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(72) Inventors:
• **Carstens, Stefan**
34513 Waldeck (DE)
• **Mecar, Jakub**
92591 Krá ová nad Váhom (SK)
• **Diler, Seref**
34513 Waldeck (DE)
• **Althaus, Tobias**
34513 Waldeck (DE)

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(71) Applicant: **Peikko Group Oy**
15170 Lahti (FI)

(74) Representative: **Boco IP Oy Ab**
Kansakoulukatu 3
00100 Helsinki (FI)

(54) **BUILDING ELEMENT FOR PROVIDING THERMAL INSULATION BETWEEN A BUILDING PART AND A PROJECTING EXTERIOR PART**

(57) Presented is a building element (1) for providing thermal insulation between a building part (2) and a projecting exterior part (3). The building element (1) comprises an elongated insulating body (4), a top rail structure (7), a bottom rail structure (8), and bars (9), which extend through the building element (1) and which

are configured to transfer forces between the building part (2) and the projecting exterior part (3). The bars (9) are connected to a bar holder rail (10) that extends in the direction of the top rail structure (7) and the bottom rail structure (8).

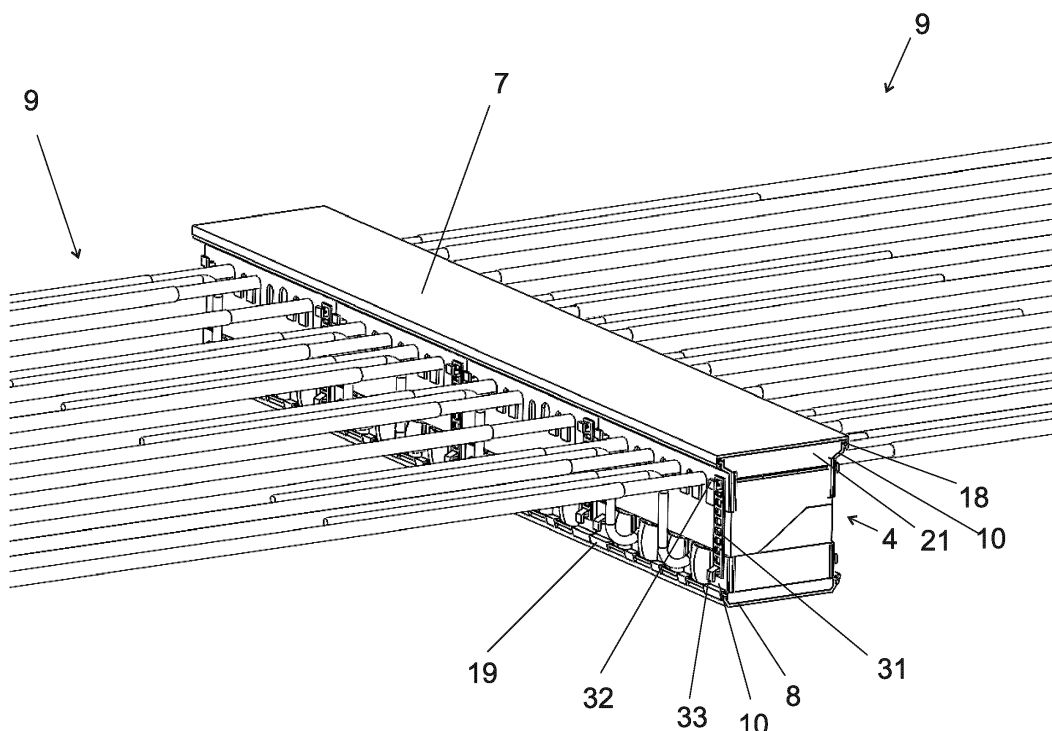


FIG 1

Description

Field of the invention

[0001] The invention relates to a building element for providing thermal insulation between a building part and a projecting exterior part such as a balcony slab, wherein the building element comprising an elongated insulating body having a first side intended to abut the building part and a second side intended to abut the projecting exterior part, a top rail structure, a bottom rail structure, and bars, which extend through the building element and which are configured to transfer forces between the building part and the projecting exterior part, as defined in the preamble of independent claim 1.

Objective of the invention

[0002] The object of the invention is to provide a building element for providing thermal insulation between a building part and a projecting exterior part such as a balcony slab that allows for easy providing of the building element with bars, when the building element is made, for transferring forces such as shear or tension forces between the building part and the projecting exterior part.

Short description of the invention

[0003] The building element of the invention is characterized by the definitions of independent claim 1.

[0004] Preferred embodiments of the building element are defined in the dependent claims.

List of figures

[0005] In the following the invention will be described in more detail by referring to the figures, which

Figure 1 shows a first embodiment of the building element,
 Figure 2 shows the first embodiment of the building element illustrated in figure 1 in cross-section and as assembled between a building part and a projecting exterior part,
 Figure 3 shows the first embodiment of the building element illustrated in figure 1 in exploded view,
 Figure 4 shows a second embodiment of the building element,
 Figure 5 shows the second embodiment of the building element illustrated in figure 4 in exploded view,
 Figure 6 shows a third embodiment of the building element,
 Figure 7 shows the third embodiment of the building element illustrated in figure 6 in exploded view,
 Figure 8 shows a fourth embodiment of the building element,
 Figure 9 shows the fourth embodiment of the building element illustrated in figure 8 in exploded view,

Figure 10 shows a bar holder rail that is attached to a top rail structure, wherein the bars are tension bars, Figure 11 shows what is shown in figure 10 in exploded view,

Figure 12 shows what is shown in figure 10 in exploded view and without bars,

Figure 13 shows a bar holder rail that is attached to the bottom rail structure, wherein the bars are shear bars,

Figure 14 shows what is shown in figure 13 in as state, where the bars are detached from the bar holder rail,

Figure 15 shows a bar holder rail that is provided with lost molds and that is attached to the bottom rail structure,

Figure 16 shows one bar holder rail section that is provided with lost molds in a state when a bar is attached to the bar holder rail section,

Figure 17 shows a bar holder rail attached to the bottom rail structure,

Figure 18 shows a bar holder rail attached to the bottom rail structure,

Figure 19 is a detail view of figure 18,

Figure 20 shows an embodiment of an external clip for fastening bars to the bar holder rail when the external clip is in a locking state,

Figure 21 shows an embodiment of an external clip for fastening bars to the bar holder rail when the external clip is in a receiving state,

Figure 22 shows an embodiment of an external clip for fastening bars to the bar holder rail when the external clip is in a locking state,

Figure 23 shows an embodiment of an external clip for fastening bars to the bar holder rail when the external clip is in a locking state and when a bar is received by the external clip,

Figure 24 shows a version of a bar holder rail section, Figure 25 shows another version of a bar holder rail section,

Figure 26 shows a compression distribution element holding rail provided with high compression distribution elements,

Figure 27 shows that what is shown in figure 26 in exploded view,

Figure 28 shows an alternative embodiment of a top rail structure or of a bottom rail structure,

Figure 29 shows a fifth embodiment of the building element,

Figure 30 shows the fifth embodiment of the building element illustrated in figure 29 in cross-section,

Figure 31 shows the fifth embodiment of the building element illustrated in figure 29 in exploded view, and

Figure 32 shows the fifth embodiment of the building element illustrated in figure 29 in exploded view.

Detailed description of the invention

[0006] Next the building element 1 for providing ther-

mal insulation between a building part 2 and a projecting exterior part 3 such as a balcony slab and some embodiments and variants of the building element 1 will be presented in greater detail.

[0007] The building element 1 comprising an elongated insulating body 4 having a first side 5 intended to abut, preferably partly abut, the building part 2 and a second side 6 intended to abut, preferably partly abut, the projecting exterior part 3.

[0008] The elongated insulating body 4 is preferably, but not necessarily, made of solid thermal insulation material, and the solid thermal insulation material that the elongated insulating body 4 being made of forming is preferably, but not necessarily, the outer surface (not marked with a reference number) of the elongated insulating body 4. In such case, the first side 5 of the elongated insulating body 4 and the second side 6 of the elongated insulating body 4 are preferably, but not necessarily, parts of the outer surface of the elongated insulating body 4.

[0009] The building element 1 comprising a top rail structure 7 that can cover an upper side (not marked with a reference numeral) of the elongated insulating body 4 and that can form at least a part of an upper surface (not marked with a reference numeral) of the building element 1. If the elongated insulating body 4 is made of solid thermal insulation material so that the solid thermal insulation material that the elongated insulating body 4 being made of forming the outer surface of the elongated insulating body 4, the upper side of the elongated insulating body 4 is preferably, but not necessarily, a part of the outer surface of the elongated insulating body 4. The top rail structure 7 can for example have a U- or a trapezoid shaped cross-section.

[0010] The building element 1 comprising a bottom rail structure 8 that can cover a lower side (not marked with a reference numeral) of the elongated insulating body 4 and that can form at least a part of a lower surface (not marked with a reference numeral) of the building element 1. If the elongated insulating body 4 is made of solid thermal insulation material so that the solid thermal insulation material that the elongated insulating body 4 being made of forming the outer surface of the elongated insulating body 4, the lower side of the elongated insulating body 4 is preferably, but not necessarily, a part of the outer surface of the elongated insulating body 4. The bottom rail structure 8 can for example have a U- or a trapezoid shaped cross-section.

[0011] It is possible that at least one of the top rail structure 7 and the bottom rail structure 8 have a first web structure 51 and two first flanges 52 projecting from the first web structure 51 as illustrated in figure 28. The first web structure and the two first flanges limits a first open channel 53. The elongated insulating body 4 is partly arranged in the first open channel 53. One of the two first flanges 52 covers partly the first side 5 of the elongated insulating body 4. The other of the two first flanges 52 covers partly the second side 6 of the elongated insulating body 4.

gated insulating body 4.

[0012] The building element 1 comprising bars 9, which extend through the building element 1 and which are configured to transfer forces between the building part 2 and the projecting exterior part 3. The bars 9 can be ribbed bars or smooth bars.

[0013] The bars 9 are connected to a bar holder rail 10 that extends in the direction of the top rail structure 7 and in the direction of the bottom rail structure 8.

[0014] The building element 1 has preferably, but not necessarily, an elongated form with opposite ends. The bar holder rail 10 extends preferably, but not necessarily, from one opposite end to the other opposite end of the building element 1.

[0015] The building element 1 can comprise several bar holder rails 10.

[0016] The bar holder rail 10 allows for easy providing of the building element 1 with bars 9 for transferring forces such as shear or tension forces between the building part 1 and the projecting exterior part 2.

[0017] The bar holder rail 10 allows for example to easily providing the building element 1 with shear bars for transferring shear forces between the building part 1 and the projecting exterior part 2 so that the shear bars are supported at a bar holder rail 10 that is attached to the bottom rail structure 8.

[0018] The bar holder rail 10 allows for example to easily providing the building element 1 with tension bars for transferring tension forces between the building part 1 and the projecting exterior part 2 so that the tension bars are supported at a bar holder rail 10 that is provided between the top rail structure 7 and the bottom rail structure 8 or so that the tension bars are supported at a bar holder rail 10 that is attached to the top rail structure 7.

[0019] At least some of the bars 9 can be connected to a bar holder rail 10 by means of external clips 11. The external clips 11 can comprise snap fit means 48 for connecting the external clips 11 to the bar holder rail 10.

[0020] The external clips 11 can, as illustrated in figures 20 to 23, comprise two parallel sections 12 attached to the bar holder rail 10 and a connecting section 13 that connects the two parallel sections 12 so that the shear bar 9 is pressed between the connecting section 13 and the two parallel sections 12.

[0021] The connecting section 13 can function a living hinge connecting the two parallel sections 12 together so that the external clip 11 can be brought into a receiving state as illustrated for example in figure 21, where the two parallel sections 12 are spaced apart from each other and where a bar 9 such as a shear bar can be brought between the two parallel sections 12 into contact with the connecting section 13, and into a locking state as illustrated for example in figure 22, where the two parallel sections 12 are in contact with each other and where the bar 9 is pressed between the connecting section 13 and the two parallel sections 12.

[0022] The two parallel sections 12 can be provided

with snap retainers 14 for connecting the two parallel sections 12 together in the locking state.

[0023] The connecting section 13 can form in the external clip 11 together with the two parallel section 12 a channel 15 that has partly a semi-tubular configuration, and that can extend in an angle with respect to the layer 15 of compression modules 13.

[0024] The external clips 11 can be made of polymer.

[0025] It is also possible that at least some of the bars 9 are connected to a bar holder rail 10 by means of bar fastening means 38 integrally formed with the bar holder rail 10, as illustrated in figures 24 and 25. Bar fastening means 38 integrally formed with the bar holder rail 10 can for example be bar clamps.

[0026] The bar holder rail 10 can comprise bar rail holder sections 16. In such case, the bar rail holder sections 16 form together the bar holder rail 10. Forming the bar holder rail 10 of bar rail holder sections 16 makes it easier to make building elements 1 of different lengths by using in the building element a number of bar rail holder sections 16 having a standardized length to provide a bar holder rail 10 having a desired length.

[0027] Adjacent bar rail holder sections 16 can be connected end to end with first connection means 17 to each other to form the bar holder rail 10.

[0028] At least some of the first connection means 17 can be integrally formed with the bar rail holder sections 16. The first connection means 17 can for example comprise a male snap-fit edge 49 at one bar rail holder section 16 and a co-operating female snap-fit edge 50 provided at another bar rail holder section 16.

[0029] At least some of the first connection means 17 can be external connection means (not illustrated in the figures).

[0030] The length of the top rail structure 7 and the bottom rail structure 8 to length of the bar rail holder sections 16 is preferably, but not necessarily, one of 1 to 2, 1 to 3, 1 to 4, 1 to 5, and 1 to 6.

[0031] The bar holder rail 10 is preferably, but not necessarily, as in the embodiments illustrated in the figures, in the form of a separate part which is formed unintegrally from the top rail structure 7 and the bottom rail structure 8.

[0032] The bar holder rail 10 is preferably, but not necessarily, as in the embodiments illustrated in the figures, in the form of a separate part which is formed nonintegrally with the top rail structure 7 and with the bottom rail structure 8.

[0033] The bar holder rail 10 is preferably, but not necessarily, as in the embodiments illustrated in the figures, formed as a part separate from the top rail structure 7 and separate from the bottom rail structure 8.

[0034] The bar holder rail 10 can, or if the building element comprises several bar holder rails 10, one bar holder rail 10 can, as for example in the first embodiment illustrated in figures 1 to 3, as for example in the second embodiment of the building element 1 illustrated in figures 4 and 5, and as for example in the fifth embodiment

of the building element 1 illustrated in figures 29 to 32 be attached to the top rail structure 7 by means of first rail fastening means 18 so that between the bar holder rail 10 and top rail structure 7 a top insulation space 20 is formed that is partly limited by the bar holder rail 10 and that is partly limited by the top rail structure 7, wherein a top insulation 21 is provided in the top insulation space 20. In the first embodiment of the building element 1 illustrated in figures 1 to 3, in the second embodiment of the building element 1 illustrated in figures 4 and 5, and in the fifth embodiment of the building element 1 illustrated in figures 29 to 32, the bar holder rail 10 that is attached to the top rail structure 7 is between the top insulation 21 provided in the top insulation space 20 and the elongated insulating body 4. In the first embodiment illustrated in figures 1 to 3, in the second embodiment of the building element 1 illustrated in figures 4 and 5, and in the fifth embodiment of the building element 1 illustrated in figures 29 to 32, the bar holder rail 10 that is attached to the top rail structure 7 is in direct contact with both the top insulation 21 provided in the top insulation space 20 and the elongated insulating body 4.

[0035] The top insulation 21 can at least partly made of expanded or extruded polystyrene, foamglass, silcate, mineral foam or mineral wool.

[0036] At least some of the first rail fastening means 18 can be integrated co-operating fastening means provided at the bar holder rail 10 and at the top rail structure 7. The first rail fastening means 18 can for example comprise a male snap-fit edge 49 provided at one of the bar holder rail 10 and the top rail structure 7 and a co-operating female snap-fit edge 50 provided at the other of the bar holder rail 10 and the top rail structure 7.

[0037] At least some of the first rail fastening means 18 can be external fastening means (not illustrated in the figures).

[0038] It is also possible that the elongated insulating body 4 of the building element 1 comprising a first insulating body part 22 that can adjoin the top rail structure 7 and a second insulating body part 23 that can adjoin the top rail structure 7, wherein the bar holder rail 10 is, or if the building element comprises several bar holder rails 10, one bar holder rail 10 is arranged between the first insulating body part 22 and the second insulating body part 23 so that the bar holder rail 10 being spaced apart from top rail structure 7 and from the bottom rail structure 8 as in the third embodiment of the building element 1 illustrated in figures 6 and 7.

[0039] The bar holder rail 10, or if the building element comprises several bar holder rails 10, one bar holder rail 10 can, as in the first embodiment of the building element 1 illustrated in figures 1 to 3, as in the third embodiment of the building element 1 illustrated in figures 6 and 7, as in the fourth embodiment of the building element 1 illustrated in figures 8 and 9, and as for example in the fifth embodiment of the building element 1 illustrated in figures 29 to 32, be attached to the bottom rail structure 8 by means of second rail fastening means 19 so that between

the bar holder rail 10 and bottom rail structure 8 a bottom insulation space 24 is formed that is partly limited by the bar holder rail 10 and that is partly limited by the bottom rail structure 8, wherein a bottom insulation 25 is provided in the bottom insulation space 24. In the first embodiment of the building element 1 illustrated in figures 1 to 3, in the third embodiment of the building element 1 illustrated in figures 6 and 7, in the fourth embodiment of the building element 1 illustrated in figures 8 and 9, and in the fifth embodiment of the building element 1 illustrated in figures 29 to 32, the bar holder rail 10 that is attached to the bottom rail structure 8 is between the bottom insulation 25 provided in the bottom insulation space 24 and the elongated insulating body 4. In the first embodiment of the building element 1 illustrated in figures 1 to 3, in the third embodiment of the building element 1 illustrated in figures 6 and 7, in the fourth embodiment of the building element 1 illustrated in figures 8 and 9, and in the fifth embodiment of the building element 1 illustrated in figures 29 to 32, the bar holder rail 10 that is attached to the bottom rail structure 8 is in direct contact with the bottom insulation 25 provided in the bottom insulation space 24 and the elongated insulating body 4.

[0040] The bottom insulation 25 can at least partly be made of expanded or extruded polystyrene, foamglass, silicate, mineral foam or mineral wool.

[0041] At least some of the second rail fastening means 19 can be integrated co-operating fastening means provided at the bar holder rail 10 and at the bottom rail structure 8. The second rail fastening means 19 can for example comprise a male snap-fit edge 49 provided at one of the bar holder rail 10 and the bottom rail structure 8 and a co-operating female snap-fit edge 50 provided at the other of the bar holder rail 10 and the bottom rail structure 8.

[0042] At least some of the second rail fastening means 19 can be external fastening means (not illustrated in the figures).

[0043] At least some of the bars 9 can be tension bars, which extend transversely through the building element 1 and which are configured to transfer tension forces between the building part 2 and the projecting exterior part 3.

[0044] At least some of the bars 9 can be shear bars, which extend diagonally through the elongated insulating body 4 of the building element 1 and which are configured to transfer shear forces between the building part 2 and the projecting exterior part 3.

[0045] The bar holder rail 10 can provided with compression distribution elements 26 configured to transfer compression forces between the building part 2 and the projecting exterior part 3.

[0046] If the bar holder rail 10 comprises bar holder rail sections 16 forming the bar holder rail 10 and if the bar holder rail 10 comprises compression distribution elements 26, each bar holder rail section can comprise 2 to 6, preferably 3 to 5, such as 4 compression distribution elements 26.

[0047] The compression distribution elements 26 can comprise lost molds 27 and compression-resistant material 28 such as concrete, for example fiber reinforced ultra-high performance concrete or mortar, cast in the lost molds 27. The lost molds 27 are preferably, but not necessarily, made of polymer. The lost molds 27 can consist of polymer so that the compression distribution elements 26 consist of compression-resistant material 28, such as concrete, for example fiber reinforced ultra-high performance concrete or mortar, cast in the lost molds 27, and the polymer of the lost molds 27.

[0048] The compression distribution elements 26 can alternatively be made of steel.

[0049] At least some of the lost molds 27 can be integrally formed with the bar holder rail 10. At least some of the lost molds 27 can be fastened to the bar holder rail 10.

[0050] Spaces 29 can be provided between adjacent compression distribution elements 26 in the bar holder rail 10 and insulating blocks 30 can be provided in the spaces 29. The insulating blocks 30 can at least partly be made of expanded or extruded polystyrene, foamglass, silicate, mineral foam or mineral wool.

[0051] The bar holder rail 10 can comprise two parallel first flanges 39.

[0052] At least one of the parallel first flanges 39 can be provided with first slits 40 to allow passage of bars 9 through the first flanges 39.

[0053] The two parallel first flanges 39 can be connected by a second web structure 41. The two parallel first flanges 39 and the second web structure 41 can form a H-shaped form for the bar holder rail 10 so that the bar holder rail 10 has a second open channel 57 formed by two parallel first flanges 39 and the second web structure 41 and so that the elongated insulating body 4 is partly received in the second open channel 57.

[0054] If the bar holder rail 10 is provided with integrated compression distribution elements 26 comprising lost molds 27, the lost molds 27 extends preferably, but not necessarily, in parallel between the two parallel first flanges 39 and beyond the two parallel first flanges 39 as illustrated in figures 13 to 17.

[0055] The lost molds 27 comprises preferably, but not necessarily, a surrounding lateral wall 42 and a bottom 43.

[0056] The height of the surrounding lateral wall 43 of the lost molds 27 can be the same as the height of the two parallel first flanges 39.

[0057] In case the bar holder rail 10 comprises two parallel first flanges 39 provided with first slits 40, the bar holder rail 10 can, as illustrated in figures 11 and 12, comprise plate means 44 provided with second slits 45 and the bar holder rail 10 and the plate means 44 can comprise co-operating fastening means 46 for fastening the second plates 44 to the bar holder rail 10 so that bars 9 can be fixed to the bar holder rail 10 by means of the first slits 40 provided in the parallel first flanges 39 and the second slits 45 in the plate means 44.

[0058] The top rail structure 7 can at least partly be made of polymer. The top rail structure 7 is more preferably made of polymer.

[0059] The bottom rail structure 8 can at least partly be made of polymer. The bottom rail structure 8 is more preferably made of polymer.

[0060] The bar holder rail 10 can at least partly be made of polymer. The bar holder rail 10 is more preferably made of polymer.

[0061] The elongated insulating body 4 can at least partly be made of expanded or extruded polystyrene, foamglass, silicate, mineral foam or mineral wool.

[0062] At least one end of at least one bar 9 can be provided with a head 56, as illustrated in figure 17 so as to enhance anchoring of said at least one bar 9 in the building part 2 or in the projecting exterior part 3.

[0063] The length of top rail structure 7 is preferably, but not necessarily, the same as the length of bottom rail structure 8.

[0064] The length of the bottom rail structure 8 and of the length of the top rail structure 7 is preferably, but not necessarily, the same as the length of elongated insulating body 4.

[0065] The building element 1 can in addition to the bar holder rail 10, as in the fourth embodiment of the building element illustrated in figures 8 and 9, or in addition to bar holder rails 10, if the building element 1 is provided with several bar holder rails 10, comprise a compression distribution element holding rail 35 at which compression distribution elements 26 are provided, wherein the compression distribution elements 26 are configured to transfer compression forces between the building part 2 and the projecting exterior part 3.

[0066] The building element 1 has preferably, but not necessarily, an elongated form with opposite ends. The compression distribution element holding rail 35 extends preferably, but not necessarily, from one opposite end to the other opposite end of the building element 1.

[0067] The building element 1 can comprise several compression distribution element holding rails 35.

[0068] The compression distribution element holding rail(s) 35 allows for easy providing of the building element 1 with compression distribution elements 26 configured to transfer compression forces between the building part 2 and the projecting exterior part 3.

[0069] The compression distribution elements 9 can comprise lost molds 27 and compression-resistant material 28 such as concrete, for example fiber reinforced ultra-high performance concrete or mortar, cast in the lost molds 27.

[0070] The compression distribution element holding rail 35 can be in the form of a separate part which is formed unintegrally from the top rail structure 7 and the bottom rail structure 8 and the bar holder rail(s) 10.

[0071] The compression distribution element holding rail 35 can be in the form of a separate part which is formed non-integrally with the top rail structure 7 and with the bottom rail structure 8 and with the bar holder rail(s)

10.

[0072] The compression distribution element holding rail 35 is preferably, but not necessarily, as in the embodiments illustrated in the figures, formed as a part separate from the top rail structure 7 and separate from the bottom rail structure 8.

[0073] The compression distribution element holding rail 35 can, as illustrated in figures 26 and 27, comprise compression distribution element holding rail sections 36, which together form the compression distribution element holding rail 35. Each compression distribution element holding rail section 36 can comprise 2 to 6, preferably 3 to 5, such as 4 compression distribution elements 26. Forming the compression distribution element holding rail 35 of compression distribution element holding rail sections 36 makes it easier to make building elements 1 of different lengths by using in the building element a number of compression distribution element holding rail sections 36 having a standardized length to provide a compression distribution element holding rail 35 having a desired length.

[0074] Adjacent compression distribution element holding rail sections 36 can be connected end to end with second connection means 37 to each other to form the compression distribution element holding rail 35.

[0075] At least some of the second connection means 37 can be integrally formed with the compression distribution element holding rail sections 36. The second connection means 37 can for example comprise a male snap-fit edge 49 provided at one compression distribution element holding rail section 36 and a co-operating female snap-fit edge 50 provided at another compression distribution element holding rail section 36.

[0076] At least some of the second connection means 37 can be external fastening means (not illustrated in the figures).

[0077] The length of the top rail structure 7 and the length of the bottom rail structure 8 to length of the compression distribution element holding rail sections 36 is preferably, but not necessarily, one of 1 to 2, 1 to 3, 1 to 4, 1 to 5, and 1 to 6.

[0078] If the bar holder rail 10 of the building elements 1 comprise bar rail holder sections 16 and if the compression distribution element holding rail 35 comprise compression distribution element holding rail sections 36, the length of the bar rail holder sections 16 is preferably, but not necessarily, essentially the same as the length of the comprise compression distribution element holding rail sections 36. This makes it easier to make building elements 1 of different lengths, because the number of bar rail holder sections 16 will be the number compression distribution element holding rail sections 36 in the building element 1.

[0079] If the compression distribution elements 9 comprises lost molds 27, at least some of the lost molds 27 can be integrally formed with the compression distribution element holding rail 35.

[0080] If the compression distribution elements 9 com-

prises lost molds 27, at least some of the lost molds 27 can be fastened to the compression distribution element holding rail 35.

[0081] The compression distribution element holding rail 35 can at least partly be made of polymer. The compression distribution element holding rail 35 is more preferably made of polymer.

[0082] The compression distribution element holding rail 35 can comprise spaces 29 between adjacent compression distribution elements 9 in the compression distribution element holding rail 35, and insulating blocks 30 can be provided in the spaces 29. The insulating blocks 30 can at least partly be made of expanded or extruded polystyrene, foamglass, silcate, mineral foam or mineral wool.

[0083] The compression distribution element holding rail 35 can, as in the second embodiment of the building element 1 illustrated in figures 4 and 5, or if the building element comprises several compression distribution element holding rails 35, one compression distribution element holding rail 35 can be attached to the bottom rail structure 8 by means of second rail fastening means 19 so that between the compression distribution element holding rail 35 and the bottom rail structure 8 a bottom insulation space 24 is formed that is partly limited by the compression distribution element holding rail 35 and that is partly limited by the bottom rail structure 8, wherein, wherein a bottom insulation 25 is provided in the bottom insulation space 24. In the second embodiment of the building element 1 illustrated in figures 4 and 5, the compression distribution element holding rail 35 that is attached to the bottom rail structure 8 is between the bottom insulation 25 provided in the bottom insulation space 24 and the elongated insulating body 4. In the second embodiment of the building element 1 illustrated in figures 4 and 5, the compression distribution element holding rail 35 that is attached to the bottom rail structure 8 is in direct contact with the bottom insulation 25 provided in the bottom insulation space 24 and the elongated insulating body 4.

[0084] The bottom insulation 25 can at least partly be made of expanded or extruded polystyrene, foamglass, silcate, mineral foam or mineral wool.

[0085] At least some of the second rail fastening means 19 can be integrated co-operating fastening means provided at the bar holder rail 10 and at the top rail structure 7.

[0086] The second rail fastening means 19 can for example comprise a male snap-fit edge 49 provided at one of the compression distribution element holding rail 35 and the bottom rail structure 8 and a co-operating female snap-fit edge 50 provided at the other of the compression distribution element holding rail 35 and the bottom rail structure 8.

[0087] At least some of the second rail fastening means 19 can be external fastening means (not illustrated in the figures).

[0088] The elongated insulating body 4 of the building

element 1 can comprise a first insulating body part 22 that can adjoin the top rail structure 7 and a second insulating body part 23 that can adjoin the top rail structure 7, and the compression distribution element holding rail 35 can, or if the building element comprises several compression distribution element holding rails 35, one compression distribution element holding rail 35 can be arranged between the first insulating body part 22 and the second insulating body part 23 so that the compression distribution element holding rail 35 is spaced apart from top rail structure 7 and from the bottom rail structure 8, as in the fourth embodiment illustrated in figures 8 and 9.

[0089] The bar compression distribution element holding rail 35 can comprise two parallel second flanges 47.

[0090] The two parallel second flanges 47 can be connected by a second web (not illustrated in the figures).

[0091] If the compression distribution element holding rail 35 is provided with integrated compression distribution elements 26 comprising lost molds 27, the lost molds 27 extends preferably, but not necessarily, in parallel between the two parallel second flanges 47 and beyond the two parallel second flanges 47.

[0092] The lost molds 27 comprises preferably, but not necessarily, a surrounding lateral wall 42 and a bottom 43.

[0093] The height of the surrounding lateral wall 42 of the lost molds 27 can be the same as the height of the two parallel second flanges 47.

[0094] It is also possible that the height of the surrounding lateral wall 42 of the lost molds 27 is more than twice the height of the two parallel second flanges 47 as illustrated in figures 26 and 27. This allows to cast and to make the compression distribution elements 26 higher and to make the compression distribution elements 26 capable of transferring shear force between the building part 2 and the projecting exterior part 3. This can make the provision of bars 9 in the form of shear bars extending through the elongated insulating body 4 unnecessarily, if the building element 1 shall be capable of transferring shear force between the building part 2 and the projecting exterior part 3.

[0095] Tension bands 31 can, as in the first embodiment illustrated in figures 1 to 3, be provided and configured to force the top rail structure 7 and the bottom rail structure 8 towards each other so that the elongated insulating body 4 and the bar holder rail(s) 10 and the possible compression distribution element holding rail(s) 35 are pressed between the top rail structure 7, the bottom rail structure 8 and the tension bands 31.

[0096] The tension bands 31 unifies the top rail structure 7, the bottom rail structure 8 and the elongated insulation body 4 and the bar holder rail(s) 10 and the possible compression distribution element holding rail(s) 35 together so that the top rail structure 7, the bottom rail structure 8 and the elongated insulation body 4 and the bar holder rail(s) 10 and the possible compression distribution element holding rail(s) 35 are connected with each other and acting as one system.

[0097] The tension bands 31 are preferably, but not necessarily, inflexible. The tension bands 31 can for example be tension straps provided with apertures, zip ties, cable ties, or the like which are preferably, but not necessarily, are made of polymer. The length of the tension bands 31 are preferably, but not necessarily, adjustable and/or selectable so that the elongated insulating body 4 can be properly pressed between the top rail structure 7 and the bottom rail structure 8 and the tension bands 31.

[0098] The tension bands 31 can circumvent the top rail structure 7, the bottom rail structure 8 and the elongated insulation body 4 or be arranged between the top rail structure 7 and the bottom rail structure 8.

[0099] It is possible that tension bands 31 are connected between the top rail structure 7 and the bottom rail structure 8 at the first side 5 of the elongated insulation body 4 and that tension bands 31 are connected between the top rail structure 7 and the bottom rail structure 8 at the second side 6 of the elongated insulation body 4. In such case, the top rail structure 7 can comprise first hooks 32, first loops or the like integrally provided with an outer surface of the top rail structure 7, and the tension bands 31 can be connected to the first hooks 32, first loops or the like. In such case, the bottom rail structure 8 can comprise second hooks 33, second loops or the like integrally provided with an outer surface of the bottom rail structure 8 and the tension bands 31 can be connected to the second hooks 33, second loops or the like.

[0100] It is also possible that tension bands 31 are at the first side 5 of the elongated insulation body 4 connected between a bar holder rail 10 or a compression distribution element holding rail 35 attached to the top rail structure 7 and a bar holder rail 10 or a compression distribution element holding rail 35 attached to the bottom rail structure 8 and that tension bands 31 are the second side 6 of the elongated insulation body 4 connected between a bar holder rail 10 or a compression distribution element holding rail 35 attached to the top rail structure 7 and or a bar holder rail 10 or a compression distribution element holding rail 35 attached to the bottom rail structure 8 at .In such case the bar holder rail 10 or the compression distribution element holding rail 35 attached to the top rail structure 7 can comprise first hooks 32, first loops or the like integrally provided at the bar holder rail 10 or at the compression distribution element holding rail 35 attached to the top rail structure 7, and the tension bands 31 can be connected to the first hooks 32, first loops or the like. In such case the bar holder rail 10 or the compression distribution element holding rail 35 attached to the bottom rail structure 8 can comprise second hooks 33, second loops or the like integrally provided at the bar holder rail 10 or at the compression distribution element holding rail 35 attached to the bottom rail structure 8, and the tension bands 31 can be connected to the second hooks 33, second loops or the like.

[0101] The elongated insulating body 4 can comprise several separate insulating parts 54 assembled together

to form said elongated insulating body 4.

[0102] If the building element 1 comprises bars 9 which are shear bars, the shear bars can extend diagonally through the elongated insulating body 4 between adjacent separate insulating parts 54.

[0103] At least two of said several separate insulating parts 54 are preferably, but not necessarily, assembled together without using adhesive or the like. This makes it easier to manufacture the building element 1.

[0104] Two elongated separate insulating parts 54 of said several separate insulating parts 54 can be separated by an inclined plane 55.

[0105] The elongated insulating body 4 can also be in a single piece form as in the fifth embodiment of the building element illustrated in figures 29 to 32. If the building element 1 comprises bars 9 which are shear bars, the shear bars can extend diagonally through cuts 58 in the elongated insulating body 4 as in the fifth embodiment of the building element illustrated in figures 29 to 32.

[0106] It is apparent to a person skilled in the art that as technology advanced, the basic idea of the invention can be implemented in various ways. The invention and its embodiments are therefore not restricted to the above examples, but they may vary within the scope of the claims.

Claims

1. A building element (1) for providing thermal insulation between a building part (2) and a projecting exterior part (3) such as a balcony slab, wherein the building element (1) comprising
 - an elongated insulating body (4) having a first side (5) intended to abut the building part (2) and a second side (6) intended to abut the projecting exterior part (3),
 - a top rail structure (7),
 - a bottom rail structure (8), and
 - bars (9), which extend through the building element (1) and which are configured to transfer forces between the building part (2) and the projecting exterior part (3),
 - characterized**
 - by** the bars (9) being connected to a bar holder rail (10) that extends in the direction of the top rail structure (7) and the bottom rail structure (8).
2. The building element (1) according to claim 1, **characterized**
 - by** the bar holder rail (10) is formed as a part separate from the top rail structure (7) and separate from the bottom rail structure (8).
3. The building element (1) according to claim 1 or 2, **characterized**
 - by** at least some of the bars (9) being connected to a

bar holder rail (10) by means of external clips (11).

4. The building element (1) according to any of the claims 1 to 3, **characterized**
by at least some of the bars (9) being connected to a bar holder rail (10) by means of bar fastening means (38) integrally formed with the bar holder rail (10). 5
5. The building element (1) according to any of the claims 1 to 4, **characterized by** the bar holder rail (10) comprising bar rail holder sections (16). 10
6. The building element (1) according to claim 5, **characterized**
by adjacent bar rail holder sections (16) being connected end to end with first connection means (17) to each other to form the bar holder rail (10). 15
7. The building element (1) according to claim 5 or 6, **characterized**
by the length of the top rail structure (7) and the bottom rail structure (8) to length of the bar rail holder sections (16) being one of 1 to 2, 1 to 3, 1 to 4, 1 to 5, and 1 to 6. 20
8. The building element (1) according to any of the claims 1 to 7, **characterized**
by the bar holder rail (10) being attached to the top rail structure (7) by means of first rail fastening means (18) so that between the bar holder rail (10) and top rail structure (7) a top insulation space (20) is formed,
by the top insulation space (20) being partly limited by the bar holder rail (10) and partly limited by the top rail structure (7), and
by a top insulation (21) in the top insulation space (20). 25
9. The building element (1) according to any of the claims 1 to 8, **characterized**
by the elongated insulating body (4) of the building element (1) comprising a first insulating body part (22) and a second insulating body part (23), and
by the bar holder rail (10) being arranged between the first insulating body part (22) and the second insulating body part (23) so that the bar holder rail (10) being spaced apart from top rail structure (7) and from the bottom rail structure (8). 30
10. The building element (1) according to any of the claims 1 to 9, **characterized**
by the bar holder rail (10) being attached to the bottom rail structure (8) by means of second rail 35

fastening means (19) so that between the bar holder rail (10) and bottom rail structure (8) a bottom insulation space (24) is formed,
by the bottom insulation space (24) being partly limited by the bar holder rail (10) and partly limited by the bottom rail structure (8) and
by a bottom insulation (25) in the bottom insulation space (24).

11. The building element (1) according to any of the claims 1 to 10, **characterized**
by at least some of the bars (9) being tension bars, which extend transversely through the building element (1) and which are configured to transfer tension forces between the building part (2) and the projecting exterior part (3). 40
12. The building element (1) according to any of the claims 1 to 11, **characterized**
by at least some of the bars (9) being shear bars, which extend diagonally through the elongated insulating body (4) of the building element (1) and which are configured to transfer shear forces between the building part (2) and the projecting exterior part (3). 45
13. The building element (1) according to any of the claims 1 to 12, **characterized**
by the bar holder rail (10) being provided with compression distribution elements (26) configured to transfer compression forces between the building part (2) and the projecting exterior part (3). 50
14. The building element (1) according to claim 13, **characterized**
by spaces (29) between adjacent compression distribution elements (26) in the bar holder rail (10), and
by insulating blocks (30) provided in the spaces (29). 55
15. The building element (1) according to claim 1 or 14, **characterized**
by the building element (1) comprising in addition to the bar holder rail (10) a compression distribution element holding rail (35) at which compression distribution elements (26) configured to transfer compression forces between the building part (2) and the projecting exterior part (3) are provided, 60
16. The building element (1) according to any of the claims 1 to 15, **characterized**
by tension bands (31) configured to force the top rail structure (7) and the bottom rail structure (8) towards each other so that the elongated insulating body (4) is pressed between the top rail structure (7) and the bottom rail structure (8) and the tension bands (31). 65

17. The building element (1) according to any of the claims 1 to 16, **characterized**

by the elongated insulating body (4) being made of solid thermal insulation material, and
by the solid thermal insulation material the elongated insulating body (4) being made of forming the outer surface of the elongated insulating body (4).

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18. The building element (1) according to claim 17, **characterized**

by the first side (5) of the elongated insulating body (4) and the second side (5) of the elongated insulating body (4) being parts of the outer surface of the elongated insulating body (4)

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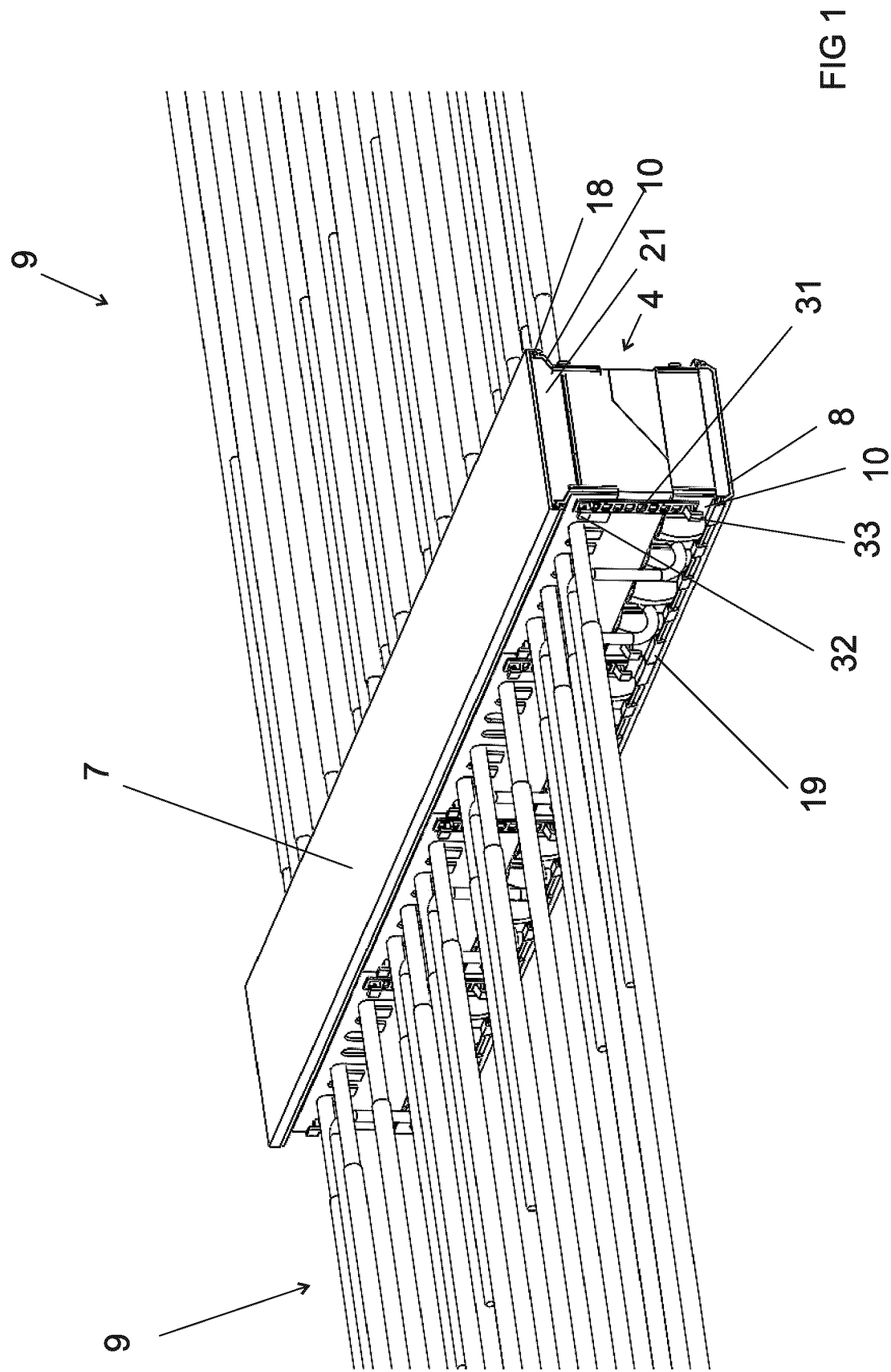
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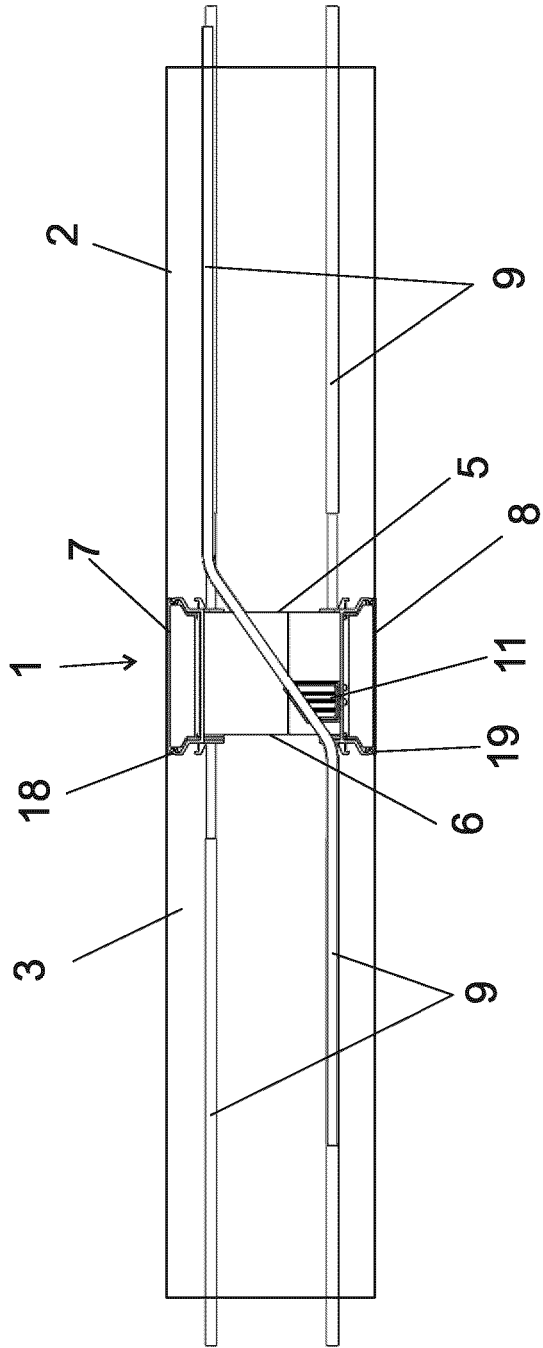


FIG 2

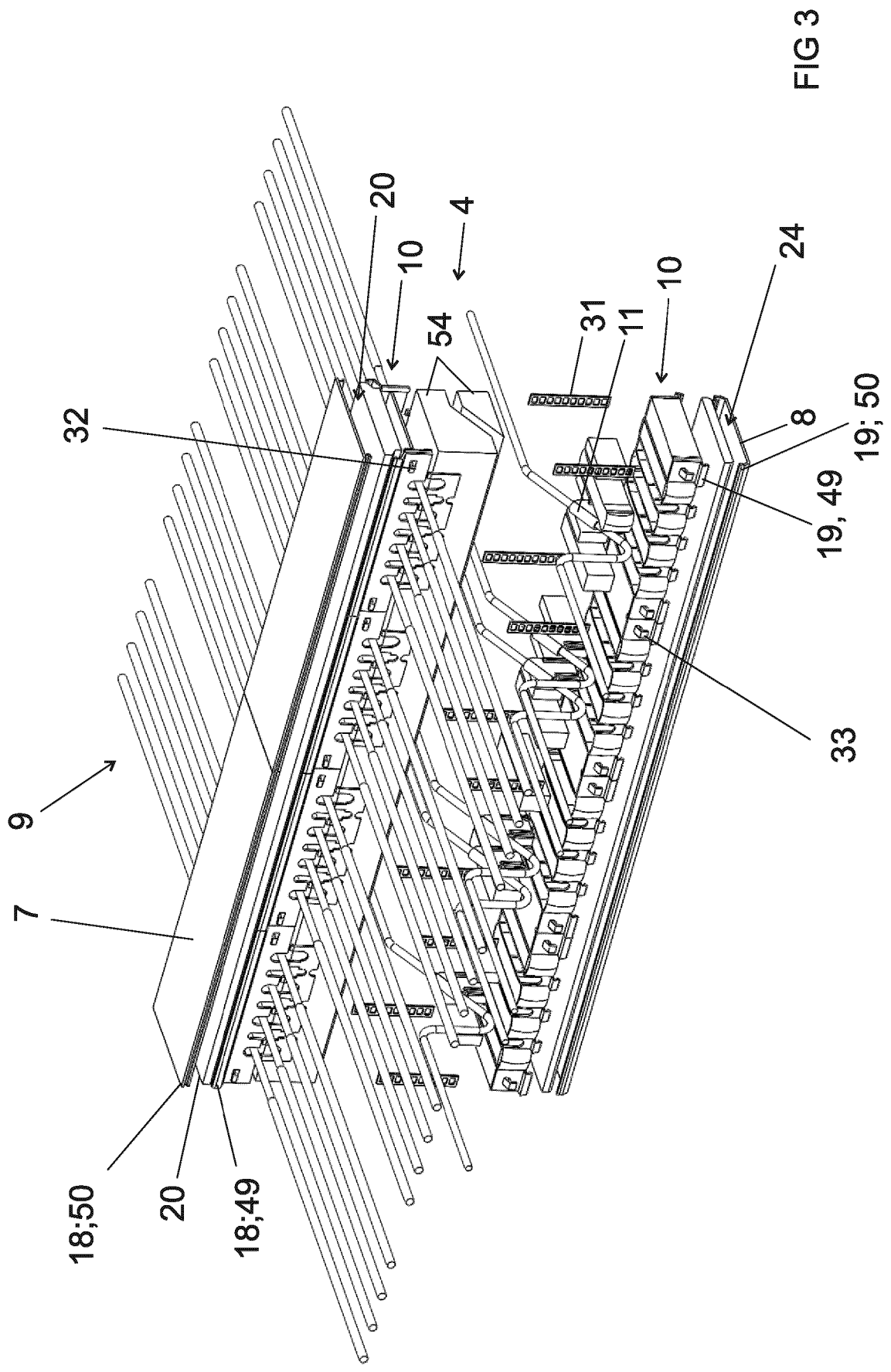


FIG 3

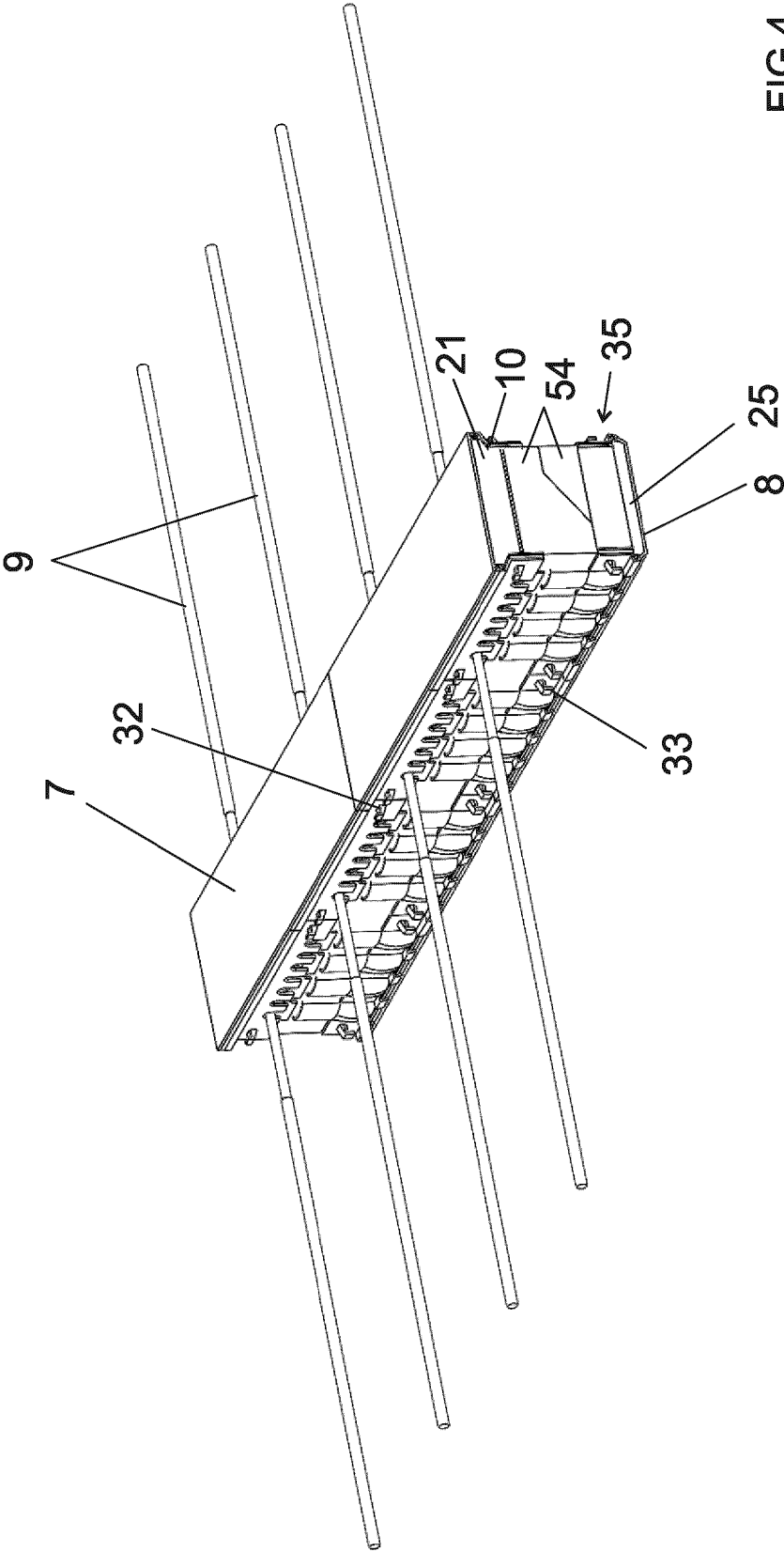


FIG 4

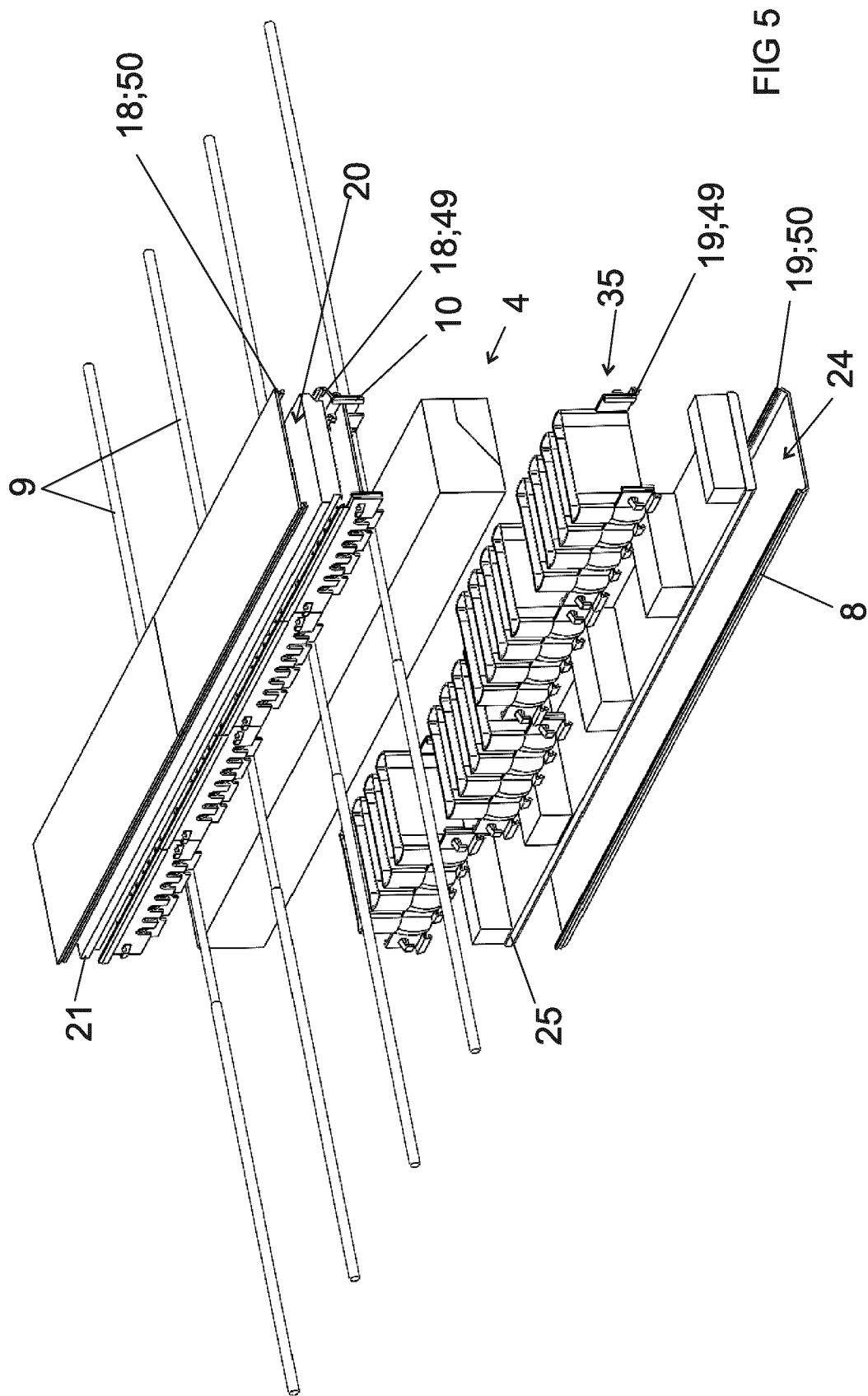


FIG 5

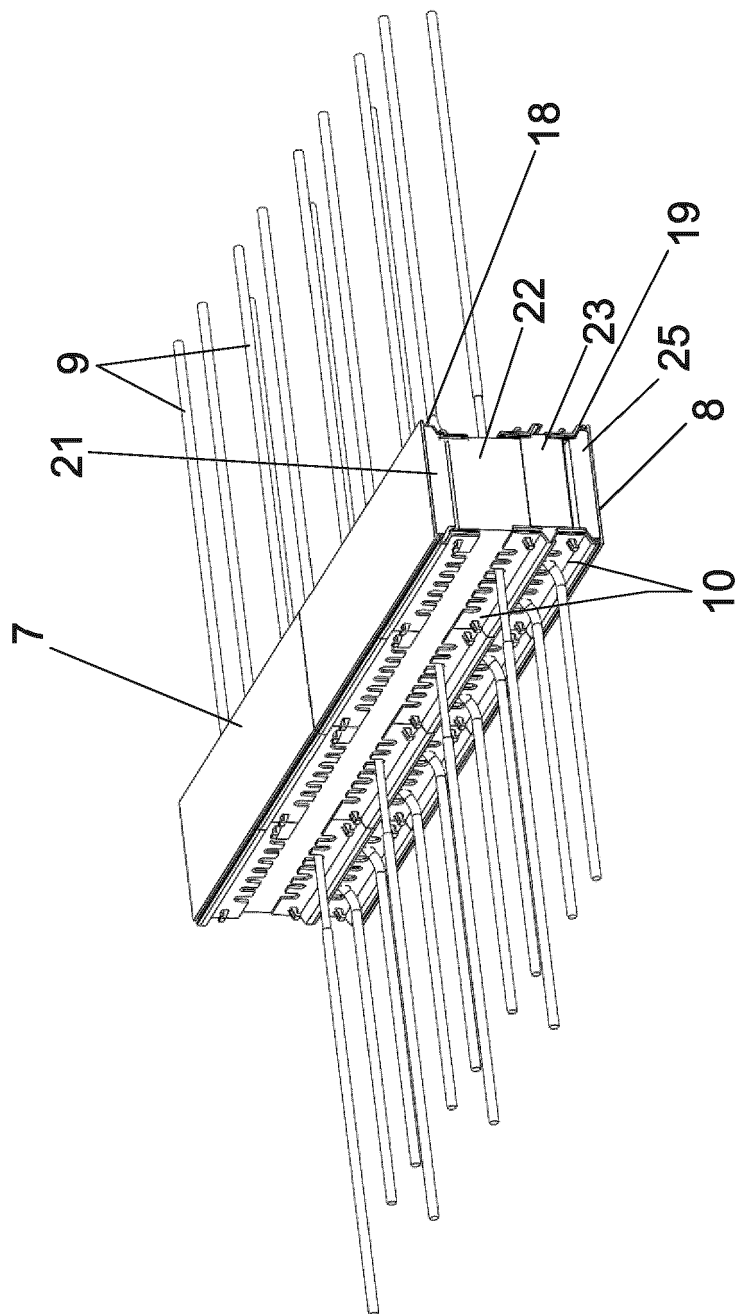
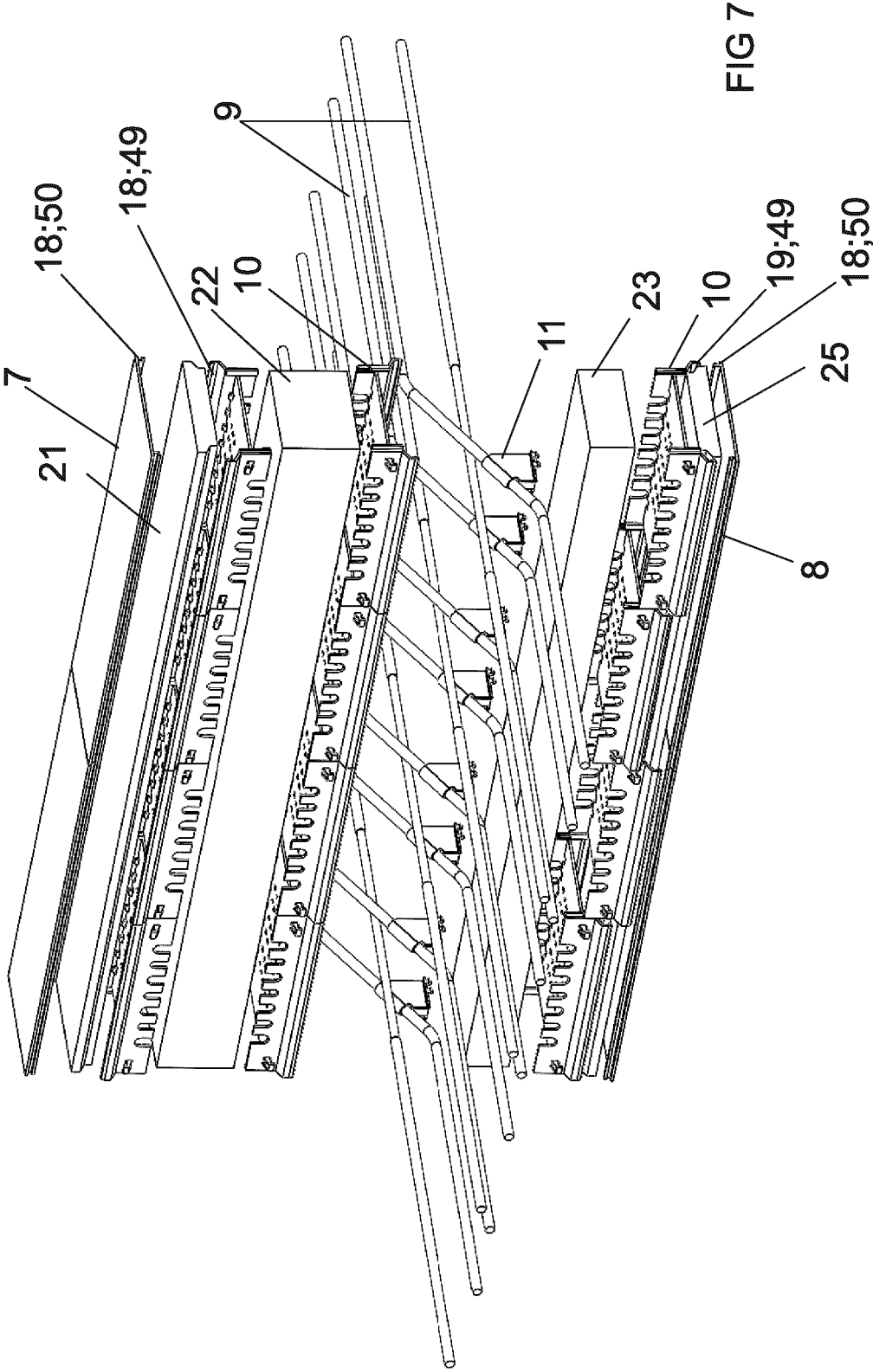
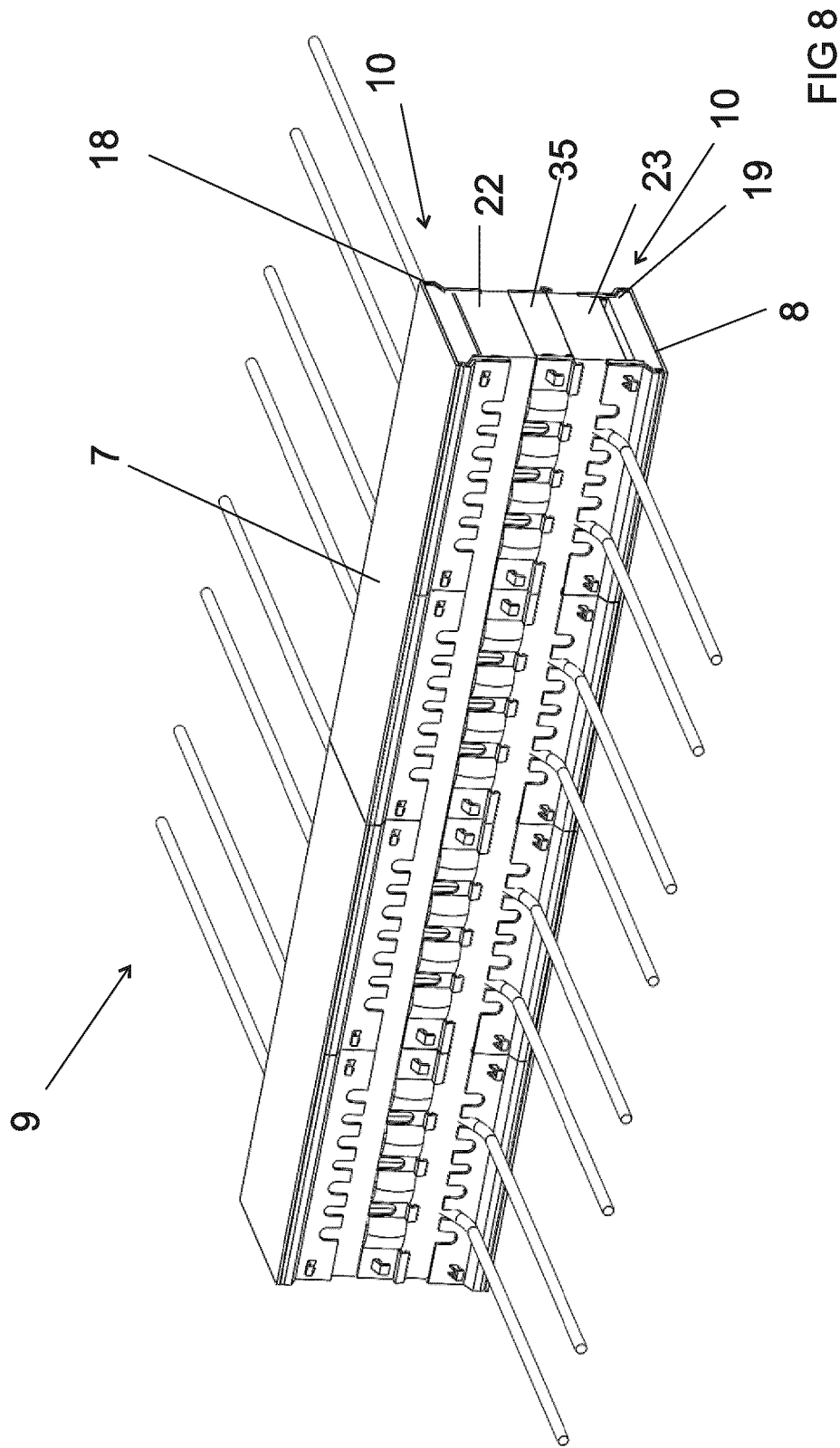
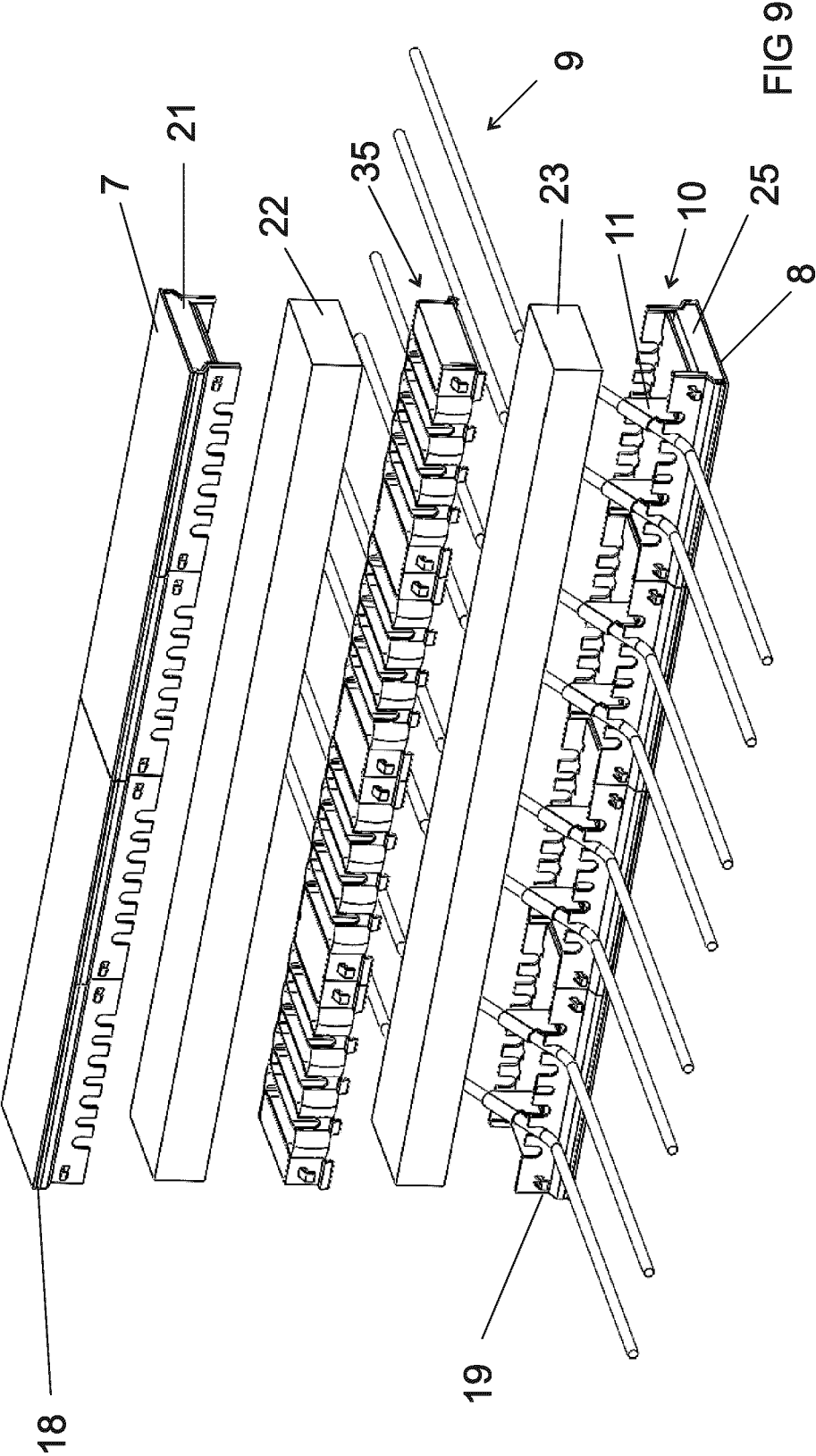


FIG 6







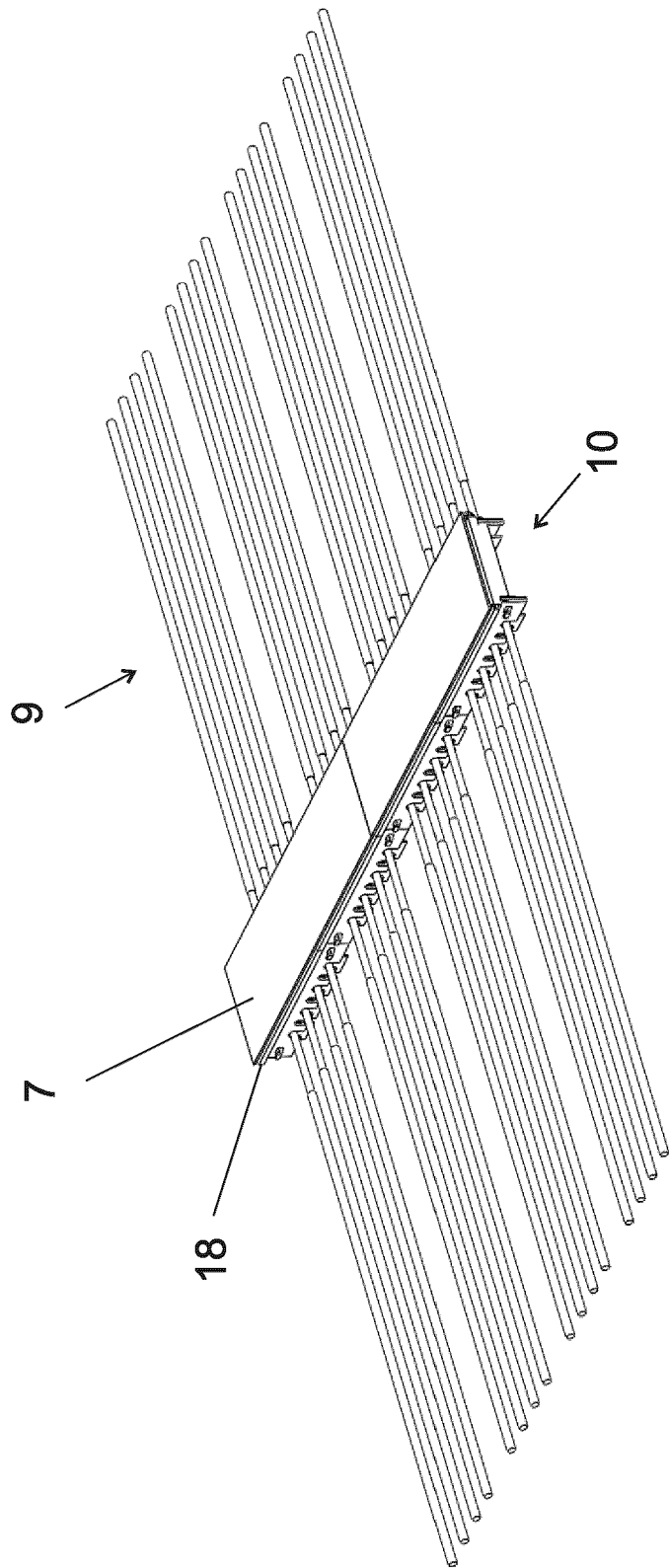


FIG 10

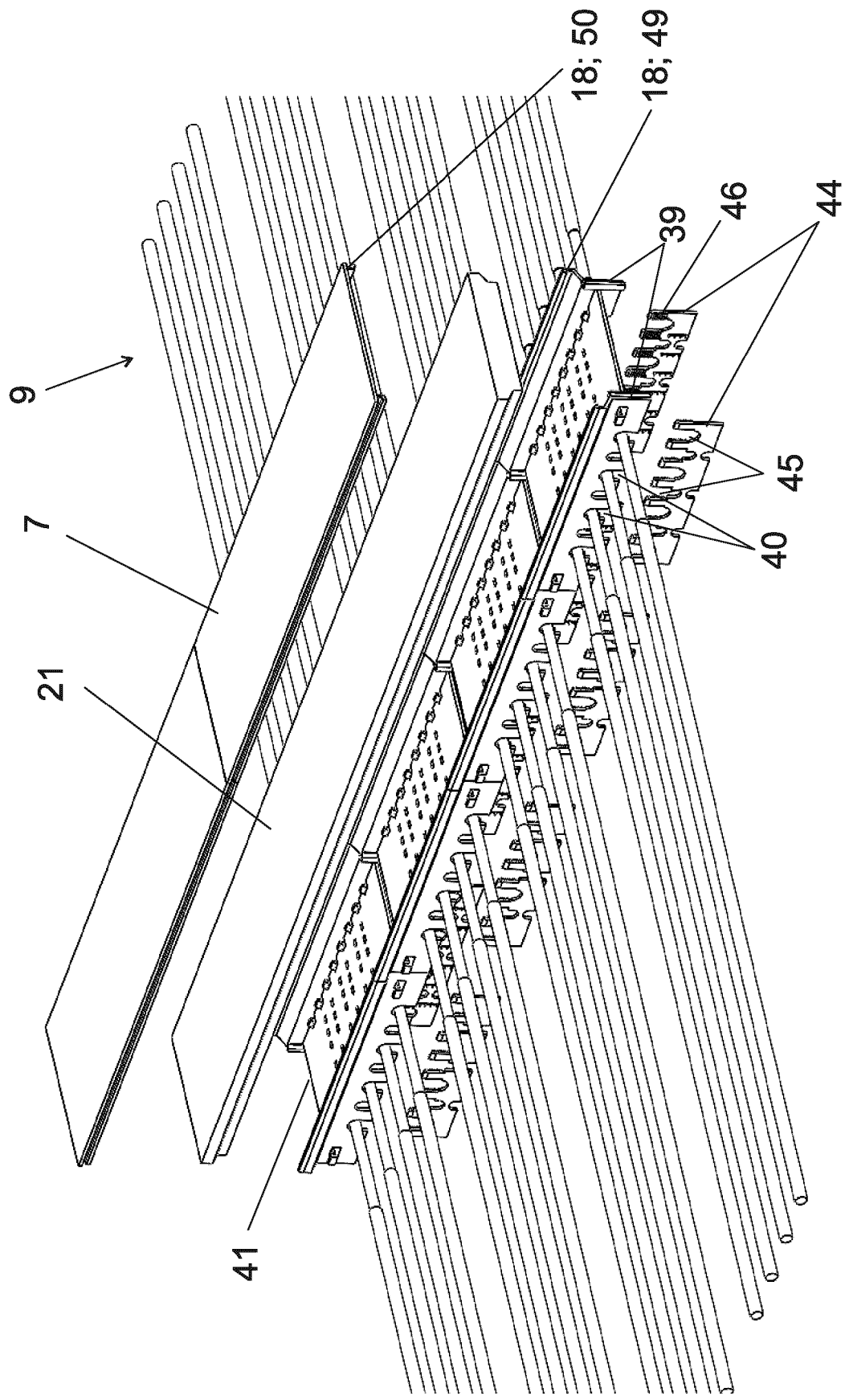


FIG 11

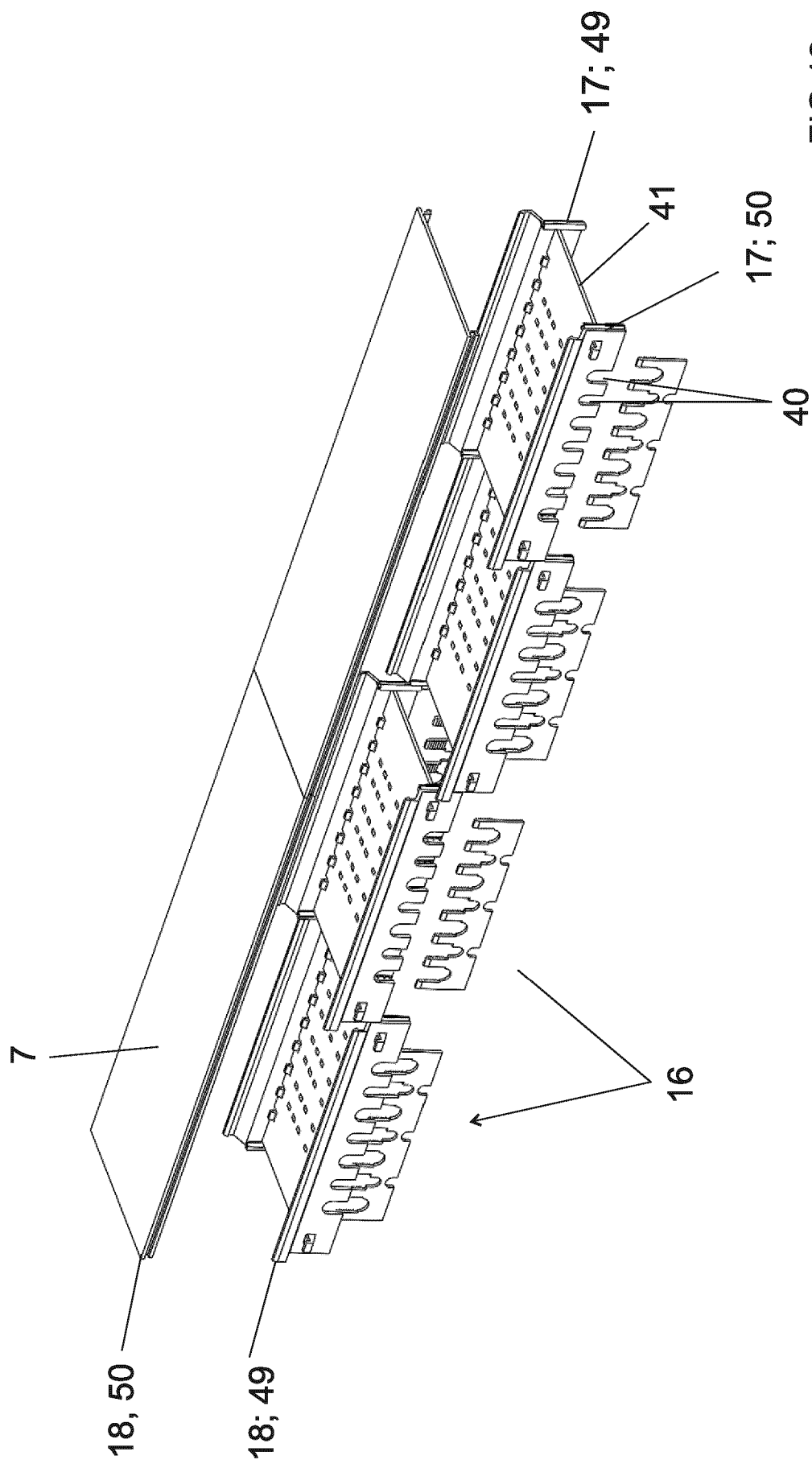


FIG 12

FIG 13

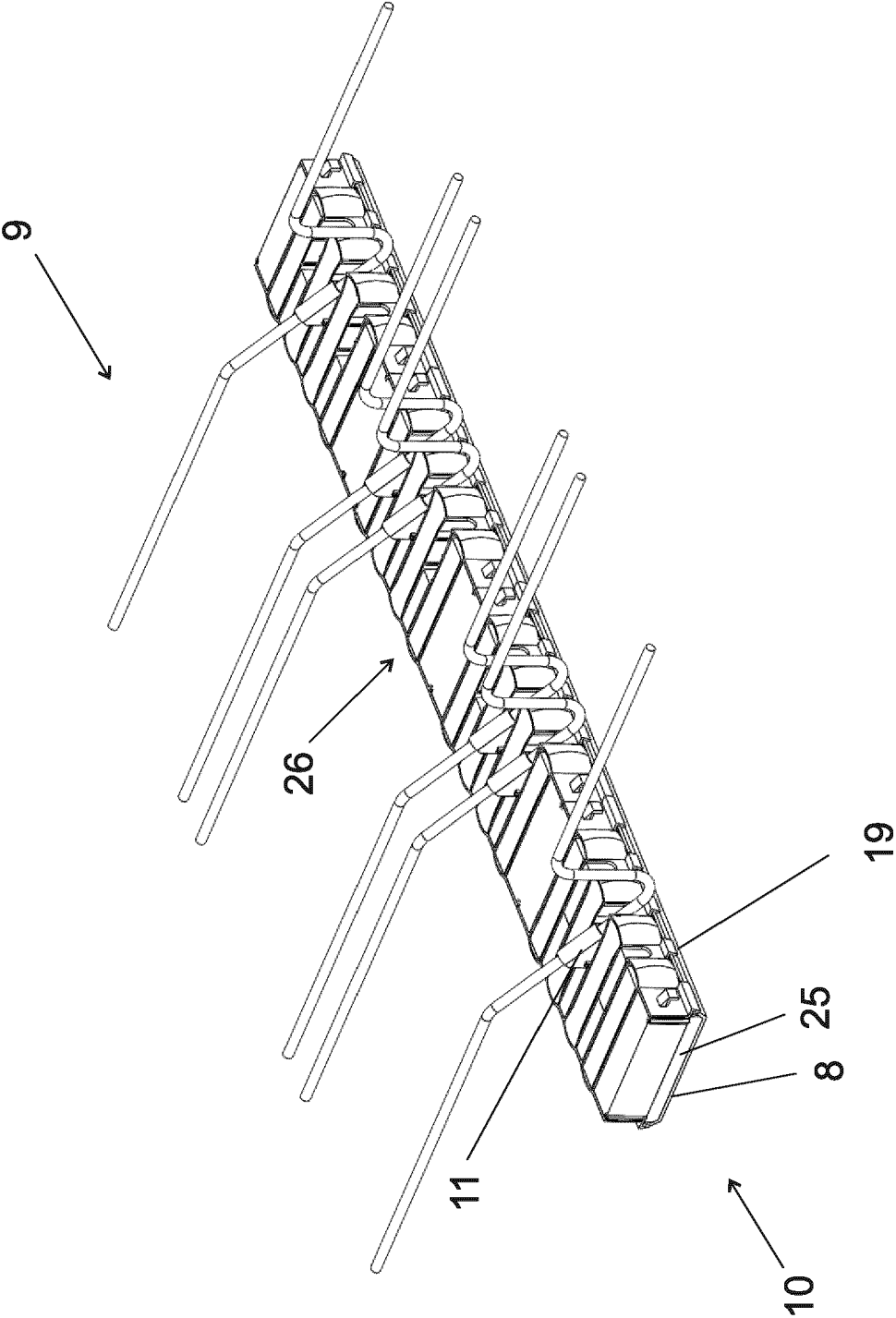
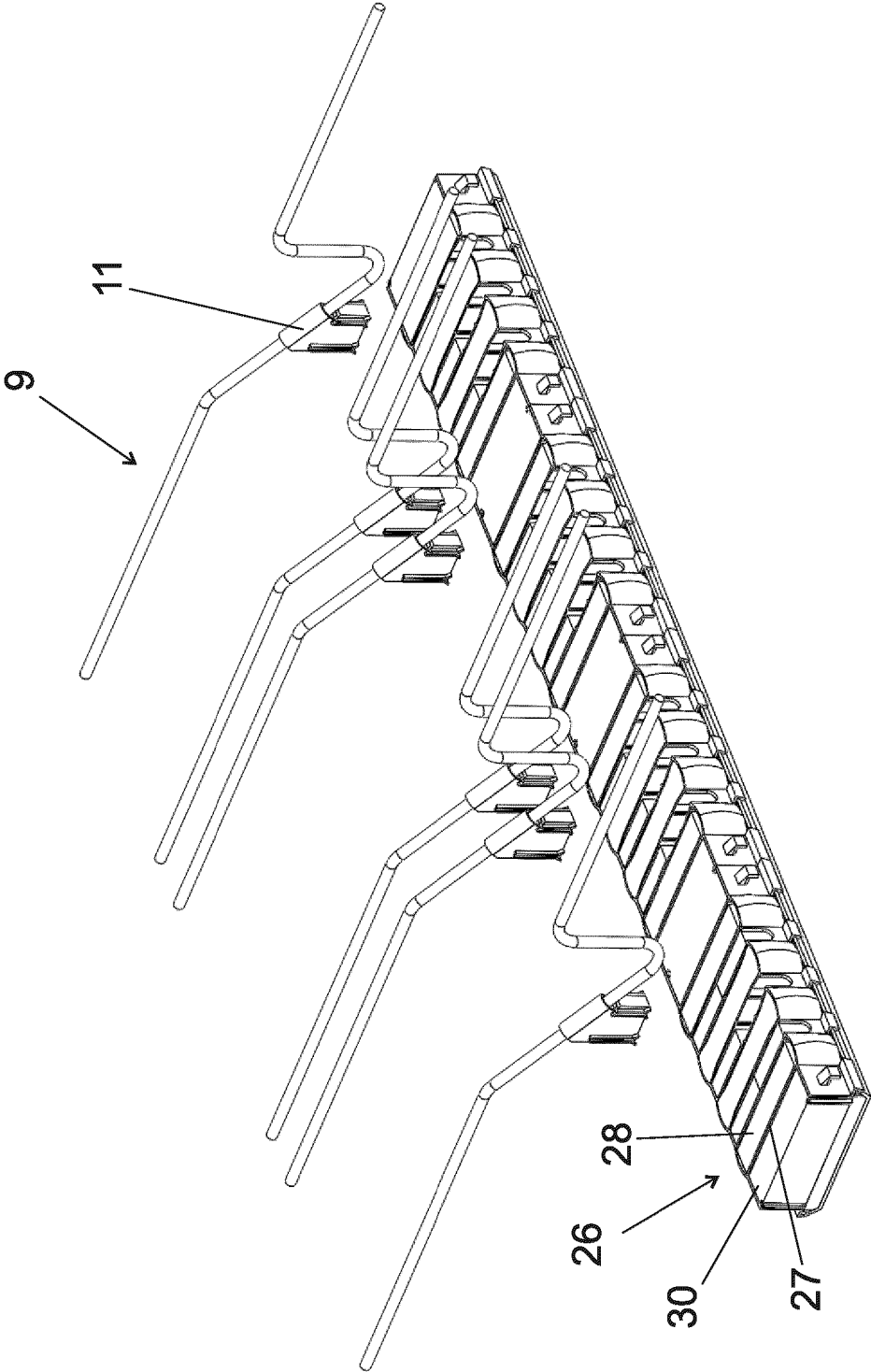


FIG 14



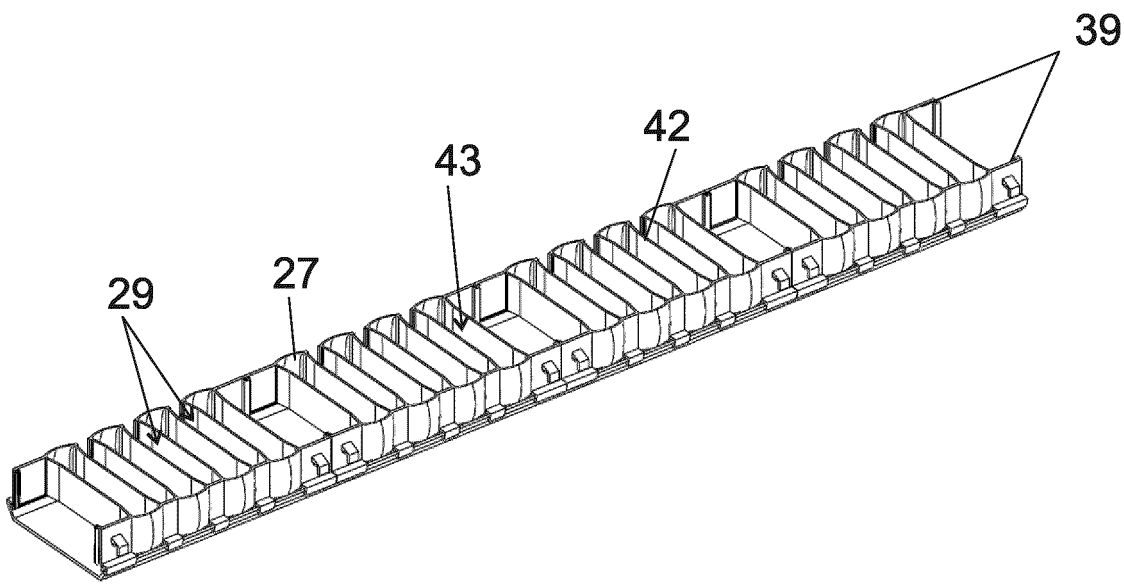


FIG 15

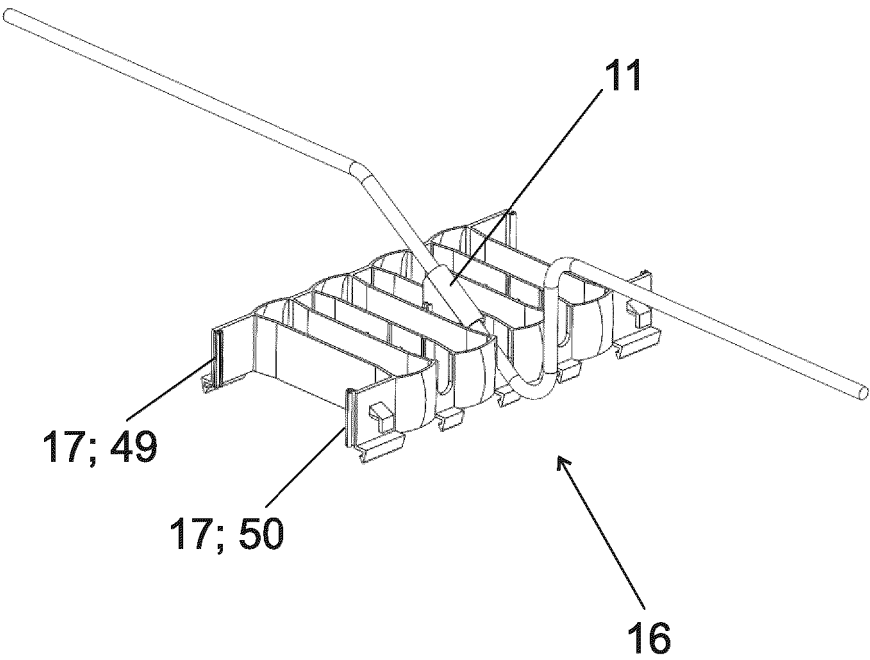


FIG 16

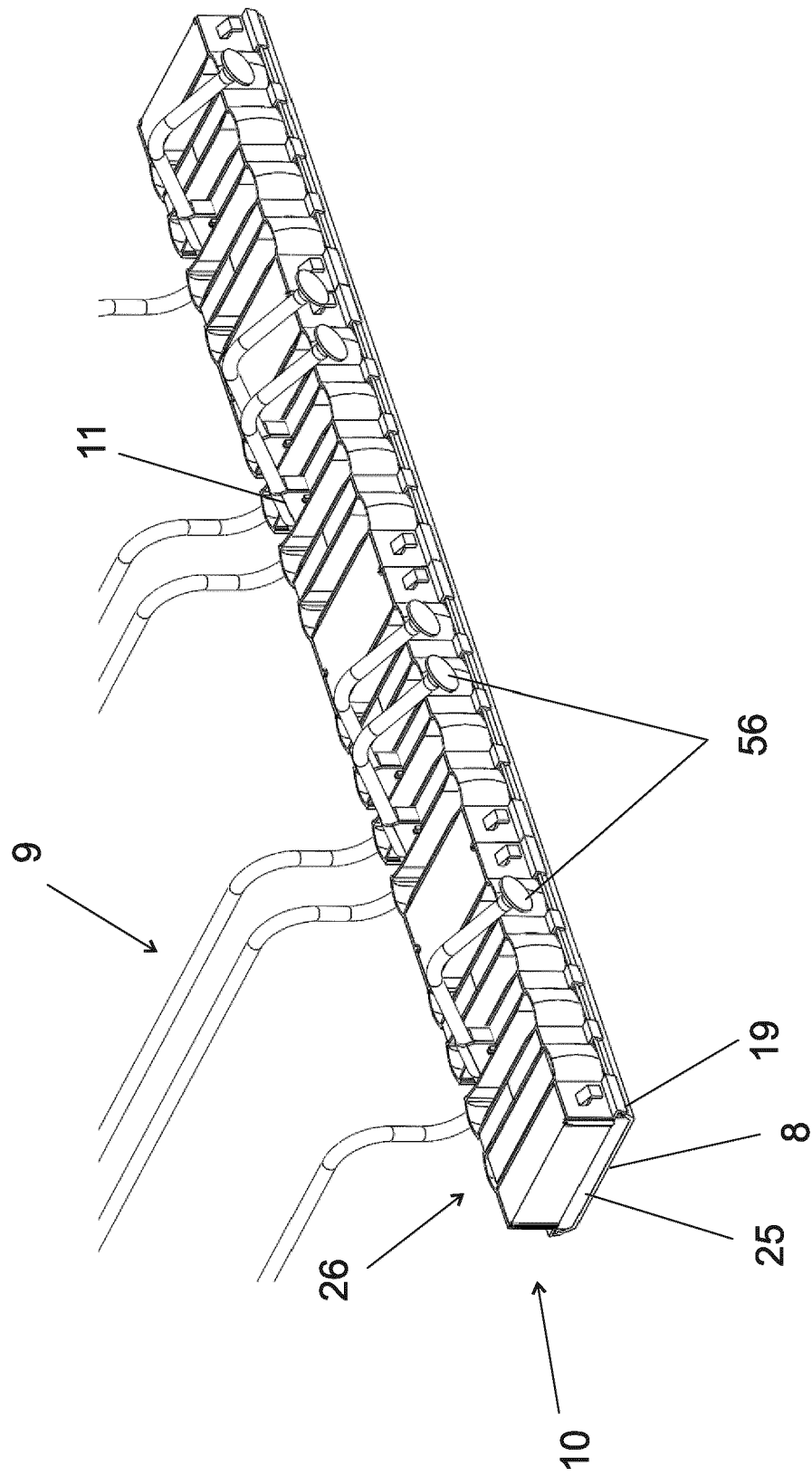


FIG 17

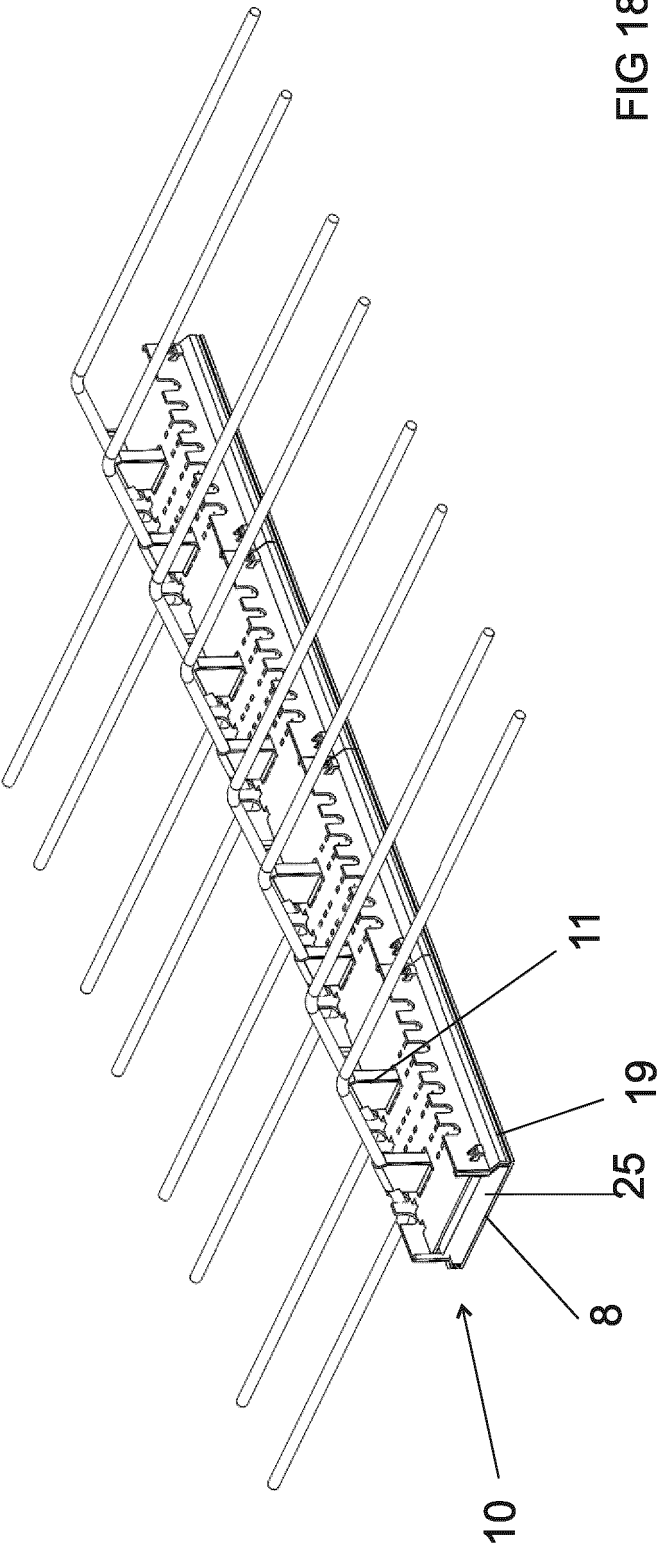
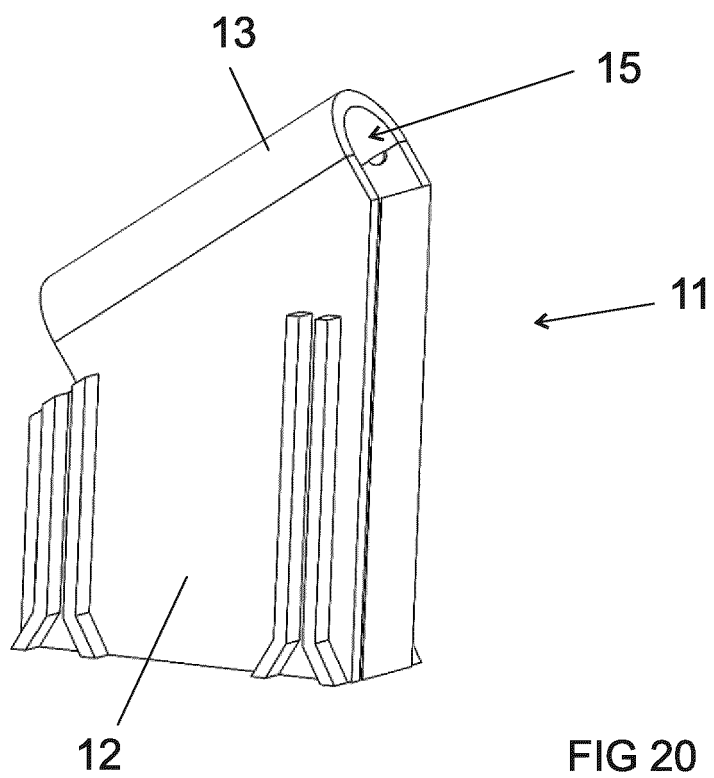
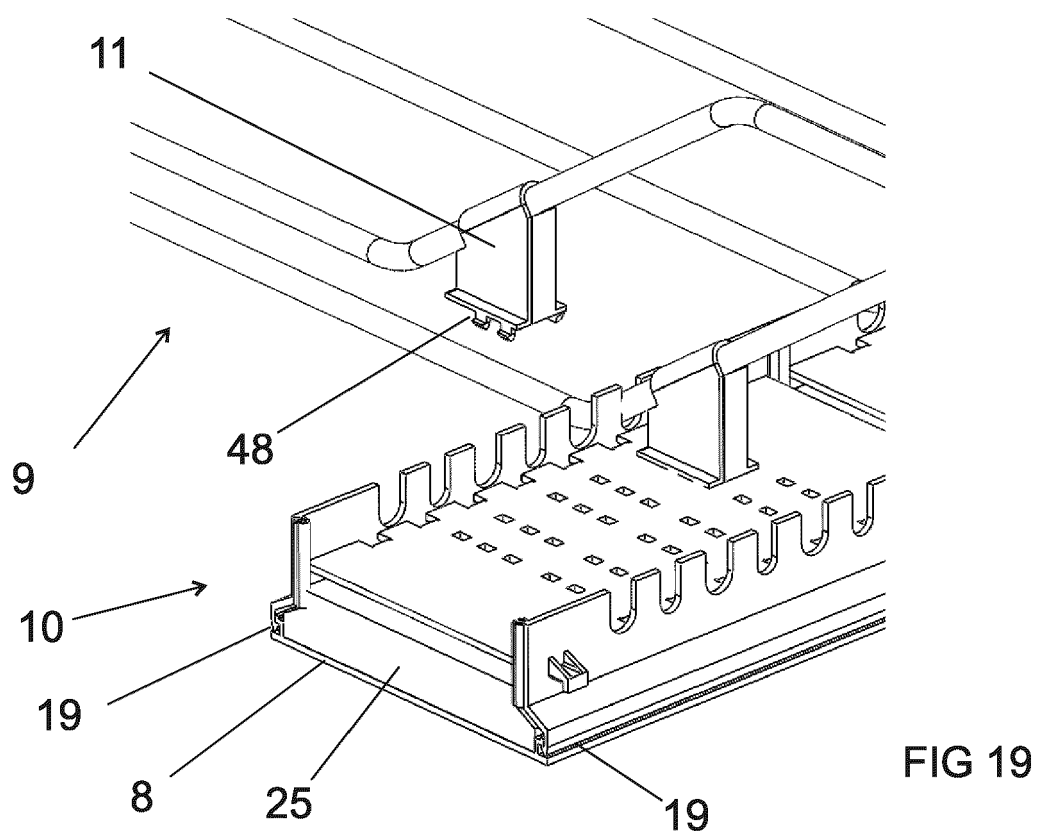
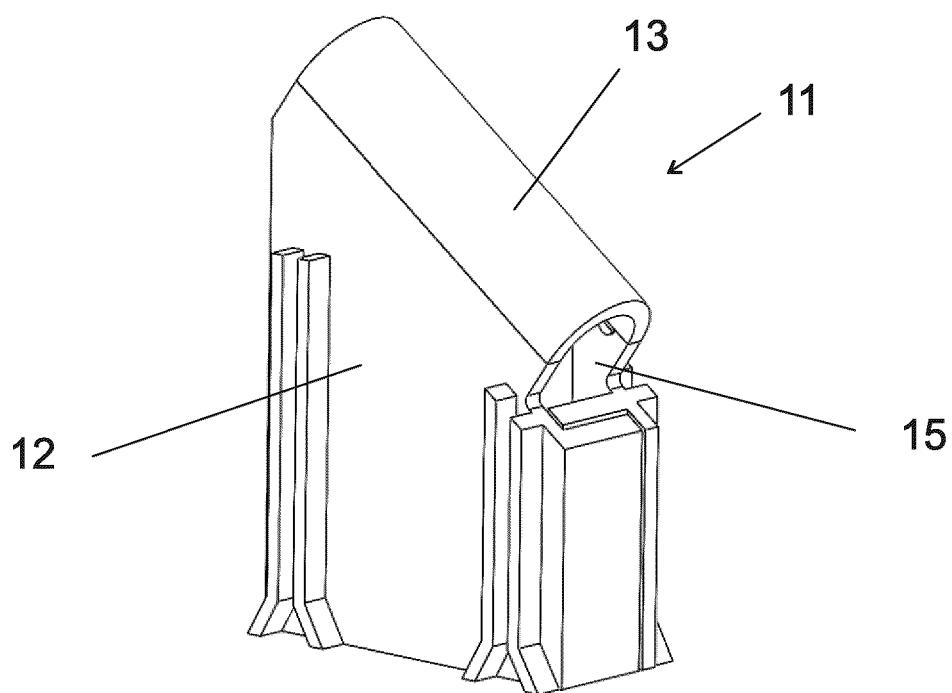
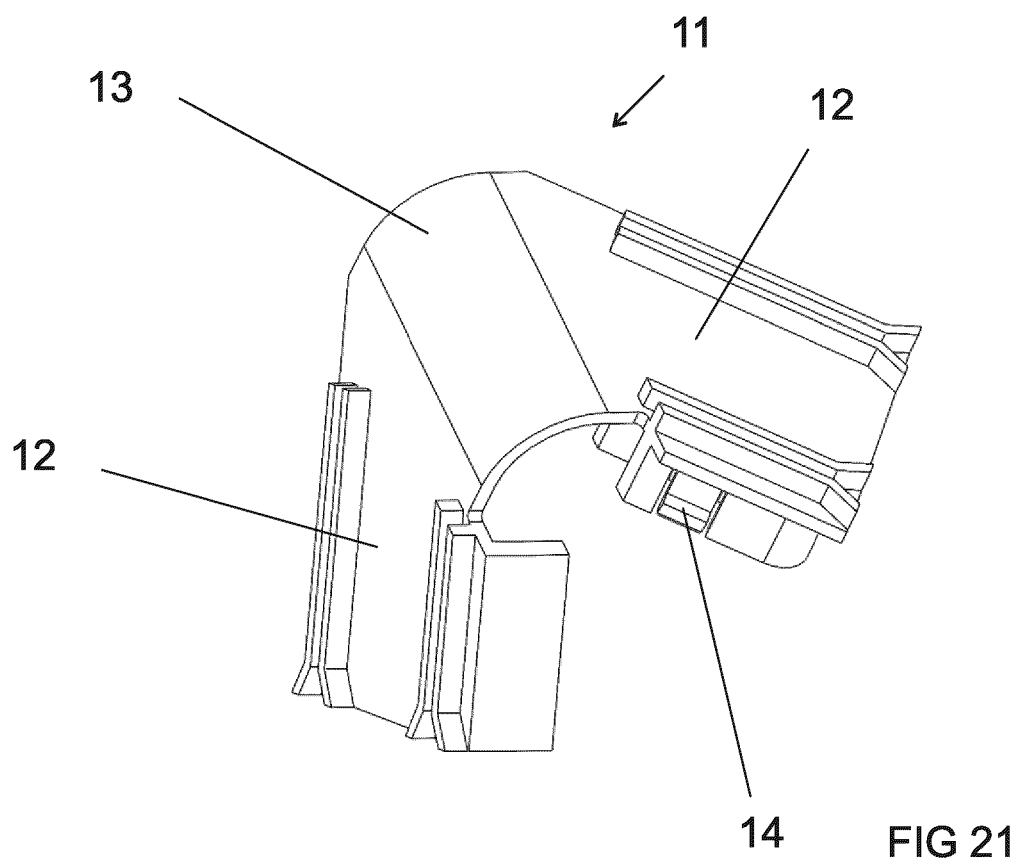


FIG 18





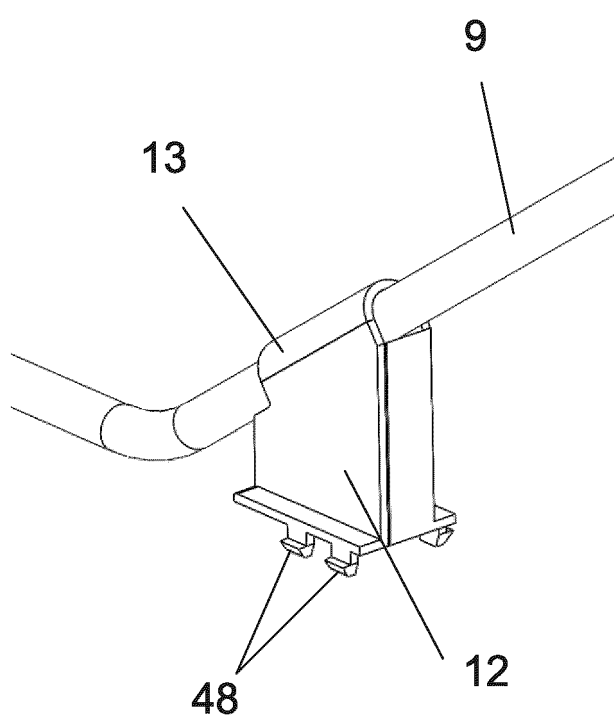


FIG 23

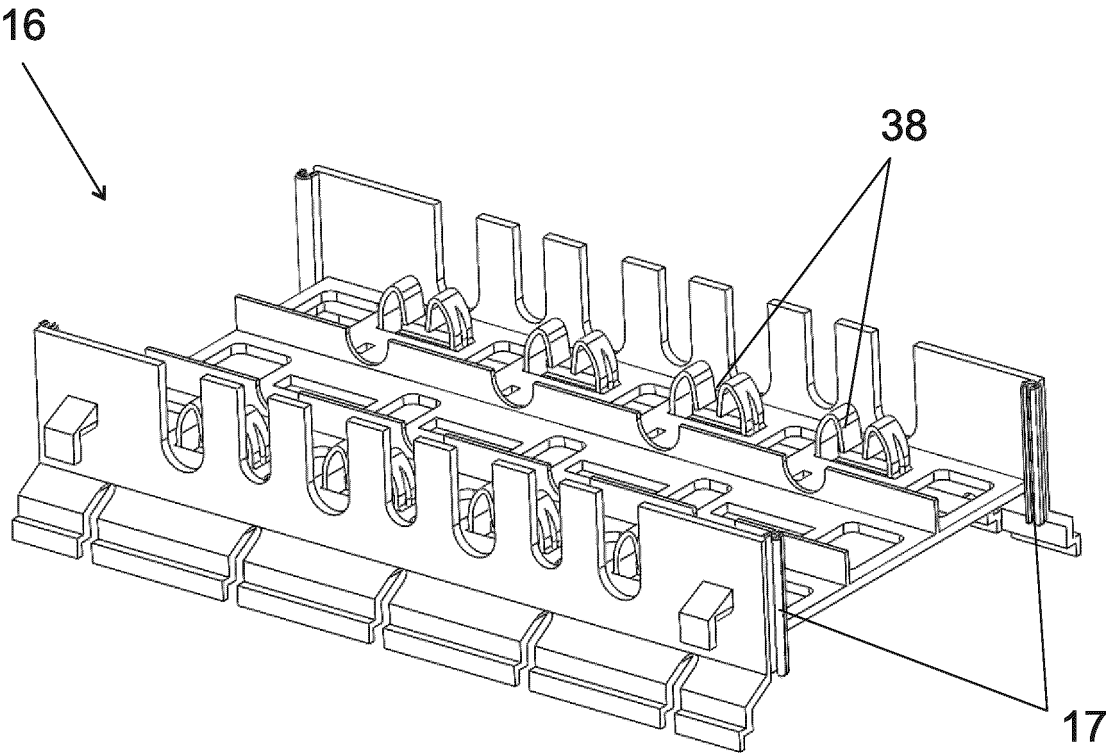


FIG 24

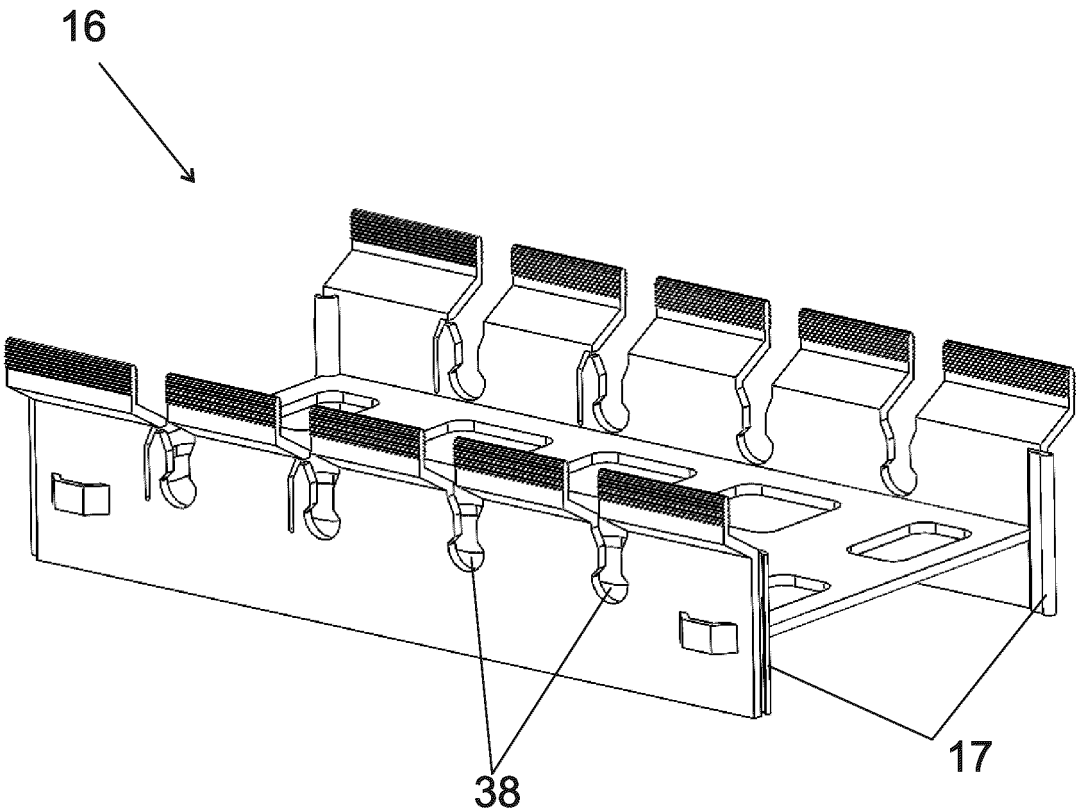
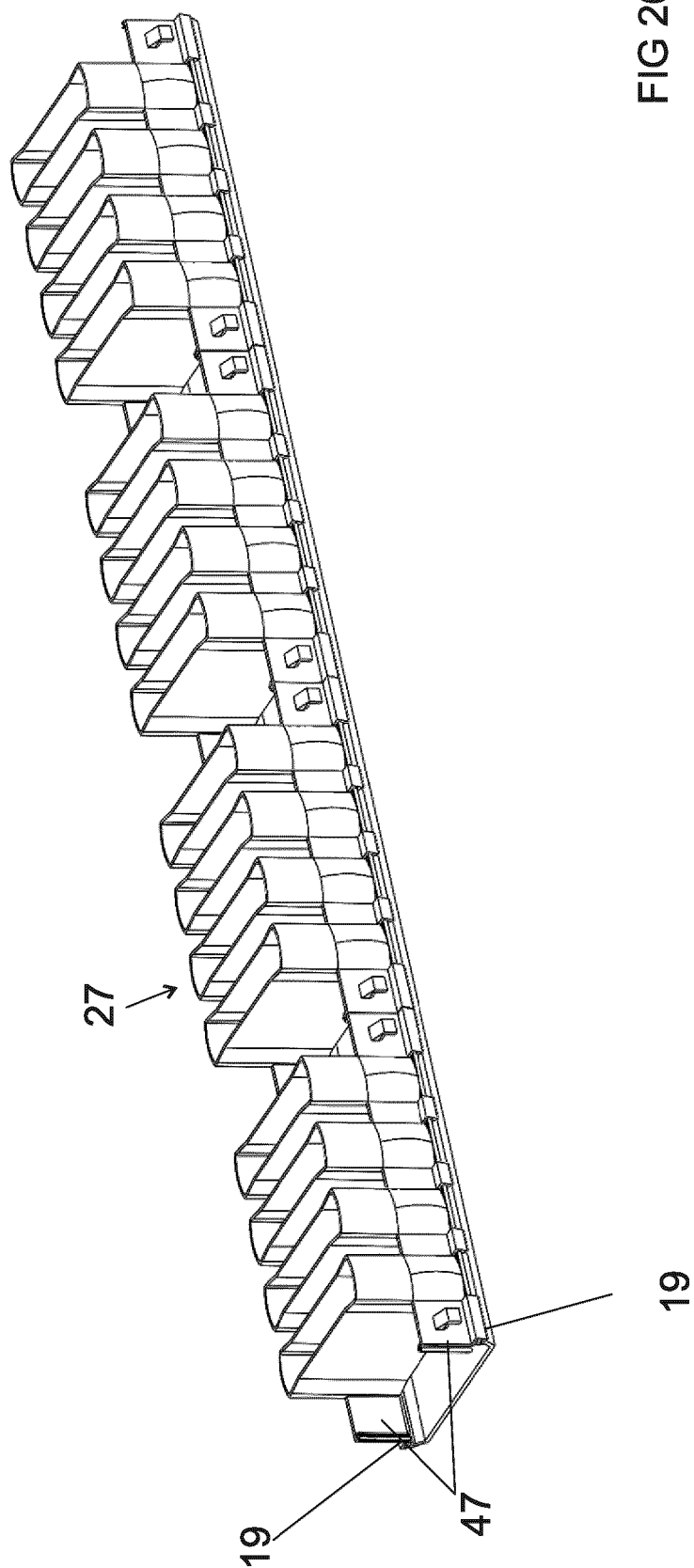
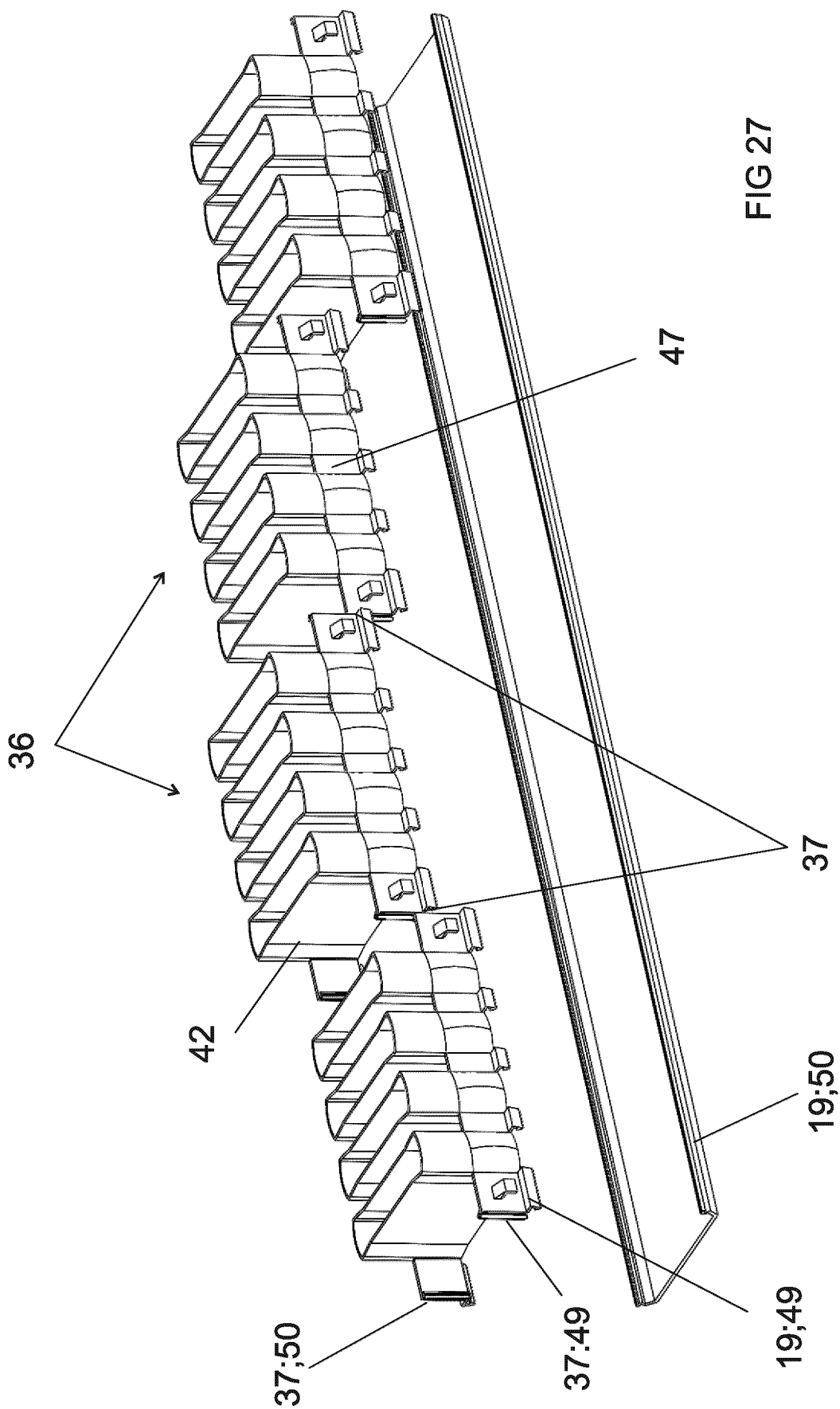


FIG 25





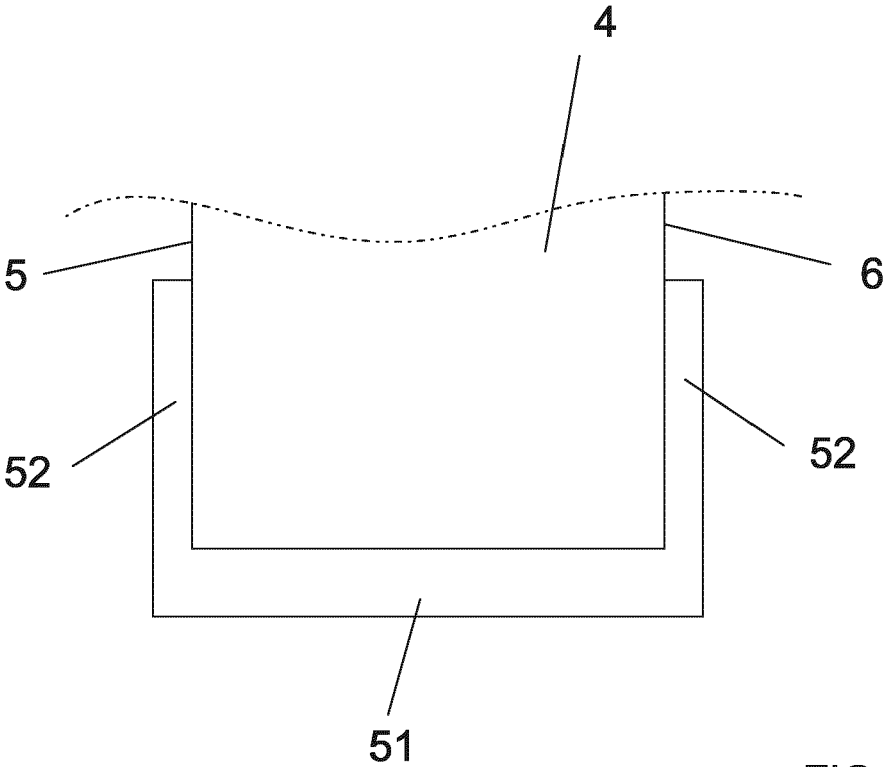


FIG 28

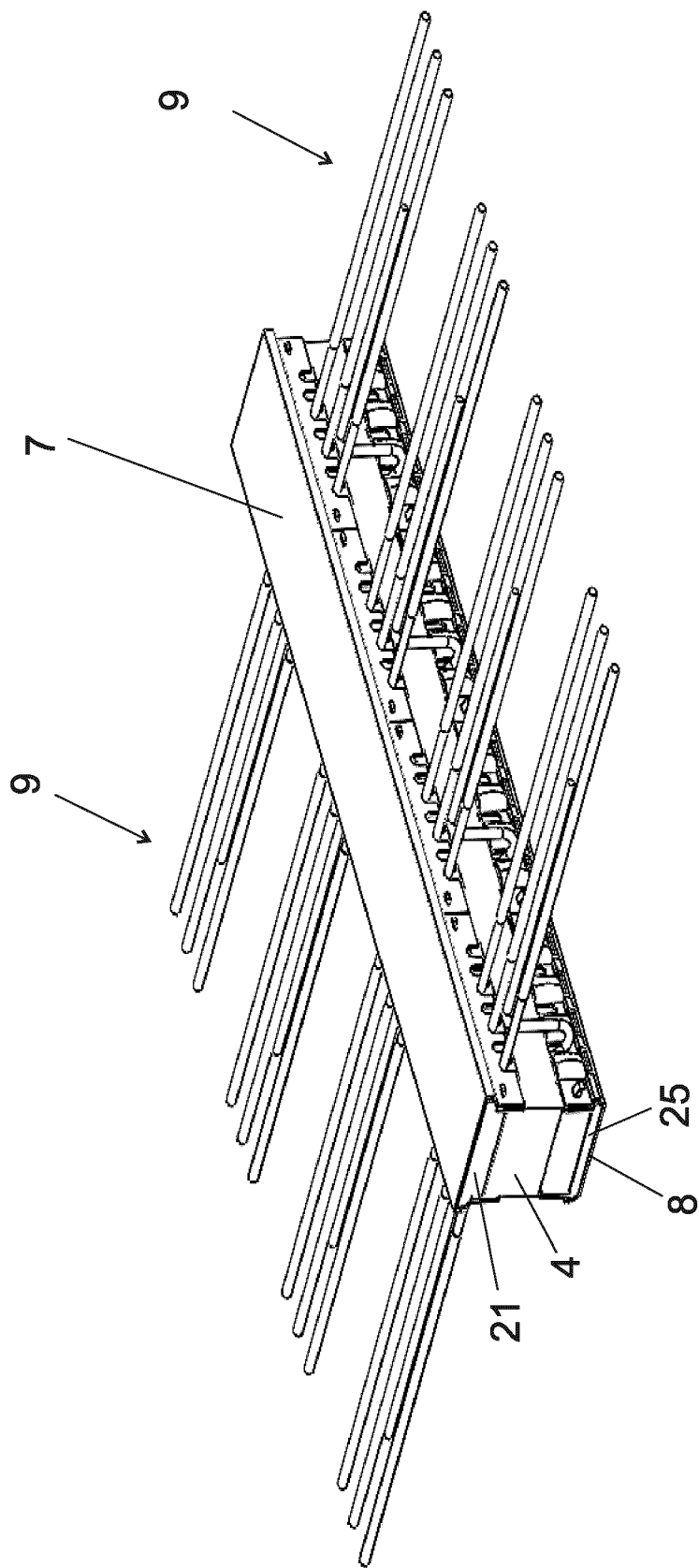


FIG 29

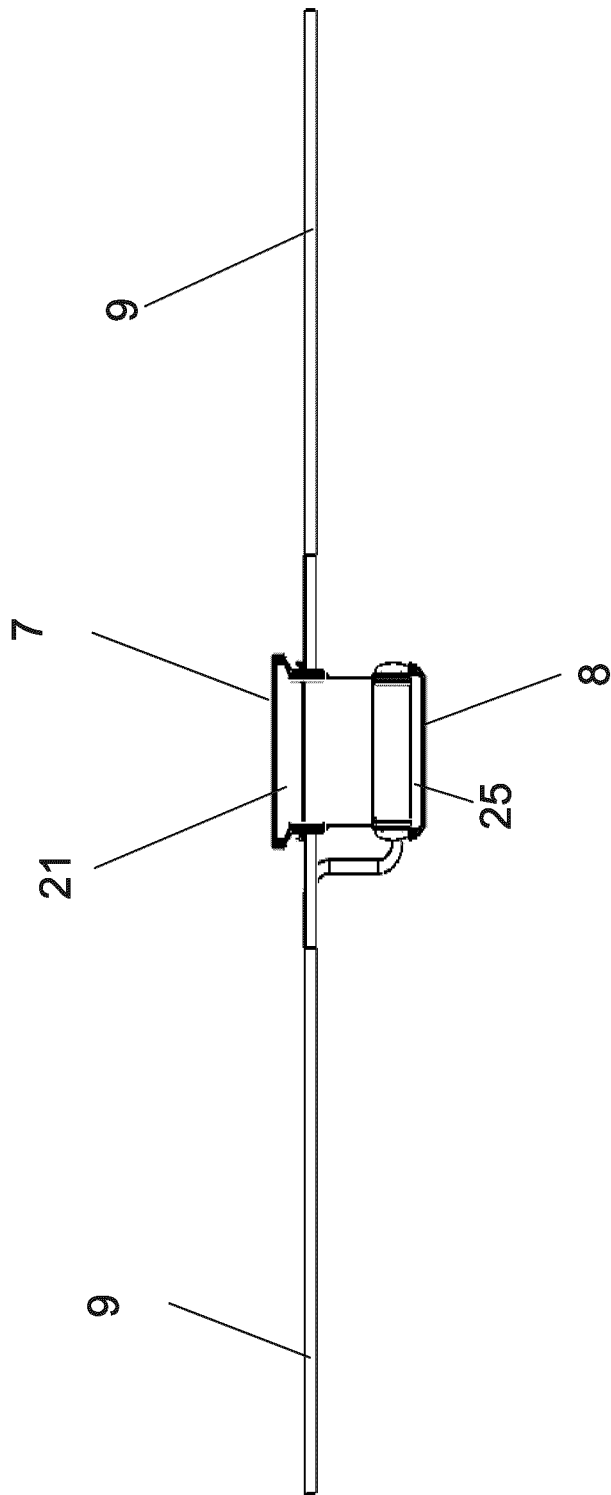


FIG 30

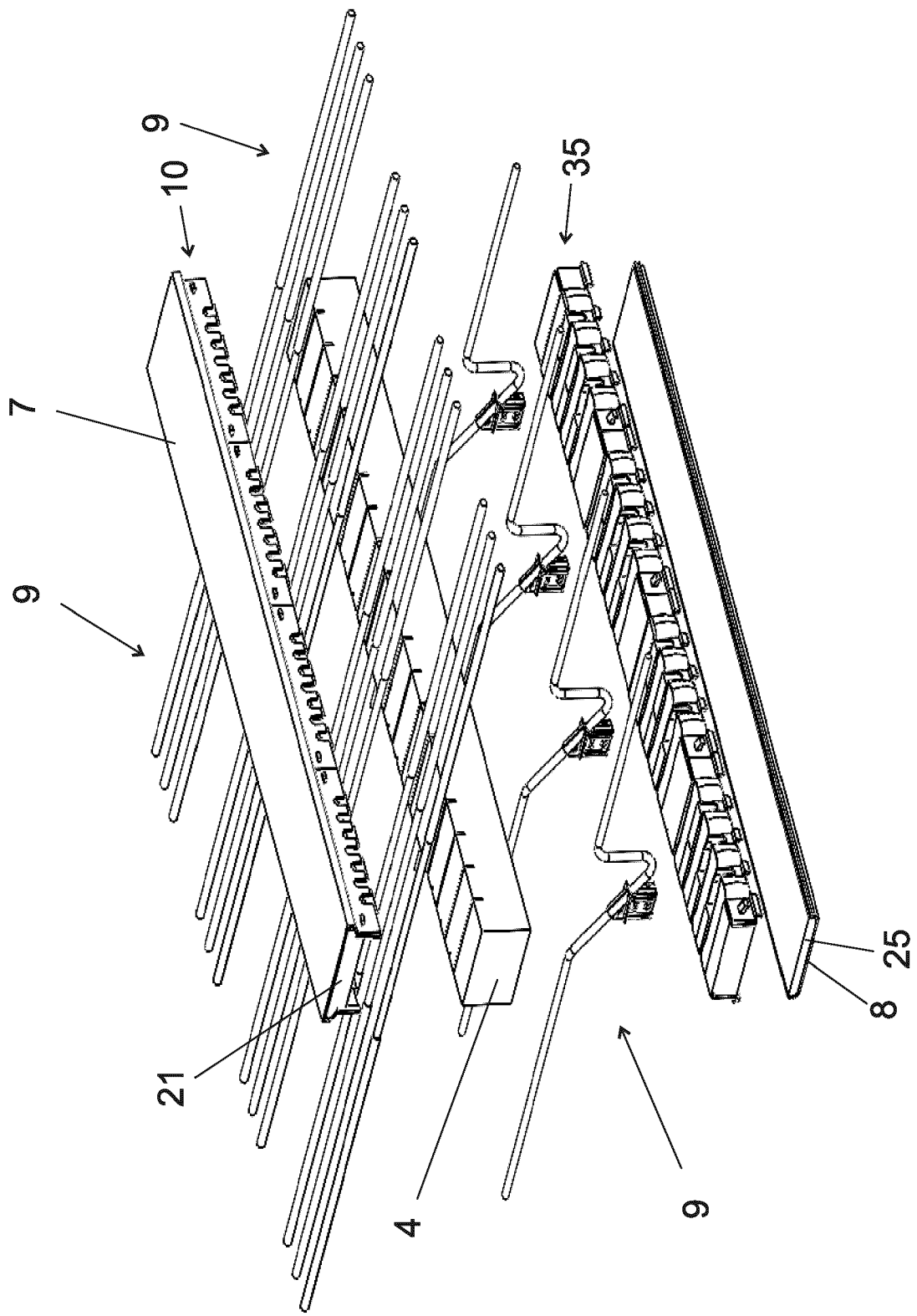


FIG 31

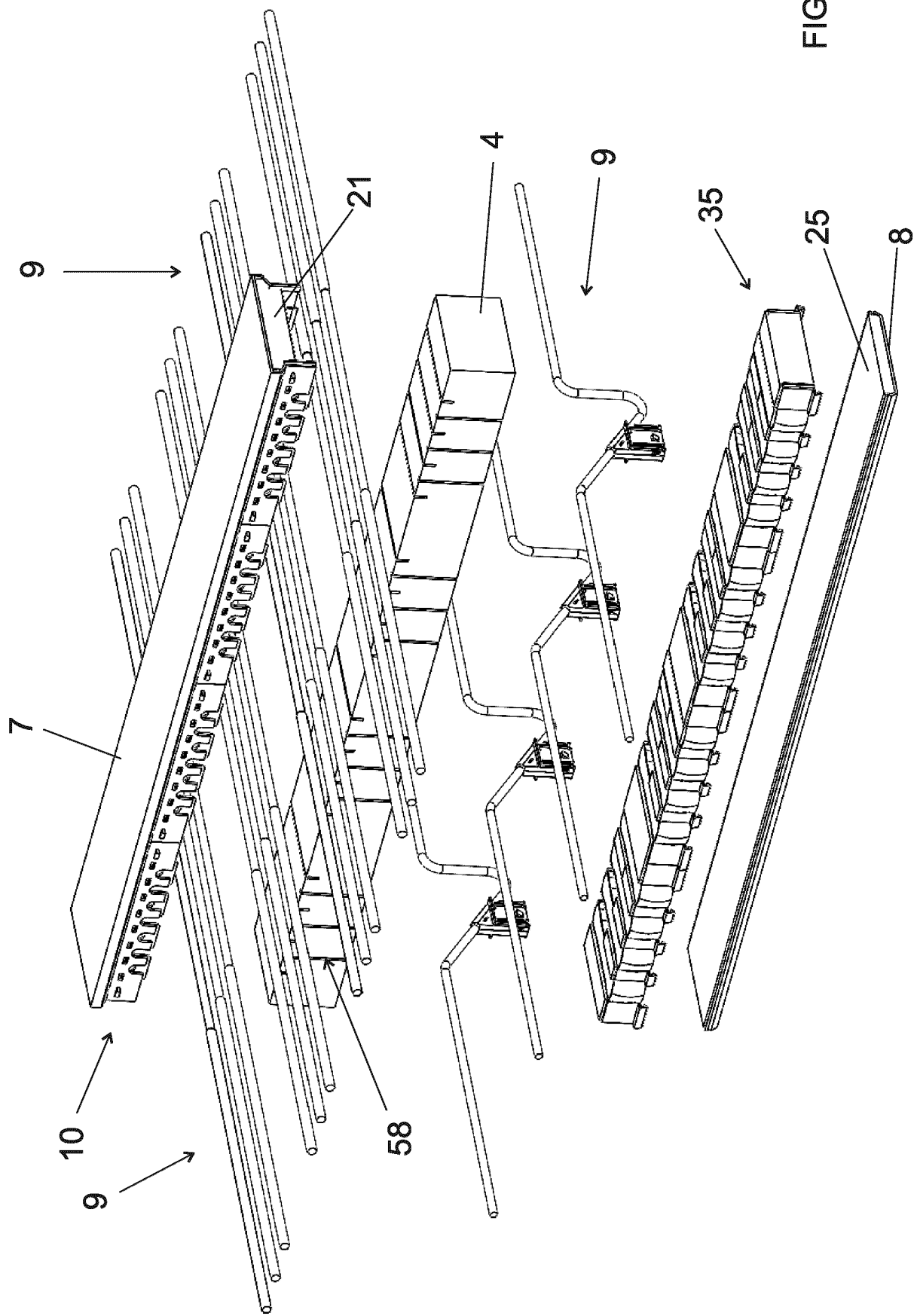


FIG 32



EUROPEAN SEARCH REPORT

Application Number

EP 24 21 8264

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2006 032444 A1 (SCHOECK BAUTEILE GMBH [DE]) 17 January 2008 (2008-01-17) * figures 1-3 * * paragraph [0022] *	1-18	INV. E04B1/00
X	Schoeck: "Schöck Isokorb", , 1 March 2021 (2021-03-01), pages 1-152, XP093093394, Retrieved from the Internet: URL:https://www.laros.com.au/wp-content/uploads/2017/03/LAROS-Technical_manual_Schoeck_Isokorb_1595_2016-02-10.pdf [retrieved on 2023-10-19] * the whole document *	1-18	
X	DE 197 22 028 A1 (SCHOECK BAUTEILE GMBH [DE]) 3 December 1998 (1998-12-03) * figures 1-14 *	1-7, 11-18	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		20 May 2025	Petrinja, Etjel
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 24 21 8264

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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20 - 05 - 2025

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DE 19722028 A1	03-12-1998	NONE	

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82