(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
3 May 2012 (03.05.2012)

PCT

(10) International Publication Number
WO 2012/058696 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/VN2011/000006

(22) International Filing Date:
14 October 2011 (14.10.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2-2010-00230 29 October 2010 (29.10.2010) VN

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS,

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(54) Title: STRUCTURE OF A REINFORCED FORMWORK PANEL

FIG.2(a)

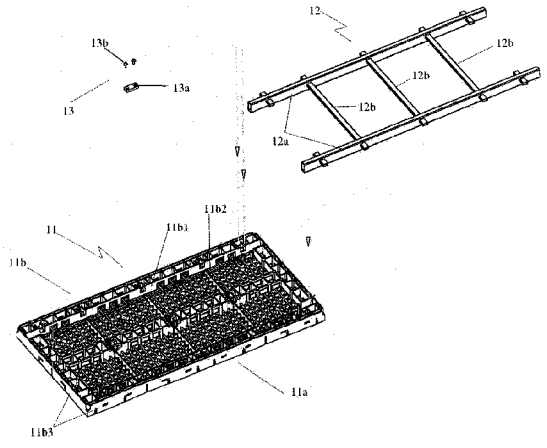
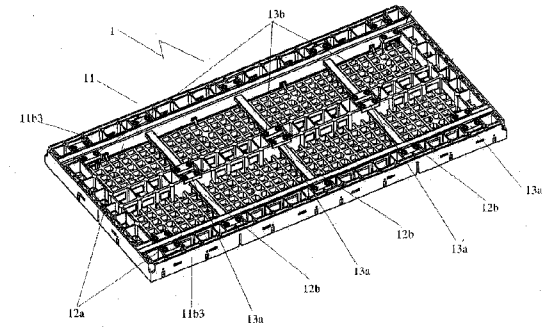


FIG.2(b)



(57) Abstract: The present invention relates to a structure of a reinforced formwork panel (1) comprising a plastic formwork panel (11), a reinforced frame (12) is detachably mounted against back or lower surface of the formwork panel (11) · and a frame fastening means (13) for fixed the frame (12) to the formwork panel (11). The panel (11) includes a front surface (11a), a back or lower surface (11b) having the longitudinal and transversals (11b1, 11b2) and the peripheral ribs (11b3) surrounding the periphery of the formwork panel. The frame (12) co at least two longitudinal bars (12a) substantially positioned paralel to the peripheral ribs (11b3) or spaced from the longitudinal peripheral ribs with a certain distance and at least two transveral bars (12b) substantially mounted perpendicular to the longituginal bars (12a), and closely located to the peripheral ribs (11b3) or spaced from the peripheral ribs (11b3) in transveral direction with a certain distance.

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SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

STRUCTURE OF A REINFORCED FORMWORK PANEL

Background of the utility solution

The utility solution relates to a structure of a formwork panel used in the building works and in particular to a structure of a formwork panel with a reinforced frame so as to improve the structural strength during the execution of the building constructions.

Prior art

As shown in Fig.4(a), in order to execute the building constructions such as to concrete the floors of the buildings, for example several units of the steel scaffold G are coupled in serious to each other in a wide direction and a transverse direction. At the uppermost plane of the top of the scafford assemblies, on which a plural of longitudinal D and transversal N supporting beams are placed so as to form a planar surface and formwork panels C are placed on these supporting so as to form a continuous surface. After placing a layer of the reinforcing structural steel on such a surface, the concrete is poured thereon and once is completely cured, the concrete continuous floors for the building constructions are formed.

Typically, since the formwork panels presently used are made by plastic material, even if it is a structure of the supporting ribs at the lower face thereof, in genenal these panels are alway weak in case they are loaded by the concrete and the reinforcing structural steels thereon. This results in that the floor concrete cured is conventionally saged so that the appearance of the floor is significantly reduced before it is finished. If the sag of the floor exceeds the permissible amount, it further must be handled and as result of that the costs are significantly increased.

Now, in a common manner, plurality of longitudinal and transversal beams supported below the plastic formwork panels are used so as to increase the load-bearing capacity for each of the formwork panels as well as of the

entire floor surface which is assembled by the plastic formwork panels. The above structure has encountered the following problems:

First, the longituginal and transversal beams and formwork panels are three different systems so that load-bearing capacity thereof is generally disadvantageous resulting in that the various types of the different materials are used, thus the costs are high and more labours are required during the assembling or dismantling.

Second, assembling or dismantling includes three stages, the time is consumed.

Third, the sizes of the longituginal and transversal beams are commontly large and difficult to normalize the sizes of the floor cells which are always changed.

Finally, since the beams are commonly in the extended and discontinuous structures, it is easily to be fall during the dismantling that causes the unsafety.

Therefore, there is a need to improve the formwork panels so as to overcome the above problems of the supporting scafford system during the execution of the building constructions.

Summary of the utility solution

A main object of an utility solution is to provide a structure of a reinforced formwork panel which is capacity of increasing the rigidity thereof without using the longituginal and transversal beams which are directly placed on the scafford assembly during the execution.

A another object of the utility solution is to provide a structure of a reinforced formwork panel with its reinforced member which is capacity of interchanging with the other plastic formwork panels.

In order to attain the above objects, according to the first aspect, the utility solution provides a structure of a reinforced formwork panel which is configured of a plastic formwork panel including: a front surface substantially

to be planned, a sheet-shaped back or lower surface having a plurality of longitudinal and transversal ribs which are substantially perpendicular to each other and a plurality of peripheral ribs surrounding so as to form a periphery of the formwork panel, the peripheral and longitudinal and transversal ribs are outwardly extended in direction substantially perpendicular to the back or lower surface, a reinforced frame detachably mounted against the back or lower surface of the formwork panel comprises at least two longitudinal bars substantially positioned closely perpendicular to or spaced from the longitudinal peripheral ribs of the formwork panel with a certain distance and at least two transveral bars substantially mounted perpendicular to the the longituginal bars, and closely positioned to or spaced from the transveral peripheral ribs of the formwork panel with a predetermined distance, and a plurality of frame fastening means for fixing the frame with the formwork panel,

With the above arrangement, the structure of the formwork panel according to the utility solution will be a strong rigidity and the concrete load-bearing capacity on the front surface of the panel is increased.

According to a preferred embodiment of the utility solution, the frame fastening means are fastening screws. Use of the fastening screws as fastening means assists in providing the simple structure for formwork panel and in significantly reducing the manufacturing costs.

Preferably, the screws are directly fastened from the front surface of the formwork panel to the reinforced frame. Since the direct fastening to the reinforced frame is performed from the surface of the panel, the assembly works of the formwork panel are carried out easily and conveniently.

According to an embodiment of the utility solution, a plurality of holes for the fastening screws are formed on the front surface of the formwork panel so that in the fastened state, the heads of the screws are located in a level lower than the front surface of the formwork panel. Furthermore, the holes for the fastening screws also are covered and closed by the plugs to

prevent the concrete from flowing into these holes. This structure secures that the structure of the formwork panel of the utility solution presents the front surface of the formwork panel with the higher appearance.

Also, the screws are preferably fastened to the back or lower surface so as to maintain a state where the belts are securely embraced into the transversal bars of the reinforced frame. With the screws (fastening means) are fastened to the back or lower surface of the formwork panel so as to maintain a state where the reinforced frame is closely held to this back or lower surface via the belts embracing the transversal bars of the reinforced frame, the reinforced frame are securely and fixedly attached at the predetermined screw fastening positions which are uniformly distributed on the back or lower surface of the formwork panel. This results in that the load-bearing capacity with the concrete of the front surface of the formwork panel is significantly increased.

The formwork panels are advantegeously coupled to each other according to the longitudinal and transversal peripheral ribs by means of the connecting means. In addition, according to a preferred embodiment of the utility solution, the connecting means comprising a plurality of slots which are formed on the peripheral ribs and a plurality of bolts are mounted into the slots in the top-down direction from the front surface of the formwork panel. By means of this structure, the formwork panels according to the utility solution can be easily and simply coupled to each other along the longitudinal and transversal peripheral ribs so as to form the formwork panel assembly facilitating the execution of the large area floors.

The material of the reinforced frame is metal. As an illustrated example of the utility solution, the metal of the frame is selected of steel or aluminium. The metal used for the reinforced frame will significantly improve the structure of the formwork panel and thus extend the working life of the formwork panels at the building constructions.

According to a preferred embodiment of the utility solution, the formwork panels are made by an injection molding method.

Brief description of the drawings

Next, a structure of a reinforced formwork panel according to an embodiment of the utility solution will be described with reference to the appended drawings, in which:

Fig.1(a) is a exploded view showing a structure of a reinforced formwork panel according to an embodiment of the utility solution;

Fig.1(b) a perspective view showing structure of the reinforced formwork panel in Fig.1(a) in a state which is completely assembled;

Fig.2(a) is a exploded view showing structure of a reinforced formwork panel according to an another embodiment of the utility solution,

Fig.2(b) is a perspective view showing structure of a reinforced formwork panel in Fig.2(a) in a state which is completely assembled;

Fig.3 is a perspective view showing the connection of the structure of a reinforced formwork panels so as to form formwork panel assembly;

Fig.4(a) is a perspective view showing state using a conventional formwork panels; and

Fig.4(b) is a perspective view showing state using structure of the formwork panels according to the utility solution.

Detailed description of the preferred embodiments

Next, a structure of a reinforced formwork panel according to an embodiment of the utility solution will be described with reference to the drawings from Figs.1 to 3.

As shown in Figs.1(a) to 2(b), a structure of a reinforced formwork panel 1 is configured of: a plastic formwork panel 11, a reinforced frame 12 that is detachably mounted against the back or lower surface of the plastic

formwork panel 11, và a frame fastening means 13 fixed reinforced frame 12 to plastic formwork panel 11.

As shown in Figs.1(b) and 2(b), the plastic formwork panel 11 includes: a front surface 11a is substantially planned, a plurality of longitudinal ribs 11b1 and tranveral ribs 11b2a are forme at the back or lower surface 11b, the longitudinal 11b1 and transveral rib 11b2 are perpendicular to each other. On the back or lower surface 11b, a plurality of peripheral ribs 11b3 are dispsed at the outmost edge thereof so as to form a periphery of the formwork panel 11. The peripheral ribs 11b3, the longitudinal 11b1 and transveral 11b2 ribs are outwardly extended in direction substantially perpendicular to the back or lower surface 11b.

As shown in Figs.1(a) and 2(a), a reinforced frame 12 is detachably mounted against the back or lower surface of the formwork panel. The frame is configured of two longitudinal bars 12a which are substantially positioned to be paralel and close to the ribs 11b3 (see Fig.1(b)) or spaced from the peripheral ribs (see Fig.2(b)) in longituginal direction of the formwork panel 11 with a certain distance, and a several of transversal bars 12b are substantially attached perpendicular to the longituginal bars 12a. These transversal bars 12b are located to be close to the peripheral ribs (see Fig.1(b)) or spaced from the peripheral ribs 11b3 in transveral direction of the formwork panel 11 with a predetermined distance (see Fig.2(b)). It is understood that, a number of the longituginal bars 12a and the transversal bars 12b in the drawings are explanatory illustration of the utility solution and the utility solution is no limited to this.

According to a preferred embodiment of the utility solution, as shown in Fig.1(a), frame fastening means 13 are fastening screws 13b. Use of the fastening screws as fastening means 13 assists that the structure of a formwork panel is simply and thus the manufacturing costs are significantly reduced.

Preferably, the screws 13b are directly fastened from the front surface 11a of the formwork panel 11 to the reinforced frame 12. Since the crews are directly fastened to the reinforced frame from the front surface of the panel, the assembly of the formwork panel 1 is easily and conveniently carried out.

As shown in Figs.1(a) and 1(b), a plurality of holes 11c for the fastening screws 13d are formed on the front surface 11a of the formwork panel 11 so that the heads of the screws 13b in the fastened state are located in a level lower than the front surface of the formwork panel 11a. Furthermore, the holes 11c for the fastening screws also are covered and closed by the plugs 13b1 to prevent the concrete from flowing into these holes.

According to a preferred embodiment of the utility solution, as shown in Fig.2(b), the fastening screws 13b (frame fastening means) are fastened to the back or lower surface so as to maintain a state where the belts 13a are securely embraced to the transversal bars (12b...) of the reinforced frame 12. By means of these frame fastening means, the reinforced frame 12 are securely and fixedly attached at the predetermined screw fastening positions which are uniformly distributed on the back or lower surface 11b of the formwork panel 11. This results in that the load-bearing capacity with the concrete of the front surface of the formwork panel 11 is significantly increased.

As shown in Fig.3, the formwork panels 11 are coupled to each other along the longitudinal peripheral ribs 11b3 (or the peripheral rib in transveral direction) by means of the connecting means 11b4. The connecting means 11b4 comprises a plurality of slots 11b4a which are formed on the peripheral ribs and a plurality of bolts 11b4b which are mounted into the slots 11b4a in top-down direction from the front surface 11a of the formwork panels 11. This structure asists the formwork panels 11 be coupled to each other easily and simply along the longitudinal ribs 11b3 and transversal peripheral ribs so

as to form a formwork panel assembly facilitating the execution of the large area floors.

The material of the reinforced frame 12 is advantageously metal. As an illustrated example of utility solution, the metal made of the frame 12 is selected of the steel or aluminium. The metal used for the reinforced frame 12 significantly increases the rigidity for structure of the formwork panel 1 and thus extend the working life of the formwork panel 1 at building constructions.

According to a preferred embodiment of the utility solution, the formwork panels 11 are made by an injection molding method.

As shown in Fig.4(b), with the above arrangement, the rigidity of the formwork panel 1 of the utility solution are high and the load-bearing capacity with the concrete of the front surface 11a of the structures of the reinforced formwork panel 1 of which assembly is supported by the scafford assembly G is increased. As shown in this drawing, the structure of a reinforced formwork panel 1 is significantly reduced the number of the supporting beams N and D.

Structure of the above-described reinforced formwork panel is only a explanatory example of the utility solution. It is understood that the utility solution is not limited to these, the modifications or changes of the structure of the reinforced formwork panel can be carried out without departing from the scope of the utility solution as set foth in the appended claims.

CLAIMS

1. A structure of a reinforced formwork panel comprising:

a plastic formwork panel includes: a front surface substantially to be planned, a sheet-shaped back or lower surface having a plurality of longitudinal and transversal ribs which are substantially perpendicular to each other and a plurality of peripheral ribs surrounding so as to form a periphery of the formwork panel, the peripheral and longitudinal and transversal ribs are outwardly extended in direction substantially perpendicular to the back or lower surface,

a reinforced frame detachably mounted against the back or lower surface of the formwork panel comprises at least two longitudinal bars substantially positioned closely perpendicular to or spaced from the longitudinal peripheral ribs of the formwork panel with a certain distance and at least two transveral bars substantially mounted perpendicular to the the longituginal bars, and closely positioned to or spaced from the transveral peripheral ribs of the formwork panel with a predetermined distance, and

a plurality of frame fastening means for fixing the frame with the formwork panel,

thus, the structure of the formwork panel is of high rigidity and the load-bearing capacity with the concrete on the front surface thereof is increased.

2. The structure of the formwork panel according to claim 1, wherein the frame fastening means are the fastening screws.

3. The structure of the formwork panel according to claim 2, wherein the screws are directly fastened from front surface of the formwork panel to the reinforced frame.

4. The structure of the formwork panel according to claim 3, wherein the holes for the fastening screws are formed on the front surface of the formwork panel so that the heads of the screws in the fastened state are located in a level lower than the front surface of the formwork panel.

5. The structure of a formwork panel according to claim 4, wherein the holes for the fastening screws are covered and closed by the plugs to prevent the concrete from flowing into the holes.

6. The structure of the formwork panel according to claim 2, wherein the screws are fastened to the back or lower surface so as to maintain a state where the belts are securely embraced to the transversal bars of the reinforced frame.

7. The structure of the formwork panel according to claim 1, wherein the formwork panels are coupled to each other along the longitudinal and transversal peripheral ribs by means of the connecting means.

8. The structure of the formwork panel according to claim 7, wherein the connecting means comprising a plurality of slots are formed on the peripheral ribs and a plurality of bolts are mounted into a plurality of slots in top-down direction from the front surface of the formwork panels.

9. The structure of a formwork panel according to claim 1, wherein the material of the reinforced frame is metal.

10. The structure of a formwork panel according to claim 9, wherein the metal made of the frame is selected of the steel or aluminium.

11. The structure of a formwork panel according to claim 1, wherein formwork panel are made by the injection molding method.

FIG.1(a)

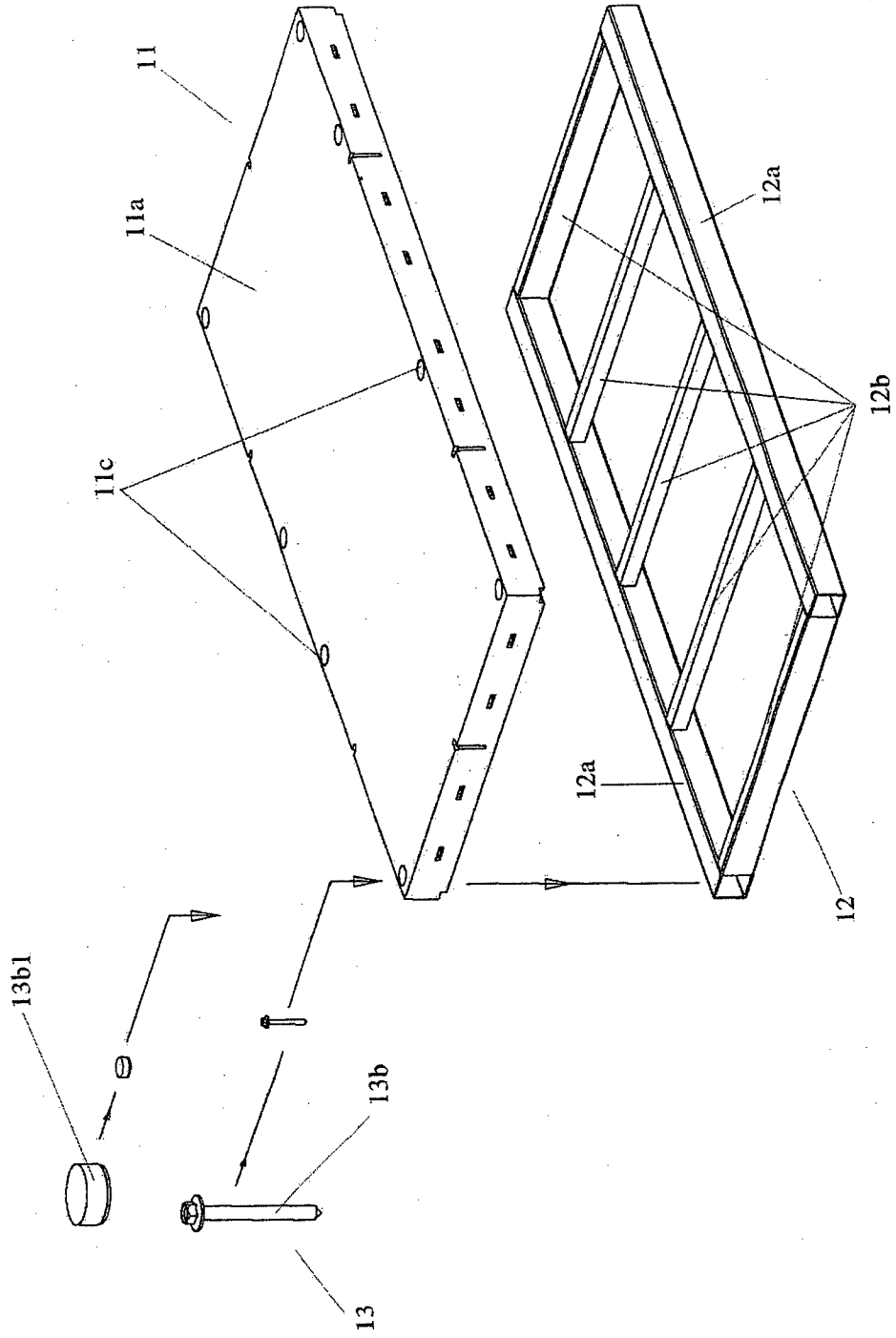

FIG.1(b)

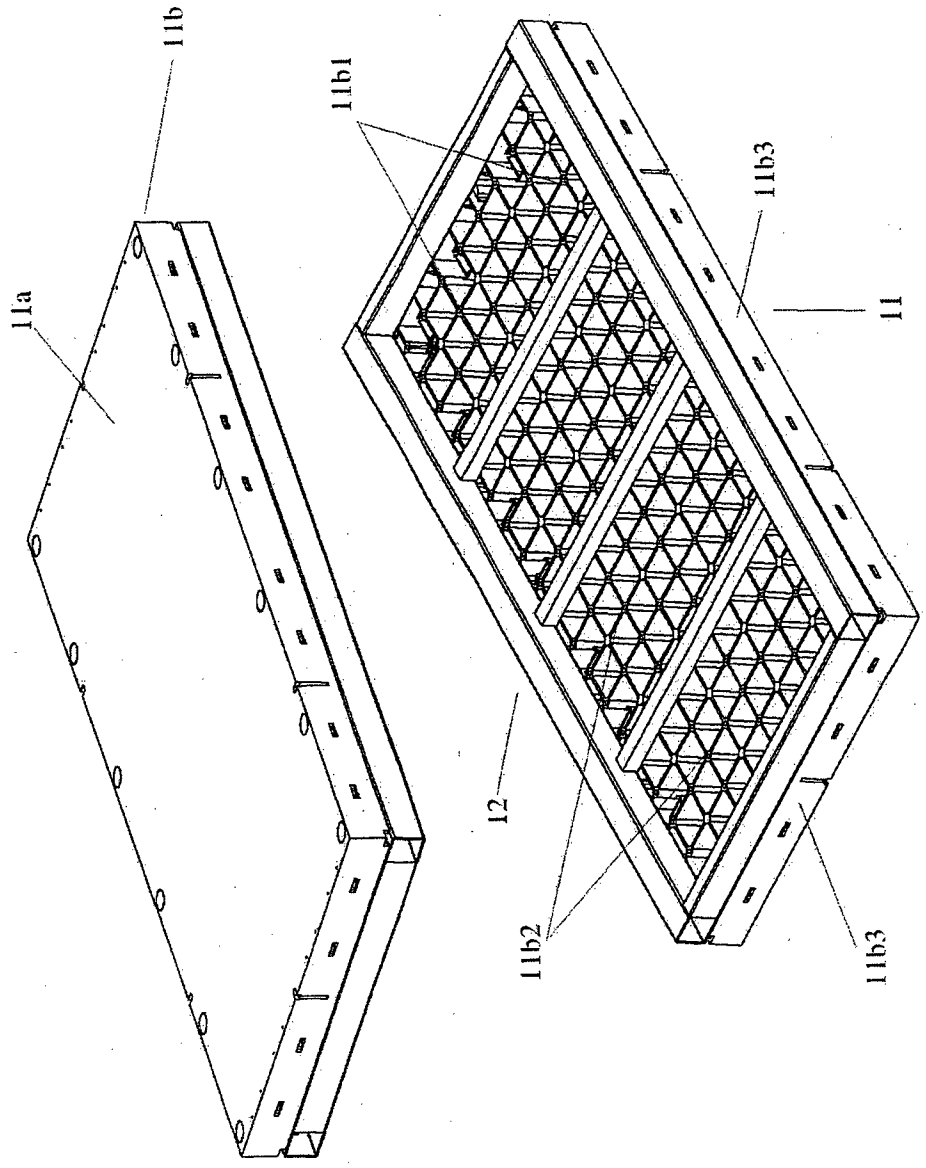

FIG.2(a)

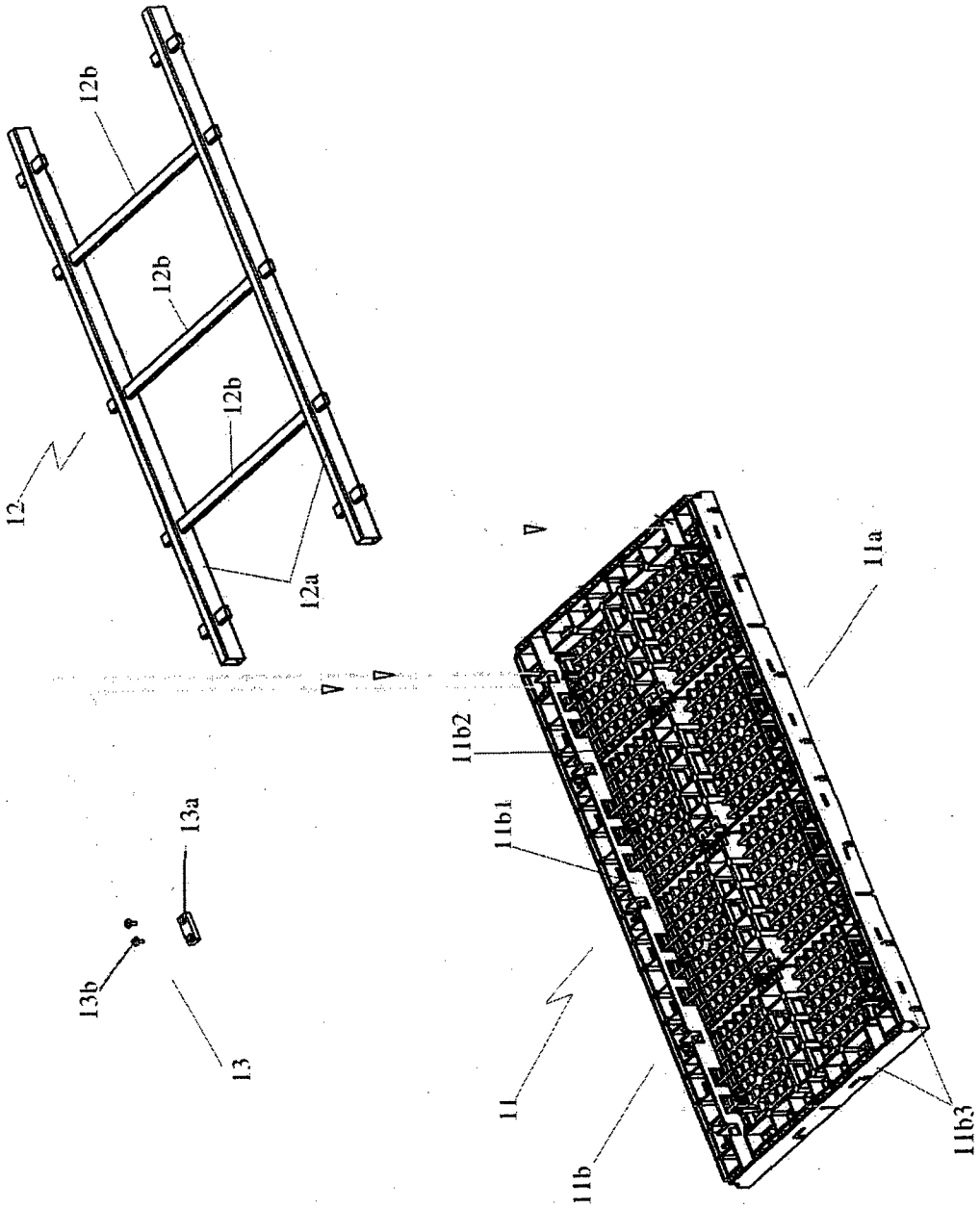

FIG.2(b)

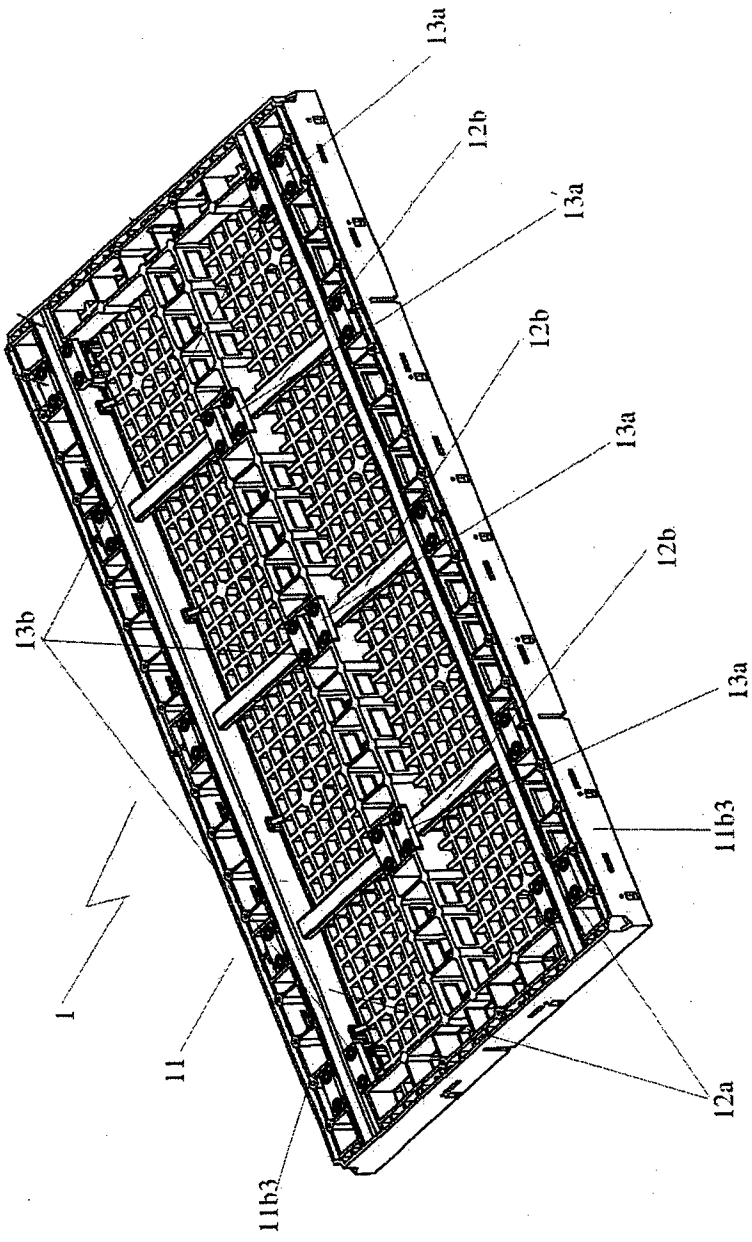

FIG.3

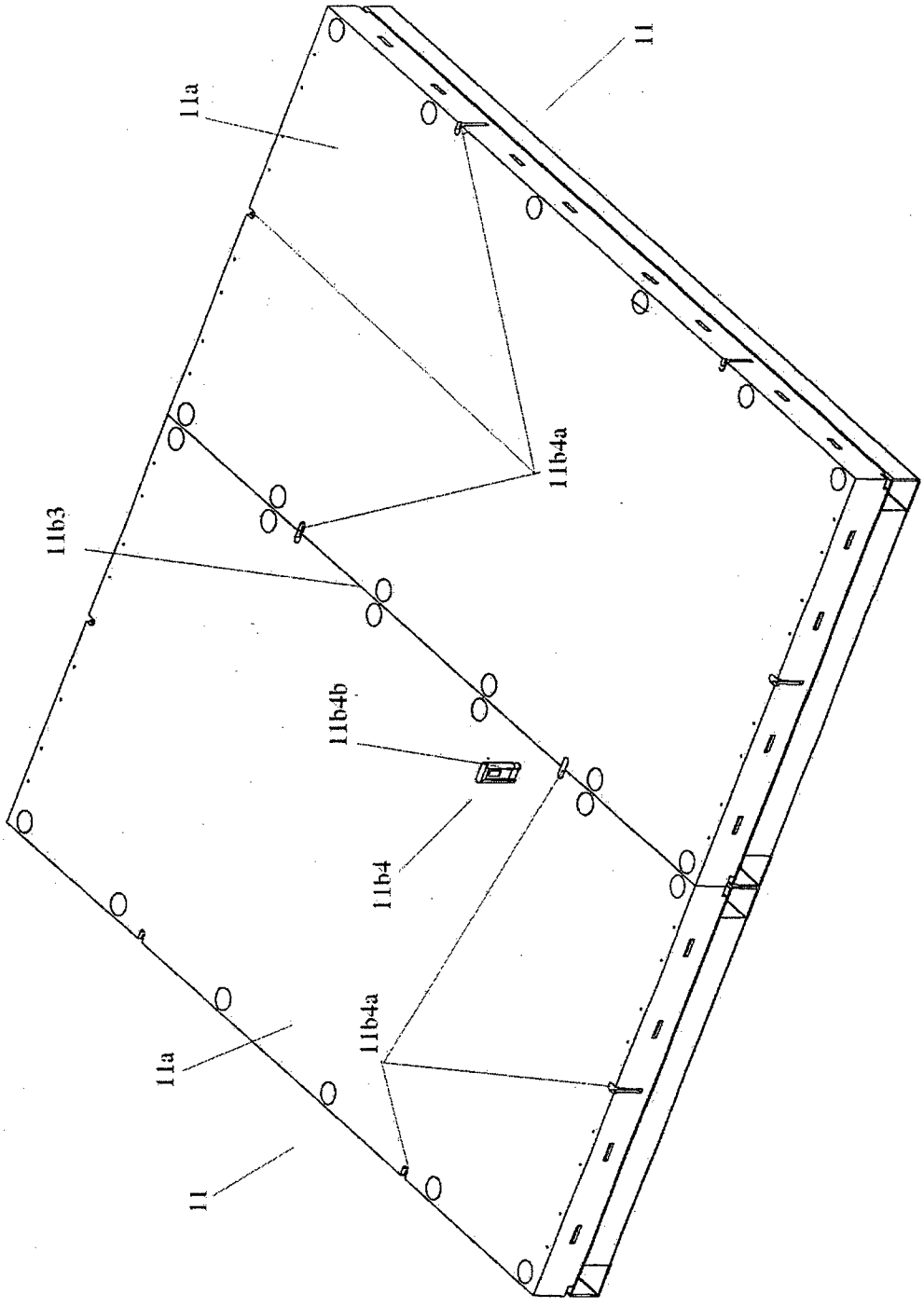

FIG.4(b)

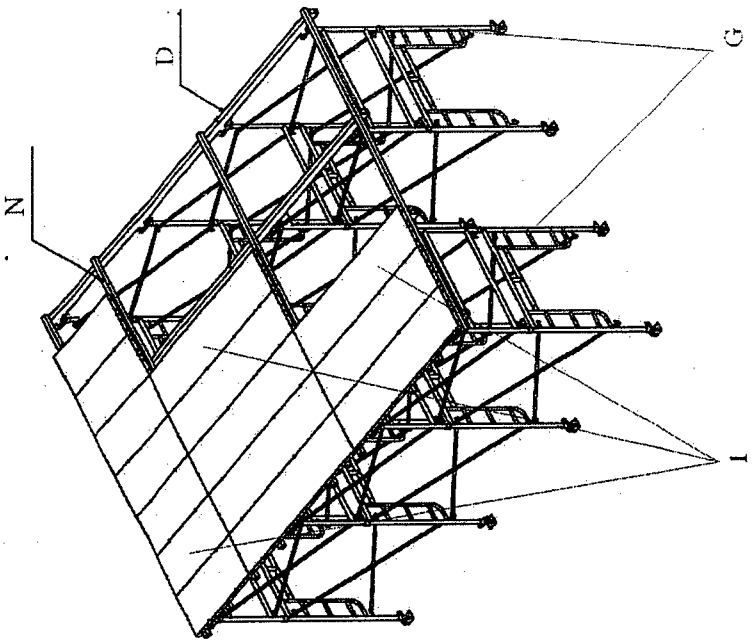

FIG.4(a)