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(54) **ACCESS FLOOR AND INSTALLATION METHOD THEREFOR**

(57) The invention relates to an access floor and the installation method thereof. The invention comprises a plurality of basic structural units (1) usually made from a lightweight plastic material, each unit including at least one surface (2), at least one lower cavity (8) defined by the upper surface (2), at least one lower unit-supporting edge (3) in contact with the supporting floor (13) and at least one opening (10) provided in the aforementioned

surface (2). The invention also relates to a method for installing the access floor, comprising the following steps: pre-positioning the pipes, assembling the units (1) and positioning the pipes in the cavities (8), forming the cavities for the pillars (12), positioning a grating (11) on the surface (2) of the units (1), sealing the openings (10) using the corresponding cover, pouring concrete (14) or another resistant material, and positioning the coating (15) and/or the final floor (17).

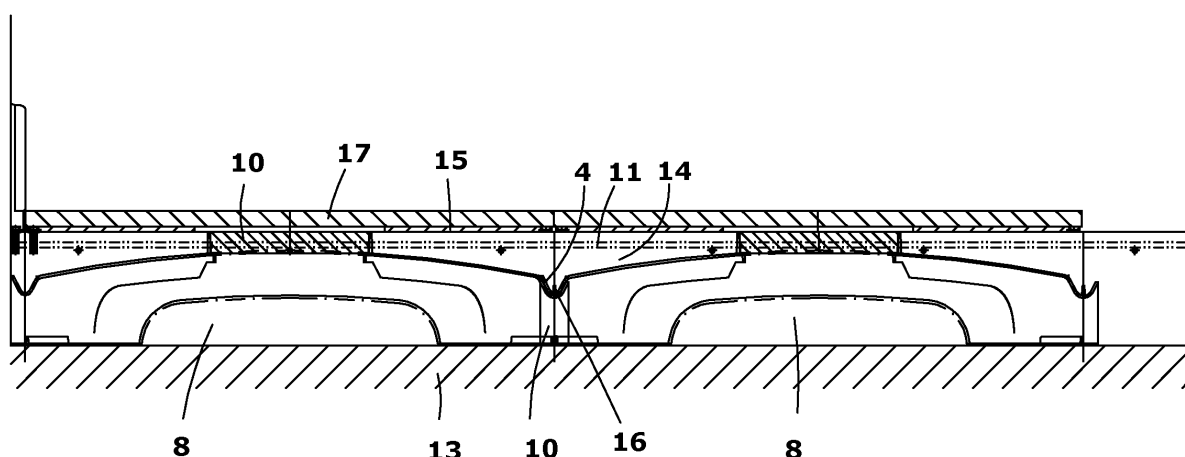


Fig. 4

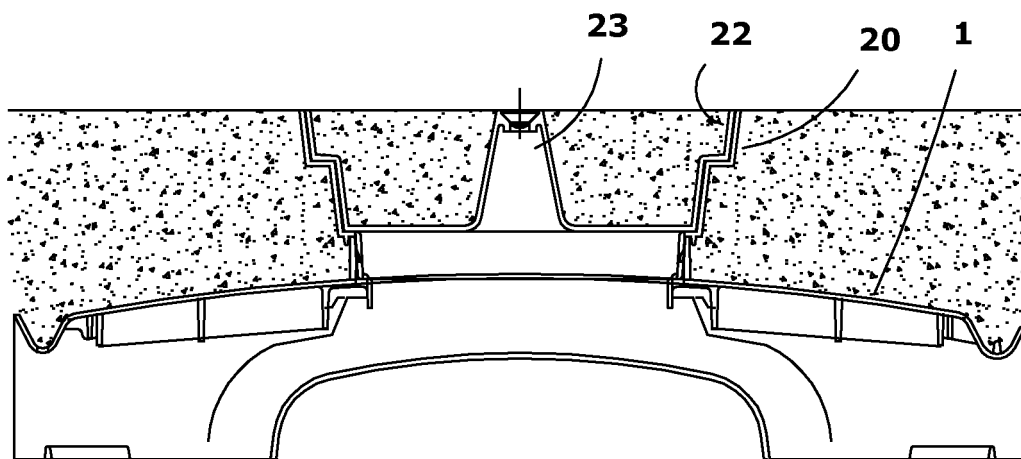


Fig. 5

Description

[0001] This invention refers to a procedure for installing a technical floor of the type mainly used in industrial or office premises, which includes the formation of a base structure, forming a structural filling and possibly a decorative covering, including opening systems for fitting different types of installations, such as electrical wiring or drainage conduits, as well as a structure for forming said base structure.

[0002] Technical floors can be defined as the type of flooring that allows access underneath these for fitting different types of installations. Though these can be removable, a permanent structure can also be set up.

[0003] Industrial, commercial or office installations have evolved over time. When office instruments were manual, such as typewriters, and operators rarely had access to the telephone, the only fixed installation required was lighting, and this was fitted from the ceiling of the corresponding area.

[0004] In industry too, in which a good deal of the machines were manual, the electrical connections were external and it was the machines which were located close to said connections.

[0005] Technological evolution meant that it was necessary for each machine or work station to have a set of conduits including, without implying any limitation thereby, electrical power and lighting connections, telephony, communications, water outlets or drains, pneumatic or hydraulic connections etc..

[0006] The development of technical floors has facilitated the installation of all this type of conduits with no need to resort to building work in floors. This nevertheless entails some difficulties when dealing with heavy machinery, or if the intention is to give the floor a strength for treading on this which technical floors do not always have.

[0007] It is thus desirable and the purpose of this invention for a technical floor to have the strength of a masonry floor and at the same time be able to be opened for fitting all kinds of installations, as described in claim 1. Another subject of the invention is a procedure for setting up the technical floor of claim 1, as described in claim 12.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] In order to illustrate the following explanation, we are enclosing three sheets of drawings with this descriptive report, which represent the essence of this invention in four figures, and in which:

Figure 1 shows an elevation of a basic unit of the technical floor of the invention, provided with a central opening for inspection;

Figure 2 shows a plan view of the basic unit of the technical floor of Figure 1, on which a clad-

ding for said floor can be fitted, such as a concrete casting;

Figure 3 shows a plan view of a set of basic units set out in fitting position; and

Figure 4 shows a cross-section of the technical floor of the invention in fitted position, provided with an inspection hatch and covered on the outside by cladding items such as tiles.

Figure 5 shows a cross-section of a unit of the technical floor of the invention according to an embodiment in which the inspection hatch is formed by an exterior body and with an interior body like a basin supported on this, which forms a very strong opening for access to the interior space of the technical floor after pouring in concrete;

Figure 6 shows a cross-section view of a unit of the technical floor according to the embodiment of Figure 6, but with the opening parts set out separately prior to being fitted and to pouring the concrete;

Figure 7 shows a cross-section of the technical floor of the invention, according to what is represented in Figure 1, in which the central opening of the inspection hatch also includes a frame for supporting a cover;

Figure 8 shows a frontal schematic view of an item for covering the lateral gaps in the technical floor units prior to concreting, providing with pre-cut zones for inserting tubes and other installations;

Figure 9 shows a schematic cross-section view of an assembly of the technical floor of the invention provided with a support for connections, this support being raised over the height of the floor on which this is located;

Figure 10 shows a schematic cross-section view of the support for connections of Figure 9;

Figure 11 gives a schematic plan view of the support for connections of Figures 9 and 10.

DETAILED DESCRIPTION OF THE INVENTION

[0009] A technical floor according to the invention is described consisting of a plurality of basic structural units 1, normally made of a light plastic material, each of said units forming a surface determining a lower space 8 which determines a corresponding covering surface 2 at the top, as well as a lower edge 3 for supporting said unit

1 in the floor 13. Each unit 1 also includes an opening 10, normally centred in this, said opening preferably being surrounded by a perimeter wall 9.

[0010] The units 1 include cut-back portions for forming pillars. According to a preferential embodiment, the corners of each of the units are cut back by a portion 6, so that the cut-back portions 6 of four adjacent units define a housing 12 for a filling material. These portions can have a support base formed as a part of each unit 1, or not have this, and have a wall for separation with the lower space 8. Between each pair of cut-back portions the upper surface has an upper edge 4, able to be assembled with the corresponding adjacent unit 1. According to a preferential embodiment, said edge 4 has a groove, so that the groove of one piece can be fitted together with the adjacent piece's. Like the upper part, the lateral zones of each of the cut-back portions 6 also include an edge, identical to or different from the upper edge 4, which is also able to fit into the adjacent unit 1. The coupling 16 of each item with the corresponding adjacent one is preferably by means of a male-female joint. The properly assembled set of units 1 is deposited on the ground 13.

[0011] After forming the set of units 1 a grid 11 of rods is fitted in order to constitute the reinforcement of the strong part of the technical floor according to the invention. Later on, concrete 14 or some other similar material is poured onto the surface forming the set of units 1. Since the cut-back parts 6 of the units adjacent to each vertex form a housing 12, this housing will have the function of a strong pillar, whose strength will be distributed by means of the concrete at the top, leaving a continuous space at the bottom formed of the set of spaces 8 of the units 1.

[0012] The openings 10 may include a protection cover (not shown) which prevents the concrete (or other material) from getting into the spaces 8.

[0013] The concrete or strength-giving material poured into the set of spaces will have to reach and be left flush with the walls 9 of the opening 10. The height of said walls 9 or of the spaces 8 can be variable depending on the particular need of each application. That is, the height in an industrial area which has to support heavy machinery will have to be greater, both as regards the height of the space 8 for conduits and of the strength-giving layer than in a room intended for offices, for example.

[0014] The upper part of the technical floor can include an intermediate layer 15 for fitting a final floor 17 (that can be dismantled) or directly be said floor 17.

[0015] The perforations required in order to access the set of conduits going underneath this can thus be made in only one of the covering slabs.

[0016] According to a preferential embodiment, the opening 10 is fitted with a frame item 18, 20, which comprises a reduction in its section on the inside (lower side). In other words, the outer (upper) edge has a projection 19 with a greater section than the interior (lower) zone. This means that between the walls 9 of the opening 10,

the upper surface of the units 1 forming the technical floor, and the lower surface of the projection there is a space able to be filled with concrete which will, after setting and possibly being reinforced, form a strong structure, in which the units 1 of the technical floor are only the elements giving shape to the formwork, with no strength-giving function for the floor after being completed.

[0017] According to a first type of frame item 18, this defines a housing for a cover or lid 21, which will be housed inside and could be withdrawn when this is considered appropriate.

[0018] A second type of frame piece 20 forms a housing for a basin, 22, so that when the concrete is poured in, this basin will also be filled with concrete, giving the inspection hatch structural strength in accordance with the height of the layer of concrete and its reinforcement. The basin will be able to be taken out by simply pulling this, as there will be no cohesion between the basin and the frame. According to a particular embodiment of this second type of frame piece 20, there is a normally circular protuberance 23 in the central part of the basin, with no significant effect on the structural strength, in which an extraction screw or hook is or can be housed.

[0019] Since the section decreases towards the bottom, a wide contact surface between the frame item 20 and the basin 22 will allow very great mechanical strength. The decreasing section can be conical or pyramidal, or stepped, either regularly or irregularly.

[0020] When the technical floor is set up the units do not quite reach the surface of the walls against which this has to be set, a space normally filled with concrete being left between some of said walls and the last of the units of the technical floor. Hence, the concreting stage requires the lower spaces 8 located outside the assembly to be covered in order to prevent the poured concrete from getting into the interior (lower) zone of the technical floor, but without restricting the corresponding conduit characteristics. For this purpose the profile of the lower spaces 8 has been designed to include a set of tabs enabling a blocking piece 24 to be fitted. The blocking piece 24 has an essentially identical section to that of the lower space in which this will be located, so that by means of the tabs set inside this lower space 8 the blocking piece 24 can be fitted into said unit 1 from below on the plane of the surface of the hollow space and at the same time, and after setting unit 1 in the floor its accidental withdrawal is practically impossible. The blocking piece 24 includes a set of pre-cut zones 25 for allowing different wiring tubes or conduits through.

[0021] When connections have to be made on the technical floor, it is advisable to prevent cleaning, or any accidental spilling of liquids etc. from getting to the connection zone. Until now however, all the technical floors which include electrical or electric connections are located at floor level, with the risks mentioned above. For this reason, we have described as part of this invention a connection body 26 able to be fitted instead of a tile or

covering slab of a technical floor which comprises a base 27, that can be secured to the technical floor, for example by screwing this on, with a connection zone 29. This connection zone 29 is raised a few centimetres over floor level. The connection zone 29 comprises a plurality of pre-cut areas 28 for fitting the corresponding connection bases.

[0022] The covering can be by means of assembled tiles or slabs. In this case, the connection body 26 can also be fitted with means for assembly with the corresponding slabs or tiles.

[0023] We should stress that the units 1 may have different heights depending on the application for which the technical floor is intended. For example, it will have to be higher if it has to contain drains than if only electrical wiring has to be allowed through. The height of the frame 20 will also depend on the thickness of concrete required, and this will be determined depending on the strength characteristics required by the installation.

[0024] Obviously the opening units 1 according to the invention can be combined with other identical units not fitted with these hatches.

[0025] In some cases technical floors can be installed in building of several storeys or with limited free height. Particularly in these cases a technical floor should be installed in such a way that the weight, and in this case the layer of concrete poured in, is reduced as far as possible. For these cases a body formed in a single piece made up of a set of units, at least one of these being openable, has been designed, so that apart from the angular spaces which will form the pillars of the assembly there are spaces for forming these pillars in multiple interior and perimeter zones other than the corners. This allows great strength through greater distribution of the loads. That is, the body described is as if at least one opening unit 1 were taken and possibly one or more non-opening units set adjacently, forming bodies of 1x2, 2x2, 2x3, 3x3 formed as a single piece. A solution equivalent to the one in the present invention and which should thus be considered within its scope is that none of the pillars are set at the corners or the perimeter and the coupling between units or bodies of sets of units is done in places which are not crossed by said pillars.

[0026] Although this has essentially been described already, the procedure includes the following stages:

- Possibly installing conduits;
- Assembly and coupling of the units 1 or bodies of sets of units and fitting, where applicable, the conduits in the spaces 8, forming the hollows for the pillars 12;
- Fitting blocking items in the spaces 8 of the units 1 not adjacent to another unit or to a wall;
- Fitting a grid 11 on the surface 2 of the units 1;
- Fitting the frames 28, 20 of the inspection hatches;
- Blocking the openings 10 by means of a corresponding cover 21 or by means of basins 22 for receiving concrete;

- Fitting, where applicable, the reinforcement for these basins
- Pouring in concrete 14 or some other strength-giving material;
- Fitting, where applicable, the cladding 15, and/or the final floor 17.

[0027] This is for application in making and installing commercial and/or industrial technical floors.

Claims

1. A technical floor, **characterised in that** this comprises a plurality of basic structural units (1) normally made of light plastic material, each of these units in turn comprising:
 - At least one surface (2)
 - At least one lower space (8) defined by said surface (2)
 - At least one lower edge (3) for supporting said unit (1) on the floor (13) on which this rests.
 - At least one opening (10) made in this surface (2)
2. A technical floor, according to claim 1, **characterised in that** the opening (10) is surrounded by a perimeter wall (9).
3. A technical floor, according to either of claims 1 or 2, **characterised in that** the opening (10) is provided with a frame item (18, 20) with a section decreasing towards the bottom.
4. A technical floor, according to claim 3, **characterised in that** the decreasing section of the frame item decreases in steps.
5. A technical floor, according to claim 3, **characterised in that** the decreasing section of the frame item decreases regularly.
6. A technical floor, according to either of claims 1 to 5, **characterised in that** each of the basic structural units (1) comprises at least one cut-back section for forming the support pillar.
7. A technical floor, according to claim 6, **characterised in that** there is a cut-back section (6) in each of the corners of each of the units (1) so that the cut-back portions 6 of four adjacent units define a housing (12) for a filling material.
8. A technical floor, according to claim 7, **characterised in that** the cut-back portions (6) comprise a separating wall with the lower space (8) and do not have a support base formed as part of each unit (1).

9. A technical floor, according to claim 7, **characterised in that** the cut-back portions (6) comprise a separating wall with the lower space (8) and have a support base formed as a part of each unit (1).
10. A technical floor, according to any of the previous claims, **characterised in that** the upper surface (2) has upper edges (4) able to be assembled with the corresponding adjacent units (1).
11. A technical floor, according to claim 10, **characterised in that** each upper edge (4) has a groove, so that the groove of one piece can fit together with the one in the adjacent piece.
12. A technical floor, according to any of claims 7 to 11, **characterised in that** the lateral zones of each of the cut-back portions (6) also comprise an edge (5) identical or different to the upper edge (4) which is also able to fit in with that of the adjacent unit (1).
13. A technical floor, according to any of the previous claims, **characterised in that** it has a grid (11) of rods and a strength-giving material such as concrete (14) at the top of the surface (2).
14. A technical floor, according to any of the previous claims, **characterised in that** each of the openings (10) comprises a protection cover (21) which is removable.
15. A technical floor, according to any of the previous claims, **characterised in that** each of the spaces (10) comprises a basin (22) for housing concrete.
16. A technical floor, according to claim 13, **characterised in that** the basin (22) comprises a central zone with a protuberance (23) normally with a circular section in which an extraction screw or hook is or can be housed.
17. A technical floor, according to any of the previous claims, **characterised in that** it also comprises blocking pieces (24), with a section essentially identical to that of the lower space (8) in which this will be located, and because this lower space (8) comprises a set of securing tabs for said blocking piece (24).
18. A technical floor, according to claim 17, **characterised in that** the blocking piece (24) comprises a set of pre-cut zones (25) for allowing through the tubes of different conduits.
19. A technical floor, according to any of the previous claims, **characterised in that** it also comprises a connection body (26) that can be fitted instead of a tile or slab for covering the technical floor, which com-

prises in turn a base (27) able to be held to the technical floor, and a connections zone (29) this connections zone (29) being a few centimetres higher than the floor itself.

20. A technical floor, according to any of the previous claims, **characterised in that** the connections zone (29) comprises a plurality of pre-cut areas (28) for fitting the corresponding connection bases.
21. A technical floor, according to any of the previous claims, **characterised in that** the units (1) are combined with one another or with other non-openable units to form a single body, and defining one or more non-perimeter spaces for forming pillars.
22. A method for installing the technical floor according to any of claims 1 to 21, **characterised by** comprising the following stages:

- Possibly the prior fitting of conduits;
- Assembly and coupling of the units (1) or bodies of sets of units and fitting, where applicable, the conduits in the spaces (8), forming the hollows for the pillars (12);
- Fitting blocking pieces in the spaces (8) of the units 1 not adjacent to another unit or to a wall;
- Fitting a grid (11) on the surface (2) of the units (1);
- Fitting the frames (28, 20) of the inspection hatches;
- Blocking the openings (10) by means of a corresponding cover (21) or by means of basins (22) for receiving concrete;
- Pouring in concrete (14) or some other strength-giving material;
- Fitting, where applicable, the cladding (15), and/or the final floor (17).

Amended claims under Art. 19.1 PCT

1. A technical floor, comprising a plurality of basic structural units (1) normally made of light plastic material, each of these units in turn comprising:
- At least one upper surface (2)
 - At least one lower space (8) defined by said upper surface (2)
 - At least one lower edge (3) for supporting said unit (1) on the floor (13) on which this rests;
 - At least one cut-back section (6) for forming a support pillar in each of the corners of each of the units (1) so that the cut-back portions (6) of four adjacent units define a housing (12) for a filling material;
 - Upper edges (4) in the upper surface (2) able to be assembled with the corresponding adja-

cent units (1), possibly having grooves, so that the groove of one piece can fit together with the one in the adjacent piece;

Characterised in that each of the basic structural units (1) comprises at least one opening (10) made in said upper surface (2) which communicates the lower space (8) with the exterior, being the opening (10) is surrounded by a perimeter wall (9).

2. A technical floor, according to claim 1, **characterised in that** the opening (10) is provided with a frame item (18, 20) with a section decreasing towards the bottom, able to be fitted with the perimeter wall (9).
3. A technical floor, according to claim 2, **characterised in that** the decreasing section of the frame item decreases in steps.
4. A technical floor, according to claim 2, **characterised in that** the decreasing section of the frame item decreases regularly.
5. A technical floor, according to any of claims 1 to 4, **characterised in that** the lateral zones of each of the cut-back portions (6) also comprise an edge (5) identical or different to the upper edge (4) which is also able to fit in with that of the adjacent unit (1).
6. A technical floor, according to any of the previous claims, **characterised in that** it has a grid (11) of rods and a strength-giving material such as concrete (14) at the top of the surface (2).
7. A technical floor, according to any of the previous claims, **characterised in that** each of the openings (10) comprises a protection cover (21) which is removable.
8. A technical floor, according to any of the previous claims, **characterised in that** each of the spaces (10) comprises a basin (22) for housing concrete.
9. A technical floor, according to claim 8, **characterised in that** the basin (22) comprises a central zone with a protuberance (23) normally with a circular section in which an extraction screw or hook is or can be housed.
10. A technical floor, according to any of the previous claims, **characterised in that** it also comprises blocking pieces (24), with a section essentially identical to that of the lower space (8) in which this will be located, and because this lower space (8) comprises a set of securing tabs for said blocking piece (24).
11. A technical floor, according to claim 10, **character-**

ised in that the blocking piece (24) comprises a set of pre-cut zones (25) for allowing through the tubes of different conduits.

12. A technical floor, according to any of the previous claims, **characterised in that** it also comprises a connection body (26) that can be fitted instead of a tile or slab for covering the technical floor, which comprises in turn a base (27) able to be held to the technical floor, and a connections zone (29) this connections zone (29) being a few centimetres higher than the floor itself.
13. A technical floor, according to any of the previous claims, **characterised in that** the connections zone (29) comprises a plurality of pre-cut areas (28) for fitting the corresponding connection bases.
14. A technical floor, according to any of the previous claims, **characterised in that** the units (1) are combined with one another or with other non-openable units to form a single body, and defining one or more non-perimeter spaces for forming pillars.
15. A method for installing the technical floor according to any of claims 1 to 14, comprising the following stages:
 - Possibly the prior fitting of conduits;
 - Assembly and coupling of the units (1) or bodies of sets of units and fitting, where applicable, the conduits in the spaces (8), forming the hollows for the pillars (12);
 - Fitting a grid (11) on the surface (2) of the units (1);
 - Pouring in concrete (14) or some other strength-giving material;
 - Fitting, where applicable, the cladding (15), and/or the final floor (17)

characterised in that, after the assembly of the units (1) and before pouring in concrete (14), it also comprises the stages:

- Fitting blocking pieces in the spaces (8) of the units 1 not adjacent to another unit or to a wall;
- Fitting the frames (28, 20) of the inspection hatches;
- Blocking the openings (10) by means of a corresponding cover (21) or by means of basins (22) for receiving concrete.

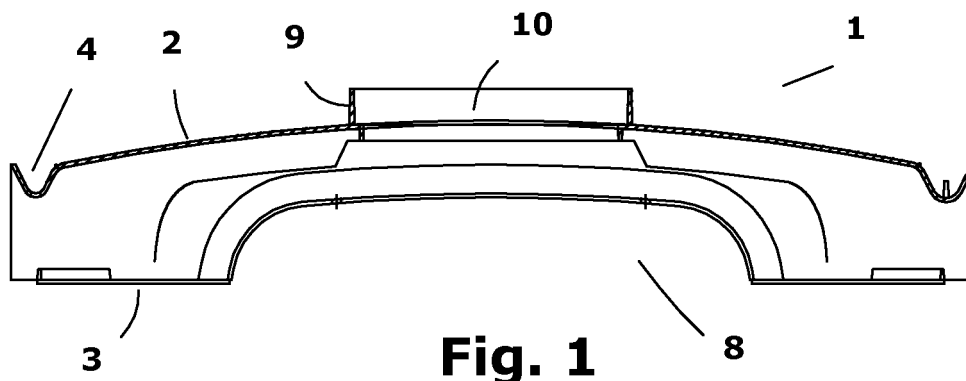


Fig. 2

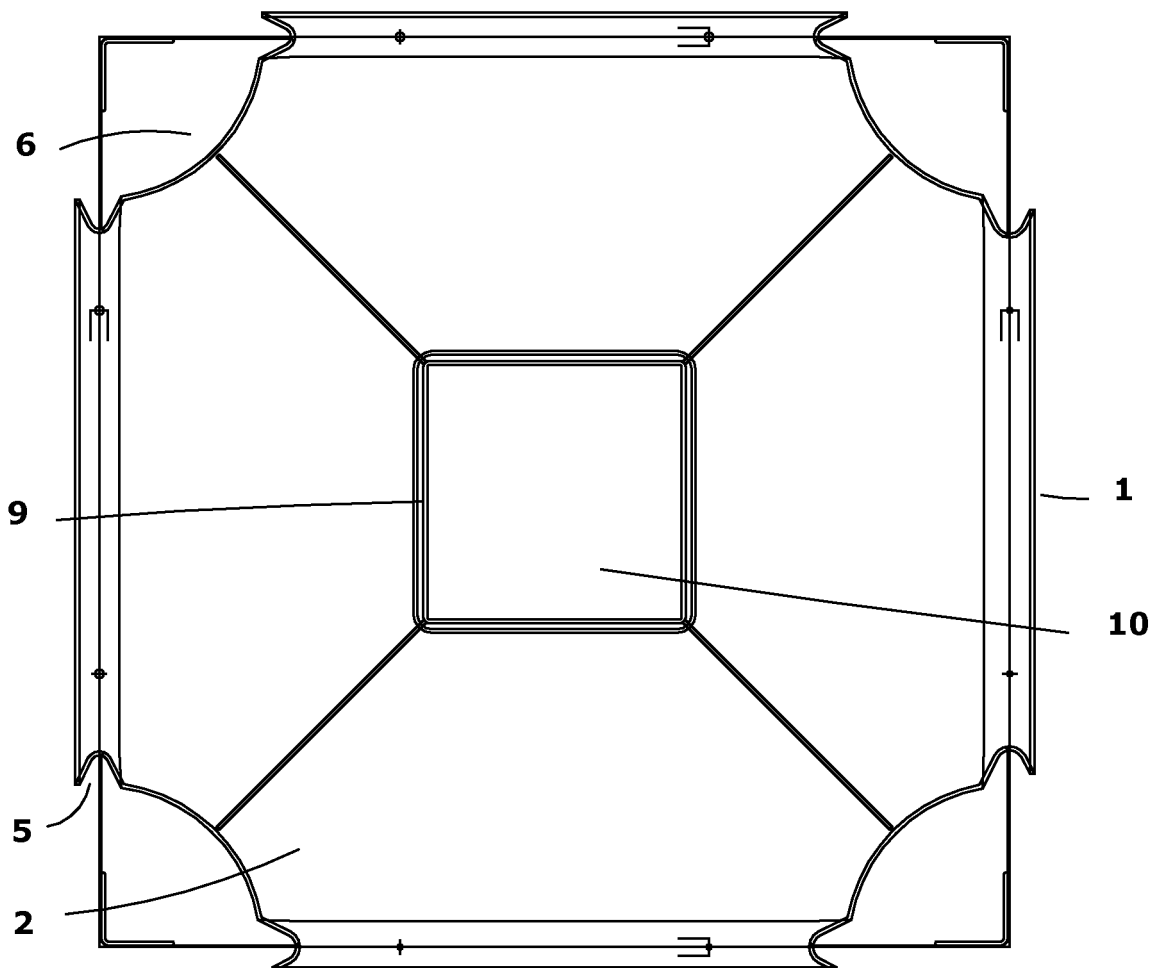
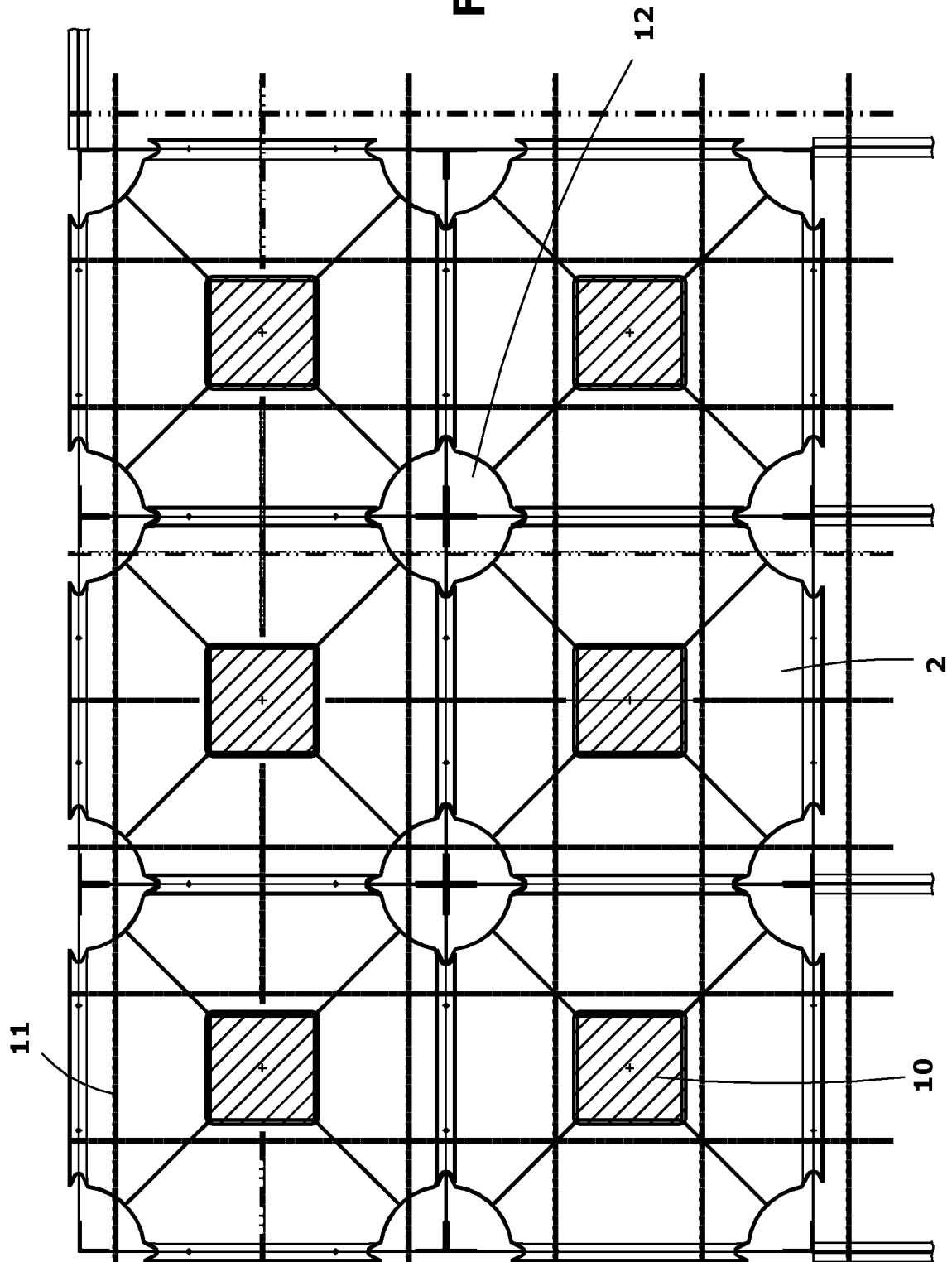


Fig. 3



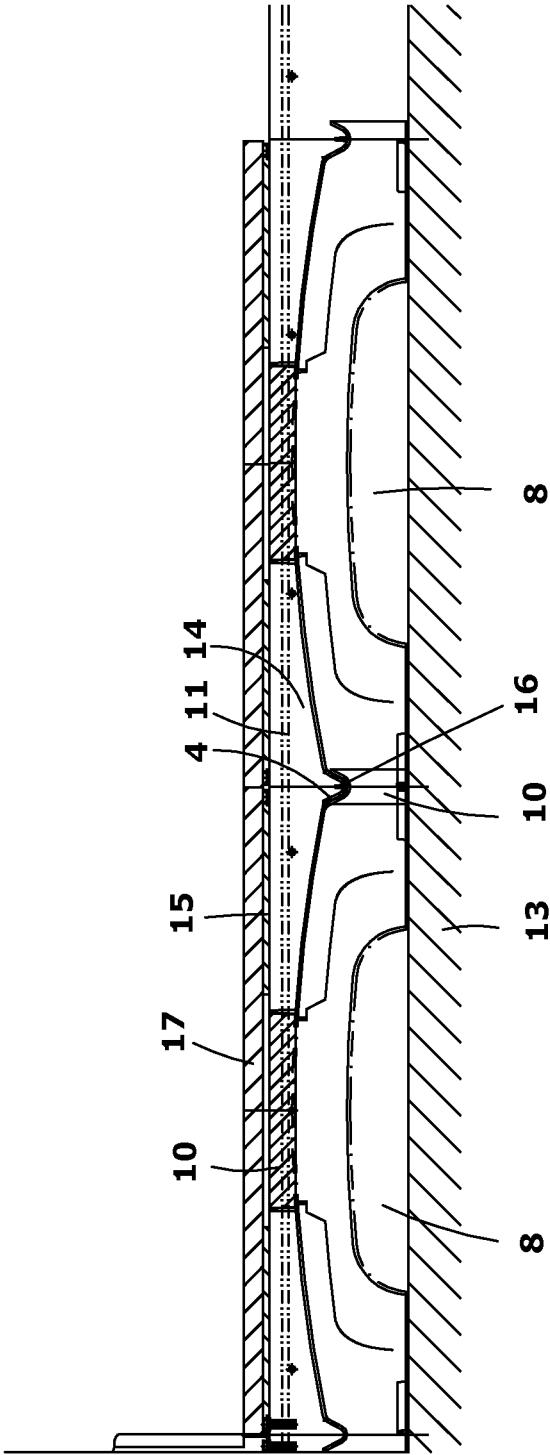


Fig. 4

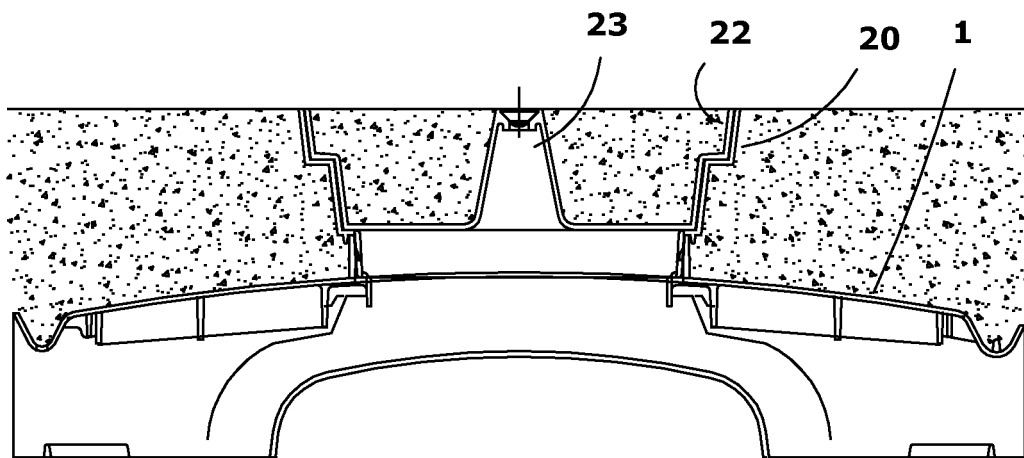


Fig. 5

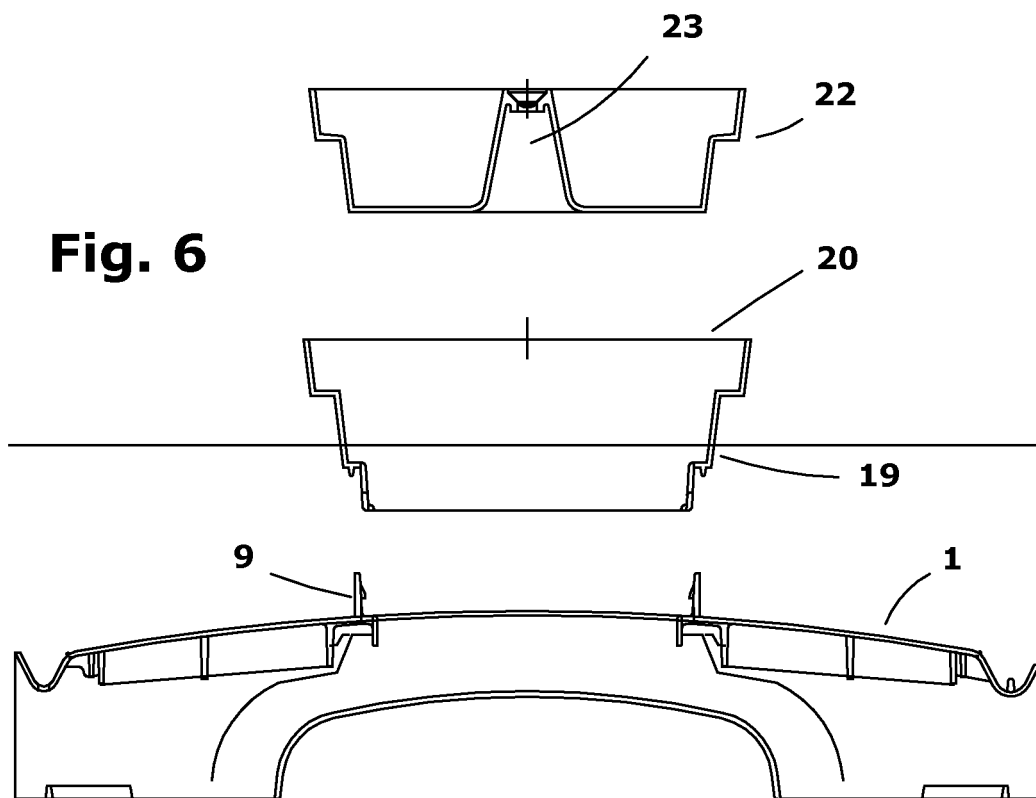


Fig. 6

Fig. 7

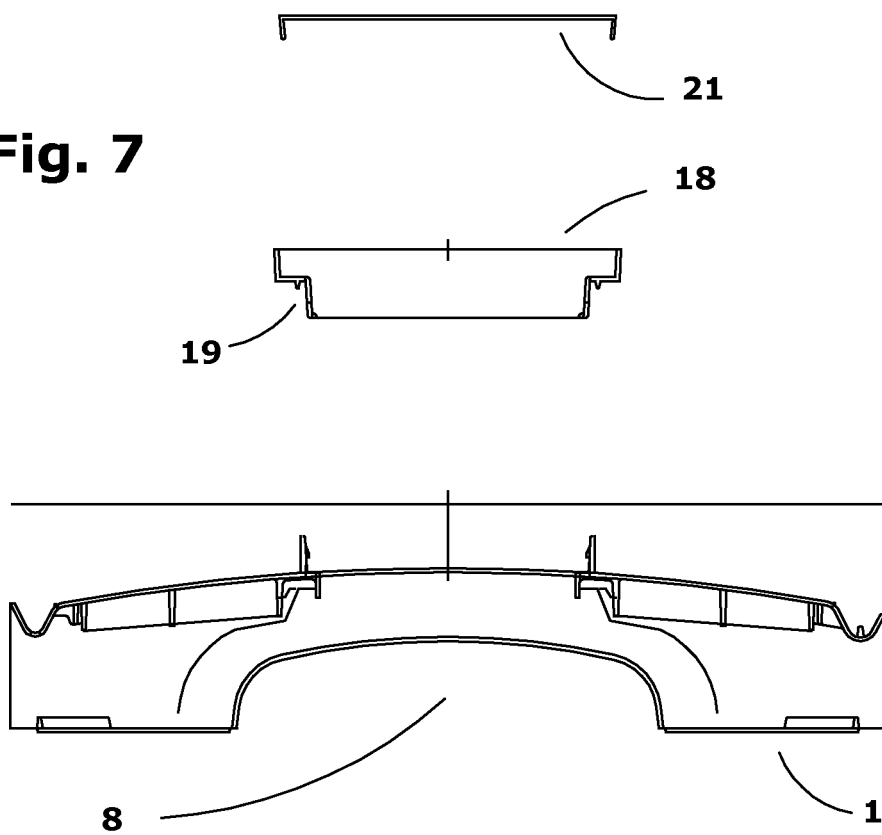
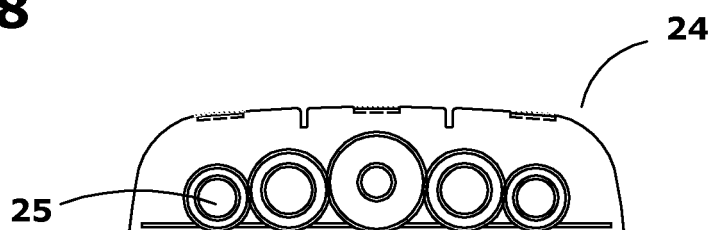


Fig. 8



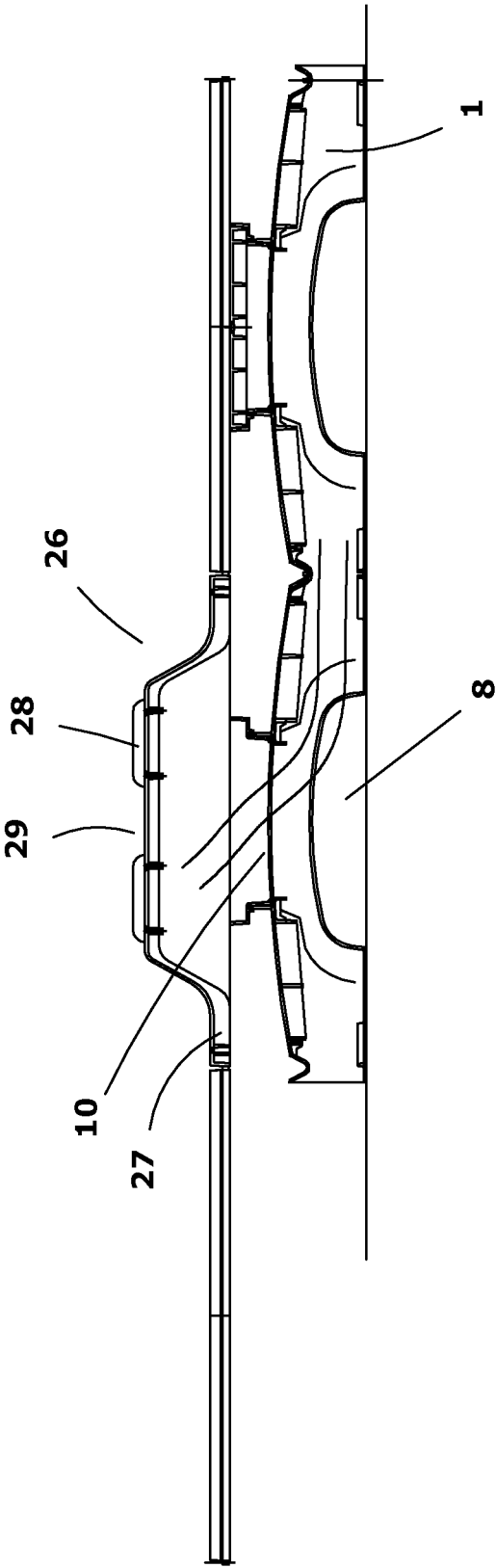


Fig. 9

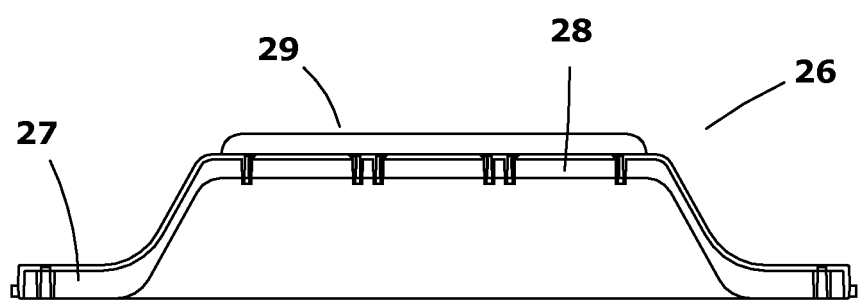
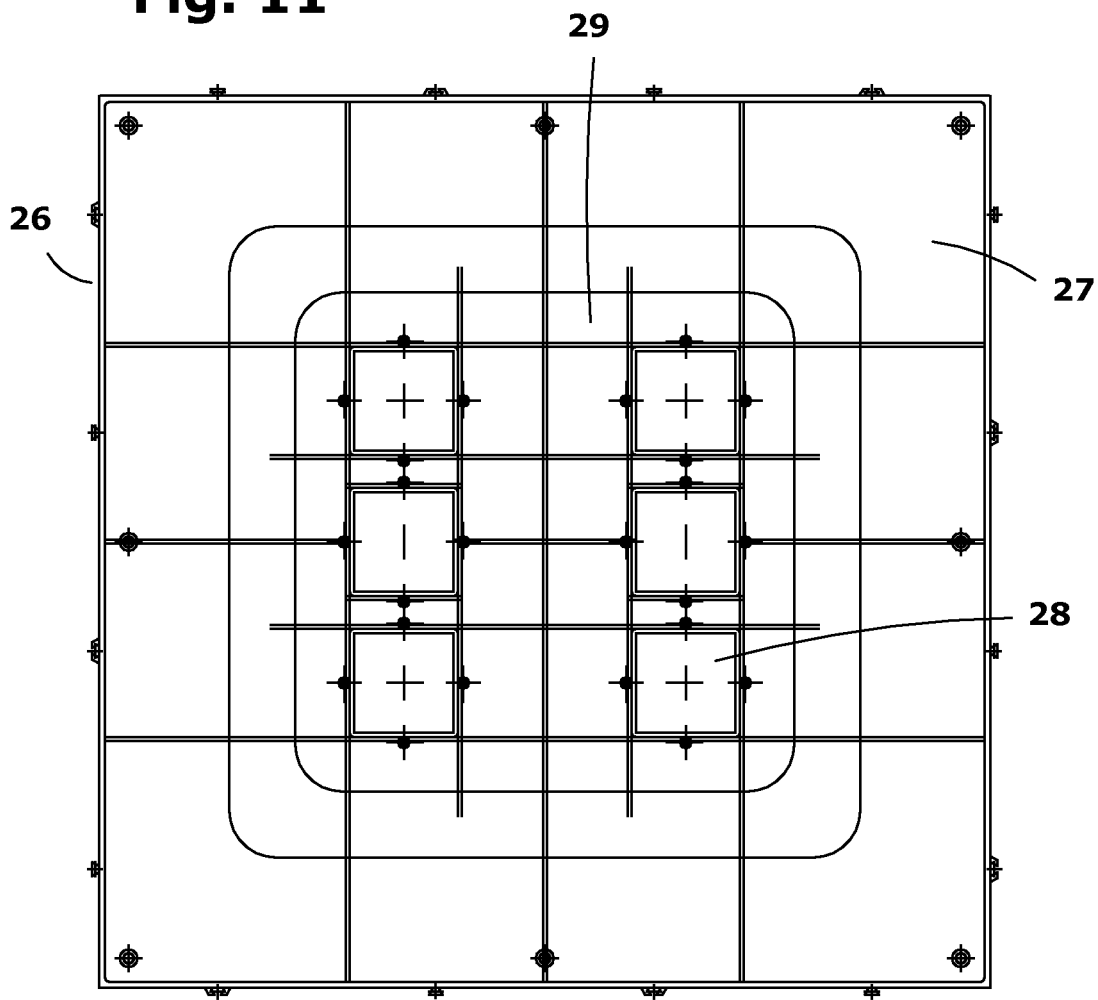


Fig. 10

Fig. 11



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2009/070046

A. CLASSIFICATION OF SUBJECT MATTER		
see extra sheet		
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) E04B5+		
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 practicable, search terms used)		
INVENES, EPODOC, WPI, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1325991 A1 (DYCORE B V) 09.07.2003, the whole document	1-22
X	EP 0803618 A2 (PONTAROLO VALERIO) 29.10.1997, the whole document	1,2,6-13
X	WO 0052279 A1 (PONTAROLO VALERIO) 08.09.2000, the whole document	1,2,6-13
X	WO 03044305 A1 (SINIGAGLIA DONATELLA) 30.05.2003, the whole document	1,2,6-13
A	DE 202008007983 U1 (KNAUF ALUTOP GMBH) 28.08.2008, the whole document	1-22
A	US 2007277457 A1 (LANGSTON et al.) 06.12.2007, the whole document	1-22
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance. "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure use, exhibition, or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "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 documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 06 April 2009 (06.04.2009)		Date of mailing of the international search report (18/06/2009)
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304		Authorized officer M ^a R. Revuelta Pollán Telephone No. +34 91 3496824

Form PCT/ISA/210 (second sheet) (July 2008)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 2009/070046

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2626605 A1 (HERBST DONALD) 04.08.1989, the whole document	1-22
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