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(54) Title: FLOOR ASSEMBLY

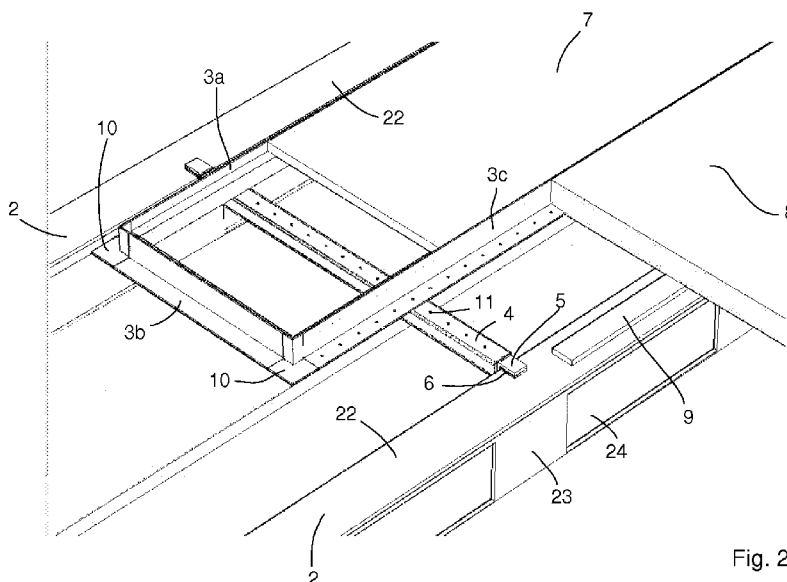


Fig. 2

(57) Abstract: The invention relates to a floor assembly provided with at least one plate, and at least two beams connected to the plate and extending parallel to each other. With the aid of the beams, at least two sections can be supported such that with the aid of the two sections, a detachable panel can be supported. Between the two beams, at least one bearing section is attachable, on which bearing section at least the two sections are attachable.



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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Title: Floor assembly

The invention relates to a floor assembly provided with at least one plate, and at least two beams connected to the plate which extend parallel to each other, wherein on extremities of the beams remote from the plate at least two sections can be positioned such that with the aid of the two sections a
5 detachable panel can be supported.

In the international patent application WO2009/058001 such a floor assembly and the advantages associated with detachable panels are described. The detachable panels are supported with the aid of at least one section supported by the beam, which section should extend transversely to the beam,
10 which, depending on the orientation of the beams extending parallel to each other, implies a compulsory orientation of the detachable panels.

The object of the invention is to provide a floor assembly, wherein in a simple manner the disadvantages of the known floor assembly are avoided.

With the floor assembly according to the invention, this object is
15 achieved in that at least one bearing section is attachable between the two beams, to which bearing section the sections are attachable.

With the aid of the bearing section, in the floor assembly according to the present invention, detachable panels can be positioned both parallel to the beams and in a direction transverse to the beams. With the aid of the
20 bearing section, it is even possible that directly below a detachable panel, no beam is located, but that the panel is floatingly supported by at least one bearing section. The freedom with which the detachable panels can be positioned is greatly enhanced through the bearing section.

A preferred embodiment of the floor assembly according to the
25 present invention is characterized in that the bearing section is attachable to the beam with the aid of a coupling means.

With the aid of a coupling means the bearing section can be relatively simply mounted on the bearing beam, so that the floor assembly can

be built up relatively rapidly and therefore cost-effectively. Through the use of a coupling means, the bearing section can be manufactured at any standard length, while the bearing section can be cut to size before assembling and, with the aid of the coupling means, be attached to a beam for providing a floor
5 assembly according to the present invention.

Another embodiment of the floor assembly according to the present invention is characterized in that the bearing section is provided, on the side proximal to the plate, with openings in which a first extremity of the coupling means is attachable.

10 In this manner, in a simple and brief assembling operation, a robust connection can be effected with the aid of the coupling means.

Yet another embodiment of the floor assembly according to the present invention is characterized in that the coupling means comprises a stepped form in which the first extremity is located at a higher level than a
15 mid-section of the coupling means extending parallel to the first extremity such that in a coupled condition, the mid-section is located substantially against the underside of the bearing section.

With the aid of the stepped form of the coupling element, in the assembled floor assembly a minimum amount of space is taken up by the
20 coupling element.

A further embodiment of the floor assembly according to the present invention is characterized in that a second extremity of the coupling means located opposite the first extremity and extending parallel thereto is attachable to a beam.

25 Owing to such a design, a transition without differences in height between the coupling means and the bearing section can be ensured.

A further embodiment of the floor assembly according to the present invention is characterized in that the coupling means can be detachably clamped in at least an extremity of the bearing section that is at least of hollow

design, while a non-clamped portion of the coupling means is attachable on the beam.

Such a coupling means that can be clamped can be mounted relatively simply and provides a robust connection between the beam and the
5 bearing section.

If the bearing sections are manufactured to size ex factory, it is also possible to provide at least one extremity and preferably two extremities of each bearing section with a one-piece attachment means connected to the bearing section for attaching the bearing section to the beam. For such bearing
10 sections, no coupling means are required.

The invention will be further elucidated on the basis of an exemplary embodiment shown in the drawings, wherein:

Fig. 1 shows a cross-sectional view of a floor assembly according to the invention.

15 Fig. 2 shows a perspective view of a floor assembly according to the invention.

Fig. 3 shows a perspective view of a floor assembly according to the invention.

Fig. 4 shows a perspective top plan view of a composite bearing
20 section according to the invention.

Fig. 5 shows a perspective bottom view of a composite bearing section according to the invention.

Figs. 6a-6d show cross-sectional views of a coupling means of a composite bearing section according to the invention.

25 Fig. 7 shows a perspective view of a corner joint between two sections connecting transversely to each other.

Fig. 8 shows an alternative embodiment of a coupling means of a composite bearing section according to the invention.

In the Figures, corresponding parts are provided with the same
30 reference numeral.

Figs. 1 – 3 show views of a floor assembly A according to the invention. The assembly A is provided with a concrete plate 1 and a number of I-shaped beams 2 connected to the concrete plate 1, of which beams only one is represented in Fig. 1.

5 Each I-shaped beam 2 has two parts 21, 22 extending parallel to each other, and a bridge part 23 extending transversely between the parts 21, 22. The part 21 is located in the concrete plate 1. The bridge part 23 is preferably provided with passages 24 (see Fig. 2) extending transversely to the bridge part 23.

10 The floor assembly A is further provided with detachable panels 7 which are supported by at least one section 3 of which only one is represented in Fig. 1. Such a section 3 is known per se from WO2009/058001 of the present applicant and will therefore not be explained further. The floor assembly A further comprises a stonelike floor 8 supported by the section 3 and a bearing
15 section 4 detachably disposed between two I-shaped beams for supporting the section 3 which bearing section 4 is detachably connected to a first extremity 25 of a coupling means 5 of which the section extremity 26 of the coupling means 5 located opposite the first extremity 25 is located on the part 22 of the beam 2 for supporting the bearing section 4 and the parts 3, 7, 8 of the
20 assembly A located thereon. Between the part 22 of the beam 2 and the stonelike floor 8, and between the coupling means 5 and the part 22 of the beam 2, insulating elements 6, 9 are located for acoustically and/or thermally insulating the floor assembly A.

 The floor assembly A further comprises angularly disposed sections
25 3a, 3b, 3c, which, with the aid of the bearing section 4, can extend both parallel and transversely to the beams 2. The angularly disposed sections 3a, 3b, 3c are mutually connected with the aid of a corner joint 10. The sections 3 can form a framework or form part thereof, for instance but not limited to a principally right-angled framework. One or more detachable panels can be placed within
30 the framework and/or be supported by the sections of the framework. The

panel or the panels can close off an opening within the framework. The framework is preferably closed upon itself.

Fig. 4 shows a perspective top plan view of a first embodiment of a bearing section 4 preferably of hollow design according to the invention which is provided, on extremities 30, 31 located opposite each other in longitudinal direction, with coupling means 5. The bearing section 4 is provided, on the top side 32 remote from the plate 1 in mounted condition, with openings 11 with the aid of which a section 3, 3a, 3c is attachable to the bearing section 4. The openings 11 are repeated in a fixed pattern over the longitudinal direction of the bearing beam 4. Preferably, the sections 3, 3a, 3c are also provided with such a pattern of openings.

Fig. 5 shows a perspective bottom view of a bearing section 4 which is provided with coupling means 5 on the extremities 30, 31 located opposite each other in longitudinal direction. The underside 33 of the bearing section 4 also comprises openings 12 in the form of slot recesses 12. The openings 12 are repeated in a fixed pattern over the longitudinal direction of the carrier beam 4. Due to the openings 11, 12 extending over the entire length of the bearing section, the bearing sections 4 can be manufactured having a standard size of, for instance, 2 meters, while upon assembly of the floor assembly A, the bearing section 4 can be cut to the correct size in situ.

In the Figures 6A-D it is shown how the bearing section 4 can be attached with the aid of the coupling means 5 to a beam (not shown in Figs. 6A-D). The coupling means 5 is provided with a stepped form, in which the first extremity 35 is located at a higher level than a mid-section 37 of the coupling means 5 that extends parallel to the first extremity 35. The first extremity 35 is connected via a connecting part 36 to the mid-section 37. The height of the connecting part 36 preferably almost corresponds to the sum of the thickness of the first extremity 35, the thickness of the mid-section 37 and the thickness of the underside 33 of the hollow bearing section 4 so that, in

coupled condition, the mid-section 37 is located substantially against the underside 33 of the bearing section 4.

Further, a second extremity 39 of the coupling means 5, located opposite the first extremity 35 and extending parallel thereto, is attachable to the part 22 of the beam 2. The second extremity 39 extends parallel to the mid-section 37 and is located highest. With the aid of a connecting part 38, the mid-section 37 is connected to the second extremity 39. The distance h between the underside of the mid-section 37 and the underside of the second extremity 39 is preferably substantially equal to the height of the bearing section 4, so that a transition 50 between the bearing section 4 and the coupling means 5 positioned on the beam 2 comprises almost no height difference.

Upon attachment of the coupling means 5, first, the first extremity 35 of the coupling means 5 is inserted into an opening 12 in the underside 33 of the bearing section 4 in a direction indicated with arrow M. The opening 12 is dimensioned such that the first extremity 36 of the coupling means 5 is movable therethrough with minimum clearance, until the connecting part 36 abuts against the underside 33 of the bearing section, hinged about a pivot 13, which is represented in Fig. 6B. Then, as is represented in Fig. 6C, the coupling means 5 is pivoted about pivot 13 in the direction indicated by arrow R, until the top surface of the second extremity 30 is located almost in one plane with the top side 32 of the bearing section 4 (see Fig. 6D). In this position, with the floor assembly in mounted condition, the coupling means 5 will rest on the beam 2. Now, the sections 3 can be positioned on the bearing section 4 so that detachable panels can be placed with greater freedom in the surface to be defined by the floor assembly.

Fig. 7 shows a perspective view of the corner joint 10 of the section 3a with the section 3b according to the invention, which corner joint 10 is provided with a support 15 which can seamlessly link up with the support 45 of the sections 3a, 3b. The corner joint 10 further comprises projecting connecting pins 16a, 16b, which are dimensioned such that they can be

clampingly attached in the hollow spaces 17 of the sections 3a and 3b or be detachably attached in a different manner. Preferably, the corner joint 10 is manufactured from plastic.

Fig. 8 shows an alternative embodiment of a coupling means 105 for providing a transition 50 without levels. The coupling means 105 comprises a first portion 107 which can be detachably clamped in the extremity 31 of the bearing section 4, and a second portion 111 which is attachable, optionally with an insulating element 6, to a beam 2. The first portion 107 is connected with the aid of an intermediate piece 109 to the second portion 111.

The bearing section 4 and the coupling means 5 are preferably manufactured from metal while the different parts can be welded together.

Through the use of acoustically and/or thermally insulating elements, a floor assembly A with good acoustically and/or thermally insulating values is obtained.

Optionally, the openings 11 provided for assembly can also be omitted. Further, it is possible to replace the openings 11 by assembly supporting markings, in the form of, for instance, centring points or stripes which can be produced relatively easily and rapidly.

With bearing sections made ex factory (not shown) it is possible to provide at least one extremity 30, 31 with a one piece attachment means (not shown) connected to the bearing section, so that the coupling means (5, 105) is no longer required.

In embodiments of the invention, acoustically insulating elements may be provided on the top of the beams. For instance, but not limited to strips with a top side. The top of the bearing sections can then, at least there where they support the sections 3, be approximately flush with the top of those elements. The sections can then extend in any direction over and between the beams, supported by at least the elements and/or the bearing sections, for instance parallel to or at an angle to the longitudinal direction of the beams and/or at an angle deviating 90° or 180°.

In one method, a floor can be formed, preferably with a floor assembly as described hereinabove, wherein an element having a plate and beams connected thereto is laid on a bearing construction, such as walls of a building, while on the top side of the beams at least one, and preferably at
5 least two bearing sections are placed, wherein on a top of the or the at least two bearing sections at least one section is placed on which a detachable panel is supported which forms part of the floor, together with further floor parts supported on the beams, preferably stonelike floor parts. Thus, from a number of sections, a framework can be formed which is supported on at least one
10 bearing section and wherein on or within the framework at least one detachable panel is supported.

The invention is not limited in any manner to the embodiments shown in the Figures. Many variations thereon are possible within the scope of the invention as given by the claims, including at least all combinations of
15 parts of the embodiments shown and described, of which all elements are to be considered generically applicable within the invention.

Claims

1. A floor assembly provided with at least one plate, and at least two beams connected to the plate, wherein on extremities of the beams remote from the plate at least one bearing section is positioned, characterized in that on the bearing section and/or between two bearing sections at least one section is attached, on which section a detachable panel is supported.
5
2. A floor assembly according to claim 1, characterized in that the bearing section is attachable to the beam with the aid of a coupling means.
- 10 3. A floor assembly according to claim 2, characterized in that the bearing section is provided, on the side proximal to the plate, with openings in which a first extremity of the coupling means is attachable.
- 15 4. A floor assembly according to any one of the preceding claims, characterized in that the coupling means comprises a stepped form, wherein the first extremity is located at a higher level than a mid-section of the coupling means extending parallel to the first extremity, such that in a coupled condition the mid-section is located substantially against the underside of the bearing section.
20
5. A floor assembly according to claim 4, characterized in that a second extremity of the coupling means located opposite the first extremity and extending parallel thereto is attachable on a beam.
- 25 6. A floor assembly according to claim 1 or 2, characterized in that the coupling means can be detachably clamped in an extremity of the bearing

section that is at least of hollow design, while a non-clamped portion of the coupling means is attachable on a beam.

7. A floor assembly according to claim 1, characterized in that the
5 bearing section is provided on at least one extremity with a one-piece attachment means connected to the bearing section for attaching the bearing section on a beam.

8. A floor assembly according to any one of the preceding claims,
10 characterized in that the bearing section is provided with openings on the side remote from the plate, with the aid of which openings a section is attachable on the bearing section.

9. A floor assembly according to any one of the preceding claims,
15 characterized in that thermal and/or acoustic insulating elements can be positioned between different parts of the floor assembly, preferably between the bearing section and the beam.

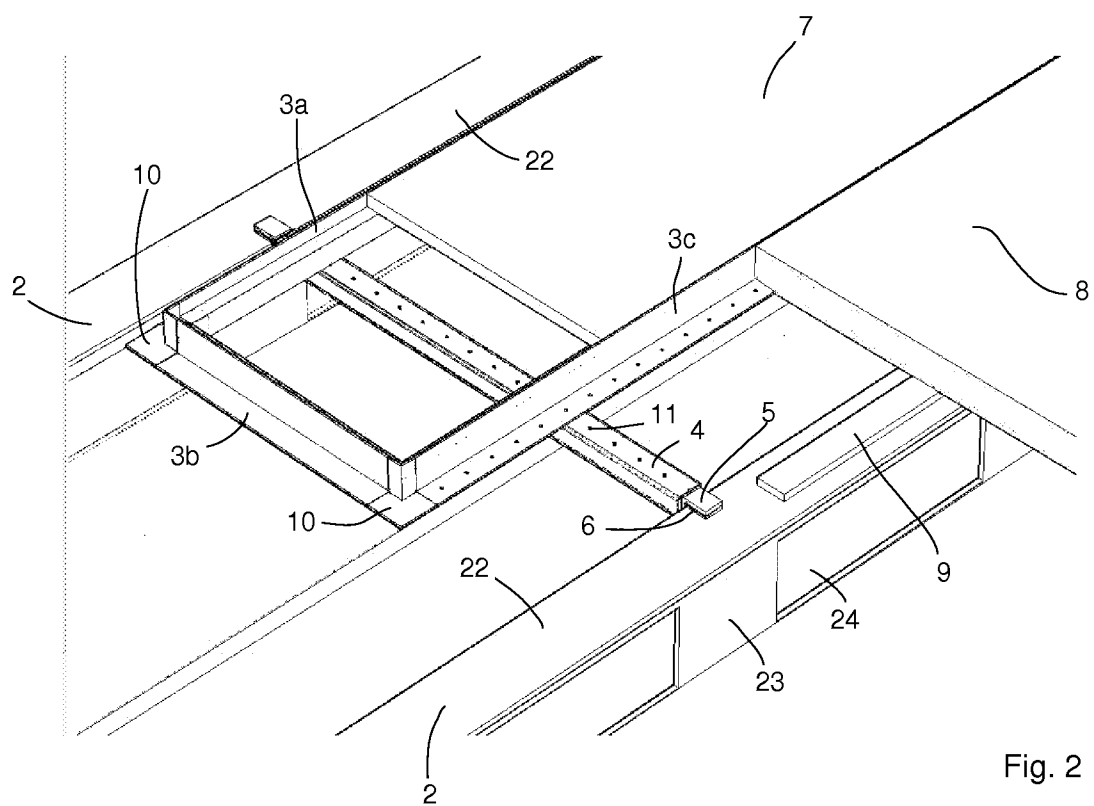
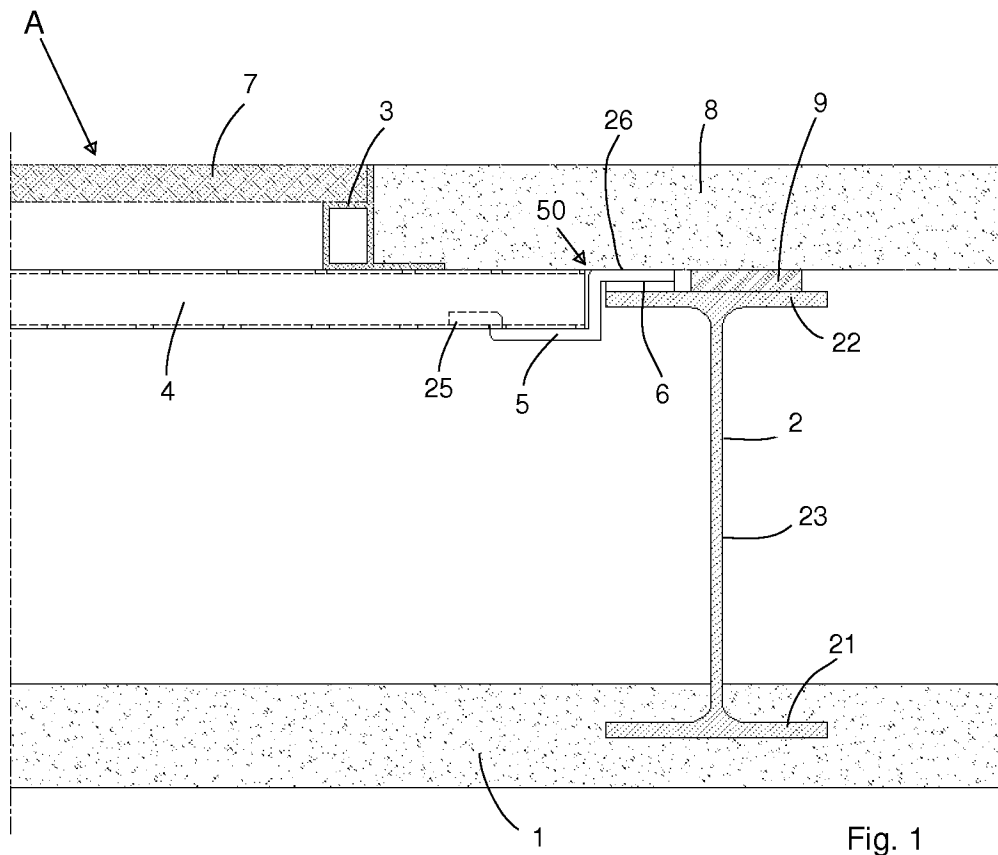
10. A floor assembly according to any one of the preceding claims,
20 characterized in that two sections extending transversely to each other can be interconnected with the aid of a corner joint.

11. A floor assembly according to any one of the preceding claims,
wherein the section supported by the at least one bearing section forms part of
25 a framework closed upon itself of sections, on which and/or within which the detachable section is supported, in particular such that a framework formed by the sections has an opening which is closed off by the panel or a number of detachable panels.

12. A floor assembly according to any one of the preceding claims,
wherein on the top side of the beams acoustically insulating elements such as
strips are placed, having a top side, and wherein the bearing sections have a
top side which is approximately flush with the top side of the acoustically
5 insulating elements.

13. A method for forming a floor, wherein an element with a plate and
beams connected thereto is placed on a bearing construction, such as walls of a
building, wherein on the top side of the beams at least one and preferably at
10 least two bearing sections are placed, wherein on a top side of the or the at
least two bearing sections at least one section is placed on which a detachable
panel is supported which forms part of the floor, together with further floor
parts supported on the beams, preferably stone-like floor parts.

14. A method according to claim 13, wherein from a number of sections,
a framework is formed, which is supported on at least one bearing section, and
wherein on or within the framework at least one detachable panel is
supported.



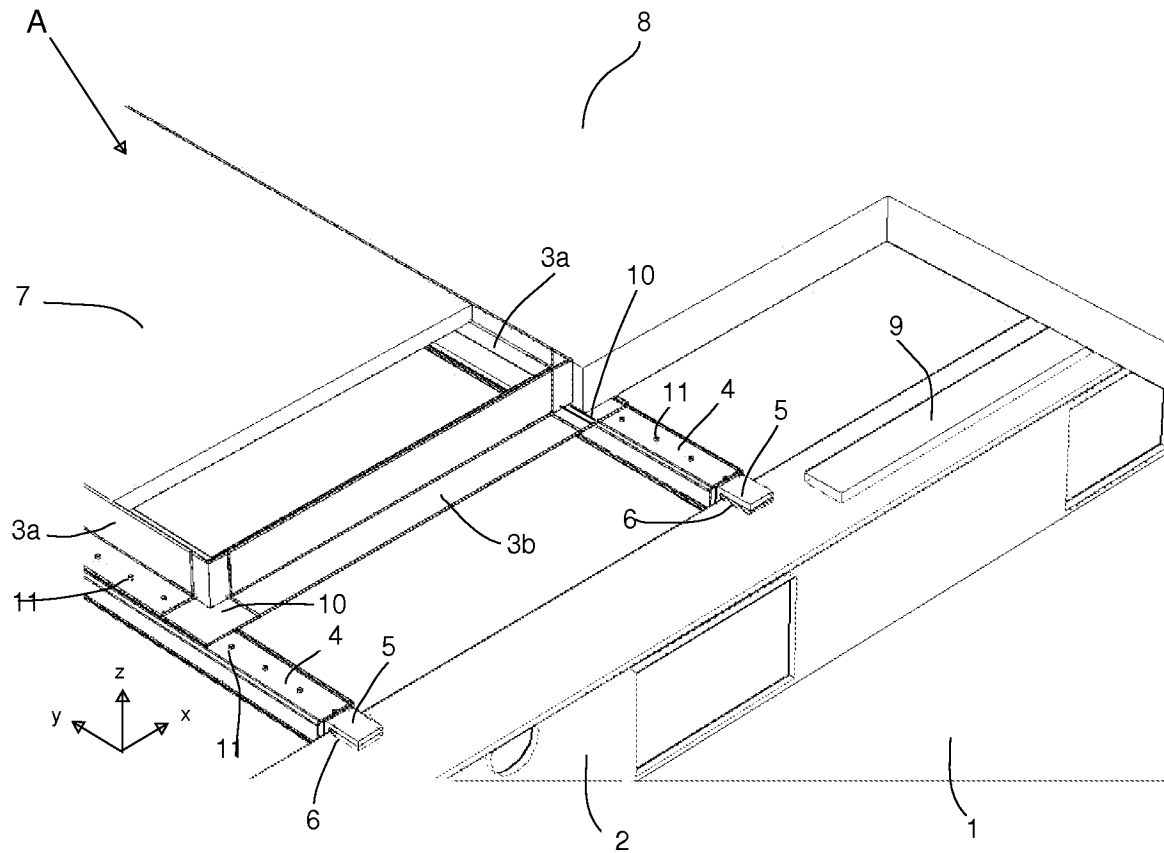


Fig. 3

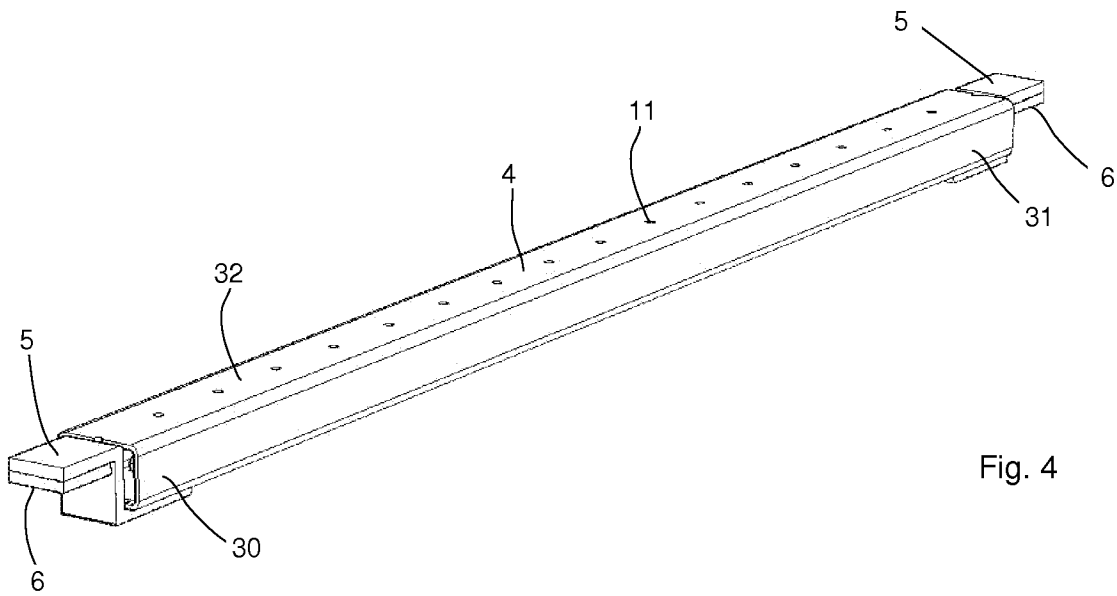


Fig. 4

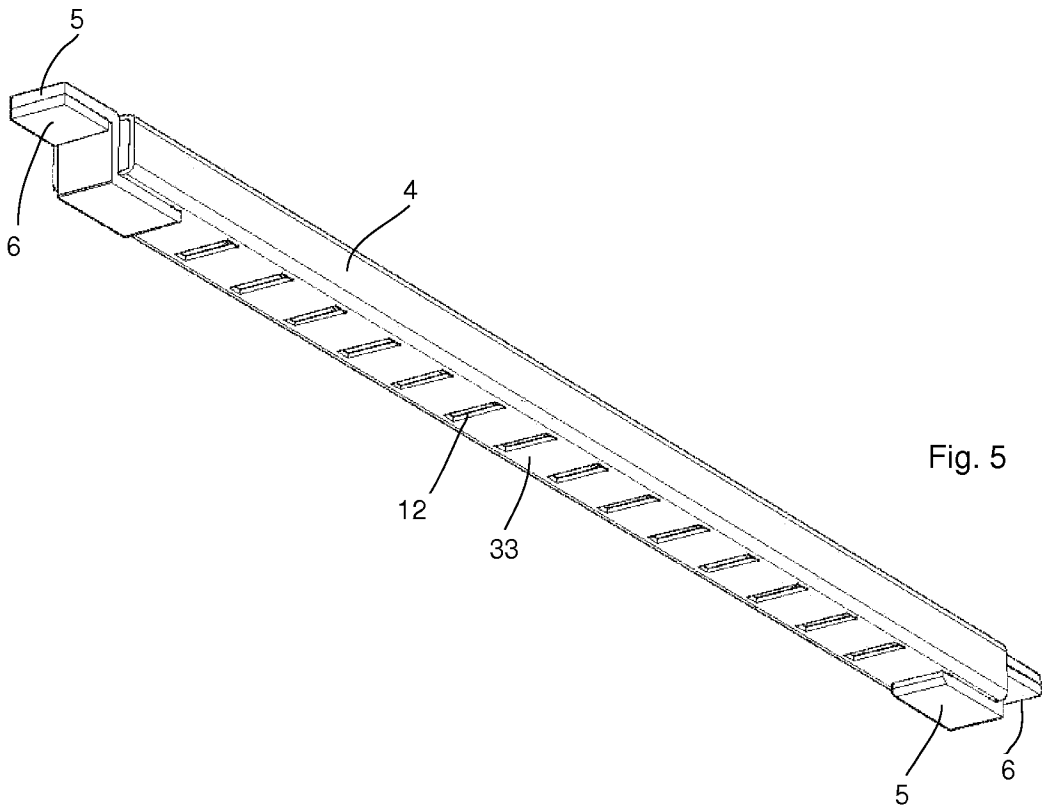
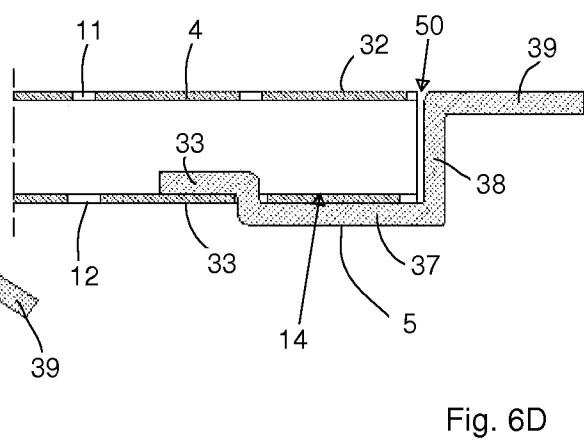
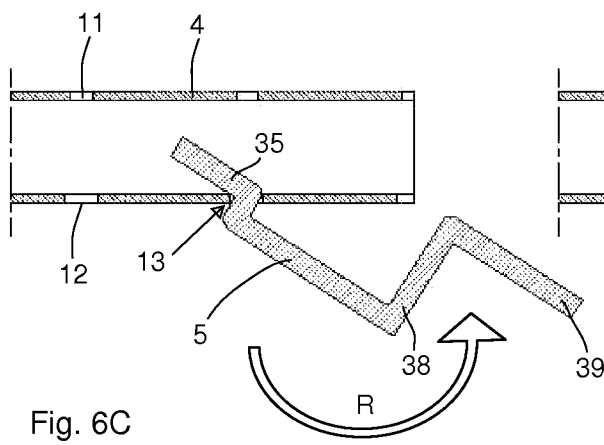
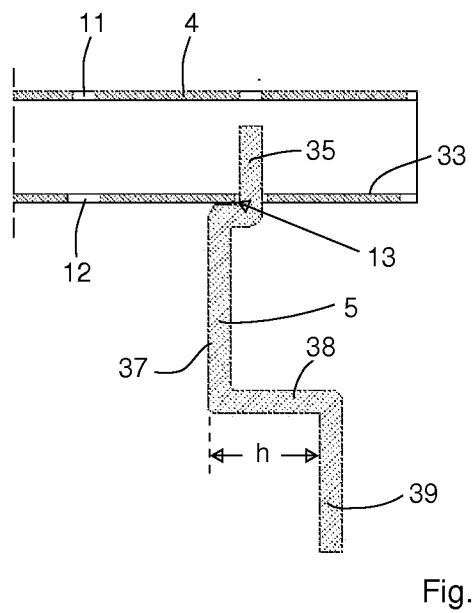
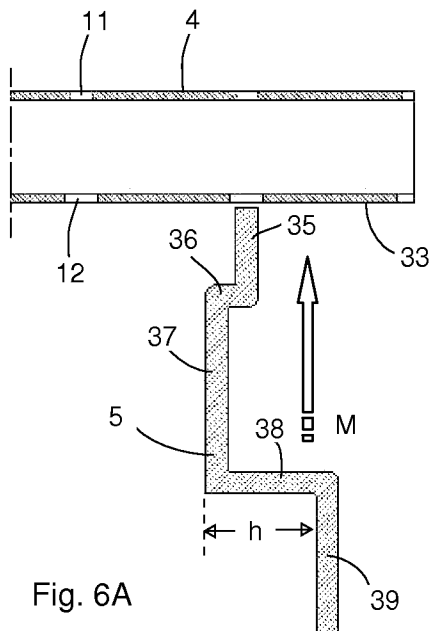
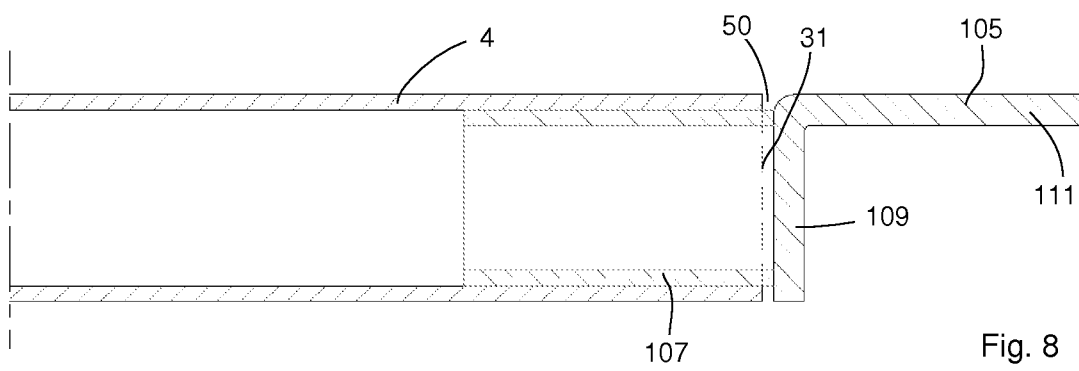
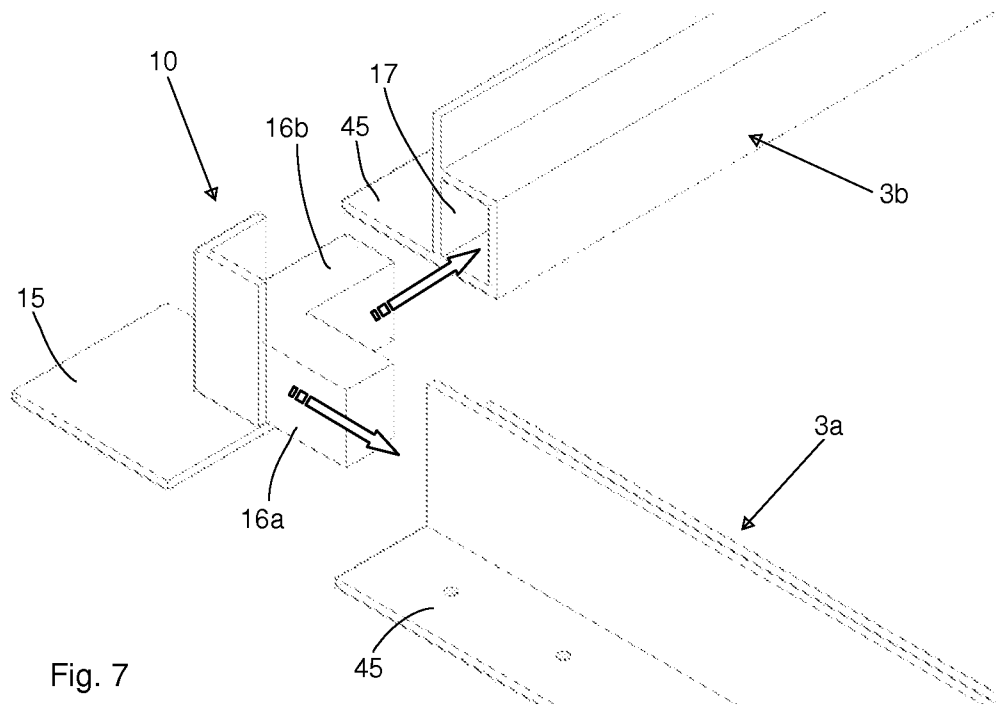


Fig. 5





INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2010/050405

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04B5/10 E04B5/48
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04B

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 260 322 B1 (LINDSAY FREDRICK H [US]) 17 July 2001 (2001-07-17) figures 9-13	1-3,7-14
A	WO 2009/058001 A1 (INFRA & B V [NL]; VAN GROEN HENDRIK DIEDERIK WIL [NL]) 7 May 2009 (2009-05-07) cited in the application the whole document	1,13

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2010/050405

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6260322	B1	17-07-2001	NONE	
WO 2009058001	A1	07-05-2009	EP 2212484 A1	04-08-2010
			NL 1034619 C2	06-05-2009