

(19)



(11)

**EP 3 122 952 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**10.08.2022 Bulletin 2022/32**

(51) International Patent Classification (IPC):  
**E04B 9/16 (2006.01)**

(21) Application number: **15767757.6**

(52) Cooperative Patent Classification (CPC):  
**E04B 9/16**

(22) Date of filing: **25.03.2015**

(86) International application number:  
**PCT/IB2015/000396**

(87) International publication number:  
**WO 2015/145245 (01.10.2015 Gazette 2015/39)**

(54) **CEILING SUSPENSION SYSTEM**

ABGEHÄNGTES DECKENSYSTEM

SYSTÈME DE SUSPENSION POUR PLAFOND

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

(74) Representative: **Gill Jennings & Every LLP**  
**The Broadgate Tower**  
**20 Primrose Street**  
**London EC2A 2ES (GB)**

(30) Priority: **25.03.2014 EP 14161590**

(56) References cited:  
**WO-A2-2008/077480 JP-A- H0 449 358**  
**JP-U- S 515 215 JP-Y1- S 451 657**  
**US-A- 3 015 375 US-A- 3 677 589**  
**US-A- 4 389 828 US-A1- 2007 180 787**  
**US-A1- 2010 005 747 US-A1- 2011 283 634**

(43) Date of publication of application:  
**01.02.2017 Bulletin 2017/05**

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

(72) Inventor: **BORGERS, Stéphane**  
**B-2640 Antwerp (BE)**

**EP 3 122 952 B1**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

### Field of the invention

**[0001]** The invention relates to a system for suspending ceiling tiles, and a method of assembling such a system, including fixing ceiling tiles. The invention also relates to a mounting clip suitable for use in the suspension system and a method of making this clip.

### Background of the invention

**[0002]** It is well known to provide grid systems for suspending ceiling tiles, to form a suspended ceiling. Such systems commonly include two sets of runners or supports, positioned mutually perpendicularly. One set of mutually parallel supports is suspended from the building ceiling and a set of mutually parallel supports is fixed perpendicular to these. One of these sets of supports forms the support for the ceiling tiles. The invention is concerned with systems in which there are upper supports which are mutually parallel and are suspended from the building ceiling, and lower supports affixed to these upper supports and which are perpendicular to the upper supports, and which act as supports for the ceiling tiles.

**[0003]** In such a system it is critical that stability of the grid formed is maintained, in particular that the distance between the supports in each parallel set is consistent and is maintained. It is also important that a system be provided in which the ceiling tiles themselves are securely positioned and do not shift easily once installed.

**[0004]** It is desirable to provide a system in which installation is convenient. It is also desirable to provide a system which is economical to provide and operate. It is particularly desirable to achieve all of these objects in the context of a grid system in which the supports themselves are intended to be invisible from below. Various systems are already known for suspending ceiling tiles, including those where the support grid is concealed by the tiles.

**[0005]** According to our earlier publication WO2008/077480 we provide a system for suspending ceiling tiles, comprising a plurality of substantially parallel upper supports, a plurality of substantially parallel lower supports which are substantially perpendicular to the upper supports and which cross the upper supports at crossing points, the upper supports having apertures and being suspended via suspending means, a mounting clip which affixes each lower support to an upper support at a crossing point, the lower supports each having a substantially vertical web, wherein the mounting clip has the form of two plates each having an upper section and a lower section and the upper section of each plate has a protruding section at one edge, and the two protruding sections each pass through an aperture in the upper support, whereby the lower sections of the two plates pass on opposite sides of the vertical web of the lower support and press against and grip the lower support as a result

of the protruding sections being held within the aperture or apertures in the upper support.

**[0006]** As a result of using this known system, the upper and lower supports are affixed in a secure and rigid manner. The configuration of the mounting clip makes the system as a whole easy to install. It is also, with this system, possible to use upper and lower supports which are of essentially the same form. In particular, it is possible to apply this system using upper and lower supports which are in the form of standard invert T-profiles. This makes the system particularly economical.

**[0007]** It is also possible to use the system in combination with a standard stop clip, which allows easy removal and replacement of individual ceiling tiles with little risk of other tiles in the grid shifting out of place.

**[0008]** The mounting clip in this known system is unitary and has the form of two plates each having an upper section and a lower section and the upper section of each plate has a protruding region at one edge, whereby the upper sections of the two plates are joined at a fold which is either at the top edges of the upper sections or at the side edges opposite those from which the protruding regions protrude, and the mounting clip is formed from material which renders it capable of being folded.

**[0009]** This system has been commercially successful for some years. However, although it solves the problem of fixing the supports in a secure manner, as discussed above, there is nevertheless room for improvement.

**[0010]** Accordingly it is an aim of the invention to provide an improved system of the same general type as the known system described above, for suspending ceiling tiles, in which the upper and lower supports are affixed even more securely and in which the system remains easy and economical to install.

### Summary of the invention

**[0011]** According to a first aspect of the invention we provide a system for suspending ceiling tiles, comprising the features of claim 1.

**[0012]** Thus the claimed system differs from the known system of WO2008/077480 in that the mounting clip is provided with at least one stabilizing wing as defined. This stabilizing wing extends from the mounting clip that is positioned over the lower support and is able to press against a surface of the upper support. This enables stabilization of the upper and lower supports in perpendicular formation. It minimizes the risk of the supports that form the grid not being mutually perpendicular. It also assists in maintaining the web of the upper support in vertical configuration.

**[0013]** For optimum stabilization the system involves pairs of wings, so that the mounting clip is provided with at least one pair of mutually opposed stabilizing wings that extend substantially perpendicularly one from each plate of the mounting clip.

**[0014]** In a second aspect, the invention provides a method of mounting a grid for a suspended ceiling, said

method comprising the features of claim 12.

**[0015]** The mounting clip is itself novel and so in a third aspect the invention provides a mounting clip comprising the features of claim 14.

**[0016]** The mounting clip is described as having the form of two substantially vertical plates, each having an upper section and a lower section. In the mounted, closed form the two substantially vertical plates are substantially parallel. The "plane of the plate" from which the wing or wings extend refers to the plane in three dimensional space in which the entire plate substantially lies. The upper, lower and intermediary sections of a plate may be slightly offset, but the planes of the sections are substantially parallel, such that a component that is substantially perpendicular to the plane of the plate is substantially perpendicular to each section of the plate. The sections of each plate are not in themselves separate plates. Thus, reference to the "plane of the plate" refers to the set of planes occupied by the sections of the plate, these planes all being parallel.

#### Detailed description of the invention

**[0017]** Usually all upper supports are alike and all lower supports are alike.

**[0018]** The system of the invention can be effected with various forms of upper and lower support, provided that the upper support has apertures into which the protrusions in the upper section of the plates can pass and thereby be held.

**[0019]** However, one advantage of the invention is that the system is effective when either the upper or lower supports or both are, independently, in the form of an invert T-profile. Preferably both upper and lower supports are in the form of an invert T-profile.

**[0020]** Generally, the upper support has a substantially vertical web in which the apertures are positioned. This is generally the web of an invert T-profile.

**[0021]** Such invert T-profiles are of well-known general construction and are produced in large quantities, making the system of the invention particularly economical to operate.

**[0022]** Supports of this kind are generally made of a strip of metal which is folded to form the web of the T-profile and flanges at one edge of the web. As is conventional for such T-profiles, the folding usually generates a hollow bulb at the opposite edge of the web from the flanges.

**[0023]** An advantage of the use of T-profiles is that they are made in large quantities and are, as a consequence, economically advantageous. They are made in slightly varying forms by different manufacturers, but each manufacturer provides a variety of invert T-profile supports having the same general shape, differing only in the length of the profile and the distance between the upper and lower apertures. They may also differ in the manner in which they are joined at their ends.

**[0024]** The invention is especially advantageous in the

case where the supports have a vertical web that has height greater than standard single height. As mentioned above, it is common for invert T-profiles to be produced in a series of standard sizes. Standard height of the invert T-profile can for instance be 30 or 38 or 41 mm. The invention is applicable when using such T-profiles. However it is especially beneficial when using invert T-profiles having greater height, for instance at least 50 mm, in particular at least 60 mm. An example of a standard "double height" T-profile is one having a height of 75 mm. It is advantageous that the same mounting clip can be used for lower or upper supports of any height as the mounting clip engages only part of the supports independent of the height thereof. This is in contrast to some prior art mounting clips, such as the mounting clip marketed by Saint-Gobain API under the trade name Cross-lock, which pass over the upper support on either side thereof so as to clasp the lower support. Thus they can only be used in the case where the mounting clip has a height greater than the height of the particular upper support used.

**[0025]** In this case any deviation of the webs of the supports from the vertical is exaggerated more as the height of the web increases. In some cases this even risks the ceiling tiles falling out of the grid. The presence of the one or more stabilizing wings minimizes deviation of the webs from the vertical.

**[0026]** Likewise the invention is especially advantageous in the case where the supports are of greater than standard length. In such cases any deviation from the perpendicular relationship between the upper and lower supports is exaggerated. Thus the invention is particularly beneficial when the upper supports or lower supports or both have length at least 3000 mm.

**[0027]** It is normal for apertures to be provided at regular intervals along the portion of the web which is between the bulb and the flanges, and it is normal practice for these intervals to be defined extremely precisely during manufacture. These apertures may be of any appropriate shape. Normally they are in the form of substantially vertical slots.

**[0028]** Each of the protruding regions of the mounting clip passes through an aperture. Depending upon the configuration of the upper support, it can be possible for the two protruding regions each to pass through a separate aperture. Normally this requires the apertures to be close together.

**[0029]** Preferably, however, the two protruding regions pass through a single aperture in the upper support. In this way they are normally held in contact with one another. Often the protruding regions are each substantially planar and are held substantially flush with one another.

**[0030]** The protruding sections from the upper section of the plates have barbs which prevent these sections from passing out of the aperture once fitted into it.

**[0031]** Preferably the fixing of the protrusions into the aperture or apertures in the upper support causes the upper sections of the plate to be in contact with one another. However, this is not necessary, provided that the

arrangement is such that the lower sections press against and grip the lower support. Preferably the upper sections are substantially planar and are flush with one another when the protruding regions pass through the aperture or apertures.

**[0032]** It is also normal for further apertures to be provided in the bulb section of the web. It is normal manufacturing practice that these apertures are spaced at regular intervals, but the precision of the spacing is not as great as for the apertures in the portion of the web between the bulb and the flanges. These upper apertures are used, in the case of the upper support, to hold suspending means, such as hangers, in conventional fashion.

**[0033]** According to the invention at least one stabilizing wing is provided which extends from one of said plates of the mounting clip in a direction substantially perpendicular to the plane of said plate, such that the upper and lower supports are stabilized in perpendicular formation by said at least one stabilizing wing. Each stabilizing wing extends from the mounting clip and is formed in such a way as to be able to contact and bear against the upper support so as to prevent it from substantially deviating from perpendicular relationship with the lower support, in the event that the upper and lower supports tend away from the perpendicular relationship.

**[0034]** In practice, once the mounting clip is positioned as described above so as to affix the upper and lower supports in mutually perpendicular relationship, part of the or each stabilizing wing will be in actual or near contact with a surface of the upper support. If the upper support begins to deviate from mutually perpendicular relationship with the lower support, then the stabilizing wing bears against it so as to prevent further deviation. Thus the mutually perpendicular configuration is stabilized.

**[0035]** When the mounting clip is in position, the or each stabilizing wing may be in contact with a surface of the upper support. Alternatively there may be a small clearance between the surface of the upper support and the closest point of any stabilizing wing to said surface.

**[0036]** Preferably any stabilizing wings are in pairs. Thus the mounting clip is preferably provided with at least one pair of mutually opposed stabilizing wings that extend substantially perpendicularly one from each plate of the mounting clip. Thus each stabilizing wing in a pair is formed so as to be able to contact and bear against a surface of the upper support, one wing on each side of the mounting clip and of the lower support, in the event that the upper support tends away from perpendicular relationship with the lower support.

**[0037]** Thus the mounting clip can be provided with a pair of mutually opposed upper wings that extend substantially perpendicularly one from the upper section of each plate. These will bear against the vertical web of the upper support and prevent substantial deviation in the horizontal plane.

**[0038]** If one or more upper wings is provided that extend substantially perpendicularly from the upper section

of a plate then their plane is usually substantially horizontal. In this way, after assembly of the system, at least part of an edge of the or each upper wing is in actual or near contact with the substantially vertical web of the upper support.

**[0039]** Preferably there is a small clearance between the vertical web of the upper support and the closest point to it of each stabilizing upper wing. This clearance aids with ease of positioning the mounting clip. It is preferably at least 0.05 mm for this reason, for instance at least 0.1 mm. However it is not so high as to lose the stabilizing function of the relevant wing. Therefore it is preferably not more than 0.2 mm.

**[0040]** Preferably the mounting clip is provided with a pair of mutually opposed lower wings that extend substantially perpendicularly one from the lower section of each plate. These will bear against the under surface of the vertical web of the upper support and prevent substantial deviation in the vertical plane.

**[0041]** If one or more lower wings is provided that extend substantially perpendicularly from the lower section of a plate then their plane is usually substantially vertical. These lower wings will bear against the under surface of the upper support and prevent substantial deviation in the vertical plane.

**[0042]** If desired there can be a small clearance between the under surface of the upper support and the closest point of each stabilizing upper wing. This clearance aids with ease of positioning the mounting clip. If present it is preferably at least 0.05 mm for this reason, for instance at least 0.1 mm. However it is not so high as to lose the stabilizing function of the relevant wing. Therefore it is preferably not more than 0.2 mm. Preferably however there is no clearance between the lower stabilizing wings and the under surface of the upper support, and there is contact between this under surface and at least part of each lower stabilizing wing.

**[0043]** Preferably then, once the mounting clip is in position at least part of an edge of the or each lower wing is in actual or contact with the under surface of the upper support.

**[0044]** In the most preferred embodiment the mounting clip is provided with both a pair of mutually opposed upper wings that extend substantially perpendicularly one from the upper section of each plate and a pair of mutually opposed lower wings that extend substantially perpendicularly one from the lower section of each plate.

**[0045]** In a preferred embodiment, each wing comprises a protrusion arranged to bear against a surface of the upper support in the case of deviation from the mutually perpendicular relationship with the lower support. Preferably such a protrusion is provided on the stabilizing wing at the end distal from said plate from which the wing extends. The provision of such a protrusion ensures that it is always this point of the wing that makes contact with and bears against the surface of the upper support in the event of deviation of the supports from the mutually perpendicular configuration. Thus stabilization can be pre-

dictable relative to the situation where no protrusion is provided, where the point of contact could be at any point along the length of the edge of the wing. Ensuring that the point of possible contact is at the greatest possible distance from the plate of the mounting clip maximises the stabilizing effect of the wing.

**[0046]** Stabilising wings inherently possess certain characteristics. A wing necessarily possesses a free end, distal from the connecting edge with the body.

**[0047]** A stabilising wing is configured to stabilise the body, in this case the clip plates and therefore also the upper and lower supports.

**[0048]** Compared to a protruding section, which in this invention denotes a part of the plate that clips in to an aperture in the upper support, a stabilising wing is an element that limits or prevents undesirable movement of the supports when clipped, rather than an element that holds the clip and the upper support together.

**[0049]** It is particularly preferred that the lower support has a substantially vertical web and, at its upper edge, a thicker section, such as a bulb in the case of a standard invert T- profile. This allows the plates of the mounting clip to be shaped so that the lower sections are able to grip along and under this thicker part. Generally the lower sections of the plates of the mounting clip are each shaped so as to be able to correspond with any such thicker portion in the web of the lower support.

**[0050]** In a normal grid system for carrying a suspended ceiling, there are a plurality of upper supports and a plurality of lower supports substantially perpendicular to these. Generally there are at least three upper supports, often four or five or more, depending upon the area of the ceiling which is to be installed. Similarly, generally there are at least three or four or five and often more lower supports.

**[0051]** Thus, there will be a plurality of points at which the upper and lower supports cross. Preferably, there is a mounting clip applied at each crossing point. However, the security and rigidity of the connection provided by the invention is such that it is in some cases not necessary to provide a mounting clip at every crossing point. For instance, it may be necessary to apply a mounting clip only at alternate crossing points. The same applies if a single upper support is crossed by more than two lower supports.

**[0052]** The mounting clip is formed of two plates which are normally substantially planar. It is possible to provide a mounting clip in which the two plates are not connected, in the case where, when the protruding sections register with the aperture or apertures in the upper support, the two protruding sections are held in position, thus forcing the remainder of the two plates in contact with each other in their upper section and with the substantially vertical web of the lower support in their lower section.

**[0053]** However, best results and greatest convenience are obtained when the two plates form part of a unitary mounting clip having a single fold. The fold is in the upper section of the mounting clip. For instance the

two upper edges of the plates may be joined. Preferably, however, the fold is substantially vertical, that is, the upper sections of the two plates are joined at their side edges opposite the protrusions which pass through the lower aperture in the upper support. This configuration assists in providing a reliable connection between the upper and lower supports.

**[0054]** Most preferably the mounting clip is unitary and is formed by folding a single sheet of material. The appropriate sheet can for instance be provided by punching out from a larger sheet. It may be made of any material having appropriate strength and malleability to allow folding and maintenance of the fold, but allowing manipulation of the mounting clip so that the two plates can be brought close to or in contact with one another in their upper sections and in the protruding sections. As provided for use in the system of the invention, a mounting clip having a fold can be provided in a form such that the angle between the plates is from 180° to zero degrees, but is usually provided so that the angle between the two plates is in the range 5 to 140°, preferably in the range 10 to 50°, often about 10 to 30°. During installation, it is preferred to complete the fold and bring the upper section and the protrusions into contact with one another.

**[0055]** It is important that the mounting clip is made of a material which is sufficiently flexible to allow folding, as discussed above, but is at the same time sufficiently stiff that holding of the protruding regions in the aperture or apertures maintains the rest of the mounting clip, in particular the lower sections, in position.

**[0056]** Suitable materials include plastics and metals, in particular steel. Spring steel can be used, provided the thickness and stiffness of the plates is sufficiently high to retain their contact with the lower support when the protrusions are brought together in the aperture.

**[0057]** The fold joins the upper sections of the plates but it is important in the invention that they are not joined along the edges of the lower section, so that one plate can rest against each side of the substantially vertical web of the lower support, and be forced against it so as to provide a robust connection.

**[0058]** The plates may be connected along the entire length of the fold but preferably there is a break in the connection, to ease the process of bringing the plates close to or into contact with one another.

**[0059]** Preferably the lower section is shaped so as to correspond with the upper part of the vertical web of the lower support, in particular if this is in the form of a bulb. The lower section can then be shaped so as to extend around and under the bulb.

**[0060]** The width of the lower section can be chosen to maximise the stability of the connection between the upper and lower supports.

**[0061]** At the lower edge of the lower section of the plates there may be projections which are arranged so as to project towards the vertical web of the lower support. These projections can be arranged to register with apertures in the lower part of the vertical web of this support.

This allows fixing of the position of the mounting clip, and hence fixing of the position of the upper support connected with the mounting clip.

**[0062]** It is also possible to include projections which are arranged to register with apertures in the bulb of the lower support. There can be any appropriate number of projections in the lower section, for instance up to three.

**[0063]** Registering these projections with these apertures has the advantage that their relative distances are very precisely defined and controlled by the manufacturers of invert T-profiles, which are the most preferred form for the lower support.

**[0064]** Alternatively, there may be apertures in the lower sections of the plates which can register with the apertures in the lower section of the vertical web of the lower support, and position can be maintained by passing a fastening means through the three registering apertures. This can be a wire, a screw or any other known form of clip.

**[0065]** Similarly, there may be apertures in the lower sections of the plates which can register with apertures in the bulb of the lower support. Any appropriate number of apertures may be provided in the lower section of the plates, for instance up to three. In a preferred embodiment there is one aperture in the upper part of the lower section and two apertures in the lower part of the lower section.

**[0066]** In a further embodiment, there are two formations in the lower part of the lower section. One is an aperture and one is a hook. A hook is similar to an aperture in the plane of the lower part of the lower section but the material that has been removed from this plane to form the aperture is not removed from the clip entirely but is bent out of that plane to form a hook. The hook can protrude from the plane of the lower part of the lower section either towards the other plate or away from the other plate, but preferably protrudes towards the other plate.

**[0067]** It is possible to include both projections and apertures in a single plate.

**[0068]** If there is an aperture in one of the plates then there is preferably a corresponding aperture in the other plate, especially if the aperture registers with an aperture in the bulb of the lower support. If there is a projection in one of the plates then it is possible to have a corresponding projection in the other plate but this is not essential.

**[0069]** A variety of fastening means can be used to pass through registering apertures.

**[0070]** In one example the fastening means has a head and a barbed shaft which is pressed through the registering apertures and the barbs prevent the fastener from moving substantially once in the apertures. In this case the fastener is preferably made from a material which is deformable so that it can be inserted into the aperture but sufficiently rigid to maintain its position. Examples include polymeric materials.

**[0071]** In other examples the fastener may be such that it has a head and a shaft, the shaft being passed through

the registering apertures and then extending some distance from the third aperture. It can then be bent, usually using a tool, so as to fix it in position in the aperture and prevent it falling out.

**[0072]** In one embodiment one lower section is provided with a catch which extends towards the other lower section so as to engage with an edge that is provided in said other lower section so as to lock the two plates of the mounting clip in the folded position in the mounted state.

**[0073]** The two plates of the mounting clip are held together by the locking of the catch engaging with the corresponding edge.

**[0074]** The catch is preferably provided with an embossing, so the catch has a width to fill the slot to thereby restrict movement of the mounting clip in relation to the lower support.

**[0075]** In an alternative preferred embodiment the catch is provided with a finger instead of an embossing. Such a finger has the same purpose of providing the catch with a width to fill the slot to thereby restrict movement of the mounting clip in relation to the lower support.

**[0076]** Preferably the lower sections are shaped so that at least a portion of each plate passes along the lower support and under the upper support.

**[0077]** Preferably the mounting clip is substantially symmetrical about the fold, so that the upper and lower sections of the two plates have essentially the same configuration. Thus, preferably the upper sections and protruding regions are substantially symmetrical about the fold. Independently, the lower sections may be symmetrical about the fold line. However, they may differ slightly in that the lower section of one plate may have a projection as discussed above, whereas the lower section of the other plate does not have such a projection.

**[0078]** According to the invention we also provide a method of fixing such a system. In this aspect, the invention provides a method of mounting a grid for a suspended ceiling, the method comprising the following steps:

40 providing  
 an upper support which has an under surface and a substantially vertical web containing an aperture and which is suspended from the building ceiling,  
 45 a lower support having a substantially vertical web  
 a mounting clip having two plates, each plate having an upper section and a lower section, each upper section having at one side edge a protruding section, wherein the mounting clip is provided with at least one stabilizing wing that extends from one of said plates of the mounting clip in a direction substantially perpendicular to the plane of said plate,  
 50 placing the mounting clip over the lower support such that the lower sections of each plate are on opposite sides of the substantially vertical web of the lower support,  
 55 bringing the upper sections of the plates toward one another, and contacting the lower sections of the

plates with the substantially vertical web of the lower profile, bringing each protruding section through an aperture provided in the vertical web of the upper support, so as to affix the lower and upper supports together in mutually perpendicular relationship, such that the upper and lower supports are stabilized in perpendicular formation by said at least one stabilizing wing.

**[0079]** In this aspect of the invention the mounting clip may have any of the additional features described above in the context of the first aspect of the invention.

**[0080]** It is possible to secure the ends of the upper and lower supports to the walls of the relevant room. This can be done in standard manner, for instance by means of brackets.

**[0081]** Generally the grid system described supports tiles, which are supported on the lower support. If this is in the form of an invert T-profile, the tiles are supported on the flange of the lower support. In other cases there is generally a substantially horizontal flange which can be used to support the tiles.

**[0082]** The tiles may be conventional and for instance may be made of fibre materials such as mineral fibres (e.g. glass, stone or slag wool). Other types can be used. Once the tiles are in position, it is often necessary to provide means for keeping appropriate spacing between them. This is commonly done by means of a stop clip. Conventional stop clips can be used in the invention.

#### Brief Description of the Figures

##### **[0083]**

Figure 1a shows a perspective view of a first variant mounting clip for use in the system of the invention.

Figure 1b shows the same mounting clip in position with upper and lower supports.

Figure 1c shows the blank for the clip of Figures 1a and 1b before folding into shape for use.

Figure 2a shows a perspective view of a second variant mounting clip for use in the system of the invention.

Figure 2b shows a second perspective view of the same mounting clip as in Figure 2a from the opposite side.

Figure 2c shows a side view of the clip of Figures 2a and 2b.

Figures 3a to 3e show the method by which the upper and lower supports are connected using the mounting clip.

Figure 4 shows a perspective view of a third variant mounting clip for use in the system of the invention.

#### Detailed Description of the Figures

**[0084]** Figure 1a shows a mounting clip 1 as produced and ready for use in the system of the invention. It has plates 2 joined by a fold 3 which connects the upper sections 4 of the two plates. The lower sections 5 of the plate are not joined. Each upper section has a protruding section 6 having a barb 7.

**[0085]** From each upper section extends a stabilizing wing 8, the wings being mutually opposed. Each stabilizing wing extends in a substantially horizontal plane.

**[0086]** From each lower section extends a lower stabilizing wing 9, the wings being mutually opposed. Each stabilizing wing extends in a substantially vertical plane.

**[0087]** Figure 1b is a perspective view of an upper support 10 and lower support 11 affixed in mutually perpendicular relationship by the mounting clip of Figures 1a and 1c. Figure 1b further shows, for comparison, a prior art clip without stabilizing wings. The method of affixing the supports is discussed in detail in connection with Figure 3 below.

**[0088]** Figure 1c shows a blank for the mounting clip before folding. To form the mounting clip the two plates are folded along the line 3. Further the stabilizing wings 8 and 9 are formed by bending along the dotted lines. Moreover a catch 20 is formed by bending. The catch 20 is explained in more detail in relation to the Figures 3a and 3b.

**[0089]** Figure 2a shows in perspective view another mounting clip 1 as produced and ready for use in the system of the invention. The same mounting clip is shown in another perspective view in Figure 2b and in side view in Figure 2c. It has plates 2 joined by a fold 3 which connects the upper sections 4 of the two plates. The lower sections 5 of the plate are not joined. Each upper section has a protruding section 6 having a barb 7.

**[0090]** From each upper section extends an upper stabilizing wing 8, the wings being mutually opposed. Each stabilizing wing extends in a substantially horizontal plane. Each upper stabilizing wing is provided with a protrusion 12 at the end distal from the upper plate of the mounting clip.

**[0091]** From each lower section extends a lower stabilizing wing 9, the wings being mutually opposed. Each stabilizing wing extends in a substantially horizontal plane. In comparison with the lower stabilizing wings of the mounting clip of Figure 1, these lower wings have a smaller depth. This has the advantage that there is more space for positioning of the ceiling tile in the grid formed of the upper and lower supports. Each lower stabilizing wing is provided with a protrusion 12 at the end distal from the lower plate of the mounting clip. From one lower section extends a catch 20 to engage with an edge 21 to lock the two plates of the mounting clip in the folded position in the mounted state, as will be described further

below.

**[0092]** Figures 3a to 3e show how the mounting clip is used to connect the upper and lower supports.

**[0093]** In Figure 3a the mounting clip 1 is placed over the lower support 11, which is in the form of a conventional invert T-profile, having a substantially vertical web 13 and substantially horizontal flanges 14. The top half of the substantially vertical web is in the form of a bulb 15.

**[0094]** The mounting clip is positioned so that the lower sections of the two plates are on opposite sides of the vertical web of the lower T-profile 11.

**[0095]** As shown in Figure 3b the clip is then closed to force the upper sections 4 together and the lower sections 5 against the bulb 15. The protruding sections 6 are then flush with one another. The two plates of the mounting clip are held together by the locking of the catch 20 engaging with edge 21. The catch 20 is provided with an embossing 22, so the catch 20 has a width to fill the slot 16 to thereby restrict movement of the mounting clip in relation to the lower T-profile 11. The upper section 4 comprises a hole 24, which for example may be used for a hanger, e.g. in a suspended ceiling system with heavy loads. In this way the mounting clip 1 may be used for the hanger instead of for connecting the lower support to the upper support.

**[0096]** It can be seen that the lower section of each plate is shaped so as to correspond with the shape of the bulb 15 and be flush with it when the upper sections are flush with one another.

**[0097]** As shown in Figure 3c, the upper support 10 is then positioned substantially perpendicular to the lower support 11 and above it and is slid along it towards the mounting clip so that the protruding sections 6 pass through the slot 16 in the vertical web 13 of the upper support 10, which is also in the form of a T-profile. Figure 3d shows the two supports in their final position. It can be seen that once the protruding sections 6 are forced together and held together by the slot 16, it is not possible for the lower sections to come away from the lower support.

**[0098]** As shown in Figure 3e, the pair of mutually opposed stabilizing wings 8 have edges 17 that, once the upper and lower supports are connected, are in near-contact with the vertical web 13 of the upper support. There is a clearance of about 0.1 mm between the edge of each wing and the vertical web. This aids in installation. However if there is any tendency for the upper and lower supports to move away from mutually perpendicular relationship in the horizontal direction, then the edge of the stabilizing wing bears against the vertical web and prevents further movement.

**[0099]** The upper wings fit under the under surface 19 of the bulb 15. This assists in preventing pivotal movement of the upper support in the vertical plane.

**[0100]** Figure 3e also shows that the pair of mutually opposed lower wings 9 which have a substantially vertical plane, have edges 17 which bear against the under surface 18 of the flange of the upper support. They minimize

any tendency to pivotal movement of the upper support in the vertical plane.

**[0101]** Figure 4 is a perspective view of a third variant of the mounting clip 1, where the catch 20 comprises a finger 23. The finger 23 replaces the embossing 22 of the second embodiment with the same purpose of providing the catch 20 with a width to fill the slot 16 to thereby restrict movement of the mounting clip in relation to the lower T-profile 11.

## Claims

1. A system for suspending ceiling tiles, comprising
  - a plurality of substantially parallel upper supports (10),
  - a plurality of substantially parallel lower supports (11) which are substantially perpendicular to the upper supports (10) and which cross the upper supports (10) at crossing points,
  - the upper supports (10) having apertures and being suspended via suspending means,
  - a mounting clip (1) which affixes each lower support (11) to an upper support (10) at a crossing point,
  - the upper (10) and lower (11) supports each having a substantially vertical web (13),
  - the upper support (10) having an under surface (18),
  - wherein the mounting clip (1) has the form of two plates (2), each of said plates (2) has an upper section (4) and a lower section (5), and the upper section (4) of each plate (2) has a protruding section (6) at one edge and the two protruding sections (6) each pass through an aperture in the upper support (10),
  - whereby the lower sections (5) of the two plates (2) pass on opposite sides of the vertical web (13) of the lower support (11) and press against and grip the lower support (11) as a result of the protruding sections being held within the aperture or apertures in the upper support (10),
  - wherein
  - the mounting clip (1) is provided with at least one stabilizing wing that extends from one of said plates (2) of the mounting clip (1) in a direction substantially perpendicular to the plane of said plate (2), such that the upper (10) and lower (11) supports are stabilized in perpendicular formation by said at least one stabilizing wing (8, 9), the stabilisation effected by the ability of the stabilising wing (8, 9) to bear against the upper support in the event of deviation of the supports (10, 11) from perpendicular formation.
2. A system according to claim 1 wherein the mounting clip (1) is provided with at least one pair of mutually

- opposed stabilizing wings (8, 9) that extend substantially perpendicularly one from each plate (2) of the mounting clip (1).
3. A system according to claim 1 wherein the mounting clip (1) is provided with a pair of mutually opposed upper wings (8) that extend substantially perpendicularly one from the upper section (4) of each plate (2). 5
  4. A system according to claim 1 wherein the mounting clip (1) is provided with a pair of mutually opposed lower wings (9) that extend substantially perpendicularly one from the lower section (5) of each plate (2). 10
  5. A system according to claim 1 wherein the mounting clip (1) is provided with both a pair of mutually opposed upper wings (8) that extend substantially perpendicularly one from the upper section (4) of each plate (2) and a pair of mutually opposed lower wings (9) that extend substantially perpendicularly one from the lower section (5) of each plate (2). 15 20
  6. A system according to any preceding claim wherein at least part of an edge (17) of each wing (8, 9) is in contact with the upper support (10). 25
  7. A system according to any preceding claim wherein if one or more upper wings (8) is provided that extend substantially perpendicularly from the upper section (4) of a plate (2) then their plane is substantially horizontal. 30
  8. A system according to claim 7 wherein at least part of an edge (17) of the or each upper wing (8) is in contact with the substantially vertical web (13) of the upper support (10). 35
  9. A system according to any preceding claim wherein if one or more lower wings (9) is provided that extend substantially perpendicularly from the lower section (5) of a plate (2) then their plane is substantially vertical. 40
  10. A system according to claim 9 wherein at least part of an edge (17) of the or each lower wing (9) is in contact with the under surface (18) of the upper support (10). 45
  11. A system according to any preceding claim wherein each wing (8, 9) comprises a protrusion (12) at the distal end from said plate (2) arranged for contact with the upper support (10). 50
  12. A method of mounting a grid for a suspended ceiling with a system for suspending ceiling tiles according to claim 1, said method comprising the following steps: 55
    13. A method according to claim 12 wherein the mounting clip (1) has any of the additional features recited in claims 2 to 11.
    14. A mounting clip (1) for use in fixing supports (10, 11) for a suspended ceiling in mutually perpendicular relationship, which is unitary and has the form of two substantially vertical plates (2) each having an upper section (4) and a lower section (5) and the upper section (4) of each plate (2) has a protruding section (6) at one edge,
 

providing  
 an upper support (10) which has an under surface (18) and a substantially vertical web (13) containing an aperture and which is suspended from the building ceiling,  
 a lower support (11) having a substantially vertical web (13),  
 a mounting clip (1) having two plates (2), each plate (2) having an upper section (4) and a lower section (5), each upper section (4) having at one side edge a protruding section (6), wherein the mounting clip (1) is provided with at least one stabilizing wing (8, 9) that extends from one of said plates (2) of the mounting clip (1) in a direction substantially perpendicular to the plane of said plate (2),  
 placing the mounting clip (1) over the lower support (11) such that the lower sections (5) of each plate (2) are on opposite sides of the substantially vertical web (13) of the lower support (11), bringing the upper sections (4) of the plates (2) toward one another, and contacting the lower sections (5) of the plates (2) with the substantially vertical web (13) of the lower profile,  
 bringing each protruding section (6) through an aperture provided in the vertical web (13) of the upper support (10), so as to affix the lower (11) and upper (10) supports together in mutually perpendicular relationship,  
 such that the upper (10) and lower (11) supports are stabilized in perpendicular formation by said at least one stabilizing wing (8, 9), the stabilisation effected by the ability of the stabilising wing (8, 9) to bear against the upper support in the event of deviation of the supports (10, 11) from perpendicular formation.
- whereby the upper sections (4) of the two plates (2) are joined at a fold (3) which is either at the top edge of the upper sections (4) or at the side edge opposite that from which the protruding sections (6) protrude, and the mounting clip (1) is formed from material which renders it capable of being folded such that the protruding sections (6) are in contact with one another, wherein the mounting clip (1) is provided with at least

one stabilizing wing (8, 9) that extends from one of said plates of the mounting clip in a direction substantially perpendicular to the plane of said plate (2), the stabilising wing (8, 9) being configured to stabilise the clip plates (2), wherein each protrusion (6) comprises a barb (7).

15. A mounting clip (1) according to claim 14 having any of the additional features recited in claims 2 to 11.

### Patentansprüche

1. System zum Abhängen von Deckenplatten, umfassend:

Eine Vielzahl von wesentlich parallelen oberen Trägern (10),  
 eine Vielzahl von wesentlich parallelen unteren Trägern (11), die wesentlich senkrecht zu den oberen Trägern (10) sind und die an Kreuzungspunkten die oberen Träger (10) kreuzen, wobei die oberen Träger (10) Öffnungen aufweisen und über Hängemittel abgehängt sind, einen Montage-Clip (1), der jeden unteren Träger (11) an einem Kreuzungspunkt an einen oberen Träger (10) befestigt, wobei die oberen (10) und unteren Träger (11) jeweils einen wesentlich senkrechten Trägersteg (13) aufweisen, wobei der obere Träger (10) eine Unterseite (18) aufweist, wobei der Montage-Clip (1) die Form von zwei Platten (2) hat, jede der Platten (2) einen oberen Teil (4) und einen unteren Teil (5) aufweist, und der obere Teil (4) jeder Platte (2) einen überstehenden Teil (6) an einer Kante aufweist und die zwei überstehenden Teile (6) jeweils durch eine Öffnung im oberen Träger (10) hindurchgehen, wobei die unteren Teile (5) der zwei Platten (2) auf gegenüberliegenden Seiten des senkrechten Trägerstegs (13) des unteren Trägers (11) passieren und, infolge davon, dass die überstehenden Teile innerhalb der Öffnung oder Öffnungen im oberen Träger (10) gehalten werden, gegen den unteren Träger (11) pressen und diesen ergreifen, wobei der Montage-Clip (1) mit zumindest einem stabilisierenden Flügel versehen ist, der sich aus einer der Platten (2) des Montage-Clips (1) derart in eine Richtung wesentlich senkrecht zur Ebene der Platte (2) erstreckt, dass die oberen (10) und unteren (11) Träger in senkrechter Formation durch den zumindest einen stabilisierenden Flügel (8, 9) stabilisiert werden, wobei die Stabilisierung durch die Fähigkeit des stabilisie-

renden Flügels (8, 9) bewirkt wird, im Falle von Abweichung der Träger (10, 11) aus der senkrechten Formation, gegen den oberen Träger zu drücken.

2. System nach Anspruch 1, wobei der Montage-Clip (1) mit zumindest einem Paar voneinander gegenüberliegenden stabilisierenden Flügeln (8, 9) versehen ist, die sich wesentlich senkrecht aus jeder Platte (2) des Montage-Clips (1) erstrecken.
3. System nach Anspruch 1, wobei der Montage-Clip (1) mit einem Paar voneinander gegenüberliegenden oberen Flügeln (8) versehen ist, die sich wesentlich senkrecht, einer aus dem oberen Teil (4) jeder Platte (2), erstrecken.
4. System nach Anspruch 1, wobei der Montage-Clip (1) mit einem Paar voneinander gegenüberliegenden unteren Flügeln (9) versehen ist, die sich wesentlich senkrecht, einer aus dem unteren Teil (5) jeder Platte (2), erstrecken.
5. System nach Anspruch 1, wobei der Montage-Clip (1) sowohl mit einem Paar voneinander gegenüberliegenden oberen Flügeln (8), die sich wesentlich senkrecht, einer aus dem oberen Teil (4) jeder Platte (2), erstrecken als auch einem Paar voneinander gegenüberliegenden unteren Flügeln (9) versehen ist, die sich wesentlich senkrecht, einer aus dem unteren Teil (5) jeder Platte (2), erstrecken.
6. System nach irgendeinem vorhergehenden Anspruch, wobei zumindest ein Teil einer Kante (17) jedes Flügels (8, 9) mit dem oberen Träger (10) in Kontakt ist.
7. System nach irgendeinem vorhergehenden Anspruch, wobei, wenn ein oder mehrere obere Flügel (8) vorgesehen ist/sind, der/die sich wesentlich senkrecht aus dem oberen Teil (4) einer Platte (2) erstreckt/erstrecken, dann ist ihre Ebene wesentlich horizontal.
8. System nach Anspruch 7, wobei zumindest ein Teil einer Kante (17) des oder jedes oberen Flügels (8) in Kontakt mit dem wesentlich vertikalen Trägersteg (13) des oberen Trägers (10) ist.
9. System nach irgendeinem vorhergehenden Anspruch, wobei, wenn ein oder mehrere untere Flügel (9) vorgesehen ist/sind, der/die sich wesentlich senkrecht aus dem unteren Teil (5) einer Platte (2) erstreckt/erstrecken, dann ist ihre Ebene wesentlich vertikal.
10. System nach Anspruch 9, wobei zumindest ein Teil einer Kante (17) des oder jedes unteren Flügels (9)

in Kontakt mit der Unterseite (18) des oberen Trägers (10) ist.

11. System nach irgendeinem vorhergehenden Anspruch, wobei jeder Flügel (8, 9) einen Überstand (12) am fernen Ende aus der Platte (2) umfasst, der für Kontakt mit dem oberen Träger (10) eingerichtet ist.

12. Verfahren zur Montage eines Gitters für eine abgehängte Decke mit einem System zum Abhängen von Deckenplatten nach Anspruch 1, wobei das Verfahren die folgenden Schritte umfasst:

Bereitstellen

eines oberen Trägers (10), der eine Unterseite (18) und einen wesentlich vertikalen Trägersteg (13) aufweist, der eine Öffnung enthält und welcher von der Gebäudedecke abgehängt ist, eines unteren Trägers (11), der einen wesentlich vertikalen Trägersteg (13) aufweist, eines Montage-Clips (1) mit zwei Platten (2), wobei jede Platte (2) einen oberen Teil (4) und einen unteren Teil (5) aufweist, jeder obere Teil (4) an einer seitlichen Kante einen überstehenden Teil (6) aufweist, wobei der Montage-Clip (1) mit zumindest einem stabilisierenden Flügel (8, 9) versehen ist, der sich aus einer der Platten (2) des Montage-Clips (1) in eine Richtung wesentlich senkrecht zur Ebene der Platte (2) erstreckt,

Platzieren des Montage-Clips (1) über den unteren Träger (11) derart, dass sich die unteren Teile (5) jeder Platte (2) auf gegenüberliegenden Seiten des wesentlich vertikalen Trägerstegs (13) des unteren Trägers (11) befinden, Bringen der oberen Teile (4) der Platten (2) aufeinander zu und Kontaktieren der unteren Teile (5) der Platten (2) mit dem wesentlich vertikalen Trägersteg (13) des unteren Profils, Bringen jedes überstehenden Teils (6) durch eine Öffnung, die im vertikalen Trägersteg (13) des oberen Trägers (10) vorgesehen ist, um die unteren (11) und oberen (10) Träger in zueinander senkrechter Beziehung zusammen zu befestigen,

derart, dass die oberen (10) und unteren (11) Träger in senkrechter Formation durch den zumindest einen stabilisierenden Flügel (8, 9) stabilisiert werden, wobei die Stabilisierung durch die Fähigkeit des stabilisierenden Flügels (8, 9) bewirkt wird, im Falle von Abweichung der Träger (10, 11) aus der senkrechten Formation, gegen den obigen Träger zu drücken.

13. Verfahren nach Anspruch 12, wobei der Montage-Clip (1) irgendwelche der zusätzlichen Merkmale aufweist, die in den Ansprüchen 2 bis 11 aufgezählt

sind.

14. Montage-Clip (1) zur Verwendung bei der Befestigung von Trägern (10, 11) für eine abgehängte Decke in zueinander senkrechter Beziehung, welcher einheitlich ist und die Form von zwei wesentlich vertikalen Platten (2) aufweist, wobei jede einen oberen Teil (4) und einen unteren Teil (5) aufweist und der obere Teil (4) jeder Platte (2) einen überstehenden Teil (6) an einer Kante aufweist,

wobei die oberen Teile (4) der zwei Platten (2) an einer Falte (3) verbunden sind, die entweder an der Oberkante der oberen Teile (4) oder an einer seitlichen Kante gegenüber jener liegt, aus welcher die überstehenden Teile (6) überstehen, und der Montage-Clip (1) aus Material gebildet ist, welches sich derart falten lässt, dass die überstehenden Teile (6) miteinander in Kontakt sind, wobei der Montage-Clip (1) mit zumindest einem stabilisierenden Flügel (8, 9) versehen ist, der sich aus einer der Platten des Montage-Clips in eine Richtung wesentlich senkrecht zur Ebene der Platte (2) erstreckt, wobei der Flügel (8, 9) konfiguriert ist, die Clip-Platten (2) zu stabilisieren, wobei jeder Überstand (6) einen Widerhaken (7) umfasst.

15. Montage-Clip (1) nach Anspruch 14, der irgendwelche der zusätzlichen Merkmale aufweist, die in den Ansprüchen 2 bis 11 aufgezählt sind.

### Revendications

1. Système de suspension de carreaux de plafond comprenant

une pluralité de supports supérieurs substantiellement parallèles (10),

une pluralité de supports inférieurs substantiellement parallèles (11) substantiellement perpendiculaires aux supports supérieurs (10) croisant les supports supérieurs (10) à des points d'intersection,

les supports supérieurs (10) comprenant des ouvertures et étant suspendus via des dispositifs de suspension,

un clip de montage (1) fixant chaque support inférieur (11) à un support supérieur (10) en un point d'intersection,

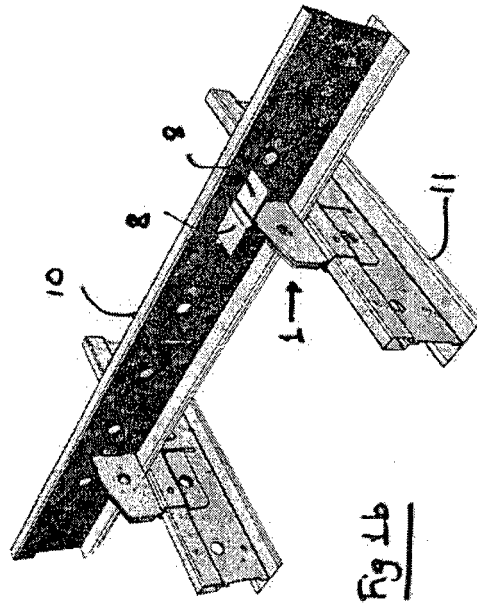
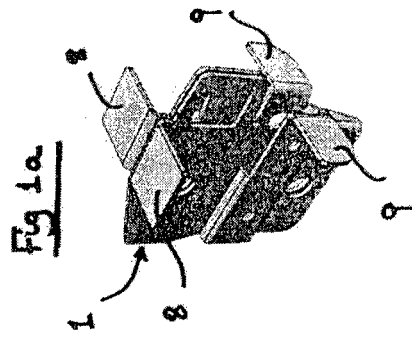
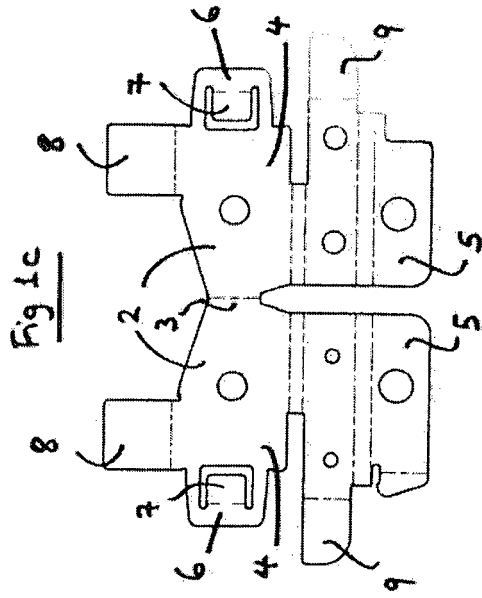
les supports supérieurs (10) et inférieurs (11) comprenant chacun une nappe substantiellement verticale (13),

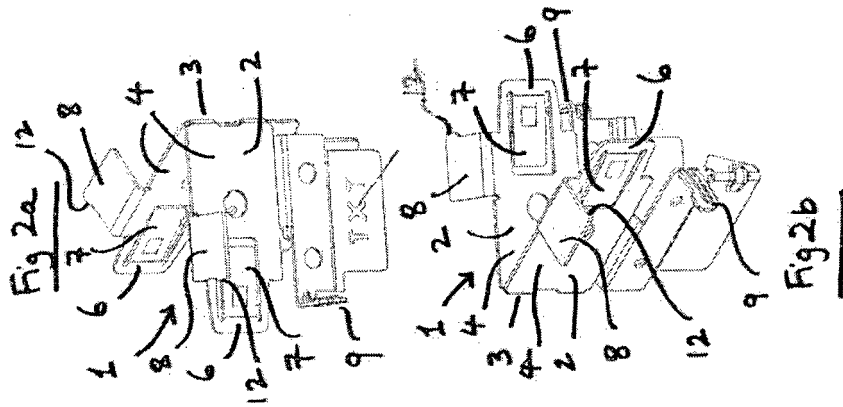
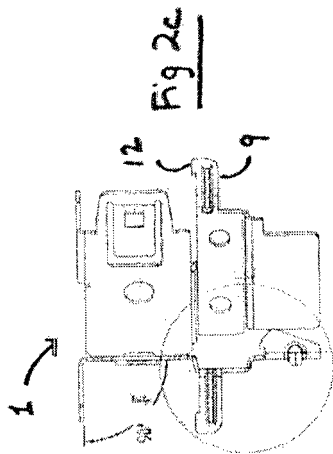
le support supérieur (10) possédant une surface inférieure (18),

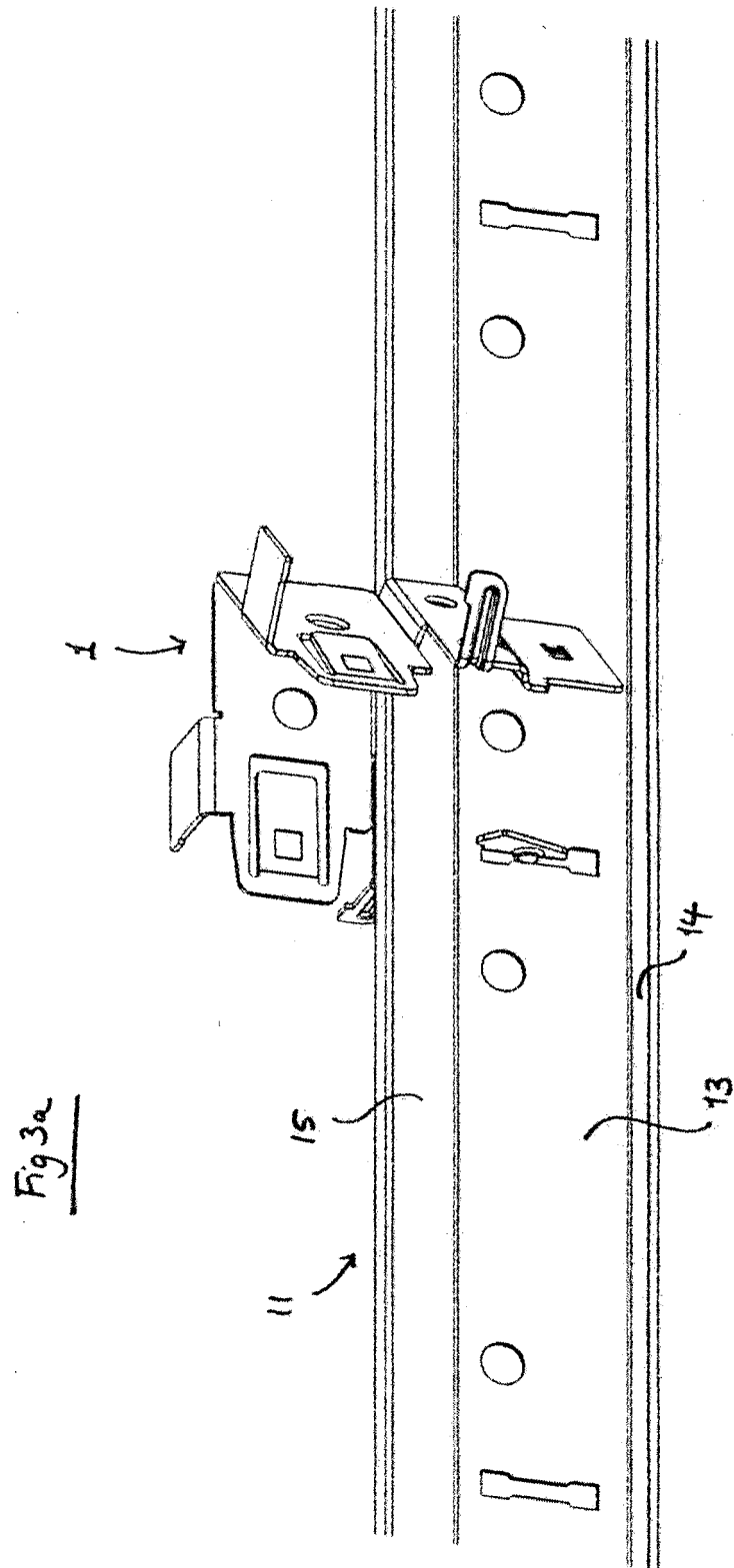
le clip de montage (1) ayant la forme de deux

- plaques (2), chacune desdites plaques (2) possédant une section supérieure (4) et une section inférieure (5), et la section supérieure (4) de chaque plaque (2) possédant une section saillante (6) à un bord, les deux sections saillantes (6) passant chacune dans une ouverture dans le support supérieur (10), les sections inférieures (5) des deux plaques (2) passant par des côtés opposés de la nappe verticale (13) du support inférieur (11), et faisant pression contre le support inférieur (11), en le serrant, du fait que les sections saillantes sont maintenues au sein de l'ouverture ou d'ouvertures dans le support supérieur (10), le clip de montage (1) étant muni d'au moins une aile stabilisatrice déployée d'une desdites plaques (2) du clip de montage (1) dans une direction substantiellement perpendiculaire au plan de ladite plaque (2) de sorte que les supports supérieurs (10) et inférieurs (11) soient stabilisés dans une formation perpendiculaire par ladite au moins une aile stabilisatrice (8, 9), la stabilisation étant assurée par la capacité de l'aile stabilisatrice (8, 9) de s'appuyer contre le support supérieur dans l'éventualité où les supports (10, 11) dévient de la formation perpendiculaire.
2. Système selon la revendication 1, le clip de montage (1) étant muni d'au moins une paire d'ailes stabilisatrices (8, 9) se faisant face et s'étendant de façon substantiellement perpendiculaire, une depuis chaque plaque (2) du clip de montage (1).
  3. Système selon la revendication 1, le clip de montage (1) étant muni d'une paire d'ailes supérieures (8) se faisant face, et s'étendant de façon substantiellement perpendiculaire, une depuis chaque section supérieure (4) de chaque plaque (2).
  4. Système selon la revendication 1, le clip de montage (1) étant muni d'une paire d'ailes inférieures (9) se faisant face, et s'étendant de façon substantiellement perpendiculaire, une depuis chaque section inférieure (5) de chaque plaque (2).
  5. Système selon la revendication 1, le clip de montage (1) étant muni à la fois d'une paire d'ailes supérieures (8) se faisant face, et s'étendant de façon substantiellement perpendiculaire, une depuis chaque section supérieure (4) de chaque plaque (2), et d'une paire d'ailes inférieures (9) se faisant face, et s'étendant de façon substantiellement perpendiculaire une depuis la section inférieure (5) de chaque plaque (2).
  6. Système selon une quelconque des revendications précédentes, au moins une partie d'un bord (17) de chaque aile (8, 9) se trouvant au contact du support supérieur (10).
  7. Système selon une quelconque des revendications précédentes, dans lequel, s'il comporte une ou plusieurs ailes supérieures (8) s'étendant de façon substantiellement perpendiculaire depuis la section supérieure (4) d'une plaque (2), leur plan est alors substantiellement horizontal.
  8. Système selon la revendication 7, au moins une partie d'un bord (17) de l'aile supérieure (8), ou de chacune de celles-ci, étant placée au contact de la nappe substantiellement verticale (13) du support supérieur (10).
  9. Système selon une quelconque des revendications précédentes, dans lequel s'il comporte une ou plusieurs ailes inférieures (9) s'étendant de façon substantiellement perpendiculaire depuis la section inférieure (5) d'une plaque (2), leur plan est alors substantiellement vertical.
  10. Système selon la revendication 9, au moins une partie d'un bord (17) de l'aile inférieure (9), ou de chacune de celles-ci, étant placé au contact de la surface inférieure (18) du support supérieur (10).
  11. Système selon une quelconque des revendications précédentes, chaque aile (8, 9) comprenant une saillie (12) à l'extrémité distale depuis ladite plaque (2) agencée pour assurer le contact avec le support supérieur (10).
  12. Méthode de montage d'une grille pour un plafond suspendu avec un système de suspension de carreaux de plafond selon la revendication 1, ladite méthode comprenant les étapes suivantes :
    - mettre en place un support supérieur (10) possédant une surface inférieure (18) et une nappe substantiellement verticale (13) possédant une ouverture et étant suspendue au plafond du bâtiment,
    - un support inférieur (11) possédant une nappe substantiellement verticale (13),
    - un clip de montage (1) possédant deux plaques (2), chaque plaque (2) possédant une section supérieure (4) et une section inférieure (5), chaque section supérieure (4) possédant, à un bord latéral, une section saillante (6), le clip de montage (1) étant doté d'au moins une aile stabilisatrice (8,9) s'étendant d'une desdites plaques (2) du clip de montage (1) dans une direction substantiellement perpendiculaire au plan de ladite plaque (2),
    - placer le clip de montage (1) sur le support inférieur (11) de sorte que les sections inférieures (5) de chaque plaque (2) se trouvent de côtés opposés de la nappe substantiellement verticale (13) du support inférieur (11),

- amener les sections supérieures (4) des plaques (2) l'une vers l'autre, et placer les sections inférieures (5) des plaques (2) au contact de la nappe substantiellement verticale (13) du profil inférieur, 5
- faire passer chaque section saillante (6) dans une ouverture pratiquée dans la nappe verticale (13) du support supérieur (10) de façon à fixer l'un à l'autre les supports inférieur (11) et supérieur (10) de façon perpendiculaire l'un à l'autre, de sorte que les supports supérieur (10) et inférieur (11) soient stabilisés dans une formation perpendiculaire par ladite au moins une aile stabilisatrice (8,9), la stabilisation étant assurée par la capacité de l'aile stabilisatrice (8, 9) de s'appuyer contre le support supérieur dans l'éventualité où les supports (10, 11) dévient de la formation perpendiculaire. 10 15
- 13.** Méthode selon la revendication 12, le clip de montage (1) étant doté d'éventuelles fonctions additionnelles parmi celles qui sont décrites aux revendications 2 à 11. 20
- 14.** Clip de montage (1) pour la fixation de supports de fixation (10, 11), pour un plafond suspendu, perpendiculaires les uns aux autres, unitaire et ayant la forme de deux plaques substantiellement verticales (2) possédant chacune une section supérieure (4) et une section inférieure (5), la section supérieure (4) de chaque plaque (2) possédant une section saillante (6) à un bord, 25 30
- les sections supérieures (4) des deux plaques (2) étant jointes à un pli (3) situé soit au bord supérieur des sections supérieures (4), soit au bord latéral faisant face à celui d'où font saillie les sections saillantes (6), et le clip de montage (1) étant composé d'un matériau grâce auquel il peut être plié de sorte que les sections saillantes (6) soient au contact l'une de l'autre, 35 40
- le clip de montage (1) étant doté d'au moins une aile stabilisatrice (8, 9) s'étendant d'une desdites plaques du clip de montage dans une direction substantiellement perpendiculaire au plan de ladite plaque (2), l'aile stabilisatrice (8, 9) étant configurée pour stabiliser les plaques du clip (2), 45
- chaque saillie (6) comprenant un ergot (7). 50
- 15.** Clip de montage (1) selon la revendication 14, doté d'éventuelles fonctions additionnelles parmi celles qui sont décrites aux revendications 2 à 11. 55







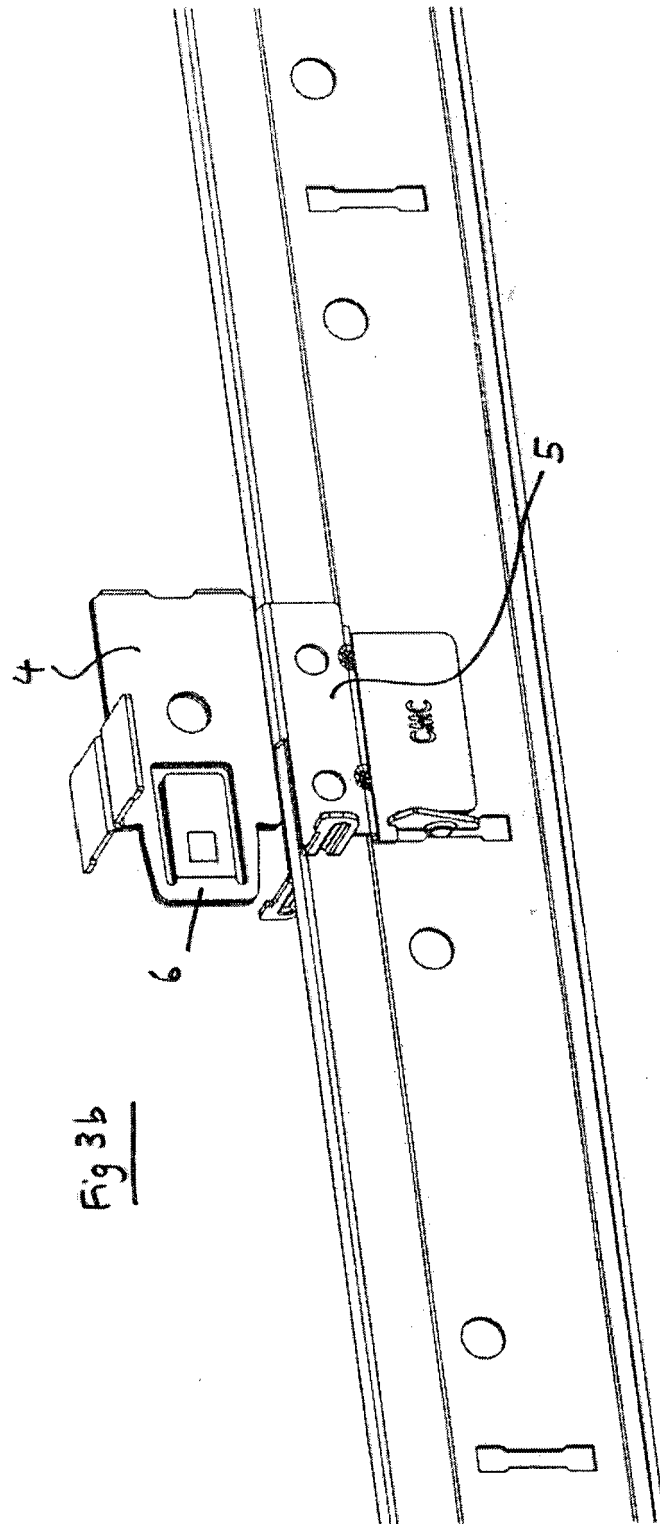
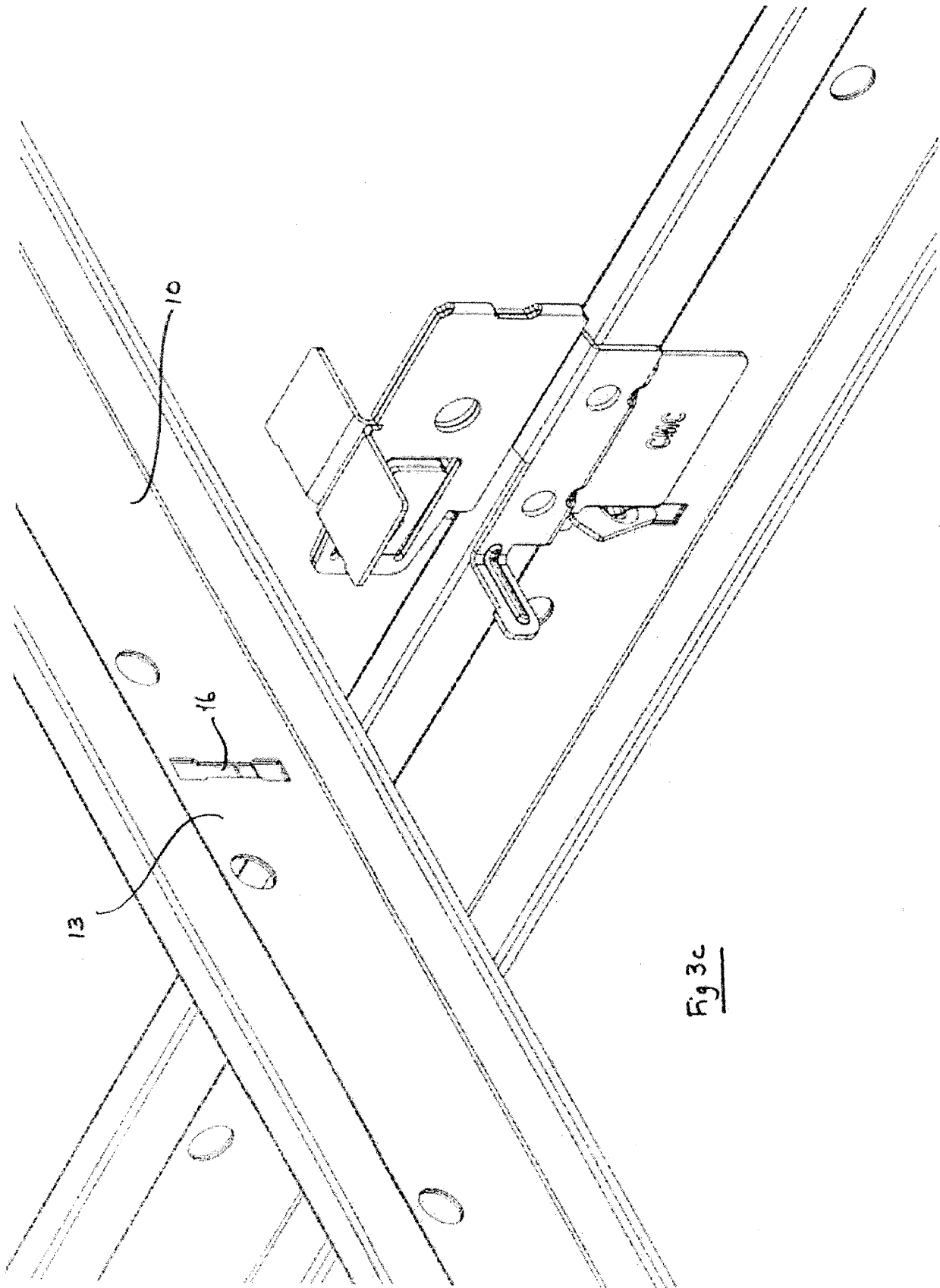


Fig 3b



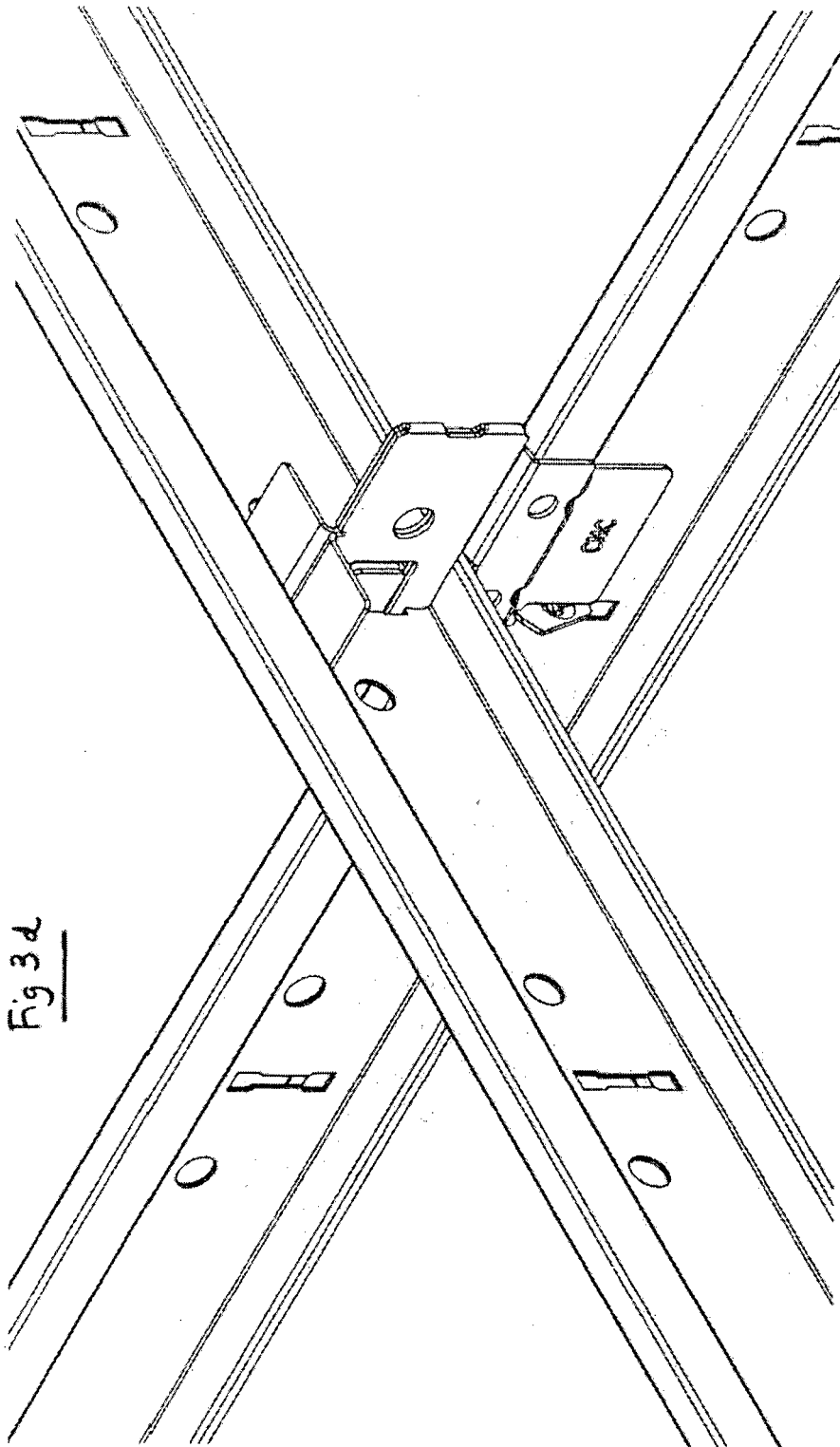


Fig 3d

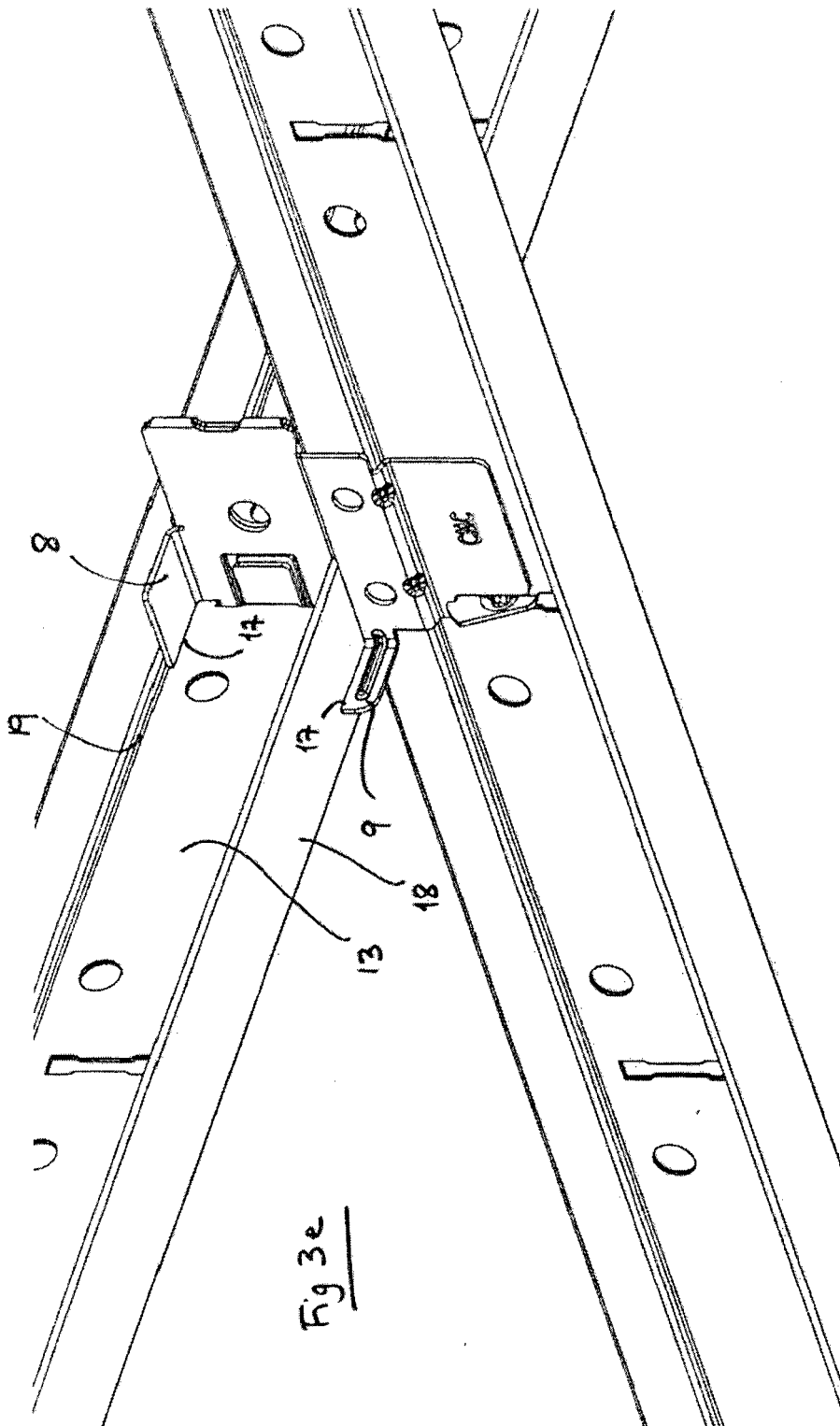


Fig 3e

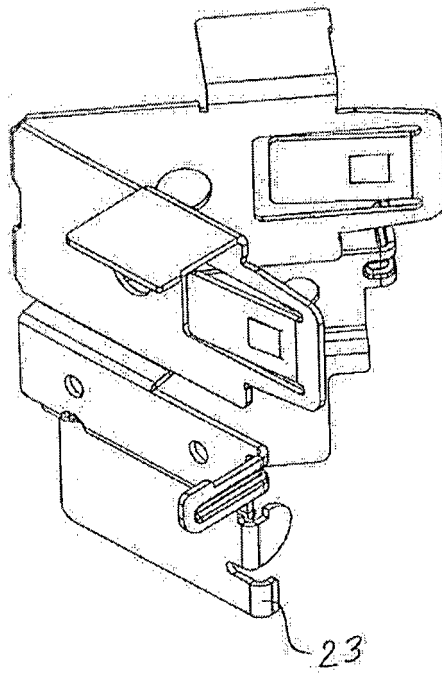


Fig. 4

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- WO 2008077480 A [0005] [0012]