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(54) **Support pillar for supporting and securing profiles in place**

(57) The present invention concerns a support pillar comprising a base structure (6), one or more middle structures (7) and a top structure (3) comprising top support surface (1b) for supporting a profile (10), which is provided with a first and a second guiding plates (2a, 2b) standing upright on either side of a first imaginary straight line (X1) crossing the centroid of said top surface (1 b), and wherein the interface between each of the first and second guiding plates and the second main surface (1 b) define a first and a second coupling lines (21 a, 21 b), respectively, each having a first and second end points, characterized in that each of the first and second coupling

lines (21 a, 21 b) are curved, forming a concavity facing away from said first imaginary straight line (X1) and in that, the ratio, D_{max} / d_{min} , of the length, D_{max} , of the longest straight segment joining two points belonging to the first and the second coupling lines (21 a, 21 b) without crossing any coupling line to the length, d_{min} , of the shortest segment joining two points belonging to the first and the second coupling lines (21 a, 21 b) without crossing any coupling line is higher than the same ratio obtained with two rectilinear coupling lines (21 r, 21 s) sharing the same end points than the non-rectilinear coupling lines.

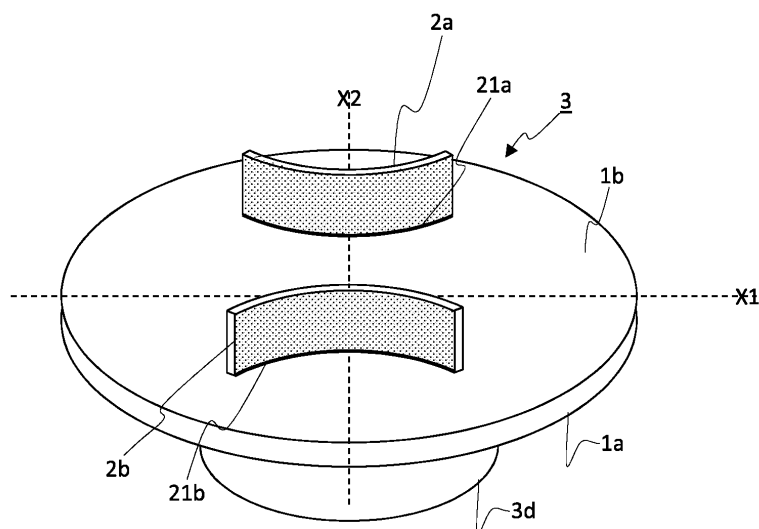


FIGURE 4

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a height-adjustable support structure for raised floors, surfaces or cable conduits.

BACKGROUND OF THE INVENTION

[0002] In the modern construction industry, the concept of height-adjustable support structures is widely used. These structures comprise a number of generally height-adjustable pillars distributed over a ground surface or a roof, terrace, or any other surface on top of which it is desired to locate an elevated floor. They are used in applications typically including technical floors for laboratories, patios, balconies, swimming pool surroundings and decking. The pillars are used to mount supporting profiles, beams or floor panels, such as pavers, or other floor surfaces. The height adjustable pillars have the advantage of permitting to obtain a horizontal surface standing on a sloping ground.

[0003] Height adjustable pillars generally comprise a base structure which provides stability to the pillar, a middle structure coupled to the base structure and allowing the height of the pillar to be varied, and a top structure, comprising a support top surface for receiving a beam or panel. The support top surface of the top structure often comprises spacers or guiding plates extending normal to the top surface and defining the position the beam or panels should adopt and also to secure them. KR20120040455 discloses height adjustable pillars comprising two parallel straight plates standing normal to the top support surface symmetrically with respect to an imaginary line passing through the centroid of the top surface. When a profile or beam is placed on the top structure, extra fastening means are needed to secure the profile or beam to the rectangular plates.

[0004] WO2008105012 discloses height adjustable pillars comprising four parallel plates, collinear two by two standing normal to the top support surface and defining the four corners of a rectangle. The plates are provided with an orifice to allow securing a profile in place with screws.

[0005] The foregoing types of fixing means must be dimensioned specifically for a type of beam. Furthermore, securing a beam into position requires the use of screws which is time consuming and damages the surface of the profile, which cannot be accepted in many applications.

[0006] Given the above, there remains a need for improving the fixing means of height-adjustable support structures allowing beams of different dimensions to be secured in place rapidly and without damaging the surface thereof. This and other advantages of the present invention are presented in continuation.

SUMMARY OF THE INVENTION

[0007] The present invention is defined in the independent claims. Preferred embodiments are defined in the dependent claims. In particular, the present invention concerns a kit of parts to be coupled to form a support pillar for supporting a profile or beam at a distance from a ground surface. The kit of parts of the present invention comprises:

(a) A base structure comprising a substantially planar portion and a column portion jutting out of one main surface of the planar portion. The column extends along a direction substantially normal to the planar portion. The free end of the column portion comprises base coupling means suitable for coupling the base structure to a middle structure.

(b) A first middle structure extending along a first direction, Z, and comprising first middle coupling means at a first end mating the base coupling means of the base structure. At a second, opposite end thereof, the middle structure comprises second middle coupling means suitable for coupling to top a structure.

(c) A top structure comprising a planar support plate comprising top coupling means mating the second middle coupling means of the middle structure. The top coupling means are located on a first main surface of the support plate. Guiding means are provided on a second, opposite main surface of the support plate for receiving and holding in position an elongated profile or beam, such that the longitudinal axis of said profile or beam is substantially parallel to the support plate. The guiding means according to the present invention comprise a first and a second guiding plates standing upright on either side of a first imaginary straight line crossing the centroid of the second main surface. The interface between each of the first and second guiding plates and the second main surface define a first and a second coupling lines, respectively, each having a first and second end points.

[0008] According to the present invention, each of the first and second coupling lines are curved, forming a concavity facing away from said first imaginary straight line (X1) and **in that**, the ratio, D_{max} / d_{min} , of the length, D_{max} , of the longest straight segment joining two points belonging to the first and the second coupling lines without crossing any coupling line to the length, d_{min} , of the shortest segment joining two points belonging to the first and the second coupling lines without crossing any coupling line is higher than the same ratio obtained with two rectilinear coupling lines sharing the same end points than the non-rectilinear coupling lines. In a preferred embodiment the first and second coupling lines are prefer-

ably in the shape of an arc of circle or arc of ellipse

[0009] In the present context, the term "centroid" of a planar surface has its geometrical meaning of the intersection of all straight lines that divide said surface into two parts of equal moment about the line. In other words, it is the "average" (arithmetic mean) of all points of the planar surface. If the planar surface has a substantially regular geometry, i.e., substantially forming a regular convex polygon or a circle or ellipse, provided with protrusions or openings extending along the plane of the surface, the centroid of the surface is considered to be the centroid of the regular geometry ignoring the protrusions or openings.

[0010] It is preferred that the two guiding plates be disposed on the second surface such that the first and second coupling lines are arranged substantially symmetrically with respect to the first imaginary straight line (X1). In yet a preferred embodiment, the first and second coupling lines are symmetrical with respect to a second imaginary line (X1), normal to the first imaginary line (X1) and passing by the centroid of the second main surface with respect to a second imaginary straight line passing the first imaginary line by the centroid of the second surface.

[0011] The new design of the guiding plates allows the clamping of a profile or beam of any width smaller or equal to d_{min} by simply rotating the top structure about an axis normal to the second surface of the support plate, such that the longitudinal axis of the profile forms a non-zero angle with the first imaginary line (X1). Thanks to the curved geometry of the guide plates, a smooth contact is thus provided between the two guiding plates and the profile or beam placed in between the two guiding plates.

[0012] It is preferred that the two end points of the shortest straight segment defining the distance, d_{min} , correspond to the two points of the first and second coupling lines intercepting the second imaginary straight line (X2). More preferably, said shortest straight segment passes by the centroid of the second surface. Alternatively or concomitantly, the two end points of the longest straight segment defining the distance, d_{max} , correspond to the two end points of the first and second coupling lines located on either side of the second imaginary straight line (X2). More preferably, said longest straight segment passes by the centroid of the second surface.

[0013] In order to increase further the height of the pillar, the kit may comprise at least a second middle structure, identical to the first middle structure, and which first middle coupling means are suitable for mating the second middle coupling means of the first middle structure. The various elements of the pillar of the present invention are conveniently made from a polymer, preferably a polyolefin such as polypropylene or polyethylene. For highly demanding applications, the polymer can be reinforced with fibres.

[0014] the base coupling means, top coupling means and first and second middle coupling means are advan-

tageously in the form of a thread, a bayonet or snap fittings, allowing easy and reliable coupling of the various elements together.

[0015] The present invention also concerns a support pillar extending along a first direction, Z, for supporting a profile or beam at a distance from a ground surface, said support pillar comprising a base structure coupled to a first middle structure itself optionally coupled to one or more second middle structures, the second middle structure furthest away from the base structure being coupled to a top structure, **wherein** the base structure, the one or more first and second middle structures, and the top structure are as defined above.

[0016] Such pillar is advantageously used to support a profile or a beam resting on top of the second surface of the top structure of said support pillar, in between the first and second guiding plates. The profile is preferably secured in place by bringing the first and second guiding plates of the guiding means into contact with two opposite surfaces of the profile, by rotation of the pillar about the axis Z such that the first imaginary line (X1) becomes secant with the longitudinal axis of the beam. Such pillars are conveniently used to support:

- (a) a profile comprising a channel for holding wires or ducts;
- (b) part of a support for supporting a deck,
- (c) a duct or pipe.

[0017] The present invention also concerns an assembly of at least two pillars as discussed above, standing upright on their respective base structures, and carrying on the second surface of their respective top structures a beam or a profile positioned in between and secured in place by the two guiding plates of each support pillar.

[0018] The specific design of the guiding plates of the top structure according to the present invention makes a support pillar of given size more versatile to receive and secure profiles of different sizes easily, without the need of additional fastening means, and without damaging sensitive profiles. A profile is secured by clamping it between the two guiding plates by rotation of the pillar. Since the guiding plates are curved a bigger and smoother contact surface between the guiding plates and the profile is obtained, thus reducing the generation of stress concentrations. Such clamping of a profile is advantageous because very quick, reversible, and causing no damage to the profiles.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Figure 1: compares a pillar of the prior art comprising two parallel guiding plates, with a pillar according to the present invention.

Figure 2: Compares clamping with (c)-(e) and with-

out (a), (b) additional fastening means of a profile between two guiding plates by rotation about the Z-axis of the pillars of Figure 1.

Figure 3: is a side view of a pillar with detached top structure comprising (a) one middle structure and (b) two identical middle structure positioned one on top of the other.

Figure 4: is a perspective view of the top structure showing the curved guiding means.

Figure 5: shows a profile supported by two pillars.

DETAILED DESCRIPTION OF THE INVENTION

[0020] The present invention concerns a pillar composed of several separate elements forming a kit which are coupled to one another as illustrated in Figure 3. The pillar comprises:

- (a) a base structure (6) coupled to,
- (b) a first and optionally one or more second middle structures (7, 7b), which is coupled to
- (c) a top structure (3) for supporting and securing a beam or a profile (10).

(a) Base structure (6)

[0021] The base structure (6) is placed on the ground surface and provides stability to the pillar. It comprises a planar base (8) and a columnar portion (9) extending out in a first direction, Z, substantially normal to the planar base (8). The mechanical integrity of the base structure may be reinforced by stiffening ribs (9s) coupled to the columnar portion and planar base, and distributed around the perimeter of the planar base (8). As illustrated in Figure 3, the base structure supports the whole pillar and any structure (beam, profile (10)) laid on top thereof. The shape of the planar base (8) is not critical and can vary but in most cases it has a substantially circular or partly circular shape. The columnar portion (9) is at least partly hollow and preferably defines an inner cylindrical surface provided with base coupling means (6c) suitable for coupling to first middle coupling means (7c) of a middle structure (7).

(b) Middle structure (7)

[0022] The first and optionally one or more second middle structures (7, 7b) are identical and define the height of the column by connecting the base structure (6) to the top structure (3). A first middle structure (7) extends along a first direction, Z, and comprises at a first end thereof, first middle coupling means (7c) mating the base coupling means (6c) of the base structure (6), and at a second,

opposite end thereof, second middle coupling means (7d) suitable for coupling to a second middle structure (7b), identical to the first middle structure (7) or to a top structure (3). As illustrated in Figure 3(a), if a pillar of higher height is required, coupling one or more second middle structures (7b) to a first middle structure (7) offers an elegant solution. This can be done if the second middle coupling means (7d) are identical to the base coupling means (6c), so that the first middle coupling means (7c) of a second middle structure can mate the second middle coupling means (7d) of a first middle structure (7). In order to enhance the stability of such high pillars, the base coupling means (6c) and second middle coupling means (7d) may end to form a shoulder on which the first middle coupling means (7c) may rest when fully engaged in the former coupling means (6c, 7d).

[0023] The height of the pillar can preferably be varied with varying means. This can advantageously be achieved by using mating threaded inner and outer surfaces of the base coupling means (6c) and first middle coupling means (7c). This way, the coupling means (6c, 7c) combine both functions of coupling the base and middle structures (6, 7) together, and of varying the height of the pillar.

(c) Top structure (3)

[0024] The top structure (3) must support and secure in place a beam or profile (10). As illustrated in Figures 3 and 4, the top structure (3) comprises a support plate (1) defined by a first and second support surfaces (1a, 1b), separated by the thickness of the plate. The support plate (1) can have any shape, but preferably has a substantially regular geometry, such as a regular convex polygon or a circle or ellipse. If the support plate has a regular geometry provided with protrusions or openings extending along the plane of the first and second support surfaces, the position of the centroid is determined for the regular geometry ignoring the protrusions or openings. If the direction, Z, along which extends the pillar also substantially defines an axis of revolution of the pillar, then the centroid of the second support surface (1b) most preferably belongs to said axis of revolution, Z.

[0025] Top coupling means (3d) are provided on the first support surface (1a) facing towards the base structure (6). They are suitable for mating the second middle coupling means of a middle structure (7, 7b), such that the support plate (1) is substantially parallel to the planar base (8) of the base structure (6). In a preferred embodiment, the top structure (3) is provided with pivoting means for changing the inclination of the support plate (1). This can be interesting in case of a profile (10) to be supported horizontally by a series of pillars standing on a sloping ground. Such embodiment is described e.g., in application EP2011/0195747.

[0026] The second support surface facing away from the base structure provides a support to a beam or a profile, and comprises guiding means (2) in the shape of

a first and second plates (2a, 2b) for positioning such profile thereon. Said first and a second guiding plates (2a, 2b) stand upright on either side of a first imaginary straight line (X1) crossing the centroid of said second main surface (1b). The interface between each of the first and second guiding plates (2a, 2b) and the second main surface (1b) define a first and a second coupling lines (21a, 21b), respectively, each having a first and second end points.

[0027] The present invention differs from the prior art in that:

(a) each of the first and second coupling lines (21a, 21b) are curved, forming a concavity facing away from said first imaginary straight line (X1) and in that,

(b) the ratio, D_{max} / d_{min} , of the length, D_{max} , of the longest straight segment joining two points belonging to the first and the second coupling lines (21a, 21b) without crossing any coupling line to the length, d_{min} , of the shortest segment joining two points belonging to the first and the second coupling lines (21a, 21b) without crossing any coupling line is higher than the same ratio obtained with two rectilinear coupling lines (21r, 21s) sharing the same end points than the non-rectilinear coupling lines.

[0028] In a preferred embodiment, the pillar extends from the base structure (6) to the middle structure(s) (7, 7a) and the top structure (3) along a first direction, Z, substantially defining an axis of revolution of the pillar. It is preferred that such axis of revolution, Z, passes by the centroid of the second support surface (1b).

[0029] Figure 1(a) illustrates an embodiment of the present invention compared with a pillar of the prior art represented in Figure 1(a) comprising two parallel straight coupling lines. It is clear that the value of the D_{max} / d_{min} ratio of Figure 1(b) according to the present invention is higher than the one of Figure 1(a) of the prior art for the following reasons. Since the end points of the guiding plates of the prior art and of the present invention are the same, it follows that the length, D_{max} , of the longest straight segment joining the two coupling lines, which is defined by two opposite end points of the coupling lines, does not vary between the straight coupling lines (21r, 21s) configuration of the prior art (cf. Figure 1(a)) and the curved coupling lines (21a, 21b) configuration of the present invention (cf. Figure 1(b)), i.e., $D_{max}(a) = D_{max}(b)$ where (a) and (b) refer to the embodiments illustrated in Figure 1(a) (= prior art) and Figure 1(b) (= invention), respectively. The length, $d_{min}(a)$, of the shortest segment joining the two straight coupling lines (21r, 21s) of Figure 1(a), defined by any segment normal to the two straight lines is larger than the length, $d_{min}(b)$, of the shortest segment joining the two curved coupling lines (21a, 21b) of Figure 1(b), since they form a concavity facing away from said first imaginary straight line (X1), i.e., $d_{min}(a) > d_{min}(b)$. It follows that $[D_{max}$

$/ d_{min}](b) > [D_{max} / d_{min}](a)$. It is most preferred that, the length, $d_{min}(b)$, of the shortest segment joining two curved coupling lines (21a, 21b) according to the present invention be smaller than the shortest segment, $d_{min}(a)$, joining the two parallel coupling lines (21r, 21s) sharing the same end points.

[0030] The distinguishing design of the guiding plates (2a, 2b) according to the present invention is advantageous over the prior art, because it provides a further function to the guiding means (2) of securing a profile (10) in place, by clamping it between the first and second guiding plates (2a, 2b) by simple rotation of the pillar such that the first imaginary line (X1) passing by the centroid of the second support surface (1b) becomes secant (i.e., forms a non-zero angle) with the longitudinal axis of the profile. Figure 2 illustrates the clamping mechanism of a profile by (a) two straight guiding plates (2r, 2s) of the prior art and (b) by two curved guiding plates (2a, 2b) according to the present invention. It can be seen that in the prior art design (a) the contact of the guiding plates (2r, 2s) with the profile is made through the lateral edges of the former, which are relatively sharp, and can damage the profile in case of rotation of the pillar with excessive force. Even by smoothening the edges, the stress applied to the sides of the profile remains very high because the contact area is very small (stress = applied force / contact area).

[0031] By contrast with the prior art design illustrated in Figure 2(a), with curved guiding plates (2a, 2b) according to the present invention (illustrated in Figure 2(b)) the contact area between the guiding plates and the profile is increased substantially, thus reducing correspondingly the stress applied to the sides of the profile (10). Even delicate profiles (e.g., pipes or brittle profiles) cannot be damaged easily by rotating the pillars with too high a torque.

[0032] In case a profile can be fixed to the pillars with fastening means such as nails or screws, the pillar of the present invention is advantageous over prior art pillars with straight guiding plates (2r, 2s) in that profiles of different width can be neatly fixed with screws or nails to the guiding plates of a pillar according to the present invention, which is not the case with the prior art pillars. Figure 2(c) shows the solution adopted by most operators using state of the art pillars with straight guiding plates separated by a distance greater than the width of the profile. Screws or nails are applied through one guide plate (2r) and the profile (10). This solution is not satisfactory because the profile is offset with respect to the centre of the pillar. Since the pillars are first laid on the ground in a precise alignment, the fact that the profile (10) is offset with respect to the alignment of the pillars renders installation of the whole structure more cumbersome. An alternative solution is to rotate the pillar of the prior art as shown in Figure 2(a) and to try to insert nails or screws through the guide plates and profile as illustrated in Figure 2(d). This solution is all but satisfactory since misalignment is sure to occur and the fastening

through the nails or screws is far from being reliable as can be appreciated from Figure 2(d). With the curved geometry of the guide plates (2a, 2b) according to the present invention, it is possible to rotate the pillar such that the profile is clamped in between the two guide plates, in alignment with the centre of the pillar and still fasten the profile with screws or nails in optimal conditions, as the curved geometry of the guide plates ensures a sufficient contact surface to satisfactorily insert screws or nails..

[0033] The first and second coupling lines (21a, 21b) are preferably in the shape of an arc of circle or an arc of ellipse. As illustrated in Figures 1(b) and 2(b), the first and second coupling lines (21a, 21b) are preferably arranged substantially symmetrically with respect to the first imaginary straight line passing by the centroid of the second surface (1b). More preferably, each of the first and second coupling lines (21a, 21b) is symmetrical with respect to a second imaginary straight line (X2), said second imaginary straight line passing by the centroid of the second surface and being substantially normal to said first imaginary straight line (cf. Figure 1(b)). In yet a preferred embodiment illustrated in Figure 1(b),

- the two end points of the shortest straight segment defining the distance, d_{min} , correspond to the two points of the first and second coupling lines intercepting the second imaginary straight line (X2), said shortest straight segment thus being coaxial with X2, and/or
- the two end points of the longest straight segment defining the distance, D_{max} , correspond to the two end points of the first and second coupling lines (21a, 21b) located on either side of the second imaginary straight line (X2), said longest straight segment preferably passing by the centroid of the second surface (1b).

[0034] The various elements of a pillar according to the present invention: base structure (6), first and second middle structures (7), and top structure (3) are preferably made of a polymer. In particular, they can be injection moulded using a thermoplastic polymer, such as a polyolefin like PE, PP, a polyamide, such as PA6, PA66, PA10, PA11, PA12, a thermoplastic polyurethane or polyester such as PET or PEN, polystyrene, polycarbonate, etc. In case of highly demanding applications, the polymer can be reinforced with short fibres of glass, carbon, aramid, or the like and/or higher performance polymers can be used such as PEEK, PEKK, PEI and the like. For most applications, pillars made of PP are preferred. They may comprise additives to enhance their conductivity or resistance to moisture, flame, or exposure to UV. The skilled person knows which material to select for a particular application and the choice of the material does not affect the present invention.

[0035] When all the elements of a kit according to the present invention are coupled to one another, they form

a pillar extending along a first direction, Z, from and normal to the planar base (9) to the support plate (1). An elongated profile (10) can rest at one point on the support plate (1) of a first pillar, secured in place by rotating the pillar about the first direction, Z, until the first and second guiding plates (2a, 2b) both contact the profile and hold it in place. The profile (10) can be supported at another point by a second pillar or can be fixed to another structure, like a masonry or the like. Figure 5 illustrates a profile (10) supported at two points by two pillars according to the present invention. No external fastening means such as screws or glue are required to secure the profile in place. This is advantageous because (a) it saves much time for the installation since it suffices that the pillar be rotated adequately to secure the profile, which is much faster than fastening a screw or applying an adhesive, (b) it is totally reversible, and (c) it does not damage the profile.

[0036] The pairs of coupling means consisting of the base coupling means (6c) and first middle coupling means (7c), and of the second middle coupling means (7d) and top coupling means (3d) can each comprise a thread, a bayonet or snap fittings. A thread is preferred at least for the first pair consisting of the base coupling means (6c) and first middle coupling means (7c) because it allows an easy way of varying the height of the pillar. If a second middle coupling structure (7b) is to be coupled to a first middle coupling structure (7), the base coupling means (6c) and second middle coupling means (7d) must be identical and must be compatible with both first middle coupling means (7c) and top coupling means (3d) which must also be identical to one another. It follows that in this embodiment, all coupling means of the first and second pairs of coupling means must be compatible with one another. If an easy height regulation is desired, then it is preferred that all coupling means be a threaded coupling means.

[0037] The pillars of the present invention are particularly suitable for supporting beams or profiles selected from:

- (a) a profile comprising a channel for holding wires or ducts;
- (b) is part of a support for supporting a deck,
- (c) a duct or pipe

Claims

1. A kit of parts for making a support pillar for supporting a profile or beam (10) at a distance from a ground surface, said kit of parts comprising:
 - (a) a base structure (6) comprising a substantially planar portion (8), and a column portion (9) jutting out of one main surface of said planar portion and extending along a direction substantially normal to said planar portion, the free end

of the column portion comprising base coupling means (6c) suitable for coupling the base structure to,

(b) at least a first middle structure (7) extending along a first direction, Z, and comprising at a first end thereof, first middle coupling means (7c) mating the base coupling means (6c) of the base structure (6), and at a second, opposite end thereof, second middle coupling means (7d) suitable for coupling to,

(c) a top structure (3) comprising a planar support plate (1) comprising top coupling means (3d) mating the second middle coupling means (7d) of the middle structure (7), said top coupling means being located on a first main surface (1a) of said support plate (1), and further comprising guiding means (2) located on a second, opposite main surface (1b) of said support plate (1) for receiving and holding in position at least one elongated profile or beam (10), such that the longitudinal axis of said at least one profile or beam is substantially parallel to said support plate (1), wherein said guiding means (2) comprise a first and a second guiding plates (2a, 2b) standing upright on either side of a first imaginary straight line (X1) crossing the centroid of said second main surface (1b), and wherein the interface between each of the first and second guiding plates and the second main surface (1b) define a first and a second coupling lines (21a, 21b), respectively, each having a first and second end points, **characterized in that** each of the first and second coupling lines (21a, 21b) are curved, forming a concavity facing away from said first imaginary straight line (X1) and **in that**, the ratio, D_{max} / d_{min} , of the length, D_{max} , of the longest straight segment joining two points belonging to the first and the second coupling lines (21a, 21b) without crossing any coupling line to the length, d_{min} , of the shortest segment joining two points belonging to the first and the second coupling lines (21a, 21b) without crossing any coupling line is higher than the same ratio obtained with two rectilinear coupling lines (21r, 21s) sharing the same end points than the non-rectilinear coupling lines.

2. A kit of parts according to claim 1, wherein each of the first and second coupling lines (21a, 21b) are in the shape of an arc of circle or arc of ellipse, and/or wherein the length, d_{min} , of a the shortest segment joining two curved coupling lines (21a, 21b) according to claim 1 is preferably smaller than the shortest segment joining the two parallel straight coupling lines (21r, 21s) sharing the same end points.
3. A kit of parts according to claim 1 or 2, wherein the first and second guiding plates (2a, 2b) are disposed

on the second surface (1b) such that the first and second coupling lines (21a, 21b) thereof are arranged substantially symmetrically with respect to said first imaginary straight line passing by the centroid of the second surface.

4. A kit of parts according to the preceding claim, wherein the first and second guiding plates (2a, 2b) are disposed on the second surface such that the first and second coupling lines (21a, 21b) thereof are arranged substantially symmetrically with respect to a second imaginary straight line (X2) said second imaginary straight line passing by the centroid of the second surface and being substantially normal to said first imaginary straight line.

5. A kit of parts according to the preceding claim, wherein:

- the two end points of the shortest straight segment defining the distance, d_{min} , correspond to the two points of the first and second coupling lines intercepting the second imaginary straight line (X2), said shortest straight segment being thus coaxial with said second imaginary line (X2), and/or
- the two end points of the longest straight segment defining the distance, D_{max} , correspond to the two end points of the first and second coupling lines (21a, 21b) located on either side of the second imaginary straight line (X2), said longest straight segment preferably passing by the centroid of the second surface (1b).

6. A kit of parts according to any of the preceding claims, further comprising at least a second middle structure (7b) identical to the first middle structure (7), wherein the first middle coupling means (7c) of the second middle structure (7b) are suitable for mating the second middle coupling means (7d) of the first middle structure (7).

7. A kit of parts according to any of the preceding claims, wherein the base structure (6), top structure (3) and one or more middle structures (7, 7b) as defined in claim 1(b) if any, are made from a polymer, preferably a polyolefin such as polypropylene or polyethylene, which is preferably reinforced with fibres.

8. A kit of parts according to any of the preceding claims, wherein said base coupling means (6c), top coupling means (3d) and first and second middle coupling means (7c, 7d) comprise a thread, a bayonet or snap fittings.

9. A support pillar extending along a first direction, Z, for supporting a profile or beam at a distance from a ground surface, said support pillar comprising a base

structure (6) coupled to a first middle structure (7) itself optionally coupled to one or more second middle structures (7b), the second middle structure furthest away from the base structure (6) being coupled to a top structure (3), **characterized in that**, the base structure (6), the one or more first and second middle structures (7, 7b), and the top structure (3) are as defined in any of the preceding claims. 5

10. Use of at least one support pillar according to claim 9, for supporting a profile or a beam resting on top of the second surface of the top structure of said at least one support pillar, in between the first and second guiding plates. 10

11. Use according to the preceding claim, wherein the profile is secured in place by bringing the first and second guiding plates (2a, 2b) of the guiding means into contact with two opposite surfaces of the profile, by rotation of the pillar about the axis Z such that the first imaginary line (X1) becomes secant with the longitudinal axis of the beam. 15 20

12. Use according to claim 10 or 11, wherein the profile or beam is: 25

- (a) a profile comprising a channel for holding wires or ducts;
- (b) is part of a support for supporting a deck,
- (c) a duct or pipe. 30

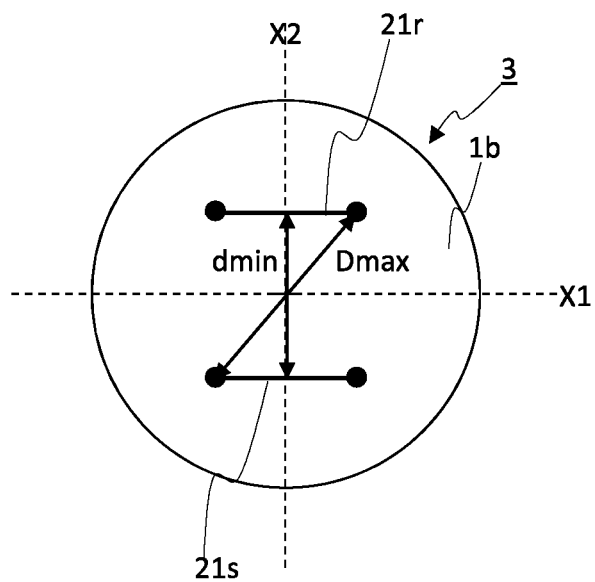
13. Assembly of at least two pillars according to claim 9, standing upright on their respective base structures (6), and carrying on the second surface (1b) of their respective top structures (3) a beam or a profile (10) positioned in between and secured in place by the two guiding plates (2a, 2b) of each support pillar. 35

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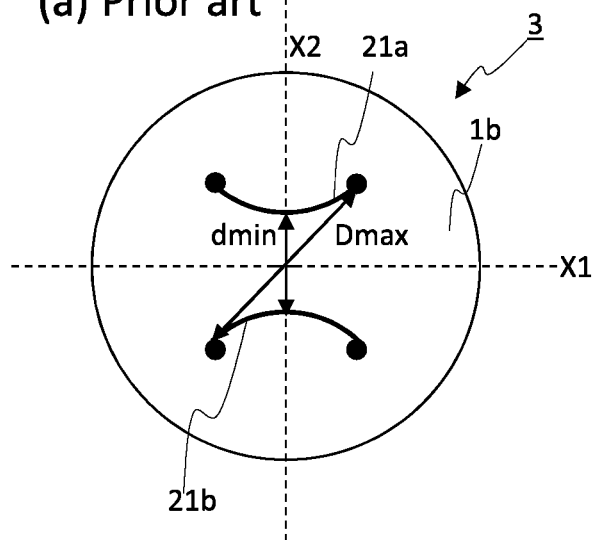
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(a) Prior art



(b)

FIGURE 1

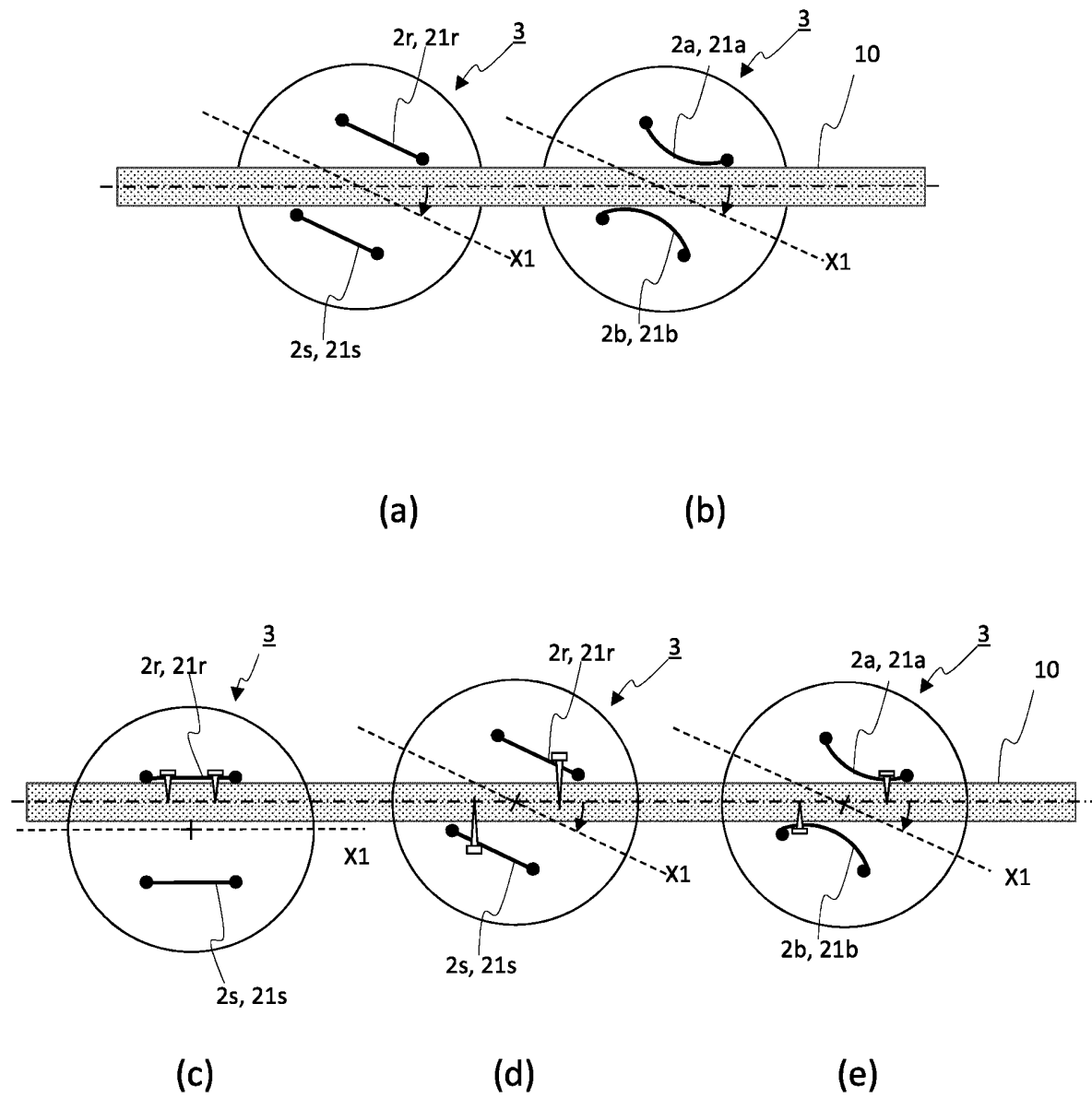


FIGURE 2

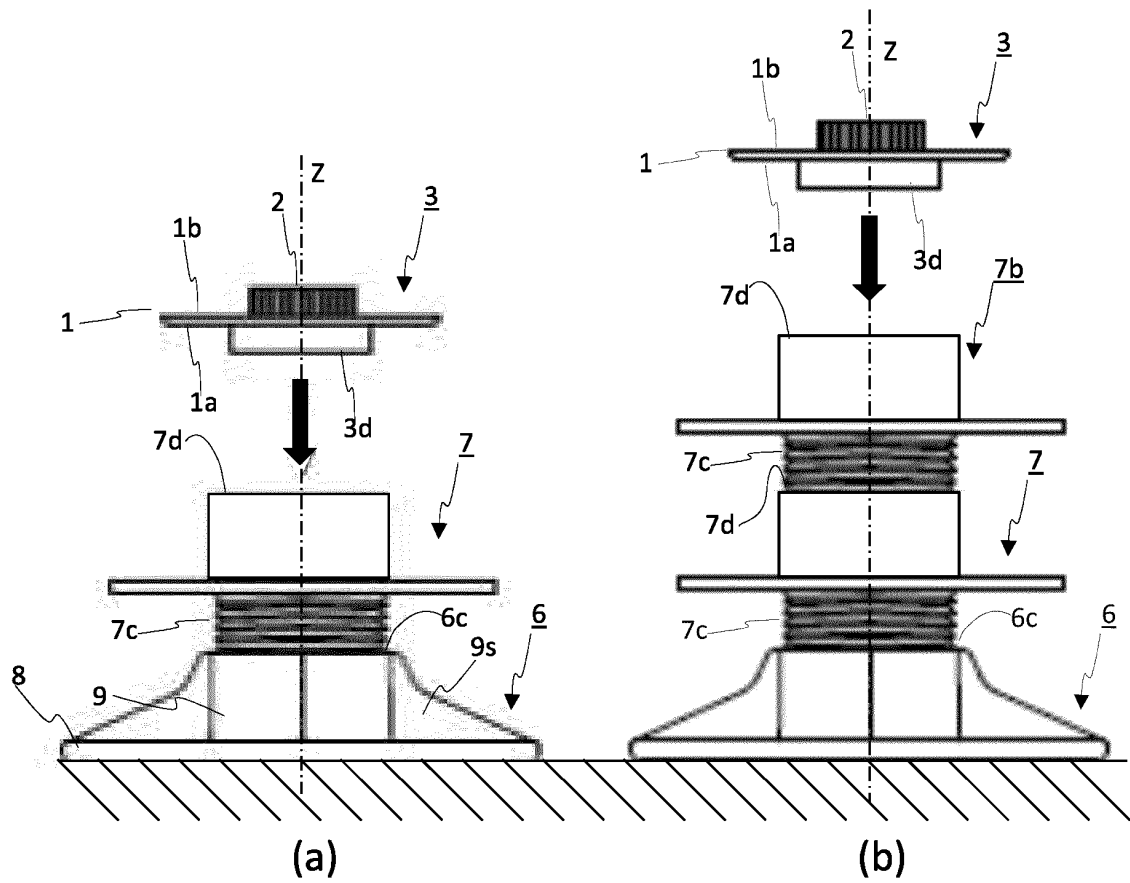


FIGURE 3

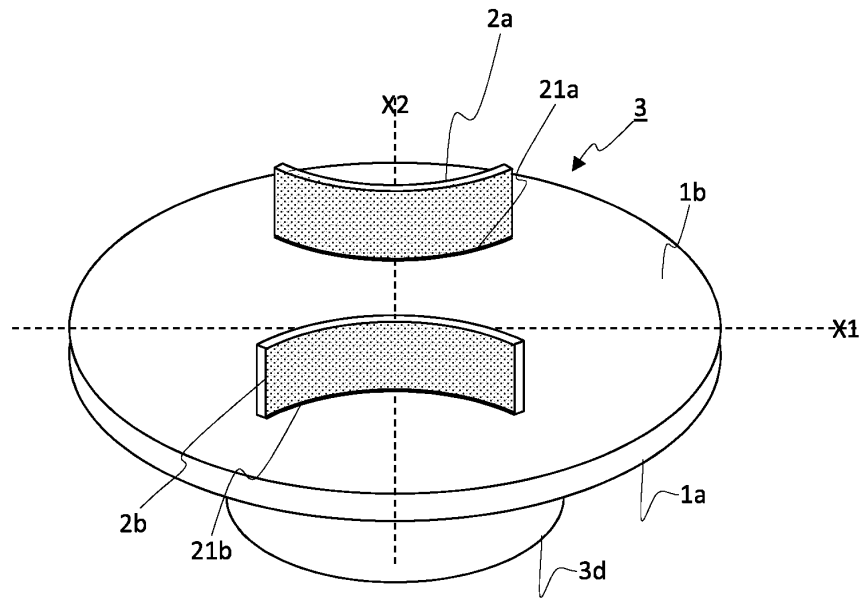


FIGURE 4

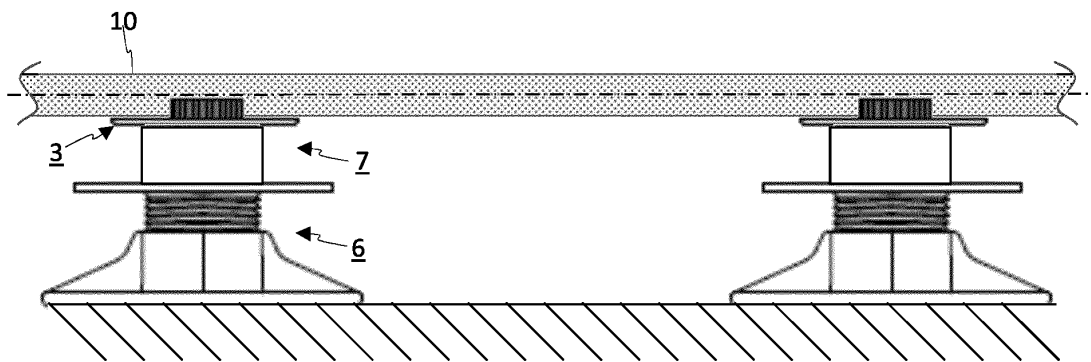


FIGURE 5



EUROPEAN SEARCH REPORT

Application Number
EP 12 19 4441

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			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 October 2013	Examiner Khera, Daljit
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