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Shim and tiled floor employing the shim.

(57)

A shim (101; 401), useful in locating and supporting a tiled floor on a building surface, has a lower surface (103; 403), adapted to be facing toward a building surface. An upper surface (105; 405) of the shim (101; 401) is spaced from the lower surface (103; 403) by a body of material (107) from which the shim is formed. The upper surface (105; 405) has a plurality of radially positioned protrusions (109; 409) that extend from the upper surface in a direction perpendicular thereto. Each protrusion (109; 409) is adapted to engage a recess (205; 505) at a bottom (203; 503) of a tile perimeter (209; 509). A radially extending slot (111; 411) is provided between each adjacent pair of protrusions (109; 409). Each radially extending slot (111; 411) is adapted to optionally allow an aligning lug (17) of a pedestal to extend there through. The shim (101; 401) can be part of a tiled floor resting on a primary building surface, such as a roof, in combination with a plurality of individual tiles (201; 501) each with at least one recess (205) in a bottom perimeter thereof. The shim (101; 401) can optionally also be part of an elevated floor resting on a plurality of height adjustable pedestals (5) and be interposed between pedestal and tile (201; 501).

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Title: **SHIM AND TILED FLOOR EMPLOYING THE SHIM**

The invention relates to a shim for locating and supporting a tiled
5 floor on a building surface, and to tiled floor assemblies incorporating such
shims. More in particular the invention relates to tiled floors on top of roofs,
such as terrace floors and parking decks.

Tiled floors forming a secondary surface above a primary surface
are well known. Such floors can be found in various forms, such as elevated
10 office floors, temporary floors for exhibitions, for tents, or stage floors for
events, and terrace floors on generally flat roofs. Except for some generally
common features, such as adaptability to the primary surface and ease of
installation, the requirements in each of these applications are very
different. A particular problem arises, when such tiled floor are used on the
15 exterior of buildings for terraces or parking decks, using concrete tiles or
slabs. Due to the required load bearing capacity of such tiled floors, it is
important to restrain lateral movement of the individual tiles. In known
arrangements that use height adjustable pedestals at the nodal
intersections between two or more adjacent rectangular tiles or slabs, such
20 pedestals have a substantially flat head portion, from which radial
alignment lugs protrude in an upward direction to locate and separate the
tiles or slabs from each other. To prevent the tiles or slabs in such a floor to
move apart, additional measures are required at the outer perimeter of the
floor. Such additional measures to retain the tiles or slabs at the outer
25 perimeter of the floor are cumbersome, and add to the cost and installation
effort for such floors. There is hence a need for improvement.

It has also been felt as a drawback that the radial alignment lugs
that protrude in an upward direction from the substantially flat head
portion of the known pedestals are rather vulnerable to damage. These
30 alignment lugs also ensure that a limited gap exists between adjacent tiles
or slabs for allowing drainage of rain water. As a result the material

thickness of these alignment lugs is dictated by the maximally allowed rain water drainage gap, and is usually not more than 2 to 3 mm. With the present popularity of using a plastic material for these pedestals and thereby for the alignment lugs there is a serious risk that while positioning quite heavy concrete tiles or slabs these may unintentionally come to rest on top of the lugs and cause their collapse. Hence there is also a need to reduce or eliminate this risk.

In addition to the above room for improvement, there has also existed a demand for a much more simple arrangement for placing tiles on a generally flat roof in situations where adjustability for level and/or slope is not required. Such situations may exist when providing service access to air condition or ventilation equipment on rooftops.

In some applications contact noise from the tiled floor via the pedestals into the building structure has been undesirable. Thus providing sound deadening properties to the existing rooftop floors has been a further wish.

Furthermore there has been a general desire not only to be able to adjust the height of the secondary floor in respect of the primary floor, but also to compensate for the inclination of the pedestal heads, which are usually parallel to the primary floor, or roof surface.

Accordingly it is an object of the present invention to propose an improved shim, tile, and tiled floor. In a more general sense it is thus an object of the invention to overcome or reduce at least one of the disadvantages of the prior art. It is also an object of the present invention to provide alternative solutions which are less cumbersome in assembly and operation and which moreover can be made relatively inexpensively. Alternatively it is an object of the invention to at least provide a useful alternative.

To this end the invention provides for a shim, a tile, and a tiled floor as defined in one or more of the appended claims.

More in particular the invention provides a shim for locating and supporting a tiled floor on a building surface, the shim having a lower surface, adapted to be facing toward a building surface, and an upper surface spaced from the lower surface by a body of material from which the shim is formed, wherein the upper surface has a plurality of radially positioned protrusions extending from the upper surface in a direction perpendicular thereto, each protrusion being adapted to engage a recess in a bottom of a tile perimeter, and wherein a radially extending slot is provided between each adjacent pair of protrusions, to allow an aligning lug of a pedestal to extend there through. Such a shim locates the individual panels with respect to one another in opposite lateral directions, and thus eliminates any need for retaining the panels about a perimeter of the tiled floor. Optionally the plurality of radially positioned protrusions of the shim can comprise four protrusions, that are each adapted to engage a recess of a corner of an individual tile. Alternatively or additionally the lower surface can be a flat surface and/or the lower surface can be parallel to the upper surface, if not an angled or spherical lower surface is used.

As a further option each radially positioned protrusion can be tapered to converge toward a free upper end thereof and/or each radially positioned protrusion can have a height above the upper surface that is adapted not to exceed a vertical depth of a recess in a bottom of a tile perimeter. These features may assist in positioning of the tiles and ensure a firm support on the individual shims.

The invention also provides a tiled floor arranged for support on a building surface, including such shims as discussed above, in combination with a plurality of individual tiles that each have at least one recess in a bottom perimeter thereof. Optionally these tiles may each have a rectangular perimeter with four corners. Then the at least one recess can be part of a recess at each corner of each individual tile. Alternatively or additionally each recess in the perimeter bottom of each tile can then be

tapered to diverge toward a bottom surface of that tile and/or each recess in the perimeter bottom of each tile can have a vertical depth not exceeding a height of the radially positioned protrusion above the upper surface of the shim. As explained above these features may assist in positioning of the
5 tiles and ensure a firm support on the individual shims.

The tiled floor of the invention may optionally also comprise a plurality of pedestals for raising the floor to an elevated position and for leveling the floor with respect to a building surface on which it is supported. Each pedestal then has a base for positioning on a primary building surface,
10 and a head adjustable in height on which the bottom surface of the shim rests, and wherein at least one aligning lug on the head of the pedestal can then protrude upwardly to extend through one of the radially extending slots in the shim. Optionally one of the base or the head of each pedestal can then be keyed to a screw threaded shaft for effecting height adjustment.
15 Also optionally one of the base or head can keyed to the screw threaded shaft by means of a rotatable nut, which will enable height adjustment with at least part of the tiles or slabs in position.

Further advantageous aspects of the invention will become clear from the appended description and in reference to the accompanying
20 drawings, in which:

Figure 1 illustrates a conventional tiled floor that is supported in an elevated position above a primary building surface:

Figure 2 is an isometric view of a shim according to the present invention;

25 Figure 3 is a top plan view of the shim of the invention;

Figure 4 is a cross section of the shim of the invention taken across the line IV-IV in Figure 3 in the direction of the indicated arrows;

Figure 5 is a bottom view of a tile according to the invention;

Figure 6 is a cross section of the tile of the invention taken across
30 the line VI-VI in Figure 5 in the direction of the indicated arrows:

Figure 7 is a side elevation of an alternative embodiment of a shim according to the invention;

Figure 8 is a side elevation of another alternative embodiment of a shim according to the invention;

5 Figure 9 is a top plan view of a resilient pad;

Figure 10 is a top plan view of another form of shim according to the invention;

Figure 11 is a cross section of the shim if Figure 10 taken across the line XI-XI therein;

10 Figure 12 is a cross section of the shim if Figure 10 taken across the line XII-XII therein;

Figure 13 is a fragmentary perspective view of a tiled floor according to the invention using an alternative embodiment of tile; and

15 Figure 14 is a fragmentary detail view of the alternative tile embodiment of Figure 13.

In the fragmentary perspective view of Figure 1 a conventional elevated floor structure 1 is shown. Shown is a nodal point in such a floor structure in which one of a plurality of individual slabs or tiles 3 has been removed to reveal a pedestal 5. The pedestal 5 includes a base 7 with a
20 bottom flange 9 for its support on a primary building surface, such as in particular a roof. Supported on the base 7 is a head 11 with a flat top surface 13. The flat top surface 13 is generally parallel to the flange 9 of the base 7. In a conventional arrangement the head 11 is adjustable in height with respect to the base 7 to compensate for the normal slope gradient of a
25 roof surface that is present to allow rain water to be drained. To obtain this height adjustability either the base 7 or the head 11 can be keyed to a screw threaded shaft (not shown but conventional) associated with the other of the base 7 or head 11. In the prior art arrangement illustrated in Figure 1 a rotatable nut 15 is associated with the base 7 to enable adjustments with
30 the tiles 3 in position. The top surface 13 is further provided with aligning

lugs 17, which also ensure that a gap 19 is maintained between adjacent panels 3. Such an elevated tiled floor assembly is generally in the public domain and has been generally described in patent document US 4 558 544.

Figure 2 is an isometric view of a shim 101. The shim 101 has a lower surface 103, and an upper surface 105. The upper surface 105 is spaced from the lower surface 103 by a body of material 107 out of which the shim 101 is formed. This body of material 107 may conveniently be a plastic material, such as an elastomer or recycled plastic material. Also the body 107 of shim 101 can be formed in polyurethane bound rubber granulate, such as recycled car tire material pressed with a polyurethane bonding agent. However, it is also conceivable that the body 107 is formed as a sheet metal shaping. For preventing contact noise some resilience would be preferred, but this may also be obtained by adding a resilient layer to the shim. The shim 101 further has four protrusions 109, each radially positioned with respect to a center of the upper surface 105 and extending therefrom in an upward direction. Between each adjacent pair of protrusions 109 is positioned a radially extending slot 111. The slots 111 are arranged to allow the aligning lugs 17 of the prior art pedestals 5 to extend there through. However, the use of the shims 101 is not limited to the elevated floor structure 1 of Figure 1, but can also be used directly on a building structure, such as a roof. In that application the lower surface 103 of the shim 101 will rest directly on the primary building surface. As shown in Figures 3 and 4 the radially extending slots 111 are seen to extend through the entire thickness of the body of material 107 and thereby allows the aligning lugs 17, when present, to protrude above the upper surface 105 and retain their function in maintaining a gap (such as in Figure 1) between adjacent tiles (such as 3 in Figure 1).

A further feature of the present invention will now be explained in reference to Figures 5 and 6. Figure 5 is a view of the bottom surface 203 of a tile 201. The tile 201 is made of concrete, or like material, and is

generally similar to the tile 3 of Figure 1, except for having a recess 205 at each corner 207 of its rectangular perimeter 209. As seen in the cross sectional elevation of Figure 6 the recesses 205 can have a vertical depth D. The recesses 205 can each engage over one of the protrusions 109 of a relevant shim 101. A conical shape of the recess 205 diverging toward the bottom side 203 can be adapted to a conical shape of the protrusion 109, which then converges upwardly from the upper surface 105 of the shim 101. When a height H of the protrusion 109 (see Figure 4) is chosen to exceed the depth D of the recess 205 in tile 201 (see Figure 6), then it is possible for the tiles 201 to be slightly angled with respect to the lower surface 103 of the shims 101. Thereby the shims 101 may adapt to an non-level, or slanted portion in the primary building surface, while a top surface 211 of the tiles 201 can remain unaffected by such fluctuations in the supporting surface. It will further be clear that through the interaction of the protrusions 109 and the recesses 205, the tiles 201 will not only be prevented from moving towards one another, but also will be prevented from moving away from one another. Other forms of protrusions 109 and recesses 205 are also conceivable, such as protrusions having a rounded top, or the like. In the prior art arrangement shown in Figure 1, additional measures around the outer edges of the floor structure 1 are required to prevent any outward movement of the tiles 3.

Referring now to Figures 7 and 8, it may additionally be necessary to compensate for a slope angle of the roof surface in connection with rain water drainage. As explained in reference to Figure 1 the top surface 13 of the pedestal 5 is generally parallel with a lower surface of the bottom flange 9. This may result in the tiles 3 or 201 when used with the shim 101 are not at their corners 207 in a continuous contact with the upper surface 105 of the shims 101. This may affect the stability of the tiled floor as a whole. To compensate for such slope and permit a proper surface contact between tile corner 207 and upper shim surface 105, the lower

surface 103A of a slightly modified shim 101A may have an appropriate angle as shown in Figure 7. The alternative shim 101A may thus have an upper surface 105 that is not parallel to its lower surface 103. The angled bottom surface 103 A can then be positioned using the radially extending
5 slits (111 in the embodiment of Figures 2-3) in a direction to compensate for the roof slope. A slightly different alternative shim 101B is shown in Figure 8. The alternative shim 101B has a lower surface 103B that is spherical, and can thereby adapt itself to a range of different slope angles.

In Figure 9 a top plan view is shown of a resilient pad 301. This
10 resilient pad 301 can be made from a sheet of resilient material 307, such as an elastomer in a thickness range of 1 to 2 mm. The sheet 307 of resilient material 307 is provided with round openings 309, and radial slots 311. The round openings 309, and the radial slots 311 allow the resilient pad 301 to be positioned on any one of the head 11 of a pedestal, on any of the shims
15 101, 101A, 101B described above, or on top of the further form of shim that will be described herein below in reference to Figures 10-12. The round openings 309 are conveniently slightly larger than the protrusions of the shims, so as to allow the protrusions to extend therethrough. Similarly the slots 311 are arranged to be somewhat larger than the radially extending
20 slots of the shims, so as not to interfere with those, and allow the alignment lugs 17 to extend also through the radial slots 311. As also illustrated in Figure 9 the radial slots 311 at their opposite longitudinal ends can end in precut tear lines 313. These precut tear lines 313 can be useful, when less than four tiles or slabs are to be supported at the nodal point provided by a
25 shim of this invention.

A top plan view of another form of shim 401 according to the invention is shown in Figures 10, 11, and 12. This shim 401 in general has a somewhat thinner body 407, and thereby may be preferred for use as an adapter on top of a pedestal head 11 (as shown in Figure 1). This shim 401
30 is also preferably combined with the resilient pad 301 that is described

above in reference to Figure 9, and which for this purpose may also be adhered or permanently attached thereto. This shim 401, in analogy with the shims 101, 101A, 101B described above, has an upper surface 405, and (visible only in Figures 10 and 11) a lower surface 403. Protruding from the upper surface 405 is a total of four radially arranged protrusions 409. Each protrusion 409 has a substantially smaller diameter top than its base, so that an upstanding perimeter wall 409A has a conical shape, converging in a direction away from the upper surface 405 of the shim 401. Preferably each protrusion 409 has a diameter B at its root, of a dimension that exceeds at least slightly a distance S, at which each protrusion 409 is spaced from an adjacent radially extending slot 411. Also it has proven convenient when the angle α of the conical perimeter wall 409A is in a region of 60 degrees. This is best seen in the cross section of Figure 11 taken across the line XI-XI in Figure 10. With such proportions it can be assured that the load of a concrete tile or slab as shown in Figures 5 and 6 is always carried by one of the protrusions 409, when placed in interference with an aligning lug (17 in Figure 1) that protrudes through the slot 411. This then prevents damage to the vulnerable aligning lug, and allows easy correction of the tile position helped by the conical protrusion 409 and the conical recess 205 at the bottom corner of the tile 201. In this regard it is only necessary in this regard for one of the recesses 205 or the protrusion 109, 409 to have a conical perimeter wall, while the other of the protrusion 109, 409 or recess 205 may have a straight-sided cylindrical perimeter wall. It is to be understood that the tile 201 does not differ with the use of any of the shims described above, and that the proportions of the protrusions in respect of their distance to the radially extending slots can also be selected to be identical.

As further shown in the cross sections of Figures 11 and 12 the shim 401 further differs from the previously described shims 101, 101A, 101B in that a perimeter ridge 415 extends downwardly from the lower

surface 403 of the shim 401. This perimeter ridge 415, apart from reinforcing the shim, can also be dimensioned to snugly fit about the head (11 in Figure 1) of a pedestal. This has been found to help stabilizing the shim 401, while tiles or slabs (201 in Figures 5 and 6) are being placed thereon. A further aspect of the shim 401 can be the provision of a weakened line 417 about the root of the protrusions 409. This will allow an individual protrusion 409 to be easily removed from the shim 401, when at a perimeter of a tiled floor only two tile corners are supported on the shim and associated pedestal. It is then convenient to remove the innermost protrusions and the aligning lugs that run parallel to the outer floor edge. This will then allow each of the adjacent perimeter tiles to rest on the entire upper surface 405 of the shim 401.

In Figures 13 and 14 an alternative embodiment of tiled floor according to the invention is shown that uses an alternative embodiment of tile 501. The elevated floor structure illustrated in Figure 13 is represented (for clarity) by a single adjustable pedestal 5 and a single alternative form of tile or slab 501. A shim, such as the shim 401, is supported on a top surface of the adjustable pedestal 5, and engages with radially extending slots 411 over aligning lugs 17 protruding from the top surface of the pedestal 5. As explained in reference to Figures 10-12, protrusions 409 are radially arranged on the upper surface 405 of the shim 401 to engage with corners of a tile or slab. In the embodiment of Figures 13 and 14 the tile 501 differs from the tile 201, described in reference to Figures 5 and 6, in that at each corner of the perimeter 509 a corner element 521 is attached to a bottom surface 503 of the tile 501. The corner element 521 has formed therein a recess 505 in the form of a cylindrical through bore, but which recess may optionally also have a conical shape. The corner element 521 can be attached to the bottom surface 503 by means of a suitable cement or adhesive. Such separately attached corner elements 521 would be particularly suitable for tiles, such as ceramic tiles, which may pose

difficulties to integrally forming of recesses. The corner element 521 can be formed of a rigid or semi-rigid material. When formed in a semi-rigid material the corner elements 521 may obviate the need for a resilient pad, such as the pad 301 of Figure 9. As already explained it is only necessary for the protrusion 409 to have a conical perimeter wall, to ensure that the load of the tile is always supported by one of the protrusions 409, when it is in a position of interference with one of the rather vulnerable aligning lugs 17. The recess 505, as illustrated in Figure 14, may then have a straight-sided cylindrical perimeter wall.

Accordingly a shim 101; 101A; 101B; 401 is disclosed, that is useful in locating and supporting a tiled floor on a building surface. Each shim 101; 101A; 101B; 401 has a lower surface 103; 103A; 103B; 403, which in use is adapted to be facing toward a building surface. An upper surface 105; 405 of the shim 101; 101A; 101B; 401 is spaced from the lower surface 103; 103A; 103B by a body of material 107; 407 from which the shim is formed. The upper surface 105; 405 has a plurality of radially positioned protrusions 109; 409 that extend from the upper surface 105; 405 in a direction perpendicular thereto. Each protrusion 109; 409 is adapted to engage a recess 205; 505 at a bottom surface 203; 503 at a tile perimeter 209; 509. A radially extending slot 111; 411 is provided between each adjacent pair of protrusions 109; 409. Each radially extending slot 111; 411 is adapted to optionally allow an aligning lug 17 of a pedestal 5 to extend there through. The shim 101; 101A; 101B; 401 can be part of a tiled floor resting on a primary building surface, such as a roof, in combination with a plurality of individual tiles 201; 501 each with at least one recess 205 in a bottom perimeter thereof. The shim 101; 101A; 101B; 401 can optionally also be part of an elevated floor 1 resting on a plurality of height adjustable pedestals 5 and be interposed between pedestal 5 and tile 201; 501, with the aligning lugs 17 extending through the radial slots 111; 411.

It is thus believed that the operation and construction of the present invention will be apparent from the foregoing description and drawings appended thereto. For the purpose of clarity and a concise description features are described herein as part of the same or separate
5 embodiments, however, it will be appreciated that the scope of the invention may include embodiments having combinations of all or some of the features described. It will be clear to the skilled person that the invention is not limited to any embodiment herein described and that modifications are possible which may be considered within the scope of the appended claims.

10 Also kinematic inversions are considered inherently disclosed and can be within the scope of the invention. In the claims, any reference signs shall not be construed as limiting the claim. The terms 'comprising' and 'including' when used in this description or the appended claims should not be construed in an exclusive or exhaustive sense but rather in an inclusive
15 sense. Thus expression as 'including' or 'comprising' as used herein does not exclude the presence of other elements, additional structure or additional acts or steps in addition to those listed. Furthermore, the words 'a' and 'an' shall not be construed as limited to 'only one', but instead are used to mean 'at least one', and do not exclude a plurality. Features that are not
20 specifically or explicitly described or claimed may additionally be included in the structure of the invention without departing from its scope. Expressions such as: "means for ..." should be read as: "component configured for ..." or "member constructed to ..." and should be construed to include equivalents for the structures disclosed. The use of expressions like:
25 "critical", "preferred", "especially preferred" etc. is not intended to limit the invention. To the extent that structure, material, or acts are considered to be essential they are inexpressively indicated as such. Additions, deletions, and modifications within the purview of the skilled person may generally be made without departing from the scope of the invention, as determined by
30 the claims.

Conclusies

1. Adapterschijf voor positioneren en ondersteunen van een tegelvloer op een primair oppervlak van een gebouw, waarbij de adapterschijf is voorzien van een onderste oppervlak, dat ingericht is om naar een gebouwoppervlak te zijn gekeerd, en een bovenste oppervlak gescheiden van het onderste oppervlak door
5 een lichaam van materiaal waaruit de adapterschijf is gevormd, waarbij het bovenste oppervlak een veelvoud van radiaal geplaatste uitsteeksels heeft die zich uitstrekken vanaf het bovenste oppervlak in een richting loodrecht daarop, waarbij elk uitsteeksel is ingericht om samen te werken met een uitsparing aan een onderkant van een tegelomtrek, en waarbij een zich radiaal uitstrekkende sleuf is
10 aangebracht tussen elk paar aangrenzende uitsteeksels, om een uitlijnlip van een sokkel toe te staan zich daar doorheen uit te strekken.
2. Adapterschijf als in conclusie 1, waarbij het veelvoud van radiaal geplaatste uitsteeksels vier uitsteeksels omvat, die elk zijn ingericht om samen te werken met een uitsparing op een hoekpunt van een individuele tegel.
- 15 3. Adapterschijf als in conclusie 1 of 2, waarbij het onderste oppervlak een plat oppervlak is.
4. Adapterschijf als in conclusie 1, 2 of 3, waarbij het onderste oppervlak parallel aan de bovenste oppervlakte is.
5. Adapterschijf als in één van conclusies 1 tot en met 4, waarbij elke
20 radiaal geplaatst uitsteeksel taps is om te convergeren naar een vrije bovineinde daarvan.
6. Adapterschijf als in conclusie 5, waarbij elke uitsteeksel een conisch gevormde opstaande omtrekswand heeft.
7. Adapterschijf volgens conclusie 6, waarbij de conisch gevormde
25 opstaande omtrekswand een hoek van in hoofdzaak 60 graden heeft ten opzichte van het bovenste schijfoppervlak.
8. Adapterschijf als in één van de conclusies 5 tot en met 7, waarbij elk uitsteeksel een diameter heeft aan een voet daarvan geassocieerd met het bovenste

schijfoppervlak, die een afmeting heeft die groter is dan een afstand tussen een uitsteeksel en een aangrenzende zich radiaal uitstrekken sleuf.

9. Adapterschijf als in één van conclusies 1 tot en met 8, waarbij elk radiaal geplaatst uitsteeksel een hoogte boven het bovenste schijfoppervlak heeft die
5 ingericht is om een verticale diepte van een uitsparing in een bodem van een tegelomtrek niet te overstijgen.
10. Adapterschijf als in één van conclusies 1 tot en met 9, waarbij het bovenste schijfoppervlak veerkrachtig is.
11. Adapterschijf als in conclusie 10, waarbij het bovenste schijfoppervlak
10 een afzonderlijk vervaardigde pad van veerkrachtig plaatmateriaal bevat.
12. Adapterschijf als in conclusie 10, waarbij de gehele adapterschijf uit een veerkrachtig materiaal is vervaardigd.
13. Tegelvloer ingericht om op een bouwoppervlak te worden ondersteund, voorzien van de adapterschijf van één van conclusies 1 tot en met 12, en een
15 veelvoud van afzonderlijke tegels met elk ten minste één uitsparing aan de omtrek van een onderkant daarvan.
14. Tegelvloer als in conclusie 13, waarbij elke tegel voorzien is van een rechthoekige omtrek met vier hoekpunten.
15. Tegelvloer als in conclusie 14, waarbij de ten minste enkele uitsparing
20 deel uitmaakt van een uitsparing op elke hoekpunt van elke individuele tegel.
16. Tegelvloer als in één van conclusies 13 tot en met 15, waarbij elke uitsparing in de bodem van de omtrek van elke tegel taps toelopend is te om naar een onderkant van die tegel te divergeren.
17. Tegelvloer als in één van conclusies 13 tot en met 16, waarbij elke
25 uitsparing in de bodem van de omtrek van elke tegel een verticale diepte heeft die niet meer bedraagt dan een hoogte van het radiaal geplaatste uitsteeksel boven het bovenoppervlak van de adapterschijf.
18. Tegelvloer als in één van de conclusies 13 tot en met 17, waarbij ten
30 minste één of elke uitsparing integraal gevormd is in de omtrek van de onderkant van de afzonderlijke tegels.

19. Tegelvloer als in één van de conclusies 13 tot en met 17, waarbij de individuele tegels op elke hoek een afzonderlijk daarmee verbonden hoekelement hebben dat bevestigd is aan de onderkant nabij de onderrand en waarbij het hoekelement daarin de tenminste ene of elke uitsparing gevormd heeft.
- 5 20. Tegelvloer als in één van conclusies 13 tot en met 19, verder voorzien van een veelvoud van sokkels voor het verhogen van de vloer naar een verhoogde positie en voor horizontaal stellen van de vloer met betrekking tot een primair gebouwoppervlak waarop het is ondersteund, waarbij elke sokkel een voetstuk heeft voor plaatsing op een gebouw oppervlak, en een in hoogte verstelbare kop
- 10 waarop de onderkant van de adapterschijf rust en waarbij ten minste één opwaarts uitstekende uitlijnlip op de kop van de sokkel door een van de zich radiaal uitstrekkende sleuven van de adapterschijf heen steekt.
21. Tegelvloer als in conclusie 20, waarbij een van het voetstuk of de kop van elke sokkel in aangrijping is met een van schroefdraad voorziene schacht om
- 15 hoogteverstelling te verkrijgen.
22. Tegelvloer als in conclusie 21, waarbij een van het voetstuk of de kop in aangrijping is met de van schroefdraad voorziene schacht door middel van een roteerbare moer.

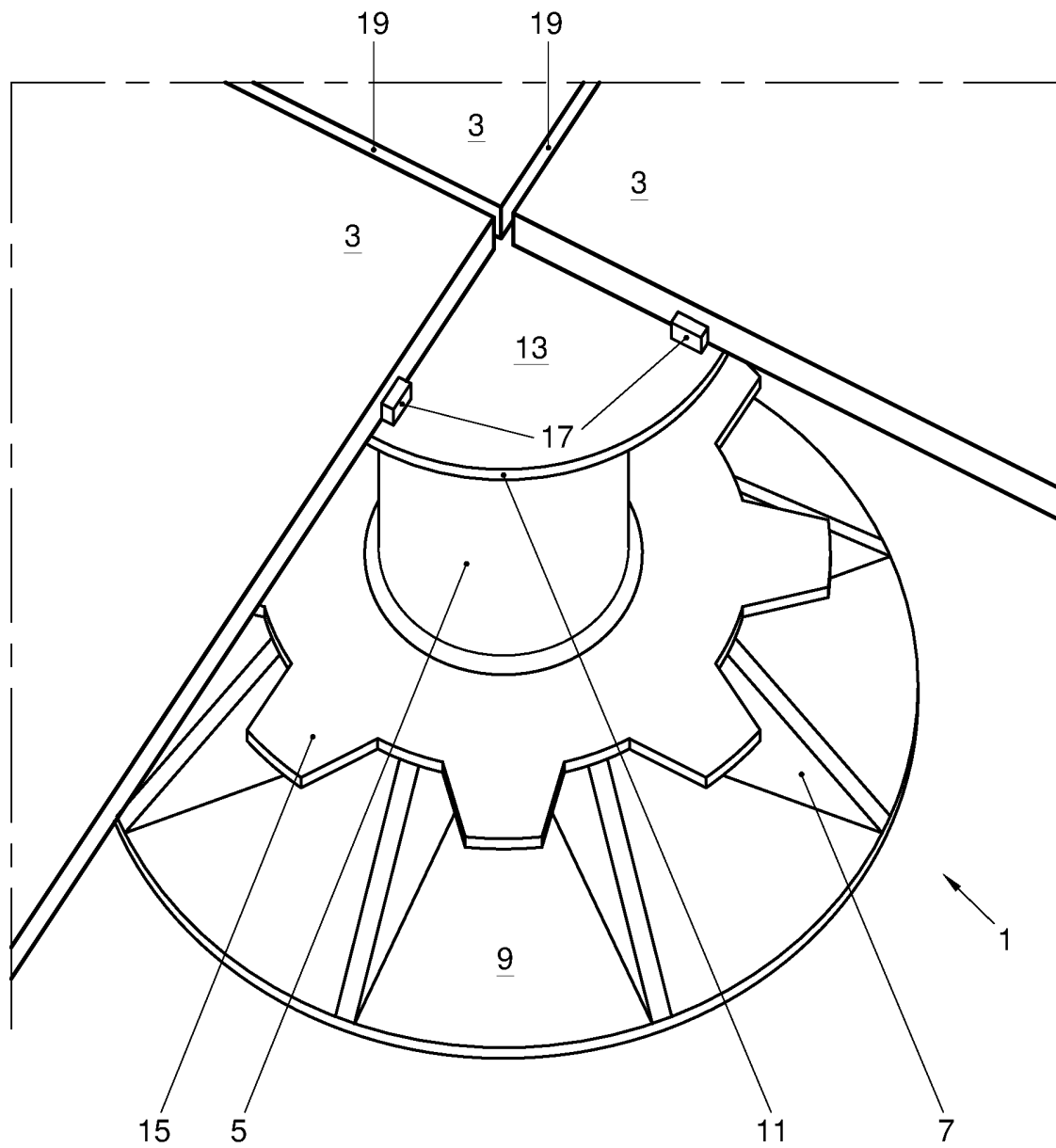


FIG. 1
PRIOR ART

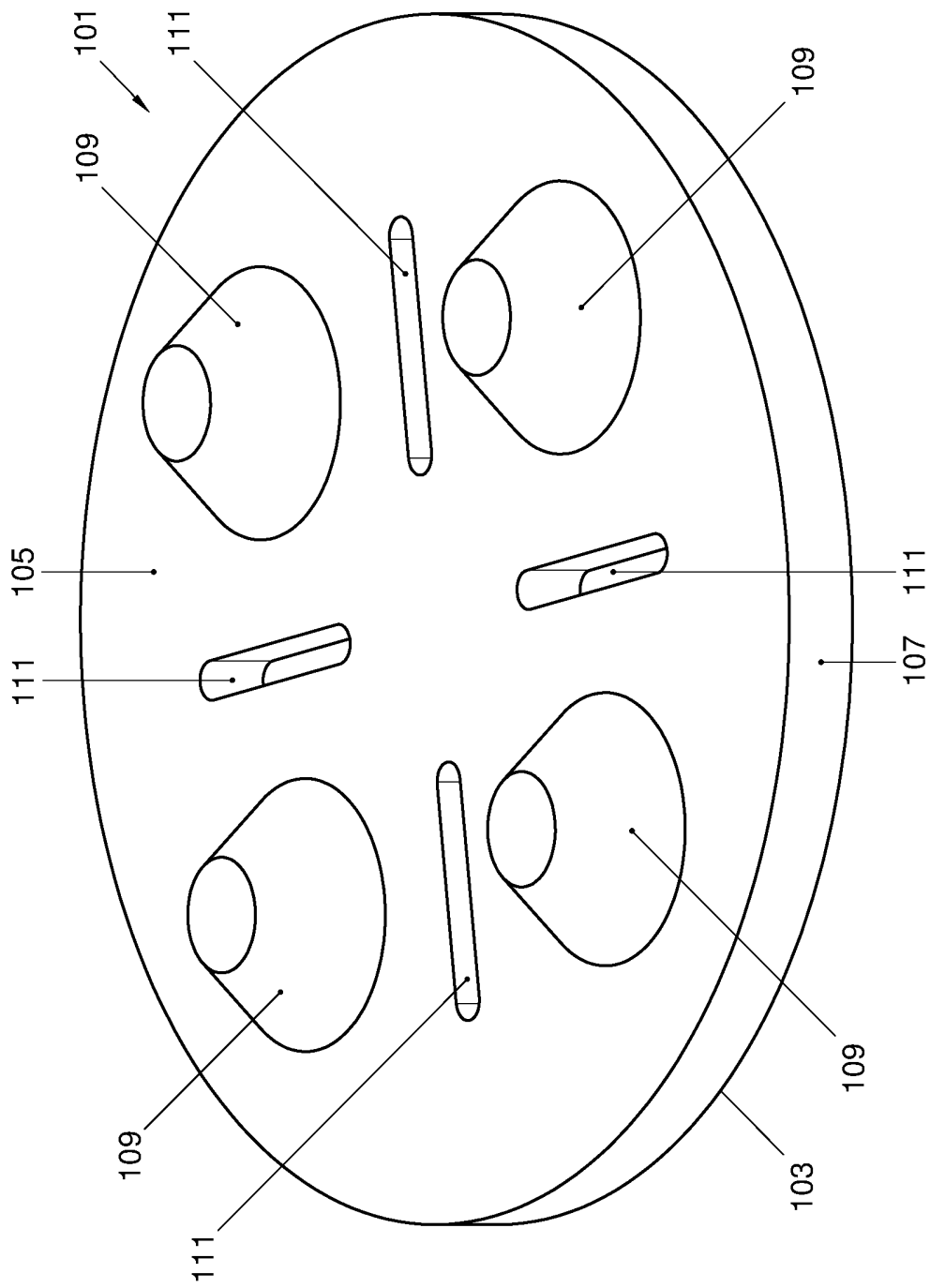


FIG. 2

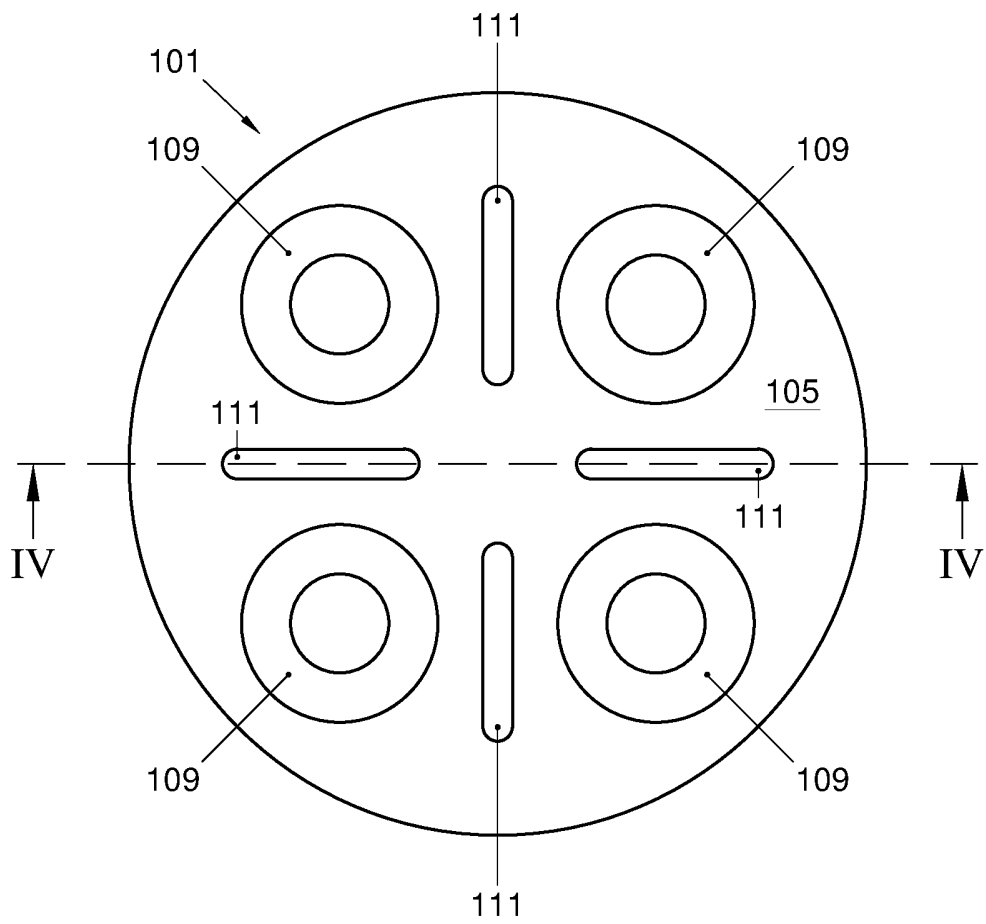


FIG. 3

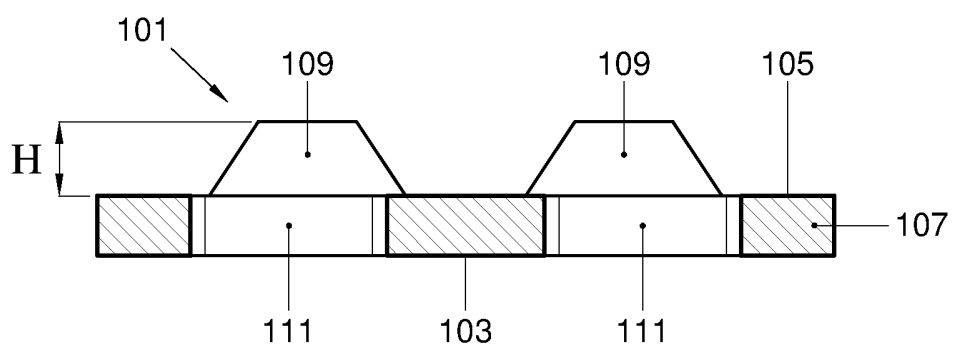


FIG. 4

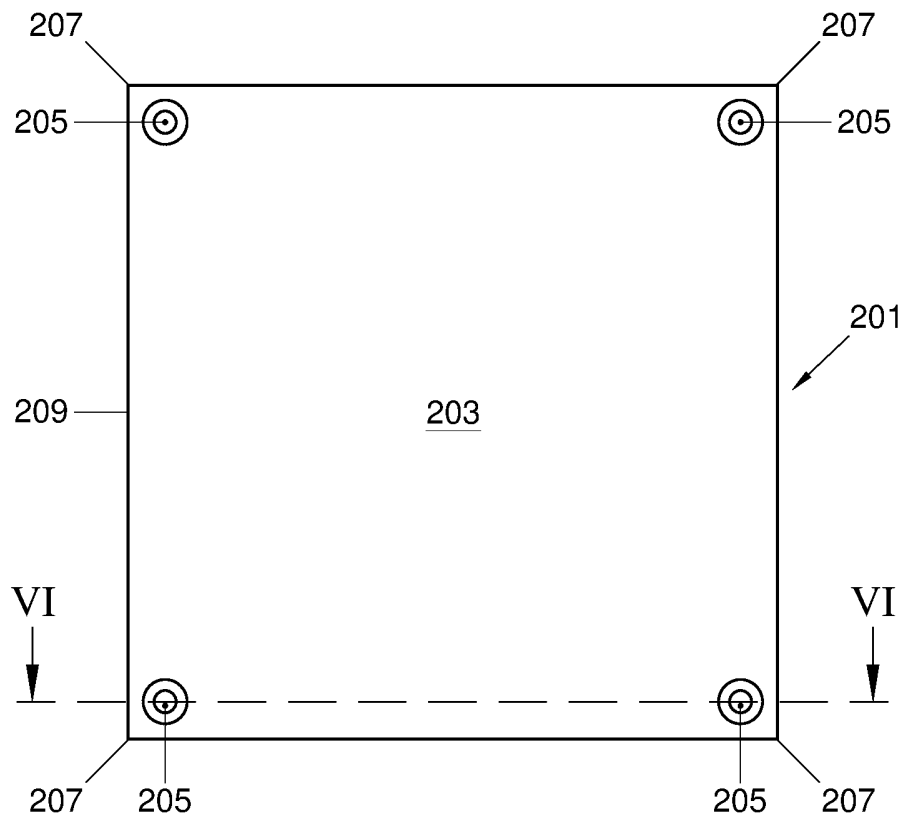


FIG. 5

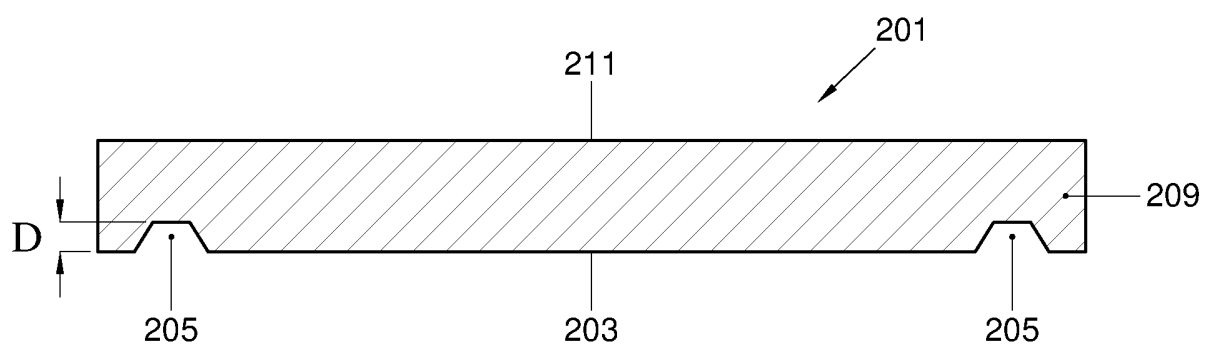


FIG. 6

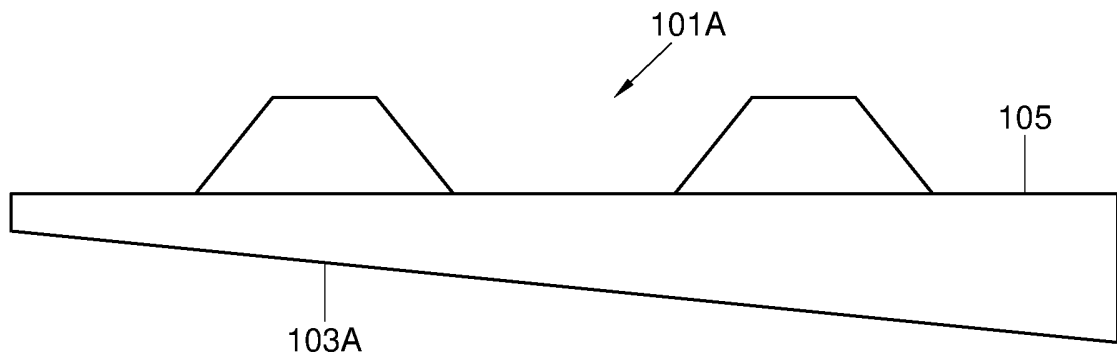


FIG. 7

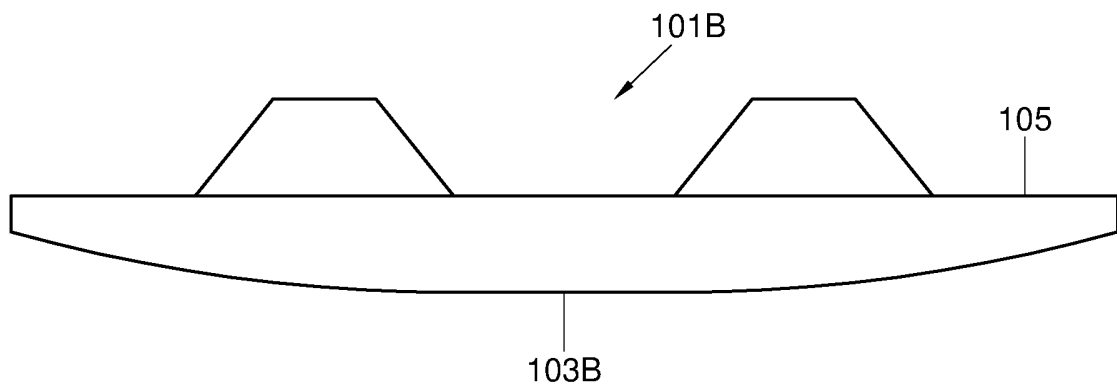


FIG. 8

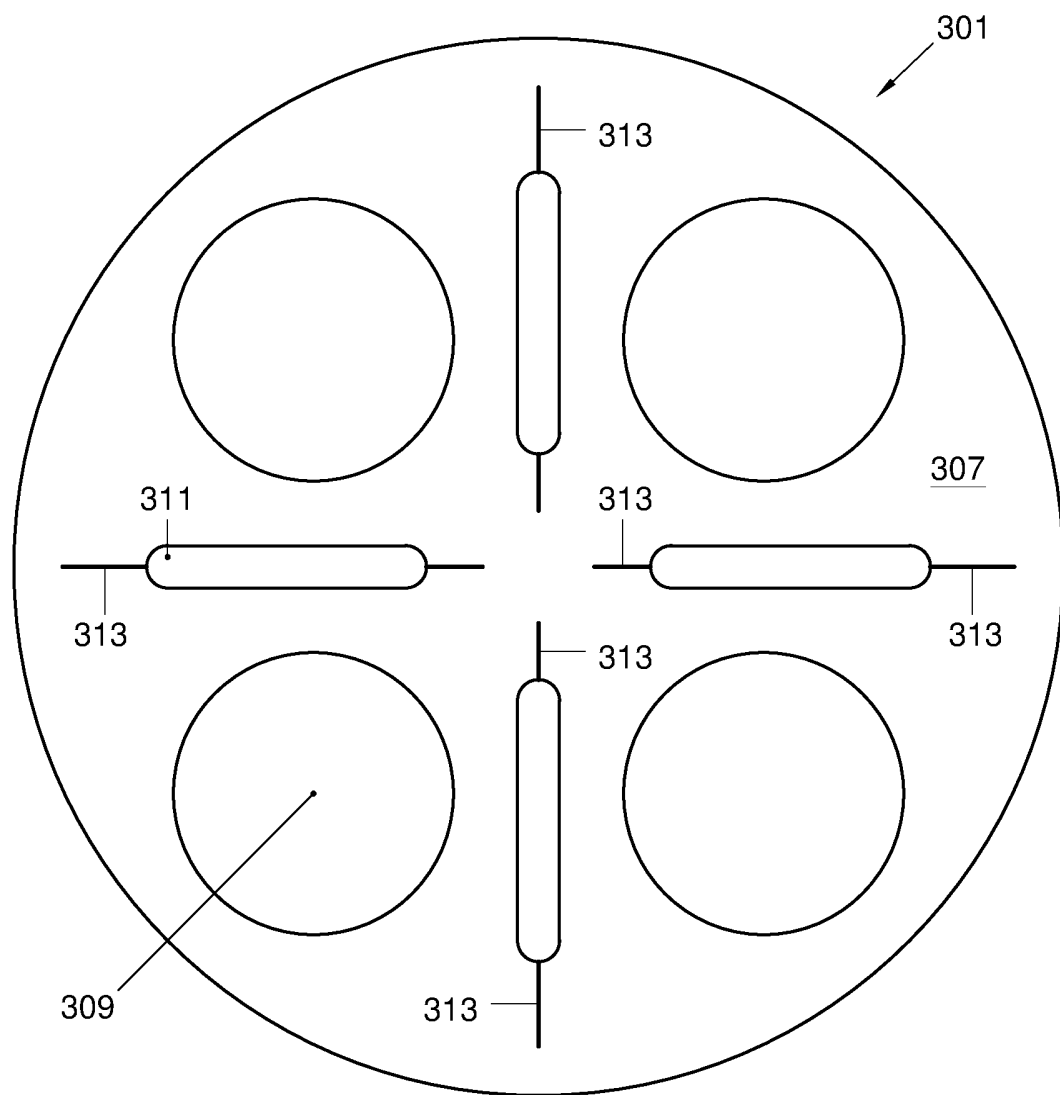


FIG. 9

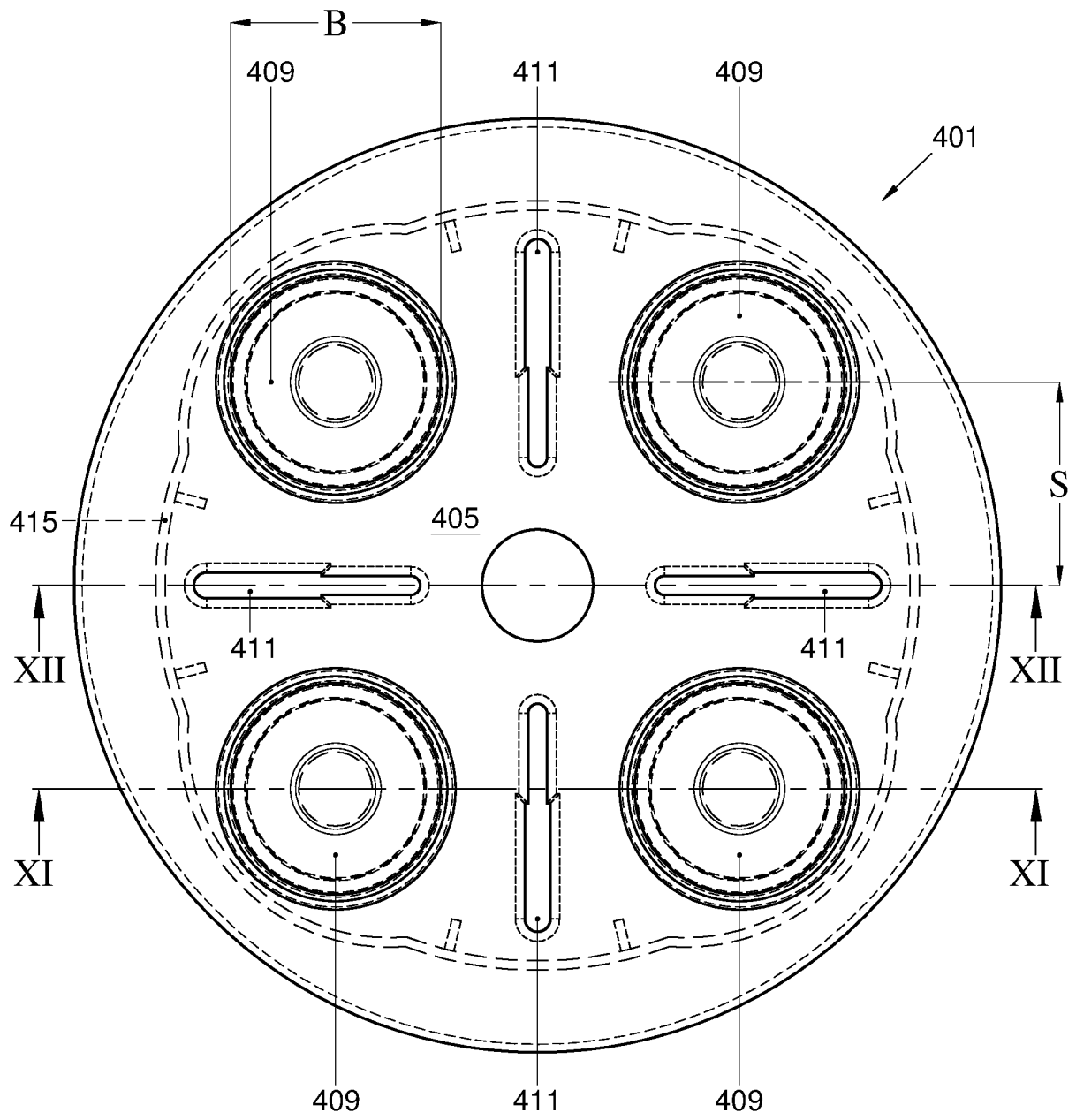


FIG. 10

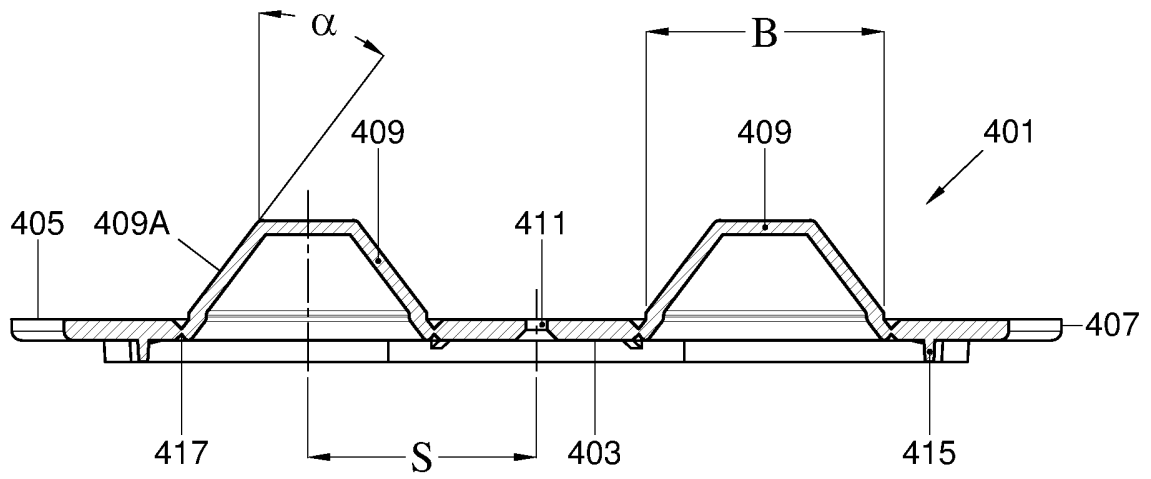


FIG. 11

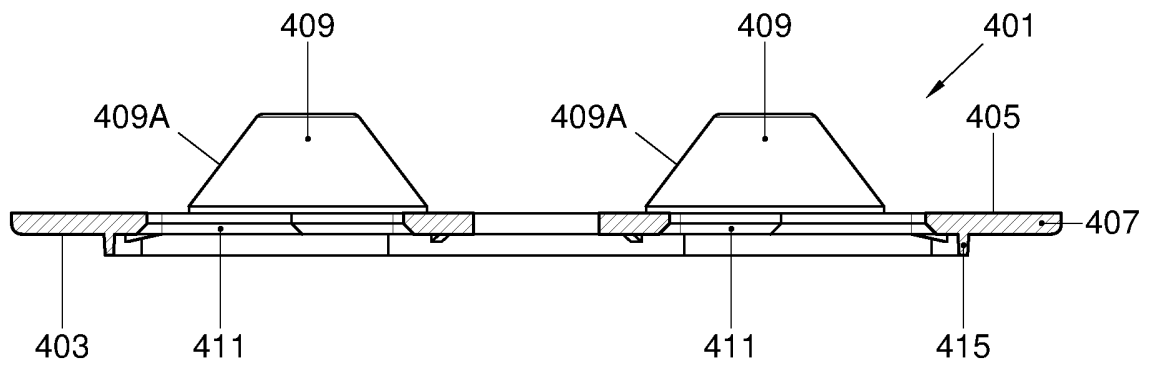


FIG. 12

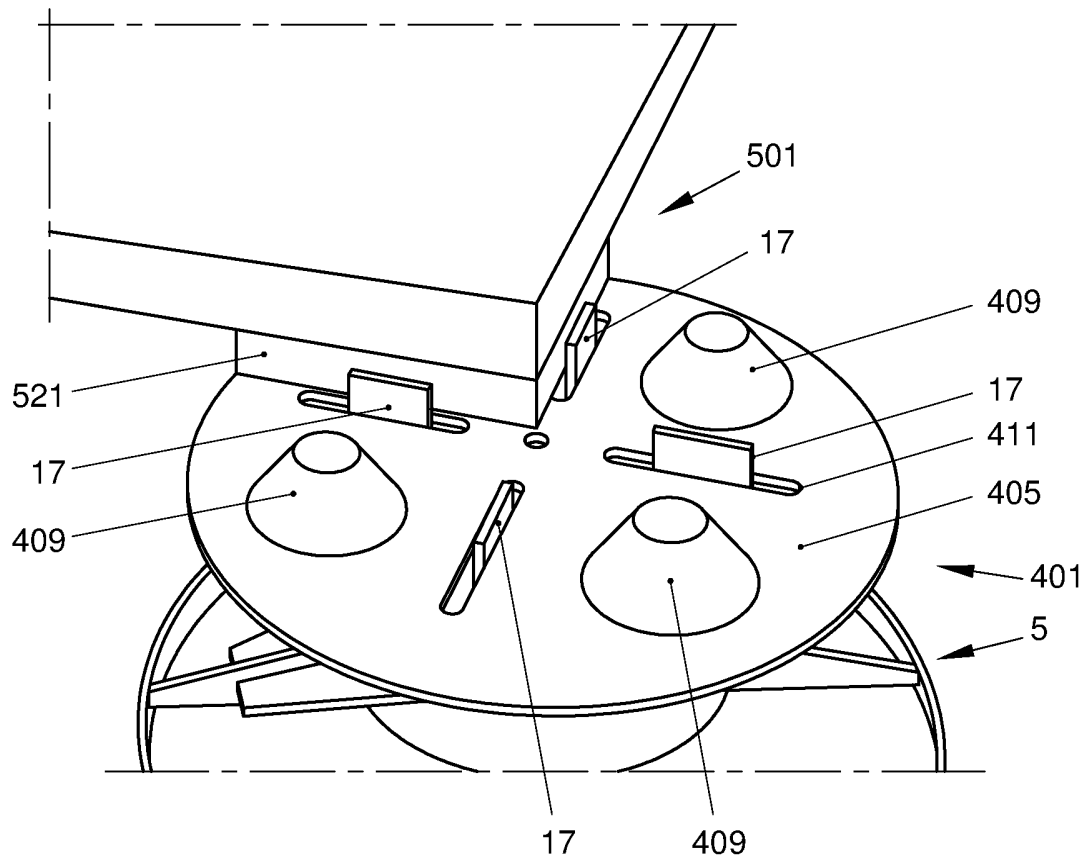


FIG. 13

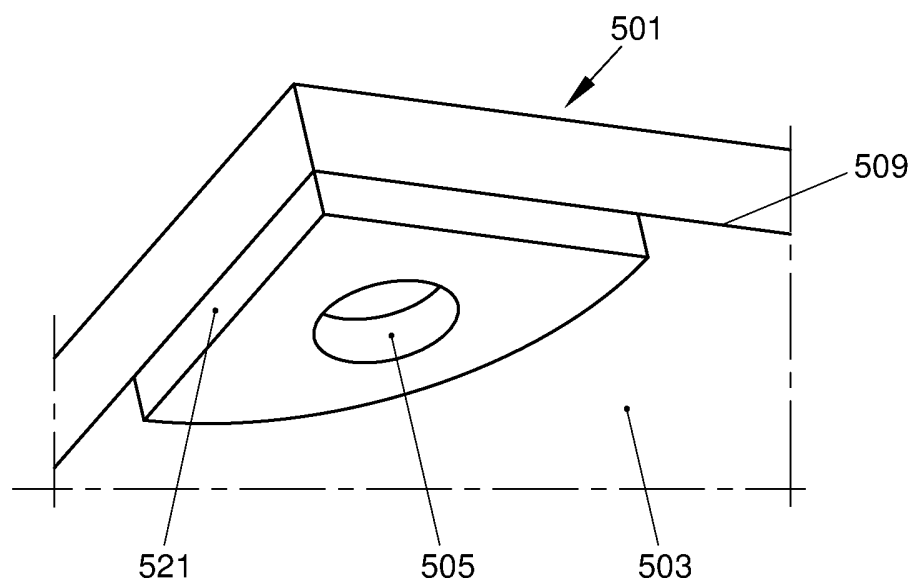


FIG. 14

Title: SHIM AND TILED FLOOR EMPLOYING THE SHIM

Abstract

A shim (101; 401), useful in locating and supporting a tiled floor on a building surface, has a lower surface (103; 403), adapted to be facing toward a building surface. An upper surface (105; 405) of the shim (101; 401) is spaced from the lower surface (103; 403) by a body of material (107) from which the shim is formed. The upper surface (105; 405) has a plurality of radially positioned protrusions (109; 409) that extend from the upper surface in a direction perpendicular thereto. Each protrusion (109; 409) is adapted to engage a recess (205; 505) at a bottom (203; 503) of a tile perimeter (209; 509). A radially extending slot (111; 411) is provided between each adjacent pair of protrusions (109; 409). Each radially extending slot (111; 411) is adapted to optionally allow an aligning lug (17) of a pedestal to extend there through. The shim (101; 401) can be part of a tiled floor resting on a primary building surface, such as a roof, in combination with a plurality of individual tiles (201; 501) each with at least one recess (205) in a bottom perimeter thereof. The shim (101; 401) can optionally also be part of an elevated floor resting on a plurality of height adjustable pedestals (5) and be interposed between pedestal and tile (201; 501).

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE		KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE	
		P106847NL10	
Nederlandse aanvraag nr.		Indieningsdatum	
2014465		16-03-2015	
		Ingereepen voormangsdatum	
		30-12-2014	
Aanvrager (Naam)			
Casalini B.V.			
Datum van het verzoek voor een onderzoek van internationaal type		Door de instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.	
02-05-2015		SN64061	
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)			
Volgens de internationale classificatie (IPC)			
E04F15/024			
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK			
Onderzochte minimumdocumentatie			
Classificatiesysteem	Classificatiesymbolen		
IPC	E04F;E04D		
Onderzochte andere documentatie dan de minimum documentatie, voer zover dergelijke documenten in de onderzochte gebieden zijn opgenomen			
III. ☐	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES		(opmerkingen op aanvullingsblad)
IV. ☐	GEBREK AAN EENHEID VAN UITVINDING		(opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2014465

A. CLASSIFICATIE VAN HET ONDERWERP
INV. E04F15/024
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (klassificatie gevolgd door classificatiesymbolen)

E04F E04D

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Gesleekte documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	WO 2014/160076 A1 (IPE CLIP FASTENER COMPANY LLC [US]; PELC ROBERT J [US]) 2 oktober 2014 (2014-10-02)	1-7, 10-15, 17-22
Y	* figuren 1-6 *	8,9,16
Y	EP 2 381 046 A1 (KIJLSTRA B V [NL]) 26 oktober 2011 (2011-10-26)	8,9,16
A,D	US 4 558 544 A (ALBRECHT RAYMOND E [US] ET AL) 17 december 1985 (1985-12-17) in de aanvraag genoemd * het gehele document *	1-22

☐ Verdere documenten worden vermeld in het vervolg van vak C.

☒ Leden van dezelfde octroofamilie zijn vermeld in een bijlage

*** Speciale categorieën van aangehaalde documenten**

"R" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"C" in de octrooiaanvraag vermeld

"E" eerdere octroop(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermeldde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorzetsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorzetsdatum gepubliceerde literatuur die niet bezwaarlijk is voor de octrooiaanvraag, maar wordt vermeld ter versterking van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere gesleekte literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"Z" lid van dezelfde octroofamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

7 oktober 2015

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

European Patent Office, P.O. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
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Fax: (+31-70) 340-3016

De bevoegde ambtenaar

Topcuoglu, Sadik Cem

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**
informatie over leden van dezelfde oestroefamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2014465

In het rapport genoemd oestroefgeslacht	Datum van publicatie	Overeenkomstig(e) geslacht(en)	Datum van publicatie
WO 2014160076	A1	02-10-2014	AU 2014244151 A1 17-09-2015
			CA 2902929 A1 02-10-2014
			WO 2014160076 A1 02-10-2014
EP 2381046	A1	26-10-2011	GEEN
US 4558544	A	17-12-1985	GEEN

WRITTEN OPINION

File No. SN64061	Filing date (day/month/year) 16.03.2015	Priority date (day/month/year) 30.12.2014	Application No. NL2014465
International Patent Classification (IPC) INV. E04F15.024			
Applicant Casalini B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner Topcuoglu, Sadik Cem
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WRITTEN OPINION

Application number
NL2014465

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	7-9, 12, 16
	No: Claims	1-6, 10, 11, 13-15, 17-22
Inventive step	Yes: Claims	
	No: Claims	1-22
Industrial applicability	Yes: Claims	1-22
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

D1 WO 2014/160076 A1 (IPE CLIP FASTENER COMPANY LLC [US];
PELC ROBERT J [US]) 2 oktober 2014 (2014-10-02)

D2 EP 2 381 046 A1 (KIJLSTRA B V [NL]) 26 oktober 2011 (2011-10-26)

2 The present application does not meet the criteria of patentability, because the subject-matter of claim 1 is not new.

D1 discloses all technical features of claim 1 (references apply to D1, see D1, Fig. 2):

"adapterschijf voorzien van een onderste oppervlak (5), dat ingericht is om naar een gebouwoppervlak te zijn gekeerd, en een bovenste oppervlak (10) gescheiden van het onderste oppervlak (5) door een lichaam van materiaal (2) waaruit de adapterschijf is gevormd, waarbij het bovenste oppervlak (10) een veelvoud van radiaal geplaatste uitsteeksels (3) heeft die zich uitstrekken vanaf het bovenste oppervlak (10) in een richting loodrecht daarop, en waarbij een zich radiaal uitstreckende sleuf ("slots" mentioned in page 10, line 9, through which tab 12 protrudes) is aangebracht tussen elk paar aangrenzende uitsteeksels (3)"

The product of D1 is furthermore suitable for all functions assigned in claim 1, as

the "adapterschijf" of D1 is suitable for "positioneren en ondersteunen van een tegelvloer op een primair oppervlak van een gebouw";

"elk uitsteeksel (3)" of the "adapterschijf" of D1 is suitable for "samen te werken met een uitsparing aan een onderkant van een tegelomtrek"

"sleuf" of the "adapterschijf" of D1 is suitable for "om een uitlijnlijp van een sokkel toe te staan zich daar doorheen uit te strekken".

3 Dependent claims 2-22 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of novelty and/or inventive step.

D1 discloses all additional features of claims 2-6, 10, 11, 13-15, 17-22, see in this regard D1, figures 1-6.

Subject matter of claim 20 comprises -among other features- both the "adapterschijf" of claim 1 and the "sokkel" defined in claim 20.

The head 10 of Fig. 2 of D1 have all the features of of the "adapterschijf" of claim 1 of the application. There is a body of material between the top and the bottom surfaces of head 10. The remaining parts of the pedestal of Fig. 2 of D1 have all the features of the "sokkel" of the claims 20-22 of the application.

The additional features of each of claims 7 and 12 are slight constructional changes within the scope of the customary practice followed by persons skilled in the art.

The features of dependent claims 8, 9 and 16 has already been employed for the same purpose in a similar pedestal (see D2, Figures 4-5). It would therefore be obvious to the person skilled in the art to apply this feature with corresponding effect to a pedestal according to D1, thus arriving at a pedestal according to said claims.