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

(11) EP 1 261 782 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
15.10.2003 Bulletin 2003/42

(21) Application number: **01913731.4**

(22) Date of filing: **09.03.2001**

(51) Int Cl.[7]: **E04B 9/28**, E04B 9/12

(86) International application number:
PCT/DK01/00155

(87) International publication number:
WO 01/066868 (13.09.2001 Gazette 2001/37)

(54) **A METHOD OF INSTALLING A SET OF CEILING PANELS**

VERFAHREN ZUR INSTALLATION VON DECKENPANEELEN

PROCEDE D'INSTALLATION D'UN ENSEMBLE DE PANNEAUX DE PLAFOND

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **10.03.2000 EP 06100291**
22.08.2000 US 226674 P
06.10.2000 DK 200001496

(43) Date of publication of application:
04.12.2002 Bulletin 2002/49

(73) Proprietor: **Rockwool International A/S**
2640 Hedehusene (DK)

(72) Inventors:
- **GALSGAARD, Niels**
DK-2850 Naerum (DK)
- **LETH, Sigurd, Lennart**
DK-2200 Copenhagen N (DK)
- **HANSEN, Vagn, Boe**
DK-4320 Lejre (DK)
- **SCHOU, Jens, Otto**
DK-6000 Kolding (DK)
- **FLOYSTRUP, Henrik**
DK-2980 Kokkedal (DK)

(74) Representative: **Kyed, Iver et al**
Zacco Denmark A/S
Hans Bekkevolds Allé 7
2900 Hellerup (DK)

(56) References cited:
EP-A- 0 209 953
DE-A- 1 939 904
US-A- 3 708 941

EP 1 261 782 B1

Description

[0001] The present invention relates to a method of installing a set of ceiling panels to a basic ceiling to obtain a suspended ceiling.

[0002] Suspended ceilings are generally known in the art. In most cases suspended ceilings are installed by use of a grid of metal beams in the form of inverted T-sections to support the ceiling panels.

[0003] The panels used in known suspended ceilings are of various materials, such as mineral fibres, fibreglass, wood, metal, gypsum, plastic or other compositions. They are positioned within the grid opening, and are supported by the grid. The panels are either of the type that expose the grid when the ceilings are viewed from below, or conceal the grid either fully or partially, when viewed from below.

[0004] A panel for a suspended ceiling with exposed grids normally has the form of an upper lip extending over the top of the grid with no lip on the panel below the grid. The panel hangs from the grid, by resting on this upper lip. Such panels are relatively simple to install, position and remove. These panels are not intended to be locked by themselves to the grid. Therefore there is a certain risk of "teething" of panels during the installation, because the panels are easily pushed out of position.

[0005] Panels that conceal the grid from below, on the other hand, pose special problems, since the portion of the edge underlying the grid interferes with the positioning, and removal of the panels and make the installation complicated and difficult. Panels that conceal the grid, however, are in general desirable for among other benefits their appearance due to stable positioning, as well as their ability to lock the grid. The grid can be partially or totally concealed. Additionally, since the panels of this type conceal the metal grid, they can have a beneficial effect during fire, as they serve to insulate the metal from transferring heat, particularly where panels are of a fire retardant material.

[0006] Panels locked to the grid, which give no visual clue to their removal procedure, also provide a degree of security against unauthorized access to the space above the ceiling.

[0007] DE 1939904 relates to panel assemblies having removable panels and particularly to suspended ceilings including parallel support runners or splines and tile panels supported on the splines, with each panel being individually selectively removable and replaceable from beneath the ceiling.

[0008] US 3 708 941 relates to suspension systems for ceilings composed of panels or tiles, and more particularly to those systems which incorporate supporting splines engageable within edge grooves, or kurfing, of the ceiling panels or tiles.

[0009] In EP 0979908 A1 a ceiling panel for use in a suspended ceiling is disclosed. The panel is for use in a grid formed of inverted T-section beams. The panel has opposing active parallel edges each of which has a profile different from the other, having at least two opposing passive edges. All the edges of the panel have lower lips to conceal the grid when seen from below. The active parallel edges are formed with special designed kerfs which define an upper and lower lip in the edges and makes it possible to install and remove the panel from the grid without the use of tools. Although the panel installed in a grid gives a good aesthetic impression in the ceiling and is easy to mount, the panel also represents some disadvantages with regard to strength and durability.

[0010] It is an object of the present invention to provide an alternative method to achieve a panel with the same qualities as the panel disclosed above with regard to easy mounting, in particular a method of installing a set of ceiling panels, which panels are improved with respect to strength and durability, and which method is easy to use and wherein the panels are easily exchangeable.

[0011] It is also an object of the present invention to provide a method for installing a set of panels in a grid, so the panels are locked and remain stable in the grid, wherein the grid may be visible, but preferably wherein the grid is partly or totally concealed. It is also a purpose of the present invention to provide ceiling panels suitable for use in the method according to the invention, and which panels preferably have a high strength relative to their densities. The densities of the ceiling panels are preferably within the range from 50 - 400 kg/m^3 and more preferably within the range 80 - 300 kg/m^3.

[0012] It has surprisingly been found that the above-mentioned objectives can be achieved by the method and the set of panels in combination with the grid as defined in the claims. The method according to the invention makes it very easy and fast to install ceiling panels in a grid, and the panels are locked and stable in the grid. The set of ceiling panels in combination with the grid according to the invention are easy to install and have excellent strength.

[0013] By the method according to the invention a method to install a suspended ceiling very fast and in a cost effective manner is provided. Furthermore, by the set of ceiling panels according to the invention a suspended ceiling with a good aesthetic look and excellent strength and durability is achieved. By use of the method and the set of panels in combination with the grid according to the invention a suspended ceiling can be installed at lower cost than already known suspended ceilings and with superior results with regard to look and durability.

[0014] The method of installing a set of ceiling panels to a basic ceiling makes use of a supporting grid, and the set of ceiling panels includes at least three substantially rectangular panels, which have a width similar to each other. The sum of the length of each panel of the set of ceiling panels is defined as the total length of the set of ceiling panels. The method comprises the follow-

ing steps:

i) to establish and attach a supporting grid to the basic ceiling, which supporting grid is established by mounting two or more carrier profiles and two or more support profiles to each other. The two or more carrier profiles are substantially parallel to each other and the two or more support profiles are substantially parallel to each other and substantially perpendicular to the two or more carrier profile. Hereby is provided a grid of at least one rectangle where the profiles constitute the edges of the rectangle, which comprise support flanges protruding into said rectangle in a plane defined by said rectangle toward the opposite parallel profile. The number and size of the flanges are sufficient to support the set of ceiling panels. The length of the rectangle is defined as the distance between the two carrier profiles constituting opposite edges of the rectangle inclusive the protruding length of the flanges protruding into the rectangle in a plane defined by said rectangle, which is substantially equal to the total length of the set of ceiling panels. The width of the rectangle is defined as the distance between the two support profiles constituting opposite edges of said rectangle including the protruding length of the flanges protruding into said rectangle in a plane defined by said rectangle being substantially equal to the width of said ceiling panels,
ii) to install the set of ceiling panels in the carrying grid by applying the ceiling panels in side by side relationship with each other in the rectangle of the grid, so that each panel engages with, and is supported by support flanges on the two supporting profiles constituting opposite edges of the rectangle. One of the panels designated as the first end panel engages with and is supported by one or more support flanges of one of the carrier profiles constituting the edges of the rectangle. A second of the panels designated as the second end panel engages with and is supported by one or more support flanges of the other of the carrier profiles constituting the edges of the rectangle.

[0015] In a preferred embodiment of the method the panels have four edges, and each of the four edges has an upper portion defined as the part the of edge being closest to the surface facing the basic ceiling and a lower portion defined as the part of the edge being closest to the surface facing away from the basic ceiling. The edges are in pairs two and two parallel to each other. The first and the third of the edges may preferably be parallel and substantially identically shaped with a groove substantially in the middle of the edges in the longitudinal direction. The grooves are brought to surround one or more of the support flanges protruding from the profiles and each of the grooves may preferably have a depth substantially equal to the width of a support flange.

[0016] Also the second and the fourth edge of the panel are parallel. The second edge may preferably be formed with a groove substantially in the middle of the edge in the longitudinal direction and the groove has a depth substantially equal to the width of a support flange of the support profile. Below the groove an extended protruding lip is formed in the longitudinal direction on the lower half portion of the edge. The lip preferably has a width sufficiently large to conceal the support profile when viewed from below, preferably substantially equal to twice the width of the support flange as said groove is brought to surround the one or more parts of the support flange.

[0017] In a preferred embodiment of the method according to the invention the first edge of the first end panel and the third edge of the second end panel are formed with a groove substantially in the middle of the edges in the longitudinal direction. The groove preferably has a depth substantially equal to the width of a support flange on the carrier profile. Below the groove a protruding lip may preferably be formed in the longitudinal direction on the lower half portion of the edge. The lip preferably has a width substantially equal to the width of the support flange and when the groove is brought to surround the one or more parts of the support flange it preferably conceals half of the carrier profile when viewed from below.

[0018] In order to make sure that the panels do not sag or bend along the first and third edges, which are not supported by the support flange of the carrier profile, it is preferred to supply one or more of these edges with a stiffening profile. In order to provide one or more of these edges with a stiffening profile the edge(s) must be formed with a groove, preferably substantially in the middle of the edge in the longitudinal direction. The stiffening profile may preferably be in the form an L-shaped profile, namely in the form of two flanges connected to each other in an angel of preferably about 90°. Alternatively, the stiffening profile may be in the form of a U-shaped profile, wherein the one of the flanges of the U-shaped profile fits into the groove along the edge of the panel. The L-shaped or U-shaped profile has a length of up to the width of the panels. Preferably the L-shaped or U-shaped profile has a length corresponding to between half the width of the panels up to the total width of the panels minus twice the width of the support flanges of the support profile, to thereby make it possible to apply the stiffening profile in a first or third edge of a panel without interfering with the support flange of the support profiles. In general, it is preferred that the L-profile or U-shaped has a length which corresponds to the total width of the panels minus the twice the width of the support flanges of the support profile. Thereby the edge is reinforced in substantially all of its length.

[0019] The L-shaped or U-shaped stiffening profiles are especially useful when the panels are large i.e. having a width above 400 mm, e.g. about 900 mm, or if the panels are thin and not sufficiently stiff themselves.

[0020] In one embodiment the stiffening profiles could have any shape.

[0021] In order to make sure that the distance between the support profiles is equal along its whole length, even when the total length of the set of ceiling panels is relatively long e.g. above 2000 mm, it is preferred to apply one or more equidistance profiles to the ceiling panels. The preferred number of equidistance profiles in a given set of ceiling panels, largely depends on the total length of the set of ceiling panels, but in most situations it is sufficient to apply 1 or 2 equidistance profiles.

[0022] An equidistance profile has a profile substantially as a stiffening profile as described above. The equidistance profile further comprises connecting flanges, snap-locks or similar means for connecting the equidistance profile to the two support profiles supporting the panel into which groove the equidistance profile is inserted. The connecting flanges, snap-locks or similar means for connecting the equidistance profile to the two support profiles supporting the panel into which groove the equidistance profile is inserted may in general be of any type, but preferably it should be easy to handle. As it should be understood the equidistance profile also has the same functions as the L-shaped or U-shaped stiffening profile, and, thus, there is no reason to use both an equidistance profile and a stiffening profile in the same panel edge.

[0023] It is preferred that an equidistance profile is applied in the first end panel in a groove in the third edge, before further panels of the set is applied in the grid. The equidistance profile is secured to the support profiles to thereby secure that the distance between the two support profiles is equal along their length and is kept stable.

[0024] In a preferred embodiment of the method the fourth edge is formed with a protruding lip in the longitudinal direction on the upper half portion of the edge. The protrusion has a width substantially equal to the width of the support flange.

[0025] Preferably the set of ceiling panels are installed in the rectangle of the supporting grid so that the support flanges are concealed by the grooves or by the protruding lips on the edges of the set of ceiling panels.

[0026] In one preferred embodiment of the invention the ceiling panels are substantially shaped as quadrangles

[0027] The carrier grid may of course be placed in any desired position with regard to the basic ceiling and have a inclination compared to horizontal direction up to 60 degrees and even up to 70 degrees, but usually it is preferred to place it in a horizontal position substantially parallel with the basic ceiling. The distance between the upper surface of the suspended ceiling and the basic ceiling may preferably vary from 3,5 cm to 350 cm and more preferably from 10 cm to 150 cm By using these distances between upper surface of the suspended ceiling and the basic ceiling an excellent sound absorbance can be established with ceiling panels made from sound reduction materials. But of course the distance between upper surface of the suspended ceiling and the basic ceiling can be adjusted to any desired distance.

[0028] In order to facilitate the installation of the ceiling panels in the grid, and also to make the production of the ceiling panels cost effective, uniform panels can be used.

[0029] As mentioned the invention also relates to a set of panels in combination with a grid, wherein the set of panels includes at least three panels which preferably may be uniform. Each ceiling panel of the set has two identical opposing edges and two non-identical opposing edges. The two identical opposing edges are formed with a groove in the longitudinal direction. The two opposing non-identical edges are formed so that one of the edges has a protruding lip from an upper portion of the edge and the other edge has a protruding lip from the lower portion of the edge which is placed below a groove in the longitudinal direction of the edge. The supporting grid is obtainable by mounting two or more carrier profiles and two or more support profiles to each other. The two or more carrier profiles are substantially parallel to each other and the two or more support profiles are substantially parallel to each other and are substantially perpendicular to the two or more carrier profiles, to thereby provide a grid of at least one rectangle.

[0030] In a preferred embodiment to facilitate the installation and dismounting of the grid to the basic ceiling, a hanging clip in combination with a strap is mounted on the profiles. The strap can be mounted parallel with the profiles, in a way so that it is not inconvenient to install and dismount the panels.

[0031] In some cases it is not possible to adapt the suspended ceiling to fit with walls, pillars or the like, therefore the invention also relates to a method of installing a suspended ceiling comprising the steps of installing one or more sets of ceiling panels to a basic ceiling. The method further comprise the step of install one or more secondary sets of ceiling panels, wherein each secondary set of panels includes two substantially rectangular panels having a width similar to each other, and where the sum of the length of the two panels of the secondary set of ceiling panels is defined as the total length of the set of ceiling panels, and the method comprises the following steps:

i) to establish and attach a supporting grid to the basic ceiling, wherein one secondary rectangle which has an open side is provided by the profiles for each secondary set of panels to be installed, each secondary open rectangle being provided by a first profile and two second profiles. The first profile is a carrier profile or a support profile and the second profiles are the opposite profile types to the first profile. The profiles constitute the edges of each of the secondary open rectangles and comprise support flanges protruding in into the rectangle in a plane defined by said rectangle. The

number and size of the flanges are sufficient to support the secondary set of ceiling panels. The length of the secondary rectangle is defined as the length of one of the second profiles determined from its contact point with the first profile to its termination at the open end of the secondary rectangle, including the protruding length of the flanges protruding into the secondary rectangle in a plane defined by said secondary rectangle from said second profile. The length is substantially equal to the total length of the secondary set of ceiling panels. The width of the secondary rectangle is defined as the distance between the two second profiles constituting opposite edges of the secondary rectangle, including the protruding length of the flanges protruding from the second profiles into the secondary rectangle in a plane defined by said second rectangle which is substantially equal to the width of said secondary ceiling panels,

ii) to install each secondary set of ceiling panels in the carrying grid by applying the secondary ceiling panels in side by side relationship with each other in the secondary rectangle of the grid, so that each panel engages with and is supported by support flanges on the two second profiles constituting opposite edges of the rectangle, and one of the panels designated as the first end panel engages with and is supported by one or more support flanges of the first profile constituting the edges of the rectangle,

iii) to close the one or more open secondary rectangles by attaching a further profile to the terminating ends of the second profiles.

[0032] In a preferred embodiment of the above-mentioned method the two secondary panels of a secondary set of profiles each has four edges with an upper portion defined as the part of the edge being closest to the surface facing the basic ceiling and a lower portion defined as the part of the edge being closest to the surface facing away from the basic ceiling, each of the secondary panels preferably comprising at least two edges each having a protruding lip in its lower portion extending substantially along the whole length of the edge, the protruding length of the respective lips in combination with the similar lips of other panels installed in the grid being adapted to the grid system so that the lips cover the grid and thereby make the grid concealed when viewed from below when the suspended ceiling is installed.

[0033] Also to adapt the suspended ceiling to walls, etc., the invention further comprises a method of installing a suspended ceiling, which method comprises the steps of installing one or more sets of ceiling panels to a basic ceiling as described above. The method further comprises the step of installing one or more tertiary ceiling panels wherein each tertiary panel has a width and a length, which method comprises the following steps:

i) establishing and attaching a supporting grid to the basic ceiling as defined above, wherein one tertiary rectangle having an open side is provided by the profiles for each tertiary panel to be installed, each tertiary open rectangle being provided by a first profile and two second profiles, the profiles constituting the edges of each of said tertiary open rectangles comprising support flanges protruding in into said rectangle in a plane defined by said rectangle, the number and size of said flanges being sufficient to support the tertiary set of ceiling panels, the length of said tertiary rectangle defined as the length of one the second profiles determined from its contact point with the first profile to its termination at the open end of the tertiary rectangle including the protruding length of the flanges protruding into said tertiary rectangle in a plane defined by said tertiary rectangle from the second profile, being substantially equal to the total length of the tertiary panel, and the width of said tertiary rectangle defined as the distance between the two second profiles constituting opposite edges of said tertiary rectangle inclusive the protruding length of the flanges protruding from the second profiles into the tertiary rectangle in a plane defined by said tertiary rectangle being substantially equal to the width of the tertiary panel,

ii) installing each tertiary panel in the carrying grid by applying the tertiary ceiling panels in the tertiary rectangle of the grid, so that the panel engages with and is supported by support flanges on the three profiles constituting the edges of the rectangle, and

iii) closing said one or more open tertiary rectangles by attaching a further profile to the terminating ends of the second profiles.

[0034] In a preferred embodiment of the method, each of the tertiary panels has an upper portion defined as the part of the edge being closest to the surface facing the basic ceiling and a lower portion defined as the part of the edge being closest to the surface facing away from the basic ceiling, each of the tertiary panels comprising at least two edges each having a protruding lip in its lower portion extending substantially along the whole length of the edge, the protruding length of the respective lips in combination with the similar lips of other panels installed in the grid being adapted to the grid system so that the lips cover the grid and thereby make the grid concealed when viewed from below when the suspended ceiling is installed.

[0035] As the skilled draftsman would know ceiling panels can be manufactured from a wide range of materials e.g. wood, gypsum, plastic, metal, composites, fibres etc. In a preferred embodiment according to the invention the ceiling panels are manufactured of mineral fibres especially stone fibres, by the known methods. The panels may be covered with vlies and/or acoustic

paints preferably on the side facing away from the basic ceiling. The use of acoustic paints is especially of advance when the panels serve as sound absorbing panels.

[0036] Furthermore, it is possible, as with known suspended ceilings, to finish the suspended ceiling according to the invention with a frieze in e.g. gypsum. One or more of the ceiling panels may also be replaced by light armatures, ventilation means or others means which is common knowledge to the skilled person.

[0037] In the following an example according to the invention will be described in details. The example only serves to illustrate the invention and shall not in any way be considered a limitation of the scope of the invention.

Example

[0038] In the example the invention will be described with reference to a drawing. The drawing comprises the following figures:

Fig. 1	shows the supporting grid with sets of ceiling panels installed.
Fig. 2	shows a panel in the set of panels according to the invention
Fig. 3 - 5	illustrate the method according to the invention.
Fig. 6 - 7	show how a ceiling panel is installed according to the invention.
Fig. 8 and 9	show an equidistance profile.
Fig. 10	shows a stiffening profile.
Fig. 11	shows an installed set of panels seen in sectional view.

[0039] A suspended ceiling was established according to the invention with ceiling panels installed in a supporting grid as seen in figure 1. With reference to figure 2 a ceiling panel of the set of ceiling panels is described. Each ceiling panel had a first side S1 adapted to face the basic ceiling and a second side S2 adapted to face away from the basic ceiling and four edges denoted D1, D2, C and C in figure 2. D1 and D2 and C and C, respectively, are parallel to each other and D1 or D2 substantially defines the length of the ceiling panel and the two edges C substantially define the width of the ceiling panel. The ceiling panels were adapted to be mounted in the supporting grid attached to the carrying parts of the basic ceiling.

[0040] First the supporting grid 1 was established. The supporting grid was attached to the carrying parts of the basic ceiling. The supporting grid was formed from carrier profiles and support profiles in such a way that the carrier profiles and support profiles were attached substantially perpendicular to each other. The carrier profiles were placed substantially parallel to each other and with a certain mutual distance substantially equal to the width of three ceiling panels. The support profiles were fastened to the carrier profiles substantially parallel to each other and with a certain mutual distance substantially equal to the length of one ceiling plate. The carrier profiles and the support profiles then created a pattern of rectangles where each rectangle had two edges M1 and M2 substantially parallel to each other and constituted by support profiles, and the two edges M1 and M2 had a length substantially equal to the length of three ceiling panels. Each rectangle also had two edges N1 and N2 substantially parallel to each other and constituted by carrier profiles, and the two edges N1 and N2 had a length substantially equal to the width of one ceiling panel. The edges M1, M2, N1 and N2 were equipped with flanges that served to support the panels.

[0041] After the supporting grid was established the ceiling panels were installed in sets of three in the rectangles created by the carrier profiles and the support profiles.

[0042] At first one ceiling panel was placed in rectangle so the edges D1 and D2 of the ceiling panel were in contact with and supported by the flanges on the edges M1 and M2 in the supporting grid. Then the ceiling panel was pushed in a direction parallel to the edges M1 and M2, and thereby one of the edges C of the ceiling panel was brought into contact with the edge N1 of the carrier profiles, fig 3.

[0043] Then the second ceiling panel of the set was placed in the rectangle so the edges D1 and D2 of the second ceiling panel was in contact with and supported by the flanges on the edges M1 and M2 of the supporting grid.

[0044] The second ceiling panel was then pushed in a direction parallel to the edges M1 and M2, where one edge C of the second ceiling panel was brought into contact with the edge N2 of the carrier profiles, figure 4.

[0045] Finally the third ceiling panel of the set was placed in the rectangle so the edges D1 and D2 of the third ceiling panel was in contact with and supported by the flanges on the edges M1 and M2 of the support profiles and the two edges C of the third ceiling panel were in contact with the edges C of the first and the second ceiling panel, figure 5.

[0046] With reference to figure 2 the ceiling panel will now be described in details. The panel had two opposing edges C, both with a groove in the longitudinal direction of the edge, which grooves interferred with the flanges on the edges N1 or N2 of the rectangle, thereby supporting the panel. The edge D2 of the panel was also shaped with a groove in the longitudinal direction of the edge, and below the groove a protruding lip was shaped with such proportions that the lip was able to cover the flanges on the edge M2 of the grid. The edge D1 was shaped with a protruding lip on the upper portion of the

edge, which lip was placed on a flange on the edge M1 to support the panel. When all the sets of ceiling panels were installed in the supporting grid, the grid was concealed when seen from below.

[0047] In figures 6 and 7 it is illustrated how the edges D1 and D2 are used to install and dismount the panels in the grid.

[0048] Figs. 8 and 9 show an equidistance profile 10 seen in, respectively, perspective view and sectional view. The equidistance profile 10 comprises an L-shaped profile composed of a vertical section 11 and a horizontal section 12. The equidistance profile further comprises a flange 13 in each end of the profile. In fig 9 it can also be seen how the horizontal section 12 of the equidistance profile is applied into the groove of the first or third edge C of a panel. This edge corresponds to the C-edge as shown in fig. 2.

[0049] Fig. 10 shows a stiffening profile 20 also comprising a vertical section 21 and a horizontal section 22. It can be seen how the horizontal section 22 of the stiffening profile is applied into the groove of the first or third edge C of a panel.

[0050] Fig. 11 shows an installed set of panels seen in sectional view. The set of panels comprise 3 panels, a first end panel 31, a second end panel 32, and a middle panel 33. The panels are installed in the grid composed of two carrier profiles 34, and two support profiles 35. In the fig. 11 only one of the support profiles 35 can be seen. As show the suspended ceiling may be fixed to the base ceiling by hangers 36 or similar means.

[0051] The panels have been applied by first applying the equidistance profile 10 in the groove of the third edge 37 of the first end panel 31. Thereafter the first end panel 31 was applied as described earlier, and the flanges 13 of the equidistance profile 10 was connected to the support profiles 35 whereby the distance between the support profiles was secured. A stiffening profile 20 was accordingly applied in the groove in the first edge 38 of the second end panel 32, and the second end panel 32 was applied in the grid. Finally, a stiffening profile 20 was applied in each of the first and the third edges 39 of the middle panel, and the middle panel was applied as described earlier.

Claims

1. A method of installing a set of ceiling panels to a basic ceiling by use of a supporting grid, said set of ceiling panels includes at least three substantially rectangular panels having a width similar to each other, the sum of the length of each panel of the set of ceiling panels being defined as the total length of the set of ceiling panels, whereby said method comprises the following steps:

i) establishing and attaching a supporting grid (1) to the basic ceiling, said supporting grid (1) being established by mounting two or more carrier profiles (N1,N2) and two or more support profiles (M1,M2) to each other, said two or more carrier profiles being substantially parallel to each other and said two or more support profiles being substantially parallel to each other and being substantially perpendicular to said two or more carrier profiles, to thereby provide a grid of at least one rectangle, said profiles constituting the edges of said rectangle comprise support flanges protruding into said rectangle in a plane defined by said rectangle toward the opposite parallel profile, the number and size of said flanges being sufficient to support the set of ceiling panels, the width of said rectangle defined as the distance between the two support profiles constituting opposite edges of said rectangle including the protruding length of the flanges protruding into said rectangle in a plane defined by said rectangle being substantially equal to the width of said ceiling panels, **characterised by** the length of said rectangle defined as the distance between the two carrier profiles constituting opposite edges of said rectangle inclusive the protruding length of the flanges protruding into said rectangle in a plane defined by said rectangle being substantially equal to the total length of the set of ceiling panels, and by

ii) installing the set of ceiling panels in the carrying grid by applying said ceiling panels in side by side relationship with each other in the rectangle of the grid, so that each panel engages with and is supported by support flanges on the two supporting profiles constituting opposite edges of said rectangle, whereby one of said panels designated as the first end panel engages with and is supported by one or more support flanges of one of the carrier profiles constituting the edges of the rectangle, and a second of said panels designated as the second end panel engages with and is supported by one or more support flanges of the other of the carrier profiles constituting the edges of the rectangle.

2. A method according to claim 1, wherein said panels have four edges (D1,D2,C,C), each of the four edges having an upper portion defined as the part of the edge being closest to the surface facing the basic ceiling and a lower portion defined as the part of the edge being closest to the surface facing away from the basic ceiling, said edges being in pairs two and two parallel to each other **CHARACTERIZED in that** the first and the third of said edges being parallel and substantially identically shaped with a groove substantially in the middle of the edges in the longitudinal direction, said grooves being

brought to surround one or more of the support flanges protruding from the profiles and said grooves having a depth substantially equal to the width of a support flange.

3. A method according to claims 1 and 2, **CHARACTERIZED in that** a second and a fourth edge of said panel being parallel with each other, said second edge being formed with a groove substantially in the middle of the edge in the longitudinal direction and said groove having a depth substantially equal to the width of a support flange of the support profile and below said groove an extended protruding lip is formed in the longitudinal direction on the lower half portion of the edge, said lip having a width sufficiently large to conceal the support profile when viewed from below, preferably substantially equal to twice the width of the support flange, as said groove is brought to surround the one or more parts of the support flange.

4. A method according to claims 1 to 3, **CHARACTERIZED in that** a first edge of the first end panel and a third edge of the second end panel are formed with a groove substantially in the middle of the edge in the longitudinal direction, and said groove having a depth substantially equal to the width of a support flange on the carrier profile, and below said groove a protruding lip is formed in the longitudinal direction on the lower half portion of the edge, said lip having a width substantially equal to the width of the support flange and said grooves being brought to surround the one or more parts of the support flange and optionally conceal half of the carrier profile when viewed from below.

5. A method according to claims 2, 3 or 4, **CHARACTERIZED in that** said forth edge is formed with a protruding lip in the longitudinal direction on the upper half portion of the edge, said protrusion having a width substantially equal to the width of the support flange.

6. A method according to claims 1 to 5, **CHARACTERIZED in that** said set of ceiling panels is installed in said rectangle of the supporting grid (1) so that the support flanges are concealed in the grooves or by the protruding lips on the edges of said set of ceiling panels.

7. A method according to any of the preceding claims, **CHARACTERIZED in that** the ceiling panels are substantially shaped as quadrangles

8. A method according to any of the preceding claims, **CHARACTERIZED in that** said supporting grid (1) is fixed in a substantially horizontal position with a distance from 3,5 to 350 cm from the ceiling, preferably from 10 to 150 cm.

9. A method according to any of the preceding claims, **CHARACTERIZED in that** a first edge of one or more of the panels beyond the first end panel and/or a third edge of one or more of the panels beyond the second end panel being formed with a groove substantially in the middle of the edge in the longitudinal direction, and said method further comprising the step of applying a stiffening profile (20) or an equidistance profile (10) in one or more of said grooves, wherein said stiffening profile (20) being formed with a L-profile and having a length of up to the width of the panels, and said equidistance profile (10) being formed as a stiffening profile (20) and further being provided with connecting flanges or snap-lock for connecting the equidistance profile (10) to the two support profiles supporting the panel into which groove the equidistance profile (10) is inserted.

10. A method of installing a suspended ceiling comprising the steps of installing one or more sets of ceiling panels to a basic ceiling according to any one of claims 1-9, **CHARACTERIZED in that** said method further comprises the step of installing one or more secondary sets of ceiling panels, wherein each secondary set of panels includes two substantially rectangular panels having a width similar to each other, the sum of the length of the two panels of the secondary set of ceiling panels being defined as the total length of the set of ceiling panels, said method comprising the following steps:

i) establishing, and attaching a supporting grid (1) to the basic ceiling as defined in claim 1, wherein one secondary rectangle having an open side is provided by said profiles for each secondary set of panels to be installed, each secondary open rectangle being provided by a first profile and two second profiles, the first profile being a carrier profile (N1,N2) or a support profile (M1,M2), the second profiles being the opposite profile types to the first profile, the profiles constituting the edges of each of said secondary open rectangles comprising support flanges protruding into said rectangle in a plane defined by said rectangle, the number and size of said flanges being sufficient to support the secondary set of ceiling panels, the length of said secondary rectangle defined as the length of one of the second profiles determined from its contact point with the first profile to its termination at the open end of the secondary rectangle including the protruding length of the flanges protruding into said secondary rectangle in a plane defined by said secondary rectangle from said second profile being substantially

equal to the total length of the secondary set of ceiling panels, and the width of said secondary rectangle defined as the distance between the two second profiles constituting opposite edges of said secondary rectangle including the protruding length of the flanges protruding from said second profiles into said secondary rectangle in a plane defined by said secondary rectangle being substantially equal to the width of said secondary ceiling panels,

ii) installing each secondary set of ceiling panels in the carrying grid by applying said secondary ceiling panels in side by side relationship with each other in the secondary rectangle of the grid, so that each panel engages with and is supported by support flanges on the two second profiles constituting opposite edges of said rectangle, and one of said panels designated as the first end panel engages with and is supported by one or more support flanges of the first profile constituting the edges of the rectangle,

iii) closing said one or more open secondary rectangles by attaching a further profile to the terminating ends of the second profiles.

11. A method according to claim 10, **CHARACTERIZED in that** said two secondary panels of a secondary set of profiles each has four edges having an upper portion defined as the part of the edge being closest to the surface facing the basic ceiling and a lower portion defined as the part of the edge being closest to the surface facing away from the basic ceiling, each of the secondary panels comprises at least two edges each having a protruding lip in its lower portion extending substantially along the whole length of the edge, the protruding length of the respective lips in combination with the similar lips of other panels installed in the grid being adapted to the grid system so that the lips cover the grid and thereby make the grid concealed when viewed from below, when the suspended ceiling is installed.

12. A method of installing a suspended ceiling, **CHARACTERIZED in that** said method comprises the steps of installing one or more sets of ceiling panels to a basic ceiling using a method according to any one of claims 1-9 and 10-11, said method further comprising the step of installing one or more tertiary ceiling panels, wherein each tertiary panel having a width and a length, said method comprises the following steps:

i) establishing and attaching a supporting grid (1) to the basic ceiling as defined in claim 1, wherein one tertiary rectangle having an open side is provided by said profiles for each tertiary panel to be installed, each tertiary open rectangle being provided by a first profile and two second profiles, the profiles constituting the edges of each of said tertiary open rectangles comprise support flanges protruding into said rectangle in a plane defined by said rectangle, the number and size of said flanges being sufficient to support the tertiary set of ceiling panels, the length of said tertiary rectangle being defined as the length of one the second profiles determined from its contact point with the first profile to its termination at the open end of the tertiary rectangle including the protruding length of the flanges protruding into said tertiary rectangle in a plane defined by said tertiary rectangle from said second profile, being substantially equal to the total length of the tertiary panel, and the width of said tertiary rectangle being defined as the distance between the two second profiles constituting opposite edges of said tertiary rectangle including the protruding length of the flanges protruding from said second profiles into said tertiary rectangle in a plane defined by said secondary rectangle being substantially equal to the width of said tertiary panel,

ii) installing each tertiary panel in the carrying grid by applying said tertiary ceiling panels in the tertiary rectangle of the grid, so that the panel engages with and is supported by support flanges on the three profiles constituting the edges of said rectangle, and

iii) closing said one or more open tertiary rectangles by attaching a further profile to the terminating ends of the second profiles.

13. A method according to claim 12, **CHARACTERIZED in that** each of said tertiary panel has an upper portion defined as the part of the edge being closest to the surface facing the basic ceiling and a lower portion defined as the part of the edge being closest to the surface facing away from the basic ceiling, each of the tertiary panels comprising at least two edges each having a protruding lip in its lower portion extending substantially along the whole length of the edge, the protruding length of the respective lips in combination with the similar lips of other panels installed in the grid being adapted to the grid system so that the lips cover the grid and thereby make the grid concealed when viewed from below when the suspended ceiling is installed.

Patentansprüche

1. Verfahren zur Montage eines Satzes von Decken-

paneelen an einer Basisdecke unter Verwendung eines Traggitters, wobei der Satz von Deckenpaneelen mindestens drei im Wesentlichen rechteckige Paneele von zueinander ähnlicher Breite beinhaltet und die Summe der Länge aller Paneele des Satzes von Deckenpaneelen als Gesamtlänge des Satzes von Deckenpaneelen definiert ist, und das Verfahren folgende Schritte beinhaltet:

i) Aufbauen und Befestigen eines Traggitters (1) an der Basisdecke, wobei das Traggitter (1) dadurch aufgebaut wird, dass zwei oder mehr Trägerprofile (N1, N2) und zwei oder mehr Tragprofile (M1, M2) aneinander befestigt werden, wobei die zwei oder mehr Trägerprofile im Wesentlichen parallel zueinander sind und die zwei oder mehr Tragprofile im Wesentlichen parallel zueinander sind und im Wesentlichen senkrecht zu den zwei oder mehr Trägerprofilen sind, um dadurch ein aus mindestens einem Rechteck bestehendes Gitter bereitzustellen, wobei die die Kanten des Rechtecks bildenden Profile Tragflansche aufweisen, die in das Rechteck in einer durch das Rechteck definierten Ebene in Richtung des gegenüberliegenden parallelen Profils vorstehen, und Anzahl und Größe der Flansche ausreichen, um den Satz der Deckenpaneele zu tragen, und die Breite des Rechtecks, die als Abstand zwischen den zwei die gegenüberliegenden Kanten des Rechtecks bildenden Tragprofilen einschließlich der Überstandslänge der Flansche, die in das Rechteck in einer durch das Rechteck definierten Ebene vorstehen, definiert ist, im Wesentlichen der Breite der Deckenpaneele entspricht, **dadurch gekennzeichnet, dass** die Länge des Rechtecks, die als Abstand zwischen den zwei die gegenüberliegenden Kanten des Rechtecks bildenden Trägerprofilen einschließlich der Überstandslänge der Flansche, die in das Rechteck in einer durch das Rechteck definierten Ebene vorstehen, definiert ist, im Wesentlichen der Gesamtlänge des Satzes von Deckenpaneelen entspricht,

ii) Einbau des Satzes von Deckenpaneelen in das Traggitter, dadurch, dass die Deckenpaneele in einer Seite-an-Seite-Beziehung zueinander im Rechteck des Gitters angebracht werden, so dass jedes Paneel mit den Tragflanschen der die gegenüberliegenden Kanten des Rechtecks bildenden zwei Tragprofile in Eingriff ist und durch diese gehaltert wird, wobei eines der Paneele, das als erstes Endpaneel bezeichnet wird, mit einem oder mehreren Tragflanschen eines der die Kanten des Rechtecks bildenden Trägerprofile in Eingriff ist und von diesem/diesen gehaltert wird, und ein zweites dieser Paneele, das als zweites Endpaneel bezeichnet wird, durch einen oder mehrere Tragflansche eines anderen der die Kanten des Rechtecks bildenden Trägerprofile gehaltert wird.

2. Verfahren nach Anspruch 1, bei welchem die Paneele vier Kanten (D1, D2, C, C) aufweisen, wobei jede der vier Kanten einen oberen Abschnitt aufweist, der als der Teil der Kante definiert ist, welcher der der Basisdecke zugewandten Fläche am nächsten liegt, und ein unterer Abschnitt als der Teil der Kante definiert ist, welcher der der Basisdecke abgewandten Fläche am nächsten liegt, wobei die Kanten paarweise (zwei und zwei) parallel zueinander sind, **dadurch gekennzeichnet, dass** die erste und dritte Kante parallel zueinander sind und im Wesentlichen identisch mit einer Nut ausgebildet sind, die im Wesentlichen in der Mitte der jeweiligen Kante in Längsrichtung verläuft, wobei die Nuten auf eine oder mehrere der von den Profilen vorstehenden Tragflansche aufgeschoben werden und die Tiefe der Nuten im Wesentlichen der Breite eines Tragflansches entspricht.

3. Verfahren nach einem der Ansprüche 1 und 2, **dadurch gekennzeichnet, dass** eine zweite und vierte Kante des Paneels parallel zueinander sind, die zweite Kante rnit einer Nut ausgebildet ist, die im Wesentlichen in der Mitte der Kante in Längsrichtung verläuft, und die Tiefe der Nut im Wesentlichen der Breite des Tragflansches des Tragprofils entspricht und unterhalb der Nut ein verlängertes vorstehendes Nasenstück in Längsrichtung auf dem unteren Halbabschnitt der Kante ausgebildet ist, wobei die Breite des Nasenstücks, die vorzugsweise im Wesentlichen der doppelten Breite des Tragflansches entspricht, ausreicht, das Tragprofil von unten gesehen zu verdecken, wenn die Nut auf einen oder mehrere Teile des Tragflansches aufgeschoben ist.

4. Verfahren nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** eine erste Kante des ersten Endpaneels und eine dritte Kante des zweiten Endpaneels mit einer Nut ausgebildet sind, die im Wesentlichen in der Mitte der Kante in Längsrichtung verläuft, die Tiefe der Nut im Wesentlichen der Breite eines Tragflansches des Trägerprofils entspricht und unterhalb der Nut ein vorstehendes Nasenstück in Längsrichtung auf dem unteren Halbabschnitt der Kante ausgebildet ist, wobei die Breite des Nasenstücks im Wesentlichen der Breite des Tragflansches entspricht und die Nuten auf einen oder mehrere Teile des Tragflansches aufgeschoben werden und von unten gesehen optional die Hälfte des Trägerprofils verdecken.

5. Verfahren nach einem der Ansprüche 2, 3 oder 4, **dadurch gekennzeichnet, dass** die vierte Kante mit einem überstehenden Nasenstück ausgebildet ist, das in Längsrichtung auf dem oberen Halbabschnitt der Kante verläuft, wobei die Breite des Überstands im Wesentlichen der Breite des Tragflansches entspricht.

6. Verfahren nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der Satz der Dekkenpaneele im Rechteck des Traggitters (1) so montiert wird, dass die Tragflansche von den Nuten oder den überstehenden Nasenstücken, die auf den Kanten des Satzes von Deckenpaneelen verlaufen, verdeckt werden.

7. Verfahren nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Deckenpaneele im Wesentlichen die Form von Vierecken haben.

8. Verfahren nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Traggitter (1) in einer im Wesentlichen horizontalen Stellung mit einem Abstand von 3,5 bis 350 cm von der Decke, vorzugsweise von 10 bis 150 cm befestigt ist.

9. Verfahren nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** eine erste Kante von einem oder mehreren der Paneele jenseits des ersten Endpaneels und/oder eine dritte Kante eines oder mehreren der Paneele jenseits des zweiten Endpaneels mit einer Nut ausgebildet ist, die im Wesentlichen in der Mitte der Kante in Längsrichtung verläuft, und das Verfahren weiter den Schritt aufweist, ein Versteifungsprofil (20) oder ein Äquidistanzprofil (10) in einer oder mehreren der Nuten anzubringen, wobei das Versteifungsprofil (20) mit einem L-Profil ausgebildet ist und dessen Länge bis an den Wert der Breite der Paneele heranreichen kann, und das Äquidistanzprofil (10) als Versteifungsprofil (20) ausgebildet ist und weiter mit Verbindungsflanschen oder einem Schnappverbindungsstück versehen ist, um das Äquidistanzprofil (10) mit den zwei Tragprofilen zu verbinden, die das Paneel, in dessen Nut das Äquidistanzprofil (10) eingeschoben ist, haltern.

10. Verfahren zum Einbau einer abgehängten Decke, welches die Schritte umfasst, einen oder mehrere Sätze von Deckenpaneelen an einer Basisdecke zu montieren, und zwar gemäß einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** das Verfahren weiter den Schritt beinhaltet, bei welchem einer oder mehrere sekundäre Sätze von Deckenpaneelen montiert werden, wobei jeder sekundäre Satz Paneele zwei im Wesentlichen rechteckige Paneele zueinander ähnlicher Breite beinhaltet und die Summe der Länge der zwei Paneele des sekundären Satzes Deckenpaneele als Gesamtlänge des Satzes Deckenpaneele definiert ist, und das Verfahren folgende Schritte beinhaltet:

i) Aufbauen und Befestigen eines Traggitters (1) an der Basisdecke, wie definiert in Anspruch 1, wobei ein sekundäres Rechteck, das eine offene Seite aufweist, für jeden zu montierenden sekundären Satz Paneele durch die Profile bereitgestellt wird und jedes sekundäre offene Rechteck durch ein erstes Profil und zwei zweite Profile bereitgestellt wird, wobei es sich beim ersten Profil um ein Trägerprofil (N1, N2) oder ein Tragprofil (M1, M2) handelt und es sich bei den zweiten Profilen um den jeweils anderen Profiltyp als das erste Profil handelt, die Profile die Kanten eines jeden der sekundären offenen Rechtecke bilden, welche Tragflansche aufweisen, die in einer durch das Rechteck definierten Ebene in das Rechteck vorragen und die Anzahl und Größe der Flansche zum Haltern des sekundären Satzes von Deckenpaneelen ausreichend ist, wobei die Länge des sekundären Rechtecks, die als die Länge eines der zweiten Profile, ausgehend von dessen Kontaktpunkt mit dem ersten Profil bis zu dessen Endstück am offenen Ende des sekundären Rechtecks einschließlich der Überstandslänge der Flansche, welche in das sekundäre Rechteck in einer durch das sekundäre Rechteck definierten Ebene vom zweiten Profil aus vorstehen, definiert ist, im Wesentlichen der Gesamtlänge des sekundären Satzes der Dekkenpaneele entspricht, und die Breite des sekundären Rechtecks, die als Abstand zwischen den gegenüberliegende Kanten des sekundären Rechtecks bildenden zwei zweiten Profilen einschließlich der Überstandslänge der Flansche, welche von den zweiten Profilen in das zweite Rechteck in einer durch das zweite Rechteck definierten Ebene vorstehen, definiert ist, im Wesentlichen der Breite der sekundären Dekkenpaneele entspricht,

ii) Einbau jedes sekundären Satzes von Dekkenpaneelen in das Traggitter, dadurch, dass die sekundären Deckenpaneele in einer Seite-an-Seite-Beziehung zueinander im sekundären Rechteck des Gitters angebracht werden, so dass jedes Paneel mit den Tragflanschen der die gegenüberliegenden Kanten des Rechtecks bildenden zwei zweiten Tragprofile in Eingriff ist und durch diese gehaltert wird, wobei eines der Paneele, das als erstes Endpaneel bezeichnet wird, mit einem oder mehreren Tragflanschen des die Kanten des Rechtecks

bildenden ersten Profils in Eingriff ist und von diesem/diesen gehaltert wird,

iii) Verschließen des einen oder der mehreren offenen sekundären Rechtecke durch Anbringen eines weiteren Profils an den Abschlussenden der zweiten Profile.

11. Verfahren nach Anspruch 10, **dadurch gekennzeichnet, dass** die zwei sekundären Paneele eines sekundären Satzes Profile jeweils vier Kanten aufweisen, die einen oberen Abschnitt, der als derjenige Teil der Kante definiert ist, welcher sich am nächsten zu der der Basisdecke zugewandten Fläche befindet, und einen unteren Abschnitt aufweist, der als der Teil der Kante definiert ist, welcher sich am nächsten zu der der Basisdecke abgewandten Fläche befindet, wobei jedes der sekundären Paneele mindestens zwei Kanten aufweist, die jeweils ein vorstehendes Nasenstück in ihrem unteren Abschnitt aufweisen, das sich im Wesentlichen über die gesamte Länge der Kante erstreckt, wobei die Überstandslänge der jeweiligen Nasenstücke in Kombination mit den ähnlichen Nasenstücken der anderen im Gitter montierten Paneele an das Gittersystem angepasst sind, so dass die Nasenstükke das Gitter verdecken und dadurch bei montierter abgehängter Decke das Gitter von unten gesehen verdeckt ist.

12. Verfahren zur Montage einer abgehängten Decke, **dadurch gekennzeichnet, dass** das Verfahren Schritte aufweist, bei denen eine oder mehrere Sätze von Deckenpaneelen an einer Basisdecke unter Verwendung eines Verfahrens nach einem der Ansprüche 1 bis 9 sowie 10 bis 11 montiert werden, wobei das Verfahren weiter den Schritt aufweist, bei dem eines oder mehrere tertiäre Deckenpaneele montiert werden, wobei jedes tertiäre Paneel eine Breite und eine Länge aufweist, und das Verfahren weiter die folgenden Schritte umfasst:

i) Aufbauen und Befestigen eines Traggitters (1) an der Basisdecke, wie definiert in Anspruch 1, wobei ein tertiäres Rechteck, das eine offene Seite aufweist, durch die Profile für jedes zu montierende tertiäre Paneel bereitgestellt wird und jedes tertiäre offene Rechteck durch ein erstes Profil und zwei zweite Profile bereitgestellt wird, die Profile, welche die Kanten eines jeden der tertiären offenen Rechtecke bilden, Tragflansche aufweisen, die in einer durch das Rechteck definierten Ebene in das Rechteck vorragen, und Anzahl und Größe der Flansche zum Haltern des tertiären Satzes von Deckenpaneelen ausreichend sind, wobei die Länge des tertiären Rechtecks, die als die Länge eines der zweiten Profile, ausgehend von dessen Kontaktpunkt mit dem ersten Profil bis zu dessen Endstück am offenen Ende des tertiären Rechtecks einschließlich der Überstandslänge der Flansche, welche in das tertiäre Rechteck in einer durch das tertiäre Rechteck definierten Ebene vom zweiten Profil aus vorstehen, definiert ist, im Wesentlichen der Gesamtlänge des tertiären Paneels entspricht, und die Breite des tertiären Rechtecks, die als Abstand zwischen den gegenüberliegende Kanten des tertiären Rechtecks bildenden zwei zweiten Profilen einschließlich der Überstandslänge der Flansche, welche von den zweiten Profilen in das zweite Rechteck in einer durch das zweite Rechteck definierten Ebene vorstehen, definiert ist, im Wesentlichen der Breite des tertiären Paneels entspricht,

ii) Einbau eines jeden tertiären Paneels in das Traggitter, dadurch, dass die tertiären Deckenpaneele im tertiären Rechteck des Gitters angebracht werden, so dass das Paneel mit den Tragflanschen der die Kanten des Rechtecks bildenden drei Profilen in Eingriff ist und durch diese gehaltert wird, und

iii) Verschließen des einen oder der mehreren offenen tertiären Rechtecke durch Anbringen eines weiteren Profils an den Abschlussenden der zweiten Profile.

13. Verfahren nach Anspruch 12, **dadurch gekennzeichnet, dass** jedes tertiäre Paneel einen oberen Abschnitt, der als derjenige Teil der Kante definiert ist, welcher sich am nächsten zu der der Basisdekke zugewandten Fläche befindet, und einen unteren Abschnitt aufweist, der als der Teil der Kante definiert ist, welcher sich am nächsten zu der der Basisdecke abgewandten Fläche befindet, wobei jedes der tertiären Paneele mindestens zwei Kanten aufweist, die jeweils ein vorstehendes Nasenstück in ihrem unteren Abschnitt aurweisen, das sich im Wesentlichen über die gesamte Länge der Kante erstreckt, wobei die Überstandslänge der jeweiligen Nasenstücke in Kombination mit den ähnlichen Nasenstücken der anderen im Gitter montierten Paneele an das Gittersystem angepasst sind, so dass die Nasenstücke das Gitter verdecken und dadurch bei montierter abgehängter Decke das Gitter von unten gesehen verdeckt ist.

Revendications

1. Procédé d'installation d'un ensemble de panneaux de plafond sur un plafond de base en utilisant une grille de support, ledit ensemble de panneaux de plafond comprenant au moins trois panneaux sen-

siblement rectangulaires ayant une largeur similaire, la somme de la longueur de chaque panneau de l'ensemble de panneaux de plafond étant définie en tant que longueur totale de l'ensemble de panneaux de plafond, moyennant quoi ledit procédé comprend les étapes suivantes :

i) mise en place et fixation d'une grille de support (1) sur le plafond de base, ladite grille de support (1) étant mise en place en montant au moins deux profils porteurs (N1, N2) et au moins deux profils de support (M1, M2) l'un sur l'autre, lesdits au moins deux profils porteurs étant sensiblement parallèles entre eux et lesdits au moins deux profils de support étant sensiblement parallèles entre eux et étant sensiblement perpendiculaires auxdits au moins deux profils porteurs, pour ainsi réaliser une grille d'au moins un rectangle, lesdits profils constituant les bords dudit rectangle comprenant des brides de support faisant saillie dans ledit rectangle dans un plan défini par ledit rectangle vers le profil parallèle opposé, le nombre et la taille desdites brides étant suffisants pour supporter l'ensemble de panneaux de plafond, la largeur dudit rectangle définie en tant que distance entre les deux profils de support constituant les bords opposés dudit rectangle comprenant la longueur de protubérance des brides faisant saillie dans ledit rectangle dans un plan défini par ledit rectangle étant sensiblement égale à la largeur totale de l'ensemble de panneaux de plafond, **caractérisé en ce que** la longueur dudit rectangle définie en tant que distance entre les deux profils porteurs constituant les bords opposés dudit rectangle comprenant la longueur de protubérance des brides faisant saillie dans ledit rectangle dans un plan défini par ledit rectangle est sensiblement égale à la longueur totale desdits panneaux de plafond,
ii) installation de l'ensemble de panneaux de plafond dans la grille porteuse en appliquant lesdits panneaux de plafond côte à côte dans le rectangle de la grille, de sorte que chaque panneau s'engage avec et soit soutenu par les brides de support sur les deux profils de support constituant les bords opposés dudit rectangle, moyennant quoi un desdits panneaux désigné en tant que premier panneau d'extrémité s'engage avec et est soutenu par une ou plusieurs brides de support d'un des profils porteurs constituant les bords du rectangle, et un second desdits panneaux désigné en tant que second panneau d'extrémité s'engage avec et est soutenu par une ou plusieurs brides de support de l'autre profil des profils porteurs constituant les bords du rectangle.

2. Procédé selon la revendication 1, dans lequel lesdits panneaux ont quatre bords (D1, D2, C, C), chacun des quatre bords ayant une partie supérieure définie en tant que partie du bord étant la plus proche de la surface faisant face au plafond de base et une partie inférieure définie en tant que partie du bord étant la plus proche de la surface orientée à l'opposé du plafond de base, lesdits bords étant par paires de deux bords parallèles entre eux, **caractérisé en ce que** le premier et le troisième desdits bords sont parallèles et de forme sensiblement identique avec une rainure sensiblement au milieu des bords dans la direction longitudinale, lesdites rainures étant amenées à entourer une ou plusieurs brides de support faisant saillie à partir des profils et lesdites rainures ayant une profondeur sensiblement égale à la largeur d'une bride de support.

3. Procédé selon les revendications 1 et 2, **caractérisé en ce qu'**un deuxième bord et un quatrième bord dudit panneau sont parallèles entre eux, ledit deuxième bord étant formé avec une rainure sensiblement au milieu du bord dans la direction longitudinale et ladite rainure ayant une profondeur sensiblement égale à la largeur d'une bride de support du profil de support et sous ladite rainure une lèvre protubérante étendue est formée dans la direction longitudinale sur la moitié inférieure du bord, ladite lèvre ayant une largeur suffisamment grande pour cacher le profil de support en vue par-dessous, de préférence sensiblement égale à deux fois la largeur de la bride de support, et ladite rainure est amenée à entourer la ou les parties de la bride de support.

4. Procédé selon les revendications 1 à 3, **caractérisé en ce qu'**un premier bord du premier panneau d'extrémité et un troisième bord du second panneau d'extrémité sont formés avec une rainure sensiblement au milieu du bord dans la direction longitudinale, et ladite rainure ayant une profondeur sensiblement égale à la largeur d'une bride de support sur le profil porteur, et sous ladite rainure une lèvre protubérante est formée dans la direction longitudinale sur la moitié inférieure du bord, ladite lèvre ayant une largeur sensiblement égale à la largeur de la bride de support et lesdites rainures étant amenées à entourer la ou les parties de la bride de support et optionnellement à cacher la moitié du profil porteur en vue par-dessous.

5. Procédé selon les revendications 2, 3 ou 4, **caractérisé en ce que** ledit quatrième bord est formé avec une lèvre protubérante dans la direction longitudinale sur la moitié supérieure du bord, ladite protubérance ayant une largeur sensiblement égale à la largeur de la bride de support.

6. Procédé selon les revendications 1 à 5, **caractérisé en ce que** ledit ensemble de panneaux de plafond est installé dans ledit rectangle de la grille de support (1) de sorte que les brides de support soient cachées dans les rainures ou par les lèvres protubérantes sur les bords dudit ensemble de panneaux de plafond.

7. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les panneaux de plafond ont sensiblement la forme de quadrangles.

8. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite grille de support (1) est fixée dans une position sensiblement horizontale à une distance de 3,5 à 350 cm du plafond, de préférence de 10 à 150 cm.

9. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**un premier bord d'un ou de plusieurs panneaux au-delà du premier panneau d'extrémité et/ou un troisième bord d'un ou de plusieurs panneaux au-delà du second panneau d'extrémité sont formés avec une rainure sensiblement au milieu du bord dans la direction longitudinale, et ledit procédé comprenant en outre l'étape consistant à appliquer un profil raidisseur (20) ou un profil d'équidistance (10) dans une ou plusieurs desdites rainures, dans lequel ledit profil raidisseur (20) étant formé avec un profil en L et ayant une longueur ne dépassant pas la largeur des panneaux, et ledit profil d'équidistance (10) étant formé comme un profil raidisseur (20) et étant fourni en outre avec des brides de connexion ou une fixation à pression pour connecter le profil d'équidistance (10) aux deux profils de support soutenant le panneau dans la rainure duquel est inséré le profil d'équidistance (10).

10. Procédé d'installation d'un plafond suspendu comprenant les étapes consistant à installer un ou plusieurs ensembles de panneaux de plafonds sur un plafond de base selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** ledit procédé comprend en outre l'étape consistant à installer un ou plusieurs ensembles secondaires de panneaux de plafond, dans lequel chaque ensemble secondaire de panneaux comprend deux panneaux sensiblement rectangulaires ayant une largeur similaire, la somme de la longueur des deux panneaux de l'ensemble secondaire de panneaux de plafond étant définie en tant que longueur totale de l'ensemble de panneaux de plafond, ledit procédé comprenant les étapes suivantes :

i) mise en place et fixation d'une grille de support (1) sur le plafond de base comme cela est défini dans la revendication 1, dans lequel un rectangle secondaire ayant un côté ouvert est réalisé par lesdits profils pour chaque ensemble secondaire de panneaux à installer, chaque rectangle ouvert secondaire étant réalisé par un premier profil et deux seconds profils, le premier profil étant un profil porteur (N1, N2) ou un profil de support (M1, M2), les seconds profils étant de type de profil opposé au premier profil, les profils constituant les bords de chacun desdits rectangles ouverts secondaires comprenant les brides de support faisant saillie dans ledit rectangle dans un plan défini par ledit rectangle, le nombre et la taille desdites brides étant suffisants pour supporter l'ensemble secondaire de panneaux de plafond, la longueur dudit rectangle secondaire définie en tant que longueur d'un des seconds profils déterminée de son point de contact avec le premier profil jusqu'à sa terminaison à l'extrémité ouverte du rectangle secondaire comprenant la longueur protubérante des brides faisant saillie dans ledit rectangle secondaire dans un plan défini par ledit rectangle secondaire à partir dudit second profil étant sensiblement égale à la longueur totale de l'ensemble secondaire de panneaux de plafond, et la largeur dudit rectangle secondaire définie en tant que distance entre les deux seconds profils constituant les bords opposés dudit rectangle secondaire comprenant la longueur protubérante des brides faisant saillie à partir desdits seconds profils dans ledit rectangle secondaire dans un plan défini par ledit rectangle secondaire étant sensiblement égale à la largeur desdits panneaux de plafond secondaires,

ii) installation de chaque ensemble secondaire de panneaux de plafond dans la grille porteuse en appliquant lesdits panneaux de plafond secondaires côte à côte dans le rectangle secondaire de la grille, de sorte que chaque panneau s'engage avec et soit soutenu par des brides de support ou les deux seconds profils constituant les bords opposés dudit rectangle, et un desdits panneaux désignés en tant que premier panneau d'extrémité s'engage avec et est soutenu par une ou plusieurs des brides de support du premier profil constituant les bords du rectangle,

iii) fermeture dudit ou desdits rectangles secondaires ouverts en attachant un autre profil aux extrémités de terminaison des seconds profils.

11. Procédé selon la revendication 10, **caractérisé en ce que** lesdits deux panneaux secondaires d'un ensemble secondaire de profils ont chacun quatre bords ayant une partie supérieure définie en tant que partie du bord étant la plus proche de la surface

faisant face au plafond de base et une partie inférieure définie en tant que partie du bord étant la plus proche de la surface orientée à l'opposé du plafond de base, chacun des panneaux secondaires comprenant au moins deux bords ayant chacun une lèvre faisant saillie dans sa partie inférieure s'étendant sensiblement le long de toute la longueur du bord, la longueur protubérante des lèvres respectives en combinaison avec les lèvres similaires des autres panneaux installés dans la grille étant adaptée au système de grille de sorte que les lèvres couvrent la grille et ainsi cachent la grille en vue par-dessous, lorsque le plafond suspendu est installé.

12. Procédé d'installation d'un plafond suspendu, **caractérisé en ce que** ledit procédé comprend les étapes consistant à installer un ou plusieurs ensembles de panneaux de plafond sur un plafond de base en utilisant un procédé selon l'une quelconque des revendications 1 à 9 et 10 à 11, ledit procédé comprenant en outre l'étape consistant à installer un ou plusieurs panneaux de plafond tertiaires, dans lequel chaque panneau tertiaire a une largeur et une longueur, ledit procédé comprenant les étapes suivantes :

i) mise en place et fixation d'une grille de support (1) sur le plafond de base comme cela est défini dans la revendication 1, dans lequel un rectangle tertiaire ayant un côté ouvert est réalisé par lesdits profils pour chaque panneau tertiaire à installer, chaque rectangle ouvert tertiaire étant réalisé par un premier profil et deux seconds profils, les profils constituant les bords de chacun desdits rectangles ouverts tertiaires comprenant des brides de support faisant saillie dans ledit rectangle dans un plan défini par ledit rectangle, le nombre et la taille desdites brides étant suffisants pour supporter l'ensemble tertiaire de panneaux de plafond, la longueur dudit rectangle tertiaire étant définie en tant que longueur d'un des seconds profils déterminée à partir de son point de contact avec le premier profil jusqu'à sa terminaison à l'extrémité ouverte du rectangle tertiaire comprenant la longueur protubérante des brides faisant saillie dans ledit rectangle tertiaire dans un plan défini par ledit rectangle tertiaire à partir dudit second profil, étant sensiblement égale à la longueur totale du panneau tertiaire, et la largeur dudit rectangle tertiaire étant définie en tant que distance entre les deux seconds profils constituant les bords opposés dudit rectangle tertiaire comprenant la longueur protubérante des brides faisant saillie à partir desdits seconds profils dans ledit rectangle tertiaire dans un plan défini par ledit rectangle secondaire étant sensiblement égale à la largeur dudit panneau tertiaire,

ii) installation de chaque panneau tertiaire dans la grille porteuse en appliquant lesdits panneaux de plafond tertiaires dans le rectangle tertiaire de la grille, de sorte que le panneau s'engage avec et soit soutenu par les brides de support sur les trois profils constituant les bords dudit rectangle, et

iii) fermeture dudit ou desdits rectangles tertiaires ouverts en attachant un autre profil aux extrémités de terminaison des seconds profils.

13. Procédé selon la revendication 12, **caractérisé en ce que** chacun desdits panneaux tertiaires a une partie supérieure définie en tant que partie du bord étant la plus proche de la surface faisant face au plafond de base et une partie inférieure définie en tant que partie du bord étant la plus proche de la surface orientée à l'opposé du plafond de base, chacun des panneaux tertiaires comprenant au moins deux bords ayant chacun une lèvre faisant saillie dans sa partie inférieure s'étendant sensiblement sur toute la longueur du bord, la longueur protubérante des lèvres respectives en combinaison avec les lèvres similaires des autres panneaux installés dans la grille étant adaptée au système de grille de sorte que les lèvres couvrent la grille et ainsi cachent la grille en vue par-dessous lorsque le plafond suspendu est installé.

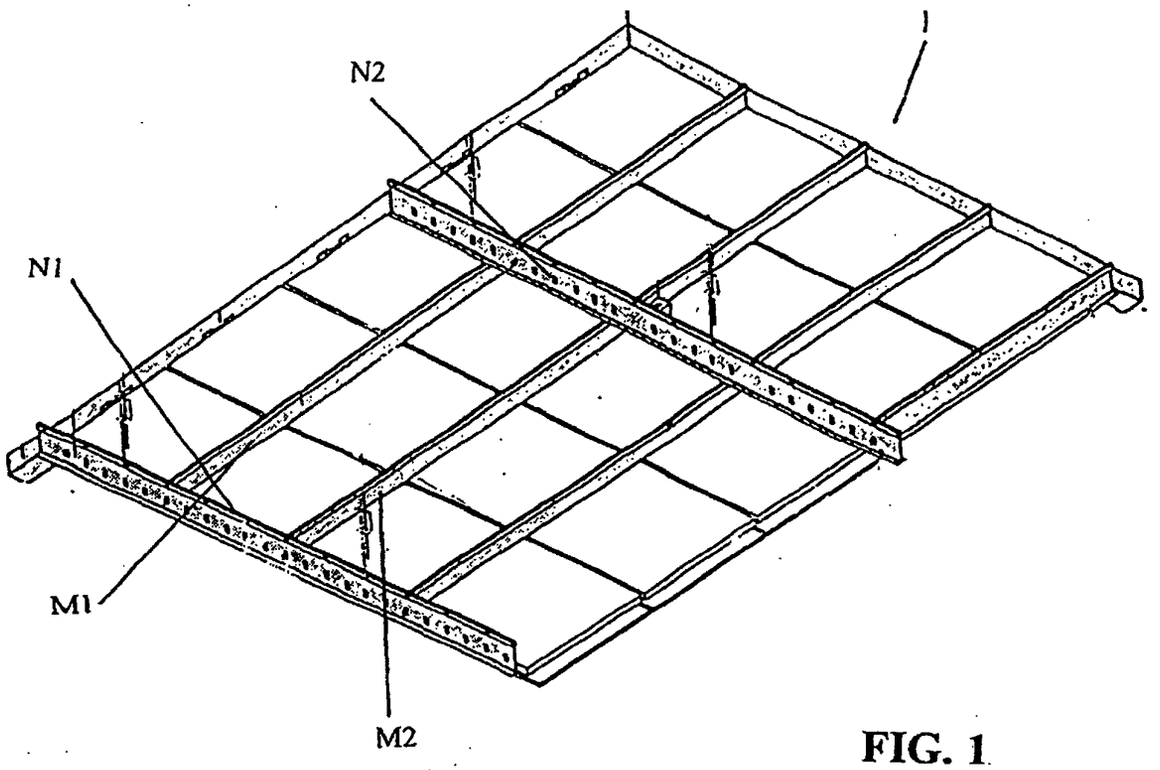

FIG. 1

FIG. 2

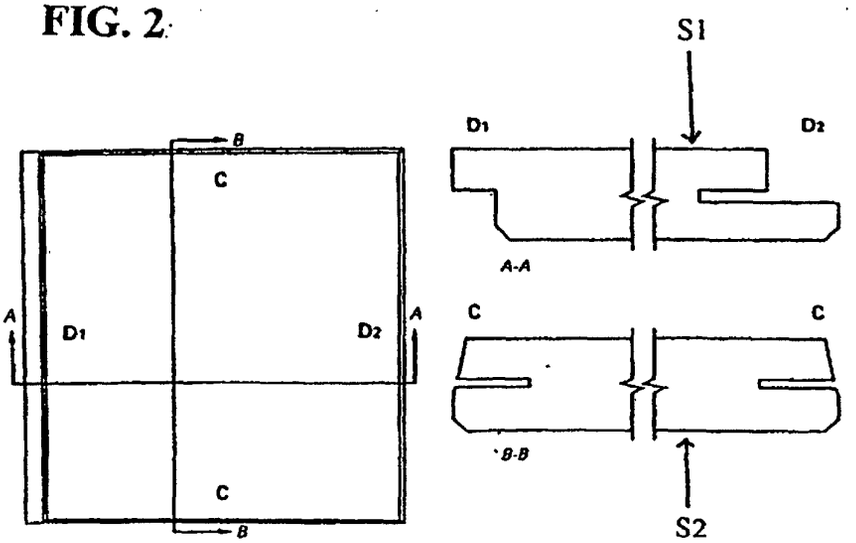

FIG. 3

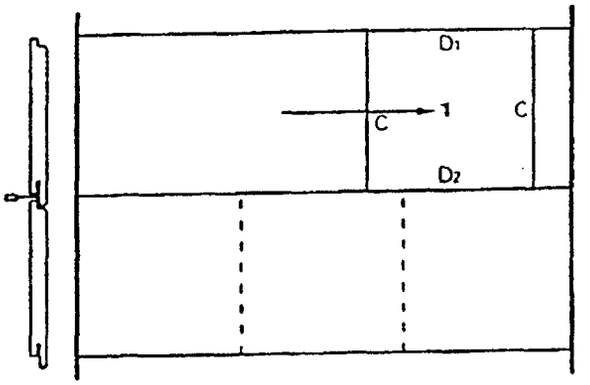

FIG. 4

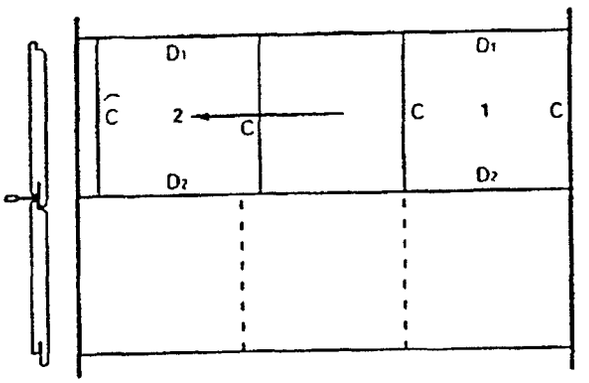

FIG. 5

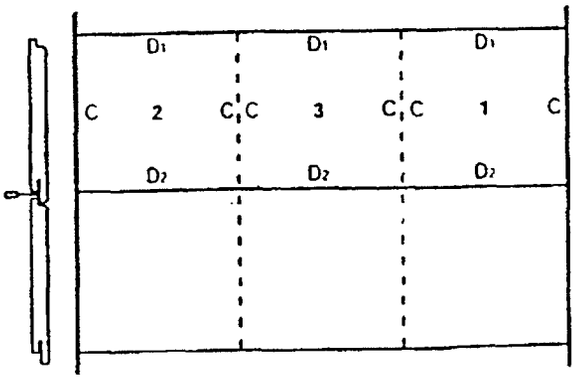

FIG. 6

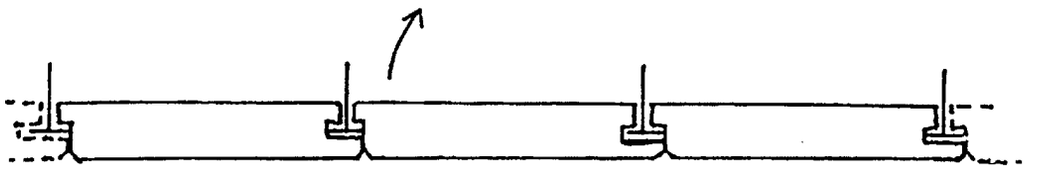

FIG. 7

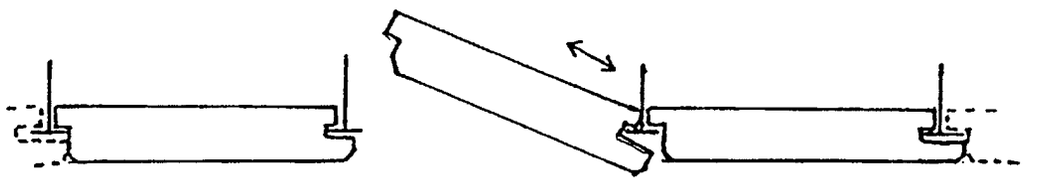

FIG. 8

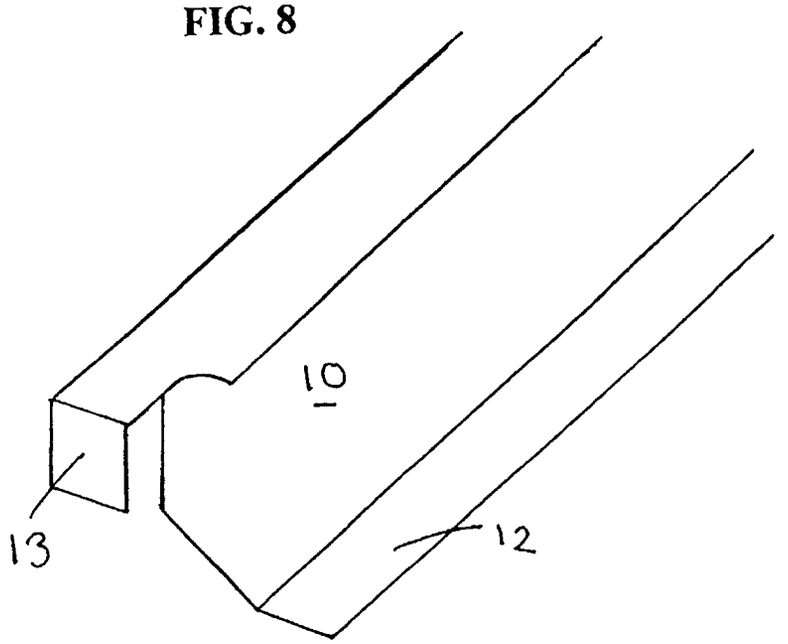

FIG. 9

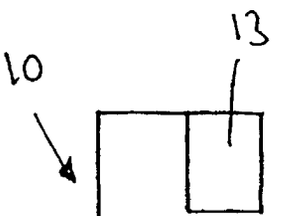

FIG. 10

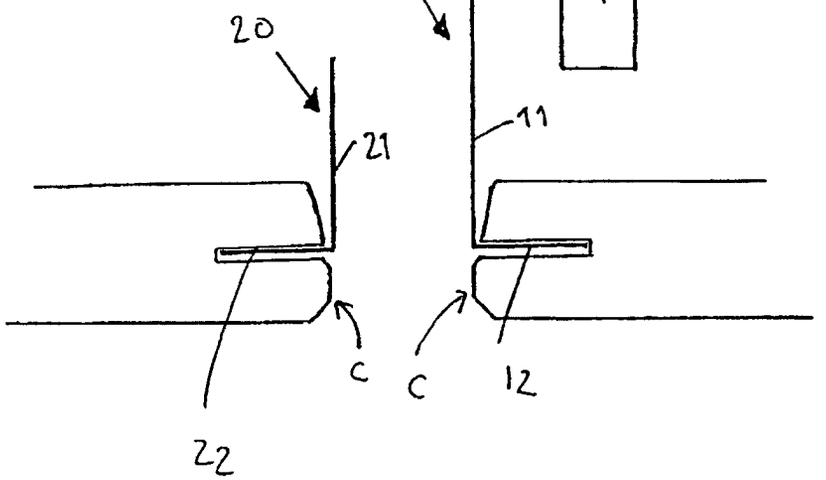

FIG. 11