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WO-A1-2005/107028
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DE-C1- 19 961 244
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JP-U- S63 198 308
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DESCRIPTION

The invention relates to a device for feeding through lines, in particular cables or pipes, through the wall of a distribution cabinet for telecommunications. Such distribution cabinets can also be used in particular in outdoor areas and serve to connect local distribution networks to underground cables, in particular to fibre optic cables laid by means of underground cables. For this purpose, the distribution cabinets comprise components such as splice modules, by means of which the corresponding fibre connections can be established. For this, it is necessary to lead the lines into the interior of the distribution cabinet after they have emerged from the ground. According to the prior art, for this purpose, appropriate holes are either drilled on site at a suitable position in the wall of the cabinet or prefabricated plastic or rubber elements with predetermined breaking points are used. What both variants have in common is the comparatively complex production of suitable openings for the lines on site.

With regard to the prior art, reference is first made to US Pat. No. 5,422,436 with a cabinet into which cables are inserted through rail-like inserts in the base of the cabinet, wherein various inserts for different cable types are able to be accommodated in the rails. Furthermore, DE 198 51 952 C1 shows a switch cabinet with various rail-like inserts in its base for the sealed introduction of cables of different thicknesses. The German utility model 77 18 935 shows a cable distribution cabinet for construction sites, campsites and festival areas, under the floor of which an inclined plate with a strain relief rail is attached. DE 199 61 244 C1 shows a housing for accommodating electrical elements, which comprises cable entry elements with seals in a side wall. Finally, JP S63 198308 U shows a cabinet with plate-like elements apparently provided for the cable feed-through.

WO 2005/107028 A1 shows an installation distributor housing, for example as a feed box, for electric cables, wherein at least one side wall with an entry plate for the cables is rotated by about 45 ° against the direction of a busbar system in the box regarding cables with particularly thick cross sections. This can also affect two such side walls. The preamble of claim 1 is based on this document.

Furthermore, DE 103 46 742 A1 shows a feed-through device for feeding through cables or lines through a wall, wherein an outlet side of this device can be at an angle between 70 ° and 120 ° to its wall-parallel and thus vertical inlet side.

The object of the present invention is to provide a distribution device which enables simple implementation of feed-throughs for lines through a wall of the device, which is advantageous compared to the prior art.

- 5 This object is achieved by the distribution device according to claim 1. The subclaims relate to advantageous embodiments and variants of the invention. According to the invention, the distribution device is a distribution cabinet.

10 According to the present invention, a lead-through or the fixation of lines, in particular pipes or cables, in a distribution cabinet can be adapted as a so-called interchangeable element.

According to the invention, therein a V-shaped entry shaft for the feeding through of lines, which comprises the interchangeable element, is formed in a wall surface of the distribution cabinet. This wall surface constitutes an intermediate part of the distribution cabinet. The bend-
15 ing radius of the lines fed through is increased by such a V-shaped design of the entry shaft and thus prevents possible damage from excessive bending.

An interchangeable element adapted as an interchangeable plate for the feeding through of lines, in particular cables or pipes, which can have different radii of feed-through openings, is
20 particularly advantageous here. Furthermore, feed-through openings of only a certain radius can also be present on such an interchangeable plate, wherein this can vary from interchangeable plate to interchangeable plate. Due to the flexibility gained in this way and the associated provision of a wide variety of interchangeable plates with a wide variety of diameters of the feed-through openings, the previous drilling through of plates or walls on site in the field is no
25 longer necessary. The interchangeable plate can in particular be formed therein using a steel sheet of suitable thickness. The feed-through openings can be provided with seals therein, in particular with rubber seals. It is advantageous if the interchangeable plates comprise a rectangular basic shape. The side length of the rectangle can be chosen to be constant therein for all radii of the feed-through openings, so that the interchangeable plates can be easily inter-
30 changed. Also, distribution cabinets can be provided with appropriate receiving openings for the interchangeable plates practically ex works, so that only the appropriate interchangeable plate has to be used on site and there is no necessity to drill through or otherwise break through walls. Unnecessary receiving openings can be closed with blind plates, i.e. interchangeable plates without feed-through openings.

It is also advantageous if the interchangeable element, which is used for the fixation of lines, is designed as a cross bar and is connected, for example, to a C-profile rail via fastening tabs. The cross bar can also be designed as a flat element therein. In particular, there can be two C-profile rails which are arranged in parallel, for example in the lower area of the distribution cabinet. Such a connection can ensure that the cross bar can be moved steplessly on the C-profile rails.

In an advantageous embodiment of a cross bar described above, this comprises a longitudinal slot and a plurality of bores, in particular threaded bores. It is thereby possible to fix a large number of cable guide elements, such as hammer head pipe clamps, collective holders or so-called combs, wherein these cable guide elements are movable, both along and together, with the cross bar along the C-profile rail and thus a high arrangement flexibility is given. Advantageously, the cross bar for the fixation of cables or pipes is adapted perpendicular or horizontal to the plane formed by the C-profile rails, so that there is also a high degree of flexibility here with regard to the spatial arrangement of cable guide elements.

The distribution cabinet can furthermore be constructed in two parts in such a way that an upper part is accessible separately from a lower part. The upper part can in particular include splice modules therein, whereas the lower part stands on the ground and for example - in the case of a cabinet for the outside area - receives cables emerging from the ground. This is particularly advantageous, as it can be guaranteed that any contamination caused by working on the lines laid in the lower part of the cabinet does not contaminate the upper part.

The invention is explained in more detail below with reference to the drawing.

Fig. 1 shows schematically a distribution cabinet,

Fig. 2 shows a conventional cable feed-through,

Fig. 3 shows exemplarily three interchangeable plates according to the invention,

Fig. 4 shows a combination of different interchangeable plates,

Fig. 5 shows the use of blind plates,

Fig. 6 shows a further advantageous possibility for making the cable routing more flexible,

Fig. 7 shows an exemplary cross bar,

Fig. 8 shows a further exemplary cross bar,
Fig. 9 shows the use of hammer head pipe clamps,
Fig. 10 shows the use of collective holders; and
Fig. 11 shows a variant in which so-called combs are used.

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Fig. 1 shows schematically a distribution cabinet in which the invention can be implemented.

In the example shown, the distribution cabinet 1 shows a two-part construction with a splice and patch area 2 in the upper part and a lower part for cable entry 3. The splice and patch area 2 shows, in a manner known per se, splice modules and components for guiding cables. In the lower part of the splice and patch area 2, a V-shaped entry shaft 4 is formed, through which the cables, not shown here, can be fed through from the lower part 3 into the splice and patch area 2. Conventional cable feed-throughs 15 in the flat bottom surface of a distribution cabinet 1 are also shown. Furthermore, the doors, not shown here, of the lower part 3 are accessible separately from the upper part 2. This enables any “dirty” work to take place only in the lower part 3 of the distribution cabinet 1 without contaminating the upper part, the splice and patch area 2.

Fig. 2 shows a conventional cable feed-through 5, as it can be used in particular in the lower part of the splice and patch area 2 for feeding through fibre optic cables or the like. The cable feed-through 5 is formed from an elastic material such as a hard rubber and shows an essentially cuboid basic shape as well as a plurality of prepared feed-through areas 6 for cables, which can be opened by means of a suitable tool if necessary.

In Fig. 3, three interchangeable plates 7 according to the invention are shown exemplarily. In the example shown, the interchangeable plates 7 show a metallic, rectangular basic body which is provided with prefabricated feed-through openings 8. Therein, the interchangeable plates 7 shown in Fig. 3, show exemplarily feed-through openings 8 with three different radii in order to clarify that a large number of such interchangeable plates 7 with appropriately prepared feed-through openings 8 can be provided. It can also be clearly seen in Fig. 3 that the interchangeable plates 7, with regard to their dimensions, in particular the edge length of the basic support, are designed in accordance with the conventional cable feed-through 5 shown in Fig. 2, in particular in accordance with the dimensions of the base area of the cable feed-through 5. In this way it is possible to exchange the elements known in Fig. 2 for the interchangeable plates 7 shown in Fig. 3 or vice versa or also to use combinations of the elements shown.

Such a combination is shown purely by way of example in Fig. 4; here it can be seen that different interchangeable plates 7 or feed-throughs 5 can be arranged in the V-shaped recess 4.

- 5 A further embodiment is shown in Fig. 5, where different interchangeable plates 7 or, if the openings are not in use, also so-called blind plates 7', are integrated in the flat bottom surface of a distribution cabinet 1.

Fig. 6 shows a further advantageous possibility for making the cable guide in distribution cabinets more flexible. Here, C-profile rails 9 arranged in the floor area of a distribution cabinet 1 are shown, on which cross bars 10 are arranged for the fixation of guide elements 11 for cables. The cross bars 10 can be displaced practically continuously along the C-profile rails 9 and thus enable an extremely flexible arrangement of cable guide elements 11.

- 15 In Fig. 7, an exemplary cross bar 10' is shown, which is referred to in the following as a horizontal rail. It comprises two fastening tabs 12 with screws for fixing to the C-profile rails 9 mentioned above, as well as a longitudinal slot 13 and a plurality of bores 14, in particular threaded bores.

- 20 In contrast to this, the rail 10'' shown in Fig. 8 is designed as a vertical rail which extends essentially vertically to the plane formed by the C-profile rails 9. What the rails 10 and 10'' have in common, as can be seen from Fig. 8, are the longitudinal slot 13 as well as the threaded bores 14 and the fastening tabs 12.

- 25 In Figs. 9 to 11, it can be seen which degree of flexibility with regard to the fixing and arrangement of cable guide elements 11 is offered by the modular rail system shown. For example, it is shown exemplarily in Fig. 9, how hammer head pipe clamps 11' are connected to a cross bar 10' and can each be used to guide individual cables or bundles of cables. Therein, the pipe clamps 11' can be moved along the cross bar 10' as well as together with the cross bar
- 30 along the C-profile rails 9, so that a pipe clamp can approach practically every point in the plane formed by the C-profile rails. The same applies to the collective holders 11'' shown in Fig. 10, which can also be screwed onto the cross bar 10' in an extremely simple manner.

Fig. 11 shows a variant in which so-called combs 11''' for guiding pipes, in which themselves cables can be guided, are fixed to a vertical cross bar 10'' by screwing into the threaded bores 14. Here, too, the simple and efficient routing of the pipes or cables becomes immediately clear.

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It goes without saying that the concepts shown do not necessarily have to be used in combination. It is also conceivable to use each of the inventive solutions shown individually or in sub-combinations, as defined in the appended claims.

PATENTKRAV

1. Fordeleranordning (1) med en anordning til gennemføring eller fastgørelse af ledninger, navnlig rør eller kabler deri, hvor en V-formet indgangsaksel (4) er dannet i en vægflade af fordeleranordningen (1), hvori mindst et udskifteligt element (7, 10) til gennemføring af ledninger er tilvejebragt,

kendetegnet ved, at fordeleranordningen er et fordelerskab (1), og vægfladen med den V-formede indgangsaksel (4) udgør et mellemstykke af fordelerskabet.

2. Fordeleranordning (1) ifølge krav 1,

kendetegnet ved, at det udskiftelige element er designet som en udskiftelig plade (7), og til gennemføring af kabler og rør har mindst én gennemgangsåbning (8) med en defineret radius.

3. Fordeleranordning (1) ifølge krav 1,

kendetegnet ved, at det udskiftelige element (10) er designet som en tværskinne (10' og 10") til fastgørelse af kabler eller rør i C-profilskinner (9).

4. Fordeleranordning ifølge krav 3,

kendetegnet ved, at tværskinnerne (10' og 10") kan forbindes med C-profilskinnerne (9) via fastgørelsesøjer (12).

5. Fordeleranordning ifølge krav 3 eller 4,

kendetegnet ved, at tværskinnerne (10' og 10") har en langsgående spalte (13) til fastgørelse af kabler eller rør.

6. Fordeleranordning ifølge et af de foregående krav 3-5,

kendetegnet ved, at tværskinnerne (10' og 10") til fastgørelse af kabler eller rør har en flerhed af borer (14), navnlig gevindboringer.

7. Fordeleranordning ifølge et af de foregående krav 3-6,

kendetegnet ved, at tværskinnerne (10' og 10") til fastgørelse af kablerne eller rørene er designet til at være vinkelret (10") eller lodret (10') på planet dannet af C-profilskinnerne (9).

8. Fordeleranordning ifølge krav 7,

kendetegnet ved, at der i et øvre (2) og et nedre (3) område af fordeleranordningen (1) er uafhængigt tilgængelige gennemgående døre.

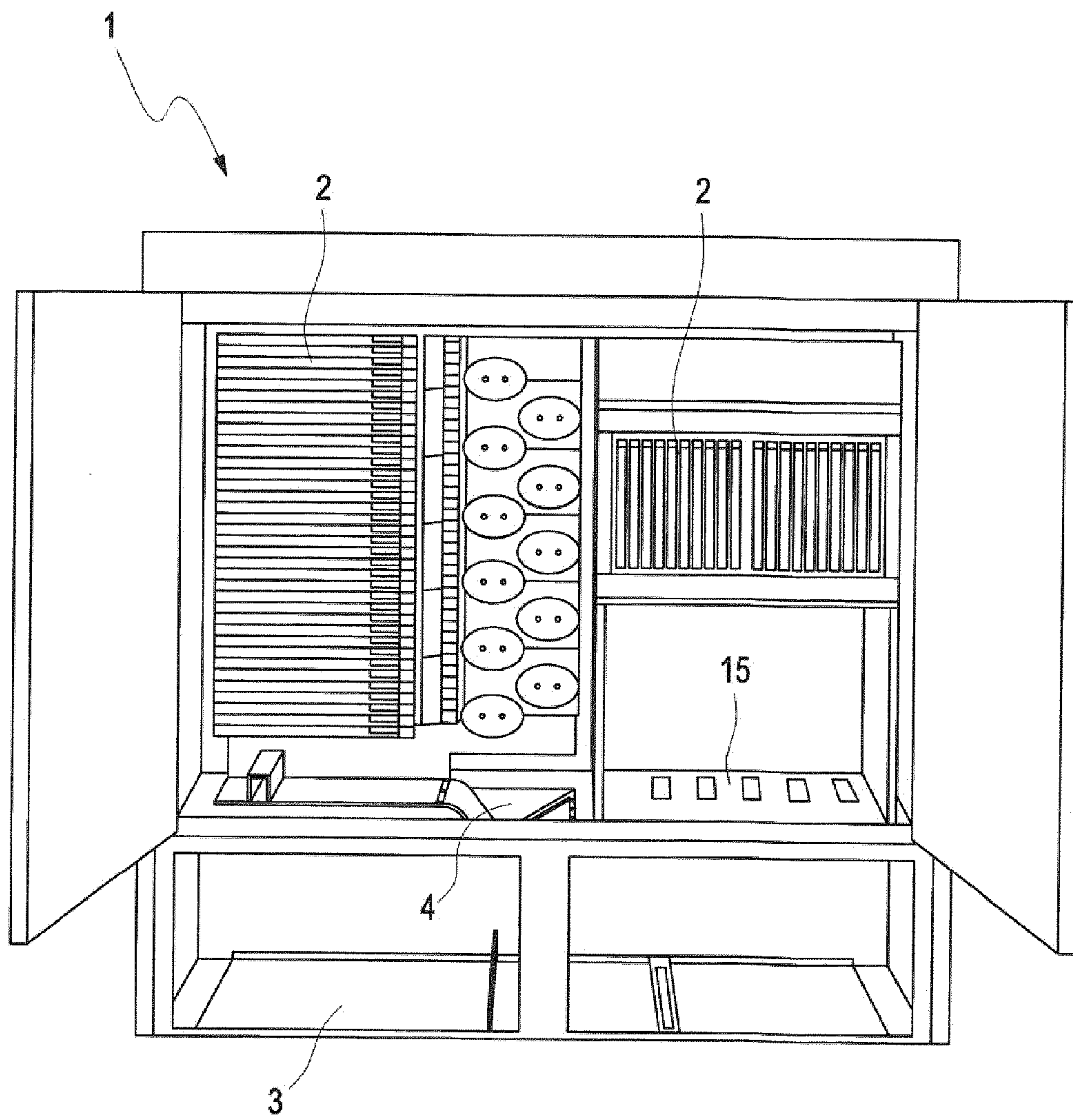


Fig. 1

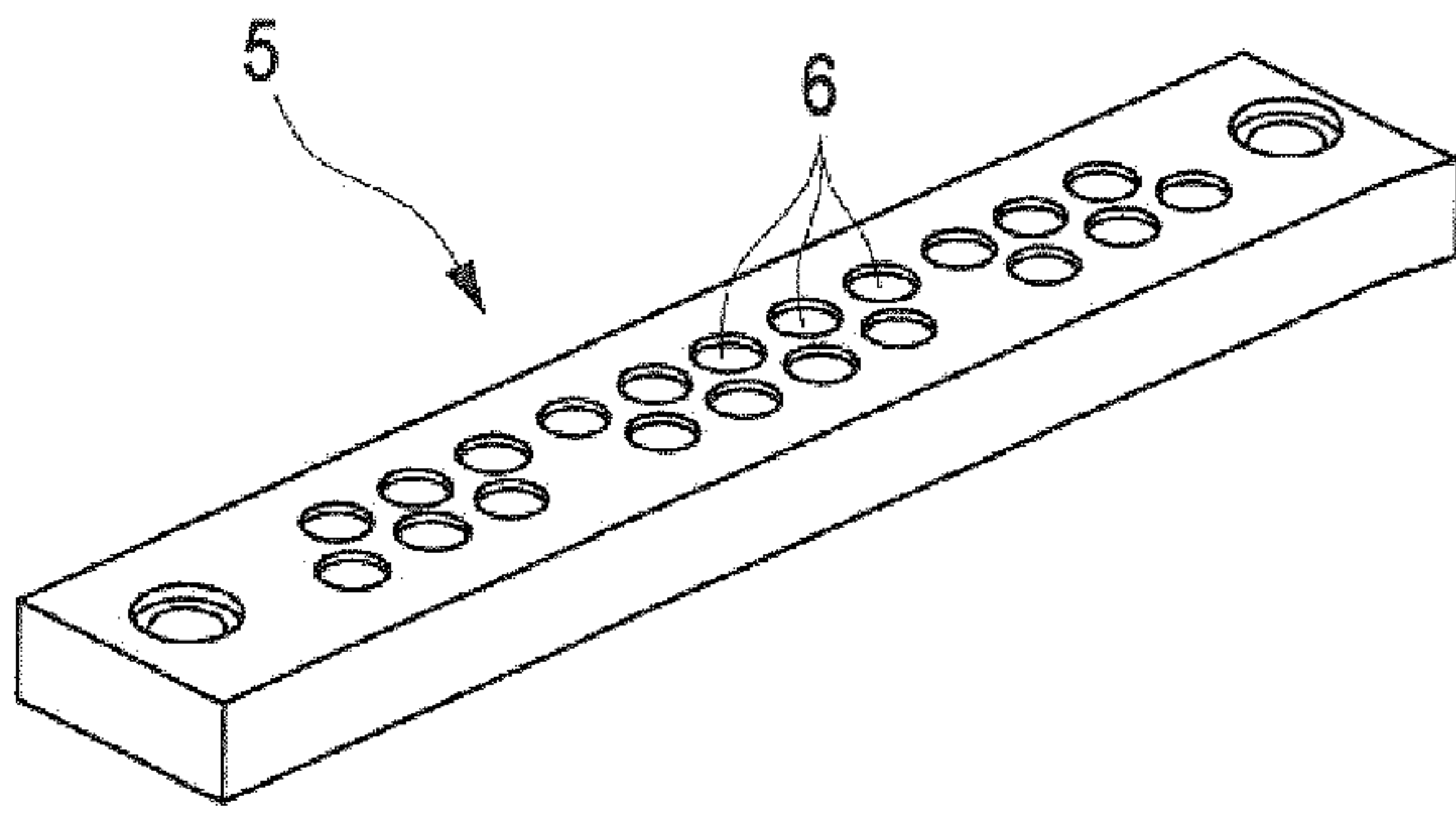


Fig. 2

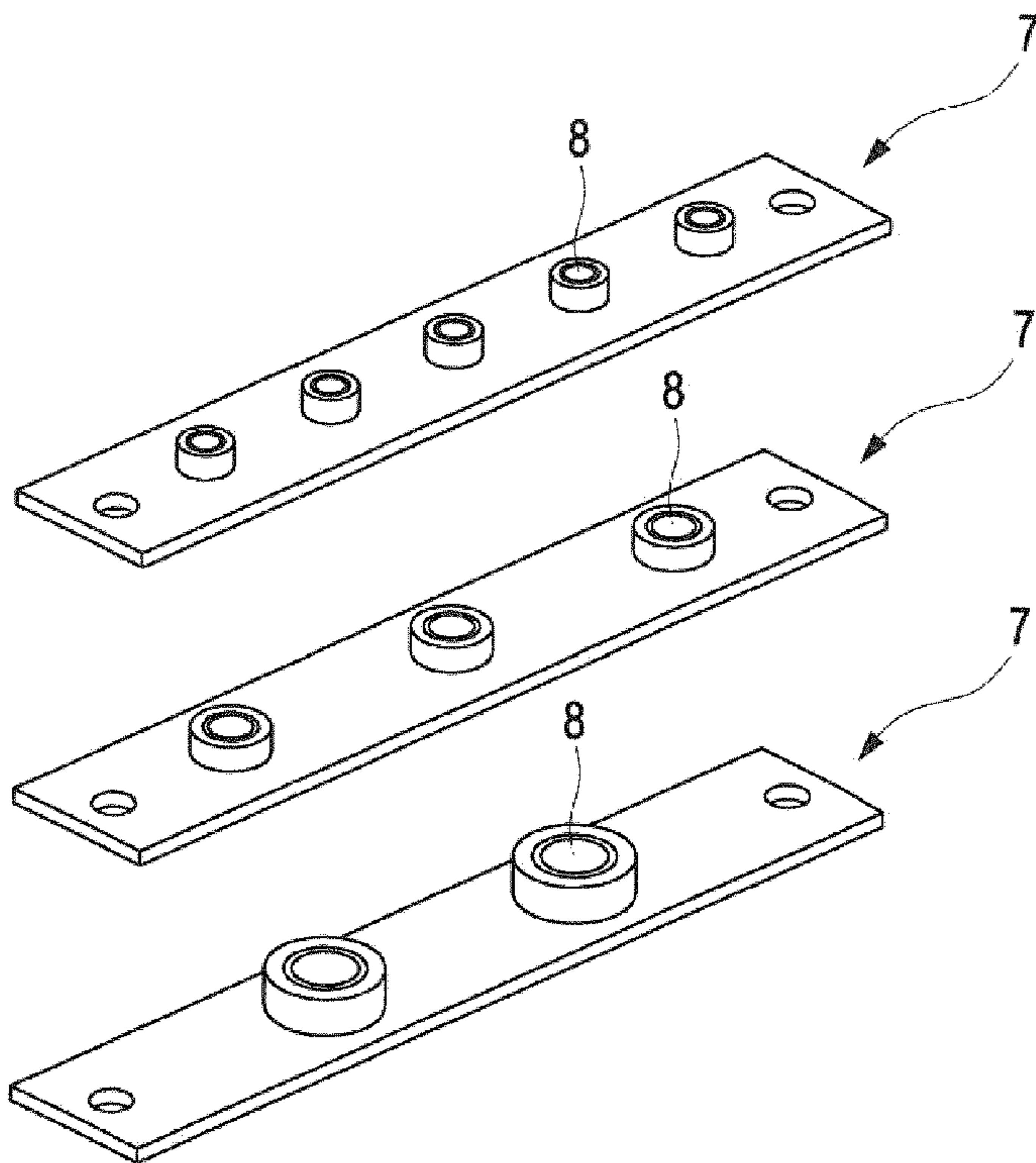


Fig. 3

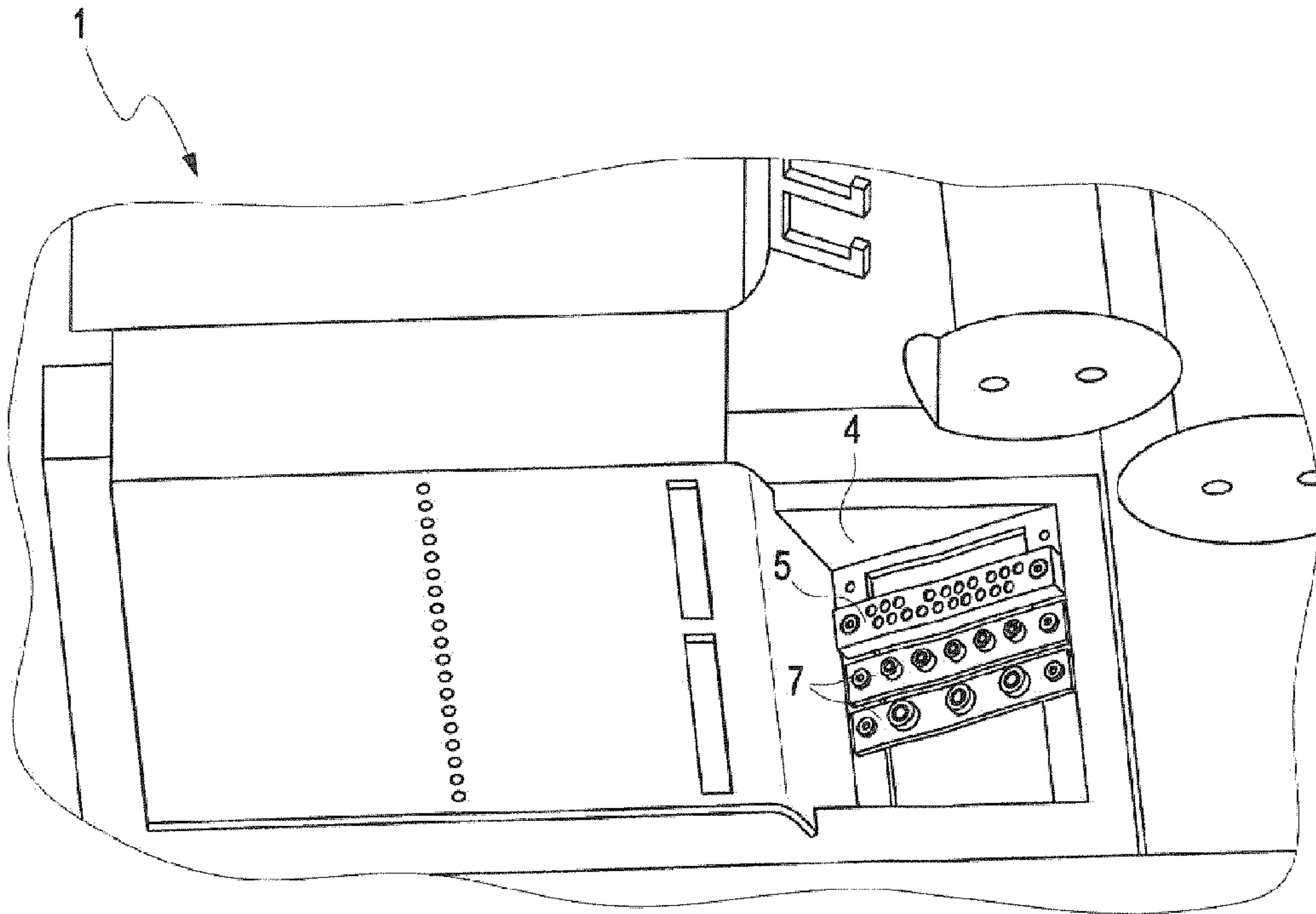


Fig. 4

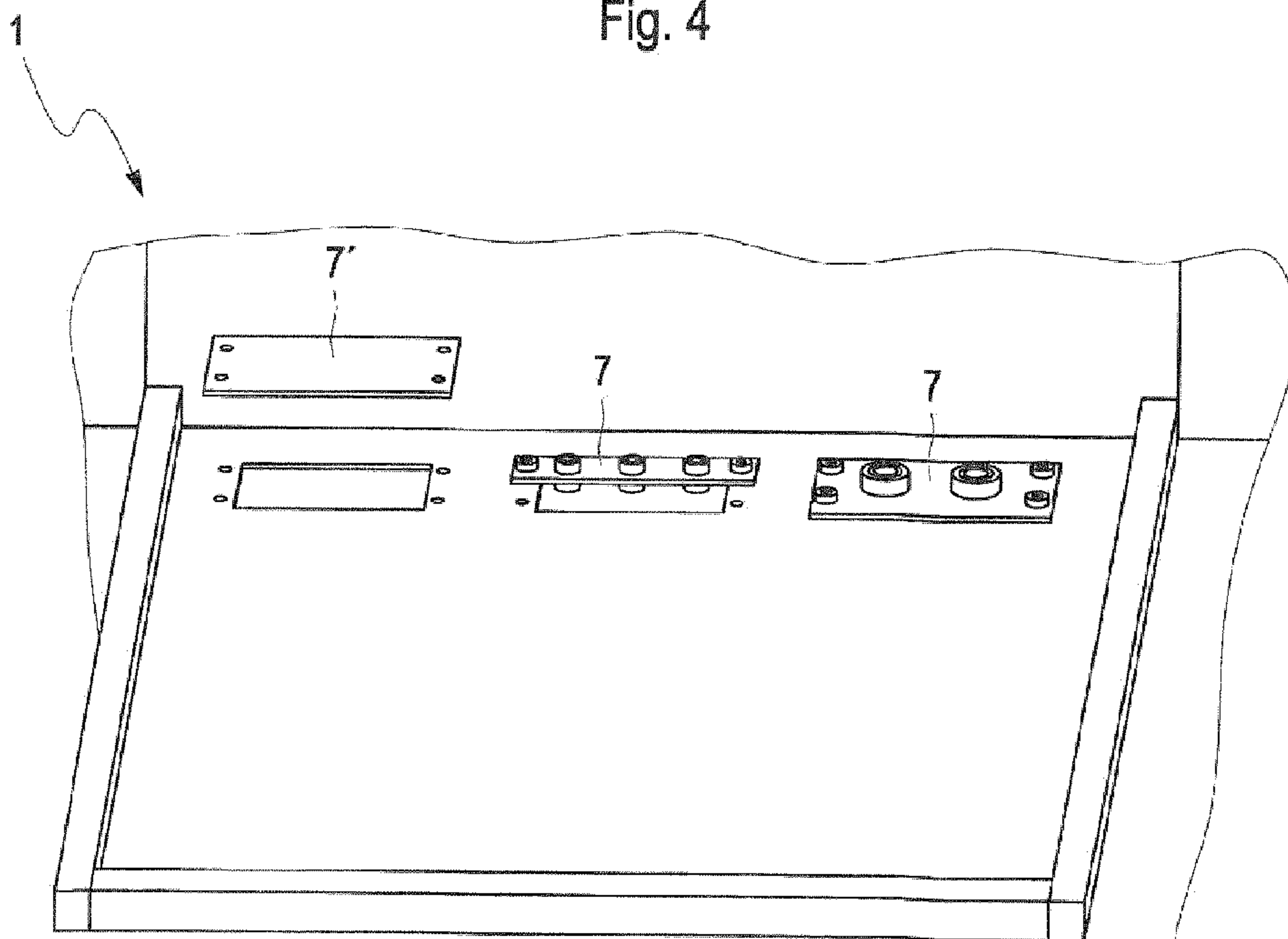


Fig. 5

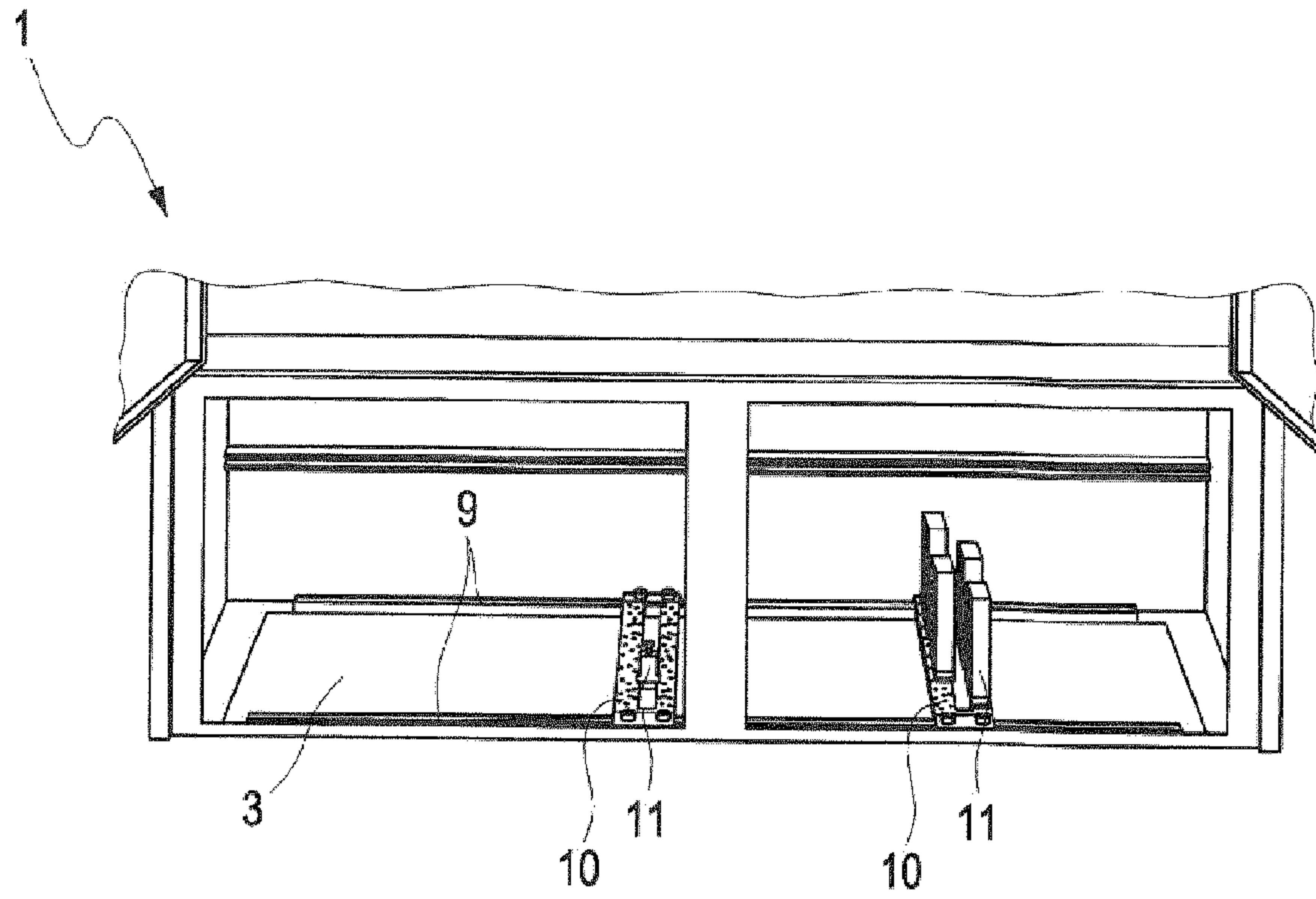


Fig. 6

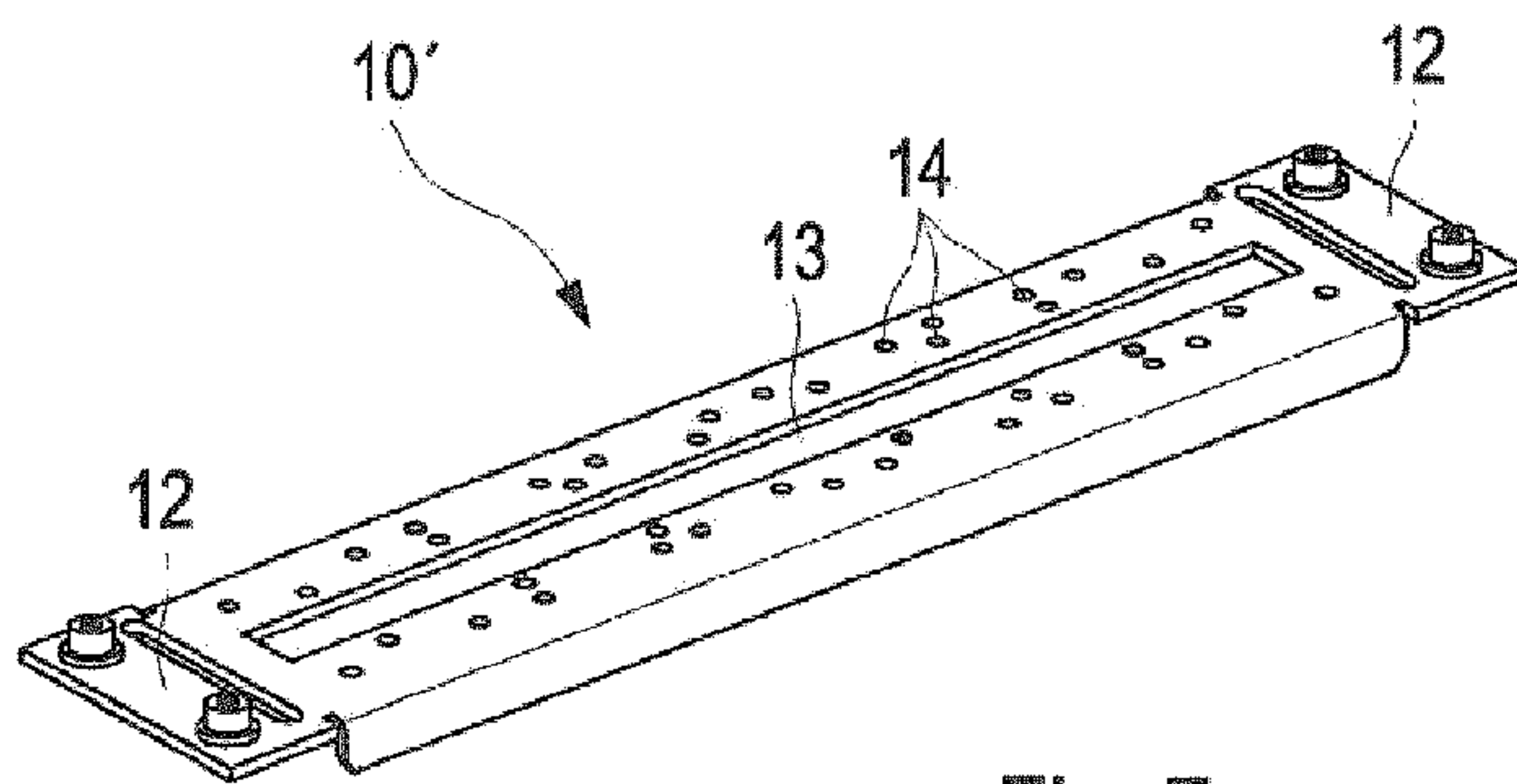


Fig. 7

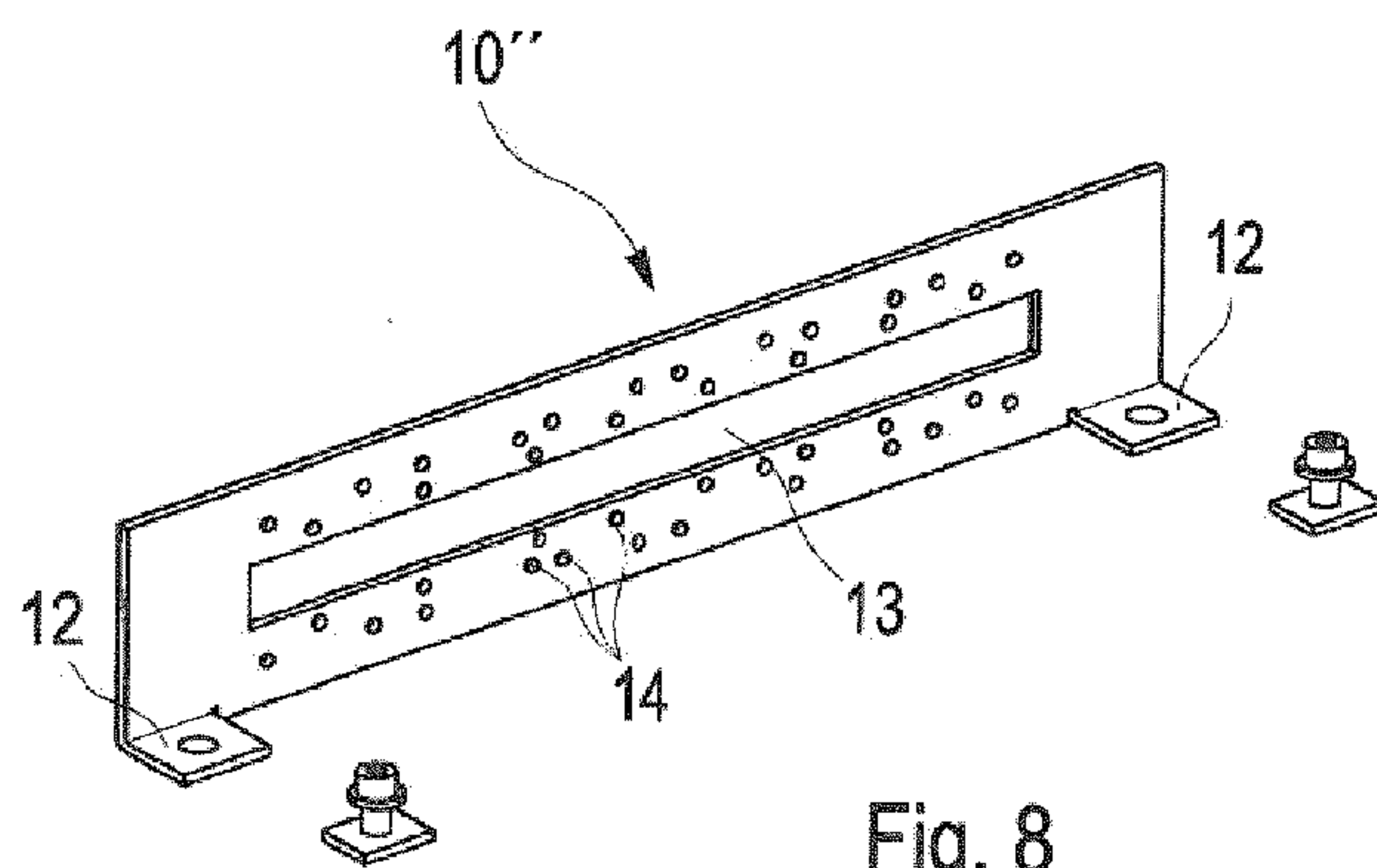


Fig. 8

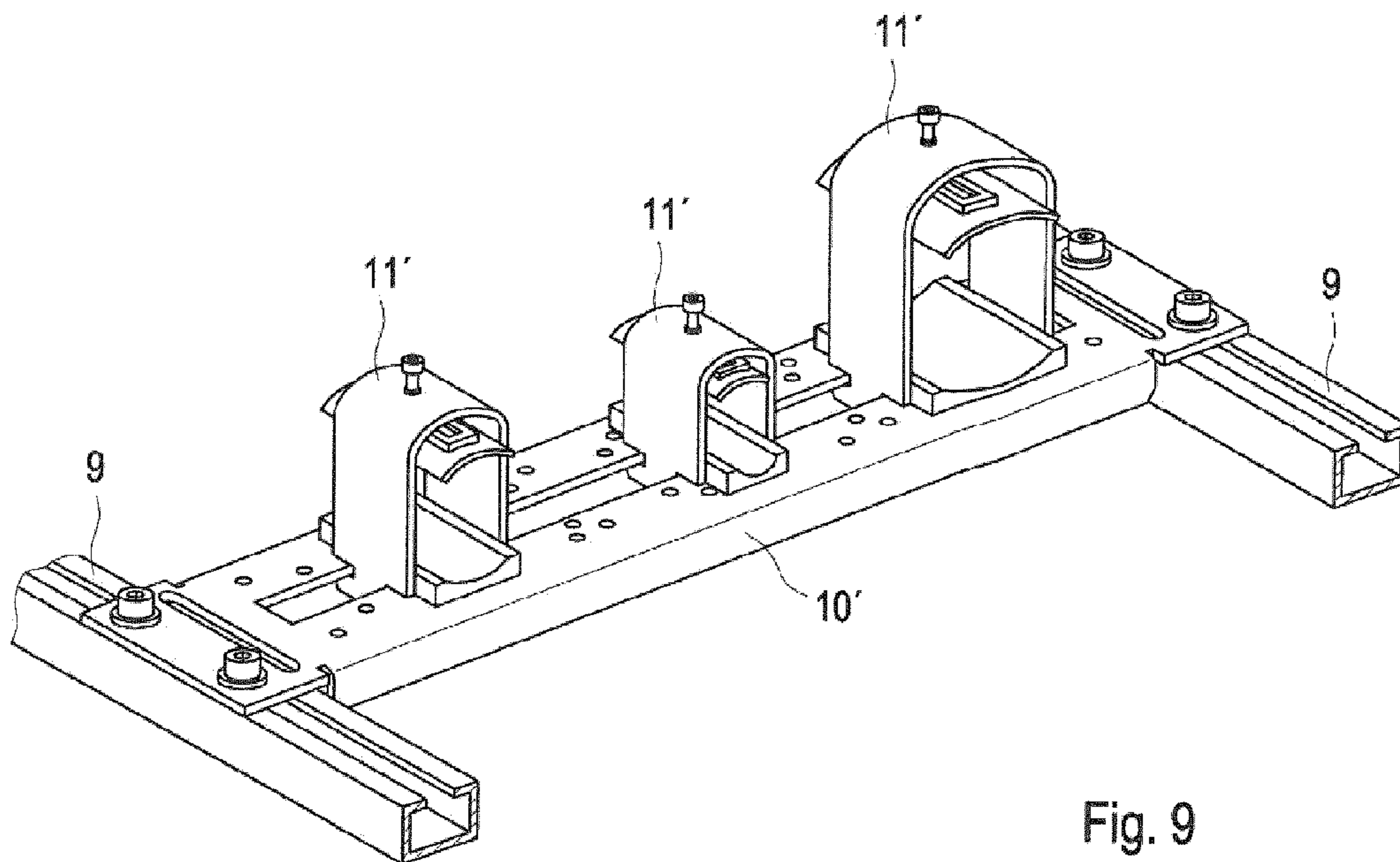


Fig. 9

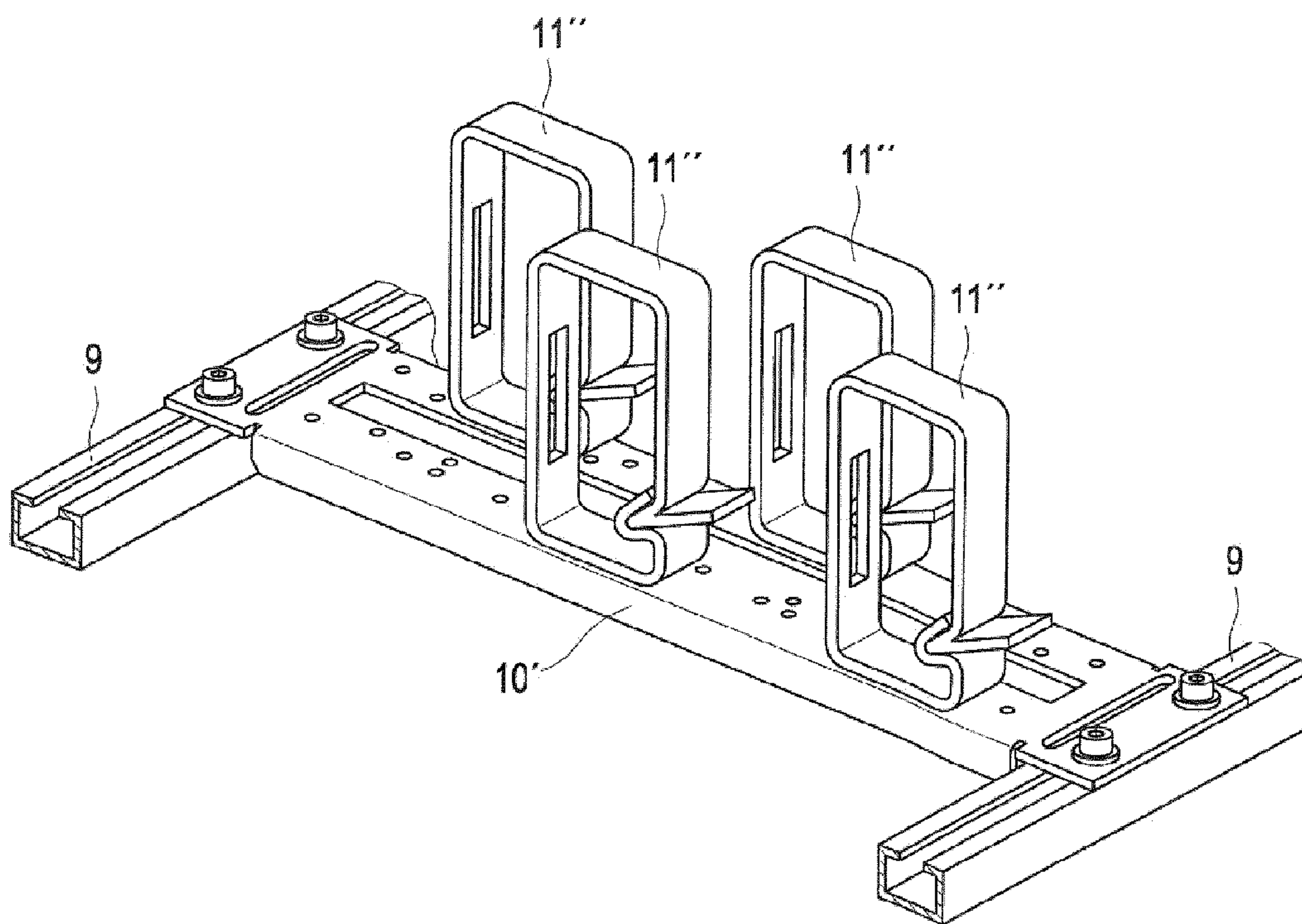


Fig. 10

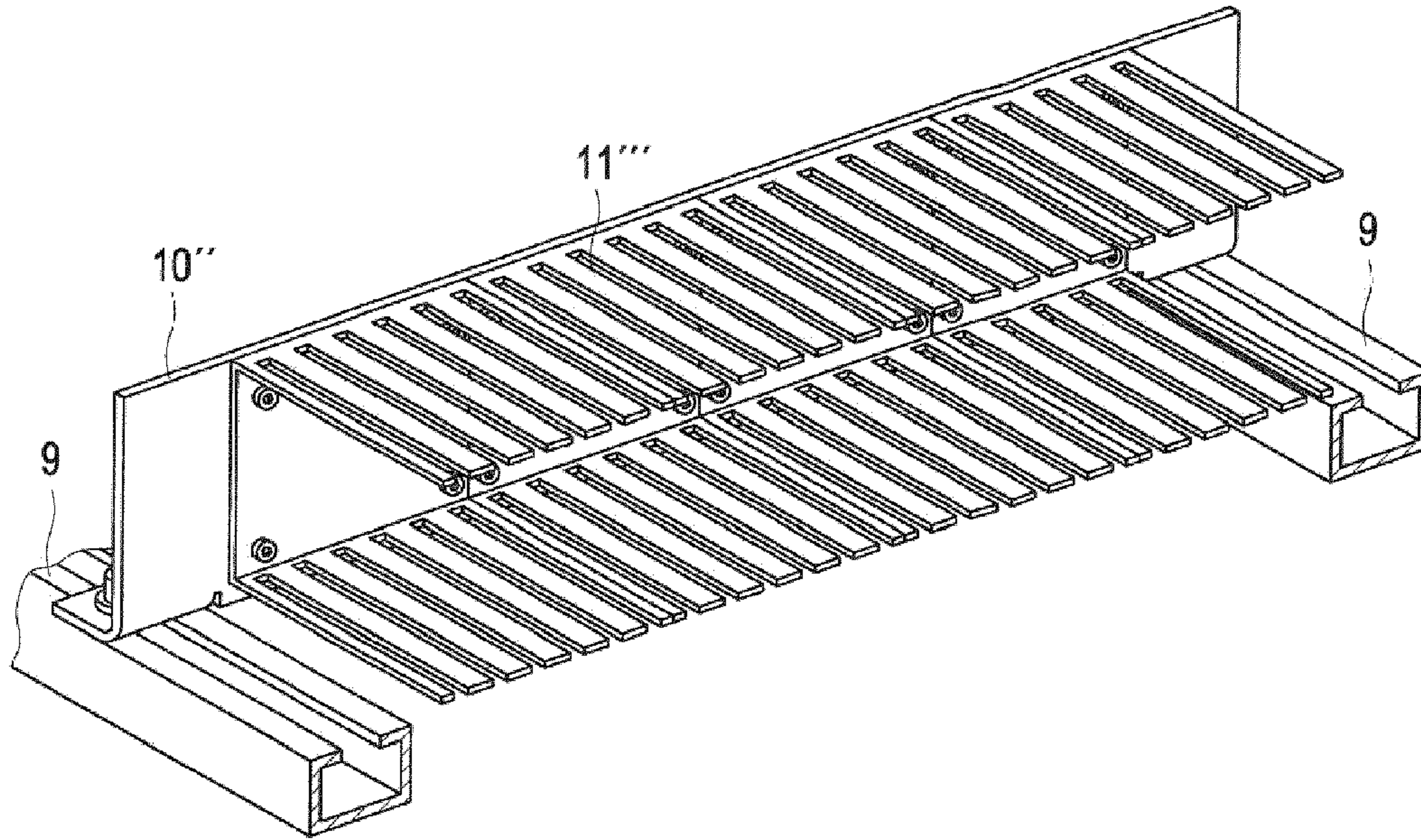


Fig. 11