

DEVICE FOR HOLDING TELECOMMUNICATION
CONNECTOR BLOCKS

The present invention relates to a device for holding telecommunication connector blocks according to the preamble of claim 1.

A device of the type referred to hereinbefore is known from EP-A-0133 824. In this device, at the lower side in the area of the front sides, two downwardly projecting latch hooks are provided. These latch hooks are clamped down at a rail behind two edges of said rail. It is disadvantageous, with this type of fastening, that the connector block is displaceable on the rail in a difficult manner only, and may easily tilt. Further, rotation or swing about the one edge of the rail is not possible. The sharp edges present a risk of injury.

Further, from DE 28 11 812, a device is known in the art, which employs a U-shaped mounting bracket as a mounting structure, the side walls of which are provided with lugs as connection elements for mounting the connector blocks thereupon. Such a mounting bracket can be employed free-standing for main distributor devices or as a wall distributor device. It is disadvantageous, further, that the lugs determine the spacings of the connector blocks to each other, so that for a different spacing or a different mounting structure height, a different mounting bracket having a different spacing of the lugs must be used.

It is therefore the object of the present invention to provide a device for holding connector blocks of the type referred to hereinbefore, wherein the mounting structure does not present a risk of injury and wherein, further, a variable spacing of the connector blocks to each other can be adjusted.

The solution of this object is achieved by the characterizing features of claim 1. According to the invention, a section rail is used as the mounting structure, the through-passing section of which does not present a risk of injury, even without a connector block being mounted thereat. According to the invention, the connector blocks are further latched onto the section rails of a circular cross-section by curved snap elements as connection elements, the terminal elements being displaceable thereon. Thereby, the spacing of the connector blocks to each other can freely be selected. Furthermore, it is possible to first wire the connector block latched onto the section rail, and to then displace it to the desired spacing to a connector block being wired already.

Further advantageous embodiments of the invention are defined in the dependent claims. Particular reference is made to the embodiment having two parallel section rails. The application of such round-section bars has the advantage that the connector block can be delatched at one side from a round-section bar, rotated about the other round-section bar and flapped out from the row of connector blocks. Thereby, the connector block is easily accessible from all sides.

In the following, the invention is described in more detail based on several embodiments of devices for holding telecommunication connector blocks. There are:

Fig. 1 a perspective representation of a wall distributor device for five vertical rows of connector blocks,

Fig. 2 a perspective view of the left-hand end portion of a free-standing cable distributor device,

Fig. 3 a perspective view of a column-type cable distributor structure for four vertical rows of connector blocks being offset by 90° relative to each other,

Fig. 4 a cable distributor structure for connector blocks formed by universal connection elements in an arbitrary size and design,

Fig. 5 a perspective view of a cable terminal unit,

Fig. 6 the enlarged detail VI of Fig. 1,

Fig. 7 the enlarged detail VII of Fig. 2 in the original mounting position of the round-section bars,

Fig. 8 the final mounting position of a round-section bar according to Fig. 6,

Fig. 9 a perspective view of a connector block provided with curved extensions for latching onto round-section bars,

Fig. 10 a perspective view of the lower side of the connector block according to Fig. 9, with an earthing clip disposed thereunder,

Fig. 11 the earthing clip according to Fig. 10 in an enlarged representation,

Fig. 12 spacer clips broken off from continuous pieces for latching onto round-section bars,

Fig. 13 individual spacer clips for latching onto round-section bars,

Fig. 14 a round-section bar latched onto an assembled reception element,

Fig. 15 an individual reception element according to Fig. 4,

Fig. 16 a latch clip inserted into a support rail for mounting reception elements for a round-section bar,

Fig. 17 the universal connection element according to Fig. 4 in a detailed and enlarged representation,

Fig. 18 a perspective view of a connector block to be screwed by means of mounting adapters on a flat plate,

Fig. 19 a side view of earthing contact lugs to be inserted into each other for insertion into the connector block,

Fig. 20 a perspective view of a connector block screwed on a flat plate,

Fig. 21 a perspective view of a receiving sheet for latching connector blocks provided with curved extensions on,

Fig. 22 a side view of the receiving sheet with a latched-on connector block,

Fig. 23 a perspective view of a connector block with a wire guide plate arranged thereabove, prior to assembly,

Fig. 24 a perspective view of the connector block of Fig. 23 with clamped-down wire guide plate,

Fig. 25 a perspective view of a connector block provided with curved extensions and strain-relief elements for receiving a flat cable,

Fig. 26 a side view thereof with a flat cable, in the assembled condition, and

Fig. 27 a side view of a 19" casing having a wiring strip on the rear.

The wall distributor device shown in Fig. 1 comprises five pairs of parallel round-section bars 1 forming section rails and being attached at a wall by means of structure portions 2 at the upper and lower ends. The lower structure portion 2 is a base plate 3 shown in more detail in Fig. 6 and being adapted as an angled sheet comprising a support strip 4 at the lower end and a screw plate 5 at the upper end, each being fixed by means of screws 6 to a not shown wall. In a horizontally extending slot 7 is disposed a clamp bracket 8 for fixing a cable to be terminated. At the upper side of the base plate 3, lugs 9 are bent off, said lugs receiving the lower ends of the round-section bars 1. The structure portions 2 provided at the upper ends of the round-section bars 1 are adapted according to the base plates 3 shown in Fig. 6 in more detail, however rotated by 180°. In the lugs 9 are fixed the upper ends of the round-section bars 1.

Connector blocks 10 are latched onto the parallel round-section bars 1, said connector blocks being described below in more detail.

Fig. 2 shows the left-hand end of a free-standing cable distributor device, the structure portions 2 of which are formed by a bottom plate 12, an upper end plate 13 and a side wall 11 rigidly connecting the bottom plate 12 and the end plate 13. The round-section bars 1 are inserted into support positions 14 provided on the bottom plate 12, and are connected in clamping manner with the upper end plate 13, as is shown in Figs. 7 and 8. The round-section bars 1 comprise annular grooves 15 at their upper ends, and the end plates 13 have slots 16 provided with different slot widths and comprising one clamping web 17 each extending in the

direction of the slot, said clamping web being made of the metal material of the end plates 13. The upper ends of the round-section bars 1 are inserted into the respective slot 16 such that the round-section bars 1 are first inserted through the slot portion having a width larger than the diameter of the round-section bars 1, and are then moved in the longitudinal direction of the slot 16 into a slot portion having a width smaller than the diameter of the round-section bars 1. The slot walls 18 engage into the annular groove 15 of the respective round-section bar 1, as is shown in Fig. 7. Then, the round-section bar 1 is pressed on up to the end of the slot 16 opposite to the free end of the clamping web 17, so that the clamping web 17 is locked, by deformation, in the free portion of the annular groove 15, according to Fig. 8. Then, the round-section bar 1 is safely connected to the upper end plate 13 as a structure portion 2.

Onto the parallel round-section bars 1 having a given spacing to each other are latched the connector blocks 10, which are described below in more detail.

Fig. 3 shows the configuration of four vertical rows of connector blocks in the form of a column-type cable distributor device, the rows of connector blocks being offset by 90° to each other and disposed around a circular base surface. The two-part bottom plate 19 of the housing portion 2 is provided - similar to the bottom plate 12 according to Fig. 2 - with sleeve-type support positions 14, into which are inserted the lower ends of round-section bars 1. The upper end plate 20 of the structure portion 2 is provided, same as the upper end plate 13 of Figs. 7 and 8, with slots 16, to which are connected the upper ends of the round-section bars in an identical manner as is shown in Figs. 7 and 8. The bottom plate 19 and the upper end plate 20 are substantially square-shaped, two round-section bars 1 being disposed on one side. Onto the round-section bars 1 are latched the connector blocks 10, which will be described below in more detail. The column-type cable distributor device is rotatable about its longitudinal axis. For this purpose, the bottom plate 19 comprises a central

annular piece 67, which is rotatable relative to the bottom plate 19.

Fig. 4 shows a cable distributor structure for connector blocks 10 formed by several universal connection elements 40, said structure being extendable in all three spatial planes. The connection elements 40 disposed in the node points of said round-section bars 1 will be described below in more detail.

Fig. 5 shows two parallel round-section bars 1 being attached at a not shown structure portion 2 by means of screws 21, onto said round-section bars connector blocks 10 being latched in a manner that will be described below. This configuration serves, for example, for incorporation in a terminal branching device.

Figs. 9 and 10 show a connector block 10 in perspective inclined views from above and from below. The connector block 10 comprises an upper portion 22 and a lower portion 23 each formed from plastic and latched to each other. In a not shown manner, insulation displacement contact elements for connecting termination wires are inserted into slots 24. Such a connector block, comprising a lower portion and an upper portion latched thereto and insulation displacement contact elements provided therein, is described in more detail in DE 28 04 478, to which reference is explicitly made. In contrast to the prior art lower portion, the lower portion of the connector block 10 comprises on both sides connection elements 25, which are formed of curved extensions 26 of the lower portion 23 formed integrally therewith and enclosing a peripheral angle of more than 180°. The inner diameter of the curved extensions 26 corresponds to the outer diameter of the round-section bars 1. Due to the provision of the connector blocks 10 and particularly of the lower portion 23 as plastic parts, the side walls of the curved extensions 26 are resilient, so that they can be pressed over the round-section bar 1 and latched therewith. The curved extensions have, on their outsides, rectangular wire guide lugs 27 having a slot in their centres. In parallel to the outsides of the upper portion 22 and through the curved extensions 26 extend through-passing slots 28, into which

metal earthing contact lugs 29 can be inserted (Fig. 11), said lugs being clamped down to the round-section bars 1 having earth potential and to which the not shown contact terminals of a surge arrester magazine to be inserted into the connector block 10 can be connected, as is shown in more detail in the DE 28 11 812. The earthing contact lugs 29 have, in their lower sections, three curved lugs 68, the inner contour of which is adapted to the round-section bars 1. At a lug 68 of the earthing contact lug 29 is provided a contacting tongue 69, which is configured in the same way as the earthing contact lug 54 of Fig. 19 described below, and which engages into an upwardly open chamber 70 of the connector block 10. The lower portion 23 of the connector block 10 comprises, further, insertion slots 30 serving for loosening the connector block 10 from the position latched with a round-section bar 1 by means of a not shown screwdriver. Further, additional wire guide lugs 31 are provided on the bottom side of the lower portion 23.

For placing the connector blocks 10 on the round-section bars 1 at a desired identical spacing, spacer clips 32 and 33 of plastic are provided according to Figs. 12 and 13. The spacer clips 32 of Fig. 12 are pre-fabricated as bar-type elongated material and can individually be broken off. The spacer clips 33 are individually formed of plastic. Both spacer clips 32, 33 are formed of annular disc pieces having an aperture angle of less than 180° , so that they can, due to their resilient configuration, be latched onto the round-section bars 1, for the inner diameters of the spacer clips 32, 33 correspond to the outer diameter of the round-section bars 1.

Figs. 14 and 15 show reception elements 34 of plastic to be put together for the metal round-section bars 1. The reception elements 34 comprise two pairs of top-side clamping lugs 35, into which can be latched the round-section bars 1 of Fig. 12, and lower tube-section pieces 36 of plastic enclosed by the outer side walls 37. As is shown in Fig. 14, the upper clamping lugs 35 of a lower reception element 34 engage between the side walls 37 of an upper reception element 34, and clamp the lower tube-section pieces 36 of the reception element 34, similar to the upper

clamping lugs 35 clamping a round-section bar 1. The reception elements 34 serve for generating a distance of the round-section bars 1 to a not shown structure portion 2.

According to Fig. 16, such a structure portion 2 can be formed of a support rail 38, whereupon a specially adapted latch clip 39 is slid having clamping lugs 35 on top, to which the latch clip 39 with reception elements according to Figs. 14 and 15 can be connected, in order to dispose round-section bars 1 in a desired distance to support rails 38.

Fig. 17 shows a universal connection element 40 as a node point for several abutting round-section bars 1. Between two parallel round-section bars 1 each are latched-on connector blocks 10 (Fig. 4). The universal connection element 40 comprises two identical half shells 41 having each crossing, semi-circular grooves 42, the radius of which corresponds to the radius of the round-section bars 1. In the intersection of the grooves 42, there is a through-passing bore 43, the diameter of which corresponds to the outer diameter of the round-section bars 1. One corner 44 of each half shell 41 is cut free and is connected with a slot 45 to the through-passing bore 43. At the opposite corner on the same side of the half shell 41, a section piece 46 corresponding to the cut-free corner 44 is formed, the section piece 46, on one hand, and the opposite corner, on the other hand, in addition having guide webs and guide grooves 47 and 48, resp. In total four Allen-head screws serve for tightly connecting the two half shells 41 and thus for tightly clamping the ends of the round-section bars 1 to be connected. Two of the four Allen-head screws 49 extend in parallel to the through-passing bore 43 and two transversely thereto.

Figs. 18 to 20 show the assemblies of the connector block 10 described here, without the latter being latched onto the round-section bars 1. For this purpose, mounting adapters 50 (Fig. 18) are provided, which are inserted into the outer wire guide lugs 27 of the connector block 10 and are screwed, together with connector block 10, on a flat plate 51 by means of screw elements 52. The mounting adapters 50 in turn comprise wire guide lugs 53 replacing the wire guide lugs 27 of the connector block 10 occu-

pied by the mounting adapters 50. Into the through-passing slots 28 of the curved extensions 26 are inserted earthing contact lugs 54, which serve - similar to the earthing contact lugs 29 - for connection to a surge arrester magazine plugged onto the connector block 10. The earthing contact lugs 54 are capable to be aligned by plugging together, according to Fig. 19.

Figs. 21 and 22 show a receiving sheet 55 having laterally bent-off and curved lugs 56, the shape of which being adapted to the round-section bars 1, such that a connector block 10 can be latched, with its curved extensions 26, onto the lugs 56 of the receiving sheet 55. In this way, shielded cables 57, 58 can be terminated at the connector blocks 10, with connection brackets 59, 60 fixing the cables 57, 58. Although only one connector block 10 is shown in Fig. 22, several connector blocks 10 can of course be plugged side-by-side on a correspondingly longer receiving sheet 55 onto the bent-off lugs 56, thereby a cable terminal device being formed. The lugs 56 have earthing contact lugs 29', which engage into the slots 28 of the extensions 26 of the connector block 10.

Figs. 23 and 24 show the configuration of per se known wire guide discs 61 at the connector blocks 10, for which special, not shown latch elements on the side surfaces of the connector block 10 are provided for latching the wire guide discs 61 on.

Fig. 25 shows a strain-relief device 62 being latched, in a similar way as the wire guide discs 61, laterally onto the connector block 10. The strain-relief device 62 comprises an integral guide body 63 for a flat cable being disposed spaced to the connector block 10, said cable being placed, according to Fig. 26, from below the connector block 10 between the guide body 63 and the side wall of the connector block 10, for which purpose additional C-shaped guide bodies 65 being provided at the strain-relief device 62. After inserting the flat cable 64, the guide body 63 is pressed into the C-shaped guide body 65, as indicated by the arrow in Fig. 28. The flat cable is thus safely fixed in the strain-relief device 62.

Fig. 27 shows a 19" casing 66 having, in the interior at the rear end of the casing 66, a rear wall wiring strip 71, which is shaped to the connector block 10. The rear wall wiring strip 71 is latched onto two round-section bars 1, 1', one of the round-section bars 1' being connected to a support rail 72. By loosening a fixing screw 73, the support rail 72 is loosened from the casing 66, together with the section bar 1'. Several wiring strips 71 arranged behind each other can thus be flapped out from the rear-side portion of the 19" casing, as is indicated by the arrow in Fig. 27. The wiring strips 71 with the curved extensions 26 will then rotate about the round-section bar 1 fixedly attached at the 19" casing 66. A wiring strip flapped out from the 19" casing is diagrammatically shown in Fig. 27. The not shown wire connections between the individual wiring strips 71 are thus performed in simplest way outside the 19" casing.



PATENT CLAIMS

1. A device for holding telecommunication connector blocks, comprising a mounting structure, at least one connector block disposed thereupon and at least one connection element, characterized by that the mounting structure is formed of at least one section rail (1) borne in a structure portion (2) and having a circular cross-section, and that the connector block (10) comprises as a connection element (25) a curved snap-fit element (26), which is latchable onto the section rail (1) and is displaceable thereon.

2. A device according to claim 1, characterized by that two parallel section rails (1) are borne in the structure portion (2), and that the connector block (10) comprises at least one snap-fit element (26) for a connection with a section rail (1).

3. A device according to claim 1, characterized by that two parallel section rails (1) are borne in the structure portion (2), and that the connector block (10) comprises two snap-fit elements (26) for a connection of the section rails (1).

4. A device according to one of claims 1 or 3, characterized by that the curved extensions (26) of the connector blocks (10) enclose the section rails (1) by an angle of more than 180°.

5. A device according to one of claims 1 to 4, characterized by that the section rails (1) are provided at least at one end with annular grooves (15), and that the respective structure portions (2) are provided with slots (16) for engagement of the annular grooves (15) of the section rails (1), said slots (16) having a slot portion of a width being larger than the diameter of the section rails (1), and having an adjacent slot portion of a width being smaller than the diameter of the section rails (1), and having a clamping web (17) extending in the direction of the slot, said clamping web engaging into the annular groove (15) of the section rails (1) and pressing them against the one end of the slot (16), wherein the slot walls (18) engage into the annular groove (15).



6. A device according to one of claims 1 to 5, characterized by that spacer clips (32, 33) are provided for latching onto the section rails (1), and that they are formed of annular disc pieces, the aperture angles of which being smaller than 180°.

7. A device according to one of claims 1 to 6, characterized by that reception elements (34) to be put together are provided for holding the section rails (1), spaced from the structure portions (2).

8. A device according to claim 7, characterized by that the reception elements (34) are latchable onto a support rail (38) forming the structure portions (2).

9. A device according to one of claims 1 to 8, characterized by that universal connection elements (40) are provided for connecting several crossing section rails (1).

10. A device according to one of claims 1 to 9, characterized by that mounting adapters (50) are provided for connecting individual connector blocks (10) with earthing contact terminals (54) to be plugged onto each other.

11. A device according to one of claims 1 to 10, characterized by that a receiving sheet (55) for individual or several connector blocks (10) provided with the curved extensions (26) is provided, the border areas of said receiving sheet being shaped semicircularly for forming tongues (56) shaped to the section rails (1).

12. A device according to one of claims 1 to 11, characterized by that at the side faces of the connector blocks (10), additional components such as wire guide discs (61) or strain-relief devices (62) for flat cables (64) can be clamped down.

13. A device according to one of claims 1 to 12, characterized by that the outside walls of the upper portion (22) of the connector block (10) are provided with through-passing slots (28), and that metal earthing contact lugs (29) are provided, which can be clamped down onto the section rods (1), passed through the through-passing slots and contacted with surge-arrester magazines to be inserted into the connector block (10).



14. A device according to claim 13, characterized by that the earthing contact lugs (29) comprise three curved lugs (68) in the lower section thereof, the inner contour of said lugs being shaped correspondingly to the section rods (1).