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(54) **FORMWORK STRUCTURE FOR THE EXECUTION OF HORIZONTAL CASTINGS FOR THE PROVISION OF FLOOR SLABS**

(57) A formwork structure (10) for the execution of horizontal castings for the provision of floor slabs, of the type comprising a plurality of props (11, 12, 13) and load-bearing heads (14, 15, 16) to be arranged on the props (11, 12, 13) for the resting of panels (17) designed to define a surface for a concrete casting, each panel (17) comprising at least two longitudinal profiles (18, 19) for resting on the load-bearing heads (14, 15, 16), and mutually connected by transverse elements (20), the formwork structure (10) being characterized in that:

- each one of the longitudinal profiles (18, 19) comprises a central body (21), a first longitudinal part (22) for fixing the transverse elements (20), and an opposite second longitudinal edge part (23), for the resting of the longitudinal profile (18, 19) on a load-bearing head (14, 15, 16),
- each one of the load-bearing heads (14, 15, 16) comprises a flat base (24) from which at least one lateral shoulder (27, 28) extends, on each one of two opposite sides (25, 26), for the resting of the central body (21) of a longitudinal profile (18, 19) in an intermediate configuration of assembly or disassembly, and a central raised portion (29) which extends from the same side as the lateral shoulders (27, 28), with cantilevered lateral flaps (30, 31) which are preset to define a tipping prevention abutment for the second longitudinal part (23) of a longitudinal profile (18, 19) in the intermediate configuration of assembly or disassembly.

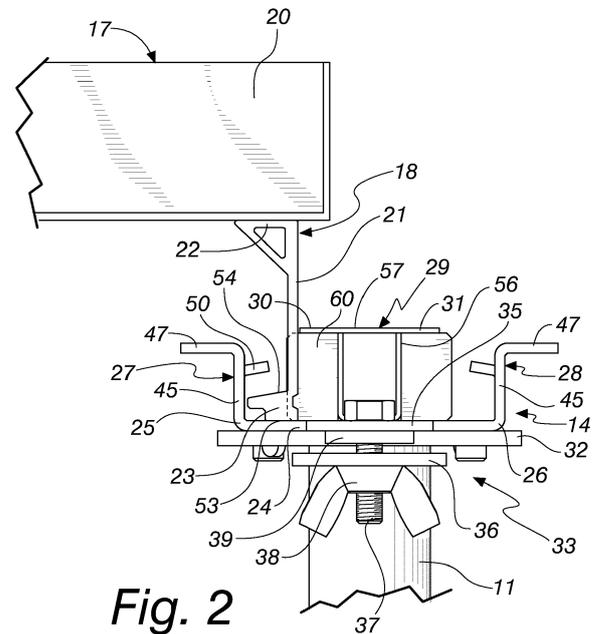


Fig. 2

Description

[0001] The present invention relates to a formwork structure for the execution of horizontal castings for the provision of floor slabs.

[0002] Nowadays formwork structures for the provision of floor slabs are known and widespread, of the type comprising a plurality of props and load-bearing heads to be arranged on the props for the resting of panels designed to define a surface for a concrete casting.

[0003] Each panel comprises at least two longitudinal profiles, for resting on the load-bearing heads, which are mutually connected by transverse elements.

[0004] The load-bearing heads and the longitudinal profiles of the panels are contoured so as to make it possible to hang a panel between two load-bearing heads, in an intermediate configuration of assembly or disassembly, i.e. before the panel is lifted into the horizontal configuration of use, or during the step of removing the panel.

[0005] Such formwork systems, although widespread and appreciated, suffer some drawbacks.

[0006] A first drawback is linked to the fact that the parts for hanging a panel between two load-bearing heads, although they fully ensure the coupling of a longitudinal profile to those load-bearing heads and the retention of the coupled panel, if the panel is improperly pushed upward from below when in the hanging configuration, the longitudinal profile might disengage from the load-bearing heads, with consequent dangers for the operators nearby and for the surrounding formwork structure.

[0007] Furthermore, the longitudinal profiles of the panel, in order to be capable of being used as described above, have to be machined with operations to perforate them and remove material in order to determine passages for corresponding engagement portions defined on the load-bearing heads; simultaneously, the load-bearing heads themselves have a complex shape, with specially-contoured coupling elements.

[0008] The aim of the present invention is to provide a formwork structure that is capable of overcoming the limitations of conventional formwork systems.

[0009] Within this aim, an object of the invention is to provide a formwork structure for the execution of horizontal castings for the provision of floor slabs which makes it possible to mount the formwork panels more safely, in particular with regard to hanging with coupling of the formwork panel to the load-bearing heads, both in the steps of preparation for assembly and in the steps of the actual assembly and, lastly, in the step of disassembly after use.

[0010] Another object of the present invention is to provide a formwork structure that is particularly resistant to the loads applied thereto.

[0011] Another object of the present invention is to provide a formwork structure for floor slabs, which has the safety systems required by regulations in the construc-

tion sector.

[0012] A further object of the invention is to provide a formwork structure that is simple and immediate to use by workers.

[0013] A still further object of the invention is to provide a formwork structure that is simpler to provide in terms of construction, by way of production processes that are simple, fast, and lower cost than similar, conventional formwork structures.

[0014] This aim and these and other objects which will become better evident hereinafter are achieved by:

A formwork structure for the execution of horizontal castings for the provision of floor slabs, of the type comprising a plurality of props and load-bearing heads to be arranged on said props for the resting of panels designed to define a surface for a concrete casting, each panel comprising at least two longitudinal profiles for resting on said load-bearing heads, and mutually connected by transverse elements, said formwork structure being characterized in that:

- each one of said longitudinal profiles comprises a central body, a first longitudinal part for fixing said transverse elements, and an opposite second longitudinal edge part, for the resting of the longitudinal profile on a load-bearing head,
- each one of said load-bearing heads comprises a flat base from which at least one lateral shoulder extends, on each one of two opposite sides, for the resting of said central body of a said longitudinal profile in an intermediate configuration of assembly or disassembly, and a central raised portion which extends from the same side as said lateral shoulders, with cantilevered lateral flaps which extend from the same side as a corresponding lateral shoulder and are preset to define a tipping prevention abutment for said second longitudinal part of a said longitudinal profile in said intermediate configuration of assembly or disassembly.

[0015] Further characteristics and advantages of the invention will become better apparent from the description of a preferred, but not exclusive, embodiment of the formwork structure according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

- Figure 1 is a perspective view of a formwork structure according to the invention;
- Figure 2 is a front elevation view of a detail of the structure according to the invention;
- Figure 3 is a perspective view of a load-bearing head of a formwork structure according to the invention;
- Figure 4 is a cross-sectional view of the load-bearing head in Figure 3;
- Figure 5 is a side view of a load-bearing head as in

Figure 3;

- Figure 6 is a perspective view of a load-bearing head in a variation of embodiment thereof;
- Figure 7 is a view from above of the load-bearing head in Figure 6;
- Figure 8 is a perspective view of a formwork structure according to the invention in an intermediate configuration of assembly or disassembly;
- Figure 9 is a front elevation view of a detail of Figure 8;
- Figures from 10 to 12 each show a step of mounting a panel on a load-bearing head of a formwork structure according to the invention.

[0016] With reference to the figures, a formwork structure for the execution of horizontal castings for the provision of floor slabs, according to the invention, is generally designated with the reference numeral 10.

[0017] The formwork structure 10 comprises a plurality of props, of which, for example, three props are designated in Figure 1 with the numerals 11, 12 and 13, and load-bearing heads, for example 14, 15, 16, to be arranged on the props 11, 12, 13 for the resting of panels, one of which is shown for the purposes of example in Figure 1 and designated therein with 17, designed to define a surface for a concrete casting.

[0018] Each panel 17 comprises at least two longitudinal profiles 18 and 19, lateral, for resting on the load-bearing heads 14, 15, 16.

[0019] The lateral longitudinal profiles 18 and 19 are mutually connected by transverse elements 20.

[0020] The formwork structure 10 according to the invention is characterized by the following peculiarity.

[0021] Each of the longitudinal profiles 18 and 19 comprises, as can clearly be seen in Figure 2 for a first longitudinal profile 18:

- a central body 21,
- a first longitudinal part 22, for fixing the transverse elements 20,
- and an opposite second longitudinal part 23, for the resting of the longitudinal profile 18 and 19 on a load-bearing head 14, 15 and 16.

[0022] Each of the load-bearing heads 14, 15, 16 comprises:

- a flat base 24,
- a lateral shoulder, 27 and 28 respectively, extends from the flat base 24, on each one of two opposite sides 25 and 26, for the resting of the central body 21 of a longitudinal profile 18 and 19 in an intermediate configuration of assembly or disassembly, as in Figures 8 and 9,
- and a central raised portion 29 which extends from the same side as the lateral shoulders 27 and 28, with cantilevered lateral flaps 30 and 31 which extend from the same side as a corresponding lateral

shoulder 27 and 28 and are preset to define a tipping prevention abutment for the second longitudinal part 23 of a longitudinal profile 18 and 19.

[0023] The flat base 24 is quadrangular, and has means for fixing to a corresponding end plate 32 of a prop, for example 11.

[0024] Such fixing means, in a first variation of embodiment shown in Figures 3, 4 and 5, are constituted by two opposite clamp devices 33 and 34, which are positioned on the two sides of the flat base 24 that are free from the shoulders 27 and 28.

[0025] The clamp devices 33 and 34 are each constituted by an appendage 35 of the flat base 24 and by a grip plate 36 placed opposite, each defining a jaw of the vise-like device, there being a screw 37 and a corresponding wing-nut or bolt 38 for tightening the appendage 35 and plate 36 on a corresponding edge of the end plate 32 of a prop 11.

[0026] Positioned below the appendages 35 are corresponding centering shims 39 which are preset to facilitate the correct positioning of the load-bearing head 14 on the plate 32.

[0027] The fixing means, in a second variation of embodiment shown in Figures 6 and 7, are constituted by two opposite wedge-like devices 133 and 134, which are positioned on the two sides of the flat base 24 that are free from the shoulders 27 and 28.

[0028] The wedge-like devices 133 and 134 are each constituted by an appendage 135 of the flat base 24 and by a wedge-shaped plate 136 arranged opposite, the latter pivoted to a screw 137 passing through the appendage 135 and held thereupon by way of a nut or bolt 138.

[0029] The wedge-shaped plate 136 has a flat body provided with a hole for pivoting to the shank of the screw 137, and has an arc-shaped perimetric profile edge, and a thickness that increases from a first end 140 to the opposite, second end 141 of the same arc-shaped edge.

[0030] The wedge-shaped plate 136 is able to rotate about the shank of the screw 137, by way of a lever appendage 142 between a configuration for coupling, shown for the purposes of example in Figure 7, with the plate arranged below the head 32 of a prop 11, and a configuration for disengagement, with the plate 136 rotated so as not to affect the head 32.

[0031] The lateral shoulders 27 and 28 are each constituted by a lower part 45, which extends from the flat base 24 for the entire length of the corresponding side 25 and 26, and by two supporting wings 46 and 47, which are bent outward in the configuration for use of the load-bearing head 14, and are spaced apart in the direction of extension of the same corresponding side 25 and 26.

[0032] In the present embodiment, the lower part 45 extends at right angles to the flat base 24.

[0033] In the present embodiment, the supporting wings 46 and 47 extend according to an arrangement that is parallel to the flat base 24.

[0034] There is an auxiliary protrusion 50 between two

laterally adjacent supporting wings 46 and 47 which extends from the same lower part 45 and extends toward the central raised portion 29 and is preset to come into contact with the lower part 23 of a longitudinal profile 18 and 19 in order to guide its rotation.

[0035] The auxiliary protrusion 50 is constituted by a wing that extends from the lower part 45 of the shoulder 27 and 28, bent toward the central raised portion 29, at a lower height than the supporting wings 46 and 47.

[0036] The longitudinal profile 18 and 19 is constituted, in the present embodiment, by a single metallic drawn element, in which the central body 21 is flat, the first part 22 is tubular with a triangular cross-section, and the second part 23 widens on one side into a ridge, obviously longitudinal, the lower surface 53 of which is preset for resting on the flat base 24, while its upper surface 54 is preset to encounter the auxiliary protrusion 50 in the steps of assembly and disassembly, as can be seen from Figures 10, 11 and 12, which in the sequence described, show three separate steps of mounting a profile 18 on a load-bearing head 14.

[0037] The central raised portion 29 is constituted, in the form described herein of the invention, which is illustrative and non-limiting of that invention, by a U-shaped bracket 56, which is fixed to the flat base 24, and by an upper plate 57 the lateral portions of which define the cantilevered lateral flaps 30 and 31.

[0038] The load-bearing heads 14 also have vertical plates 60 which are adapted to prevent the translation of the longitudinal profiles 18 and 19 in the direction of their longitudinal extension.

[0039] In practice it has been found that the invention fully achieves the intended aim and objects.

[0040] In fact the cantilevered lateral flaps 30 and 31 prevent the involuntary disengagement of the longitudinal profile 18 and 19 of a panel 17 from a load-bearing head 14, both in the configuration for assembly and in the in configuration for disassembly.

[0041] In particular the supporting wings 46 and 47 cooperate to keep the central body 21 of a longitudinal profile 18 and 19 substantially horizontal in the intermediate configuration of assembly or disassembly shown in Figure 9, with the central body 21 resting on the supporting wings 46 and 47 and the second part 23 resting against a tipping prevention lateral flap 30, so as to prevent the weight of the transverse elements 20 from causing the downward rotation and the uncoupling of the panel 17.

[0042] Therefore, with the invention a formwork structure has been devised for the execution of horizontal castings for the provision of floor slabs which makes it possible to mount the formwork panels more safely, in particular with regard to hanging with coupling of the formwork panel to the load-bearing heads, both in the steps of preparation for assembly and in the steps of the actual assembly and, lastly, in the step of disassembly after use.

[0043] With the invention a formwork structure has been devised that is particularly resistant to the loads applied thereto, and which offers performance levels that

are not inferior to known formworks.

[0044] Moreover, with the present invention a formwork structure for floor slabs has been devised, which has the safety systems required by regulations in the construction sector.

[0045] Furthermore, with the invention a formwork structure has been devised that is simple and immediate to use by workers.

[0046] Moreover, with the invention a formwork structure has been devised which is simpler to provide in terms of construction, by way of production processes that are simple, fast, and lower cost than similar, conventional formwork structures.

[0047] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0048] In practice the components and the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0049] The disclosures in Italian Patent Application No. 102015000035889 (UB2015A002326) from which this application claims priority are incorporated herein by reference.

[0050] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A formwork structure (10) for the execution of horizontal castings for the provision of floor slabs, of the type comprising a plurality of props (11, 12, 13) and load-bearing heads (14, 15, 16) to be arranged on said props (11, 12, 13) for the resting of panels (17) designed to define a surface for a concrete casting, each panel (17) comprising at least two longitudinal profiles (18, 19) for resting on said load-bearing heads (14, 15, 16), and mutually connected by transverse elements (20), said formwork structure (10) being **characterized in that:**

- each one of said longitudinal profiles (18, 19) comprises a central body (21), a first longitudinal part (22) for fixing said transverse elements (20), and an opposite second longitudinal edge part (23), for the resting of the longitudinal profile (18, 19) on a load-bearing head (14, 15, 16),
- each one of said load-bearing heads (14, 15, 16) comprises a flat base (24) from which at least one lateral shoulder (27, 28) extends, on each

- one of two opposite sides (25, 26), for the resting of said central body (21) of a said longitudinal profile (18, 19) in an intermediate configuration of assembly or disassembly, and a central raised portion (29) which extends from the same side as said lateral shoulders (27, 28), with cantilevered lateral flaps (30, 31) which extend from the same side as a corresponding lateral shoulder (27, 28) and are preset to define a tipping prevention abutment for said second longitudinal part (23) of a said longitudinal profile (18, 19) in said intermediate configuration of assembly or disassembly.
2. The formwork structure according to claim 1, **characterized in that** said flat base (24) is provided with means for fixing to a corresponding end plate (32) of a prop (11).
 3. The formwork structure according to one or more of the preceding claims, **characterized in that** said fixing means are constituted by two opposite clamp devices (33, 34), which are arranged on the two sides of the flat base (24) that are free from the shoulders (27, 28).
 4. The formwork structure according to one or more of claims 1 and 2, **characterized in that** said fixing means are constituted by two opposite wedge-like devices (133, 134), which are arranged on the two sides of the flat base (24) that are free from the shoulders (27, 28).
 5. The formwork structure according to one or more of the preceding claims, **characterized in that** said lateral shoulders (27, 28) are each constituted by a lower part (45), which extends from the flat base (24) for the entire length of the corresponding side (25, 26), and by two supporting wings (46, 47), which are bent outward in the configuration for use of the load-bearing head (14) and are spaced apart in the direction of extension of said corresponding side (25, 26).
 6. The formwork structure according to one or more of the preceding claims, **characterized in that** said lower part (45) extends at right angles to the flat base (24), said supporting wings (46, 47) extending along an arrangement that is parallel to the flat base (24).
 7. The formwork structure according to one or more of the preceding claims, **characterized in that** there is an auxiliary protrusion (50) between two laterally adjacent supporting wings (46, 47) which extends from the same lower part (45) and extends toward the central raised portion (29) and is preset to come into contact with the lower part (23) of a longitudinal profile (18, 19) in order to guide its rotation.
 8. The formwork structure according to one or more of the preceding claims, **characterized in that** said auxiliary protrusion (50) is constituted by a wing that extends from the lower part (45) of the shoulder (27, 28), bent toward the central raised portion (29), at a lower height than the supporting wings (46, 47).
 9. The formwork structure according to one or more of the preceding claims, **characterized in that** said longitudinal profile (18, 19) is constituted by a single metallic drawn element, in which the central body (21) is flat, the first part (22) is tubular with a triangular cross-section, and the second part (23) widens on one side into a ridge the lower surface (53) of which is preset for resting on the flat base (24), while its upper surface (54) is preset to encounter the auxiliary protrusion (50) in the steps of assembly and disassembly.
 10. The formwork structure according to one or more of the preceding claims, **characterized in that** said central raised portion (29) is constituted by a U-shaped bracket (56), which is fixed to the flat base (24), and by an upper plate (57) the lateral portions of which determine said cantilevered lateral flaps (30, 31).

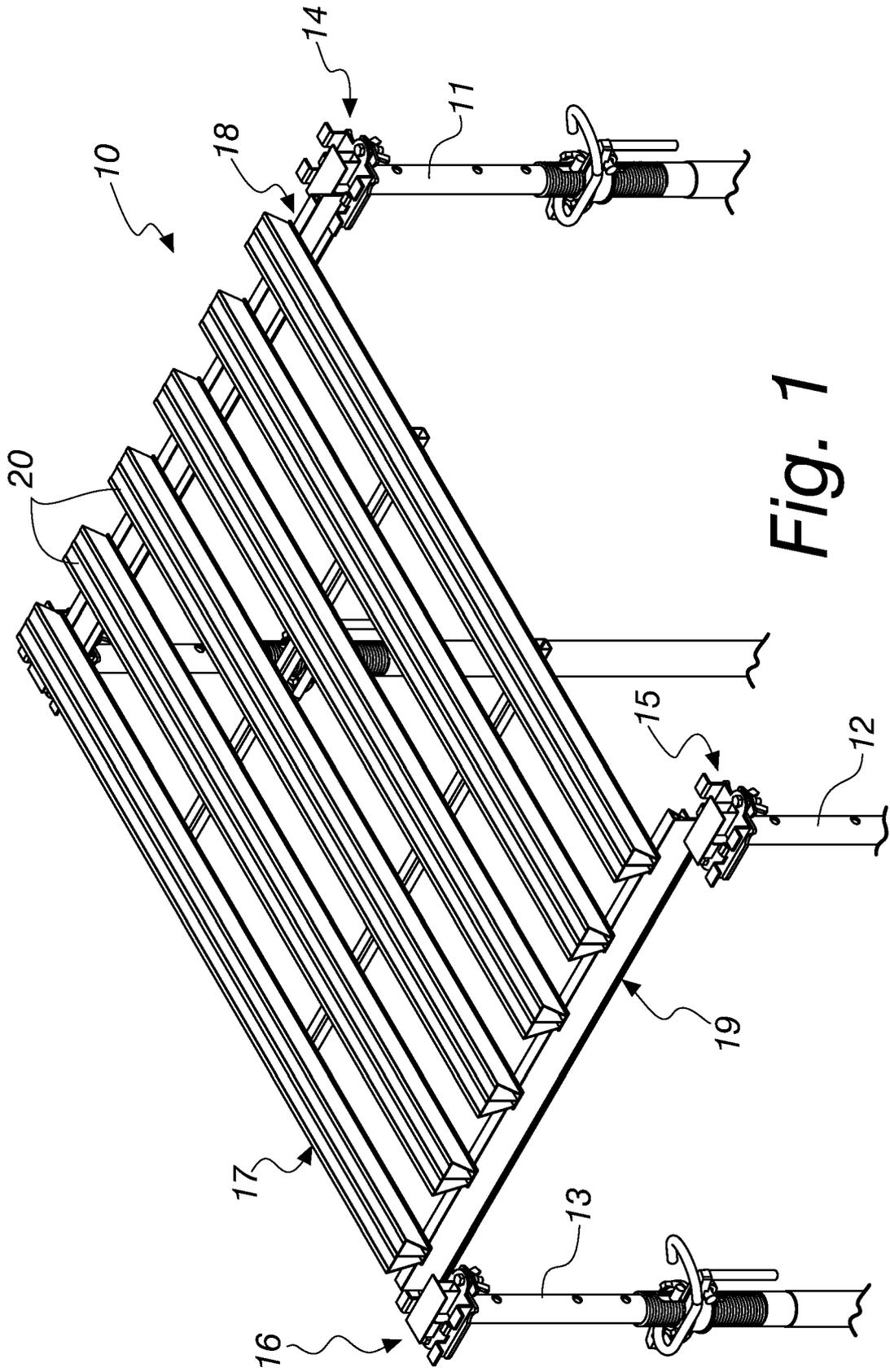


Fig. 1

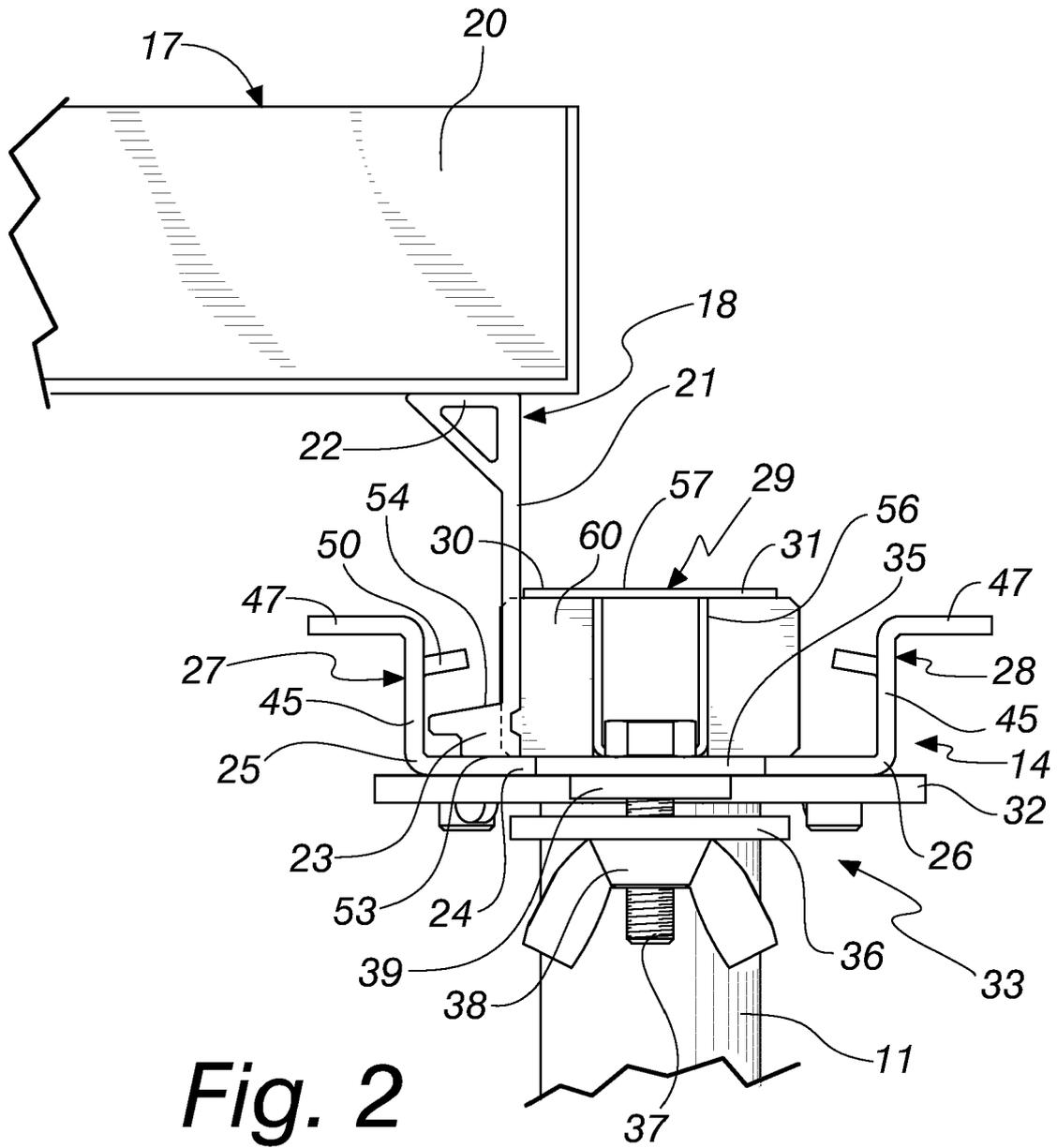
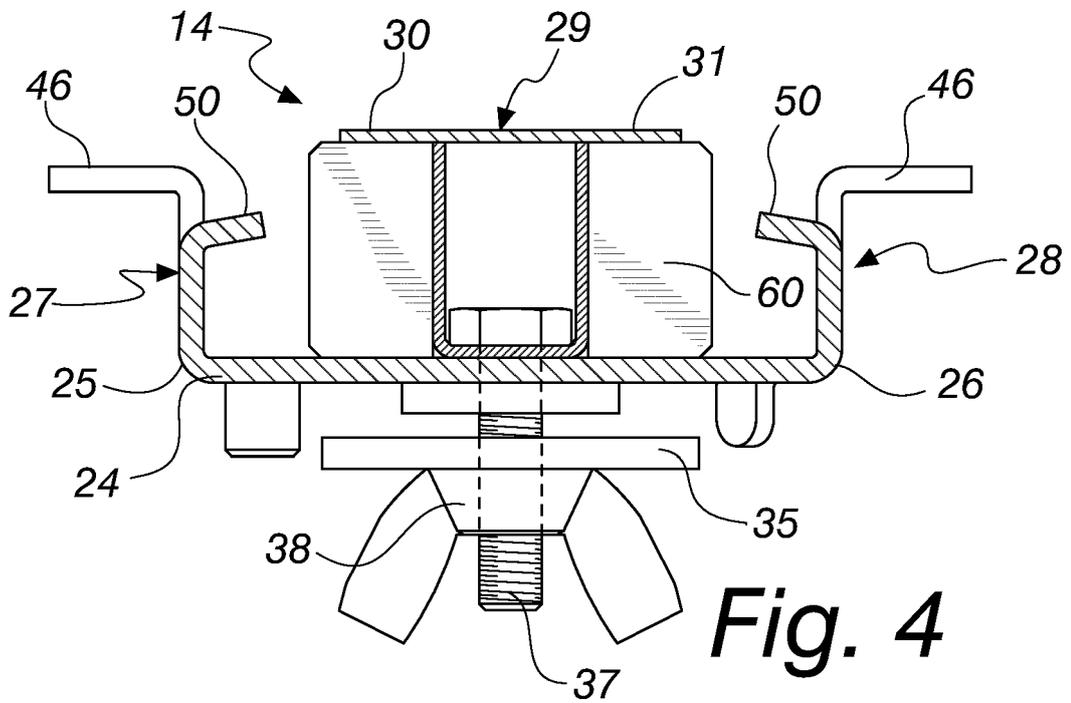
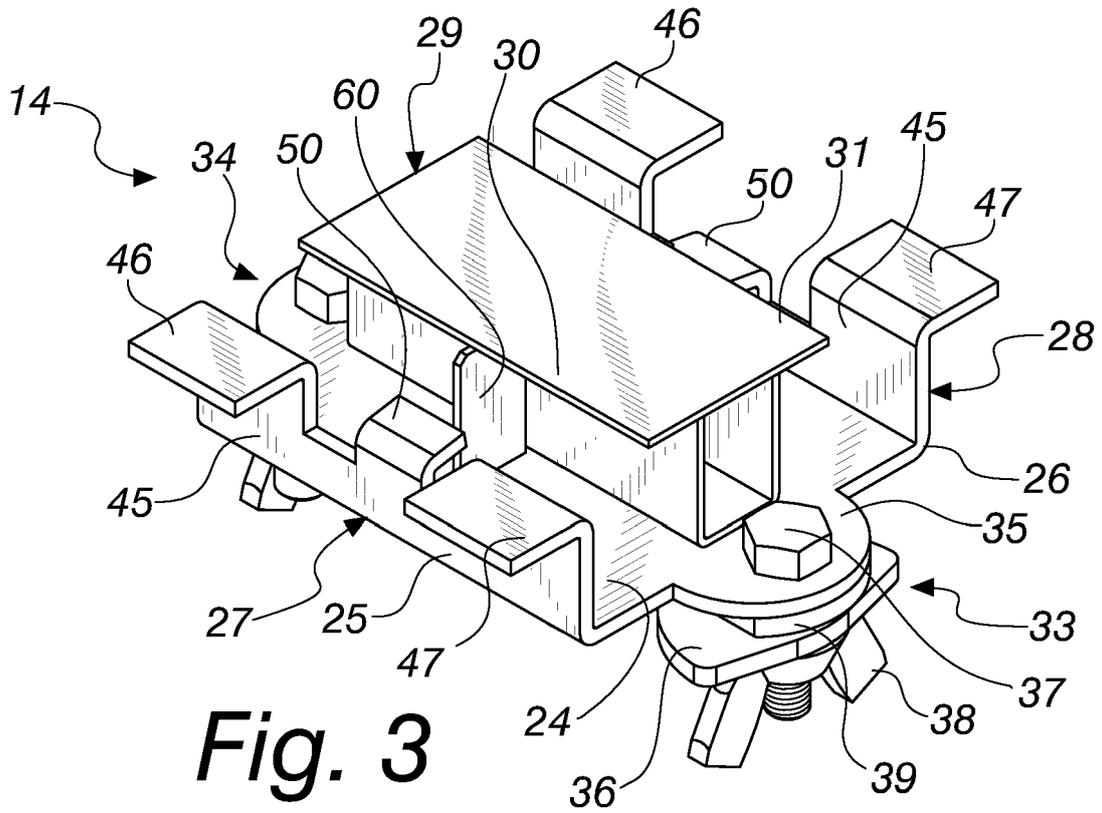
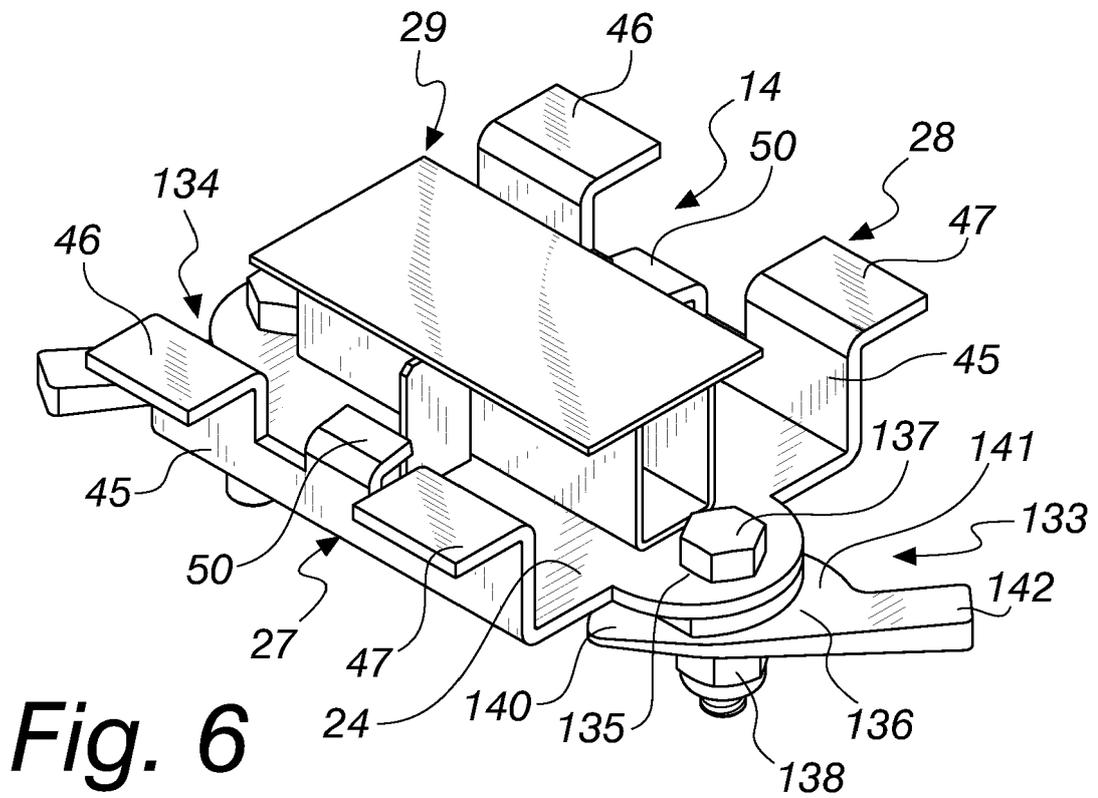
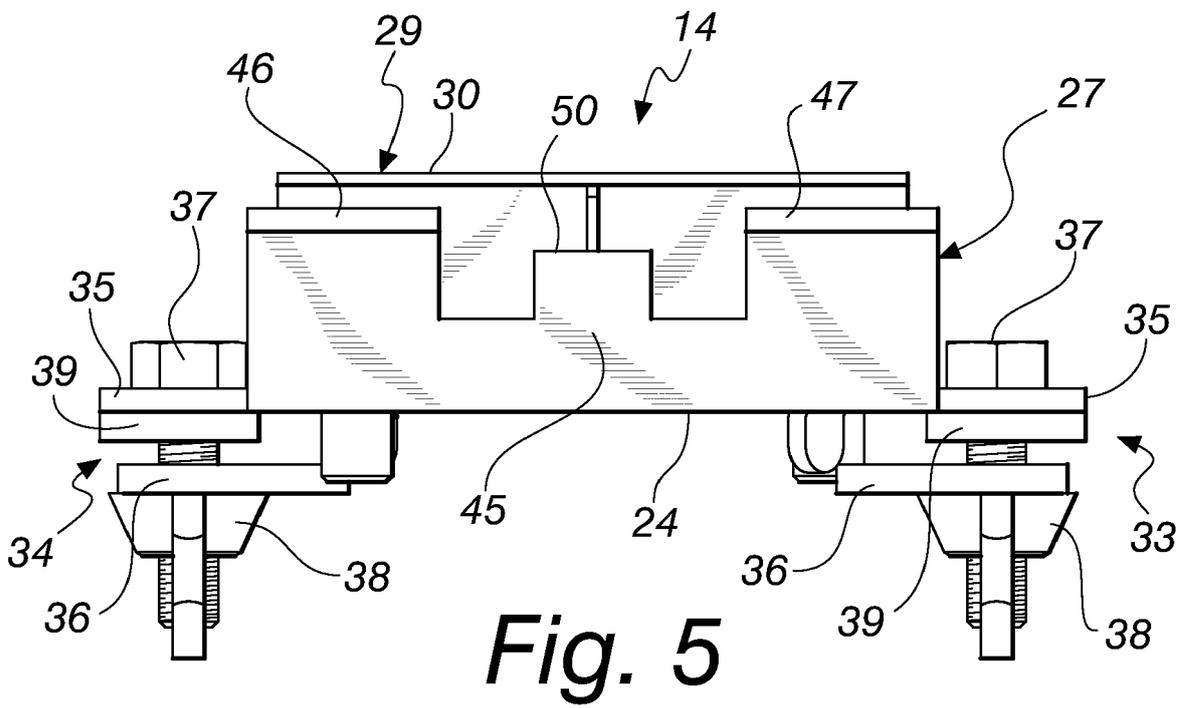


Fig. 2





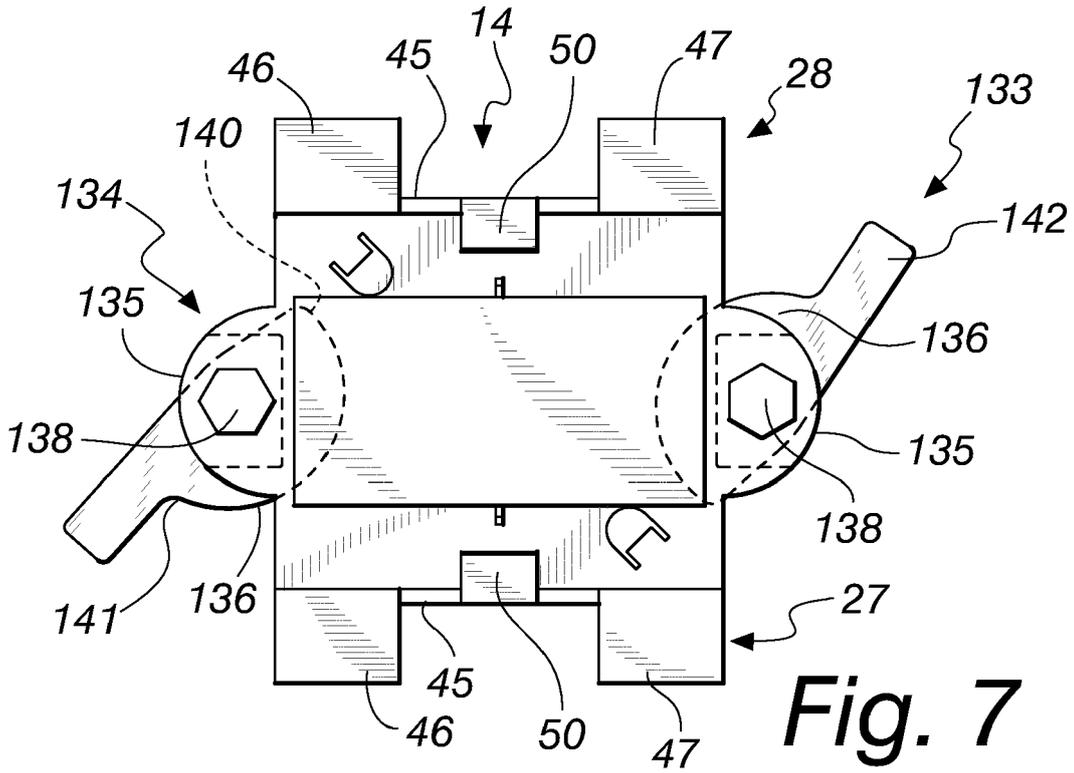


Fig. 7

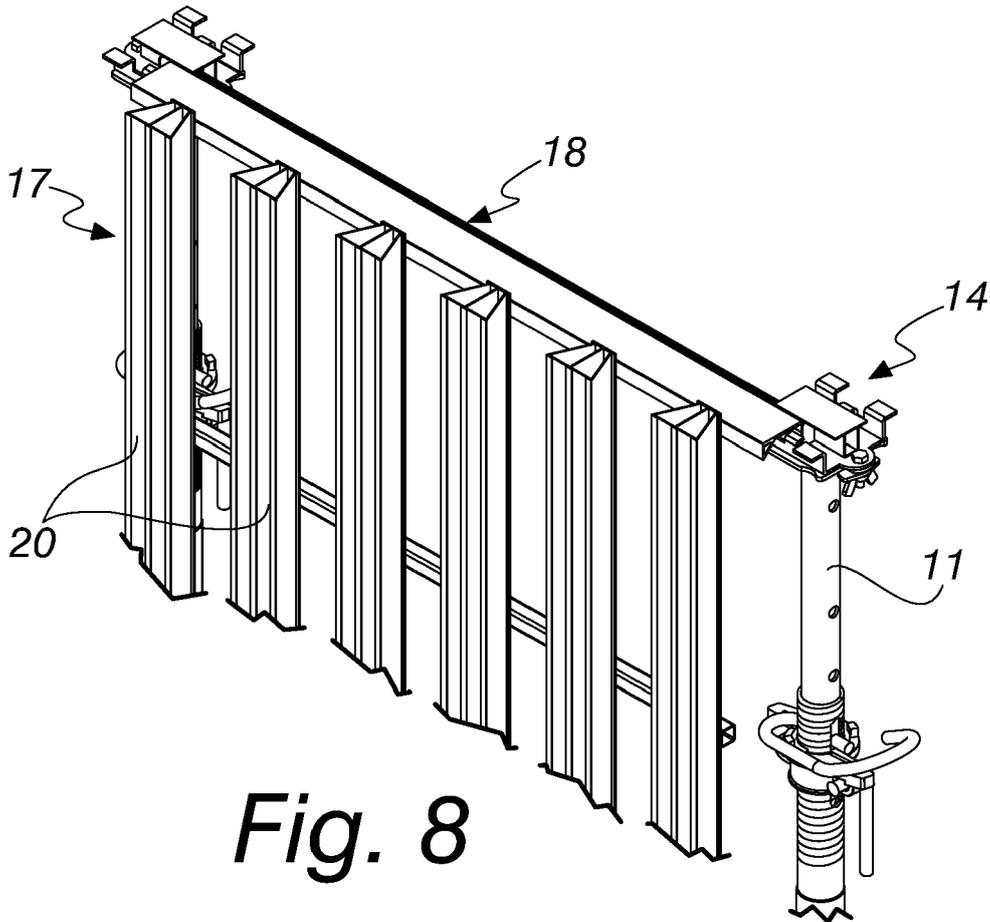
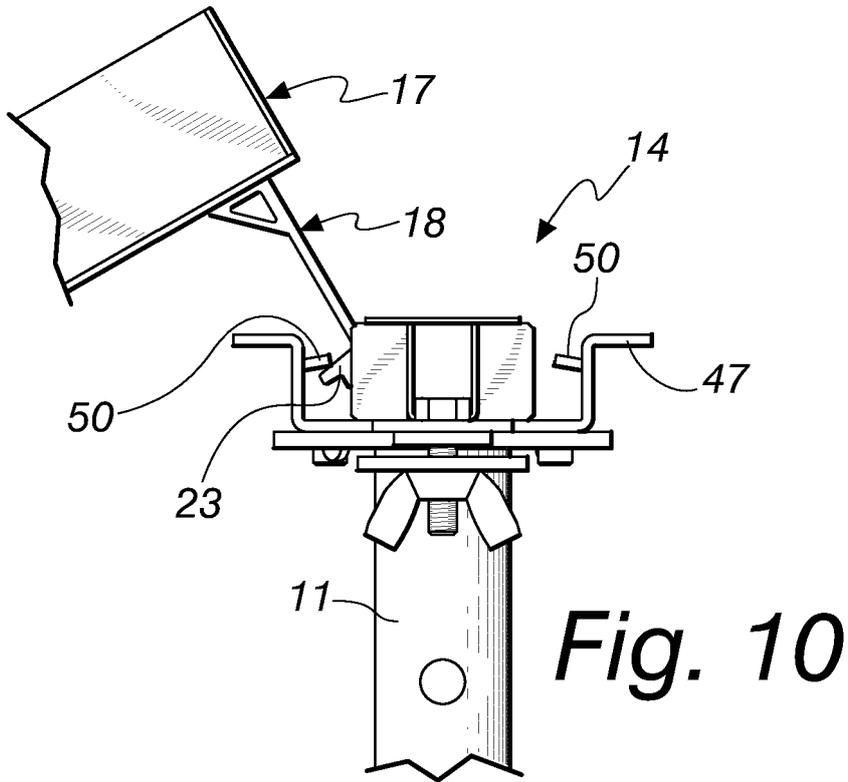
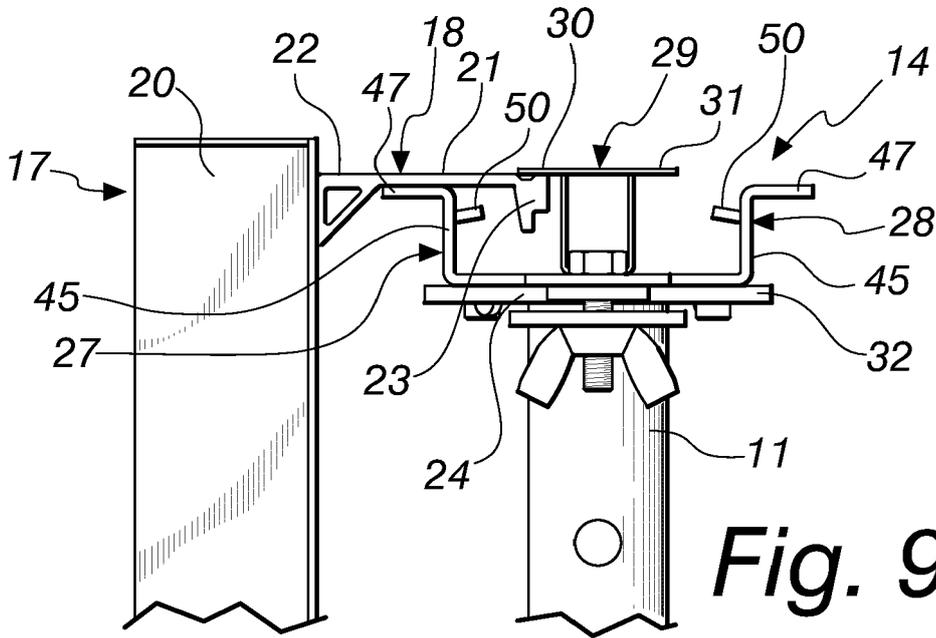


Fig. 8



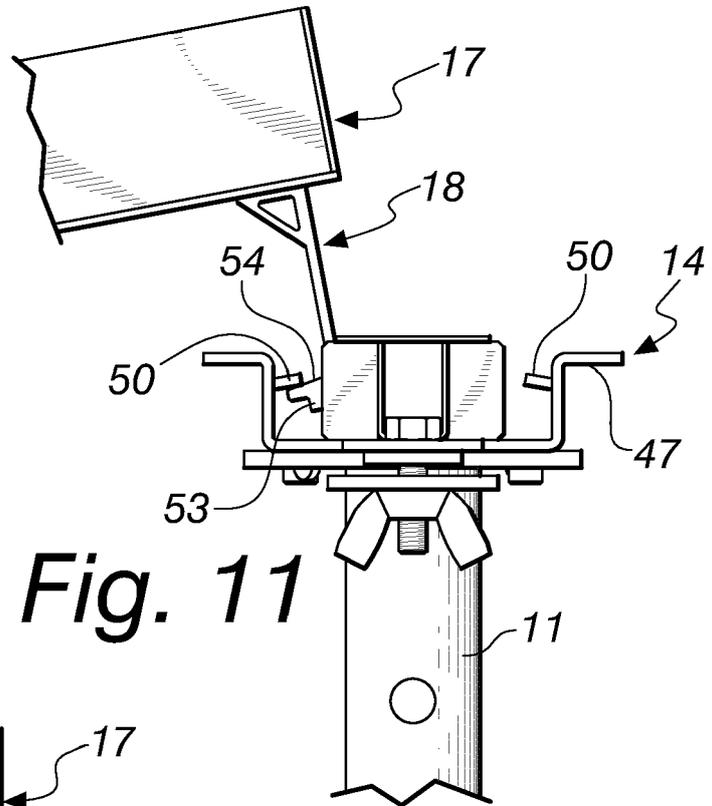


Fig. 11

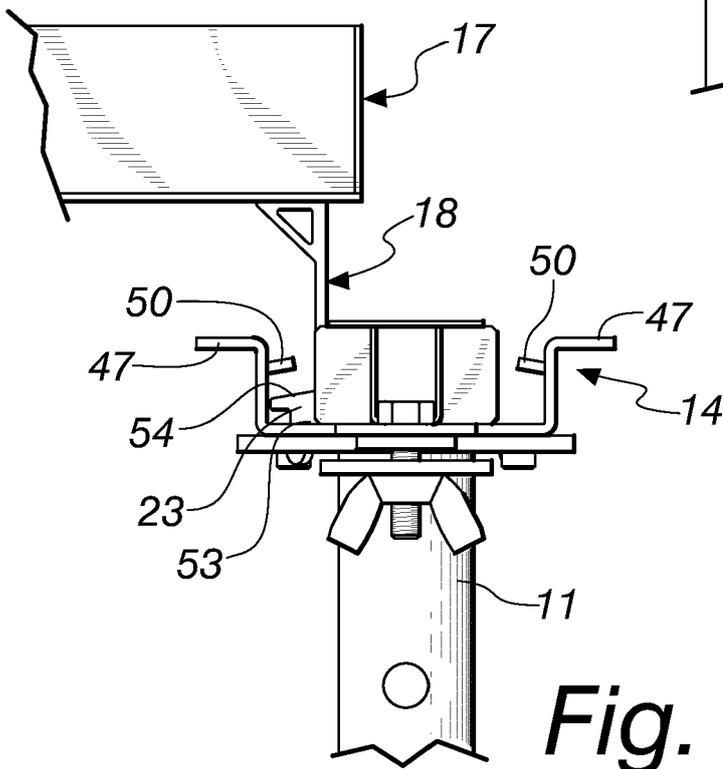


Fig. 12



EUROPEAN SEARCH REPORT

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EP 16 17 9964

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