



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.07.2014 Bulletin 2014/27

(51) Int Cl.:
E04G 11/48 (2006.01)

(21) Application number: **13198780.2**

(22) Date of filing: **20.12.2013**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(30) Priority: **28.12.2012 IT PD20120411**

(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 series of props (11), and load-bearing heads (12) to be arranged on the props (11) for the resting of panels (13, 14, 15, 16) designed to form a surface for a concrete casting.

Each one of the load-bearing heads (12) comprises a plate (17) on which a cage (17a) is welded, the cage having a square plan shape and being obtained from metallic profiled elements.

Recessed seats (18, 19) are provided in the corner regions of the cage (17a) and constitute the corner sup-

port of the load-bearing lateral profiles (22, 23) of a panel (13), which rests on a corner different from the one that comprises the recessed seats (18, 19), but are in any case equivalent.

Each corner region of the plate (17) has means (26) for the reversible engagement of one of the panels (13, 14, 15, 16) on one side thereof that is selected, for example, from the two incident sides (27, 28) of the panel (14), the reversible engagement means (26) being designed to support the panel hung in a temporary inclined configuration for assembly and disassembly, with anti-tipping safety means (29).

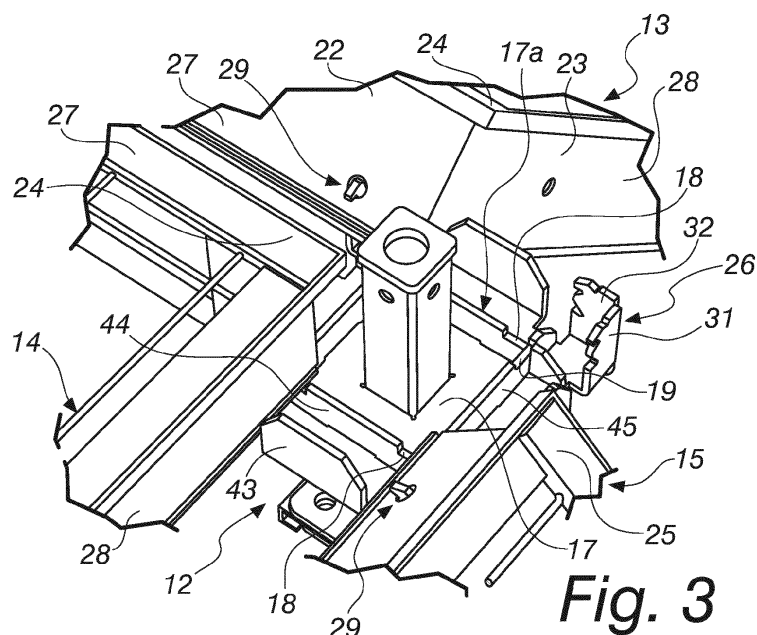


Fig. 3

Description

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

[0002] Nowadays, conventional formwork structures have props that support a frame upon which panels rest which are made with wooden boards or with a metallic frame that supports plywood sheets.

[0003] Normally the assembly of these structures involves the handling of the various elements by a single operator.

[0004] A first drawback of the structures known today consists in the fact that the panels are inconvenient to handle owing to the weight of their wooden components, to the detriment of the speed of assembly of the formwork structure and of the safety of the operator.

[0005] In order to overcome such drawback, nowadays one solution is to use panels that are smaller, and hence of reduced weight with respect to panels of larger size.

[0006] However, such a solution involves an increase in the number of panels to be applied on the frame, to the detriment of the speed of its assembly.

[0007] Furthermore, in order to facilitate detachment of the panels from the floor slab, after it has been provided, their wooden parts are treated with formwork separating oils.

[0008] Thus the working surface that such panels define, and which is a deck for the operator to walk on, is dangerously slippery, to the detriment of the safety of the personnel who work on it.

[0009] In order to overcome these drawbacks, as disclosed and claimed in EPA 10710850.8 in the name of Faresin Building Division S.p.A., a formwork structure for executing floor slabs and the like has been devised which comprises a frame for supporting panels and props for supporting such frame, characterized in that the panels comprise a frame covered by a metallic net that defines a working surface of the panel.

[0010] The metallic net is made of electro-welded metallic rods.

[0011] Such invention provides a formwork structure that is easy and safe to set up even by a single operator; in fact the panels with a working surface defined by a metallic net are much lighter and manageable than the wooden panels known today.

[0012] Furthermore, such formwork structure for the same weight, compared to the structures known today, makes it possible to set up a surface for the execution of a floor slab with a larger area.

[0013] Such a formwork structure, although widespread and appreciated, has room for improvement.

[0014] In fact, such a conventional structure has a predefined direction of assembly, since both the load-bearing heads and the corner regions of the panels are made so that the assembly can be performed by engaging a panel between two heads at a predefined side thereof and then by raising the opposite side of the same panel.

[0015] In this manner the formwork is comprised of panels that are laterally adjacent in one direction and are separated by a space in the direction of the perpendicular, such space being necessary to allow the engagement of the panels, in an inclined arrangement, during the assembly step and their subsequent rotation.

[0016] Such structure thus imposes a well-defined and unavoidable arrangement of assembly, which is restrictive in those particular situations in which a panel needs to be attached or detached by inclining in a direction different from the one which is predefined.

[0017] The aim of the present invention is to provide a formwork structure for the execution of horizontal castings for the provision of floor slabs, which is capable of overcoming the above-mentioned limitation of conventional formwork structures.

[0018] Within this aim, an object of the invention is thus to make available a formwork structure that can be assembled and dismantled in two mutually different directions.

[0019] Another object of the invention is to provide a formwork structure that is easy to handle in the manner of conventional formworks.

[0020] Another object of the invention is to provide a formwork structure that is more flexible in use than conventional formworks.

[0021] Another object of the invention is to provide a formwork structure that offers performance levels that are not lower than those of formworks of the conventional type.

[0022] Another object of the invention is to provide a formwork structure that can be provided using conventional systems and technologies.

[0023] This aim and these and other objects which will become more 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 series of props, and load-bearing heads to be arranged on said props for the resting of panels designed to form a surface for a concrete casting, said formwork structure being characterized in that each one of said load-bearing heads comprises a plate on which a cage is welded, said cage having a square plan shape and being obtained from metallic profiled elements, recessed seats being provided in the corner regions of said cage and constituting the corner support of the load-bearing lateral profiles of the panel, each corner region of said plate having means for the reversible engagement of one of the panels on one side thereof that is selected, said reversible engagement means being designed to support the panel hung in a temporary inclined configuration for assembly and disassembly, with anti-tipping safety means.

[0024] Further characteristics and advantages of the invention will become more 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 detail of Figure 1;

Figure 3 is an additional perspective view of the detail in Figure 2;

Figure 4 is a perspective view of a detail of a component of the structure according to the invention;

Figure 5 is a side view of a structure according to the invention with a panel in the inclined configuration for assembly or disassembly;

Figure 6 is a detail of Figure 5;

Figure 7 is a further detail of Figure 5;

Figure 8 is a view from above of a structure according to the invention with four panels of which two are in the inclined configuration for assembly or disassembly;

Figure 9 is a detail of Figure 8;

Figure 10 is a further detail of Figure 8;

Figure 11 is a cross-sectional view of a portion of a panel of the structure according to the invention;

Figure 12 is a view of a portion of a component of a panel of a structure according to the invention.

[0025] With reference to the figures, a formwork structure 10 for the execution of horizontal castings for the provision of floor slabs, of the type comprising a series of props 11, and load-bearing heads 12 to be arranged on the props 11 for the resting of panels 13, 14, 15, and a fourth panel 16 which is shown schematically in Figure 8, all designed to form a surface for a concrete casting.

[0026] Each one of the load-bearing heads 12 comprises a plate 17 on which a cage 17a is welded, having a square plan shape and being obtained from metallic profiled elements; in the corner regions of the cage 17a are recessed seats 18 and 19, clearly visible in Figures 3 and 4, which constitute the corner support of the load-bearing lateral profiles 22 and 23 of a panel, for example 13 (which rests on a corner different from the one that comprises the recessed seats 18 and 19, but in any case in an equivalent manner).

[0027] Each corner region 20 of the plate 17 has means 26 for the reversible engagement of a corner portion, designated for example with the reference numeral 24 for a panel 13 and with the reference numeral 25 for another panel 15, of a panel 13, 14, 15 and 16 on one of its sides selected from the two incident sides, for example 27 and 28 in Figure 3, which define a corner portion 24 and 25 between them.

[0028] The reversible engagement means 26 are designed to support the panel when hung in a temporary inclined configuration for assembly and disassembly, with anti-tipping safety means 29, described in more detail hereinbelow.

[0029] The means 26 for the reversible engagement of a corner portion 24 and 25 of a panel 13, 14, 15 and 16 can clearly be seen in Figures 4, 5 and 6; they comprise, for each corner region 20, two contoured tabs 31 and 32, which are arranged on mutually perpendicular

planes of arrangement and extend both substantially at right angles to the plate 17, a first contoured tab 31 available for the engagement and disengagement of a side 28 of a corner portion, for example 24, of a panel, for example 13, the second contoured tab 32 being available for the engagement and disengagement of the other side 27 of the same corner portion of the same panel.

[0030] Each one of the contoured tabs 31 and 32 has an angled portion 33 adapted to receive by resting a complementarily shaped part 37, which can clearly be seen in Figures 6 and 7, of a load-bearing lateral profile 22 or 23, which can clearly be seen in Figures 11 and 12, of the frame border 35 of the frame 36 of a panel 13, 14, 15 and 16, such resting being provided with the panel in the inclined configuration for assembly or disassembly, such as for example for the panel 15 in Figure 7.

[0031] The anti-tipping safety means are constituted, for each one of the contoured tabs 31 and 32, by a tooth 38, which can clearly be seen in Figures 6 and 7, that is extended at the angled portion 33 so as to define, above it in the configuration for use, an abutment undercut 39 for the inner rim 40 of a hole 41 that is defined in a load-bearing lateral profile 22 or 23 that defines a side 27 and 28 of a panel.

[0032] Each load-bearing lateral profile 22 or 23 has a base 42 for supporting the panel 13, 14, 15 and 16 in the configuration for use, which is designed to be arranged resting on the corresponding recessed seat 18 or 19 of the cage 17a, and in abutment against a corresponding centering wing 43 that protrudes upward from the plate 17, as can clearly be seen in Figure 6.

[0033] Advantageously, each load-bearing head 12 has a plate 17 that is substantially square, with contoured tabs 31 and 32, for engagement, that are arranged symmetrically at the corner regions, and centering wings 43 that are interposed between two contoured tabs 31 and 32 having the same arrangement and being equidistant from the same contoured tabs 31 and 32.

[0034] Contoured tabs and wings are spaced apart so as to allow the mounting and removal of panels on both sides of those same panels.

[0035] The cage 17a having a square plan shape and being obtained from metallic profiled elements is constituted by four substantially flat metallic bars, for example 44 and 45 in the figures, that are fixed perpendicularly, for example by welding, to the plate 17, with the recessed seats 18 and 19 that are provided on the respective upper edges 46 and 47 at the end portions of the bars 44 and 45, as in Figure 4.

[0036] The load-bearing heads 12 are of the drop type for early removal, and should be understood as being of a known type, but it should be understood that they can also be of a different type, according to necessity and use.

[0037] Mounting a panel on a load-bearing head 12 of the structure according to the invention is done as follows.

[0038] The operator chooses on which side to mount a panel; the panel is then rested, for example panel 15 in Figure 7, on the load-bearing head 12, so that a con-

toured tab 31 engages in the complementarily shaped part 37 of the load-bearing lateral profile 22 that defines a side 27 of the panel 15, with the tooth 38 entering the anti-tipping hole 41 in the same load-bearing lateral profile 22 of the same side 28 of the panel 15.

[0039] The tooth 38 prevents the panel from falling.

[0040] The latter, in order to be brought to the horizontal configuration for the completion of the mounting, must be rotated upward, until the part 37 is disengaged from the corresponding contoured tab 31 and the base 42 of the load-bearing lateral profile 22 comes to rest on the corresponding recessed seat 19 and in abutment on the corresponding centering wing 43, while the base 42 of the load-bearing lateral profile 23 of the other, incident side 28 of the panel rests in the other recessed seat 18.

[0041] In practice it has been found that the invention fully achieves the intended aim and objects.

[0042] In particular, with the invention a formwork structure is provided that can be assembled and dismantled in two different directions.

[0043] Furthermore, with the invention a formwork structure is provided that is easy to handle in the manner of conventional formworks.

[0044] What is more, with the invention a formwork structure is provided that is more flexible in use than conventional formworks.

[0045] Furthermore, with the invention a formwork structure is provided that offers performance levels that are not lower than those of formworks of the conventional type.

[0046] In addition, with the invention a formwork structure is provided that can be made using conventional systems and technologies.

[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 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. PD2012A000411 from which this application claims priority are incorporated herein by reference.

[0050] Where technical features mentioned in any claim are followed by reference signs, such reference signs have been inserted 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 series of props (11), and load-bearing heads (12) to be arranged on said props (11) for the resting of panels (13, 14, 15, 16) designed to form a surface for a concrete casting, said formwork structure being **characterized in that** each one of said load-bearing heads (12) comprises a plate (17) on which a cage (17a) is welded, said cage having a square plan shape and being obtained from metallic profiled elements, recessed seats (18, 19) being provided in the corner regions of said cage (17a) and constituting the corner support of the load-bearing lateral profiles (22, 23) of the panel (13), each corner region (20) of said plate (17) having means (26) for the reversible engagement of one of the panels (13, 14, 15, 16) on one side thereof that is selected from two incident sides (27, 28), said reversible engagement means (26) being designed to support the panel hung in a temporary inclined configuration for assembly and disassembly, with anti-tipping safety means (29).

2. The formwork structure according to claim 1, **characterized in that** said means (26) for the reversible engagement of a corner portion (24, 25) of a panel (13, 14, 15, 16) comprise, at each corner region (20) of said plate (17), two contoured tabs (31, 32), which are arranged on mutually perpendicular planes of arrangement and extend both substantially at right angles to said plate (17), a first contoured tab (31) available for the engagement and disengagement of a side (27) of a corner portion, for example (24), of a panel, for example (13), the second contoured tab (32) being available for the engagement and disengagement of the other side (28), incident to the first side (27), of the same corner portion (24) of the same panel (13).

3. The formwork structure according to one or more of the preceding claims, **characterized in that** each one of said contoured tabs (31, 32) has an angled portion (33) adapted to receive by resting a complementarily shaped part (37) of a perimetric profile (34) of the frame border (35) of the frame (36) of a panel (13, 14, 15, 16), said resting being provided with said panel in the inclined configuration for assembly or disassembly.

4. The formwork structure according to one or more of the preceding claims, **characterized in that** said anti-tipping safety means are constituted, for each one of said contoured tabs (31, 32), by a tooth (38) that is extended at the angled portion (33) so as to define, above it in the configuration for use, an abutment undercut (39) for the inner rim (40) of a hole (41) that is defined in said load-bearing lateral profile (22, 23) that defines a side (27, 28) of a panel.

5. The formwork structure according to one or more of

the preceding claims, **characterized in that** each load-bearing lateral profile (22, 23) has a base (42) for supporting the panel in the configuration for use, said base (42) being designed to be arranged in abutment against a corresponding centering wing (43) that protrudes upward from said plate (17). 5

6. The formwork structure according to one or more of the preceding claims, **characterized in that** each load-bearing head (12) is substantially square, with contoured tabs (31, 32), for engagement, that are arranged symmetrically at the corner regions, and centering wings (43) that are interposed between two contoured tabs (31, 32) having the same arrangement and being equidistant from said contoured tabs (31, 32). 10 15
7. The formwork structure according to one or more of the preceding claims, **characterized in that** said load-bearing heads (12) are of the drop type for early removal. 20

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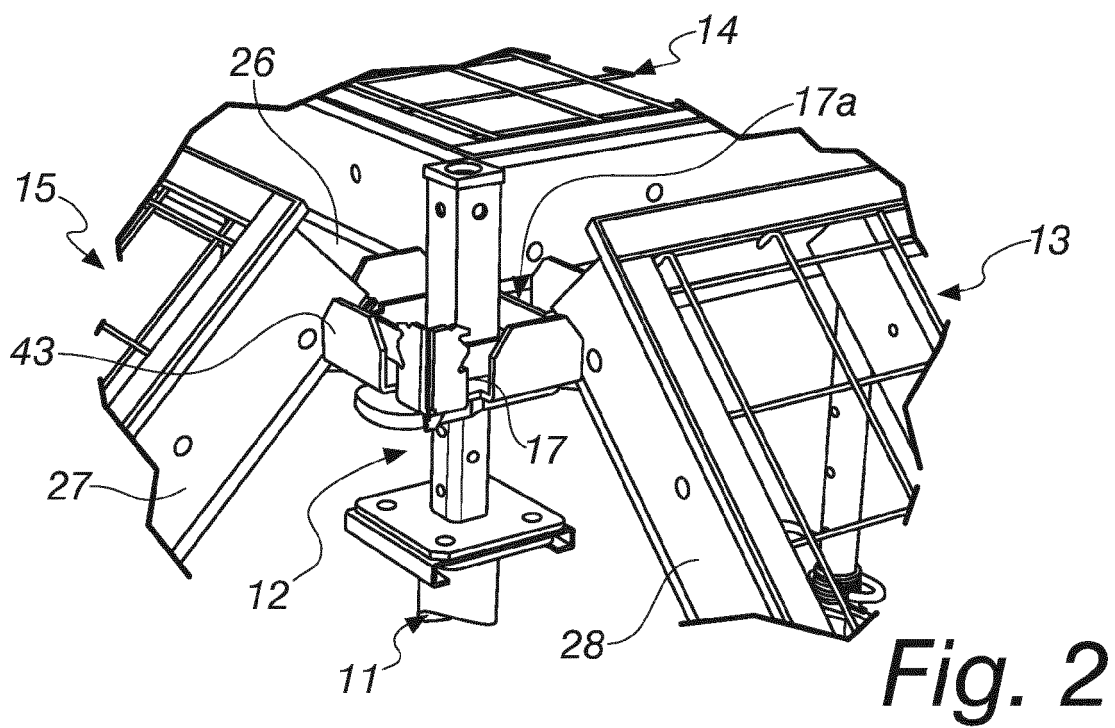
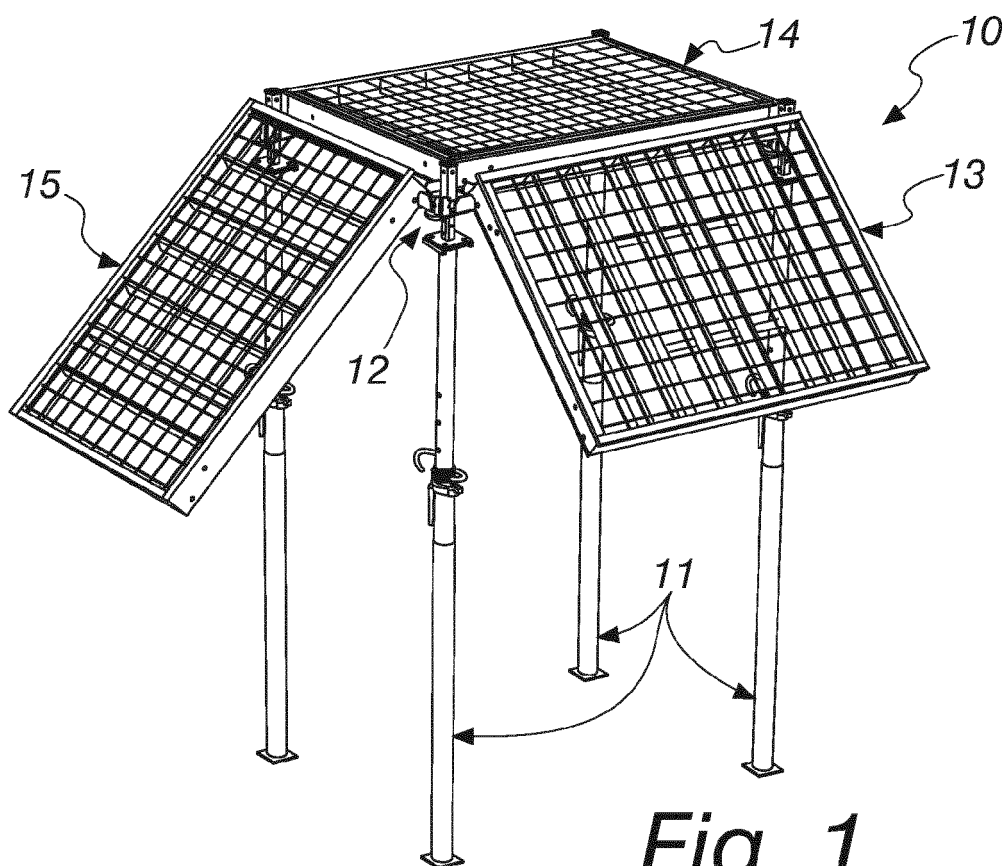
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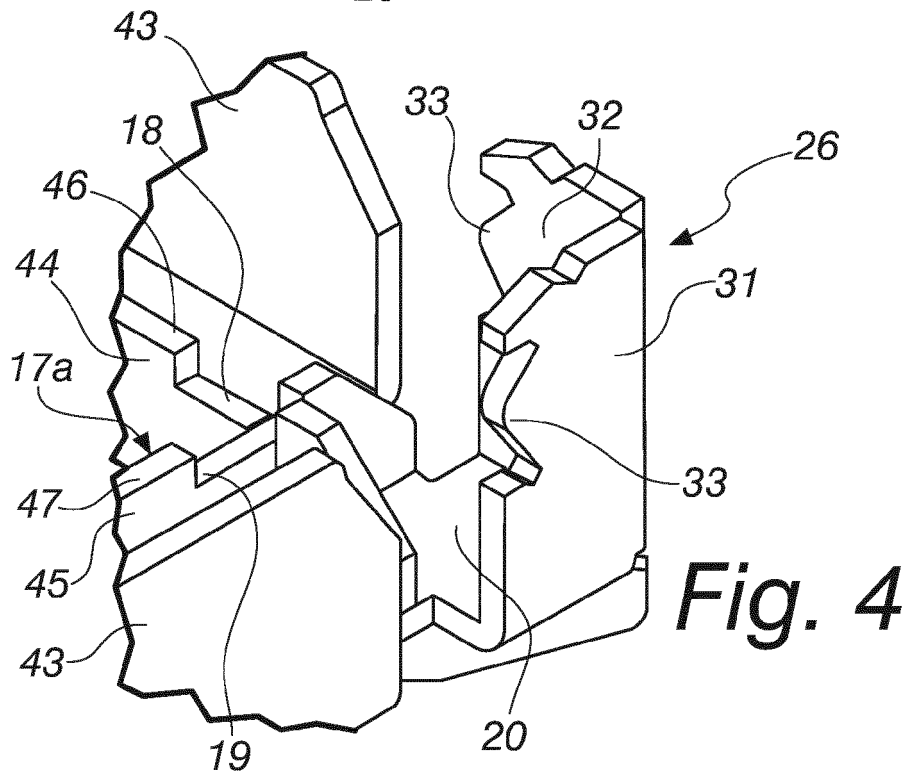
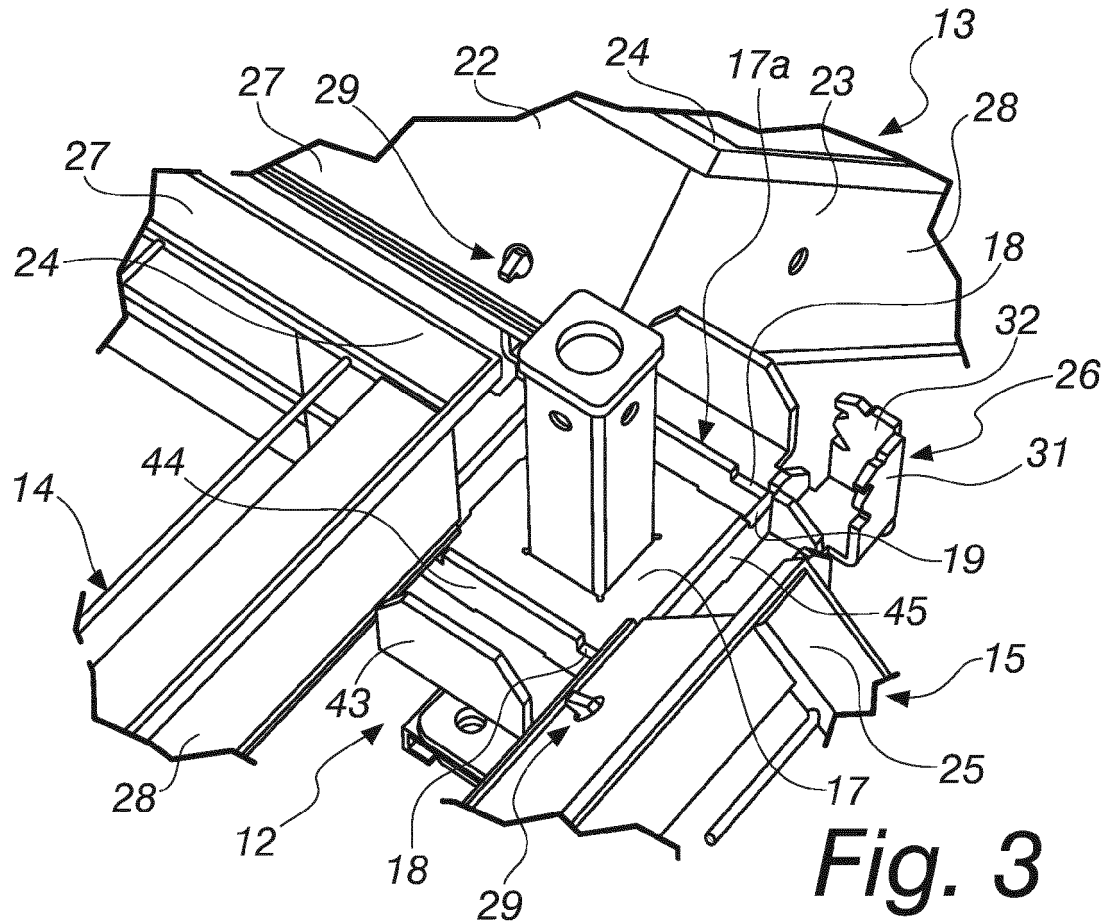
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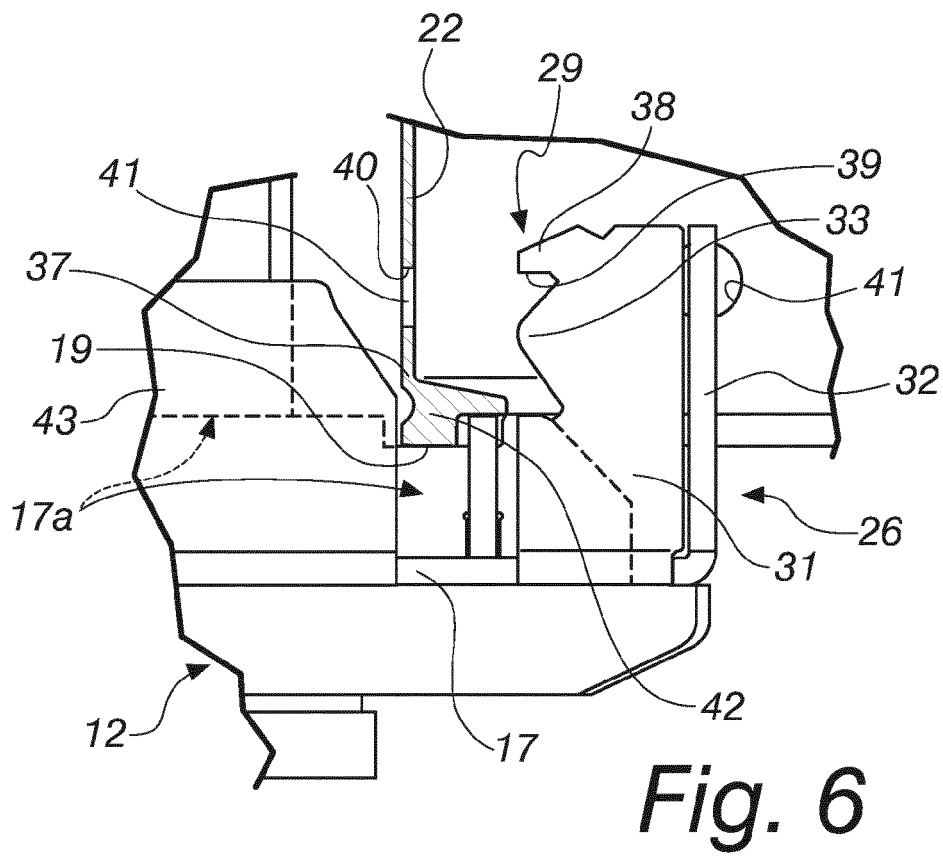
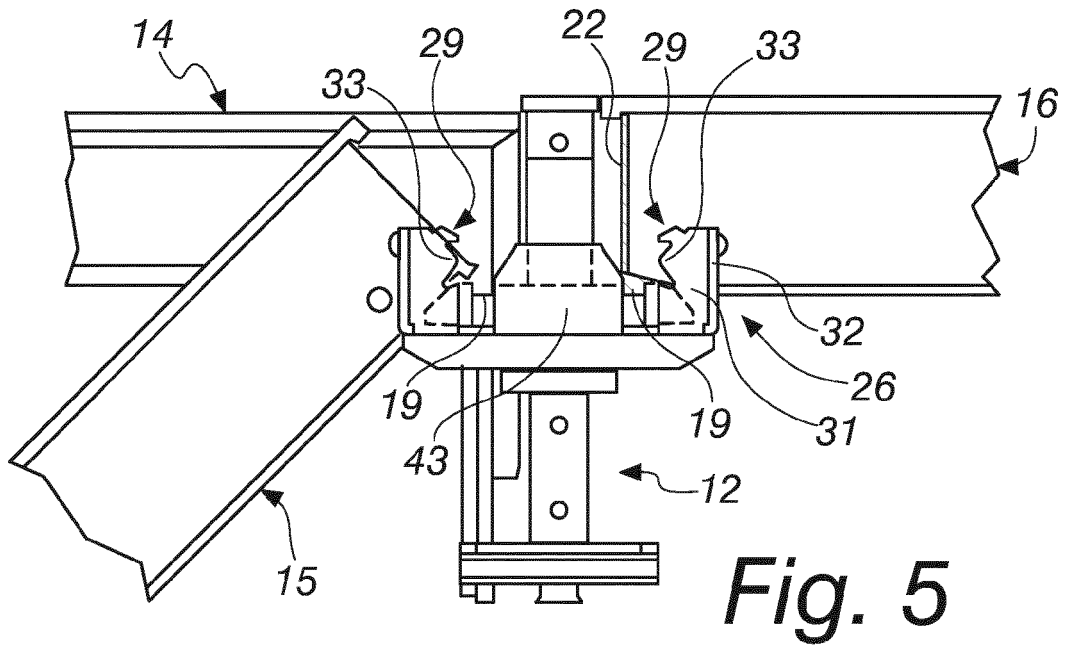
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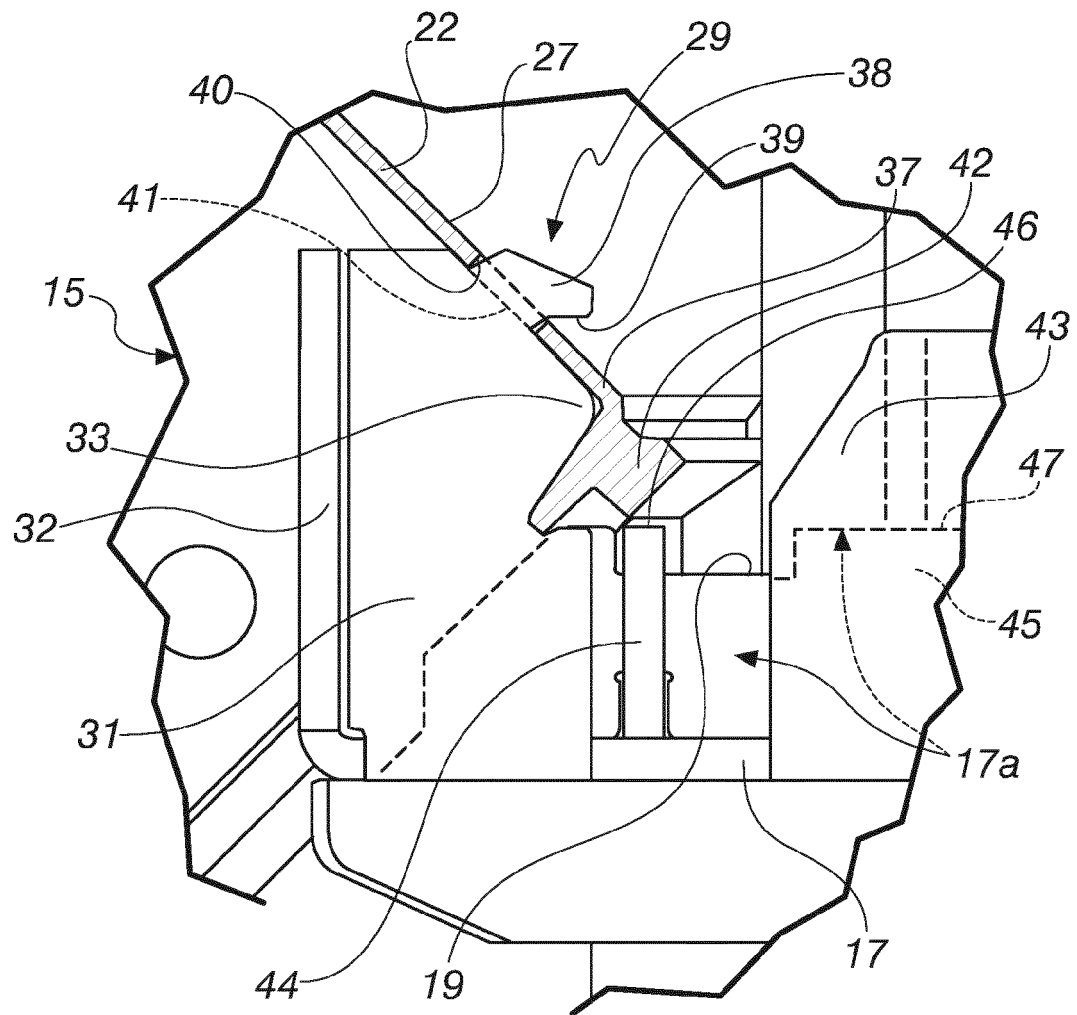
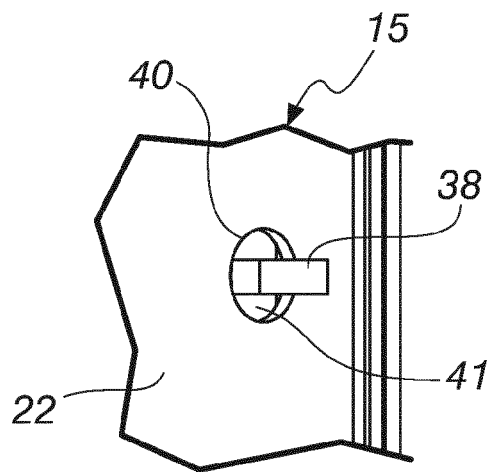
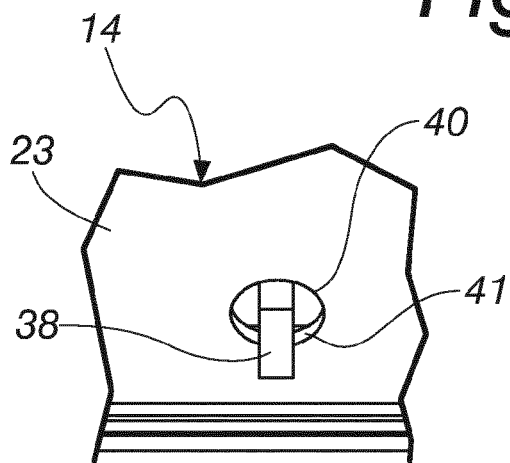
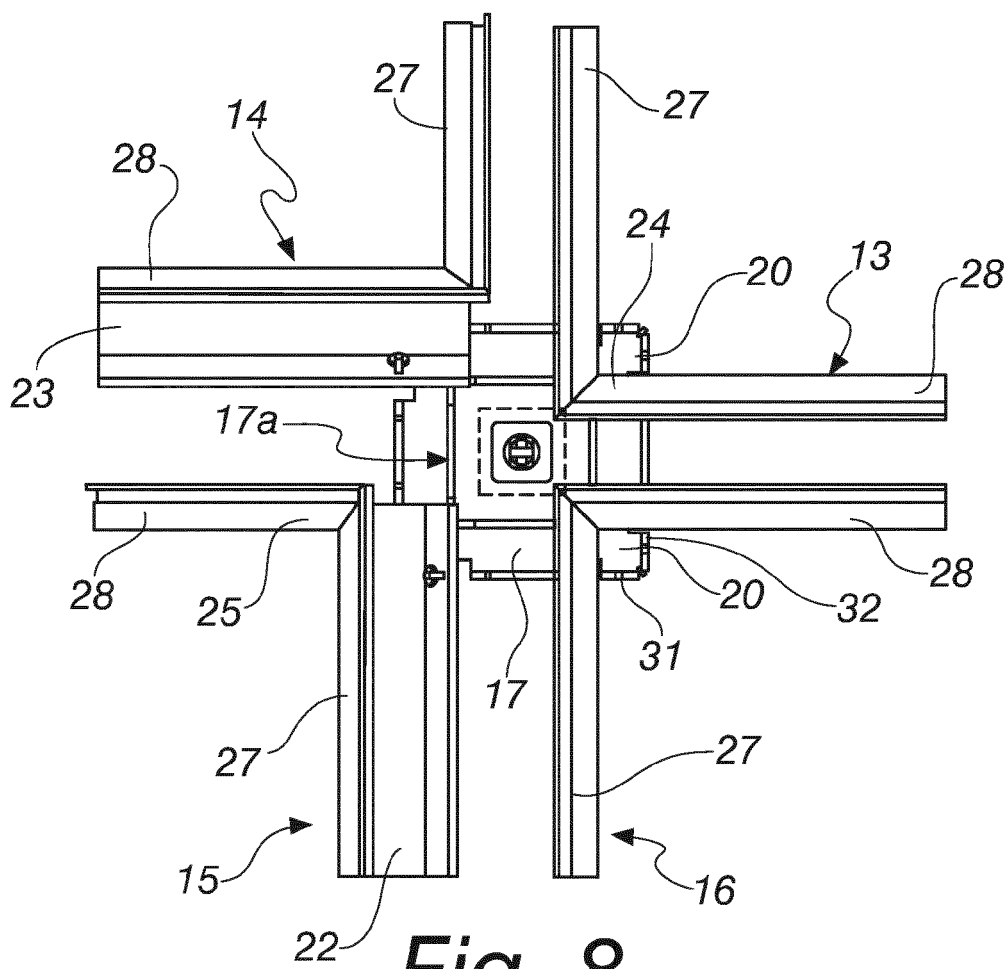


Fig. 7



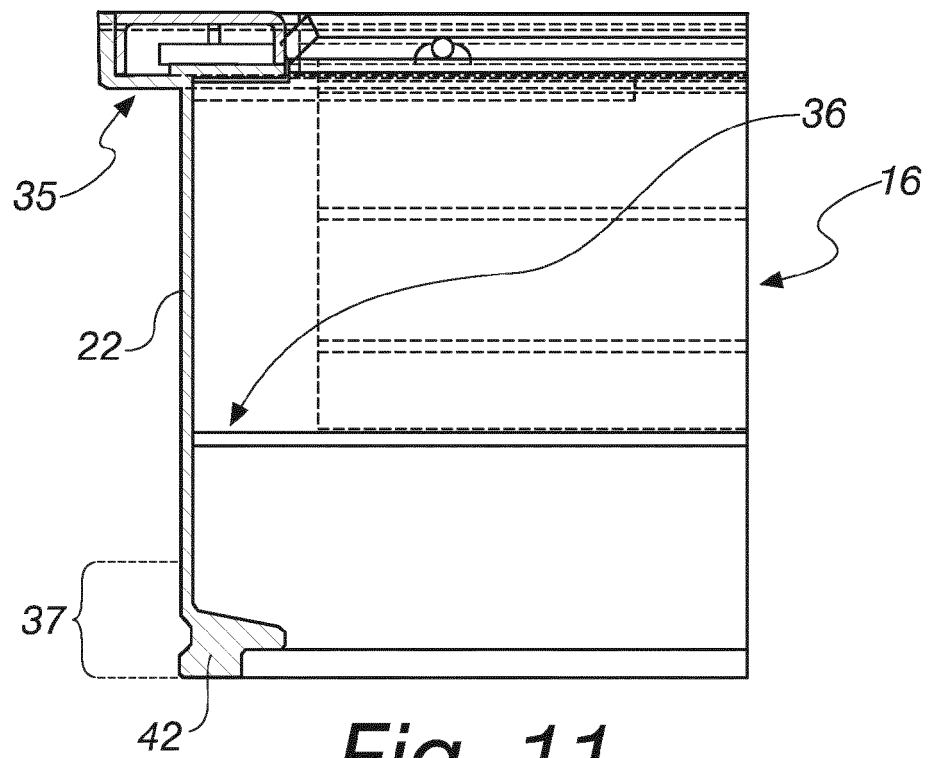


Fig. 11

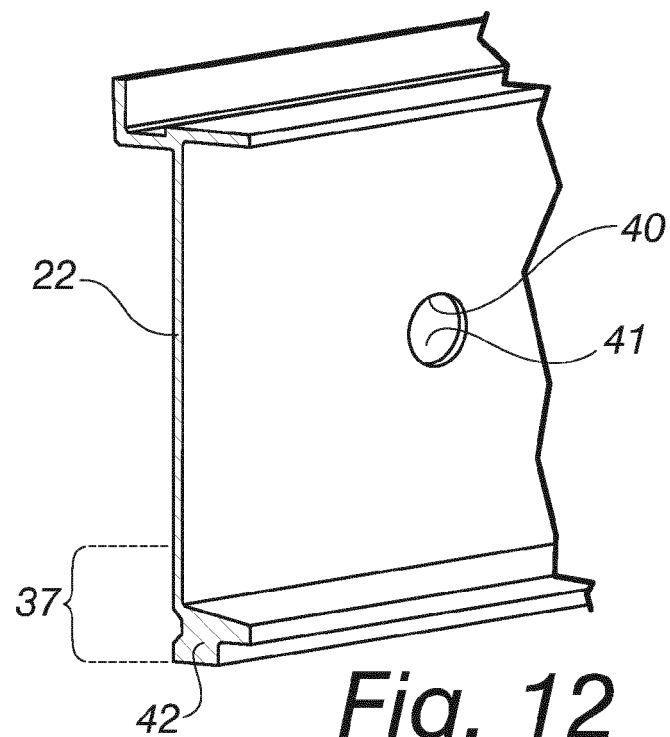


Fig. 12



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Application Number
EP 13 19 8780

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A	* figures 1, 4, 5, 6, 10 *	2-4	
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			E04G
Place of search		Date of completion of the search	Examiner
The Hague		8 April 2014	Bauer, Josef
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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REFERENCES CITED IN THE DESCRIPTION

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