particularly when a covering sheath is provided.

[0106] The adjustable support 100 further comprises

a support head 2 which is configured to receive in a supporting way one or more covering elements 101 of the floor 102 to be supported. In a conventional positioning of the floor 102, each support head 2 is configured to support four different covering elements 101, but in accordance with the position of the support in the floor and/or the configuration of the floor and/or the arrangement of the covering elements or the configuration thereof, the number of covering elements on each support may be different from 4, for example, as shown with reference to Figures 11 to 13 and as better described below.

[0107] The support head 2 comprises a discoidal member 20 having a height H1 which is considered along the longitudinal axis Z' of the support 100 and which is delimited by an external edge 20A, by a support face 21 which defines the support base for the covering elements 101 of the floor 102 and an opposing second face 22 which is directed in use towards the support structure 3 and which is supported in use thereon and longitudinally opposite the first face 21.

[0108] The discoidal element 20 is configured so that the support face 21 is substantially planar; the second face 22 comprises a curved central portion 42 and a peripheral flange 43 which is substantially planar.

[0109] The curved central portion 42 is outwardly convex.

[0110] The curved central portion 42 is formed so as to be connected with form-fitting connection to the abutment surface 32 of the spacer member 31, as better explained below.

[0111] The curved central portion 42 and the abutment surface 32 constitute the connection surfaces between the support structure 3 and the support head 2.

[0112] The formation of the curved central portion 42 and the abutment surface 32 allows a self-levelling support 100 to be obtained.

[0113] In case of variation of inclination, the curved central portion 42 can slide on the abutment surface 32 in order to allow alignment of the support 100 and in particular the support face 21.

[0114] In the embodiment shown, the second face 22 is supported in use on the abutment surface 32 of the spacer member 31 opposite the base element 1.

[0115] The second face 22 has such dimensions that, during use, the support head 2 is supported on the abutment surface 32 in the region of the curved central portion 42, the peripheral flange 43 projecting in a transverse plane XY with respect to the spacer member 31.

[0116] The support head 2 is further provided with positioning elements 23 which project from the support face 21 in a direction opposite the second face 22 and which are configured to be interposed between the covering elements 101 which are supported on the support face 21 of the adjustable support 100. The positioning elements 23 are advantageously arranged in openings 230 which are formed in the support head 2.

[0117] The number of positioning elements 23 depends on the number of covering elements 101 which are supported on the support face 21 of the same adjustable support 100 and the positioning thereof.

[0118] The position and/or the formation of the positioning elements 23 depends on the number, the formation and/or the positioning of the covering elements 101 which are supported on the support face 21 of the same adjustable support 100.

[0119] In the embodiment shown, four different positioning elements 23 are provided which are arranged on the support face 21 so as to define thereon four different positioning sectors 28, each positioning sector 28 being suitable for receiving an angular portion 103 of a corresponding covering element 101. Each positioning sector 28 is configured to receive in a supporting way an angular portion 103 of a corresponding covering element 101.

[0120] Each positioning element 23 is in the form of a plate and is configured to be positioned in use in the joints between two adjacent covering elements 101.

[0121] The positioning elements 23 define a lateral spacing between the adjacent covering elements 101 in order to allow rain water and other fluids to be discharged through the flooring 102.

[0122] The positioning elements 23 further act as alignment elements for the covering elements 101 during the positioning thereof on the support 100, the side walls 23A of the positioning elements 23 being positioned in abutment and in alignment with the side walls of the angular portions 103 of the covering elements 101.

[0123] The positioning elements 23 have a height Z2 which depends on the thickness of the covering elements 101 to be positioned on the support 100, usually between 3 and 4 mm, and a thickness which depends on the dimensions of the joints to be formed between the covering elements 101.

[0124] The support head 2 is provided with a central through-hole 14 which extends in the direction of the longitudinal axis Z' of the support 100 and which is configured to allow the adjustment of the height of the support 100, as will be better explained below.

[0125] In the second face 22, the central hole 14 has a shape, when viewed from above, corresponding to the shape of the adjustment head 15 provided on the abutment surface 32 of the spacer member 31 and dimensions greater, when viewed from above, than those of the adjustment head 15.

[0126] The central hole 14 and the adjustment head 15 have cross-like shapes, when viewed from above, as can better be seen in Figures 3 and 6, so as to prevent undesirable unscrewing of the spacer member.

[0127] On the support face 21, the central hole 14 has a circular shape, when viewed from above, with an aperture which is greater than the dimensions of the central hole defined in the second face 22.

[0128] The adjustment head 15 constitutes an adjustment device 15 for the support 100 which can be actuated by means of the central hole 14 and which is configured to be actuated in order to adjust the height Z1 of the support 100.

[0129] The central hole 14 is partially covered, in use, by the covering elements 101 which are supported on the support face 21, as explained below.

[0130] When it is necessary to adjust the height of the support 100, the user can access to the adjustment head 15 with an adjustment key which is connected to the slot 15A which is provided in the adjustment head 15 in order to rotate the spacer member 31 and consequently to vary the height of the support 100.

[0131] Each positioning sector 28 receives an angular portion 103 of a covering element 101, the side walls 23A of the positioning elements 23 allow alignment of the angular portions 103 of the support elements 101 on the adjustable support 100 and define a lateral spacing between the adjacent covering elements 101 in order to allow rain water and other fluids to be discharged through the floor 102.

[0132] The support head 2 is further provided with a friction-producing device 25 in order to apply friction between the support head 2 and the support structure 3 and between the support head 2 and the covering elements 101.

[0133] The friction-producing device 25 comprises friction mats 26 which are provided on the support face 21 and which are configured to receive in a supporting way the covering elements 101 and friction end-pieces 27 which are provided on the second face 22 of the support head 2 and which are configured to be supported on the abutment surface 32 of the spacer member 31, as better explained below.

[0134] The four friction mats 26 are provided on the support face 21 and project therefrom so as each can receive in a supporting manner the angular portion 103 of a corresponding covering element 101.

[0135] Each friction mat 26 is positioned so as to project with respect to the support face 21 by a thickness "D" between 1 and 10 mm, preferably approximately 2 mm.

[0136] In other embodiments, there may be provided a single friction mat which is configured to receive in a supporting way all the covering elements 101 which are supported on the same support 100.

[0137] The friction mats 26 are configured to apply friction to the sliding action of the covering elements 101 with respect to the support face 21 and therefore the support 100.

[0138] Each friction mat 26 may be made from rubber or an elastomer material or other material with a high friction coefficient, preferably EPDM.

[0139] The friction mats 26 allow attenuation of the noise generated by the footsteps on the floor 102 and attenuation of the vibrations generated during use.

[0140] The friction mats 26 can be produced separately with respect to the support head 2 and subsequently fixed in a stable way to the support face 21, for example, by means of mechanical fixing elements and/or by means of adhesives.

[0141] Alternatively, the friction mat 26 may be produced by co-moulding at the same time as the support head 2, as better explained below.

[0142] The support face 21 is provided with recesses 29 which are configured to receive the friction mats 26 and which are configured so as to receive the friction mats 26 in a stable way on the support head 2.

[0143] Each recess 29 may be provided with engagement elements, which are not visible in the Figures and which are configured to engage with the respective friction mat 26, keeping it received in the recess 29 itself in a stable way.

[0144] The friction mats 26 increase the friction between the covering elements 101 and the support head 2, preventing damage to the support face 21 of the support 100 during positioning of the covering elements 101.

[0145] The support head 2 is further provided on the second face 22 with friction end-pieces 27 which are positioned so as to abut the support structure 3 in order to apply friction to the relative sliding between the support structure 3 and the support head 2. In this way, the relative rotation between the support head 2 and the support structure 3 is impeded. The friction end-pieces 27 are configured to be supported in use on the abutment surface 32 of the spacer member 31. Therefore, the support head 2 is supported on the support structure 3, and in particular on the abutment surface 32 in the region of the friction end-pieces 27.

[0146] In the embodiment shown, four different friction end-pieces 27are provided which are suitably spaced apart on the second face 22.

[0147] Advantageously, the four different friction end-pieces 27 are arranged in a cross-like way on the second face 22, that is to say diametrically opposite in pairs.

[0148] In other embodiments which are not shown, the friction device 25 comprises a number of friction end-pieces other than four, advantageously suitably spaced apart on the second face 22. By increasing the number of the friction end-pieces and/or their extent, that is to say the contact surface between the friction end-pieces and the support structure, the relative friction between the support structure and the support head is increased.

[0149] Each friction end-piece 27 is positioned on the second face 22 so as to project with respect thereto by a projection "d" between 0.1 and 1 mm, preferably of approximately 0.2 mm. Each friction end-piece 27 is produced from rubber or elastomer material, or another material with a high friction coefficient, which is suitable for generating friction for the relative sliding between the support structure 3 and the support head 2 and also to dampen the impacts and friction between the support head 2 and the support structure 3.

[0150] In a particularly preferred embodiment, each friction end-piece 27 is made from EPDM.

[0151] Each friction end-piece 27 extends radially on the second face 22 and preferably has a width L, measured circumferentially, which increases in the direction away from the centre 14 of the second face 22.

[0152] Therefore, each friction end-piece 27 is prefer-

ably, as in the embodiment shown, in the form of a circular sector or a circular corona arc.

[0153] Each friction end-piece 27 may be constructed separately with respect to the support head 2 and subsequently fixed in a stable way to the second face 22, for example, by means of fixing elements of the mechanical type and/or by means of adhesives.

[0154] The second face 22 of the support head 2 is provided with a plurality of receptacles 30 in a number that corresponds to the number of the friction end-pieces 27, each receptacle 30 being intended to receive in a stable way a corresponding friction end-piece 27.

[0155] Each receptacle 30 may be provided with engagement elements which cannot be seen in the Figures and which are configured to engage with the respective friction end-piece 27 by keeping it in a stable way in the receptacle 30 itself.

[0156] Each friction end-piece 27 comprises a plurality of rib structures 27A which have a width L2, measured in the circumferential direction, and which extend in the radial direction and which are configured to abut the abutment surface 32 of the spacer member 31. The adjacent rib structures 27A are spaced apart by indentations 27B and interconnected by one or more connection bridge(s) 27C which have a circumferential extent.

[0157] Each friction end-piece 27 is therefore supported on the abutment surface 32 in the region of the rib structures 27A and the connection bridges 27C.

[0158] The friction generated by the friction end-piece 27 on the spacer member 31 is increased by increasing the width L2 of the rib structures 27A, the number and extent of the connection bridges 27C.

[0159] This allows adjustment of the friction generated by the friction end-pieces 27, at the same time obtaining friction end-pieces having a stable member.

[0160] This advantage is obtained without complicating the production process of the support head 2 of the invention.

[0161] In other words, by varying the number of the friction end-pieces 27 and/or their extent, that is to say the contact surface between the friction end-pieces 27 and the abutment surface 32, it is possible to adjust the friction generated by the friction end-pieces 27, that is to say the resistance to relative rotation between the support head 2 and the support structure 3.

[0162] This selection is carried out on the basis of the loads and the impacts to which the floor 102 is subjected.

[0163] In an embodiment which is not shown, the friction end-pieces are provided on the abutment surface 32 of the spacer member 31, which is configured to receive in a supporting way the second face 22 of the support head 2, and are positioned so as to abut the second face 22.

[0164] In this case, the friction end-pieces are also provided at the interface between the support structure 3 and the support head 2 and are configured to apply friction to the relative sliding action between the support structure 3 and the support head 2.

[0165] In this case, the friction end-pieces also constitute the support interface between the support structure 3 and the support head 2.

[0166] In a preferred embodiment, the friction end-piece(s) 27 can be produced by co-moulding together with the support head 2 or the spacer member 31.

[0167] In a preferred embodiment of the friction device 25, the friction end-pieces 27 and the friction mats 26 are provided on the support head 2 in a mutually corresponding position. In the preferred embodiment shown in the Figures, the friction device 25 comprises four different friction elements 25A.

[0168] In this case, each friction element 25A, as can be seen in Figure 7, comprises a first friction element which is positioned on the support face 21 and which projects therefrom, and a second friction element which is positioned on the second face 22 and which projects therefrom, the first and second friction elements being integrally produced with each other.

[0169] In this embodiment, as can better be seen in Figure 7, each friction element 25A comprises a friction mat 26 which is positioned on the support face 21 and a friction end-piece 27 which is positioned on the second face 22 and a connection end-piece 5 which is interposed between the friction mat 26 and the friction end-piece 27 and which is configured to mutually connect the friction mat 26 and the friction end-piece 27.

[0170] The connection end-piece 5 is integrally produced with the friction mat 26 and the friction end-piece 27, that is to say, each friction element 25A is formed as a single member.

[0171] The connection end-piece 5 is configured to extend at the height H1 of the discoidal member 20 of the support head 2. The support head 2 is provided with one or more through-holes 6 for receiving the connection end-pieces 5.

[0172] This embodiment of the friction elements 25A is advantageously obtained by co-moulding with the support head 2.

[0173] In an embodiment, the adjustable support 100 may be provided with one or more spacer members which are configured, for example, as the extensions described below.

[0174] With reference to Figures 9A to 9E, it is shown a preferred embodiment of a spacer member according to the invention.

[0175] The spacer member is formed in the way of an extension 200 which includes a member 201 which preferably has a substantially cylindrical shape and which is internally hollow. The member 201 has a height "h" which is defined as the spacing between an upper edge 209 and a lower edge 222 of the member 201 of the extension 200. In the invention, there may be used extensions having a height "h" having a desired value in accordance with the final height which it is desirable to achieve with the adjustable support 100.

[0176] Figures 9A to 9D show an extension having a first height h, while Figure 9E shows an extension 200'

having a height h' which is less than that of the extension 200 of Figures 9A-9D. The extensions 200 and 200' are structurally and functionally similar with the exception of the height, therefore only one of them will be described in detail below.

[0177] Preferably, the extension 200 is configured to be interposed during use between the annular member 10 of the base element 1 and the base 11 of the base element 1 support structure 2 of the adjustable support 100.

[0178] The extension 200 is provided at a first longitudinal end 200A thereof with an engagement device 40 in order to engage the extension 200 with the base element 1 of the adjustable support 100 or with another extension.

[0179] The extension 200 is provided at a second opposite longitudinal end 200B with an additional engagement device 41 which is configured to be connected to the engagement device 40 of an additional extension or the annular member 10.

[0180] In this way, the extension 200 can be engaged in a stable way with the base element 1, the support structure or another extension.

[0181] This allows a modular structure to be obtained, the overall height of which can be readily varied by engaging successively with each other various extensions.

[0182] It is thereby possible to obtain adjustable supports with different heights from each other.

[0183] The engagement device 40 comprises an internal collar 207 and an internal collar 203 which project longitudinally from the extension 200 and which are mutually spaced apart in the radial direction so as to define an engagement sleeve.

[0184] The internal collar 207 and the external collar 203 define an engagement cavity for engaging the extension 200 with the base element 1 or another extension.

[0185] The external collar 207 and the internal collar 203 define first and second engagement elements of the engagement device 40.

[0186] The external collar 203 is provided with a plurality of fins 204 which project from the external collar 203 in a longitudinal direction and which are configured to be connected to the additional engagement device 41 of another extension or the base element 1.

[0187] Each fin 204 of the plurality of fins is provided with an engagement tooth 205 which projects in a radial direction and which is configured to be received in a connection seat 206 which is provided on the additional engagement device 41 of another extension or on the base element 1, as better explained below.

[0188] The fins 204 are spaced circumferentially apart on the external surface "S1" of the extension 200. In a preferred embodiment, there are provided 4 fins.

[0189] The additional engagement device 41 comprises a plurality of connection seats 206 which are provided on the external surface S1 of the extension 200 and which are configured to receive the engagement teeth 205 of the fins 204 of an additional extension or the support structure 3.

[0190] Each engagement seat is shaped like a slot 206 which is preferably substantially horizontal and which is arranged near the second end 200B of the extension 200.

[0191] In the embodiment shown, the engagement seat is a through-slot, but in other embodiments there may be provided as an engagement seat a recess which is defined in the external surface and which is configured to receive the engagement tooth of a fin.

[0192] In other embodiments, the position of the engagement tooth and of the slot can be transposed, that is to say the slot can be provided in the fin and the engagement tooth can be provided on the external surface S1 of the extension 200.

[0193] In another embodiment which is not shown, the internal collar is provided with a plurality of fins which project from the internal collar in a longitudinal direction and which are configured to be connected to the additional engagement device of another extension or the base element. In this embodiment, the additional engagement device comprises a plurality of connection seats which are provided on the internal surface S2 of the extension.

[0194] The extension 200 is further provided with a plurality of ribs 202 which are defined on the external surface S1 and which extend in a substantially longitudinal direction.

[0195] The ribs 202 allow reinforcement of the extension 200 and therefore of the adjustable support 100. The ribs 202 also act as guide elements for the insertion of the fins 204, as better explained below.

[0196] The guide seat 292 is formed so as to slidingly receive in the longitudinal direction the fins and to substantially prevent a relative rotation between two consecutive extensions and/or between an extension and the annular member. On the internal surface S2 of the extension 200 a plurality of internal ribs 211 are provided, which extend in a substantially longitudinal direction.

[0197] The internal ribs 211 extend over a longitudinal portion of the internal surface S2 so that in the region of the second longitudinal end 200B of the extension 200 an insertion portion 213 is defined, which does not have any ribs.

[0198] This insertion portion 213 is formed so as to receive the internal collar 207 of another extension.

[0199] The internal collar 207 and the insertion portion 213 are formed so that, by inserting one extension into the other, the external edge 208 of the internal collar 207 is inserted in the insertion portion 213 and moves into abutment with the end 212 of the internal ribs 211.

[0200] The presence of the internal ribs 211 allows reinforcement of the structure of the extension 200.

[0201] The internal ribs 211 further allow distribution of the weight applied to the extension 200, preventing localized overloads. The extensions of the invention can be mutually engaged in a simple way and at the same time in a resistant and stable way. The internal ribs 211 also have the function of preventing the relative rotation between the consecutive extensions and/or between the

extension and the support head 2.

[0202] Figures 10A and 10B illustrate an additional embodiment of a support 100' according to the invention, in which portions identical to the support previously described will be indicated with the same reference numerals and will not be described in detail.

[0203] The support 100' comprises an extension 200 and an additional extension 200' which are engaged with each other.

[0204] The annular member 10 is connected to the upper edge 209 of the extension 200 by inserting the upper edge 209 in the engagement sleeve 10' which is defined by the edge 10A of the annular member 10.

[0205] An internal portion 10B of the edge 10A of the annular member 10 is inserted in the insertion portion 213 of the extension 200 and urged into abutment against the internal ribs 212 thereof.

[0206] The upper edge 209 of the extension is urged into abutment against the bottom of the engagement sleeve 10'.

[0207] In this embodiment, the annular member 10 is further provided with a plurality of additional fins 204" which project from the edge 10A and which are connected to the slots 206 of the extension 200. Each additional fin 204" is provided with a tooth 19, which is inserted in the slot 206 of the extension 200 when the extension 200 is inserted in the engagement sleeve 10'. The additional fins 204'' are inserted between two contiguous ribs 202.

[0208] The extension 200 is in turn engaged with the additional extension 200' by inserting the upper edge 209' of the additional extension 200' into the engagement sleeve which is defined in the extension 200 by the fins 204 and the internal sleeve 207. The internal sleeve 207 of the extension 200 is inserted in the insertion portion 213 of the additional extension 200' and urged into abutment against the internal ribs 212.

[0209] In this way, the extension 200 is supported on the additional extension 200' and the weight is distributed.

[0210] In turn, the additional extension 200' is engaged with the base element 1 by inserting the vertical wall 110 in the engagement sleeve of the additional extension 200'. Advantageously, the tooth 205' of the fin 204' of the additional extension 200' is inserted in a grooved area 113, defined on the vertical wall 110 of the base 11.

[0211] The base 11 is further provided with a plurality of reinforcement elements 111 which are defined between the vertical wall 110 and the flange 12.

[0212] As can better be seen in Figure 14A, the grooved area 113 is preferably formed between two contiguous reinforcement elements 111.

[0213] The grooved area 113 is configured to receive a fin of an extension.

[0214] The flange 12 is provided with a plurality of positioning pins 410 which are configured to receive positioning elements 400 as better described below.

[0215] Figures 11 to 13 show additional embodiments of an adjustable support according to the invention which differ from the embodiment of Figures 10A and 10B substantially as a result of the presence of support inserts which are provided on the support face 21 and which are configured to support particular covering elements, as better explained below.

[0216] For this reason, members which are identical to the support of Figures 10A and 10B will not be described in detail and will be indicated with the same reference numerals.

[0217] In the embodiment of Figure 11, the adjustable support 100' comprises an upper insert 300 and a lower insert 400 which are suitable for supporting a possible vertical covering element of the floor, for example, to produce a step.

[0218] Preferably, the upper insert 300 is mounted on the support face 21 of the support head 2 and is substantially parallelepipedal. The upper insert 300 comprises a pair of openings 301, 302 which are suitable for receiving the positioning elements 23 of the support face 21. The upper insert 300 preferably has a central opening 303 in the region of the central hole 14 of the support head 2. Advantageously, the central hole 303 of the upper insert 300 has a plurality of fins, preferably directed towards the bottom so as to project inside the central hole 14 of the support head 2 in order to connect the upper insert to the support head.

[0219] The upper insert 300 includes a first end 310 and a second opposite end 320, each provided with at least one plate 330 which projects towards the base element 1.

[0220] The second end 320 advantageously projects to a greater extent towards the outer side with respect to the first end 310. Both the first end 310 and the second end 320 advantageously comprise a pair of plates 330 which are directed towards the lower insert 400, preferably arranged on the sides of each end 310, 320. Advantageously, the second end 320 comprises an extension 340, preferably in the form of a T, which advantageously extends from the second end 320 towards the outer side, even more preferably in a direction parallel with the support surface S. The extension 340 advantageously includes a central plate 330 which is directed towards the base element 1 and a pair of lateral fins 330 which are directed in opposite directions.

[0221] In the embodiment of Figure 11, there are provided a pair of upper inserts 300 which are arranged in a cross-like manner so that the respective openings 301, 302 receive positioning elements 23 which are opposite with respect to the central hole 14.

[0222] The lower positioning insert 400 is preferably mounted on the flange 12 of the base element 1 in such a way that it is positioned in the region of the upper insert 300. The flange 12 advantageously comprises protuberances 410, wherein each protuberance is advantageously arranged between two reinforcement elements. The protuberances 410 have preferably a substantially cylindrical shape. The lower insert 400 includes a member

413, which is substantially flat and suitable for being arranged between two successive reinforcement elements of the flange 12. The member 413 advantageously comprises a hole 401 which is suitable for receiving the protuberance 410 of the flange 12. The member 413 comprises an end 414 which projects outwards. The end 414 advantageously comprises a pair of plates 430 which are directed towards the support head 2, preferably arranged at the sides of the end 414. Advantageously, the end 414 comprises an extension 440 which advantageously extends from the end 414 outwards, even more preferably in a direction parallel with the support surface S. Advantageously, the extension 440 includes an additional plate 441 which is preferably directed towards the support head 2.

[0223] A possible vertical covering element of the floor, for example, a riser of a step, may be positioned so as to have: an upper tip which is arranged between the plates 330 of the second end 320 of the upper insert 300 and the central fin 330 of the extension 340 of the upper insert 300; and

a lower tip which is arranged between the flat fins of the end 414 of the lower insert 400 and the additional plate 430 of the extension 440 of the lower insert 400.

[0224] In this way, the vertical covering element is blocked in the desired position.

[0225] The plates and the additional plates of the upper insert and lower insert, respectively, act as blocking elements for the vertical covering element which is not shown in the Figures. In alternative embodiments, the inserts 300, 400 could have forms, configurations and orientations which are different from what is illustrated in Figure 11.

[0226] In another embodiment, the support of the invention may be used to support elongate covering elements of the floor which are configured as beams, for example wooden or aluminium beams.

[0227] In the embodiments of Figures 12 and 13, the adjustable support 100' is configured to support wooden beams and aluminium beams, respectively, or generally elongate elements which extend over the support face so as to cover the central hole 14.

[0228] In this case, the support 100' has an annular member 10 which is provided with projections 501. These projections 501 preferably comprise support elements 502, for example, gripping handles, which allow the user to interact with the adjustable support 100 in spite of the central hole 14 of the support head 2 not being directly accessible, as will be explained below. Advantageously, there are present four projections 501 which are mutually equidistant.

[0229] This also allows adjustment of the height of the adjustable support without being able to gain access directly to the central hole 14.

[0230] In the embodiment of Figure 12, a plate 600 is provided which is substantially discoidal and which includes a central depression 610 in the region of the central hole 14 of the support head 2.

[0231] The plate 600 preferably comprises a vertical bulkhead 601 in order to support the beam to be positioned on the support 100'. This embodiment is particularly suitable for wooden beams.

[0232] In the embodiment of Figure 13, the support 100' is provided with an additional plate 650 comprising a pair of hooked projections 651 in order to block the beam to be positioned on the support 100'. This embodiment is particularly suitable for aluminium beams.

[0233] The lower portion of the plate 600 and the additional plate 650 advantageously comprises a plurality of positioning and/or connection elements, preferably projections and/or snap-fit engagements, which are suitable for being connected to the openings 230 of the support head 2. In both cases, the support head 2 is not provided with the projections 23 in order to be able to be connected to the plate 600 or to additional plate 650.

[0234] With reference to Figures 14A and 14B, the base element 1 comprises a closure insert 700, which can be seen in Figure 14B and which can be mounted in the lower portion of the base 11 in order to cover the openings present in the base itself. The closure insert 700 has preferably a parallelepipedal shape, even more preferably a square shape. This closure insert 700 allows isolation of the base element 1 from possible infiltrations, for example, when the support surface S is constituted by a sheath.

[0235] The closure insert 700 allows to define a support base with a discoidal shape. Therefore, the support of the invention solves the proposed problems by allowing at the same time a number of advantages to be achieved with respect to the known supports.

[0236] The supports of the invention can be used to construct raised floors to be supported on a surface S which is planar or also inclined.

[0237] The support is further particularly flexible in use thanks to the possibility of using any combination of elements described in accordance with the needs of the user and the conditions of use.

Claims

1. A support (100) for raised floors comprising a base element (1) having an annular member (10) and a base (11, 12) which is fixed to the annular member (10) and which is configured to be supported on a support surface (S) so as to define the base of the support (100), a support head (2) which is configured to receive in a supporting way a covering element (101) of the floor (102) to be supported and which has a support face (21) which defines the support base for the covering element (101) of the floor (102) to be supported and an opposite second face (22) which is directed in use towards the support surface (S), a support structure (3) which is configured to be interposed in use between the base element (1) and the support head (2), said support structure (3) being

provided with connection elements (31) to connect the support structure (3) to the base element (1), the second face (22) being configured to be supported in use on an abutment surface (32) of the support structure (3), **characterized in that** the support comprises a friction-producing device (25) having a friction end-piece (27) which is defined on one among said second face (22) and said abutment surface (32) and which is positioned so as to abut against the other among said abutment surface (32) and said second face (22) which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure (3) and the support head (2).

2. A support according to the preceding claim, wherein the friction end-piece (27) is positioned on the second face (22) so as to project from it in order to abut the support structure (3).

3. A support according to claim 1 or claim 2, wherein the friction end-piece (27) has a radial shape, preferably with a circumferential extent which increases from a centre (14) of the second face (22) towards the outer edge (2A) thereof or from a centre (32B) of the abutment surface (32) towards the outer edge (32A) thereof, respectively.

4. A support according to any one of the preceding claims, wherein the friction-producing device (25) comprises a plurality of friction end-pieces (27) which are suitably spaced apart on the second face (22) or on the abutment surface (32), respectively, preferably 4 individual friction end-pieces (27).

5. A support according to any one of the preceding claims, wherein the friction-producing device (25) further comprises a friction mat (26) which projects from the support base (21) and which is configured to apply friction to the sliding of the covering element (101) in relation to the support (100), the friction mat (26) preferably being constructed integrally with the friction end-piece (27) so as to form a friction element of the friction-producing device (25), each friction element further comprising a connection end-piece (5) between the friction mat (26) and the friction end-piece (27).

6. A support according to any one of the preceding claims, wherein the friction end-piece comprises a rib structure (27A) which extends in a radial direction on the second face (22) or on the abutment surface (32), respectively.

7. A support according to any one of the preceding claims, wherein the connection elements (31) of the support structure (3) are adjustable connection elements (31) in order to connect the support structure (3) to the base element (1) in an adjustable way in order to adjust the spacing of the support face (21) from the support surface (S).

8. A support according to claim 1, wherein the friction end-piece (27) is positioned on the abutment surface (32) so as to project from it in order to abut the support head (2), the friction-producing device (25) preferably being constructed from elastomer material, preferably EPDM.

9. A support according to any one of the preceding claims, comprising at least one spacer member which is configured as an extension (200, 200') which is configured to be interposed between the base element (1) and the support head (2) and which is provided at a first longitudinal end (200A) thereof with an engagement device (40) for engaging the extension (200, 200') with the base element (1) of the adjustable support (100), or with another extension (200'), and at an opposite longitudinal end (200B) with an additional engagement device (41) which is configured to be connected to the engagement device (40') of an additional extension (200') or of the annular member (10) of the base element (1) of the support (100).

10. A support according to the preceding claim, wherein the extension (200, 200') has a substantially cylindrical member which is internally hollow and which is provided with a longitudinal cavity, in which the engagement device (40) comprises a first engagement element and a second engagement element which project longitudinally from the extension (200, 200') and which are mutually spaced apart in a radial direction so that between the first engagement element and the second engagement element remains defined an engagement sleeve (215) for engaging the extension (200, 200') with the base element (1) or another extension (200, 200'), the first engagement element comprising an internal collar (207) and the second engagement element comprising an external collar (203) which both project from the extension (200).

11. A support according to the preceding claim, wherein the external collar is provided with a plurality of fins (204) which project from the external collar in a longitudinal direction and which are configured to be connected to the other engagement device (41) of another extension or of the base element, each fin (204, 204') preferably being provided with an engagement tooth (205) which projects in a radial direction and which is configured to be received in a connection seat (206) which is provided in the additional engagement device (41) of another extension or of the base element.

12. A support according to the preceding claim, wherein the additional engagement device (41) comprises a plurality of connection seats (206) which are configured to receive the engagement teeth of the fins of an additional extension or of the annular member.

13. A support according to any one of claims 12 to 14, wherein the extension is further provided with a plurality of external ribs which extend in a substantially longitudinal direction and preferably with a plurality of internal ribs which are defined on an internal wall of the extension and which extend in a substantially longitudinal direction over a longitudinal portion of the internal wall so that in the region of the second longitudinal end of the extension an insertion portion is defined without any ribs projecting from the extension.

14. An adjustable support for raised floors comprising a base element having an annular member and a base which is fixed to the annular member and which is configured to be supported on a support surface so as to define the base of the support, a support head which is configured to receive in a supporting way a covering element of the floor to be supported, and which has a support face which defines the support base for the covering element of the floor to be supported and an opposite second face which is directed in use towards the support surface, a support structure which is configured to be interposed in use between the base element and the support head, said support structure being provided with adjustable connection elements to connect the support structure to the base element in an adjustable way in order to adjust the spacing of the support face from the support surface, and an extension which is configured to be interposed between the base element and the support head provided at a first longitudinal end thereof with an engagement device for engaging the extension with the base element of the adjustable support, or with another extension of the adjustable support, and at an opposite second longitudinal end with an additional engagement device which is configured to be connected to the engagement device of an additional extension or of the annular member.

15. A support head (2) for a support (100) for raised floors which is configured to receive in a supporting manner a covering element (101) of the floor (102) to be supported, having a support face (21) which defines the support base for the covering element (101) of the floor (102) to be supported and an opposite second face (22) which is directed in use towards the support surface (S) and which is configured to be supported in use on an abutment surface (32) of the support structure (3), **characterized in that** it comprises a friction-producing device (25) having a friction end-piece (27) which is defined on the second face (22) and which is positioned so as to abut the abutment surface (32) which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure (3) and the support head (2).

16. A support structure (3) for a support (100) comprising connection elements (31) to connect the support structure (3) to a base element (1) of the support and an abutment surface (32) which is configured to receive in a supporting way a face (22) of a support head (2) of the support (100), **characterized in that** it comprises a friction-producing device (25) having a friction end-piece (27) which is defined on the abutment surface (32) and which is positioned so as to abut the second face (22) which is made of a high friction coefficient material in order to apply friction to the relative sliding between the support structure (3) and the support head (2).

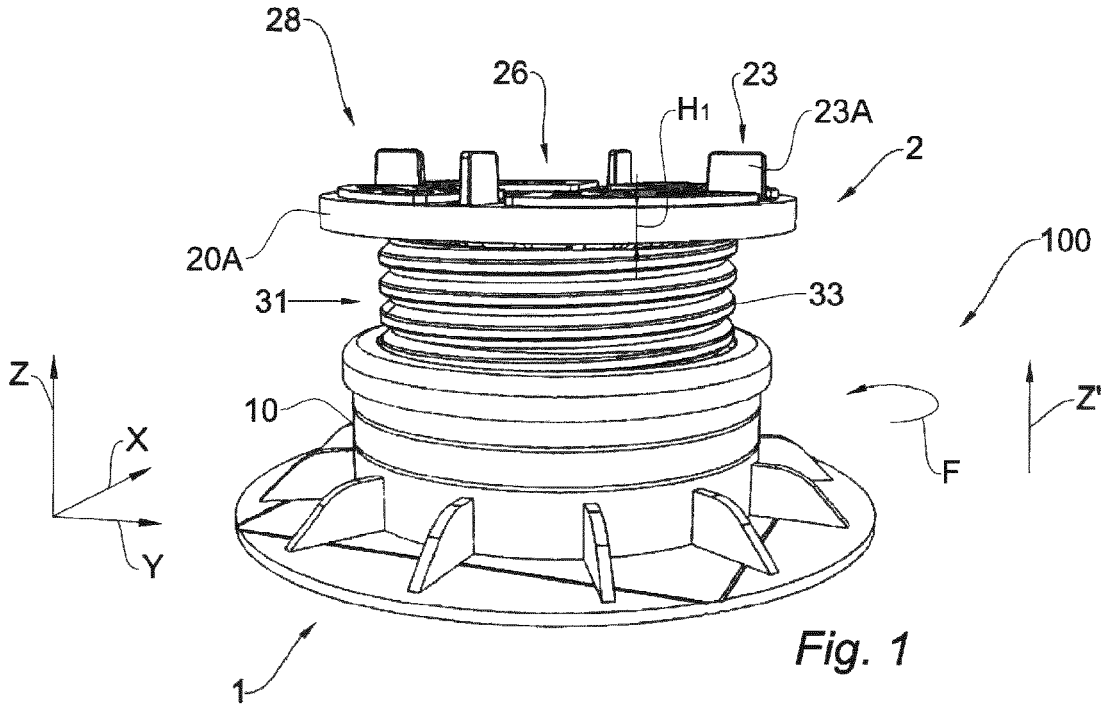
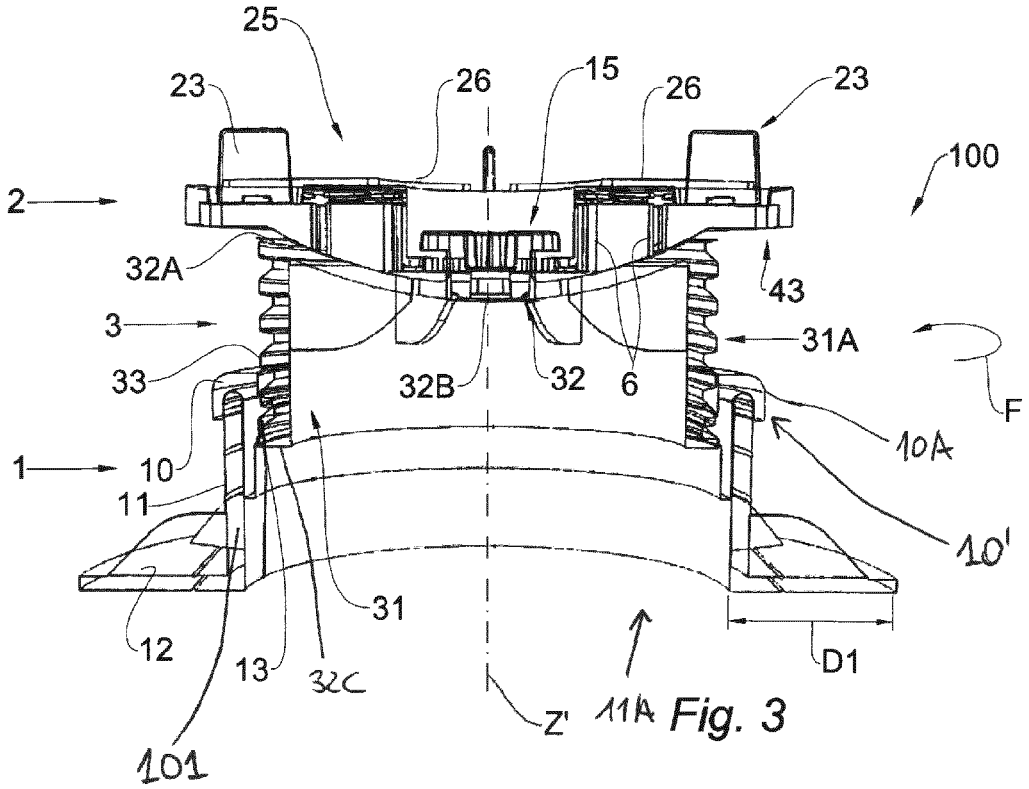

28
26
23
H1
23A
2
20A
100
31
33
Z
X
Y
10
Z'
F
1

Fig. 1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23
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15
26
23
100
2
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43
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31A
33
32B
32
6
F
10A
1
10
11
10'
31
12
13
32C
D1
Z'
11A
101

Fig. 3

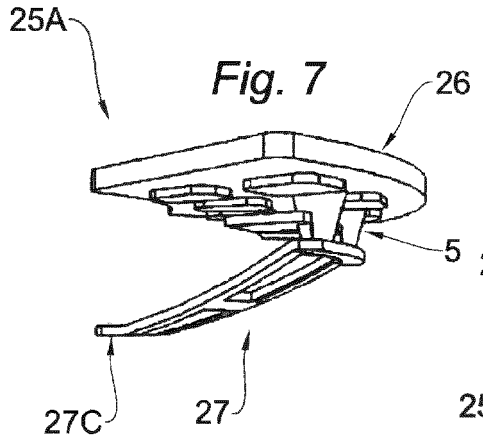


Fig. 7

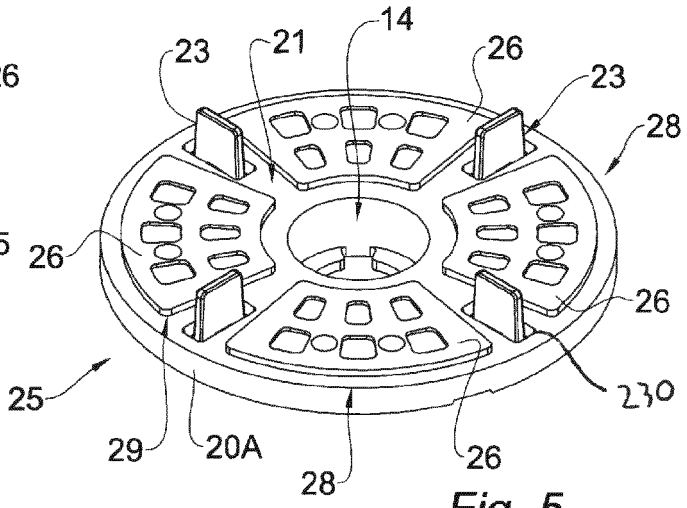


Fig. 5

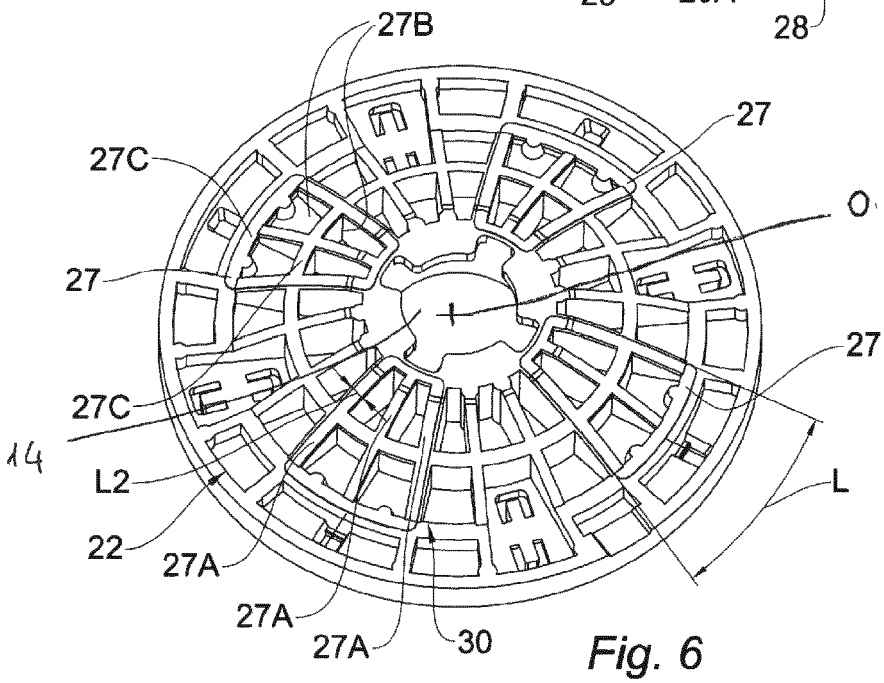


Fig. 6

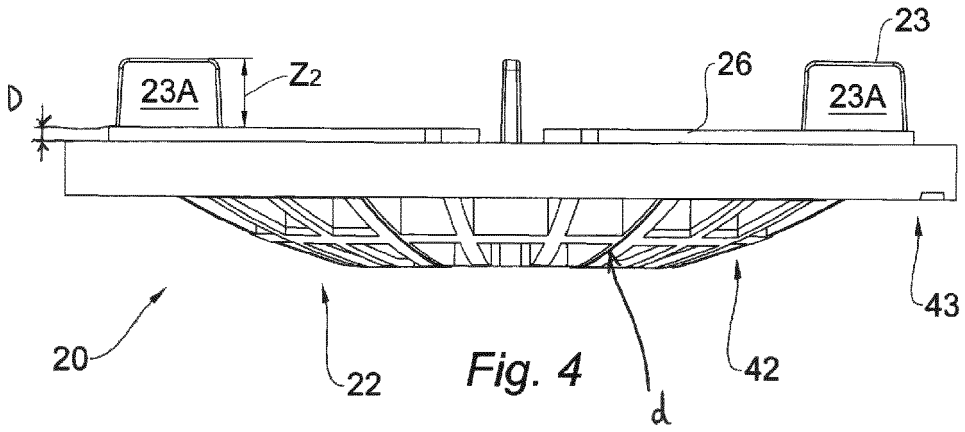
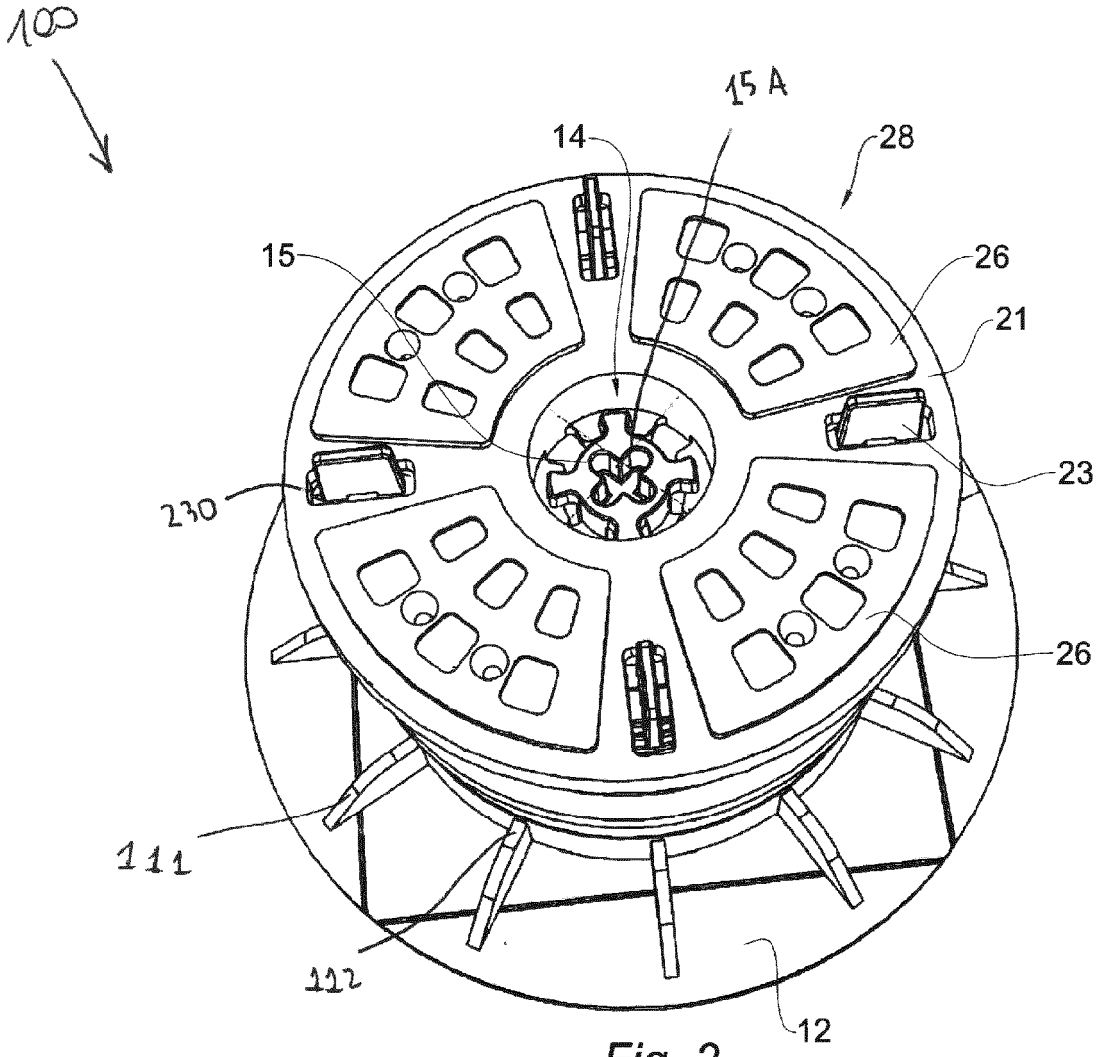


Fig. 4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28
15
26
21
23
230
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111
112
12

Fig. 2

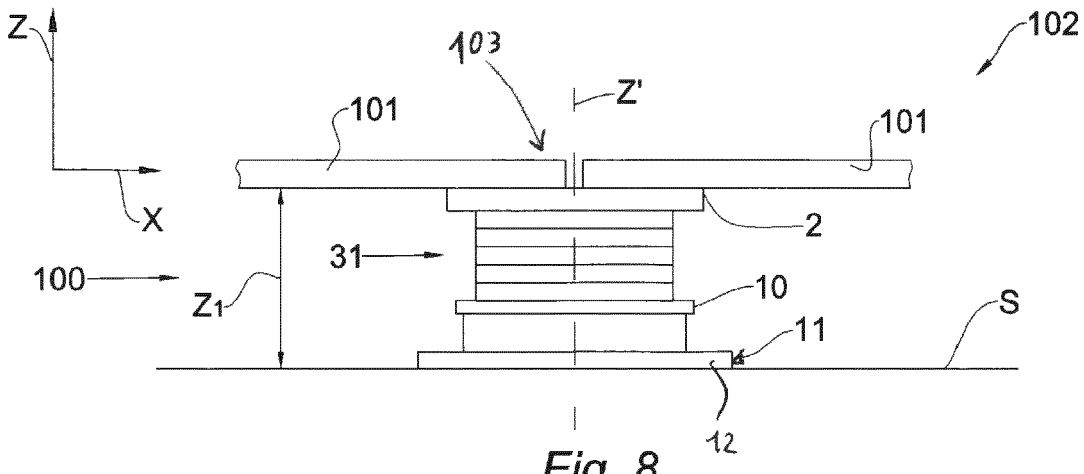

Z
X
103
Z'
102
101
101
2
31
100
Z1
10
11
S
12

Fig. 8

FIG 9A

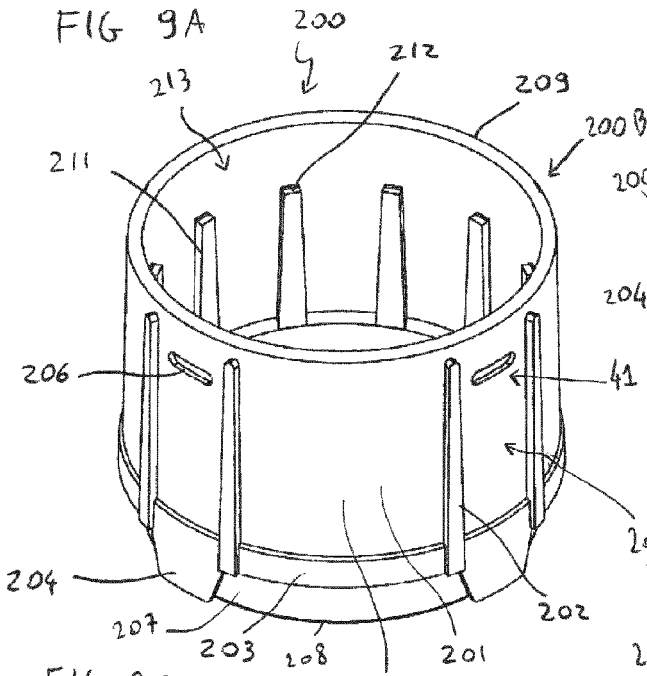


FIG 9B

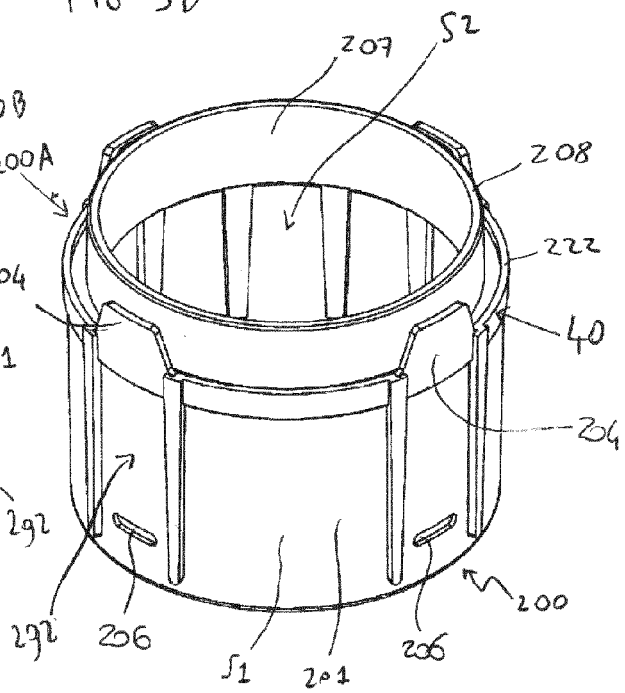


FIG 9C

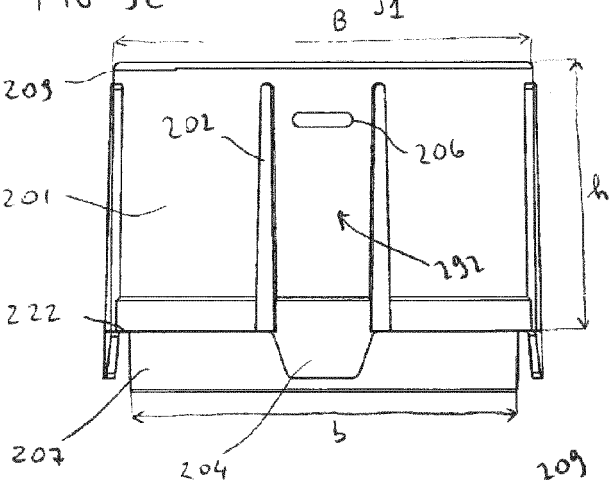


FIG. 9E

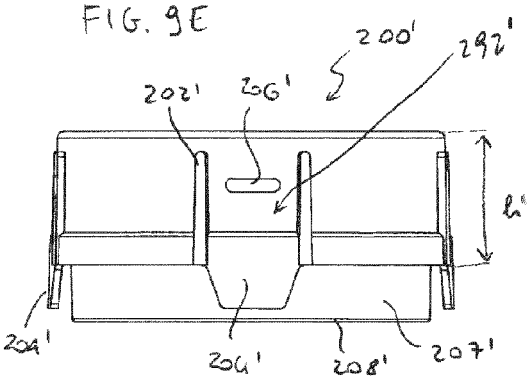


FIG 9D

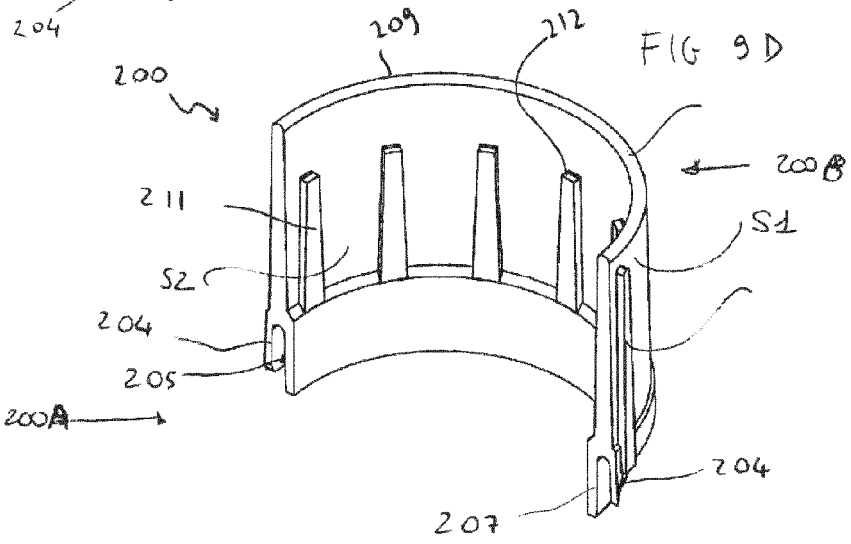


FIG 10A

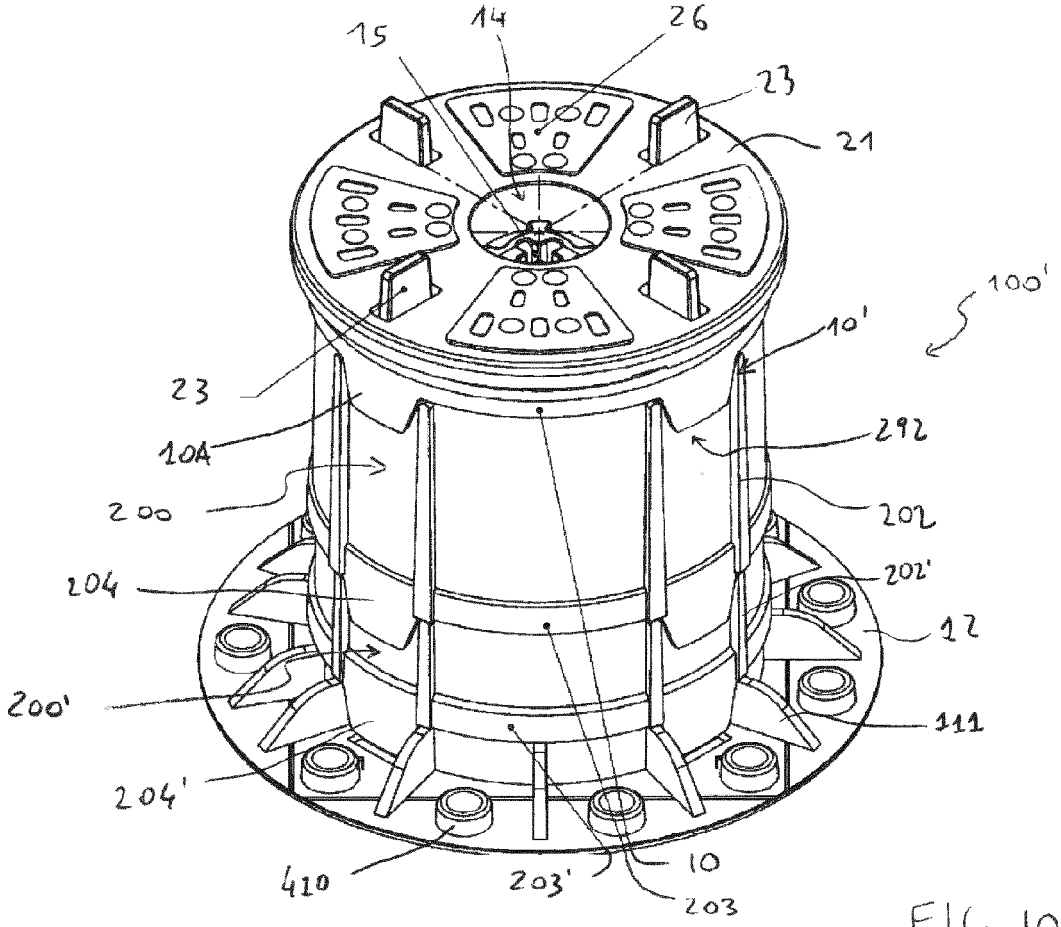


FIG 10B

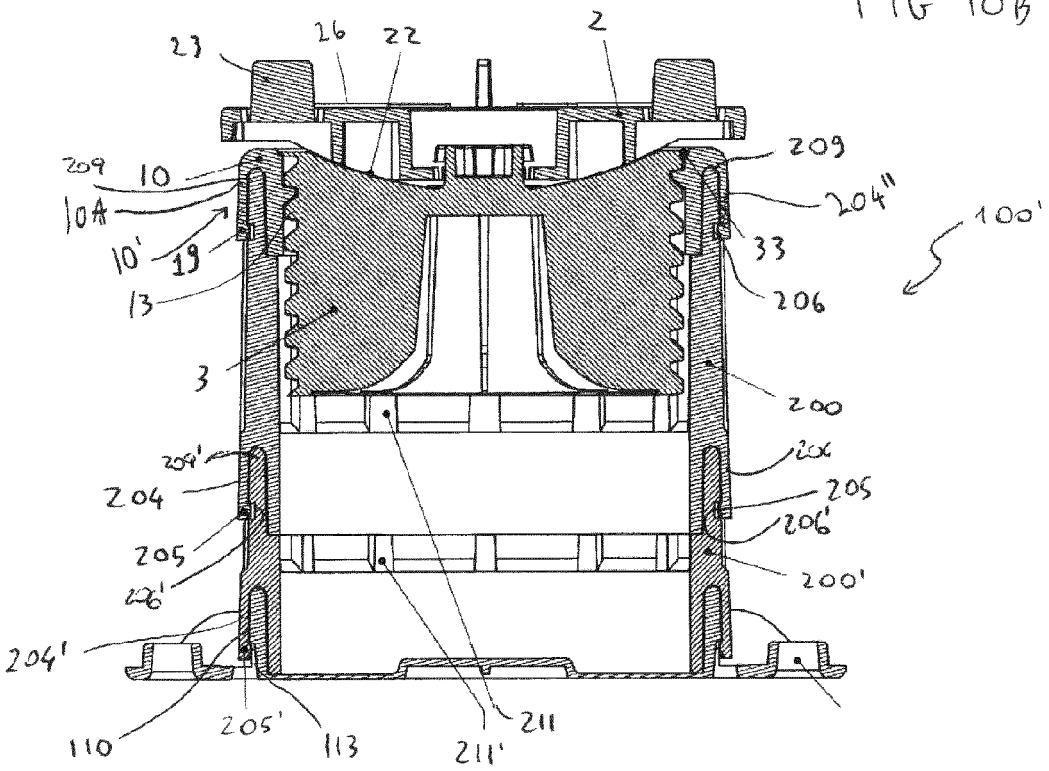
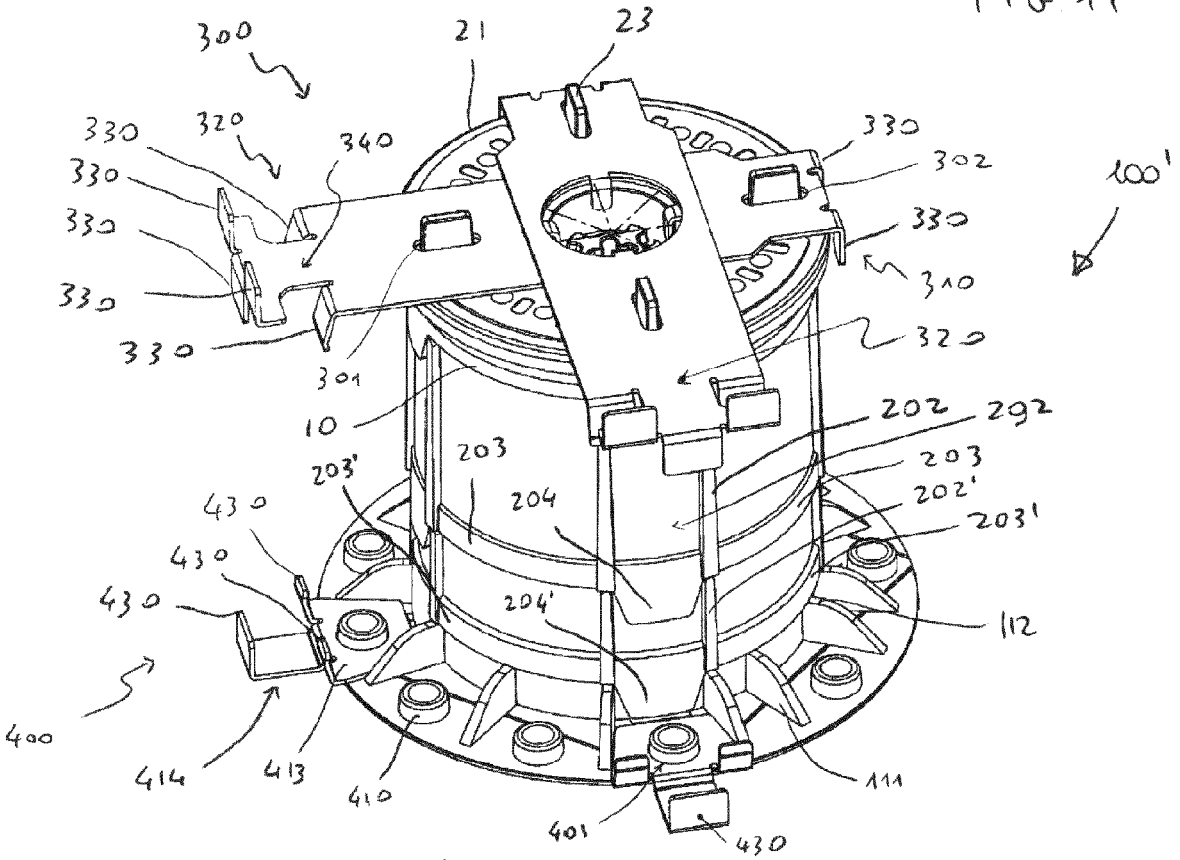


FIG 11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21
23
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330
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330
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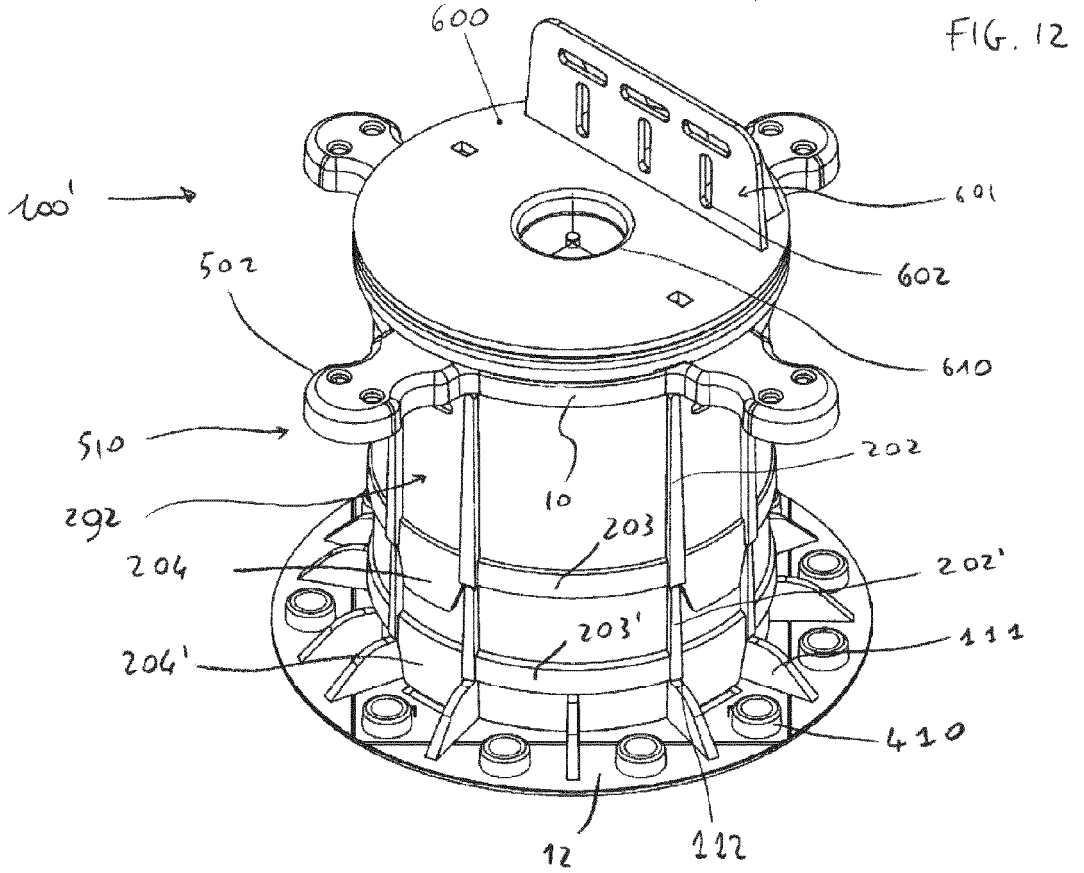
100'
330
310
320
301
10
202
292
203
203'
204
202'
203'
430
430
430
204'
112
400
414
413
410
111
401
430

FIG. 12


600
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10
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202'
203'
204'
111
410
12
122

FIG. 13

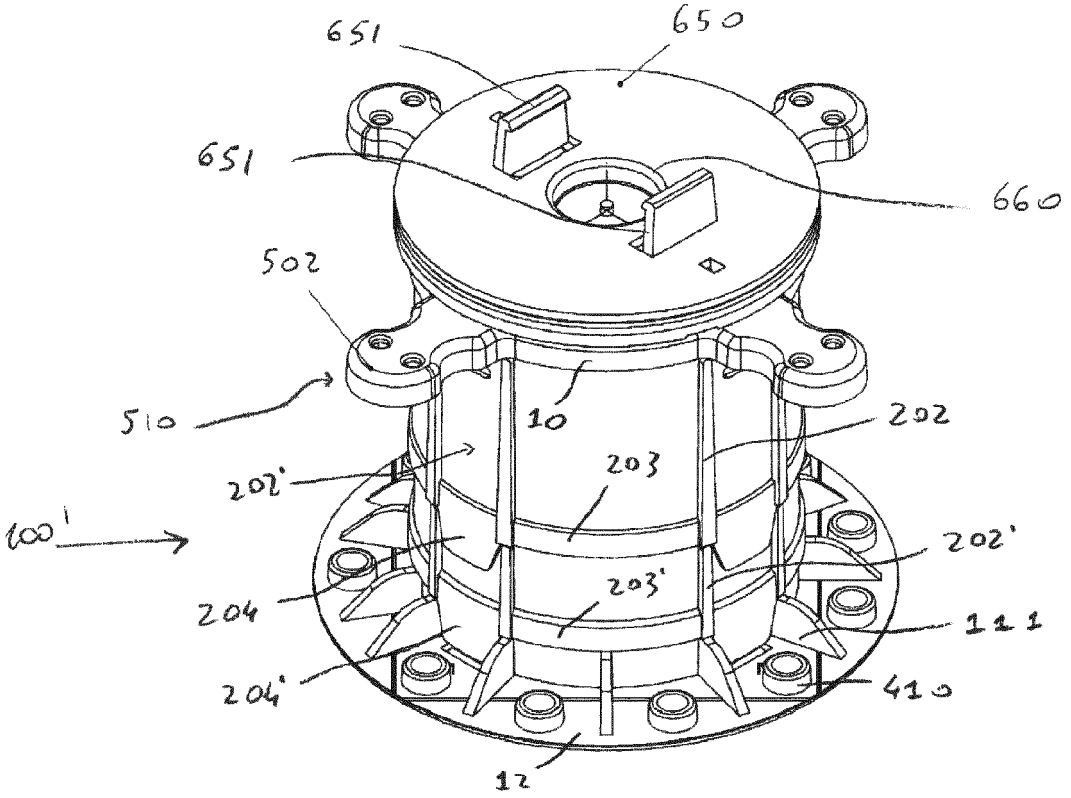


FIG 14 a

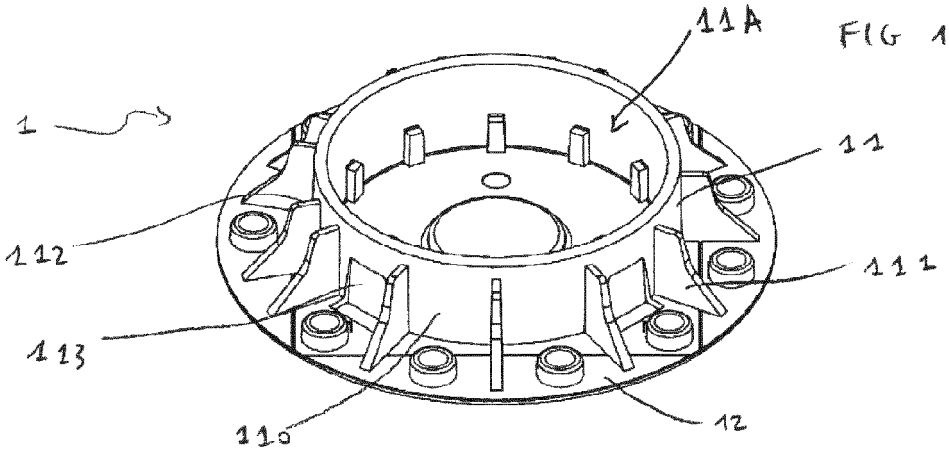
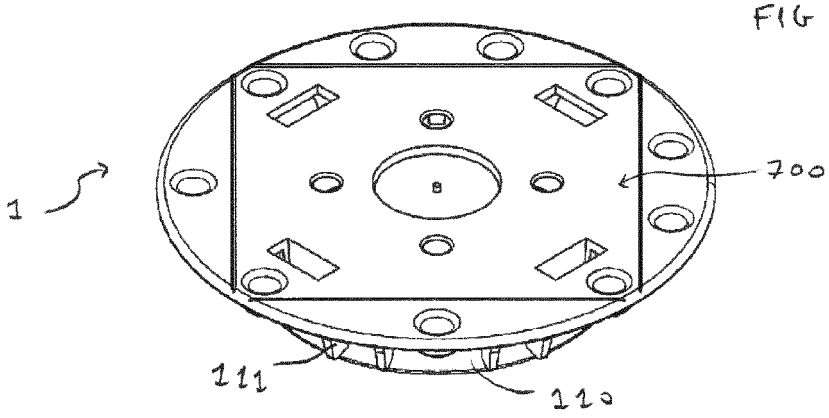


FIG 14 b



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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 4206

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y A	WO 2018/122159 A1 (MARANA ANDREA [IT]) 5 July 2018 (2018-07-05) * figures 1-3, 5-6 * * page 2, line 7 - line 8 * * page 3, line 32 * * page 4, line 1 - line 12 * * page 4, line 19 - line 21 * * page 5, line 1 - line 6 * * page 5, line 18 - line 30 * * page 6, line 1 - line 3 * * page 8, line 23 - line 24 *	1-4,7-16 5,6	INV. E04F15/024
Y	EP 2 431 550 A1 (SOLIDOR RUBBER & PRODUCTS [BE]) 21 March 2012 (2012-03-21) * paragraph [0021] * * paragraph [0026] - paragraph [0027] *	1-4,7-16	
Y	US 8 438 805 B2 (REPASKY JOHN [US]) 14 May 2013 (2013-05-14) * figure 1 * * column 2, line 64 - line 66 * * column 3, line 10 - line 11 *	8	TECHNICAL FIELDS SEARCHED (IPC) E04F
Y	WO 2018/121892 A1 (MARANA ANDREA [IT]) 5 July 2018 (2018-07-05) * figures 11-12 * * page 10, line 9 - line 19 *	8-14	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 April 2020	Estorgues, Marlène

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