



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.05.2011 Bulletin 2011/20

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

(21) Application number: **09425467.9**

(22) Date of filing: **17.11.2009**

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

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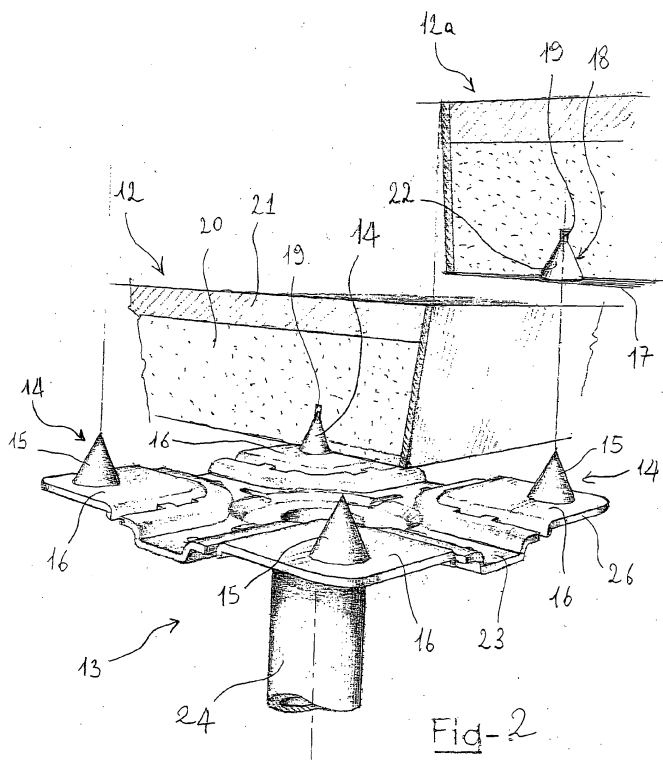
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(54) **Support for flooring elements, and flooring assembly comprising such support**

(57) The present invention concerns a support (13) adapted to bear one or more flooring elements, which comprises a body (26) with a bearing surface (16) that, in operation, has a substantially horizontal orientation, to support a bottom face (17) of a flooring element (12), said body (26) having one or more coupling elements

(14) designed to be fitted into corresponding seats (18) formed in said bottom face (17) of the flooring element (12) when the latter is supported by the support (13). These coupling elements (14) have at least one frustoconical portion (15) adapted to cooperate, in operation, with a corresponding frustoconical portion (22) formed in said seat (18) of the flooring element.



Description

[0001] The present invention addresses a novel support for flooring elements, as well as a flooring comprising such support element.

[0002] It is known in the art to make raised floorings using panel elements that are designed to be mounted to a plurality of supports laid on the underlying floor.

[0003] This kind of flooring may be employed, for instance, when a bumpy or artistically valuable floor needs to be covered for shows or events to be held thereon, or when a given flooring is desired in a room.

[0004] Patent EP1167652 discloses a flooring of this type, which is composed of supports and flooring panels engaged on such supports. The supports include a bearing surface and cylindrical pins adapted to fit into the panels.

[0005] Nevertheless, this kind of flooring does not afford accurate and firm positioning of the flooring elements. Particularly, slight shape and/or position defects in pins may affect proper assembly of the flooring. Furthermore, when the flooring is only partially assembled, the panels may have poor stability. This causes serious problems during maintenance (for instance of electrical systems beneath the flooring), when partial removal of panels is required.

[0006] In the light of the prior art as described above, the object of the present invention is to provide a support that can firmly bear flooring panel elements in accurate positions.

[0007] A further object of the invention is to provide a support for raised floorings that has a simple and inexpensive structure.

[0008] Another object of the invention is to provide a support that allows quick and easy assembly of the flooring.

[0009] Yet another object of the invention is to provide a flooring assembly that ensures sufficient stability, even when it is only partially assembled.

[0010] A further object of the invention is to provide a support for flooring panels that may replace supports that are used in existing systems.

[0011] According to the present invention, this object is fulfilled by a support adapted to bear one or more flooring elements, which comprises a body with a bearing surface that, in operation, has a substantially horizontal orientation, to support a bottom face of a flooring element, said body having coupling elements designed to be fitted into corresponding seats formed in said bottom face of the flooring element when the latter is supported by the support, characterized in that said coupling elements have at least one frustoconical portion, which is designed to cooperate, in operation, with a corresponding substantially frustoconical portion formed in said seat of the flooring element.

[0012] The characteristics and advantages of the present invention will appear from the following detailed description of one practical embodiment, which is given

as a non limiting example with reference to the annexed drawings, in which:

- Figure 1 is a plan view of a flooring formed using the supports of the present invention,
- Figure 2 is a perspective view of the support of the invention, with the flooring elements, shown in partial section, mounted thereto,
- Figure 3 is a plan view of the support as shown in the previous figure,
- Figure 4 shows the support of the invention with its bearing foot,
- Figure 5 shows an alternative embodiment of a support of the invention.

[0013] Figure 1 shows a part of a flooring assembly 11, comprising a plurality of flooring elements 12 and a plurality of supports 13 for supporting the flooring elements.

[0014] The flooring elements 12 consist of panels that are supported, in operation, by the supports 13 at their apices. Advantageously, the panels 12 have a rectangular or square shape, and each is supported by four supports 13.

[0015] As clearly shown in Figure 2, the supports 13 include a body 26 and a plurality of coupling elements 14.

[0016] The body 26 defines one or more bearing surfaces 16 that have a substantially horizontal orientation in operation, for contacting and bearing a bottom face 17 of the panels 12.

[0017] The coupling elements 14 are designed to engage in corresponding seats 18 of a flooring element 12.

[0018] Advantageously, there are four coupling elements 14 for one support 13, each designed to engage in a corresponding seat 18 of a flooring element 13.

[0019] The bearing surfaces 16 may be joined together to form a single surface, or be separated as shown in Figure 2.

[0020] Figure 2 shows both a panel 12 (in a broken away view), coupled to the support 13 and a panel 12a that has not been coupled yet.

[0021] According to the invention, the coupling elements 14 have at least one frustoconical portion 15 adapted to cooperate with a corresponding frustoconical portion 22 of the seat 18 by being coupled thereto.

[0022] This arrangement easily affords both accurate positioning of the panel relative to the support, and safe fixation of the two elements together.

[0023] According to a preferred embodiment of the invention, the frustoconical portion 15 of the coupling element 14 is directly adjacent to the bearing surface 16 of the support. Accordingly, the frustoconical portion 22 of the seat 18 in the panel is preferably formed adjacent to the bottom face 17 of the panel.

[0024] This further facilitates proper assembly of the flooring. In fact, all that is needed is to simply form a conical hole 18 of predetermined width on the bottom face 17 of the panel, to ensure proper coupling between

the conical surfaces of the element 14 and the seat 18.

[0025] Preferably, the upper portion 19 of the seat 18, i.e. the one away from the bottom face 17, has a cavity that does not contact the coupling element 14 when the flooring is in the assembled state. This more safely ensures firm wedging of the coupling element 14 into the panel, even in case of slight defects in part sizing.

[0026] Advantageously, the frustoconical portion 15 of the coupling element forms at least 70% of the overall surface of the element, so that stable coupling may be obtained with no excessive space requirements and material consumption.

[0027] Preferably, the support 13 is made of metal, particularly steel. Advantageously, the coupling elements are also made of steel, and may be screwed to or integrally formed with the body 26.

[0028] Advantageously, the generatrix of the frustoconical surfaces of the element 14 and the seat 18 is inclined at an angle of 15° to 40° to a line orthogonal to the bearing surface 16.

[0029] Preferably, the lower layer 20 of the panel 12 that forms the seat 18 may be formed of a slightly yielding material, such as chipboard. The yielding nature of the layer 20 may possibly allow the walls of the seat 18 to slightly yield (i.e. deform) when the coupling element 14 is fitted therein. This ensures that the coupling element can wedge into its seat.

[0030] Advantageously, when the panel 12 is mounted to the support 13, the bottom face 17 only contacts the bearing surface 16 when the frustoconical surface 15 of the coupling element has already engaged with the frustoconical surface 22 of the seat 18 substantially throughout its length (or at least not before such engagement).

[0031] Preferably, at least before mounting the panels 12 for the first time, the width of the seat 18 8 may be slightly smaller than the maximum width of the coupling element.

[0032] Preferably, the coupling element 15 and the seat 18 have an axis substantially perpendicular to the bearing surface 16 of the support.

[0033] The body 26 of the support 13 has the shape of a plate that, in operation, has a horizontal orientation. The plate 26 preferably has a substantially square shape, with a coupling element 14 close to each of its four apices.

[0034] A shaft 24 extends downwards from the plate 26, for engagement with a foot 40 lying on the ground or an underlying flooring (see Figure 4).

[0035] Advantageously, the shaft 24 may be hollow and have internal threads engaging with the threads of a rod 41 of the foot 40, for adjustment of the height of the bearing surfaces 16 from the foot. Other adjusting arrangements between the plate 26 and the foot may be easily designed by the skilled person. These adjusting arrangements can compensate for any unevenness of the floor on which the foot 40 rests, to obtain a perfectly flat flooring.

[0036] The adjacent supports 13 may be connected together by joists 35 (as shown in Figure 1) to add further

stability to the flooring assembly, by ensuring proper mutual positioning of the coupling elements 14 operating on the same panel.

[0037] The joists 35 may be connected together by their opposite ends at the seats 23 formed in the supports 13, possibly by screw coupling or another known fastening arrangement. In each support 13, the seats 23 for fixing the beams 35 are interposed between two adjacent coupling elements 14. The seats 23 are at a lower level than the bearing surfaces 16.

[0038] Advantageously, the beams 35 have a C shape, with the opening at the bottom when in operation. Preferably, the joists 35 have a flange 35a that extends from a top face to abut on the support 13 and create the connection. The side faces of the joists 35 have a longitudinal slit for the body 26 of the support to fit therein when assembly is completed (see Fig. 4).

[0039] Preferably, in addition to the yielding layer 20, the panels 12 also have an upper layer 21, that forms the exposed surface of the layer and may be made of any typical flooring material, such as marble, ceramic, stoneware, or else.

[0040] Figure 5 shows an alternative embodiment of a support of the invention. The parts in this figure that correspond to parts of the first embodiment are designated by the same numerals, increased by 100.

[0041] Here, the plate 126 of the support is completely flat and forms a substantially continuous bearing surface 116.

[0042] The coupling elements 114 are frustoconical, and not conical, as described above. There is no cone tip at the top of the element 114.

[0043] The supports 13, 113 are particularly advantageous in that they may be also employed with commercially available or existing flooring panels and feet. In fact, the supports 13, 113 may be supplied to the users in combination with a drilling machine, which can make holes 18, 118 of appropriate size and shape on the bottom face of a flooring element.

[0044] Thus, the user may form the seats 18 on existing panels, thereby obtaining a flooring assembly according to the invention.

[0045] Therefore, particular advantages are obtained from the provision of a flooring kit comprising a plurality of supports like 13, 113 as claimed in any claim from 1 to 6, and a drilling machine for forming seats 18, 118 on the bottom face of a flooring element, as claimed in any claim from 7 to 14.

[0046] The above clearly shows that the objects of the present invention have been fulfilled.

[0047] Particularly, there is provided a support for flooring elements that allows easy and quick assembly of floorings, with panels firmly and accurately mounted in their proper operating position.

[0048] Furthermore, the support may be also used with existing or commercially available feet and panels, once appropriate seats 18, 118 have been formed on the bottom face of the panel.

[0049] The support element is also formed at low cost, with minimized consumption of materials and parts.

[0050] The flooring may be also partially removed, without involving excessive instability of the panels that are still in their assembled positions. This considerably facilitates maintenance, for instance, of the electrical systems beneath the flooring.

[0051] Those skilled in the art will obviously appreciate that a number of changes and variants may be made to the arrangements as described hereinbefore to meet incidental and specific needs, without departure from the scope of the invention, as defined in the following claims.

[0052] For instance, the substantially frustoconical portion of the seat might also have discontinuities or slits, while still operating as described above to provide firm and proper positioning of the flooring element. It shall be understood that the shape of the coupling element might also be slightly different from a full cone, while still operating as described above.

Claims

1. A support (13) adapted to bear one or more flooring elements, which comprises a body (26) with a bearing surface (16) that, in operation, has a substantially horizontal orientation to support a bottom face (17) of a flooring element (12), said body (26) having one or more coupling elements (14) designed to be fitted into corresponding seats (18) formed in said bottom face (17) of the flooring element (12) when the latter is supported by the support (13), **characterized in that** said coupling elements (14) have at least one frustoconical portion (15), which is designed to cooperate, in operation, with a corresponding substantially frustoconical portion (22) formed in said seat (18) of the flooring element.
2. A support as claimed in claim 1, **characterized in that** the coupling element (14) has a frustoconical portion (15) which is directly adjacent to said bearing surface (16) of the support.
3. A support as claimed in one or more of the preceding claims, **characterized in that** the surface of the frustoconical portion (15) of the coupling element (14) is inclined at an angle of 15° to 40° to a line orthogonal to the bearing surface (16) of the support.
4. A support as claimed in one or more of the preceding claims, **characterized in that** the frustoconical portion (15) of the coupling element (14) forms at least 70% of the overall surface of the coupling element.
5. A support as claimed in one or more of the preceding claims, **characterized in that** the coupling element (14) is a full cone.
6. A support as claimed in one or more of the preceding claims, **characterized in that** the coupling element (14) is made of metal.
7. A flooring assembly comprising a plurality of supports as claimed in any claim from 1 to 6 and a plurality of flooring elements (12), each having at least one seat (18) for receiving the coupling element (14) of the support, the flooring element (12) having a bottom face (17) which is adapted to lie, in operation, on said bearing surface (16) of the support, said seat (18) having at least one substantially frustoconical portion (22) adapted to lie on the frustoconical portion (15) of the coupling element (14), when the bottom face (17) lies on the bearing surface (16) of the support.
8. A flooring assembly as claimed in claim 7, **characterized in that** at least one lower layer (20) of the flooring element (12) in which said seats (18) are formed, is made of a yielding material.
9. A flooring assembly as claimed in claim 7 or 8, **characterized in that** said frustoconical portion (22) of the seat is placed directly adjacent to said bottom face (17) of the flooring element.
10. A flooring assembly as claimed in one or more of claims 7 to 9, **characterized in that**, when the flooring element is mounted to the support, a portion of said seat (18) away from the bottom face (17) does not contact the coupling element (14).
11. A flooring assembly as claimed in one or more of claims 7 to 10, **characterized in that** the seat (18) and the coupling element (14) are in such position and have such a size that, when the flooring element (12) is mounted to the support (13), the bearing surface (16) only contacts the bottom face (17) of the flooring element (12), when the frustoconical portion (15) of the coupling element has already contacted the frustoconical portion (22) of the seat of the flooring element almost throughout its length, or at least not before such contact.
12. A flooring assembly as claimed in one or more of claims 7 to 11, **characterized in that** the flooring element (12) has a substantially rectangular or square shape and has a seat (18) at each apex, the flooring element engaging in operation with four support elements (13).
13. A flooring assembly as claimed in one or more of claims 7 to 12, **characterized in that** said support (14) is when the flooring element is engaged with a foot lying on the ground (40) in adjustable fashion, to change its height above the bearing surface (16).

14. A flooring assembly as claimed in one or more of claims 7 to 13, **characterized in that** it comprises joists (35) for connecting adjacent supports (13) of the assembly.

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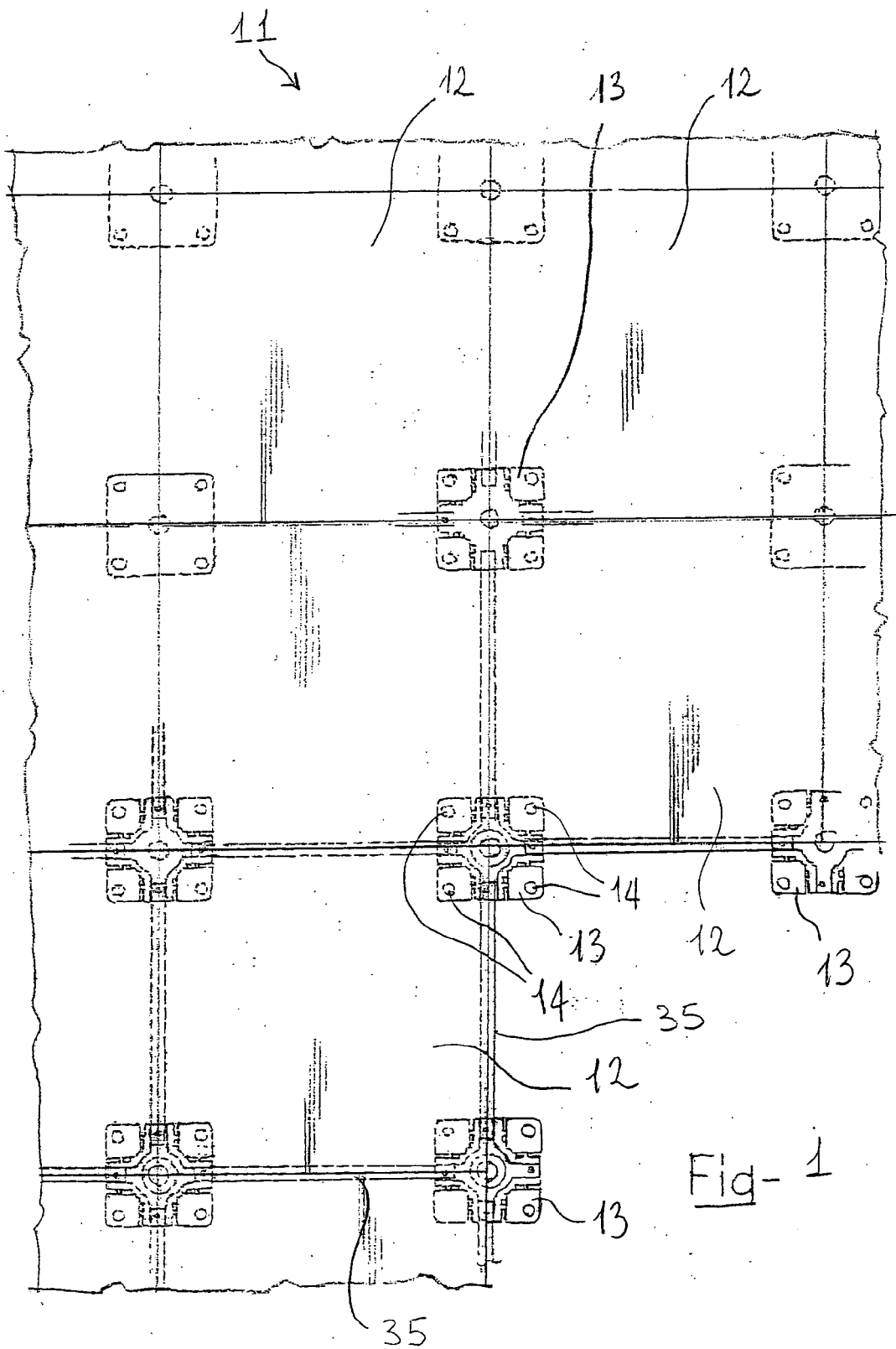
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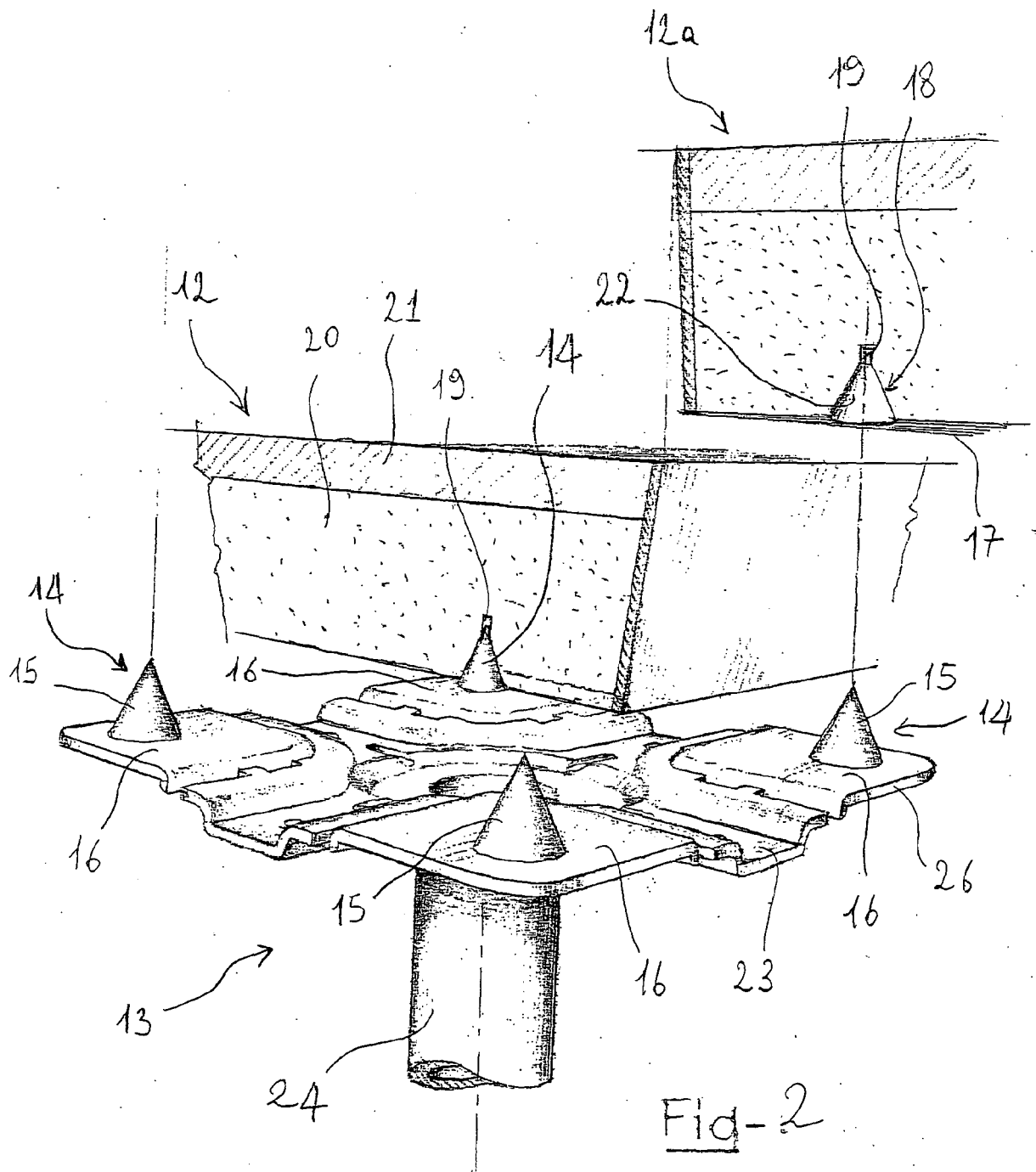
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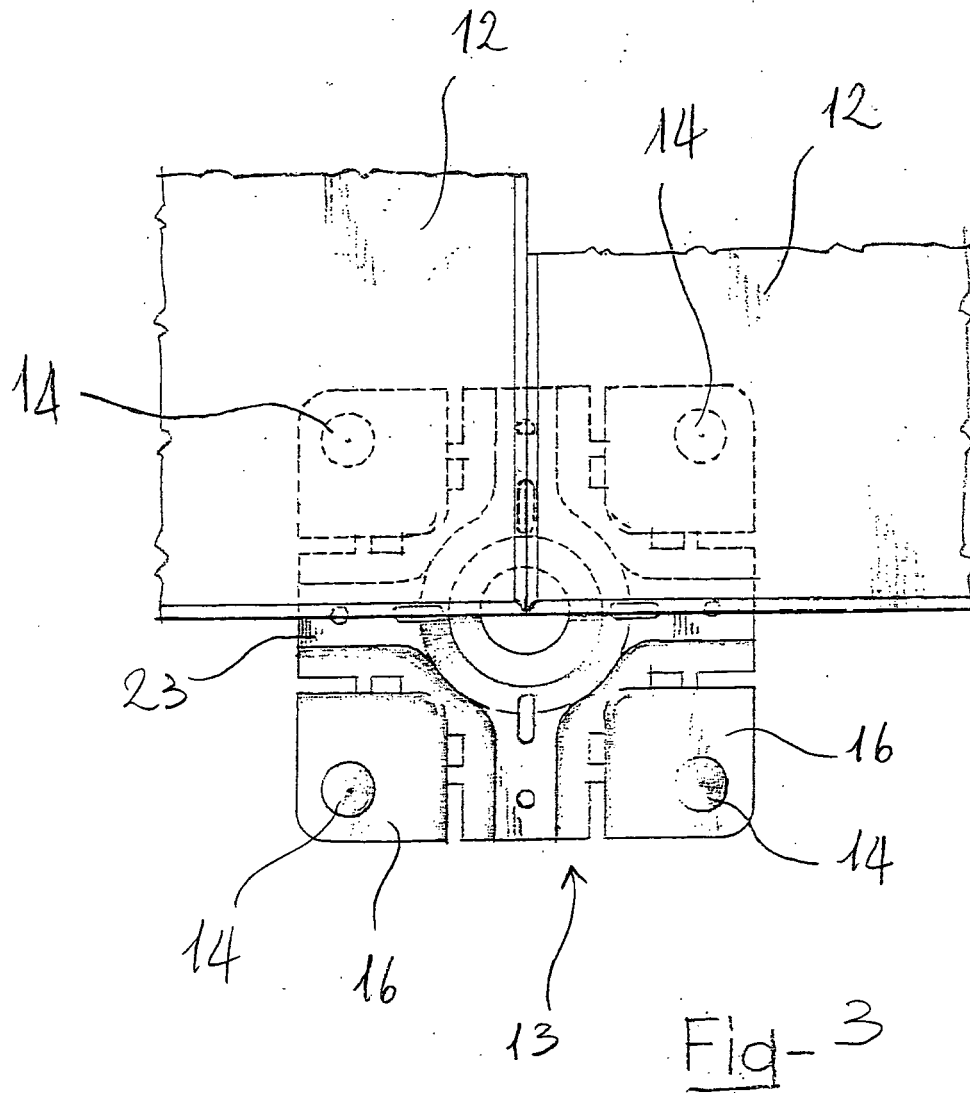
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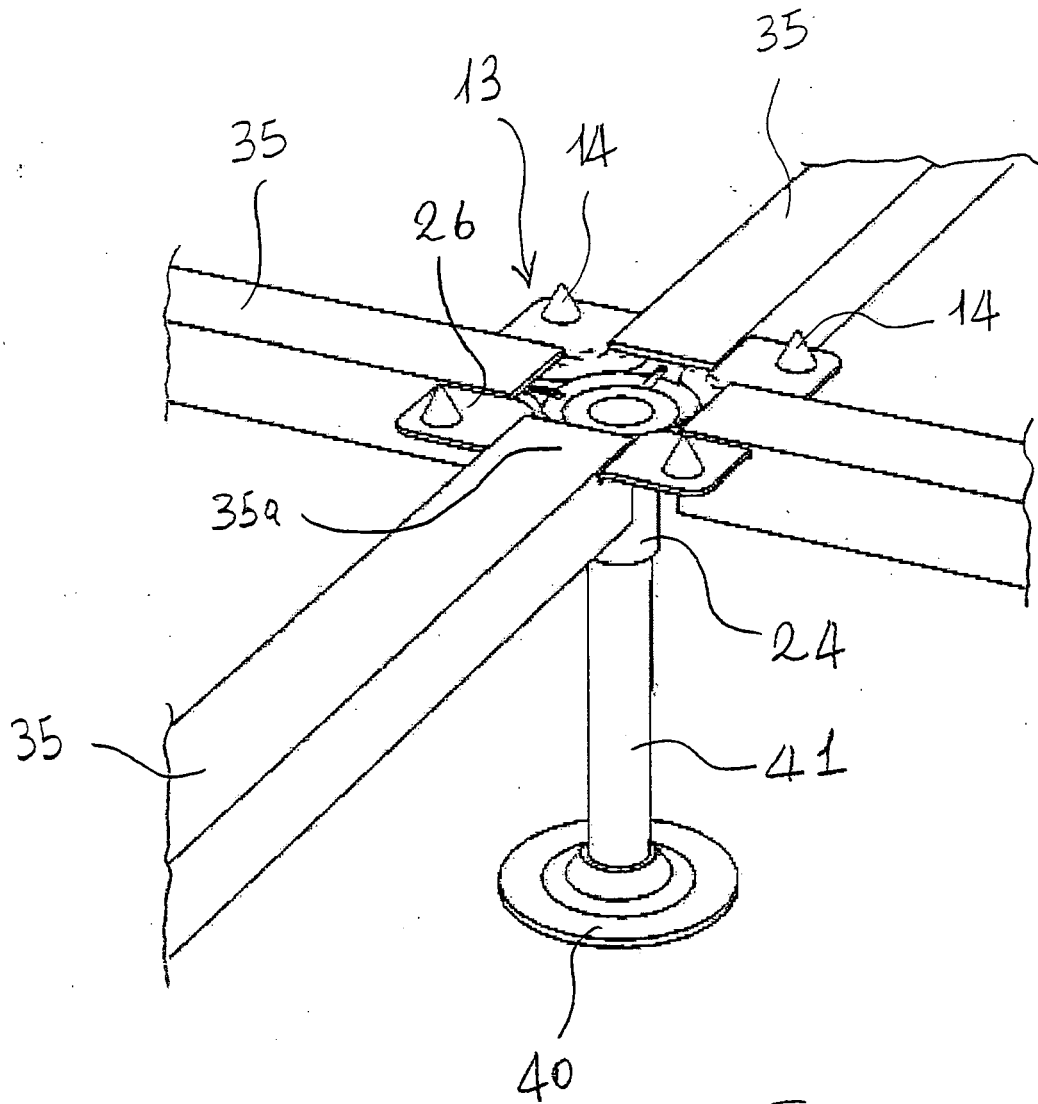


Fig. 4

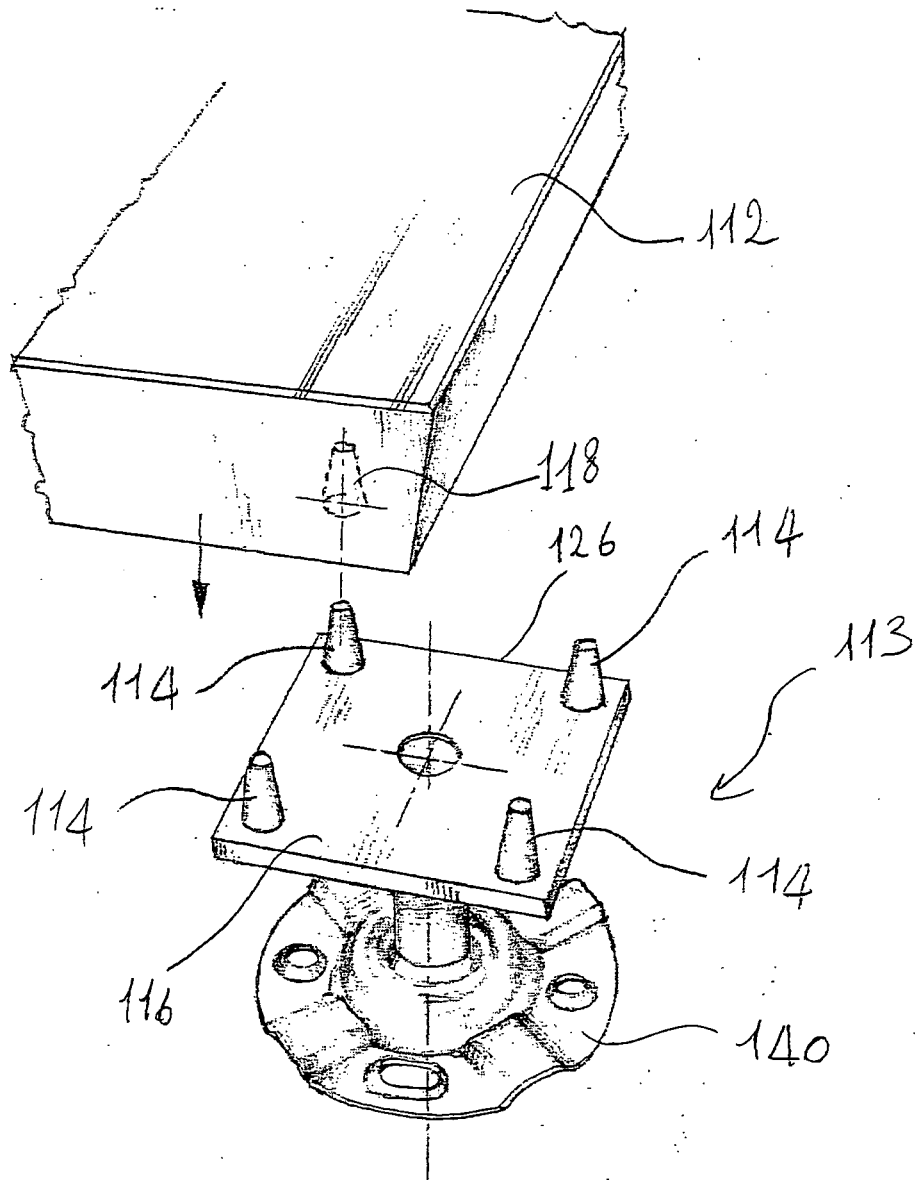


Fig-5



EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5467

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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