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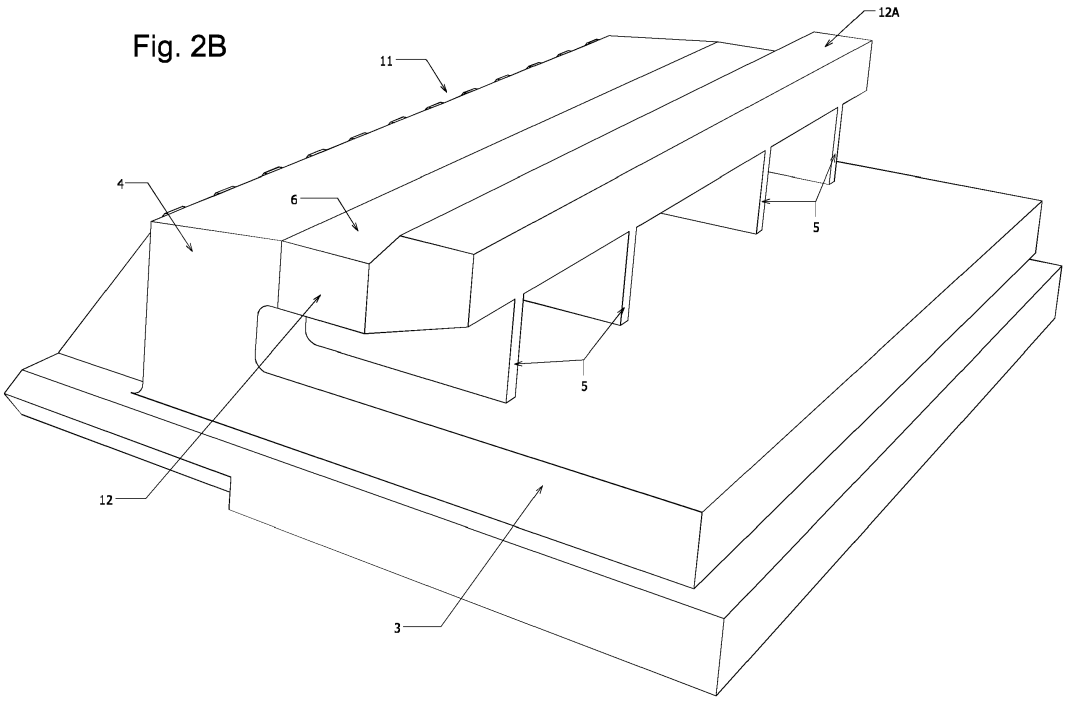
(54) FORMWORK EDGE ELEMENT AND METHOD FOR FORMING A FOUNDATION FOR A BUILDING

(57) The invention relates to a formwork edge element (11) of insulating material for manufacturing a formwork edge for a formwork floor of insulating material for a foundation floor to be poured for a building. The edge element comprises a bottom part (3) and a top part (12) connected to each other by means of an edge part (4). The top part extends from the edge part above the bottom part at some distance from the bottom part such that a space is formed between the bottom part, the edge part and the top part, which space is configured to receive concrete to be poured. The bottom part is configured for connection to the formwork floor and the top part is configured for placing of a wall of the building and for connection to insulating material in the wall.

The invention also relates to a method for forming a foundation for a building making use of a formwork edge element according to the invention.

Fig. 2B



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Description

[0001] The present invention relates to a formwork edge element of insulating material for manufacturing a formwork edge for a formwork floor of insulating material for a foundation floor to be poured for a building.

[0002] The invention also relates to a method for forming a foundation of a building, such as a dwelling, comprising the steps of:

a) manufacturing a formwork by laying plate elements of insulating material adjacently so as to form a formwork floor and arranging a formwork edge along the formwork floor; and
b) pouring concrete into the formwork.

[0003] Such a method is described for instance in WO2011/135354 together with a system of blocks of insulating material for application in the method. According to the known method a temporary edge is arranged round the formwork floor. After pouring of a part of the foundation floor the edge is moved and the rest of the foundation floor is poured, after which the edge is removed. In this way a foundation floor with a stepped peripheral edge is formed for recessed placing of a wall.

[0004] The known method has the drawback that cold thermal bridging occurs at the location of the contact surfaces between the wall and the foundation floor, which has an adverse effect on the insulation values of the building.

[0005] The invention has for its object to provide a method of the type described in the preamble which obviates this drawback.

[0006] The invention provides for this purpose a formwork edge element of the type stated in the preamble which is provided with a bottom part and with a top part connected to each other by means of an edge part, which top part extends from the edge part above a portion of the bottom part at some distance from the bottom part such that a space is formed between the bottom part, the edge part and the top part, which space is configured to receive concrete to be poured, wherein the bottom part is configured for connection to the formwork floor and wherein the top part is configured for placing of a wall of the building and for connection to insulating material in the wall.

[0007] The formwork edge element according to the invention is configured to be integrated into the foundation and here connects the formwork floor insulation to the wall insulation, whereby an insulation shell is created in the building which has a favourable influence on the insulation value of the building. Because of the space in the formwork edge element a peripheral edge is created on the concrete foundation floor and extends into the formwork edge element and imparts strength thereto. A foundation is created as a result with a foundation edge element for placing of walls without thermal bridging.

[0008] In a first preferred embodiment of the formwork edge element according to the invention the top part is provided with one or more strengthening elements for the purpose of supporting the wall. A thus strengthened foundation is suitable for heavier walls, for example brickwork outer walls.

[0009] According to an elegant variant of the first preferred embodiment, the one or more strengthening elements comprise strips of a second insulating material with a greater load-bearing capacity than the first insulating material.

[0010] According to a practical variant of the first preferred embodiment, the one or more strengthening elements comprise inserts of a third insulating material with a greater load-bearing capacity than the first insulating material and the top part is provided with through-openings for receiving the inserts. The number of inserts and the mutual distance therebetween can be adapted to the required load-bearing capacity of the foundation.

[0011] In a further preferred embodiment of the formwork edge element according to the invention the top part comprises an at least partially inclining surface for connection to the wall of the building. The inclining surface facilitates drainage, for instance of cavity water from a cavity wall.

[0012] In a dimensionally stable preferred embodiment the formwork edge element comprises a number of partitions which extend in the space between the top part and the bottom part.

[0013] Suitable insulating material is expanded polystyrene (EPS), preferably with a compression strength between 100 and 350 kPa.

[0014] The second insulating material is then preferably expanded polystyrene (EPS) with a compression strength between 250 and 500 kPa.

[0015] A highly suitable third insulating material is glass foam, preferably bonded glass foam granulate.

[0016] The invention further provides a method of the type stated in the preamble, whereing the method is characterized by the following steps of:

c) arranging the edge by laying a number of formwork edge elements according to the invention along the periphery of the formwork floor; and
d) pouring the material, such as concrete, into the formwork edge elements, wherein the formwork edge elements form the edge elements of the foundation.

[0017] Application of the formwork edge elements in the method according to the invention results in a shorter construction time. The method can moreover be carried out with fewer personnel. The formwork forms part of the foundation, whereby supply and disposal of formwork materials can be avoided.

[0018] The present invention will now be further elucidated with reference to the accompanying figures, in which:

Figure 1A is a schematic cross-section through a part of a building in which a first preferred embodiment of the formwork edge element according to the invention is arranged;
Figure 1 B is a schematic front view of the formwork edge element of figure 1A;
Figure 1 C is a schematic rear view of the formwork edge element of figure 1A;
Figure 2A is a schematic cross-section through a part of a building in which a second preferred embodiment of the formwork edge element according to the invention is arranged;
Figure 2B is a schematic front view of the formwork edge element of figure 2A;
Figure 3A is a schematic cross-section through a part of a building in which a third preferred embodiment of the formwork edge element according to the invention is arranged; and
Figure 3B is a schematic front view of the formwork edge element of figure 3A.

[0019] The same components are designated in all figures with the same numerals.

[0020] Figures 1A and 1 B show schematic cross-sections of a part of a first building in which a first preferred embodiment of the formwork edge element according to the invention is arranged. The building is a for instance a dwelling. Figure 1 B shows a schematic front view of the formwork edge element of figure 1A and figure 1C shows a schematic rear view of the formwork edge element of figure 1A.

[0021] A plurality of formwork edge elements 1 have to be placed along the periphery of a formwork floor 100. Formwork floor 100 can consist of a plurality of adjacent plate elements. The formwork edge elements form together with the formwork floor elements a formwork of a first insulating material for a concrete foundation floor 101 to be poured. Suitable materials for use as first insulating material are expanded polystyrene (EPS), extruded polystyrene (XPS) or similar materials with comparable insulation value and compression strength. Various types of concrete can be poured hereon, including conventional (reinforced) concrete, steel fibre concrete or a combination thereof, also known as hybrid concrete.

[0022] Owing to the specific form of formwork edge element 1 a protruding peripheral edge 102 is formed on foundation floor 100. This peripheral edge 102 is shown in the context of this text as lateral frost-protected edge.

[0023] Wall 110 is placed on formwork edge element 1 above lateral frost-protected edge 102. In the shown preferred embodiment wall 110 is a timber frame construction wall consisting of various plate materials, including insulating material 111. Because of formwork edge element 1 a continuous shell of insulating material is created (100, 1, 111) without thermal bridging.

[0024] Formwork edge element 1 according to the present invention comprises a bottom part 3 and a top part 2 which are connected to each other on one side by means of an edge part 4. Top part 2 extends from edge part 4 over a portion of bottom part 3 at some distance therefrom. Formed as a result between top part 2 and bottom part 3 is a space for receiving concrete to be poured. This space determines the shape of lateral frost-protected edge 102.

[0025] A number of partitions 5 extend between top part 2 and bottom part 3. These partitions 5 are stiffening partitions which guarantee the dimensional stability of formwork edge element 1 during the pouring and curing of the concrete. Bottom part 3 is configured for connection to formwork floor 100. In the shown preferred embodiment the bottom part 3 comprises a stepped shape on one side with surfaces 3A, 3B and 3C. Formwork floor 100 therefore has a stepped shape coacting therewith so that formwork edge element 1 can be placed in dimensionally stable manner against formwork floor 100.

[0026] Top part 2 is configured for connection to insulating material in wall 110. Top part 2 is provided for this purpose with connecting surface 2A. Situated adjacently of connecting surface 2A is an upward sloping drainage surface 2B which transposes into a fixing surface 2C.

[0027] Formwork edge element 1 is preferably provided on the underside with a sawtooth pattern 9. The sawtooth pattern serves the purpose of absorbing pressure differences occurring in the ground surface after pouring of the foundation floor so as to prevent the formation of cracks in the formwork edge element.

[0028] Figure 2A shows a schematic cross-section through a part of a second building in which a second preferred embodiment of the formwork edge element according to the invention is arranged. Figure 2B shows a schematic front view of the formwork edge element of figure 2A.

[0029] Figure 3A shows a schematic cross-section through a part of a third building in which a third preferred embodiment of the formwork edge element according to the invention is arranged. Figure 3B shows a schematic front view of the formwork edge element of figure 3A.

[0030] In the second and third preferred embodiments the formwork edge elements 11,21 respectively are adapted to be able to support a heavy outer wall 112, 212 respectively. In the second and third preferred embodiments the modification relates to only top part 12, 22 respectively of the associated formwork edge element 11, 21 respectively.

[0031] Formwork edge element 11 and formwork edge element 21 are provided with one or more strengthening elements 6, 8 respectively for supporting an outer wall 112, 212 respectively to be placed on top part 12, 22 respectively.

[0032] Formwork edge element 11 is provided with strips 6 of a second insulating material with a greater load-bearing capacity than the first insulating material. Use is preferably made of the same insulating material, but then with a higher compression strength. In a preferred embodiment the first insulating material is EPS with a compression strength between 100 and 350 kPa.

A suitable second insulating material is then for instance EPS with a compression strength between 250 and 500 kPa. The strips are located at the position of fixing surface 2C in figure 1C. These strips can be co-formed with formwork edge element 11 during the autoclaving. Strength calculations have shown that formwork edge element 11 has sufficient load-bearing capacity to be able to support a brickwork outer wall 112, for instance as part of a cavity wall.

[0033] Formwork edge element 21 is provided with one or more inserts 8 of a third insulating material with a greater load-bearing capacity than the first insulating material. Openings 7 are arranged in fixing surface 21C for receiving inserts 8. A suitable material for inserts 8 comprises glass foam, preferably bonded glass foam granulate. Inserts 8 are preferably cone-shaped. An example of a suitable material for inserts 8 is (ultra-)light concrete. The desired shape of the inserts can be obtained by binding by means of cement or other suitable binder.

[0034] Cavity wall 210 comprises an outer wall 212 an inner wall 213 between which insulating material 211 is arranged. Insulating material 211 connects to surface 21A and forms an insulation shell in co-action with formwork edge element 21 and formwork floor 100.

[0035] It is noted for the sake of completeness that formwork edge elements 11 and 21 are interchangeable in figures 2A and 3A.

[0036] The present invention is based on the insight of providing a formwork edge element for co-action with a formwork floor of insulating material for the purpose of forming a so-called lost formwork for pouring of a concrete foundation floor. The formwork edge element forms as it were a shoe for receiving concrete and forming a lateral frost-protected edge. The formwork edge element is configured to support a wall. The formwork edge element is configured such that it also connects to insulating material of a wall intended for placing on the formwork edge element.

[0037] The present invention is of course not limited to the described and shown embodiments. The invention extends generally to any embodiment falling within the scope of protection as defined in the claims and as seen in the light of the foregoing description and accompanying drawings.

Claims

1. Formwork edge element of insulating material for manufacturing a formwork edge for a formwork floor of insulating material for a foundation floor to be poured for a building, wherein the edge element is provided with a bottom part and with a top part connected to each other by means of an edge part, which top part extends from the edge part above a portion of the bottom part at some distance from the bottom part such that a space is formed between the bottom part, the edge part and the top part, which space is configured to receive concrete to be poured, wherein the bottom part is configured for connection to the formwork floor and wherein the top part is configured for placing of a wall of the building and for connection to insulating material in the wall.

2. Formwork edge element as claimed in claim 1, wherein the top part is provided with one or more strengthening elements for the purpose of supporting the wall.

3. Formwork edge element as claimed in claim 2, wherein the one or more strengthening elements comprise strips of a second insulating material with a greater load-bearing capacity than the first insulating material.

4. Formwork edge element as claimed in claim 2, wherein the one or more strengthening elements comprise inserts of a third insulating material with a greater load-bearing capacity than the first insulating material and wherein the top part is provided with through-openings for receiving the inserts.

5. Formwork edge element as claimed in one or more of the foregoing claims, wherein the top part comprises an at least partially inclining surface for connection to the wall of the building.

6. Formwork edge element as claimed in one or more of the foregoing claims, wherein the formwork edge element comprises a number of partitions which extend in the space between the top part and the bottom part.

7. Formwork edge element as claimed in one or more of the foregoing claims, wherein the insulating material is expanded polystyrene (EPS), preferably with a compression strength between 100 and 350 kPa.

8. Formwork edge element as claimed in one or more of the foregoing claims 3-7, wherein the second insulating material is expanded polystyrene (EPS), preferably with a compression strength between 250 and 500 kPa.

9. Formwork edge element as claimed in one or more of the foregoing claims 4-7, wherein the third insulating material comprises glass foam, preferably bonded glass foam granulate.

10. Method for forming a foundation for a building, such as a dwelling, comprising the steps of:

    a) manufacturing a formwork by laying plate elements of insulating material adjacently so as to form a formwork floor and arranging an edge along the formwork floor; and

b) pouring material, such as concrete, into the formwork, wherein the method is **characterized by** the following steps of:

c) arranging the edge by laying a number of formwork edge elements according to one or more of the foregoing claims along the periphery of the formwork floor; and

d) pouring the material, such as concrete, into the formwork edge elements, wherein the formwork edge elements form the edge elements of the foundation.

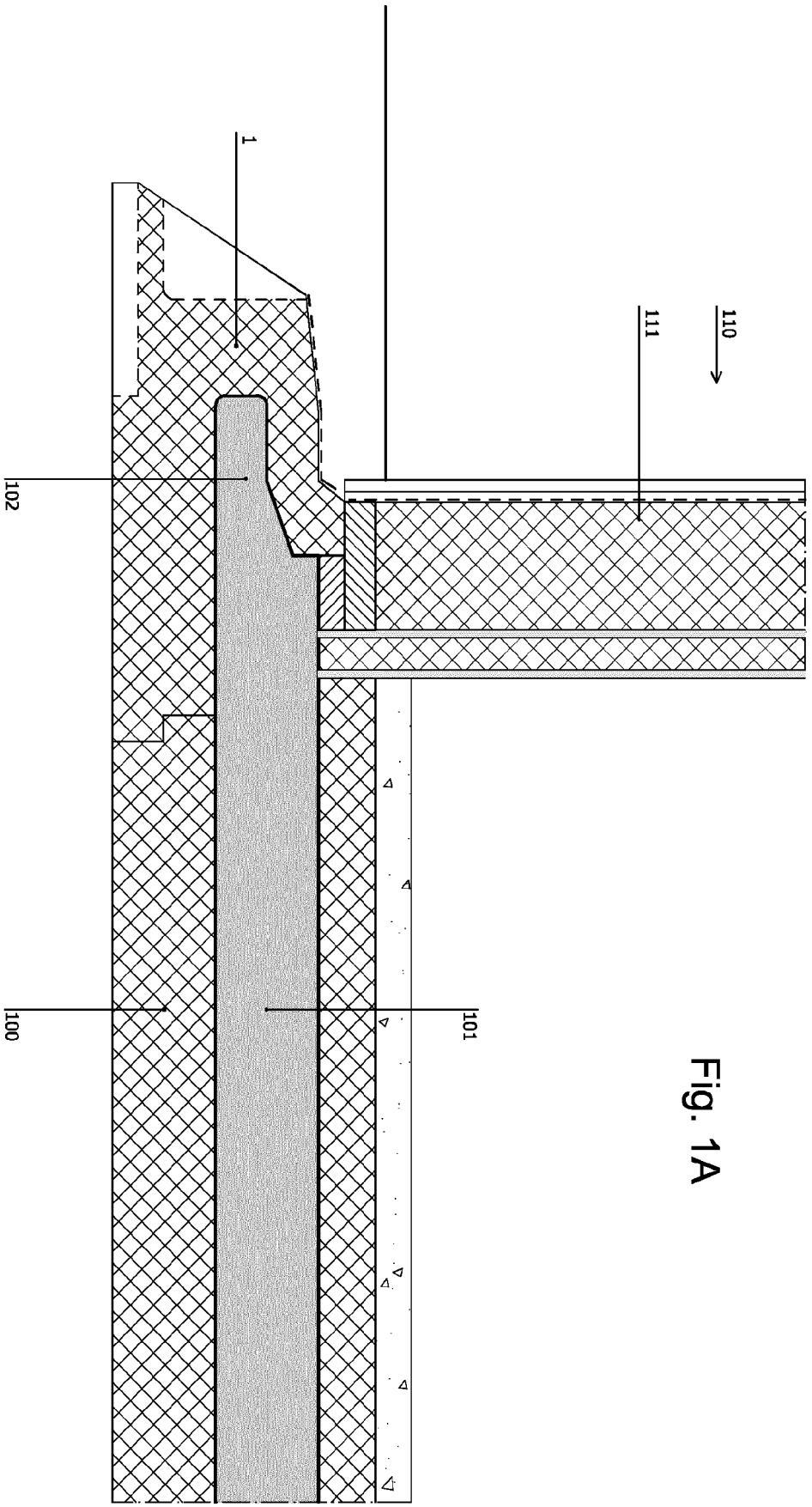


Fig. 1A

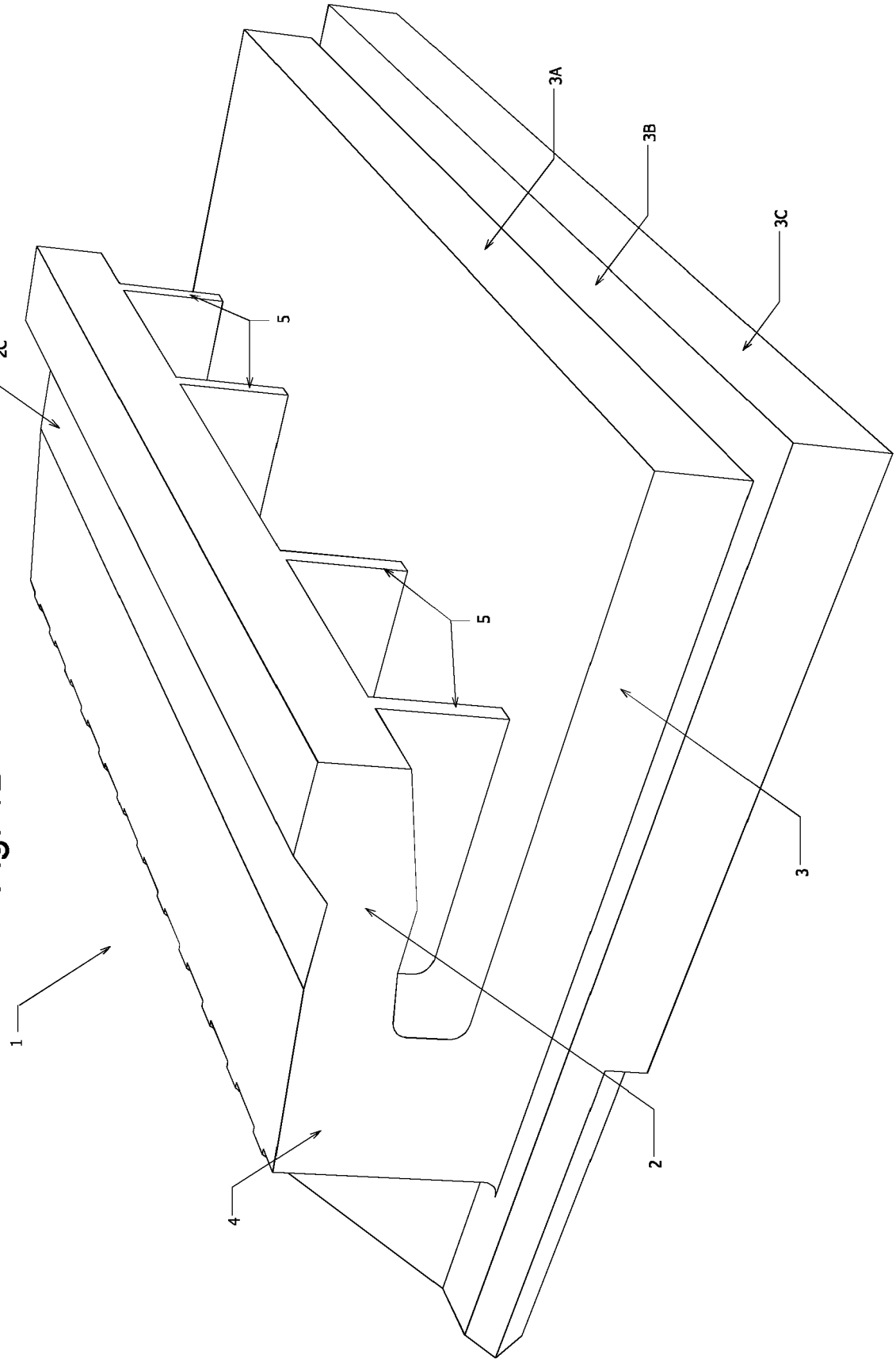


Fig. 1B

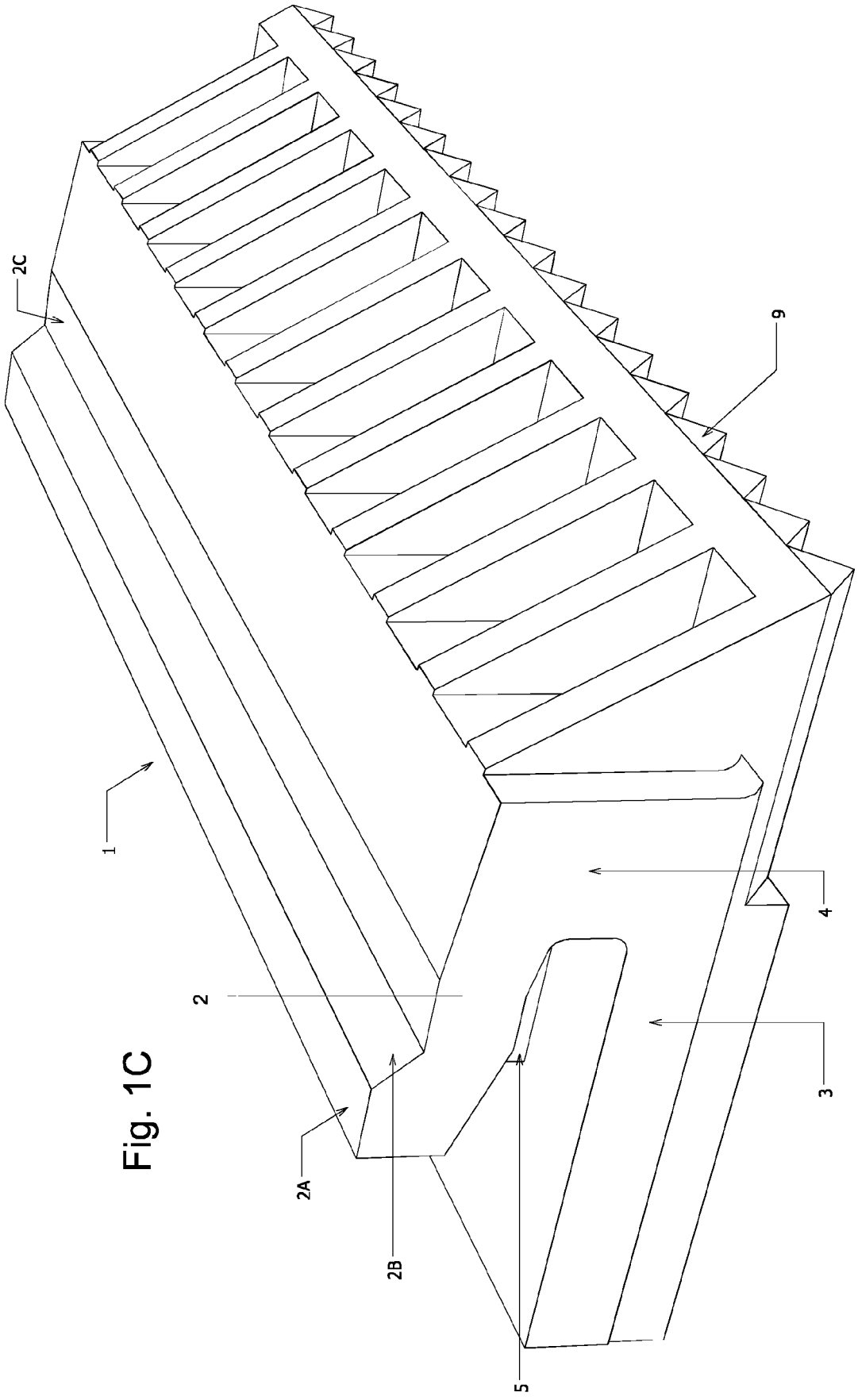
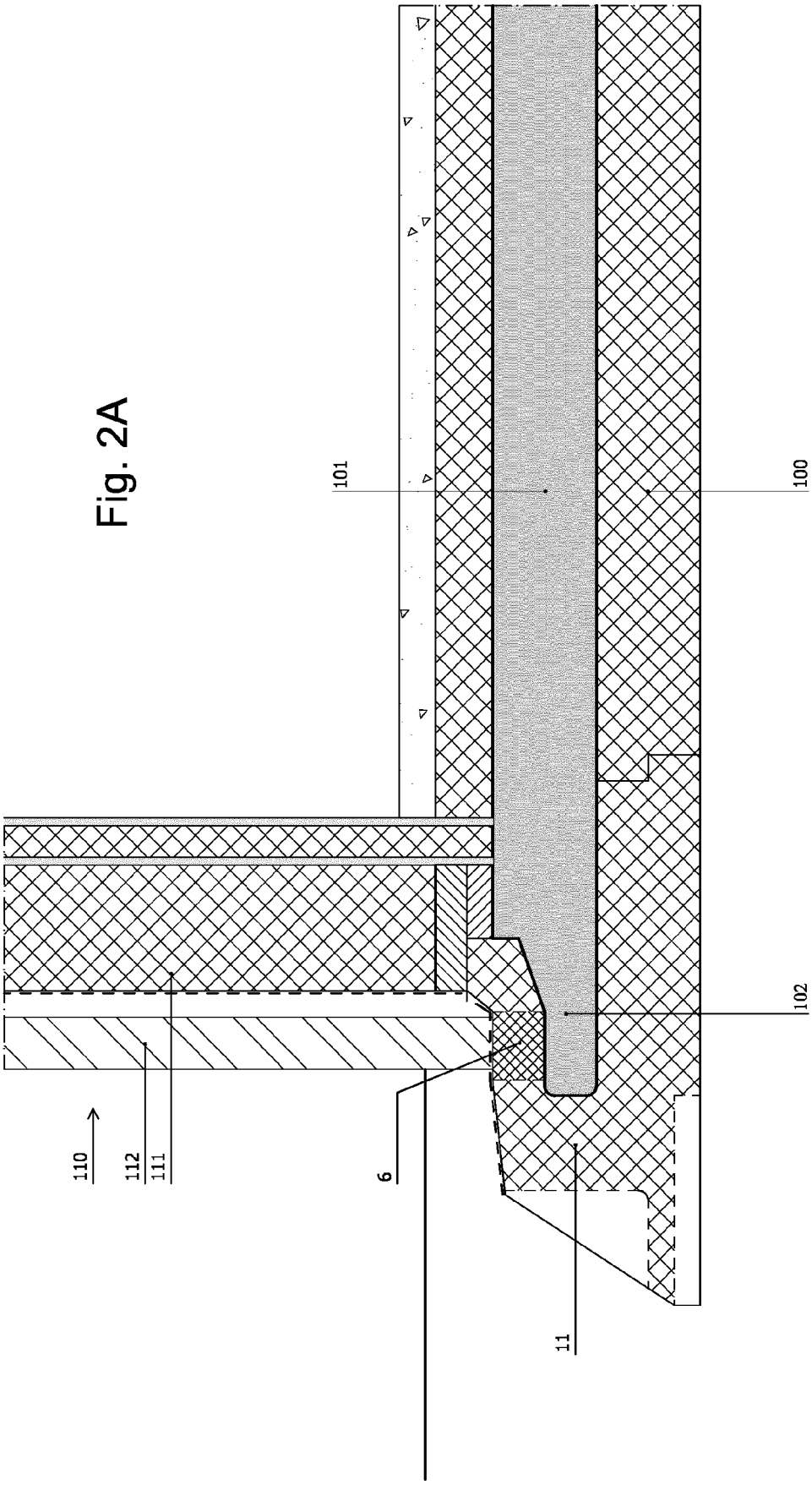


Fig. 1C

Fig. 2A



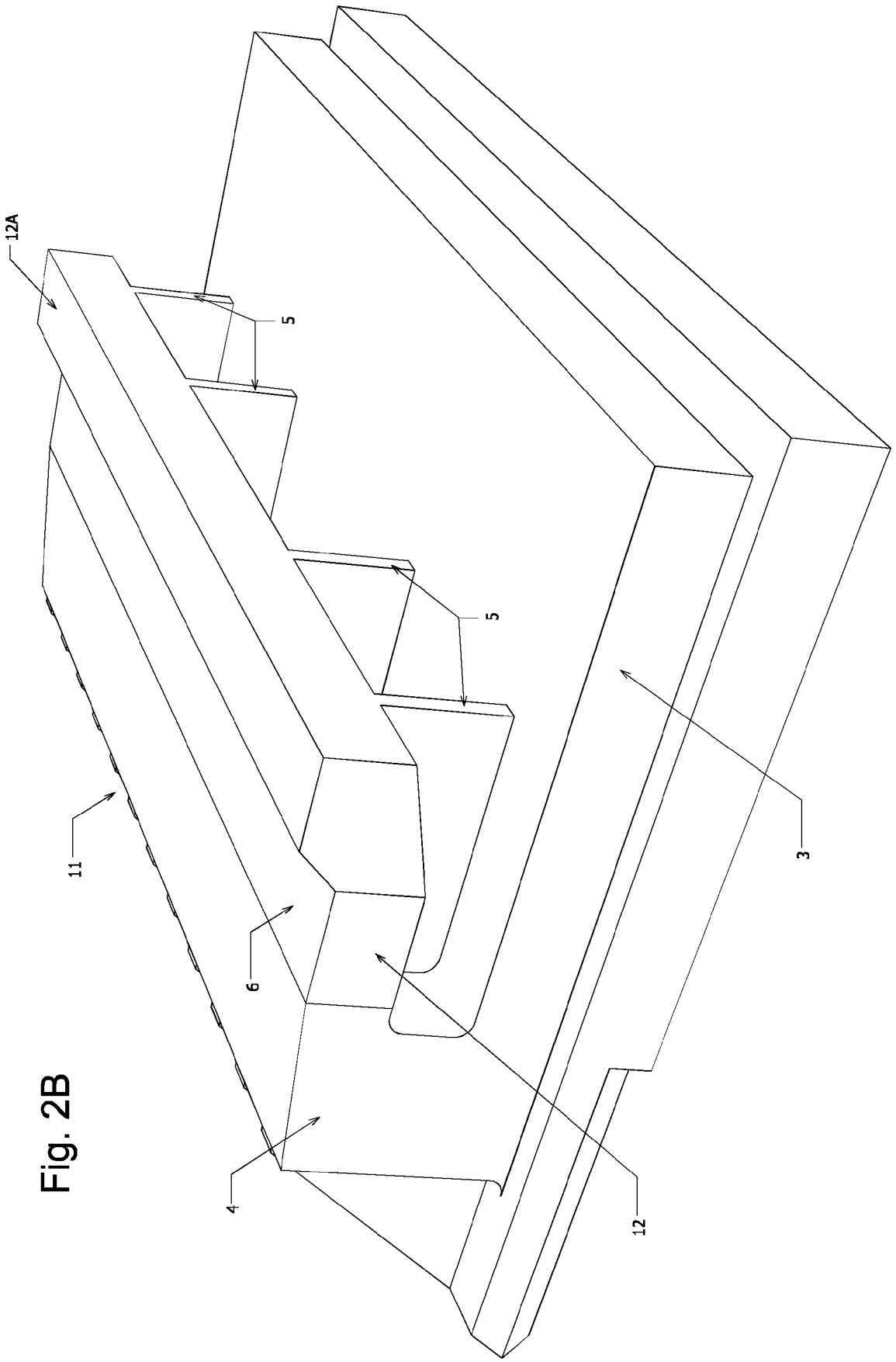
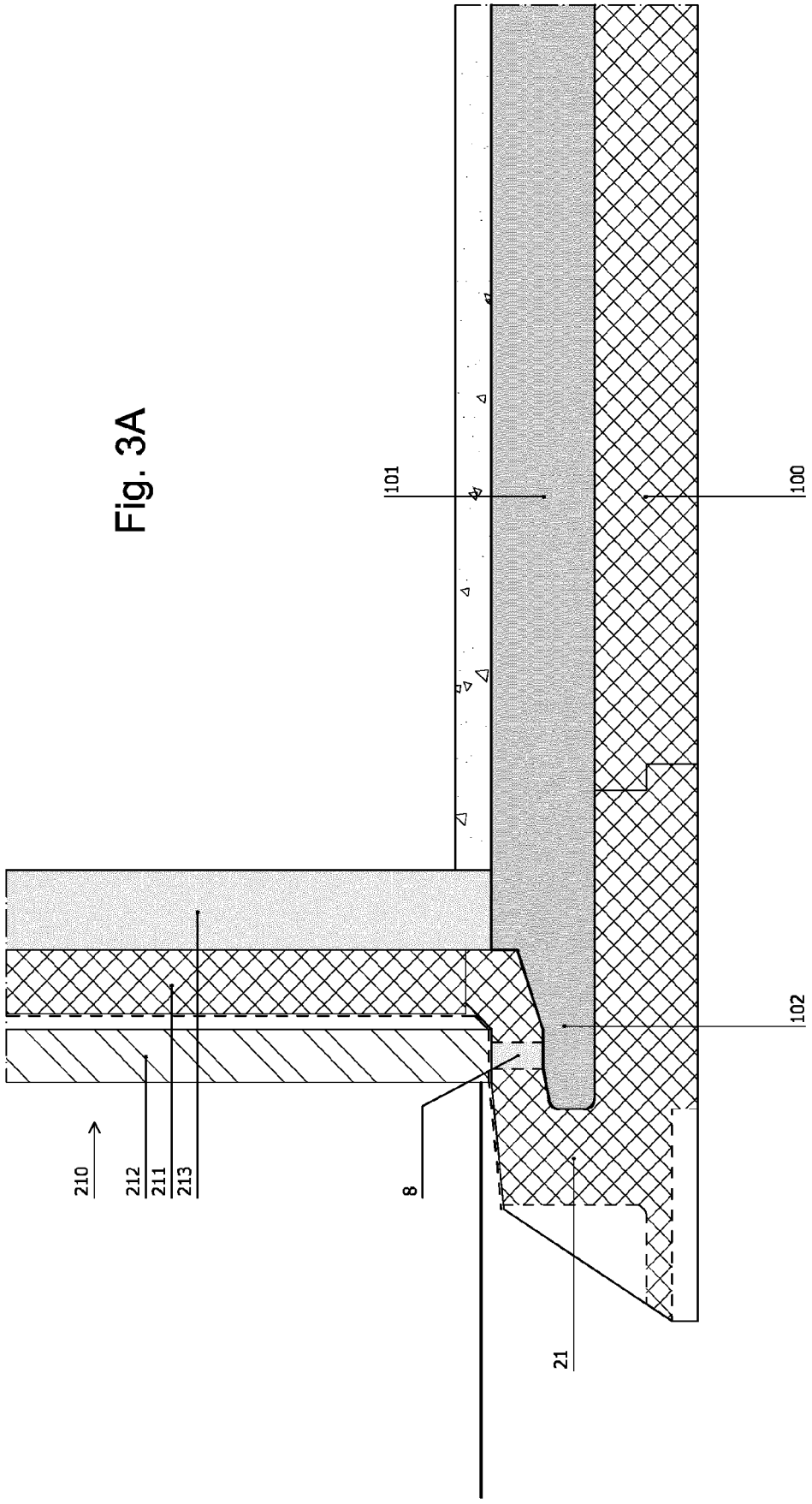


Fig. 2B

Fig. 3A



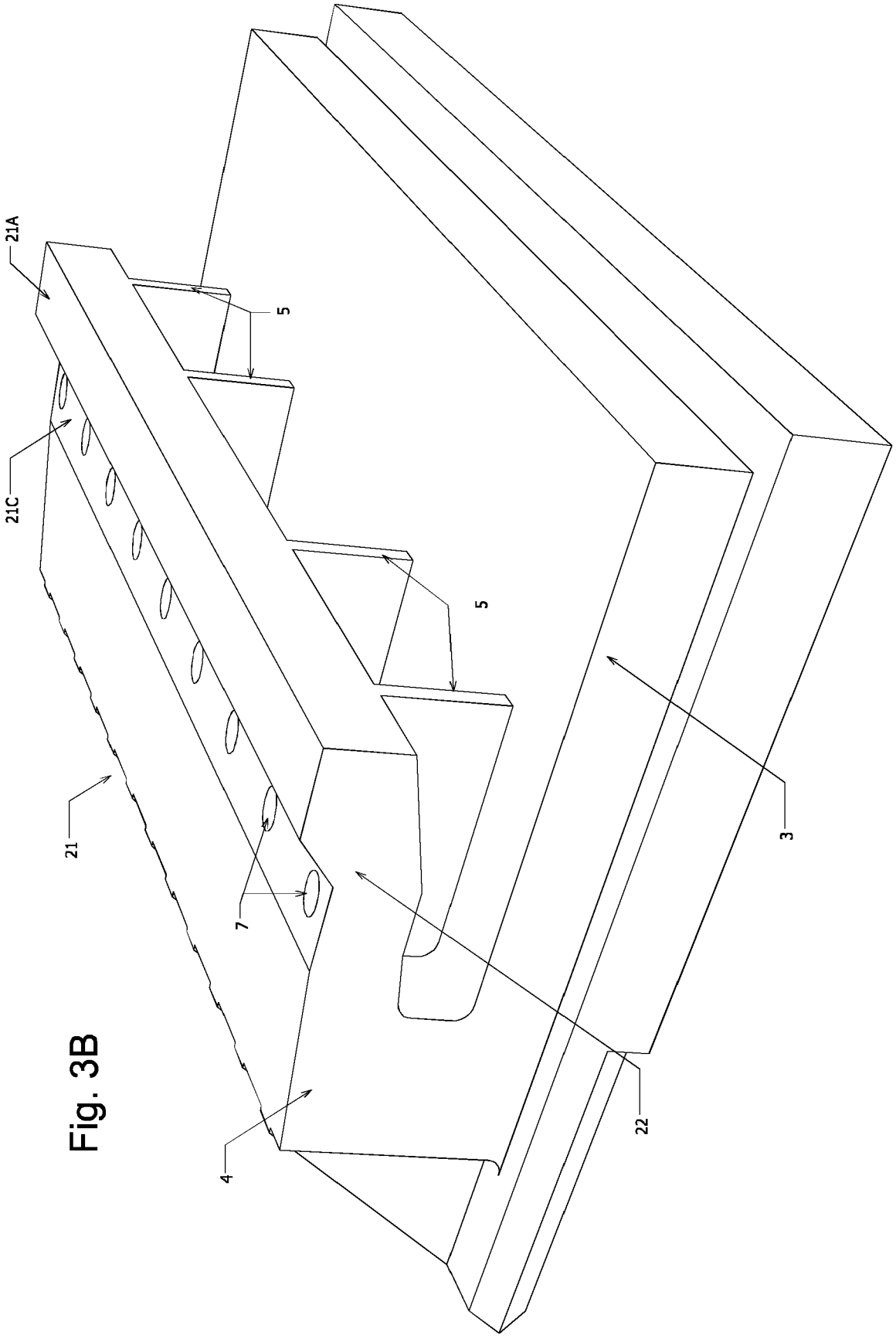


Fig. 3B

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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 5692

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2007/046718 A2 (LONSDALE CRAIG WALLACE [NZ]; HARRIS PETER RAYMOND [NZ]) 26 April 2007 (2007-04-26)	1,2,5, 7-10	INV. E02D27/01 E02D27/02
A	* abstract * * page 4, lines 1-26; figure 1 *	3,4,6	

TECHNICAL FIELDS SEARCHED (IPC)

E02D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 June 2016	Koulo, G

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EPO FORM 1503 03.82 (P04C01)

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20-06-2016

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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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