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(54) **Kábelcsatorna-idomdarab**

The invention relates to a cable channel segment having a channel that is formed by two side members and a base connecting the side members, the cable channel segment having two channel parts which are connected to one another at one of the two side members by at least one hinge point, the channel parts being adjustable in relation to one another via the pivot axis which is provided by such a hinge point.

Cable channel segments are used to construct a cable support or cable guide system from a plurality of elements of this type. In this regard, each cable channel segment forms a section of such a cable support or cable guide system. For connecting two cable channel segments, according to one embodiment these are arranged in overlap with one another. For this purpose, typically one end section of such a cable channel segment is crimped with an offset to form a bushing for accommodating therein the uncrimped end section of another cable channel segment. Two cable channel segments are connected either by screwing, or by providing complementary connecting elements which are associated with the connecting sections of two cable channel segments to be engaged with one another in each case. In such a design, a connection is possible without tools or screws. To be able to construct a cable support or cable guide system having various configurations, a plurality of various cable channel segments is provided for each different channel cross-sectional size (useful width or useful height). These cable channel segments differ with regard to their channel design. Thus, straight and curved segments are also provided in different lengths, angular segments, junctions, branches, and the like. When sections of a cable support system adjoin one another at an angle, angular segments are required. Angular segments must be provided with various angles, depending on the structural factors and the intended routing for constructing the cable support system. Cable channel angular segments having angles of 30°, 45°, 60°, and 90° are common. However, even if angular segments having different angular configurations are provided, considerable effort is required for manufacturing and in particular for storage, for keeping all the different segments in stock. Despite predefined angular segments, it is sometimes also necessary to make them fit by cutting them to size on site during construction of a cable support system.

A cable channel segment according to the preamble of Claim 1 which is configurable with regard to its angle is known from EP 0 578 459 A1. This cable channel segment is manufactured in one piece from a plate. A base part having an edge piece integrally molded thereon is situated between the two channel parts, which are spaced apart from one another and joined together along a side member by at least one hinge point. The base part is separated from the adjoining base parts of the channel parts by a gap. To allow this base part to bridge the distance between the base parts of the channel parts, the channel parts must be situated at an angle relative to one another. The edge piece opposite from the hinge point(s) has extension tongues which are to be connected to the side members of the two channel parts which adjoin one another at an angle. A disadvantage of this previously known cable channel segment is that it is not suitable for forming smaller angular segments or for use as a straight channel segment.

DE 20 2006 019 238 U1 describes a connecting piece between two cable ducts which is designed as a cover.

FR 1 471 497 describes how an angular arrangement of two cable channel parts may be made. For this purpose, the channel parts must have a particular final design so that they may be joined at an angle to correspondingly designed connecting ends of a second cable channel by screwing.

Against the background described above, the object of the invention is therefore to propose a cable channel segment which may not only be used as a universally configurable angular segment, but which in particular is also suited for forming a straight segment and which is easier to handle.

This object is achieved according to the invention by a generic cable channel segment, mentioned at the outset, in which the cable channel segment has an insert element adjacent thereto which is connected to a hinge point, with a base part which bridges the gap present between the bases of the channel parts, and the base part at its edge opposite the at least one hinge point carries a channel edge strip which bridges the gap

present between the side members of the channel parts, situated opposite from the at least one hinge point.

This cable channel segment includes two channel parts which are connected to one another in one of the two side members via one or more hinge points. The two channel parts are pivotable relative to one another via the at least one hinge point, which forms a pivot axis that extends orthogonally with respect to the plane of the base of the cable channel segment. Due to the provided configuration of the pivot axis, the two channel parts may thus be pivoted about the hinge point in order to form angular segments whose angles are adapted to the on-site situation. According to one preferred exemplary embodiment, the hinge point is provided within the side member by a material reduction in the axis of the pivot axis. Such a material reduction may be brought about by tapering the material thickness, so that the hinge point is designed in the manner of a film hinge. According to another embodiment, it is provided to design the pivot axis of the hinge point via multiple through openings in the side member, which are situated one behind the other. In principle, the hinge point may also be provided by an articulated hinge. However, this is generally not necessary, since the channel parts are adjusted relative to one another only once for forming an angular channel segment.

The cable channel segment which is configurable in this way also has an insert element. The insert element is connected to the cable channel segment, and has a base part. The base part bridges the gap that is present between the two bases of the channel parts. The base part is preferably situated resting on the top side of the bases of the two channel parts, and has an extension such that the base gap present between the channel parts is bridged in any intended position of the two channel parts relative to one another. The insert element has a channel edge strip next to the base part. The channel edge strip is situated on the side of the base part that is opposite the at least one hinge point. The channel edge strip bridges the gap that is present between the side members of the channel parts situated opposite from the at least one hinge point, and thus forms a peripheral boundary of the channel, in particular when the channel parts have been shifted relative to one another, about the pivot axis, from their aligned arrangement. The

channel edge strip preferably has a length such that the side member gap between the two channel parts is bridged in any intended position of the two channel parts relative to one another. The channel edge strip is preferably situated on the inside with respect to the adjacent side members of the channel parts, and rests against same. For securing the channel edge strip to the side members of the channel parts, these side members have mutually aligned through openings. The channel edge strip is secured to the side member by means of at least one securing element which passes through two through openings situated in mutual alignment. Typically, the through opening within the channel edge strip and/or the through opening of the adjacent side member are/is designed as an elongated opening which follows the longitudinal extension of the cable channel segment. It is then possible to adjust the two channel parts relative to one another for setting the desired angle, using the securing element which is inserted but not yet fully tightened. The length of the channel edge strip is typically greater than the maximum side member gap width between the two channel parts. This ensures that the channel edge strip may be fixed in any position on each side member of a channel part.

For guiding such a channel edge strip, in one embodiment of the invention it is provided to inwardly crimp the side members of the two channel parts, situated adjacent to the channel edge strip, at an offset so that they protrude, thus creating a channel edge strip holder. The height of the channel edge strip holder extends from the base of a channel part to the inwardly protruding offset crimp, whereby the height of the channel edge strip corresponds to, or, with the necessary play, is greater than the height of the channel edge strip. In such an embodiment, due to the engagement of the channel edge strip with the channel edge strip holder of the side members, buckling loads may be intercepted particularly effectively when the channel edge strip is connected to the respective side member of the adjacent inner part. In principle, it is likewise possible to use the eye, which typically forms the upper end of a side member, for the purpose of guiding the channel edge strip. The height of the channel edge strip then corresponds to the distance between the base of a channel part from the inner vertex of the eye.

The same as for the channel edge strip, the base part of the insert element also preferably

has through openings so that the base part may also be secured to the bases of the adjacent channel parts by using securing elements. Screws which are used anyway in conjunction with constructing a cable support system are typically employed as securing elements.

In addition to the above-described connection of the insert element via its channel edge strip to the side members of the two channel parts situated opposite from the hinge point, according to one refinement it is provided to also secure the insert element to the side member of the cable channel segment on the side opposite from the channel edge strip. This advantageously takes place adjacent to a hinge point. For the case that two hinge points are provided which are spaced apart from one another, this additional securing of the insert element takes place between the two hinge points. For securing the insert element adjacent to a hinge point, according to one embodiment a connection angle piece is used. The connection angle piece is integrally molded onto the base part of the insert element. To simplify installation of the insert element into the channel formed by the two channel parts, in particular to simplify preassembly of the cable channel segment, it may be provided, in the area of the transition between the base and the side member adjacent to a hinge point, to provide a through opening through which the connection angle piece is or may be led out from the channel interior. The length of the through opening is such that a portion of the base part may also be led out. In such an embodiment, the insert element is secured via the connection angle piece by means of a securing element on the outer side of the side member. A connection of the insert element also to the side member of the cable channel segment which carries the at least one hinge point is regarded as an additional connection option, since the side members of the channel parts on this side are already connected to one another via the hinge point. The situation is different for the other side members, which are separated from one another by a gap. Therefore, a connection of the channel edge strip to the side members of the channel parts has priority over the connection of the insert element to the side member carrying the hinge point.

Further advantages and embodiments result from the following description of one

exemplary embodiment, with reference to the appended figures, which show the following:

Figure 1: shows a perspective illustration, in the manner of an exploded drawing, of a cable channel segment according to the invention,

Figure 2: shows the cable channel segment assembled from the components shown in Figure 1,

Figure 3: shows the cable channel segment from Figure 2 in another perspective illustration,

Figure 4: shows an enlarged cross-sectional illustration of a section of the cable channel segment from Figures 2 and 3,

Figure 5: shows the cable channel segment from the preceding figures in an exemplary configuration for forming a first angular segment, and

Figure 6: shows the cable channel segment from the preceding figures in an exemplary configuration for forming a different angular segment.

A cable channel segment 1 has a channel 4 that is formed by two side members 2, 2.1 and a base 3. The channel 4 is used for accommodating cables, lines, or the like. The cable channel segment 1 is used with other standard cable channel segments for constructing cable support systems.

The cable channel segment 1 is a cable channel segment which is variably configurable with regard to the geometry of its longitudinal course. The cable channel segment 1 is formed by two channel parts 5, 5.1. Each channel part 5, 5.1 has a base 3.1, which together with the base 3.1 of the other channel part forms the base 3 of the cable channel segment 1. The base 3.1 of each channel part 5, 5.1 is bordered by two side member

sections 6, 6.1. The two channel parts 5, 5.1 have identical designs, so that the same reference characters are used for like elements for the two channel parts 5, 5.1.

The two channel parts 5, 5.1 are connected to one another in the area of the side member 2 by two hinge points 7, 7.1. In the exemplary embodiment illustrated, the hinge points 7, 7.1 are provided by multiple openings which pass through in the vertical direction, and thus in the transverse direction, with respect to the longitudinal extension of the side member 2. The openings are designed as elongated holes. Two indentations 9, 9.1 are introduced into the top-side eye 8 of the side member 2, in alignment with the openings in the hinge points 7, 7.1. The indentations 9, 9.1 pass through the eye 8 and also through an inwardly protruding offset crimp situated in the upper area of the side member 2. In addition, there is a gap 10 between the two channel parts 5, 5.1. The gap 10 passes through the side member 2.1, thus forming the two side member sections 6.1 which form the side member 2.1, and forming the base 3 in order to form the two bases 3.1 of the two channel parts 5, 5.1.

As a result of the hinge points 7, 7.1 within the side member 2, formed by the openings and the indentations 9, 9.1, the two channel parts 5, 5.1 may be adjusted relative to one another about the pivot axes formed by the longitudinal extension of the hinge points 7, 7.1. This is the basis for the adjustability of the channel parts 5, 5.1 relative to one another, and the angular configurability of the cable channel segment 1.

The cable channel segment 1 has an insert element 11 next to the two channel parts 5, 5.1. The insert element 11 includes a base part 12 having a circular segment-like design, a connection angle piece 13, integrally molded onto the base part 12 at the radially inner edge 14 with respect to the geometry of the base part 12, for connecting the insert element 11 to the side member 2, and a channel edge strip 15 that is integrally molded on at an edge situated opposite from the edge 14. The channel edge strip 15 in the region of its middle section is integrally molded onto the base part 12, and is situated at the radially outer side of the base part 12. The base part 12 and the channel edge strip 15 are used for bridging the gap 10 that is present between the two channel parts 5, 5.1. The

width of the gap 10 is a function of the position of the two channel parts 5, 5.1 relative to one another. In the longitudinally axially aligned arrangement of the two channel parts 5, 5.1 relative to one another shown in Figure 1, the gap 10 is shown with its smallest gap width. If the two channel parts 5, 5.1 are adjusted relative to one another for forming an angular piece, the distance between the side member parts 6, 6.1, and thus, the gap that is present between the abutting ends of the channel parts 5, 5.1, increases. The base part 12 is used for bridging the gap 10 between the two bases 3, 3.1 of the two channel parts 5, 5.1. The channel edge strip 15 is used for bridging the gap 10 between the two side member parts 6.1. In the exemplary embodiment illustrated, in the channel parts 5, 5.1 in each case a portion of the eye on the top side is recessed in the area of the side member 2.1, adjacent to the gap 10. An eye piece 16, integrally molded onto the channel edge strip 15 in this area on the top side, engages with this recess in the eye.

Square through openings 17, which follow the longitudinal extension of the channel edge strip 15, are introduced into the two sections adjacent to the eye piece 16. An elongated hole 18 which follows the longitudinal extension is introduced into each of the side member parts 6.1. The through openings 17 are aligned with the elongated hole 18, and are used for securing the channel edge strip 15 to the inner side of the two side member sections 6.1. By way of example, a fastening screw 19 having a square shank that is integrally molded onto the underside of the head is inserted into the left section of the channel edge strip 15. The square shank engages in a torque-locking manner into a through opening 17 in the channel edge strip 15.

The connection angle piece 13 is used for connecting the insert element 11 to the side member 2. The section of the side member 2 that is situated between the two hinge points 7, 7.1 is provided for this purpose. To this end, a section in the area of the transition between the bases 3.1 and the side member 2 or the side member parts 6 is situated through an insertion opening 20. The connection angle piece 13 may be passed through this opening 20 and connected on the outside of the side member 2 by means of a securing element.

The bases 3.1 have a transversely extending ridge 22 for delimiting their connecting sections 21 on the end side. The height of the ridge 22 is slightly greater than the material thickness of a cable channel segment which with its connecting section is inserted in overlap with the connecting section 21 of the cable channel segment 1. The ridge 22 is thus used on the one hand for transverse reinforcement, and on the other hand for providing edge protection.

The cable channel segment 1 is shown in Figure 2 with the assembled elements; with the exception of the fastening screw 19, further fastening screws are not shown. A further fastening screw is seated in the right branch of the channel edge strip 15. Yet another fastening screw is used for securing the connection angle piece 13 to the side member 2.

The distance of the connection angle piece 13 from the channel edge strip 15 is such that in the installed position of the insert element 11 and the channel parts 5, 5.1 shown in Figure 2, the surface of the channel edge strip 15 facing the inner side of the side member 2.1 or the side member parts 6.1 rests against same.

Figure 3 shows the cable channel segment 1 from its other side compared to the illustration in Figure 2. It is apparent that a nut 23 is seated on the threaded section of the fastening screw 19. The viewing angle of the cable channel segment 1 in Figure 3 facing in the direction of the inner side of the side member 2 also shows the insertion opening 20 in the area of the transition of the base 3.1 into the side member 2.

As previously discussed, the side members 2, 2.1 have an inwardly protruding offset crimp beneath their eye 8. The enlarged cross-sectional illustration of the side member 2.1 in Figure 4 shows the offset crimp 24 more clearly. A channel edge strip holder 25 is created between the base 3 or 3.1 and the offset crimp 24 by the inwardly protruding offset crimp 24. The height of this channel edge strip holder 25 corresponds to the height of the channel edge strip 15 from the base 3.1 of a channel part 5 or 5.1. Since the channel edge strip 15 rests against the inner side of the side member 2.1 and is accommodated in the channel edge strip holder 25, the connection, provided by the channel edge strip

15, between the side member parts 6.1 of the two channel parts 5, 5.1 is afforded additional protection from buckling. Figure 4 shows the cross-sectional area of the channel edge strip 15 in crosshatch for clarification.

Figure 5 shows the cable channel segment 1, with the two channel parts 5, 5.1 adjusted relative to one another by an angle of approximately 45°. The two channel parts 5, 5.1 are pivoted with respect to one another, about the two hinge points 7, 7.1, in the area of the side member 2. The base part 12 of the insert element 11 together with the channel edge strip 15 integrally molded thereon are used for bridging the gap 10 which is formed between the channel parts 5, 5.1, and which becomes larger in the direction of the side member 2.1.

Figure 6 shows by way of example another position of the two channel parts 5, 5.1 relative to one another. In this position, the two channel parts 5, 5.1 enclose an angle of approximately 90°.

The insert element part 11 is preinstalled when the cable channel segments 1 are delivered. This means that the insert element 11 is connected to the side member 2 by means of a securing element. This securing element has been described above as a fastening screw by way of example. A clinch connection or a rivet, for example, may also be used instead of a screw as the securing element. Likewise, the channel edge strip 15 is connected via at least one securing element in each case to each side member part 6.1 of the two channel parts 5, 5.1. In the delivered state of the cable channel segment 1, these securing elements are typically only loosely tightened, so that the two channel parts 5, 5.1 may be arranged with respect to one another on site without having to loosen a securing element beforehand. After the two channel parts 5, 5.1 are arranged with respect to one another, the securing elements which connect the channel edge strip 15 to the two side member parts 6.1 are then tightened. If desired, for further securing, one or more securing elements for fixing the base part 12 of the insert element 11 to the bases 3.1 of the two channel parts 5, 5.1 may likewise be used.

With regard to its cross-sectional dimensioning, the cable channel segment 1 of the exemplary embodiment illustrated in the figures is designed to accommodate the uncrimped connecting section of a standard cable channel segment, i.e., a cable channel segment which typically is not configurable, in the particular connecting section 21. The connecting sections 21 of the cable channel segment 1 are thus designed as bushings. In this regard, the offset crimp 24 in the two side members 2, 2.1 of the cable channel segment 1 is also used for aligning the top-side eye on the two side members 2, 2.1 with the cable channel segments connected to the cable channel segment 1. This simplifies the installation of a cover.

List of reference numerals

1	Cable channel segment
2, 2.1	Side member
3, 3.1	Base
4	Channel
5, 5.1	Channel part
6, 6.1	Side member section
7, 7.1	Hinge point
8	Eye
9, 9.1	Indentation
10	Gap
11	Insert element
12	Base part
13	Connection angle piece
14	Edge
15	Channel edge strip
16	Eye piece
17	Through hole
18	Elongated hole
19	Fastening screw
20	Insertion opening
21	Connecting section
22	Ridge
23	Nut
24	Offset crimp
25	Channel edge strip holder

714866/DO

KÁBELCSATORNA-IDOMDARAB

SZABADALMI IGÉNYPONTOK

1. Kábelcsatorna-idomdarab, amely kábelcsatorna-idomdarabnak két oldalsó tartó (2, 2.1) és az oldalsó tartókat (2, 2.1) összekötő fenék (3) képezte csatornája (4) van, amely kábelcsatorna-idomdarab (1) két csatornarésszel (5, 5.1) rendelkezik, amely csatornarészek a két oldalsó tartó (2, 2.1) egyikénél legalább egy csuklózási hely (7, 7.1) útján egymással össze vannak kötve, és amely csatornarészek (5, 5.1) egy ilyen csuklópánt (7, 7.1) adta elfordulási tengely körül egymáshoz képest állíthatóak, **azzal jellemezve**, hogy a kábelcsatorna-idomdarabnak (1) van egy betétje (11), amely egy csuklópánt (7, 7.1) szomszédságában a kábelcsatorna-idomdarabhoz van csatlakoztatva, és amely a csatornarészek (5, 5.1) fenekei (3.1) között található hézagot (10) áthidaló fenékrésszel (12) rendelkezik, amely fenékrészen (12) a legalább egy csuklópánttal (7, 7.1) átellenben lévő pereménél egy csatorna-peremszalag (15) van, amely áthidalja a csatornarészeknek (5, 5.1) a legalább egy csuklópánttal (7, 7.1) átellenben lévő oldalsó tartói (2, 2.1) között található hézagot (10).

2. Az 1. igénypont szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a betét (11) a fenékrészhez (12) képest derékszögben behajlított csatlakoztatószöglettel (13) rendelkezik, amivel a fenékrész a kábelcsatorna-idomdarab (1) egyik oldalsó tartója (2) csuklópántjának (7, 7.1) szomszédságában csatlakoztatva van.

3. A 2. igénypont szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a kábelcsatorna-idomdarab a fenéktől (3) abba az oldalsó tartószakaszba (2) vezető átmenetnek a területén, amelyhez a betét (11) csatlakoztatószöglete (13) hozzá van erősítve, áttöréssel (20) van ellátva, amelyen keresztül a csatlakoztatószöglet (13) átnyúlik.

4. Az 1–3. igénypont egyike szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a betét (11) fenékrésze (12) felülnézetben körcikk alakú, és a csatlakoztatószöglet (13) sugárirányban a belső oldalon, a csatorna-peremszalag (15) pedig sugárirányban a külső oldalon a fenékrész (12) alakját tekintve rendre a körcikk alakú fenékrész (12) közepének területén rá van formázva a fenékrészre.

5. A 2–4. igénypont egyike szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a két csatornarész (5, 5.1) a kábelcsatorna-idomdarab (1) hosszkiterjedésének irányában egymástól távközre lévő két csuklópánt (7, 7.1) útján van egymással összekötve, és a betét (11) a

csatlakoztatószögleténél (13) fogva a két csuklópánt (7, 7.1) között található oldalsó tartószakaszhoz van csatlakoztatva.

6. Az 1–5. igénypont egyike szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a betét (11) csatorna-peremszalagja (15) a csatornarészek (5, 5.1) oldalsó tartórészeinek (6.1) belső oldalára felfekszik, és az oldalsó tartórészek (6.1) egy csatorna-peremszalagot befogadó tér (25) kialakítása végett befelé irányuló könyökhajlattal (24) vannak ellátva.

7. A 6. igénypont szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a kábelcsatorna-idomdarabnak (1) a csatorna-peremszalaggal (15) átellenben lévő oldalsó tartója (2) irányuló könyökhajlattal (24) is el van látva befelé.

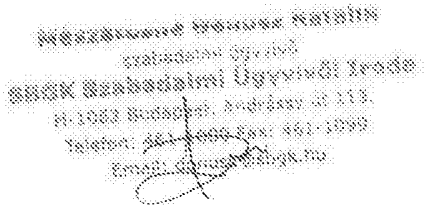
8. Az 1–7. igénypont egyike szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a kábelcsatorna-idomdarab (1) belső szélessége úgy van méretezve, hogy a hosszkiterjedés irányában nyitott végoldali összekötő szakaszba (21) behelyezhető egy standardizált kábelcsatorna-idomdarab végoldali összekötő szakasza.

9. A 8. igénypont szerinti kábelcsatorna-idomdarab a 6. és 7. igénypontra hivatkozásával összefüggésben, **azzal jellemezve**, hogy az oldalsó tartók (2, 2.1) befelé irányuló könyökhajlatának (24) beugrási szélessége akkora méretű, hogy a kábelcsatorna-idomdarab (1) oldalsó tartóinak (2, 2.1) felső lezárása egybeesik a végszakaszba behelyezett kábelcsatorna-idomdarab oldalsó tartójának (2, 2.1) vonatkozó szomszédos felső lezárásával.

10. Az 1–9. igénypont egyike szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a csatorna-peremszalag (15) és kábelcsatorna-idomdarab (1) szomszédos oldalsó tartója (2.1) egy vonalba eső áttörésekkel (17) van ellátva avégett, hogy a csatorna-peremszalag (15) egy vagy több rögzítőelem (19) segítségével a szomszédos oldalsó tartóhoz (2) legyen erősíthető.

11. Az 1–10. igénypont egyike szerinti kábelcsatorna-idomdarab, **azzal jellemezve**, hogy a betét (11) fenékrésze (12) és a csatornarészek (5, 5.1) feneke (3.1) egy vonalba eső áttörésekkel van ellátva avégett, hogy a betét (11) fenékrésze (12) egy vagy több rögzítőelem segítségével a csatornarészek (5, 5.1) fenekéhez (3.1) legyen erősíthető.

A meghatalmazott:



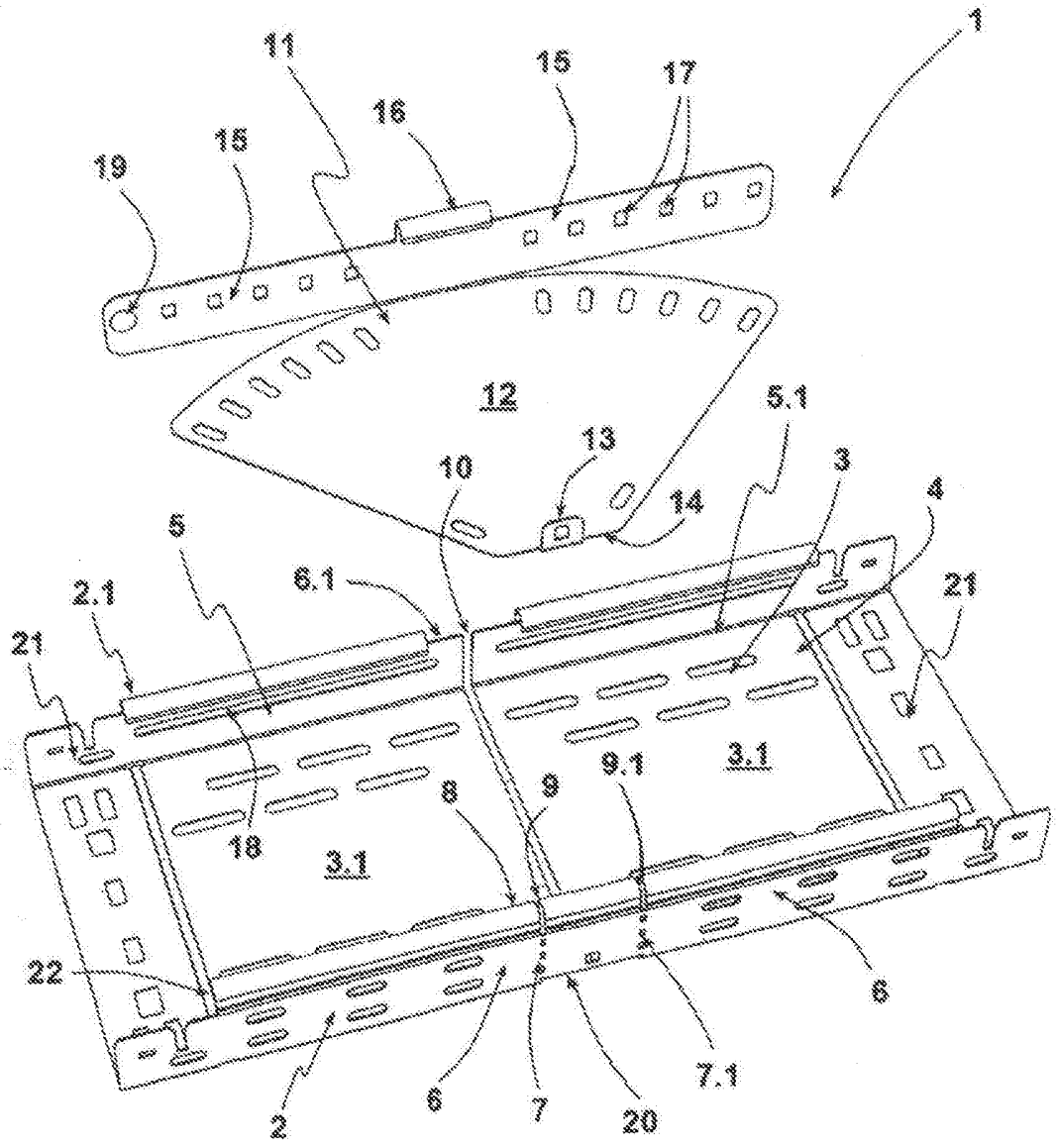

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Fig. 1

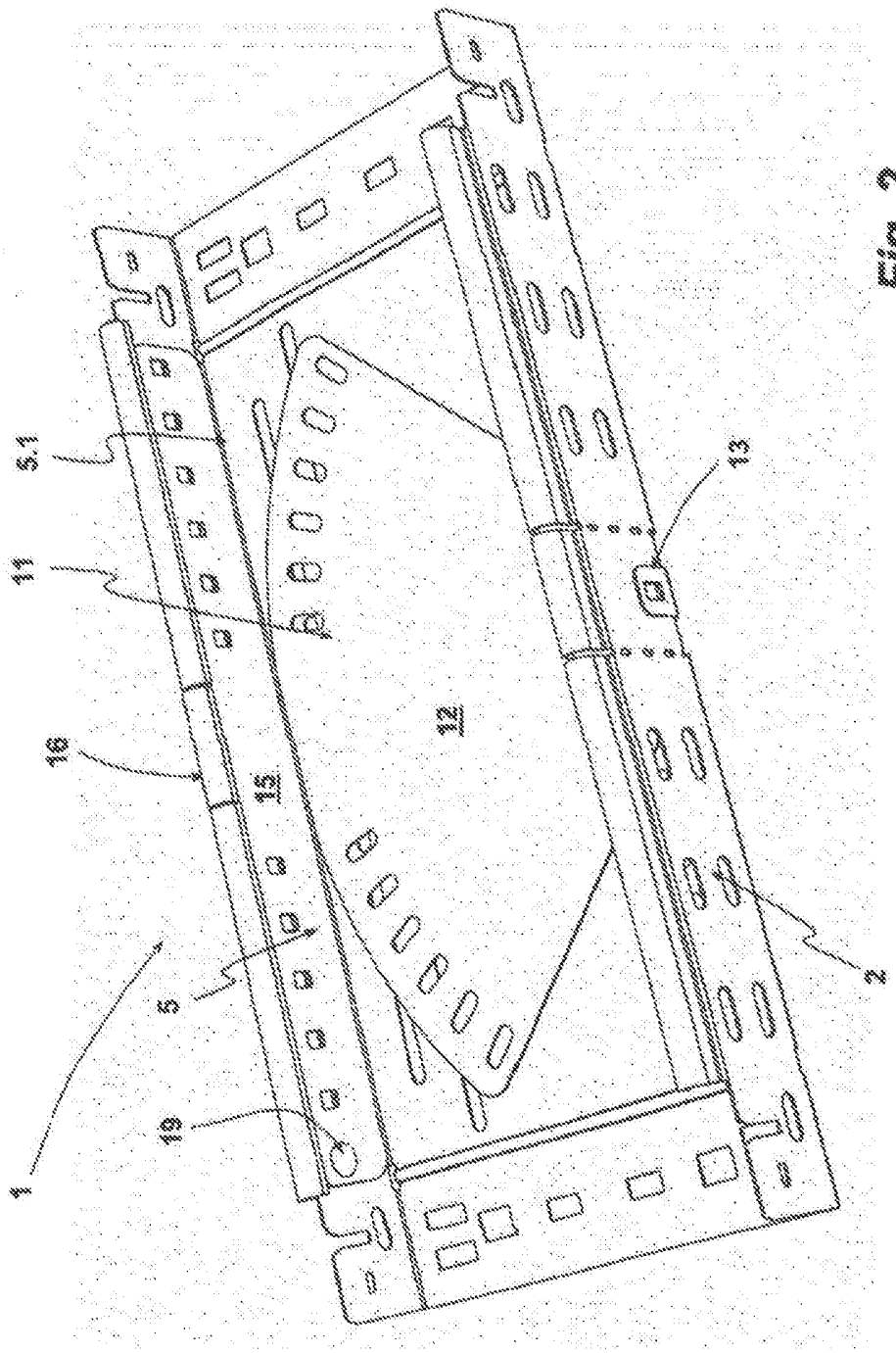

Fig. 2

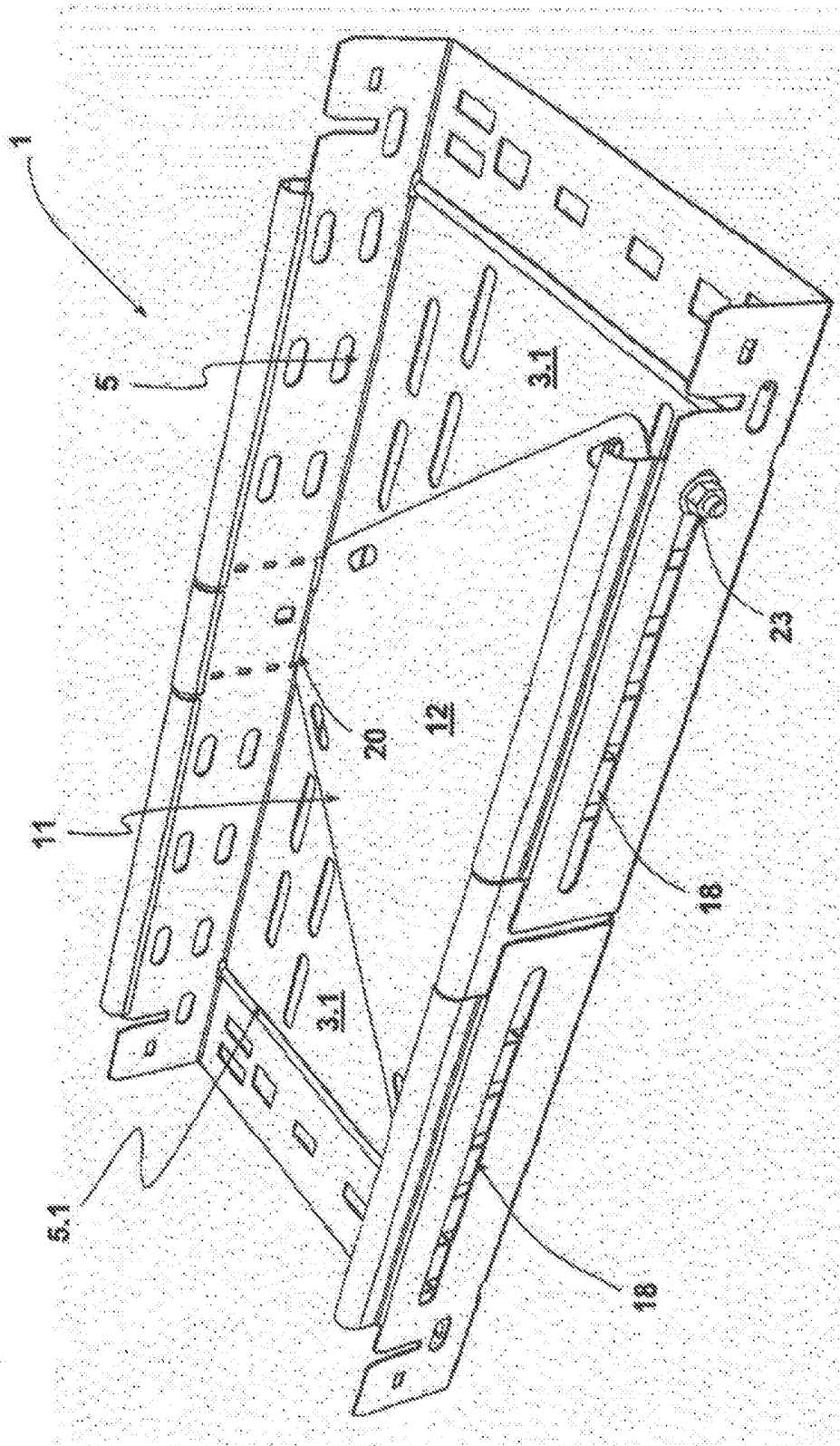

Fig. 3

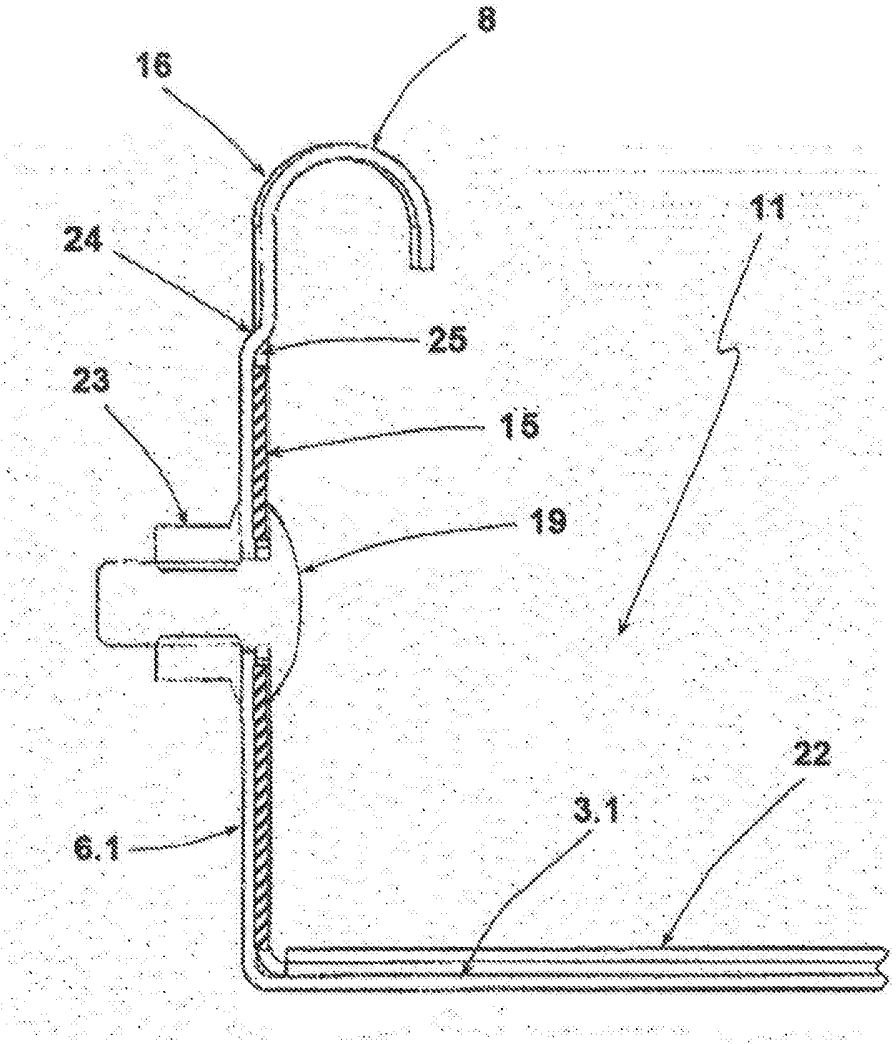

Fig. 4

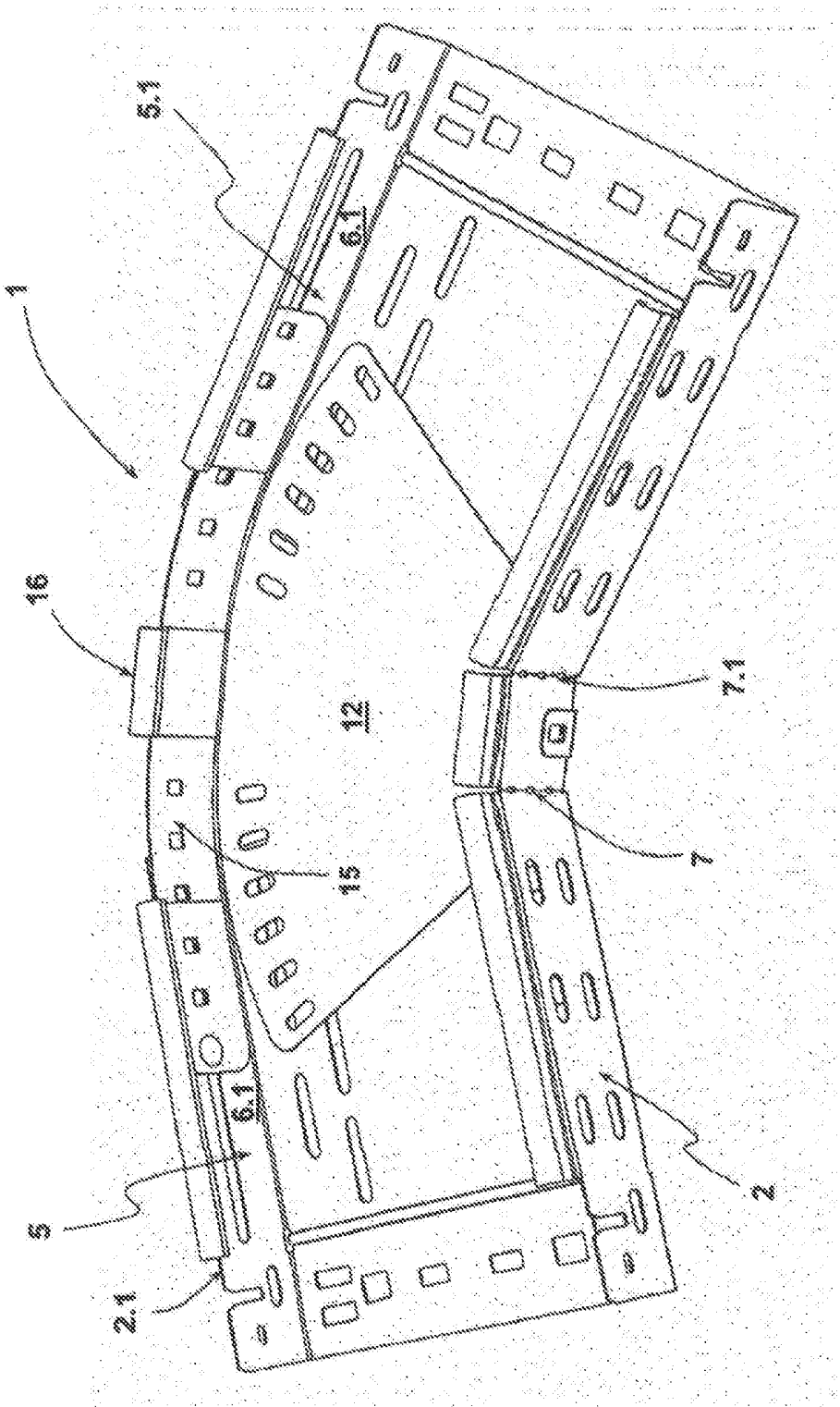

Fig. 5

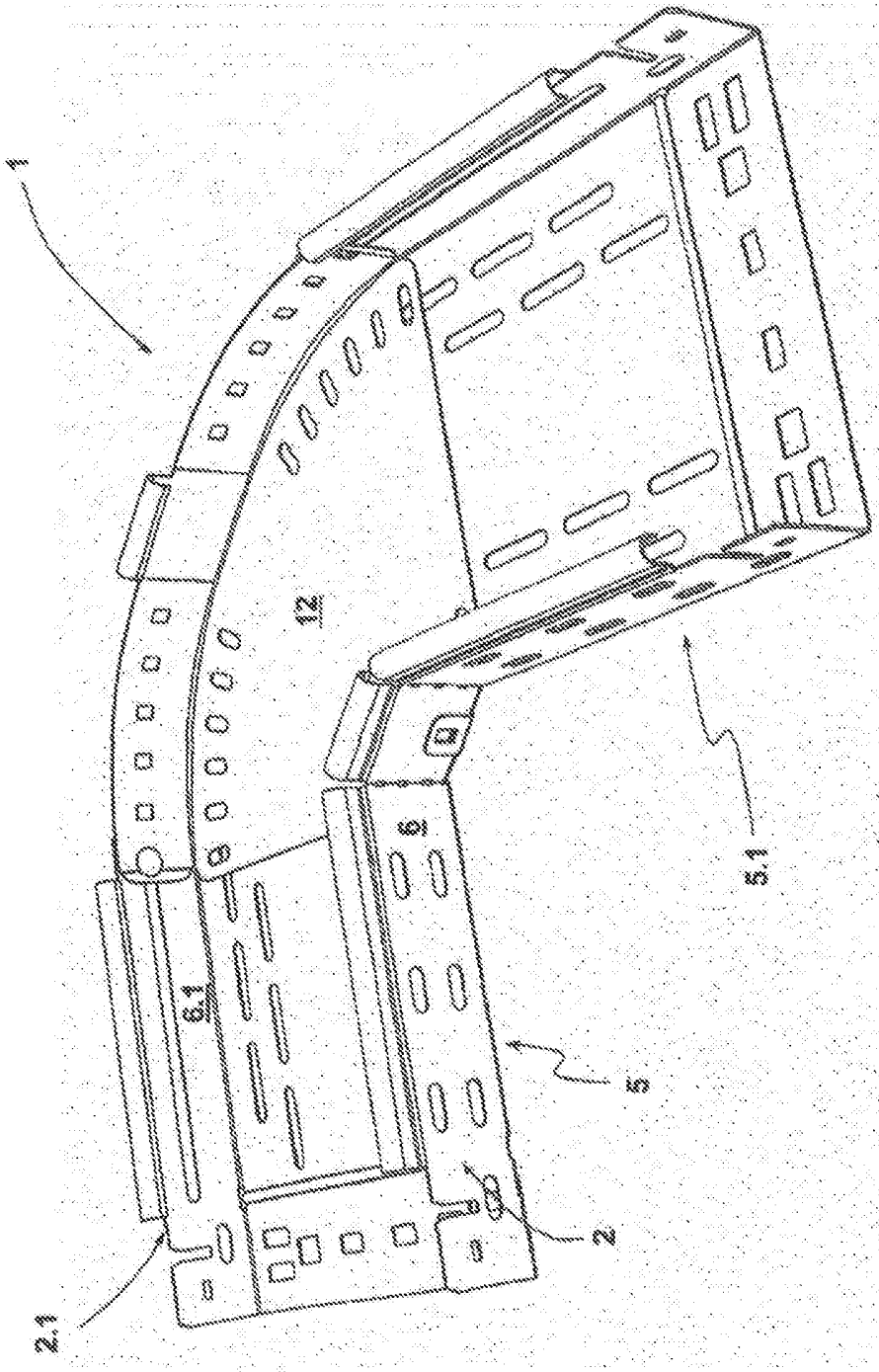

Fig. 6