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(54) **A SUSPENDED CEILING**

SELBSTTRAGENDE DECKE

PLAFOND SUSPENDU

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Description

[0001] The present invention relates to a suspended ceiling. A suspended ceiling is a ceiling, which is hung below a main structural ceiling and constitutes a secondary ceiling. It is also referred to as a dropped ceiling.

[0002] A typical suspended ceiling comprises a frame system suspended on hangers or wires from the main structural ceiling or an overhead structure. Ceiling tiles (also known as panels) are placed in the frame system, which supports the ceiling tiles. The ceiling tiles thereby form a two-dimensional grid with a number of rows and columns depending on the size of the ceiling with respect to the size of the individual ceiling tiles. Each ceiling tile constitutes a cell in the grid, and the sides of the ceiling tiles form the grid lines of the grid.

[0003] A plenum space (air-filled space in the structure) may exist between the suspended ceiling and the main structural ceiling. Piping and/or wiring may run above the suspended ceiling in the plenum space.

[0004] The ceiling tiles are placed in proximity to each other. In this way a suspended ceiling may hide the building infrastructure, including the piping and/or wiring.

[0005] A suspended ceiling, in which access to the plenum space above the suspended ceiling may readily be obtained at any desired location in the grid, is typically referred to as an accessible suspended ceiling construction.

[0006] An example of a suspended ceiling is disclosed in CN205382614. The frame system of the suspended ceiling disclosed in CN205382614 comprises a number of T-profile rails facing upside down and which cross each other at right angles. US 3,332,194 discloses a suspended ceiling, wherein the support structure only comprises a first set of profile rails extending substantially parallel to each other in a first direction. The result is that the individual ceiling plates need alignment both after mounting and after each inspection of the plenum space. JP H07119235 discloses a suspended ceiling according to the preamble of claim 1, where the system comprises a first set of profile rails and a second set of profile rails. The system further comprises a plurality of ceiling boards, which comprises a cutout or groove on all four sides such that all four sides are supported by the first and second set of profile rails. This results in the ceiling boards being difficult to install and/or remove.

[0007] It is an object of the present invention to provide a suspended ceiling in which the ceiling tiles may be easily placed in a frame system. It is a further object of the present invention to provide a suspended ceiling in which the ceiling tiles may be easily aligned, both during assembly of the suspended ceiling as well as after an inspection of the plenum space. Specifically, it is an object of the present invention to provide a suspended ceiling in which the ceiling tiles in neighboring rows of the grid are aligned, and to provide a suspended ceiling in which the ceiling tiles in neighboring columns of the grid are aligned.

[0008] The above object and advantages together with numerous other objects and advantages, which will be evident from the description of the present invention, are according to an aspect of the present invention obtained by:

A suspended ceiling according to independent claim 1 extending in a substantially horizontal plane, said suspended ceiling comprising:

- a set of ceiling tiles;
- a first set of profile rails extending substantially parallel to each other in a first direction;
- a second set of profile rails extending substantially parallel to each other in a second direction;
- wherein the profile rails in said first set of profile rails and the profile rails in said second set of profile rails are interlocked and extend substantially orthogonal to each other forming a frame system for the ceiling tiles in said set of ceiling tiles;
- wherein each ceiling tile in said set of ceiling tiles is a substantially rectangular/quadratic ceiling tile, and is supported at opposite sides alone by profile rails in said first set of profile rails, and
- wherein each ceiling tile in said set of ceiling tiles loosely abuts the profile rails in said second set of profile rails.

[0009] Substantially parallel directions means directions deviating with less than 10° , and substantially orthogonal means $90^\circ \pm 10^\circ$.

[0010] A set of ceiling tiles means a collection of individual ceiling tiles. The ceiling tiles may be made of gypsum or other materials. The ceiling tiles in the set of ceiling tiles may be substantially structurally identical ceiling tiles not withstanding production margins allowing a difference in a specification of individual ceiling tiles of up to 10 %.

[0011] The total number of members in the set of ceiling tiles inevitably depends on how many ceiling tiles are needed in order to fill out each cell in the grid, wherein the number of cells in the grid depends on the dimension of the suspended ceiling relative to the dimension of the individual ceiling tiles in the set of ceiling tiles, and the size of a possible gap between ceiling tiles.

[0012] Each ceiling tile in the set of ceiling tiles is substantially rectangular, i.e. each ceiling tile may have a geometry of an irregular polygon, which is approximating the shape of a rectangle or a square. For example, a corner of a ceiling tile may be cut or rounded off, meaning that the ceiling tile may constitute an irregular pentagon with three interior angles being 90° and the remaining two interior angles each being 45° .

[0013] Opposite sides of a ceiling tile may also not be perfectly parallel, i.e. they may have an angle less than $\pm 10^\circ$ between them. Preferably, each ceiling tile forms a square shape, meaning that all four sides have an equal length.

[0014] The first and second sides of each ceiling tile

constitute opposite sides, which are parallel in the first direction and thereby parallel to the profile rails in the first set of profile rails.

[0015] The third and fourth sides of each ceiling tile constitute opposite sides, which are parallel in the second direction and thereby parallel to the profile rails in the second set of profile rails. The first, second, third and fourth sides constitute the four sides of the substantially rectangular ceiling tile. Each ceiling tile has a top side facing upwards and towards, the overhead structure and a bottom side facing downwards and towards a building floor.

[0016] Each ceiling tile in the set of ceiling tiles is supported at the first side of the ceiling tile and at the second side of the ceiling tile only; thus, leaving the third side and the fourth side of the ceiling tile unsupported.

[0017] When an individual ceiling tile is supported only at two sides, the individual ceiling tile is less cumbersome to install and place in the frame system. The individual ceiling tile may also be less cumbersome to remove and place back again in the frame system. A set of profile rails means a number of substantially structurally identical profile rails not withstanding production margins allowing a difference in a specification of individual ceiling tiles of up to 10 %, and also not withstanding special profile rails at the edges of the suspended ceiling where the ceiling meets building walls.

[0018] The suspended ceiling may comprise a plurality of hangers or wires for supporting the profile rails in the first set of profile rails.

[0019] The profile rails in the first set of profile rails constitute support profiles for supporting the ceiling tiles. Each profile rail belonging to the first set of profile rails may comprise a first flange extending in a horizontal direction for providing a support surface for a ceiling tile belonging to the set of ceiling tiles.

[0020] During assembly of the suspended ceiling, ceiling tiles are placed on support surfaces for resting thereon. Preferably, each ceiling tile comprises a first groove or indentation along the first side of each ceiling tile, and a second groove or indentation along the second side of each ceiling tile. These grooves are intended for engagement with flanges of the profile rails in the first set of profile rails, i.e. the first flange of each of the profile rails in the first set of profile rails.

[0021] Each profile rail in the first set of profile rails may comprise a first web constituting a first plate being orthogonal to the first flange; the first web and the first flange forming a T-shaped cross section facing upside down, i.e. an inverse T as seen in a direction up towards the suspended ceiling.

[0022] A first ceiling tile may rest on a first part of the first flange, the first part being at a right side of a profile rail in the first set of profile rails. A second ceiling tile may rest on a second part of the first flange, the second part being at a left side of the profile rail. Preferably, each profile rail in the first set of profile rails comprises a first skirt extending from a bottom side of the first flange in a

vertical plane for aligning the ceiling tiles along the second direction.

[0023] Each ceiling tile in the set of ceiling tiles may abut at the first side and the second side the profile rails in the first set of profile rails, so that the location of ceiling tiles is fixed in the second direction, the abutment being in a horizontal direction.

[0024] Since the profile rails in the first set of profile rails extend parallel to each other, the ceiling tiles can become aligned along the second direction when the ceiling tiles abut the profile rails in the first set of profile rails. This means that the grid lines in the first direction form straight lines. Each ceiling tile may abut the first skirt of a respective profile rail in the first set of profile rails.

[0025] Each profile rail in the first set of profile rails may comprise a bead. The bead may be arranged at an opposite side of the first web relative to the first flange.

[0026] The profile rails in the second set of profile rails may constitute alignment profiles for aligning the ceiling tiles along the first direction. Each profile rail in the second set of profile rails may comprise a second skirt consisting of a second web extending in a vertical direction.

[0027] The first skirt may extend to a first height, i.e. a bottom end of the first skirt ends at the first height. The second skirt may extend to a second height, i.e. a bottom end of the second skirt ends at the second height, the first height being substantially equal to the first height. Substantially equal heights means that a difference between them is less than 10 %. Hereby, is achieved flush gridlines seen from below.

[0028] The profile rails in the first set of profile rails may differ from each other for decorative reasons. Similarly, the profile rails in the second set of profile rails may also differ from each other.

[0029] Each ceiling tile may extend to a third height, i.e. the bottom side of each ceiling tile being in a plane at the third height. The third height may be substantially equal to the first height. Preferably, the third height is lower than the first height. In this way, the bottom side of each ceiling tile extends below the frame system.

[0030] Each profile rail in the second set of profile rails may comprise a second flange being orthogonal to the second web/second skirt, the second web and the second flange forming a T-shaped cross section, and the second flange providing an upper stop for a ceiling tile during assembly of the suspended ceiling, thereby stopping upwards displacement or movement of the ceiling tile.

[0031] Each ceiling tile belonging to the set of ceiling tiles may loosely abut at the third side and the fourth side profile rails belonging to the second set of profile rails. This means that the third and fourth sides of each ceiling tile are not locked or supported in a downwards direction by the profile rails in the second set of profile rails, but only prevented from being moved too much upwards during assembly or misaligned along the first direction.

[0032] Each ceiling tile in the set of ceiling tiles may abut at the third side and the fourth side profile rails in

the second set of profile rails, so that the location of ceiling tiles is fixed in the first direction, the abutment being in a horizontal direction.

[0033] Since the profile rails in the second set of profile rails extend parallel to each other, the ceiling tiles can become aligned along the first direction when the ceiling tiles abut the profile rails in the second set of profile rails. This means that the grid lines in the second direction form straight lines. Preferably, each ceiling tile abuts the second skirt of a respective profile rail in the first set of profile rails.

[0034] When the ceiling tiles abut both the profile rails in the first set of profile rails and the profile rails in the second set of profile rails in a horizontal direction, the ceiling tiles are aligned to form a regular grid, i.e. a grid with structured grid lines that form straight and parallel lines in both the first and the second direction.

[0035] The profile rails in the first set of profile rails and the profile rails in the second set of profile rails may be interlocked by way of tongues and through-holes. Each profile rail in the first set of profile rails may comprise a through-hole.

[0036] Preferably, each profile rail in the first set of profile rails comprises a plurality of through-holes placed along each profile rail. The through-hole may be provided in the first web of a respective profile rail in the first set of profile rails.

[0037] Each profile rail in the second set of profile rails may comprise a first end having a first tongue for extending through the through-hole. For increased stability of the interlocking, the first tongue may comprise a first pawl for engaging said first web.

[0038] The first pawl may extend out from the first tongue and may be elastic such that it can be moved towards the first tongue when it is pushed through the through-hole, i.e. as the first pawl comes into contact with a wall of the first web around the through-hole as it moves through the through-hole.

[0039] The first pawl may form an irreversible lock in that the profile rail in the first set of profile rails and the profile rail in the second set of profile rails may not become unlocked from each other unless the first pawl is pushed towards the first tongue.

[0040] Additionally, each profile rail in said second set of profile rails may comprise a second end having a second tongue, wherein the second tongue may comprise a second pawl.

[0041] The second pawl may extend out from the second tongue and may be elastic such that it can be moved towards the second tongue when it is pushed through the through-hole, i.e. as the second pawl comes into contact with a wall of the first web around the through-hole.

[0042] The first pawl of a profile rail in the second set of profile rails may interlock with the second pawl of another profile rail in the second set of profile rails.

[0043] Alternatively, the profile rails in the first set of profile rails and the profile rails in the second set of profile rails may be interlocked by way of hook locks. Each pro-

file rail in the second set of profile rails may comprise a first end having a hook bolt for engaging the through-hole. The through-hole may be provided in the first flange of a respective profile rail in the first set of profile rails.

[0044] A respective profile rail means a profile rail that a ceiling tile engages, i.e. each ceiling tile engages with two profile rails in the first set of profile rails, and two profile rails in the second set of profile rail.

[0045] The second flange at a first end of a profile rail in the second set of profile rails may abut the first web for increased stability of the frame system. Alternatively, the second flange at a first end of a profile rail in the second set of profile rails may abut the bead.

[0046] The first end of each profile rail in the second set of profile rails may be shaped to match a shape of the left side of the profile rails in the first set of profile rails - except for the first tongue, which extends through the through-hole of a respective profile rail in the first set of profile rails.

[0047] The second end of each profile rail in the second set of profile rails may be shaped to match a shape of the right side of the profile rails in the first set of profile rails - except for the second tongue, which may extend through the through-hole of a respective profile rail in the first set of profile rails.

[0048] The invention will now be explained in more detail below by means of examples of embodiments with reference to the very schematic drawing, in which

Fig. 1 shows a perspective view of a frame system for a suspended ceiling including a part of a ceiling tile placed in the frame system.

Fig. 2 shows a side view of an individual ceiling tile as it is being supported by two neighboring profile rails in the first set of profile rails.

Fig. 3 shows a view from below of a part of the suspended ceiling.

Fig. 4 shows an end view of a profile rail, which belongs to the first set of profile rails.

Fig. 5 shows the cross section A-A' of the profile rail shown in Fig. 6.

Fig. 6 shows a side view of a profile rail, which belongs to the second set of profile rails.

Fig. 7 shows an exploded view of a part of the suspended ceiling.

Fig. 8 shows an exploded view of a part of the suspended ceiling, and

Fig. 9 shows a perspective view of a part of the suspended ceiling.

[0049] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. The invention may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention as defined in the appended claims to those skilled in the art. Like reference numerals refer to like elements throughout. Like elements will, thus, not be described in detail with respect to the description of each figure.

[0050] The suspended ceiling shown in Fig. 1 comprises profile rails, which belong to a first set of profile rails. In Fig. 1, parts of three profile rails belonging to the first set of profile rails can be seen, among other a first profile rail 1 and a second profile rail 6.

[0051] Each profile rail in the first set of profile rails has a length of several meters and extends parallel to the other members in the first set of profile rails. The profile rails in the first set of profile rails are hung from the main ceiling by hangers 19. Two hangers can be seen in Fig. 1.

[0052] Profile rails belonging to a second set of profile rails extend orthogonal to the profile rails in the first set of profile rails, among other a third profile rail 10 and a fourth profile rail 11.

[0053] Each profile rail in the second set of profile rails extends between two neighboring profile rails belonging to the first set of profile rails and orthogonal to these, so that a frame system is formed. The profile rails in the first set of profile rails and the profile rails in the second set of profile rails are interlocked or fixed to each other in order to form a rigid frame system.

[0054] Ceiling tiles are placed in the frame system. In Fig. 1, a part of a ceiling tile 9 can be seen. Each ceiling tile has a rectangular shape with four sides and is surrounded by parts of two profile rails from the first set of profile rails and two profile rails from the second set of profile rails.

[0055] Two opposite sides of an individual ceiling tile are parallel to the profile rails in the first set of profile rails, and are supported at these sides by two neighboring profile rails belonging to the first set of profile rails, i.e. by resting on support surfaces of a first profile rail 1 and of a second profile rail 6 from the first set of profile rails.

[0056] Fig. 2 shows a side view of an individual ceiling tile 9 as it is being supported by two neighboring profile rails in the first set of profile rails, i.e. the first profile rail 1 and the second profile rail 6.

[0057] A first side 21 of the ceiling tile 9 and a second side 22 of the ceiling tile 9 have grooves 22 exposing downwards and facing resting surfaces 23 of the ceiling tile 9. The first side of the ceiling tile and the second side of the ceiling tile are opposite each other. The grooves are cut out to match flanges on the profile rails in the first set of profile rails.

[0058] A third side 24 of the ceiling tile 9 and a fourth

side 25 of the ceiling tile 9 are flush and form a planar surface.

[0059] Fig. 3 shows a view of a part of the suspended ceiling from below. Three ceiling tiles can be seen in the view of Fig. 3. The ceiling tiles extend below the frame system such that the frame system is not visible from below.

[0060] The ceiling tiles are adjacent to each other and abut each other in order to form a substantially unbroken suspended ceiling surface not withstanding small gaps between them due to the fact that the ceiling tiles are individual items placed next to each other.

[0061] Fig. 4 shows an end view of a profile rail, which belongs to the first set of profile rails. The first profile rail 1 is an example of a profile rail in the first set of profile rails. The other profile rails in the first set of profile rails correspond structurally to the first profile rail.

[0062] The first profile rail 1 is made of a folded plate of metal. The plate has been folded twelve times. Alternatively, the first profile rail may be made from two main profiles with four folds (capping).

[0063] The first profile rail comprises a first flange 3 extending in a horizontal direction for providing a support surface for a ceiling tile 9.

[0064] The first profile rail comprises a first web 2 constituting a first plate being orthogonal to the first flange 3.

[0065] The first web 2 and the first flange 3 forms a T-shaped cross section facing upside down, i.e. an inverse T as seen in a direction up towards the suspended ceiling. Thus, the first profile rail can support a ceiling tile that can rest on the flange part on the left side of the first profile rail, and the first profile rail can support a ceiling tile that can rest on the flange part on the right side of the first profile rail.

[0066] Both ends of the metal plate have been folded back over the first flange. The ends do not extend all the way into the first web, i.e. the support surfaces for a ceiling tile are in the embodiment show in Fig. 4 the parts of the folded plate that are close to the two ends.

[0067] The first profile rail comprises a bead 5, which is arranged at an opposite side of the first web relative to the first flange, i.e. at the top of the first profile rail.

[0068] The first profile rail comprises a first skirt 4 extending from the bottom side of the first flange and is orthogonal to the first flange. The first skirt extends from an end of the first flange, i.e. the end of the part of the first flange that is to the right of the first web.

[0069] Fig. 5 shows the cross section A-A' of the profile rail shown in Fig. 6. The profile rail belongs to the second set of profile rails, i.e. the third profile rail is an example of a profile rail in the second set of profile rails. The other profile rails in the second set of profile rails correspond structurally to the third profile rail.

[0070] The third profile rail is made of a folded plate of metal. The metal plate has been folded three times.

[0071] The third profile rail comprises a second skirt 7 consisting of a second web extending in a vertical direction. The second web is a plate forming a planar surface

which is flush, so that a flush side of a ceiling tile can be placed up against the second skirt.

[0072] The third profile rail comprises a second flange 8 being orthogonal to the second skirt. The second flange constitutes an upper section of the profile rail. The second web and the second flange forms a T-shaped cross section.

[0073] Fig. 6 shows a side view of a profile rail, which belongs to the second set of profile rails, i.e. the third profile rail is an example of a profile rail in the second set of profile rails. The other profile rails in the second set of profile rails correspond structurally to the third profile rail.

[0074] The third profile rail comprises a first end having a first tongue 12. The first tongue comprises a first pawl 13. The first pawl extends out from the first tongue and is elastically fixed to the first tongue so that it can be pushed towards the first tongue, and move back away from the first tongue when no force is applied to the first pawl.

[0075] The third profile rail comprises a second end having a second tongue 14. The second tongue comprises a second pawl 15. The second pawl extends out from the second tongue and is elastically fixed to the second tongue so that it can be pushed towards the second tongue, and move back away from the second tongue when no force is applied to the second pawl.

[0076] The first end of the third profile rail is shaped to match a shape of the left side of the first profile rail 1 (and thereby to the left side of the profile rails in the first set of profile rails). The first end comprises a recess 18 for accommodating a part of the first flange, i.e. the part of the first flange that extends to the left of the first web.

[0077] Below the recess is a protrusion 17, which is to extend below a part of the first flange and abut the first skirt of the first profile rail 1 (and thereby to the profile rails in the first set of profile rails). The protrusion constitutes a lower part of the first end of the third profile rail.

[0078] The second end of the third profile rail is shaped to match a shape of the right side of the profile rails in the first set of profile rails.

[0079] Fig. 7 shows an exploded view of a part of the suspended ceiling, specifically parts of the frame system without any ceiling tiles placed in the frame system.

[0080] A third profile rail 10 and a fourth profile rail 11, which belong to the second set of profile rails, can be seen respectively at a left side and a right side of a profile rail, which belongs to the first set of profile rails, i.e. the first profile rail 1. The respective first profile rail has a through-hole 16 in which the first tongue 12 is to be inserted. The through-hole is a vertical slit in the first web.

[0081] Fig. 8 shows an exploded view of a part of the suspended ceiling. In the exploded view of Fig. 8, the third profile rail shown in Fig. 7 has been interlocked with the first profile rail, i.e. the profile rail from the first set of profile rails, which is also shown in Fig. 7.

[0082] The first end of the third profile rail abuts the left side of the first profile rail, i.e. the lower section of the first end of the third profile rail (the protrusion 17) abuts

the first skirt of the first profile rail, and the middle section of the first end of the third profile rail abuts the first web - except for the first tongue, which extends into the through-hole - and the upper section of the first end of the third profile rail abuts the bead.

[0083] The first tongue extends through the through-hole and is prevented from being pulled back through the through-hole by the first pawl, which will be stopped by the first web, unless it is being actively pushed back towards the first tongue.

[0084] The second tongue is to be inserted through the through-hole so that the fourth profile rail can become interlocked with the first profile rail.

[0085] Fig. 9 shows a view of a part of the suspended ceiling. The view is from below the suspended ceiling. In the view of Fig. 9, the fourth profile rail shown in Figs. 7 and 8 has been interlocked with the profile rail from the first set of profile rails, i.e. Fig. 9 specifically shows an intersection in the frame system where a profile rail in the first set of profile rails (the first profile rail) has been interlocked by way of tongues and a through-hole with profile rails from the second set of profile rails (the third and fourth profile rails).

[0086] The second end of the respective fourth profile rail abuts the right side of the profile rail from the first set of profile rails, i.e. the lower section of the second end of the respective fourth profile rail abuts the first skirt on the first profile rail, and the middle section of the second end of the respective fourth profile rail abuts the first web.

[0087] The second flange at the second end of the respective fourth profile rail abuts the bead along the first direction.

[0088] The second tongue extends through the through-hole and is prevented from being pulled back through the through-hole by the second pawl, which will be stopped by the first web, unless it is being actively pushed back towards the second tongue.

[0089] Thus, in Fig. 9 a profile rail in the first set of profile rails has been interlocked by way of tongues and a through-hole with profile rails from the second set of profile rails. The interlocking is the same in the rest of the intersections of the frame system.

[0090] The first skirt on the first profile rail and the second skirt on the respective third profile rail as well as the second skirt on the respective fourth profile rail all extend to the same height, i.e. the bottom of each of the skirts is in the same plane.

[0091] As described above in connection with the view shown in Fig. 3, the ceiling tiles extend below the frame system such that the frame system is not visible from below. This means that the bottom sides of the ceiling tiles are below the bottom of the skirts, i.e. the bottom sides of the ceiling tiles are in a plane at a lower height than the bottom of the skirts.

[0092] In the following is given a list of reference signs that are used in the detailed description of the invention and the drawings referred to in the detailed description of the invention.

1	First profile rail	
2	First web	
3	First flange	
4	First skirt	
5	Bead	5
6	Second profile rail	
7	Second skirt	
8	Second flange	
9	Ceiling tile	
10	Third profile rail	10
11	Fourth profile rail	
12	First tongue	
13	First pawl	
14	Second tongue	
15	Second pawl	15
16	Through-hole	
17	Protrusion	
18	Recess	
19	Hanger	
20	Groove	20
21	First side of a ceiling tile	
22	Second side of a ceiling tile	
23	Resting surface	
24	Third side of a ceiling tile	
25	Fourth side of a ceiling tile	25

Claims

1. A suspended ceiling extending in a substantially horizontal plane, said suspended ceiling comprising:
 - a set of ceiling tiles (9);
 - a first set of profile rails (1, 6) extending substantially parallel to each other in a first direction;
 - a second set of profile rails (10, 11) extending substantially parallel to each other in a second direction;
 - wherein the profile rails in said first set of profile rails (1, 6) and the profile rails in said second set of profile rails (10, 11) are interlocked and extend substantially orthogonal to each other forming a frame system for the ceiling tiles (9) in said set of ceiling tiles (9);
 - wherein each profile rail in said first set of profile rails (1,6) comprises a first web (2) extending in a substantially vertical plane;
 - wherein each ceiling tile (9) in said set of ceiling tiles (9) is a substantially rectangular ceiling tile (9) which comprises a first side (21) and a second side (22) which have grooves (22) exposing downwards and facing resting surfaces of said ceiling tile (9), said first side (21) and said second side (22) being opposite each other; each ceiling tile (9) further comprising a third side (24) and a fourth side (25), which are flush over the entire height of the ceiling tile (9) and form a planar surface over the entire height of the ceiling tile

(9), and
 wherein each ceiling tile (9) in said set of ceiling tiles (9) loosely abuts the profile rails in said second set of profile rails (10, 11), and
 wherein each profile rail in said second set of profile rails (10, 11) comprises a skirt (7) extending in a substantially vertical plane, and where said skirt (7) consists of a second web, where said second web is a plate, forming a planar surface which is flush, so that a flush side of a ceiling tile (9) can be placed up against said skirt (7),
characterized in that
 each ceiling tile (9) in said set of ceiling tiles (9) is supported at opposite sides alone by the profile rails in said first set of profile rails (1),

2. The suspended ceiling according to claim 1, wherein each ceiling tile (9) comprises a bottom side, said bottom side facing downwards and towards a building floor, and wherein said bottom side extends below said frame system.
3. The suspended ceiling according to any of the preceding claims, wherein the ceiling tiles (9) abut each other and form a substantially unbroken suspended ceiling surface.
4. The suspended ceiling according to claim 1, wherein each profile rail in said first set of profile rails (1, 6) comprises a first flange (3) being orthogonal to said first web.
5. The suspended ceiling according to claim 4, wherein each profile rail in said first set of profiles rails (1, 6) comprises a skirt (4) being substantially orthogonal to said first flange (3) and extending from said first flange (3) in a direction away from said first web.
6. The suspended ceiling according to claim 1, wherein said first web (2) comprises a through-hole (16).
7. The suspended ceiling according to claim 1, wherein each profile rail in said second set of profile rails (10, 11) comprises a second flange (8) being orthogonal to said skirt (7).
8. The suspended ceiling according to claim 7, wherein each profile rail in said second set of profile rails (10, 11) comprises a first end having a first tongue (12) for extending through said through-hole (16).

Patentansprüche

1. Selbsttragende Decke, die sich in einer im Wesentlichen horizontalen Ebene erstreckt, wobei die selbsttragende Decke umfasst:

einen Satz Deckenplatten (9);
 einen ersten Satz Profilschienen (1, 6), die sich im Wesentlichen parallel zueinander in einer ersten Richtung erstrecken;
 einen zweiten Satz Profilschienen (10, 11), die sich im Wesentlichen parallel zueinander in einer zweiten Richtung erstrecken;
 wobei die Profilschienen in dem ersten Satz Profilschienen (1, 6) und die Profilschienen in dem zweiten Satz Profilschienen (10, 11) ineinandergreifen und sich im Wesentlichen orthogonal zueinander erstrecken, um ein Rahmensystem für die Deckenplatten (9) in dem Satz Deckenplatten (9) zu bilden;
 wobei jede Profilschiene in einem ersten Satz Profilschienen (1, 6) einen ersten Steg (2) umfasst, der sich in einer im Wesentlichen vertikalen Ebene erstreckt;
 wobei jede Deckenplatte (9) in dem Satz Deckenplatten (9) eine im Wesentlichen rechteckige Deckenplatte (9) ist, die eine erste Seite (21) und eine zweite Seite (22) umfasst, die Rillen (22) aufweisen, die nach unten hin freiliegen und den Auflageflächen der Deckenplatte (9) zugewandt sind, wobei die erste Seite (21) und die zweite Seite (22) einander gegenüberliegen;
 jede Deckenplatte (9) ferner eine dritte Seite (24) und eine vierte Seite (25) umfasst, die über die gesamte Höhe der Deckenplatte (9) bündig sind und eine ebene Oberfläche über die gesamte Höhe der Deckenplatte (9) bilden, und wobei jede Deckenplatte (9) in dem Satz Deckenplatten (9) lose an den Profilschienen in dem zweiten Satz Profilschienen (10, 11) anliegt, und
 wobei jede Profilschiene in dem zweiten Satz Profilschienen (10, 11) eine Schürze (7) umfasst, die sich in einer im Wesentlichen vertikalen Ebene erstreckt, und
 wobei die Schürze (7) aus einem zweiten Steg besteht, wobei der zweite Steg eine Platte ist, die eine ebene Oberfläche bildet, die bündig ist, so dass eine bündige Seite einer Deckenplatte (9) gegen die Schürze (7) angeordnet werden kann,
dadurch gekennzeichnet, dass
 jede Deckenplatte (9) in dem Satz Deckenplatten (9) an gegenüberliegenden Seiten allein durch die Profilschienen in dem ersten Satz Profilschienen (1) getragen wird.

2. Selbsttragende Decke nach Anspruch 1, wobei jede Deckenplatte (9) eine Unterseite umfasst, die nach unten und zu einem Gebäudeboden hin gerichtet ist, und wobei sich die Unterseite unter dem Rahmensystem erstreckt.
3. Selbsttragende Decke nach einem der vorhergehen-

den Ansprüche, wobei die Deckenplatten (9) aneinander stoßen und eine im Wesentlichen ununterbrochene selbsttragende Deckenfläche bilden.

4. Selbsttragende Decke nach Anspruch 1, wobei jede Profilschiene in dem ersten Satz Profilschienen (1, 6) einen ersten Flansch (3) umfasst, der orthogonal zu dem ersten Steg verläuft.
5. Selbsttragende Decke nach Anspruch 4, wobei jede Profilschiene in dem ersten Satz Profilschienen (1, 6) eine Schürze (4) umfasst, die im Wesentlichen orthogonal zu dem ersten Flansch (3) ist und sich von dem ersten Flansch (3) in einer Richtung weg von dem ersten Steg erstreckt.
6. Selbsttragende Decke nach Anspruch 1, wobei der erste Steg (2) ein Durchgangsloch (16) umfasst.
7. Selbsttragende Decke nach Anspruch 1, wobei jede Profilschiene in dem zweiten Satz Profilschienen (10, 11) einen zweiten Flansch (8) umfasst, der orthogonal zu der Schürze (7) verläuft.
8. Selbsttragende Decke nach Anspruch 7, wobei jede Profilschiene in dem zweiten Satz Profilschienen (10, 11) ein erstes Ende mit einer ersten Zunge (12) umfasst, die sich durch das Durchgangsloch (16) erstreckt.

Revendications

1. Plafond suspendu s'étendant sur un plan sensiblement horizontal, ledit plafond suspendu comprenant :
 un ensemble de dalles de plafond (9) ;
 un premier ensemble de rails profilés (1, 6) s'étendant sensiblement parallèles l'un à l'autre dans une première direction ;
 un deuxième ensemble de rails profilés (10, 11) s'étendant sensiblement parallèles l'un à l'autre dans une deuxième direction ;
 dans lequel les rails profilés dans ledit premier ensemble de rails profilés (1, 6) et les rails profilés dans ledit deuxième ensemble de rails profilés (10, 11) sont interverrouillés et s'étendent sensiblement de façon orthogonale l'un à l'autre formant un système de châssis pour les dalles de plafond (9) dans ledit ensemble de dalles de plafond (9) ; dans lequel chaque rail profilé dans ledit premier ensemble de rails profilés (1, 6) comprend une première toile (2) s'étendant sur un plan sensiblement vertical ;
 dans lequel chaque dalle de plafond (9) dans ledit ensemble de dalles de plafonds (9) est une dalle de plafond sensiblement rectangulaire (9)

- qui comprend un premier côté (21) et un deuxième côté (22) qui ont des rainures (22) s'exposant vers le bas et orientés vers les surfaces de repos de ladite dalle de plafond (9), ledit premier côté (21) et ledit deuxième côté (22) étant opposés l'un à l'autre ; chaque dalle de plafond (9) comprenant en outre un troisième côté (24) et un quatrième côté (25), qui affleurent la totalité de la hauteur de la dalle de plafond (9) et forment une surface plane sur la totalité de la hauteur de la dalle de plafond (9), et dans lequel chaque dalle de plafond (9) dans ledit ensemble de dalles de plafond (9) vient librement en butée contre les rails profilés dans ledit deuxième ensemble de rails profilés (10, 11), et dans lequel chaque rail profilé dans ledit deuxième ensemble de rails profilés (10, 11) comprend une jupe (7) s'étendant sur un plan sensiblement vertical, et où ladite jupe (7) est constituée d'une deuxième toile, où ladite deuxième toile est une plaque, formant une surface plane affleurante, de sorte qu'un côté affleurant d'une dalle de plafond (9) puisse être placé contre ladite jupe (7), **caractérisé en ce que** chaque dalle de plafond (9) dans ledit ensemble de dalles de plafond (9) est supportée aux côtés opposés seulement par les rails profilés dans ledit premier ensemble de rails profilés (1),
2. Plafond suspendu selon la revendication 1, dans lequel chaque dalle de plafond (9) comprend un côté inférieur, ledit côté inférieur étant orienté vers le bas et vers un plancher du bâtiment, et dans lequel ledit côté inférieur s'étend en dessous dudit système de châssis.
 3. Plafond suspendu selon l'une quelconque des revendications précédentes, dans lequel les dalles de plafond (9) viennent en butée l'une contre l'autre et forment une surface de plafond suspendu sensiblement intacte.
 4. Plafond suspendu selon la revendication 1, dans lequel chaque rail profilé dans ledit premier ensemble de rails profilés (1, 6) comprend une première bride (3) étant orthogonale à ladite première toile.
 5. Plafond suspendu selon la revendication 4, dans lequel chaque rail profilé dans ledit premier ensemble de rails profilés (1, 6) comprend une jupe (4) étant sensiblement orthogonale à la dite première bride (3) et s'étendant de ladite première bride (3) dans une direction loin de ladite première toile.
 6. Plafond suspendu selon la revendication 1, dans lequel ladite première toile (2) comprend un trou traversant (16).
 7. Plafond suspendu selon la revendication 1, dans lequel chaque rail profilé dans ledit deuxième ensemble de rails profilés (10, 11) comprend une deuxième bride (8) étant orthogonale à ladite jupe (7).
 8. Plafond suspendu selon la revendication 7, dans lequel chaque rail profilé dans ledit deuxième ensemble de rails profilés (10, 11) comprend une première extrémité ayant une première languette (12) pour s'étendre à travers ledit trou traversant (16).

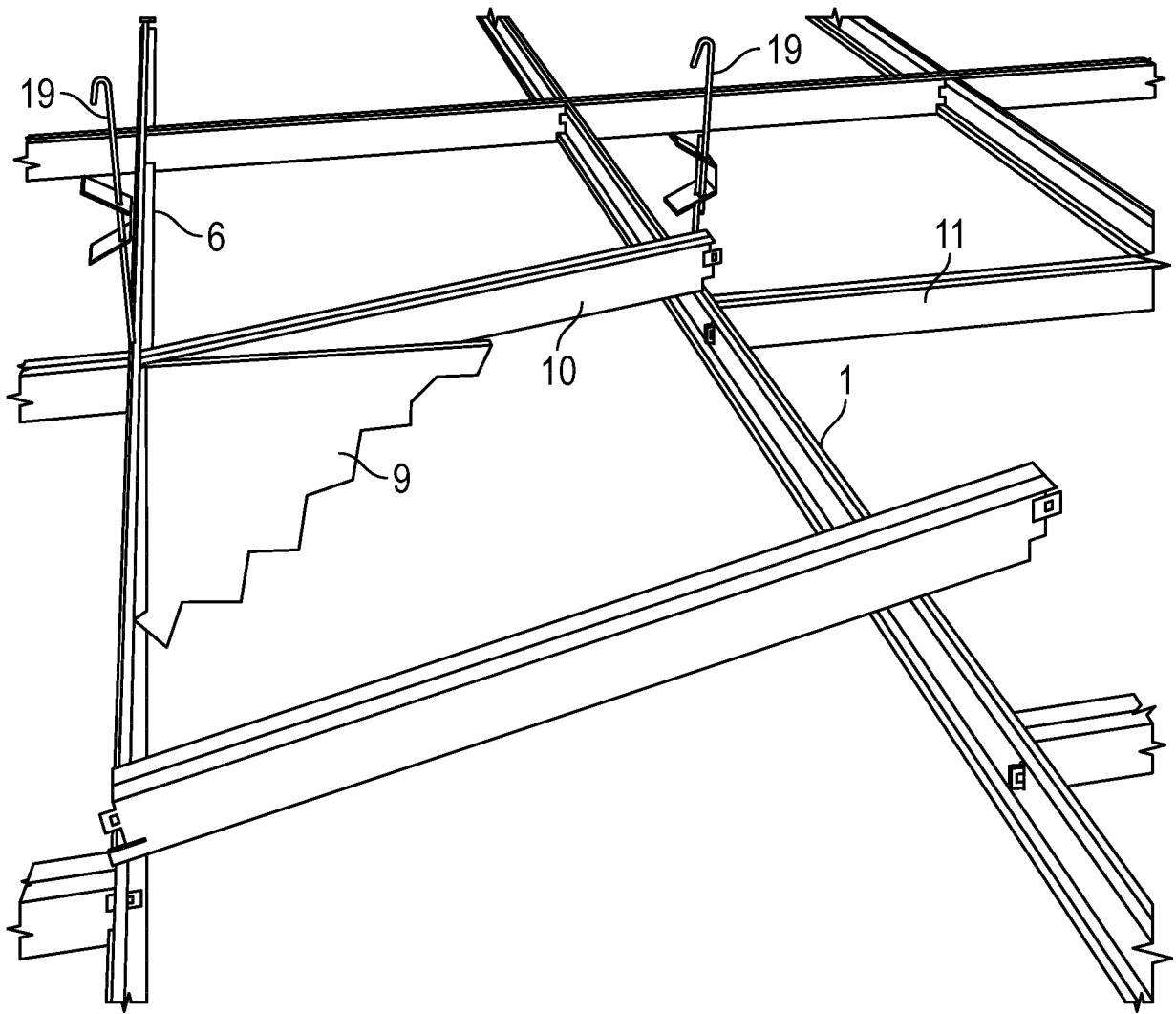


FIG. 1

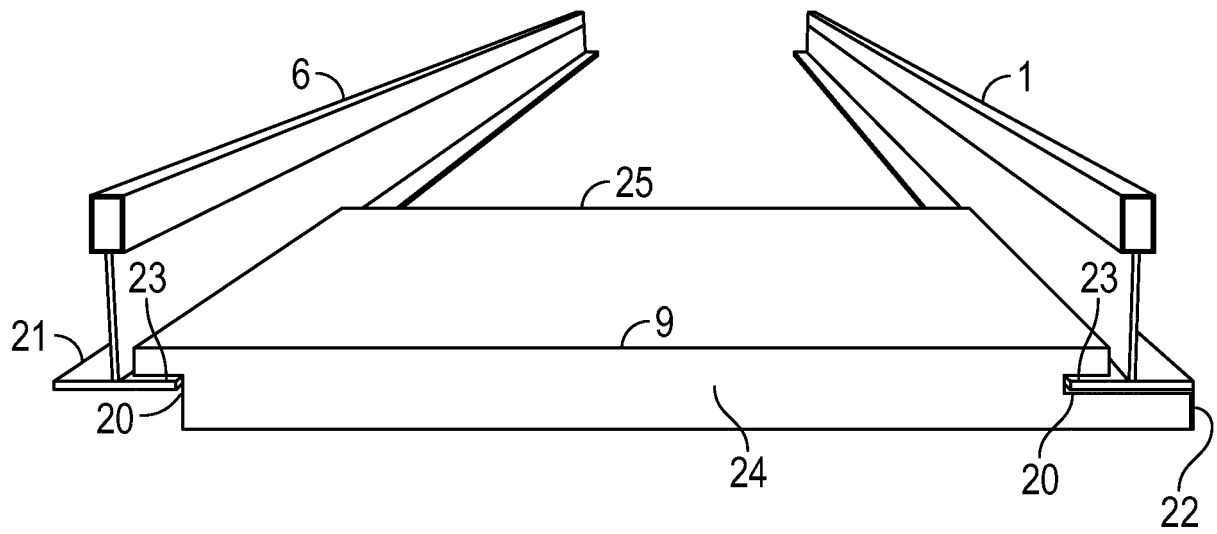


FIG. 2

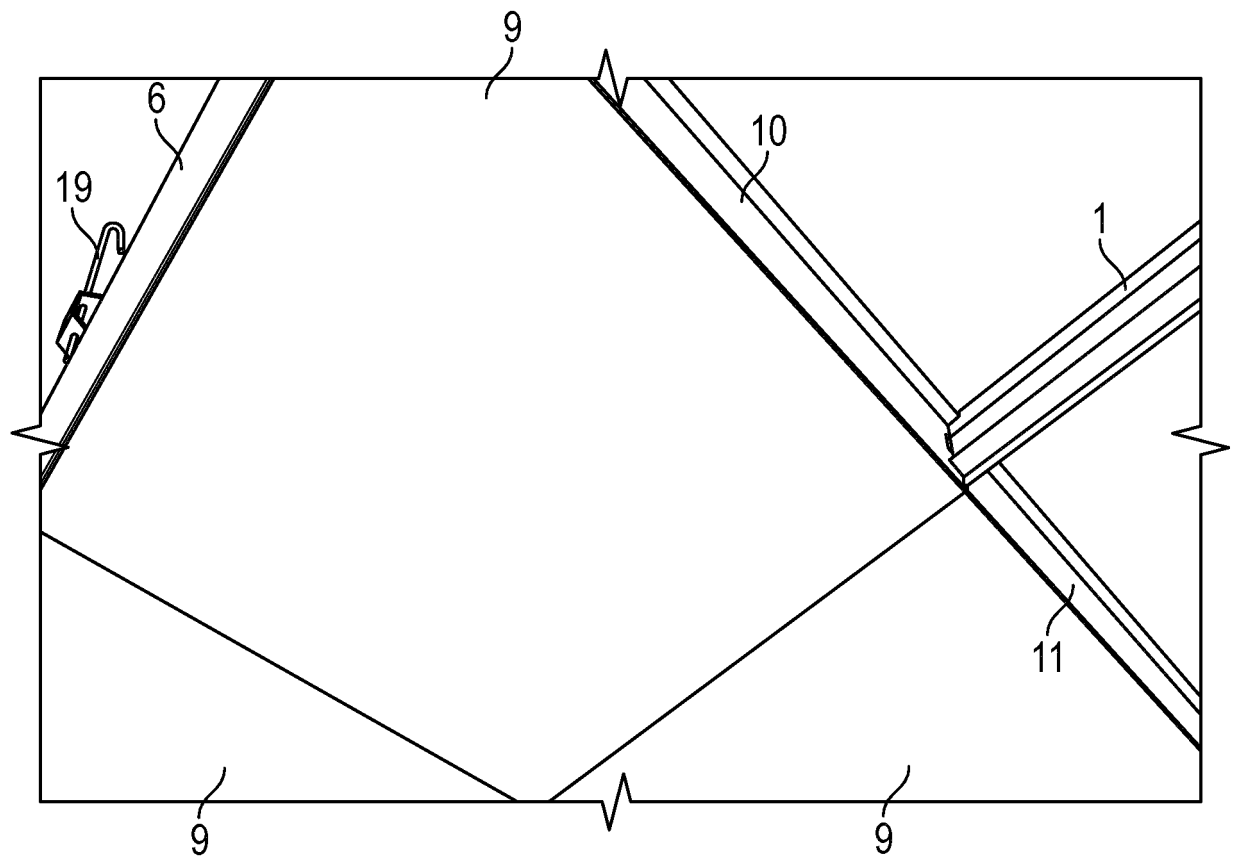


FIG. 3

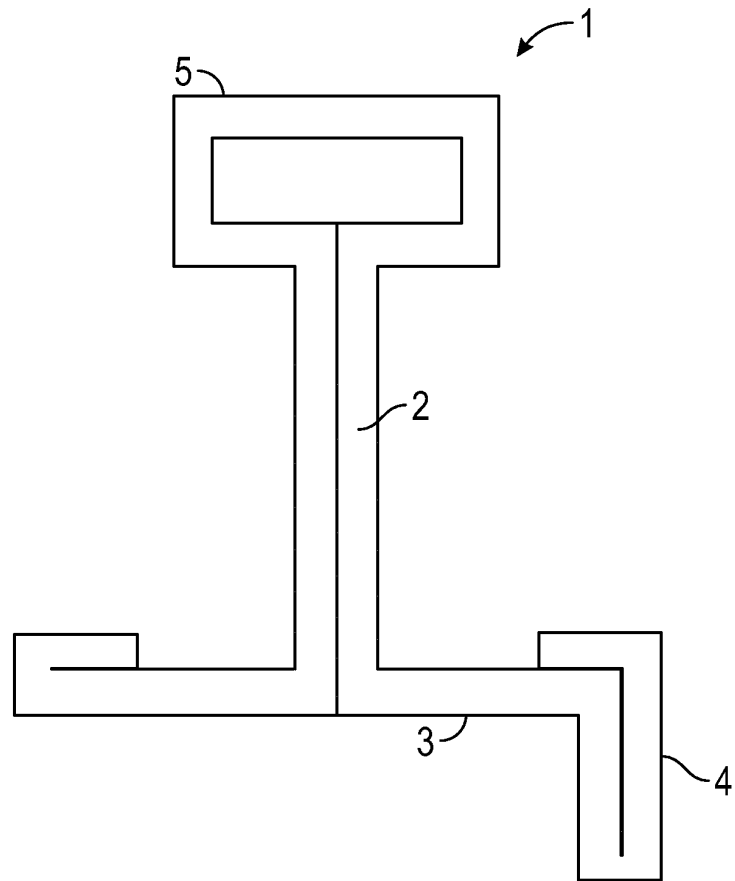


FIG. 4

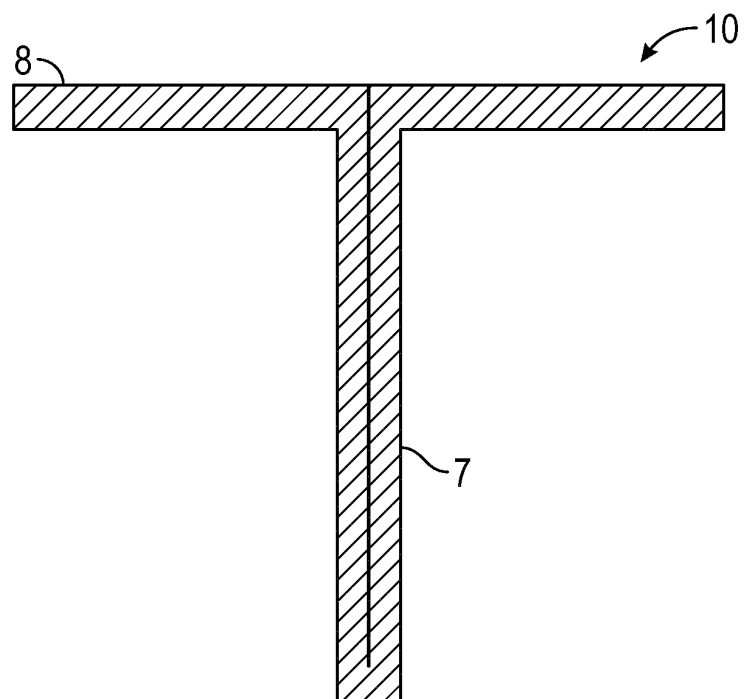


FIG. 5

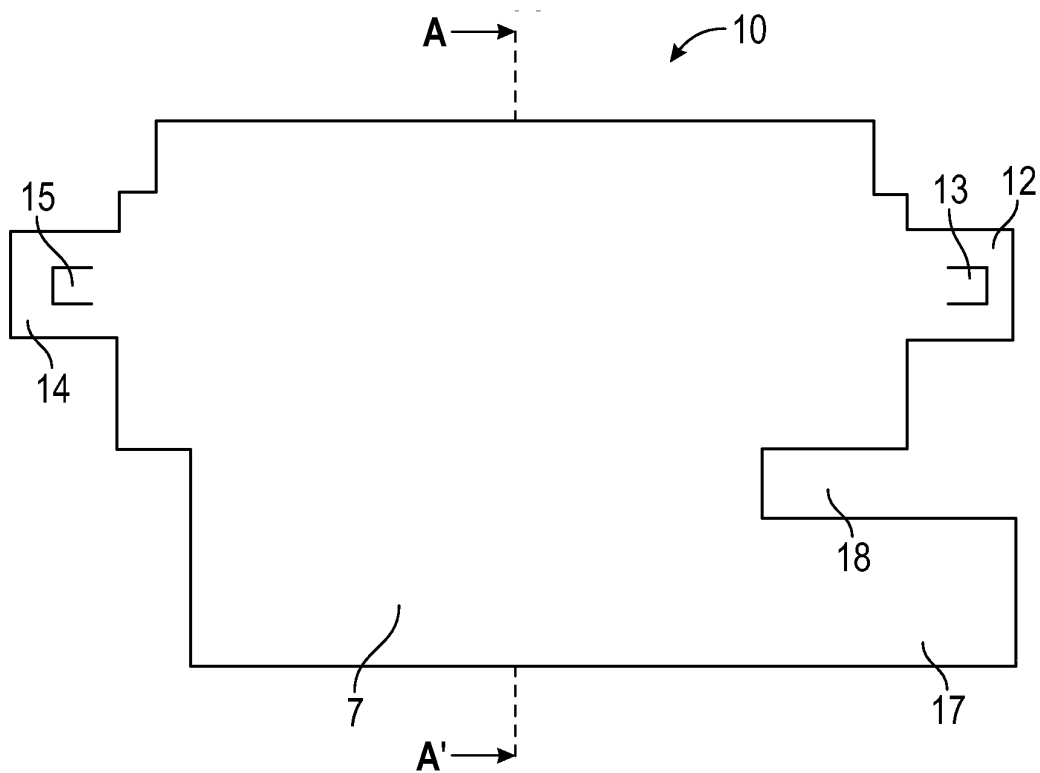


FIG. 6

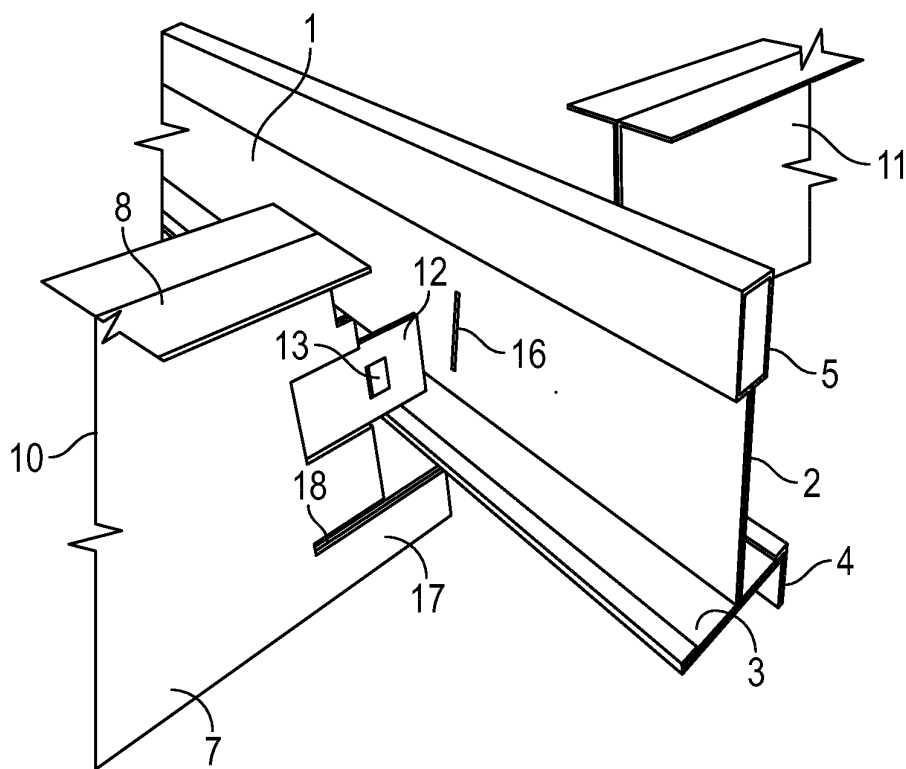


FIG. 7

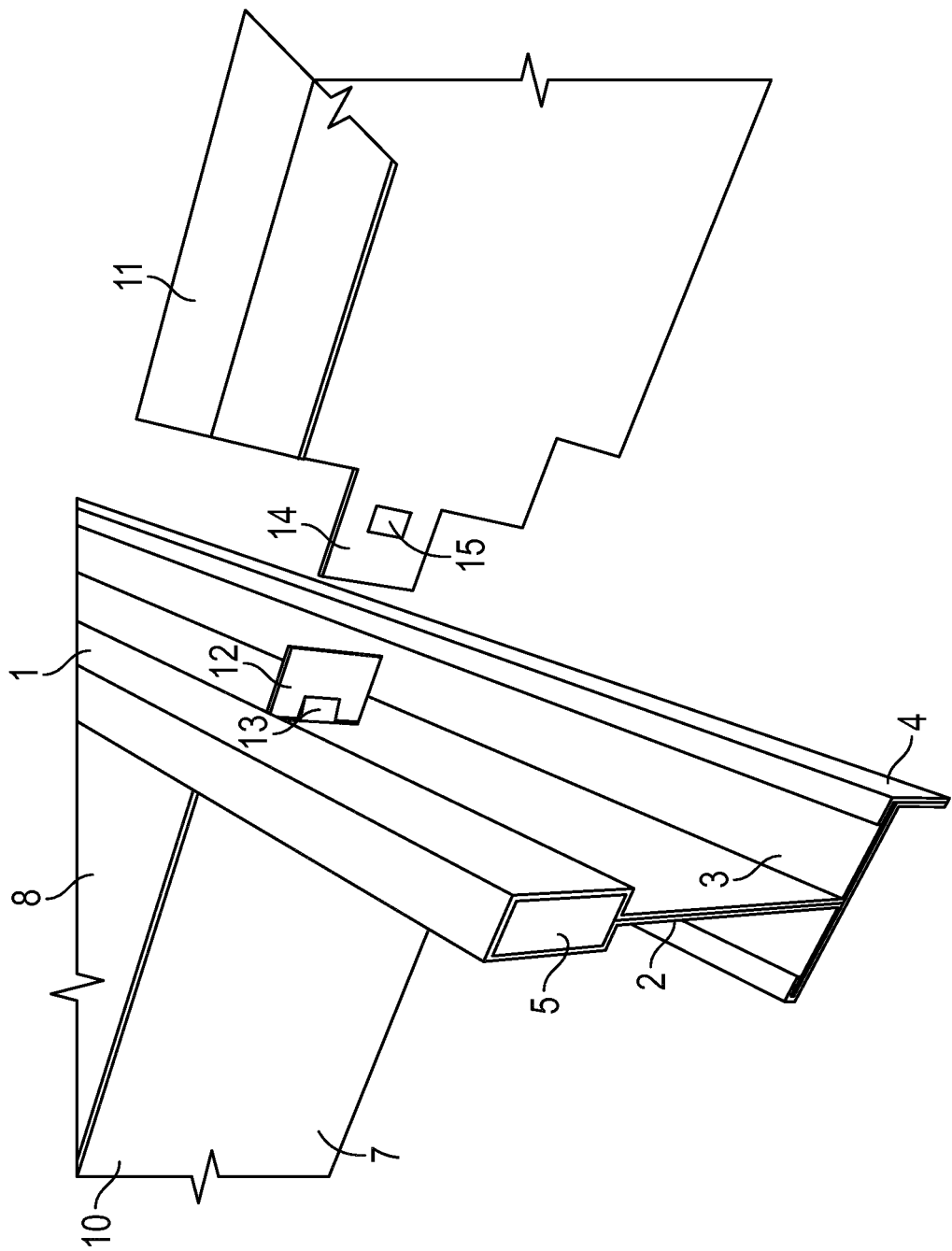


FIG. 8

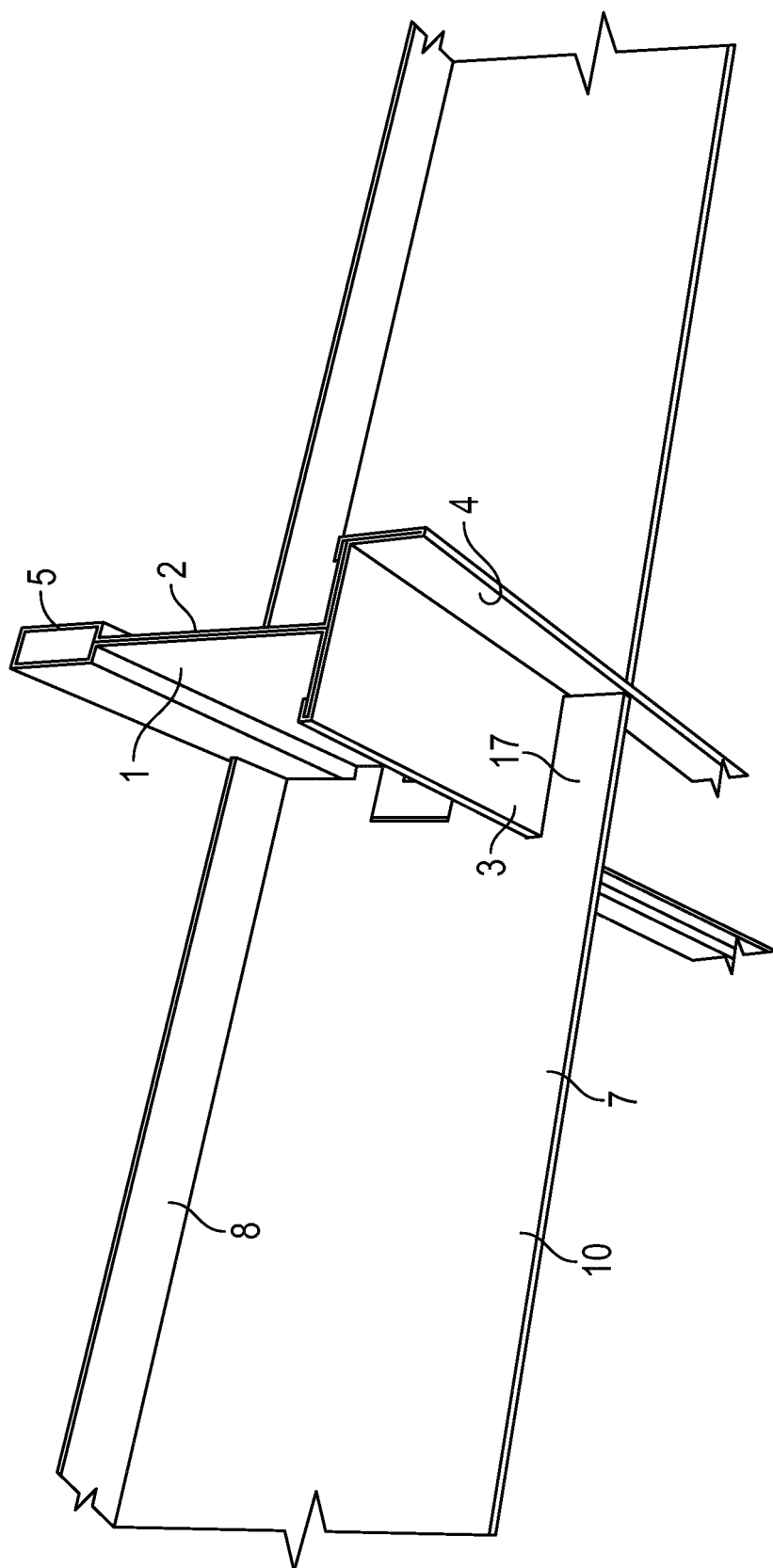


FIG. 9

REFERENCES CITED IN THE DESCRIPTION

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