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Title: TELECOMMUNICATIONS TRAY WITH OFFSET PATCH PANEL


Declarations under Rule 4.17:
— of inventorship (Rule 4.17(iv))
— Published:
— with international search report (Art. 21(3))

Abstract: A multi-positionable tray assembly (20) for mounting within a chassis (10) of a telecommunications panel (100) is disclosed. The multi-positionable tray assembly (20) may include support arm (24) that pivotally supports a tray (22) and that allows the tray assembly (20) to be installed and removed from the chassis (10). The tray (22) and the support arm (24) cooperatively define a cable routing pathway (208) that extends through a pivot axis (A1) defined by the tray and the support arm. To minimize the required depth of the tray (10) and optimize cable routing, the tray (20) can include a cable management structure (102) with an offset patch panel (104) having a plurality of adapters (108) arranged along a transverse axis (A2), wherein the transverse axis is non-parallel or oblique to a front plane (A4) of the tray.
TELECOMMUNICATIONS TRAY WITH OFFSET PATCH PANEL

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Patent Application Serial No. 62/051,112, filed on September 16, 2014, the disclosure of which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to telecommunications panels and cable bend control guides, patch cord supports, and hinges adapted to be used in various telecommunications panels.

BACKGROUND

[0003] Numerous telecommunications panels exist today and are used in various equipment applications. Conventional telecommunications panels include hinges that are designed to allow a tray to be rotated out of the telecommunications panel. By rotating the tray out of the telecommunications panel, access is provided to rear portions of a termination field. Such trays may include cable management structures that aid in organizing and managing telecommunications cables routed to and away from the telecommunications panel.

SUMMARY

[0004] Aspects of the disclosure are directed to a multi-positionable tray assembly for mounting within a chassis of a telecommunications panel. In one aspect, the multi-positionable tray assembly includes a tray and a support arm. The tray is configured to support at least one cable management structure while the support arm is connected to and supports the tray at a pivot joint. This structure allows the tray to be rotatable about the pivot joint at a pivot axis between a folded position and an access position. In one aspect, the support arm is configured for removable attachment to the chassis such that the multi-positionable tray assembly can be placed in a removed position away from the chassis and an installed position within the chassis.

[0005] In one aspect, the tray and the support arm cooperatively define a cable routing pathway that extends through the pivot axis of the pivot joint defined by the tray and the
support arm. In contrast to pivoting trays relying upon a structural element extending along
the pivot axis, the disclosed configuration has an open configuration that allows for cabling to
be routed through the pivot axis without having to be routed around a structural element.

[0006] In yet another aspect, the cable management structure in the tray includes a patch
panel having a plurality of adapters arranged along a transverse axis, wherein each of the
adapters has a longitudinal connection axis. In one configuration, some of the adapters are
positioned with their longitudinal connection axes disposed at an oblique angle relative to the
transverse axis. In one configuration, the patch panel is offset such that the transverse axis is
non-parallel or oblique to the front face and rear side of the tray. By placing the adapters at
an angle relative to the tray and the transverse axis, less depth is required of the tray to
accommodate cabled fiber optic connecters that are connected on either or both sides of the
adapters. By placing the patch panel transverse axis at an angle with respect to the front face
of the tray, the areas within the tray that have the largest accumulated bundles of patch cords
are increased in size to better accommodate the cords.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The accompanying drawings, which are incorporated in and constitute a part of
the description, illustrate several aspects of the present disclosure. A brief description of the
drawings is as follows:

[0008] Figure 1 is a perspective view of an example telecommunications panel including
a plurality of multi-positionable tray assembly in accordance with principles of the present
disclosure;

[0009] Figure 2 is a top view of the telecommunications panel of Figure 1;

[0010] Figure 3 is a perspective view of the telecommunications panel of Figure 1, with
one of the multi-positionable tray assemblies in a removed position;

[0011] Figure 4 is a perspective view of the chassis of the telecommunications panel of
Figure 1;

[0012] Figure 5 is a perspective view of one of the multi-positionable tray assemblies of
Figure 1;
[0013] Figure 6 is a perspective view of the multi-positionable trays of Figure 6 with the various cable management structures removed from the tray;

[0014] Figure 7 is a perspective view of the multi-positionable tray assembly of Figure 6 mounted to the chassis in an installed position and rotated into an access position;

[0015] Figure 8 is a cross-sectional perspective view of one of the multi-positionable tray assemblies of Figure 1 shown in an installed position and rotated into an access position;

[0016] Figure 9 is a perspective view of a tray of one of the multi-positionable tray assemblies of Figure 1;

[0017] Figure 10 is a top view of the tray of Figure 9;

[0018] Figure 11 is a front view of the tray of Figure 10;

[0019] Figure 12 is a front-right perspective view of a support arm of one of the multi-positionable trays of Figure 1;

[0020] Figure 13 is a front-left perspective view of the support arm of Figure 12;

[0021] Figure 14 is a top view of the support arm of Figure 12;

[0022] Figure 15 is a bottom view of the support arm of Figure 12;

[0023] Figure 16 is an end view of the support arm of Figure 12;

[0024] Figure 17 is a perspective photographic view of a support arm of Figure 12 with cables routed within a cable routing path defined by the support arm;

[0025] Figure 18 is a perspective photographic view of a support arm of Figure 12 with cables of Figure 17 wrapped around the first end of the support arm about the pivot joint; and

[0026] Figure 19 is a perspective view of the telecommunications panel of Figure 1, with additional cable mounting features mounted thereon.
DETAILED DESCRIPTION

[0027] Reference will now be made in detail to exemplary aspects of the present disclosure that are illustrated in the accompanying drawings. Whenever possible, the same reference numbers will be used throughout the drawings to refer to the same or similar parts.

[0028] Referring now to Figures 1 and 2, a telecommunications panel 100 (e.g., an enclosure, an optical distribution frame, etc.) is illustrated according to the principles of the present disclosure. As further illustrated at Figure 1, the telecommunications panel 100 may be included in a cabinet 200. The telecommunications panel 100 and/or the cabinet 200 may be used for various purposes in telecommunications systems. For example, housing a cable management structure 102 including, for example, stacked splice trays 112 and a patch panel 104. In one aspect, patch cords 302, 304 (i.e., patch cables, connectorized fiber optic cables, etc.) may enter the telecommunications panel 100 and/or the cabinet 200 and be interconnected at a patch panel 104. The patch panel 104 may include a plurality of fiber optic adapters 108. Fiber optic connectors 110, 114 that terminate ends of the patch cords 302, 304 may connect with the fiber optic adapters 108 of the patch panel 104. The interconnections at the patch panel 104 may be rearranged from time-to-time, as desired, for changing configurations of the telecommunications system. The telecommunications panel 100 may further hold splitters, filters, and various other telecommunications components.

[0029] The telecommunications panel 100 may include a chassis 10 to which a plurality of stacked multi-positionable tray assemblies 20 may be removably attached. In one aspect, the multi-positionable tray assembly 20 includes a tray 22 (e.g., a sub-rack) and a support arm 24 that are pivotally connected to each other via a pivot joint 26 that allows the tray assembly 20 to be moved between a folded position 200 and an access position 202. The pivot joint 26 is formed by the interface between an upper joint arm 28 of the support arm 24 and an upper joint extension 32 of the tray 22 and by the interface between a lower joint arm 30 of the support arm 24 and a lower joint extension 34 of the tray 22. The interfaces can be secured together by a variety of means, for example, a snap-fit type connection via protrusions and corresponding recesses or by a connection utilizing fasteners. As depicted, the pivot joint 26 represents the connection between the tray 22 and the support arm 24 to the chassis 10 and defines a vertical hinge with an axis A1 for the multi-positionable tray assembly 20.
[0030] As most easily seen at Figure 4, the chassis 10 includes a rear side 10a extending between a first side 10c and a second side 10d. The chassis 10 also includes an open front side 10b for slidably receiving the tray assembly 20. The chassis may include a number of features to facilitate the mounting of the tray assembly 20 to the chassis 10 from a removed position 206 to an installed position 204. For example, the chassis 10 may be provided with a plurality of attachment slots 12 at the first and second sides 10c, 10d that are configured to engage with corresponding attachment guide members 40 located on the support arm 24. In the embodiment shown, the attachment slots 12 and the guide members 40 extend in a direction D1 that is parallel to the first and second sides 10c, 10d of the chassis 10. This configuration allows the guide members 40 to engage with the attachment slots 12 when the tray assembly 20 is inserted into the chassis 10 into an installed position 204. In one example, the guide members 40 have a T-shape cross-section to more securely engage the attachment slots 12 by preventing rotation of the support arm 24 with respect to the side 10c or 10d of the chassis 10 to which the support arm 24 is attached.

[0031] The chassis 10 can also be provided with features to secure the tray assembly 20 within the chassis 10 so that the tray assembly 20 is retained in the installed position 204. For example, the chassis 10 can be provided with a first latch recess 14 configured to receive a first latch member 36 of the tray assembly 20. In the embodiment shown, the support arm 24 is provided with a depressible first latch member 36 that initially deflects as the tray assembly 20 is being pushed into the installed position 204 and then snaps into the latch recess 14 once the tray assembly 20 is fully installed to form a snap-fit type of connection. The tray assembly 20 can be released from the chassis 10 by depressing the latch member 36 and pulling the tray assembly out of the chassis 10.

[0032] The chassis 10 can also be provided with features to secure the tray 22 of the tray assembly 20 to the chassis 10 so that the tray assembly 20 is retained in the folded position 200. For example, the chassis 10 can be provided with a second latch recess 14 configured to receive a second latch member 38 of the tray assembly 20. In the embodiment shown, the support arm 24 is provided with a second depressible latch member 38 that initially deflects as the tray assembly 20 is being rotated into the folded position 200 and then snaps into the latch recess 38 once the tray assembly 20 is fully rotated to form a snap-fit type of connection. The tray 22 can be released from the chassis 10 by depressing the latch member 38 and rotating the tray 22 away from the chassis 10 towards the access position 202.
[0033] The chassis 10 can also be configured to support other components of the telecommunications panel 100, as desired. For example, the chassis 10 can be configured to support cable management features 44 and 54. In the embodiment shown, cable management features 54 and 44 guide patch cords 304 extending from the tray assembly 20. The chassis 10 may also be provided with one or more features for allowing cable to enter the chassis 10, for example cable routing slot 46 and cable routing aperture 48.

[0034] In addition to the previously described aspects of the support arm 24, the support arm 24 further includes a first end 24a and a second end 24b having an exterior side 24d, a top wall 24e, and a bottom wall 24f. In the embodiment presented, the walls 24e, 24f and the side 24d together form a channel-like structure having an open interior side 24c within which a portion of a cable pathway 208 is formed. Adjacent the first end 24a are the upper and lower joint arms 28, 30 that form a part of the pivot joint 26. In one aspect, the support arm 24 is provided with a plurality of cable guides 42 to ensure that cables 300 routed within the support arm 24 are adequately retained.

[0035] In addition to the previously described aspects of the tray 22, the tray 22 further includes a rear side 22a and a front side 22b that extend between opposite first and second sides 22c, 22d. The tray 22 may also be provided with a cover 23 for protecting the components and fiber supported within the tray 22. In one aspect, the tray 22 includes a pair of hinges 52 for rotatably supporting an access door or cover. The location of the door and hinges 52 can define a front plane A4 of the tray 22 which is shown as being parallel to the rear side 22a and orthogonal to the first and second sides 22c, 22d.

[0036] The tray 22 further defines the cable routing pathway 208 via the walls forming the first side 22c and the rear side 22a of the tray 22, along with a bottom portion 22h of the tray 22. An interior wall structure 22e also functions to define the cable routing pathway 208, as do radius guides 22f which prevent the cables 300 from kinking or bending too severely. The cables 300 can be further retained within the cable routing pathway 208 via a plurality of cable guides 22g located at the top of the tray 22.

[0037] As discussed previously, the cable routing pathway 208 passes between the space defined between the upper and lower joint extensions 32, 34 of the tray 22. Because the upper joint extension 32 engages with the upper joint arm 28 and the lower joint extension 34 engages with the lower joint arm 30, the pivot joint 26 is formed without the need for any
structure between the upper and lower joint extensions 32, 34. Accordingly, this space can be
utilized to define the cable routing pathway 208 as it extends from the support arm 24 and the
tray 22. The upper and lower joint extensions 32, 34 also serve to constrain the cables 300 as
the cables traverse between the support arm 24 and the tray 22. Accordingly, the cables 300
within the cable routing pathway 208 enter the tray 22 through the pivot joint 26 in an
orientation that is perpendicular to the rotation axis A1. Figures 17 and 18 show an example
of a number of cables 300 passing through the pivot joint 26. A key benefit to allowing the
cables 300 to be routed through the pivot joint 26 rotational axis A1 is that the routing length
of the cables 300 can remain relatively unchanged as the tray 22 is rotated between the folded
and access positions 200, 202. Thus, the rotation of the tray 22 does not cause undue tension
on the cables 300 as the tray 22 is being rotated about the pivot axis A1.

[0038] Referring to Figure 8, it can be seen that above described configuration results in
the cable routing pathway 208 extending from the second end 24b of the support arm 24 to
the first end 24a of the support arm 24, across the pivot joint 26, and along the first side 22c
and rear side 22a of the tray 22. The cables 300 can further extend from the second end 24b
of the support arm along the rear side 10a of the chassis 10 towards the second end 10d, and
through the cable routing aperture 48.

[0039] In the embodiment presented, the tray 22 is configured to hold a plurality of
splice trays 112 or other components to which the cables 300 can be routed along the rear
side 22a of the tray 22. In the embodiment shown, the cables 300 extend to the splice trays
112 from which patch cords 302 extend as cabled ends 110a of fiber optic connectors 110.
The fiber optic connectors 110 are shown as being connected to the first sides 108a of
adapters 108. As shown, the adapters 108 are arranged along a transverse axis A2 which
generally extends between the sides 22c and 22d of the tray 22. In one embodiment, the
adapters 108 in the patch panel 104 are supported by a patch panel frame 106 extending along
transverse axis A2 from a first end 106a proximate first side 22c to a second end 106b
proximate second side 22d. Fiber optic connectors 114 are shown as being connected to the
second sides 108b of the adapters 108. The fiber optic connectors 114 are shown as having
cabled ends 114a which form patch cords 304 which can be routed through cable
management features 44 and 50 to the outside of the telecommunications panel 100.
As shown, the adapters 108 and connectors 110, 114 are aligned along an axis A3 which is shown as forming an oblique angle with the transverse axis A2. This configuration is advantageous over configurations in which the axes A2 and A3 are generally orthogonal in that less overall depth (i.e. the distance between the rear side 22a and the front side 22b) is required of the tray 22 in order to accommodate the cable management structures. Additionally, by disposing the cabled ends 114a of the connectors 114 at an angle towards the end of the telecommunications panel 100 at which the patch cords 304 exit via cable management feature 44, less turning is required of the cords and thus bend radius protection is enhanced. Likewise, by disposing the cabled ends 110a of the connectors 110 at an angle towards the splice trays 112, less turning is required of the cords and thus bend radius protection is enhanced in this manner as well.

Space allocation can be further enhanced by offsetting the patch panel frame 106 such that axis A3 is not parallel to the front plane A4 or rear side 22a. For example, the patch panel 104 and frame 106 can be oriented such that axis A3 is at a non-zero angle ranging from about 2 to about 4 degrees, and preferably about 2.5 degrees, with respect to the axis A4 and the rear side 22a of the panel 22. This configuration allows for there to be a greater distance D1 provided between the patch panel 104 and the front face plane A4 of the tray 22 at the first side 22c, as compared to the corresponding distance D2 at the second side 22d of the tray 22. Likewise, this configuration also allows for there to be a greater distance D3 provided between the patch panel 104 and the splice tray 112 of the tray 22 at the second side 22d, as compared to the corresponding distance D4 at the first side 22c of the tray 22. As the patch cords 302 are greater towards the second end 22d of the tray 22 and the patch cords 304 are greater in number towards the first end 22c of the tray 22, the increased distances D1 and D3, respectively, provide for additional cable routing space where it is most needed and allows for a more compact construction of the tray 22.

It is noted that the drawings show a configuration in which the support arm 24 and pivot joint 26 are proximate the first side 22c of the tray 22. This configuration results in the tray 22 being pivotable from the first side 22c of the tray 22. However, the support arm 24 and tray 22 can be produced as mirror images of the embodiment shown in the drawings, such that the support arm 24 and pivot joint 26 are located proximate the second side 22d of the tray 22 which would allow for the tray 22 to be rotated about the second side 22d of the tray 22.
While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention and other modifications within the scope. Any such modifications or variations that fall within the purview of this description are intended to be included therein as well. It is understood that the description herein is intended to be illustrative only and is not intended to be limitative.
### List of Reference Numerals and Corresponding Features

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0044]</td>
<td>A1 pivot axis</td>
</tr>
<tr>
<td>[0045]</td>
<td>A2 transverse axis</td>
</tr>
<tr>
<td>[0046]</td>
<td>A3 longitudinal connection axis</td>
</tr>
<tr>
<td>[0047]</td>
<td>A4 front face plane</td>
</tr>
<tr>
<td>[0048]</td>
<td>D1 first distance</td>
</tr>
<tr>
<td>[0049]</td>
<td>D2 second distance</td>
</tr>
<tr>
<td>[0050]</td>
<td>D3 third distance</td>
</tr>
<tr>
<td>[0051]</td>
<td>D4 fourth distance</td>
</tr>
<tr>
<td>[0052]</td>
<td>1 telecommunications cabinet</td>
</tr>
<tr>
<td>[0053]</td>
<td>10 chassis</td>
</tr>
<tr>
<td>[0054]</td>
<td>10a rear side</td>
</tr>
<tr>
<td>[0055]</td>
<td>10b front side</td>
</tr>
<tr>
<td>[0056]</td>
<td>10c first side</td>
</tr>
<tr>
<td>[0057]</td>
<td>10d second side</td>
</tr>
<tr>
<td>[0058]</td>
<td>12 attachment slots</td>
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<tr>
<td>[0059]</td>
<td>14 first latch recess</td>
</tr>
<tr>
<td>[0060]</td>
<td>16 second latch recess</td>
</tr>
<tr>
<td>[0061]</td>
<td>20 multi-positionable tray assembly</td>
</tr>
<tr>
<td>[0062]</td>
<td>22 tray</td>
</tr>
<tr>
<td>[0063]</td>
<td>23 tray cover</td>
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<tr>
<td>[0064]</td>
<td>22a rear side</td>
</tr>
<tr>
<td>[0065]</td>
<td>22b front side</td>
</tr>
<tr>
<td>[0066]</td>
<td>22c first side</td>
</tr>
<tr>
<td>[0067]</td>
<td>22d second side</td>
</tr>
<tr>
<td>[0068]</td>
<td>22e interior wall structure</td>
</tr>
<tr>
<td>[0069]</td>
<td>22f radius guides</td>
</tr>
<tr>
<td>[0070]</td>
<td>22g cable guides</td>
</tr>
<tr>
<td>[0071]</td>
<td>23 tray cover</td>
</tr>
<tr>
<td>[0072]</td>
<td>24 support arm</td>
</tr>
<tr>
<td>[0073]</td>
<td>24a first end</td>
</tr>
<tr>
<td>[0074]</td>
<td>24b second end</td>
</tr>
</tbody>
</table>
24c open interior side
24d exterior side
24e top wall
24f bottom wall

26 pivot joint
28 upper joint arm
30 lower joint arm
32 upper joint extension
34 lower joint extension

36 first latch member
38 second latch member
40 attachment guide members
42 support arm cable guides
44 cable management feature

46 cable routing slot
48 cable routing aperture
50 cable management feature
52 cover hinges
54 cable management feature

100 telecommunications panel
102 cable management structure
104 patch panel
106 patch panel frame
106a first end
106b second end

108 fiber optic adapters
108a first side
108b second side
110 first fiber optic connectors

110a cabled end
112 splice tray
114 second fiber optic connectors
114a cabled end
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>folded position</td>
</tr>
<tr>
<td>202</td>
<td>access position</td>
</tr>
<tr>
<td>204</td>
<td>installed position</td>
</tr>
<tr>
<td>206</td>
<td>removed position</td>
</tr>
<tr>
<td>208</td>
<td>cable routing pathway</td>
</tr>
<tr>
<td>300</td>
<td>cables</td>
</tr>
<tr>
<td>302</td>
<td>patch cord</td>
</tr>
<tr>
<td>304</td>
<td>patch cord</td>
</tr>
</tbody>
</table>
WHAT IS CLAIMED IS:

1. A multi-positionable tray assembly (20) for mounting within a chassis (10) of a telecommunications panel (100), the multi-positionable tray assembly (20) comprising:
   a. a tray (22) configured to support at least one cable management structure (102), the tray (22) defining a front face plane (A4);
   b. a support arm (24) connected to and supporting the tray (22) at a pivot joint (26) such that the tray (22) is rotatable about the pivot joint at a pivot axis (A1) between a folded position (200) and an access position (202); and
   c. a patch panel (104) including a plurality of adapters (108) arranged along a transverse axis (A2), the transverse axis (A2) being disposed at a non-zero angle with respect to the front face plane (A4).

2. The multi-positionable tray assembly (20) of claim 1, wherein:
   a. each of the adapters (108) having a longitudinal connection axis (A3), wherein at least some of the plurality of adapters (108) are positioned with the longitudinal connection axis (A3) disposed at an oblique angle relative to the transverse axis (A2).

3. The multi-positionable tray assembly (20) of claim 2, wherein:
   a. the cable management structure (102) further includes at least one splice tray (112) mounted to the tray (22);
   b. a first plurality of fiber optic connectors (110) are connected to a first side (108a) of the plurality of adapters (108), the first plurality of fiber optic connectors (110) being located between the splice tray (112) and the plurality of adapters (108); and
   c. the first plurality of fiber optic connectors (110) being aligned parallel to the longitudinal connection axis (A3) such that a cabled end (110a) of each of the connectors (110) is disposed towards the second side of the tray (22d).

4. The multi-positionable tray assembly (20) of claim 3, wherein:
   a. a second plurality of fiber optic connectors (114) are connected to the plurality of adapters (108) at a second side (108b) of the plurality of fiber optic connectors (110); and
b. the second plurality of fiber optic connectors (114) being aligned parallel to the longitudinal connection axis (A3) such that a cabled end (114a) of each of the connectors (114) is disposed towards the pivot joint (26).

5. The multi-positionable tray assembly (20) of claim 1, wherein:
   a. the angle between the transverse axis (A2) and the front face plane (A4) is from about 2 degrees to about 4 degrees.

6. The multi-positionable tray assembly (20) of claim 5, wherein:
   a. the angle between the transverse axis (A2) and the front face plane (A4) is about 2 degrees.

7. A telecommunications panel (100) comprising:
   a. a chassis (10) having a rear side (10a) extending between first and second sides (10c, 10d) to define an open front side (10b); and
   b. a plurality of multi-positionable tray assemblies (20), each of the tray assemblies (20) including:
      (i) a tray (22) configured to support at least one cable management structure (102), the tray (22) defining a front face plane (A4);
      (ii) a support arm (24) connected to and supporting the tray (22) at a pivot joint (26) such that the tray (22) is rotatable about the pivot joint at a pivot axis (A1) between a folded position (200) and an access position (202); and
      (iii) a patch panel (104) including a plurality of adapters (108) arranged along a transverse axis (A2), the transverse axis (A2) being disposed at a non-zero angle with respect to the front face plane (A4).

8. The telecommunications panel (100) of claim 7, wherein:
   a. each of the adapters (108) having a longitudinal connection axis (A3), wherein at least some of the plurality of adapters (108) are positioned with the longitudinal connection axis (A3) disposed at an oblique angle relative to the transverse axis (A2).
9. telecommunications panel (100) of claim 8, wherein:
   a. the cable management structure (102) further includes at least one splice tray (112)
      mounted to the tray (22);
   b. a first plurality of fiber optic connectors (110) are connected to a first side (108a)
      of the plurality of adapters (108), the first plurality of fiber optic connectors (110)
      being located between the splice tray (112) and the plurality of adapters (108); and
   c. the first plurality of fiber optic connectors (110) being aligned parallel to the
      longitudinal connection axis (A3) such that a cabled end (110a) of each of the
      connectors (110) is disposed towards the second side of the tray (22d).

10. telecommunications panel (100) of claim 9, wherein:
   a. a second plurality of fiber optic connectors (114) are connected to the plurality of
      adapters (108) at a second side (108b) of the plurality of fiber optic connectors
      (110); and
   b. the second plurality of fiber optic connectors (114) being aligned parallel to the
      longitudinal connection axis (A3) such that a cabled end (114a) of each of the
      connectors (114) is disposed towards the pivot joint (26).

11. telecommunications panel (100) of claim 10, wherein:
   a. the angle between the transverse axis (A2) and the front face plane (A4) is from
      about 2 degrees to about 4 degrees.

12. telecommunications panel (100) of claim 11, wherein:
   a. the angle between the transverse axis (A2) and the front face plane (A4) is about 2
      degrees.

13. The telecommunications panel (100) of claim 7, wherein the plurality of multi-
    positionable tray assemblies (20) includes three multi-positionable tray assemblies (20).

14. The telecommunications panel (100) of claim 7, wherein the cable management structure
    (102) includes at least one splice tray (112).
**INTERNATIONAL SEARCH REPORT**

**PCT/EP2015/071195**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. G02B6/44

**ADD.**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>&amp; GB 2 482 673 A (FIBREFAB LTD [GB]) 15 February 2012 (2012-02-15) figures 1, 11</td>
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**Date of the actual completion of the international search**

16 November 2015

**Date of mailing of the international search report**

23/11/2015

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<th>Publication date</th>
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<tr>
<td>US 2009310929 A1</td>
<td>17-12-2009</td>
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