**EUROPEAN PATENT SPECIFICATION**

(54) **Connector device for electrical cable carrier tray sections**
Verbindungsvorrichtung für elektrische kabelkanalprofile
Dispositif de connexion pour profilés de canal de câbles électriques

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GB-A- 2 038 109 NL-A- 7 412 503

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a connector device for electrical cable carrier tray sections which come together at a point of connection, each of the electrical cable carrier tray sections comprising a straight elongate U-shaped body member, where each arm of the U defines a side wall and a bottom wall extends between both side walls, and more precisely to sets of two symmetrical or asymmetrical joining members to form a end-to-end joint of two electrical cable carrier tray sections which change direction at the point of connection, such that said sections are contained in one plane, forming a flat angle, or are contained in concurrent planes, forming a dihedral angle, at the same time as they are attached together by the side walls thereof by removable securing means.

Prior Art Reference

In the present art, respective rigid, straight, identical connecting parts are used for joining two coplanar aligned electrical cable carrier tray sections and they are respectively attached to the side walls and bottom walls of the ends of said sections placed end-to-end at the point of connection of both electrical cable carrier tray sections.

On the contrary, when it is a case of connecting electrical cable carrier tray sections which are not aligned at the point of connection, albeit contained in one same plane or contained in two planes in dihedral form, random means are used, such as parts hand-formed from sheet, bar or other items, which undoubtedly represent an inconvenience for the fitter, do not allow a precise installation to be made and make it unsightly.

Document US-A-5470021 discloses a connector for attaching cable trays by using splice plates which eliminates the need for mitering the trays. The splice plates are positioned between the ends of the trays, so that the trays do not come in contact together. Document GB-A-2038109 discloses a cable tray having a special configuration and including an angle connector plate which, as in the previous document, eliminates the need for mitering the trays when they are assembled together with a change of direction. The trays do not come together with full contact.

With a view to overcoming such drawback and avoiding the production of such random means, centrally hinged connector devices have been manufactured. For the former case, they are hinged about an axis formed on the same plane as the two wings defining the devices, while for the latter case, they are hinged about an axis perpendicular to the wings which, in this case, have a mutually overlapping portion. This kind of hinged connector devices are known from document EP 0 094 321.

This latter arrangement of hinged connector devices affords the advantage of allowing any flat or dihedral angle to be formed at the point of connection where the electrical cable carrier tray sections change direction, but, on the other hand, it does not of itself allow the precise angle to be maintained in each case, whereby it must be complemented with extra supports or other arrangements. Furthermore, the lack of angular rigidity of such items and the possibility of adaptation to any angle, contribute to a summation of angular errors at the time of installing the cable carrier trays, obliging troublesome final positional corrections of the complete installation, or a strict control throughout the complete assembly thereof.

SUMMARY OF THE INVENTION

With a view to avoiding such drawbacks, the solution has been adopted of making such angular connecting portions rigidly, according to pre-established angles.

In accordance with the foregoing premises, there has been developed the connector device for electrical cable carrier tray sections of the invention which comprises at least one joining member and wherein the joining member is rigid and is differentiated in two parts, preferably of like length, forming a fixed angle therebetween which locates the apex and/or edge in the central region of the device and which have means for attachment to the trays.

One feature of the invention is that the fixed angle has a value of 135 sexagesimal degrees, measured obviously on the concave portion.

According to the invention, the two differentiated parts of the joining member comprise respective web walls which are contained substantially in one same plane when the two tray sections are not coplanar, the fixed angle formed between both walls being plane. In this case, both members of a set are mutually symmetrical and, therefore, identical.

Likewise, also according to the invention, both differentiated parts of the device comprise respective web walls that are not contained substantially within one same plane when both tray sections are coplanar, with the angle formed by both walls being dihedral. In this case, both members of a set are mutually asymmetrical.

BRIEF DESCRIPTION OF THE DRAWING

To facilitate an understanding of the present ideas, there are described hereinafter joining members according to the invention, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a joining member according to the invention, which is applicable to the concave dihedral angle elbow formed between two
of the opposite side walls in a joint of two coplanar cable carrier trays.

Figure 2 is a perspective view of a joining member according to the invention, which is applicable to the convex dihedral angle elbow formed between two of the opposite side walls in a joint of two coplanar cable carrier trays and forms a pair with the joining member of the previous Figure.

Figure 3 is a perspective view of a joining member according to the invention, which is applicable to the concave plane angle elbow formed between each pair of opposite side walls in a joint of two non-coplanar cable carrier tray sections.

Figure 4 is a perspective view of a joining member according to the invention, which is applicable to the convex plane angle elbow formed between each pair of opposite side walls in a joint of two non-coplanar cable carrier tray sections.

Figure 5 is a perspective view of an installation of cable carrier trays in which all the joining members shown in the previous Figures are used.

Figure 6 is a cross section view of a detail of the attachment of a joining member, according to the invention, to a cable carrier tray.

DETAILED DESCRIPTION OF THE INVENTION

[0013] In the embodiment illustrated in the drawings, the cable carrier trays 1 are formed by elongate bodies of straight U-shaped section which, extrusion molded from synthetic plastic materials, have a bottom wall 2, provided with elongated holes 3, and respective side walls 4, provided with an inwardly directed visor 5 forming a retaining rib 6, as is to be seen in the detail of Figure 6. The elongated holes 3 are arranged lengthwise in one or more centrally aligned rows, and crosswise in each of two outer edge rows.

[0014] For this embodiment, the joining members A, B, C and D are rigid, made from synthetic plastic material and are differentiated in two parts of equal length, each of which has a web wall 7, a wide stirrup 8 provided with elongated holes 9, a lip 10 complementary of the visor 5 of the cable carrier tray 1, a central rib 11 and respective end ribs 12.

[0015] Each of the joining members A and B has its respective stirrups 8 coplanar, as is to be seen in Figures 1, 2 and 5, while the respective web walls 7 thereof are not coplanar and form a dihedral angle of 135 sexagesimal degrees, evidently measured on the concave side, at the same time as said stirrups 8 form plane angles of 135 sexagesimal degrees.

[0016] On the contrary, each of the joining members C and D has the web walls 7 thereof coplanar, forming a plane angle of 135 sexagesimal degrees, measured on the concave side, at the same time as the stirrups 8 are not coplanar and form dihedral angles, also of 135 sexagesimal degrees, as is to be seen in Figures 3, 4 and 5.

[0017] In the elbows of cable carrier trays where the two sections to be joined are coplanar, a pair of asymmetrical joining members is used, such as a joining member A in the concave part of the joint and a joining member B in the convex part of the joint, as is shown in Figure 5.

[0018] On the other hand, in the elbows where the two sections of cable carrier tray to be united form a dihedral angle, a pair of symmetrical joining members, such as a joining member C, is used on both side walls 4 when the dihedral angle is concave, and a joining member D is used, also on both side walls 4, when the dihedral angle is convex.

[0019] The attachment of the joining members A, B, C and D to the cable carrier trays 1 is carried out by engagement of the lip 10 thereof between the retaining rib 6, the visor 5 and the side wall 4 and, also, it is secured by means of screws 13 and nuts 14 passing through the transverse elongated holes 3 of the bottom wall 2 and the elongated holes 9 of the stirrups 8, such as it is shown in Figures 5 and 6.

[0020] The angle of 135 sexagesimal degrees has been chosen because it allows a change of direction of 90 degrees to be made with a large radius of curvature, which favors the gentle curving of the cables.

Claims

1. Connector device for connecting two electric cable carrier tray sections (1), said cable carrier tray sections (1) comprising a straight elongated U-shaped body member defining two side walls (4) and a bottom wall (2) extending between said side walls (4), said connector device being suitable for connecting said cable tray sections (1) such that they are directly come together with a change of direction at a plane of connection by said bottom wall (2) and by said side walls (4), said connector device comprising two joining members (A, B, C, D) which form a set for the connection of said electrical cable carrier tray sections (1), each of said joining members (A, B, C, D) being differentiated in two rigid parts of the same length forming an angle therebetween, each of said parts comprising a web wall (7) and a transversal planar stirrup (8) which extends perpendicularly from the longitudinal edge of said web wall (7), and each of said parts having means (9, 10) for attaching to said electrical cable carrier tray sections (1), characterized in that each of said joining members (A, B, C, D) is a one-piece rigid element having a central plane in which said two parts come together by said web walls (7) and by said stirrups (8), so that said joining members (A, B, C, D) are suitable for being located inside said connected cable carrier tray sections (1) in such a way that said central plane is coplanar to said plane of connection, said web wall (7) extending from said central plane against said side wall (4) and said stirrup (8) extending from said cen-
2. - Connector device for electric cable carrier tray sections, according to claim 1, wherein said fixed angle has a value of 135 sexagesimal degrees.

3. - Connector device for electric cable carrier tray sections, according to claim 1 or claim 2, wherein the respective web walls (7) of said two differentiated parts of said joining member (C, D) are contained substantially in a same plane when said two cable carrier tray sections (1) are not coplanar, said fixed angle formed between said two web walls (7) being plane.

4. - Connector device for electric cable carrier tray sections, according to claim 1 or claim 2, wherein the respective web walls (7) of said two differentiated parts of said joining member (A, B) comprise respective web walls (7) that are not contained substantially in a same plane when said two cable carrier tray sections (1) are coplanar, said fixed angle formed between said two web walls (7) being dihedral.

5. - Connector device for electric cable carrier tray sections, according to claim 3, wherein said two joining members (C, D) form a mirror image.

6. - Connector device for electric cable carrier tray sections, according to claim 4, wherein said two members (A, B) of said set are asymmetrical to each other.

7. - Connector device for electric cable carrier tray sections, according to any of claims 1 to 6, the walls (4) of said cable tray sections (1) being provided with an inwardly directed visor (5) forming a retaining rib (6), wherein each of said joining members (A, B, C, D) comprises a lip (10) extending from said web wall (7), said lip (7) being engaged between said retaining rib (6), said visor (5) and said side wall (4) for the attachment of said joining members (A, B, C, D) to said carrier trays (1).

8. - Connector device for electric cable carrier tray sections, according to claim 7, said bottom wall (2) being provided with elongated holes (3), wherein said stirrup (8) is provided with elongated holes (9) for the attachment of said joining members (A, B, C, D) to said carrier trays (1) by means of screws (13) passing through said elongated holes (9) of the stirrup (8) and through said elongated holes (3) of the bottom wall (2).

Patentansprüche

1. Verbindungseinrichtung zum Verbinden von zwei elektrischen Kabelkanalschalenabschnitten (1), wo-
Dispositif de raccord destiné à raccorder deux sections de plateau de transport de câble électrique (1), lesdites sections de plateau de transport de câble (1) comprenant un élément droit allongé en forme de U définissant deux parois latérales (4) et une paroi inférieure (1) s’étendant entre lesdites parois latérales (4), ledit dispositif de raccord conve...
conque des revendications 1 à 6, les parois (4) desdites sections de plateau de câble (1) étant pourvues d'une visière (5) dirigée vers l'intérieur formant une nervure de maintien (6), dans lequel chacun desdits éléments de jonction (A, B, C, D) comprend une lèvre (10) s'étendant de ladite paroi d'âme (7), ladite lèvre (7) étant mise en prise entre ladite nervure de maintien (6), ladite visière (5) et ladite paroi latérale (4) pour fixer lesdits éléments de jonction (A, B, C, D) auxdits plateaux de transport (1).

8. Dispositif de raccordement pour sections de plateau de transport de câble électrique, selon la revendication 7, ladite paroi inférieure (2) étant pourvue de trous allongés (3), dans lequel l'étrier (8) est pourvu de trous allongés (9) destinés à la fixation desdits éléments de jonction (A, B, C, D) auxdits plateaux de transport (1) au moyen de vis (13) passant à travers lesdits trous allongés (9) de l'étrier (8) et à travers lesdits trous allongés (3) de ladite paroi inférieure (2).