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Remarks:

Amended claims in accordance with Rule 86 (2) EPC.

(54) **Building block**

(57) A building block, characterized by the fact, that the supporting structure of the block is constituted by repeatable and ramified cavities of basic profile P made inside a thermo insulating insert, filled with supporting material, where said basic profiles having parallel shifted arms A and C, connected by connecting arms B, while said thermo insulating insert is constituted by two halves of identical form having cavities in form of said basic profiles, comprising arms A and C as well as connecting arms B, said insert halves abutting with each other but turned in relation to each other of 180° so that the edge X of first insert half (1) contacts edge Y of said second turned insert half (2) and correspondently, edge Y of first insert half (1) contacts with edge X of second turned insert half (2), while arms A(1) and C(1) of first insert half(1) are connected with arms A(2) and C(2) of said turned second insert half(2), thus constituting through channels filled with supporting material in such a manner that create supporting element of full height of the block while connecting arms B(1) and B(2) of said two halves (1) and (2) of said insert pass by in relation to each other and enter inside the block beginning from its horizontal surfaces and reach up to 0,25 to 0,75 of the block height, while between arms A(1) and A(2) and respectively arms C(1) and C(2) of subsequent basic profile P there are, arranged in one axis, connecting arms D(1) and D(2) of both insert halves, made from said supporting material,

penetrating into inside of the block and providing between them room for the thermo insulating material, and, the block has also connecting elements E(1) and E(2), shifted in relation to each other, situated in different axes which can enter into inside of the block at any required depth but not reaching the opposite block base surface. Building block has connecting members connecting parallel fragments of the basic profile which create three dimensional structure of the insert, which has various height less than the height of the through element, and building block has arms B of the profile P and connecting members E of any length, but not reaching the opposite surface. Building block has connecting members D less than half of the block height, and has connecting members E of height shorter than full height of the block. Building block has arms B of profile P as well as connecting members D and E of the internal structure, which have endings in shape of an arc of any radius, and has arms A and C, connected by connecting arm B may form a stylized letter "Z". Building block has repeatable profile P having round or polygon shape bending and endings and the building block can be created by a thermo insulating insert comprising at least one row of basic profile P, formed in any shape, connected with other profiles in any manner.

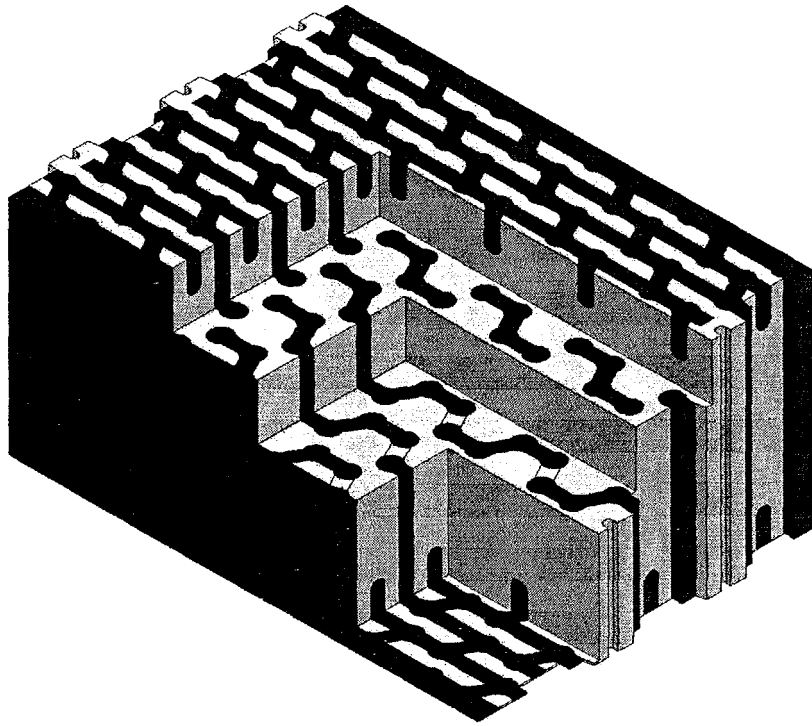


Fig. 14

Description

[0001] The object of this invention is a new and original form of a building block featuring good thermo insulation properties and comprising thermo insulating insert of a new configuration.

[0002] There are known building blocks constituting different building modules. From solution disclosed in EP 0094067 there are known building elements in form of three dimensional supporting structure with through channels filled with insulating material. There are known from Polish patent No 181846 and from Polish patent applications No. P.338641 and P.353526 building blocks comprising inserts of one or multi layer thermo insulating materials joined by a supporting structure.. These building blocks or modules are made in form of cuboidal solids and they are provided with internal inserts of different three-dimensional forms and shapes.

[0003] In accordance of this invention there is provided a supporting structure of a building block, in shape of repeatable and ramified cavities of basic profile P, made inside a thermo insulating insert, filled with supporting material, having parallel shifted arms A and C, connected by connecting arms B, while said thermo insulating insert is constituted by two halves of identical form having cavities in form of said basic profiles , comprising arms A and C as well as connecting arms B , said insert halves connected with each other but turned in relation to each other of 180° so that the edge X of first insert half contacts edge Y of said second turned insert half and correspondently, edge Y of first insert half contacts with edge X of second turned insert half, while arms A(1) and C(1) of cavities of said basic profile of first insert half are connected with arms A(2) and C(2) of cavities of said basic profile of said second insert half which is turned about 180° relative to first half, thus constituting through channels filled with supporting material in such a manner that create supporting element of full height of the block. Connected together connecting arms B(1) and B(2) of said two halves of said insert pass by in relation to each other and enter inside the block beginning from its external, horizontal surfaces and reach preferably up to 0,25 to 0,75 of the block height, while between arms A(1) and A(2) and respectively arms C(1) and C(2) of subsequent basic profile there are, arranged in one axis, connecting arms D(1) and D(2) of both insert halves, made from said supporting material , penetrating into inside of the block and providing between them room for the thermo insulating material. The block has also connecting members E(1) and E(2), shifted in relation to each other , situated along different axes which enter into inside of the block at any required depth but not reaching the opposite block surface.

[0004] In accordance of this invention, the of arms B of said basic profile P as well as connecting arms D and E of said internal supporting structure, can be ended in form of arc with any radius.

[0005] The block can have connecting elements , con-

necting parallel fragments of said basic profile, thus creating three dimensional structure of the insert, of various, height lesser than that of said through channels

[0006] The block according to this invention can have connecting arms D less than half of the block height and connecting arms E less than full height of the block, and also can have arms A and C may be connected by connecting arm B in such a manner that create stylized letter Z.

[0007] The block can have basic, repeating profile, with its end in shape of an arc or a polygon with bends or angles.

[0008] The insert of the block can be constituted of one row of basic profile with given shape which can be connected with subsequent rows of basic profile of different shape.

[0009] In solution according to present invention the basic repeatable profile of said thermo insulating insert is in form of two parallel , spaced apart elements connected together by a connecting arm, creating three dimensional forms, with bendings and endings, in section in shape of arcs or polygons.

[0010] Two identical halves of the insert are juxtaposed one against other and turned about 180° in relation to each other in such a manner that edges X and Y of first insert half connect edges Y and X of the second insert half, creating points of connection X - Y and Y - X.

[0011] The block can have said thermo insulating insert provided with at least one row of given basic profile , connected in any manner with subsequent rows of different basic profile.

[0012] The solution according to this invention is characterized by the thermo insulating insert enabling to reduce substantially bulk density of the ready product while substantially increasing its durability and thermo insulating proprieties.

[0013] Unitary bodies of the basic profile, which can be shaped in different manner , connected together by means of bridges or pins, create inside the block, a three-dimensional lattice which, deeply inwards of the block, is different from that in the vicinity of the block horizontal surfaces upper and lower. The structure under the block surfaces is created by connecting arms, which connect together basic profile elements, which constitute elementary units, and by means of connecting arms, connecting these elementary units. The structure deeply inwards of the block is formed differently, as a result of different arranging of parallel through arms and their connecting arms, which can be situated between said parallel through arms, thus constituting rows of said unitary units , or, which said connecting arms can be situated between said rows, connecting said rows together. The thermo insulating insert can have the basic profiles arranged in such a manner that the basic profiles are directed in opposite directions relative to each other, and they are shifted in relation to each other by the width of the through arm, creating external surfaces of the block, upper and lower, formed from parallel arms of the through profile,

and directed in opposite directions. The insert can also comprise elements B, D and E, ended inwardly by arcs.

[0014] Connecting arms, made of supporting material and connecting given particular profiles, can enter inside the block on any depth, leaving room for thermo insulating insert. The unitary row inside the block can be created by an undetermined number of basic profile cavities. Depending on the thickness of thermo insulating insert basic profile the unitary row thickness can be varied. For the purpose of this invention realization, it is preferred to apply elements creating the insert with the same thickness. Situated inside the block, connecting elements in the shape of pins made from supporting material, can have varied height and be ended by any form of the pin ending, while the parallel segments of a single elementary unit constituting the insert, can be situated in relation to each other at varied angles.

[0015] Solution according to this invention, which has shifting basic profile cavities and entering at varied depth the arms and connecting arms, creates an internal structure made of the supporting material, invisible from outside.

[0016] In this solution, the cavities of the basic profile P, owing to varied heights of the connecting arms D and E, passing (entering) from first into second half of the insert cause diminishing up to disappearance the basic profile inside the block.

[0017] The internal structure of the block depends on the heights of particular connecting elements E(1) E(2) and D(1) D(2) of the supporting material.

[0018] Disappearance of the insert in cavities of the basic profile P results from uniting both insert halves (1) and (2) and from surface of interpenetration of connecting elements D and E.

[0019] The block according to this invention can have the insert provided with arm B of figure P and element D and E with the cavities endings in the shape of arcaded surfaces, serving for easy filling the supporting material into the empty internal spaces of the insert.

[0020] The thickness of the external walls of the block made from the supporting material, can be varied, depending on kind of the block and its purpose and application.

[0021] The aspect of the horizontal surfaces upper and lower of the block depends on the shape of the basic profile creating the insert, as well as, on the endings of the parallel segments, and position of connecting element between arms A and C.

[0022] The building block, made according to this invention, has several parting faces, in which the faces have different configurations of elements constituting the thermo insulating insert, depending on the position of parting i.e. longitudinal and transversal. The aspect of these faces results from different positioning of parallel arms of the basic profile and connecting elements positioned between them, as well as depending on their height. The basic elementary unit creating the insert half can be of the shape of a stylized letter "Z".

[0023] The block according to this invention has through parallel elements of the basic profile cavities filled with supporting material, thus creating the block supporting structure.

5 **[0024]** The cavities and the endings of particular, given elements in the shape of arcades with varied radius, enable easy filling the insert cavities and empty spaces with supporting mineral material thus creating compact block supporting structure.

10 **[0025]** The solution in accordance with this invention is shown in examples of preferred embodiments on the drawings, on which the block is being shown in different projections and sections and where is shown an example of basic profile cavity, which composes the thermo insulating insert in its varied embodiments.

15 **[0026]** On Fig 1 to 3 there are shown the repeatable basic profile cavities in form of mould cores for forming the thermo insulating inserts halves, as well as cross sections of these profiles, and their modifications consisting of uniting several single profiles P thus creating the elementary units of the insert halves. Fig 4, 4a, and Fig 5, 5a, show basic profile cavities of the insert when both insert halves are abutted against each other and turned about 180° relative each other. Fig 6 presents exemplary half of the block supporting structure, where the thermo insulating insert has been imaginarily removed for illustrating purposes. The block supporting structure is being composed from uniting and turning about 180° of two identical insert halves. On Fig 6a are illustrated both halves of the block supporting structure with a fragmentary section of a corner on which connecting elements D and B are shown.. On Fig 7 is shown demonstrative view of the supporting structure after putting the upper and lower surface one upon another, with description of the arms and connecting elements visible on horizontal external surfaces, while Fig 8 and 8a illustrates an exemplary supporting structure visualizing the block internal lattice. Fig 9 illustrates the insert in projection from above and section views across surfaces E - E and F - F. Fig 10 shows the building block filled with supporting material in side projection and its sections across horizontal surfaces G - G, H - H, I - I and J - J, taken at different heights. Fig 11 presents the block with its insert in projection from above with sections across vertical surfaces D - D and C - C, taken at different distance from the border of the block. Fig 12 illustrates a view from above of the thermo insulating insert and its sections taken across vertical surfaces A - A and B - B, mutually perpendicular. On Fig 13 the exemplary thicknesses of the block are shown, and Fig 14 illustrates partial sections of the block showing the internal block structure at different surfaces.

Example 1

55 **[0027]** Building block in form of a cuboid comprises a thermo insulating insert made of foamed polystyrene, which comprises cavities in form of parallel basic profiles P. The cross section of the polystyrene foam of height

equal half height of the building block, comprising profile cavities in shape of stylized letter "Z" is combined with identical insert turned about 180°. Both identical halves (1) and (2) of the thermo insulating insert are set in such a manner, that points "X" are to be situated in left hand lower position. The half (2) of the insert is being turned about 180° in horizontal surface in accordance with Fig 6, thus creating the supporting structure. Interconnection of points X and Y of the halves (1) and (2) into pairs X - Y and Y - X results in creating the full block. Thus composed insert is being put into a frame, and then it is filled with concrete-ceramic mass and further proceeded in known manner. The block has externally visible elements of supporting structure and thermo insulating insert, arranged into parallel surfaces and directed towards each other. The block has, on surfaces contacting adjacent walls, undercuttings and keys enabling easy connecting and erecting the walls.

Example 2

[0028] Building block, fabricated as in example 1, comprises several layers of thermo insulating insert composed of basic profiles cavities P having in section an ending in shape of rectangle. Thus created block, in the shape of cuboid, with keys and undercuttings composing a lock, has upper and lower surfaces, with parallel, short strips of supporting material.

Example 3

[0029] Building block, fabricated as in example 1, comprises insert made by combining two halves of the thermo-insulating insert and by turning these halves about 180° one half in relation to other. Combined two halves of the insert comprise connecting members D and E, creating room for supporting material of these connecting members of height less than half height of the block, resulting in providing room for basic profile in the thermo insulating insert.

Example 4

[0030] Building block, fabricated as in example 1, comprises insert made by combining two halves of the thermo insulating insert and by turning these halves about 180° one half in relation to other. Combined two halves create room for supporting material of connecting members D and E of height equal half of the insert height thus causing diminishing room up to its disappearance for basic profile inside the thermo insulating insert.

Example 5

[0031] Building block, fabricated as in example 1, comprises insert, in which connecting elements B and E inside the block do not reach the opposite surface and have endings in form of arcs. The insert is put into frame and

is filled with supporting material, which fills the internal empty spaces creating the block supporting structure.

Example 6

[0032] Building block, fabricated as in example 1, comprises insert with cavities with element B of figure P and connecting members E with arc shaped endings leaving empty room for filling with the supporting material. The arc shaped endings enable good filling of the internal structure of the block.

Example 7

[0033] Building block, fabricated by putting three-dimensional insert into a frame and filling with supporting material. The thermo insulating insert has cavities ended by arcs for connecting members D. The height of the connecting members D is less than the height of half of the block, thus creating internal empty space filled with supporting material during fabricating the block.

Example 8

[0034] Proceeding as in example 7, the connecting members D with height equal to half of the block height, partially contact each other, with their edges preserving free space filled with thermo insulating insert. The connecting members are situated along the same axes at different places of the block.

Example 9

[0035] Proceeding as in example 7, the connecting members D, after forming the block, do not contact each other, preserving the element of the thermo insulating insert inside the block.

Example 10

[0036] Building block, fabricated as in example 1, comprises the thermo insulating insert having an empty space, which is filled with the supporting material, producing inside the block the basic profile P in shape of stylized letter "Z". Connecting members B(1), D(1), E(1), and B(2), D(2), E(2) made from supporting material, are less than half of the block height.

Example 11

[0037] Building block, fabricated as in example 10, comprises internal structure in which profile P diminishes up to disappearance through connecting members B(1) and E(1) longer than the block half height.

Claims

1. A building block in form of cuboid comprising a three dimensional thermo insulating one or multi layer insert, and supporting material, constituting supporting structure and having optionally on its side surfaces undercuttings and keys, **characterized by** the fact, that the supporting structure of the block is constituted by repeatable and ramified cavities of basic profile P made inside a thermo insulating insert, filled with supporting material, where said basic profiles having parallel shifted arms A and C, connected by connecting arms B, while said thermo insulating insert is constituted by two halves of identical form having cavities in form of said basic profiles, comprising arms A and C as well as connecting arms B, said insert halves abutting with each other but turned in relation to each other of 180° so that the edge X of first insert half (1) contacts edge Y of said second turned insert half (2) and correspondently, edge Y of first insert half (1) contacts with edge X of second turned insert half (2), while arms A(1) and C(1) of first insert half(1) are connected with arms A(2) and C(2) of said turned second insert half(2), thus constituting through channels filled with supporting material in such a manner that create supporting element of full height of the block while connecting arms B(1) and B(2) of said two halves (1) and (2) of said insert pass by in relation to each other and enter inside the block beginning from its horizontal surfaces and reach up to 0,25 to 0,75 of the block height, while between arms A(1) and A(2) and respectively arms C(1) and C(2) of subsequent basic profile P there are, arranged in one axis, connecting arms D (1) and D(2) of both insert halves, made from said supporting material, penetrating into inside of the block and providing between them room for the thermo insulating material., and, the block has also connecting elements E(1) and E(2), shifted in relation to each other, situated in different axes which can enter into inside of the block at any required depth but not reaching the opposite block base surface.
2. Building block according to Claim 1, **characterized by** the fact, that it has connecting members connecting parallel fragments of the basic profile which create three dimensional structure of the insert, which has various height less than the height of the through element
3. Building block according to Claim 1, **characterized by** the fact, that it has arms B of the profile P and connecting members E of any length, but not reaching the opposite surface
4. Building block according to Claim 1, **characterized by** the fact, that it has connecting members D less than half of the block height

5. Building block according to Claim 1, **characterized by** the fact, that it has connecting members E of height shorter than full height of the block.
6. Building block according to Claim 1, **characterized by** the fact, that it has arms B of profile P as well as connecting members D and E of the internal structure, which have endings in shape of an arc of any radius.
7. Building block according to Claim 1, **characterized by** the fact, that arms A and C, connected by connecting arm B may form a stylized letter "Z".
8. Building block according to Claim 1, **characterized by** the fact, that it has repeatable profile P having round or polygon shape bendings and endings
9. Building block according to Claim 1, **characterized by** the fact, that it can be created by a thermo insulating insert comprising at least one row of basic profile P, formed in any shape, connected with other profiles in any manner.

Amended claims in accordance with Rule 86(2) EPC.

1. A building block in form of cuboid comprising a three dimensional thermo insulating one or multi layer insert, and supporting material, constituting supporting structure and having optionally on its side surfaces undercuttings and keys, **characterized by** the fact, that the supporting structure of the block is constituted by repeatable and ramified cavities of basic profile P made inside a thermo insulating insert, filled with supporting material, where said basic profiles having parallel shifted arms A and C, connected by connecting arms B, while said thermo insulating insert is constituted by two halves of identical form having cavities in form of said basic profiles, comprising arms A and C as well as connecting arms B, said insert halves abutting with each other but turned in relation to each other **by** 180° so that the edge X of first insert half (1) contacts edge Y of said second turned insert half (2) and **correspondingly**, edge Y of first insert half (1) contacts with edge X of second turned insert half (2), while arms A(1) and C(1) of first insert half(1) are connected with arms A(2) and C(2) of said turned second insert half(2), thus constituting through channels filled with supporting material in such a manner that create supporting element of full height of the block, while between arms A(1) and A(2) and respectively arms C(1) and C(2) of subsequent basic profile P there are, arranged in one axis, connecting arms D(1) and D(2) of both insert halves, made from said supporting material, penetrating the block and providing always between them room for the thermo insulating material. and,

the block has also connecting elements E(1) and E(2), shifted in relation to each other, situated in different axes which can enter of the block at any required depth but not reaching the opposite block base surface.

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2. Building block according to Claim 1, **characterized by** the fact, that it has arms B of the profile P and connecting members E of any length, but not reaching the opposite surface

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3. Building block according to Claim 1, **characterized by** the fact, that it has connecting members D less than half of the block height

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4. Building block according to Claim 1, **characterized by** the fact, that it has connecting members E of height shorter than full height of the block.

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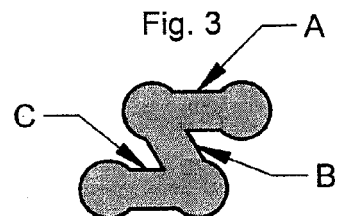
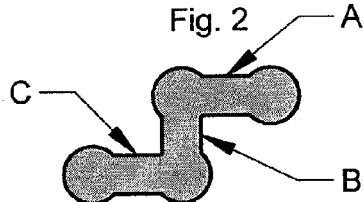
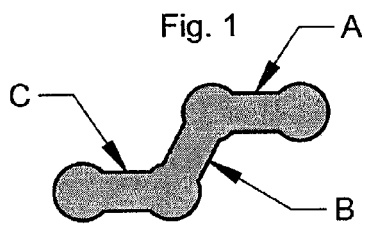
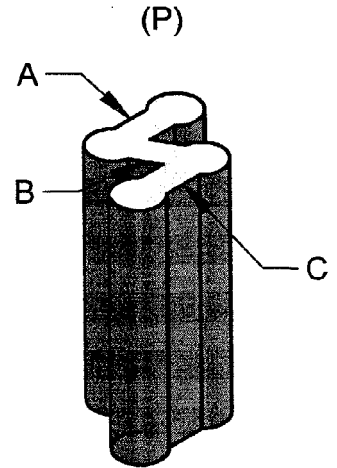
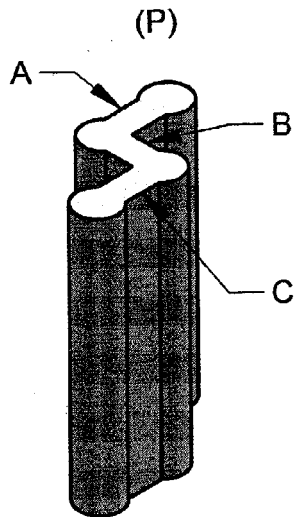
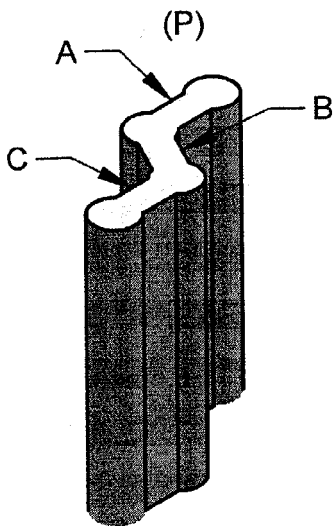


Fig. 1a

Fig. 2a

Fig. 3a

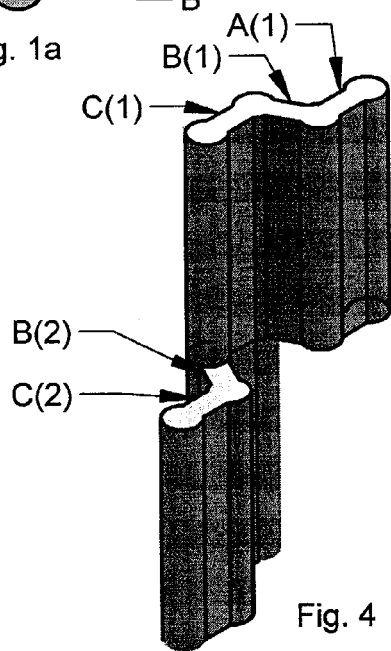


Fig. 4

Fig. 5

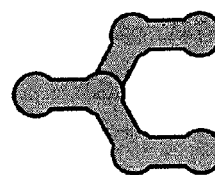
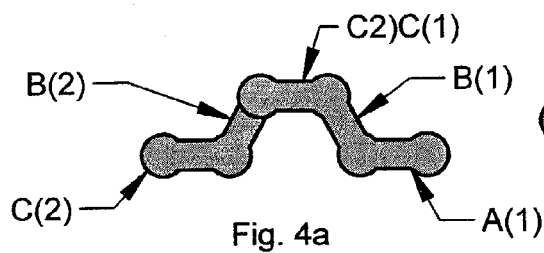
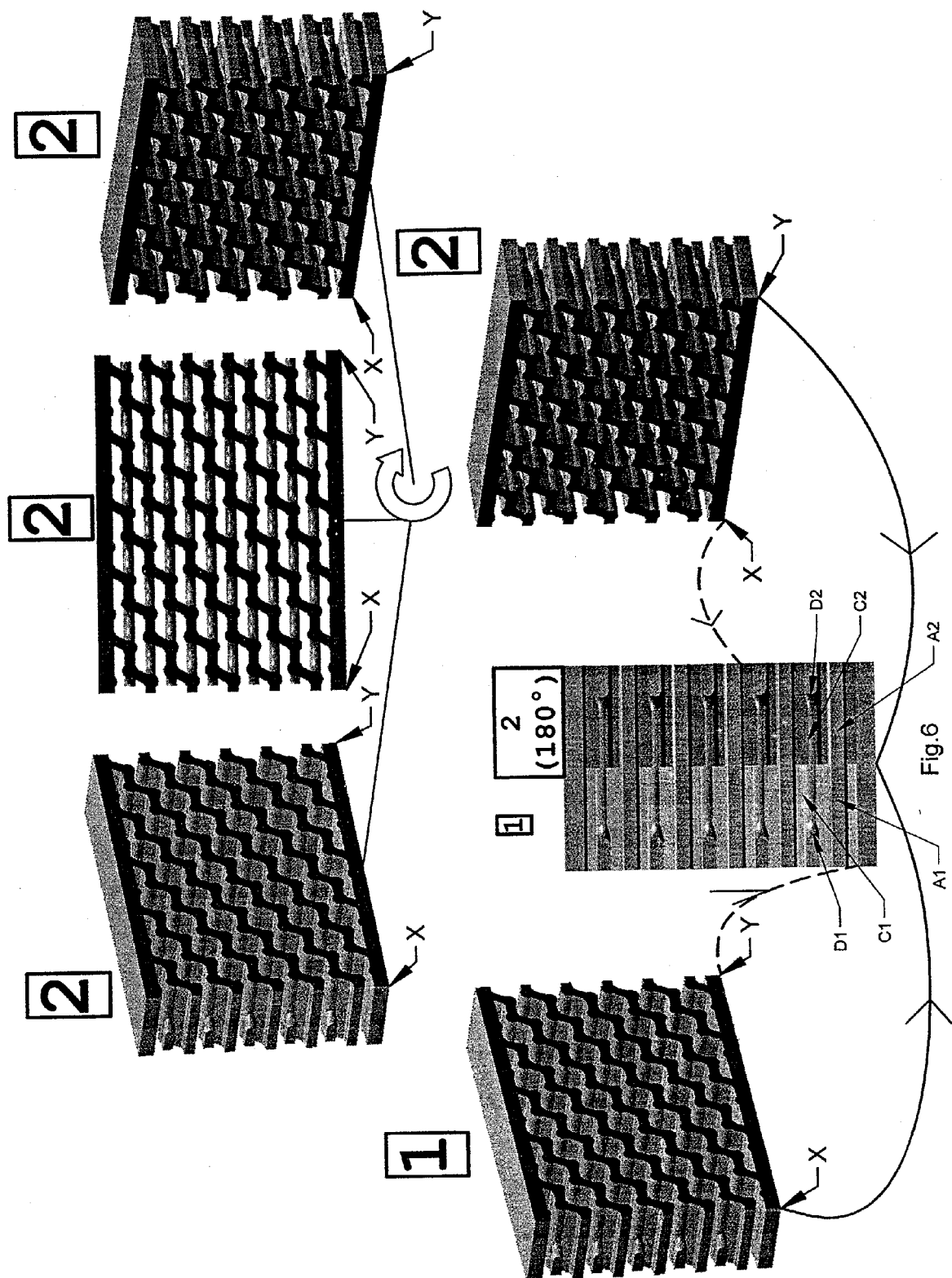
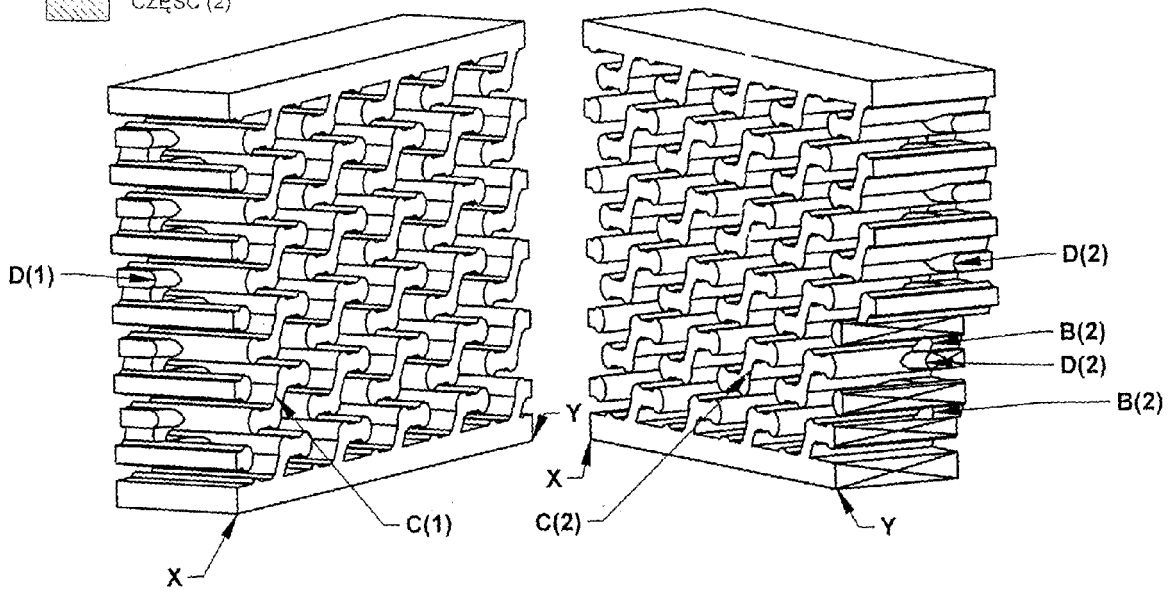
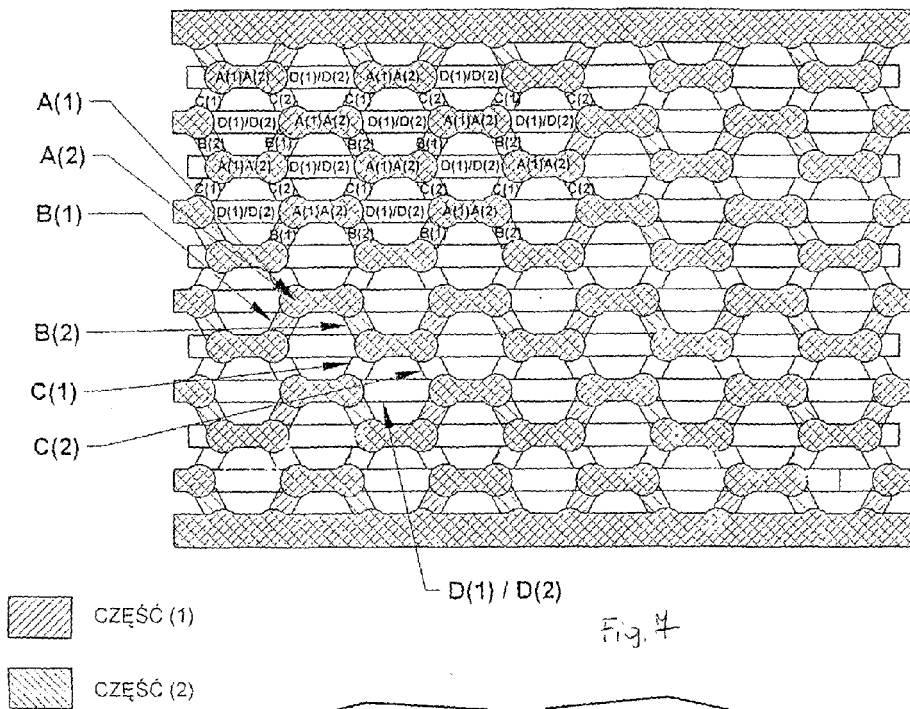


Fig. 4a

Fig. 5a





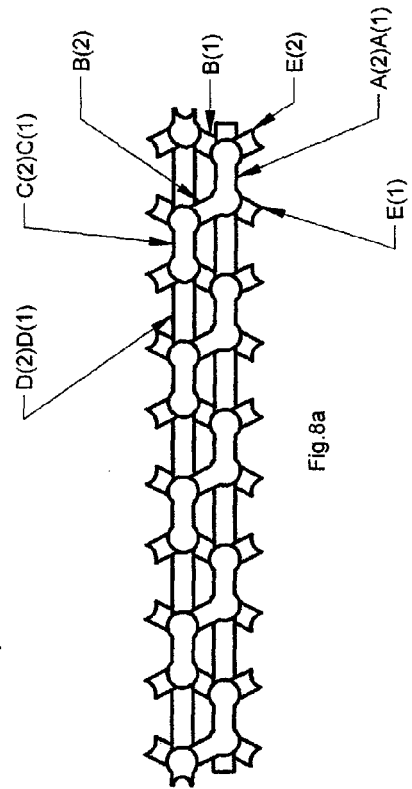
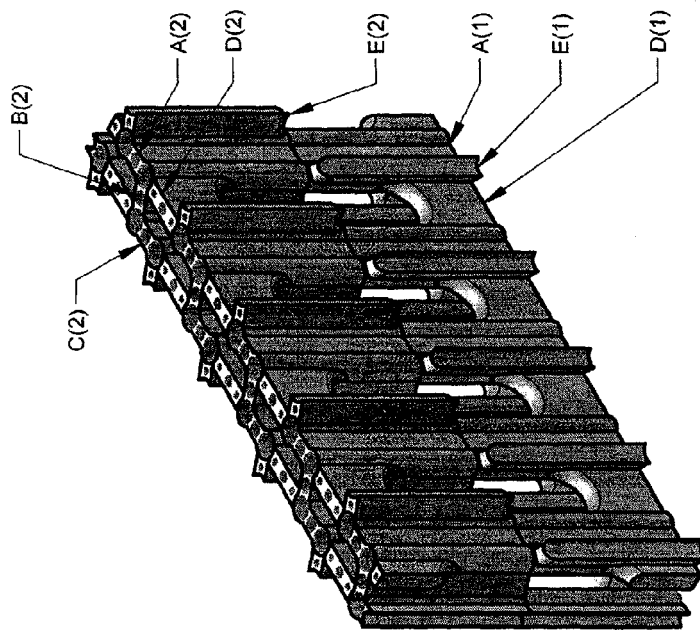


Fig. 8a

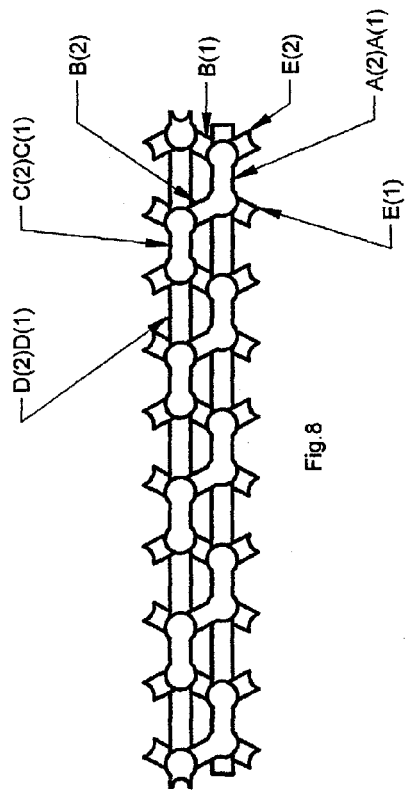
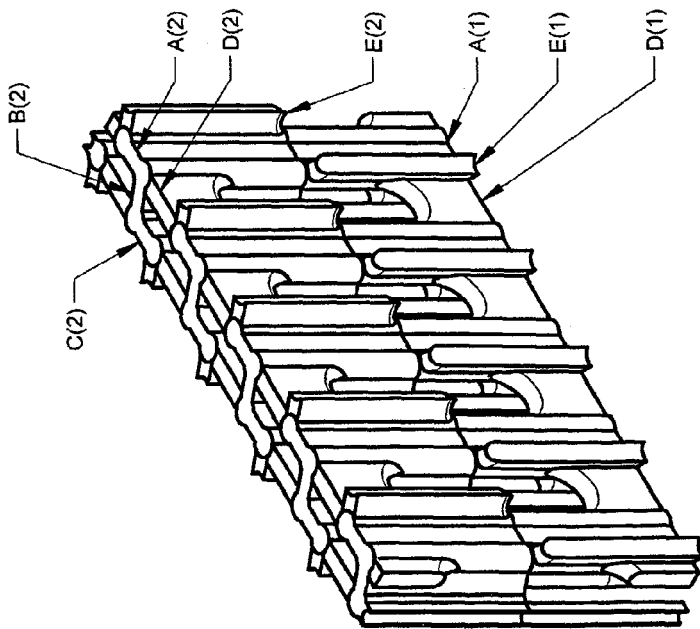
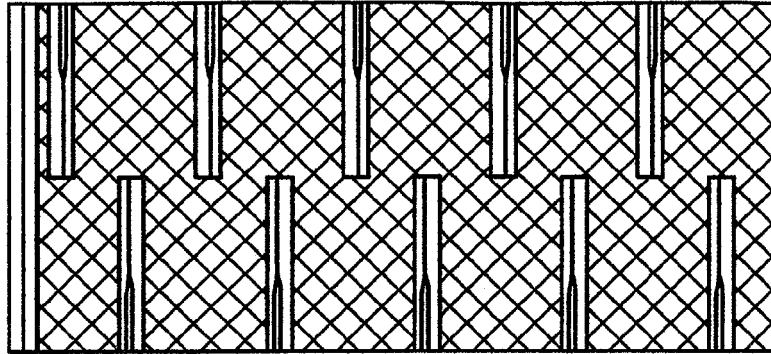


Fig. 8

F-F



E-E

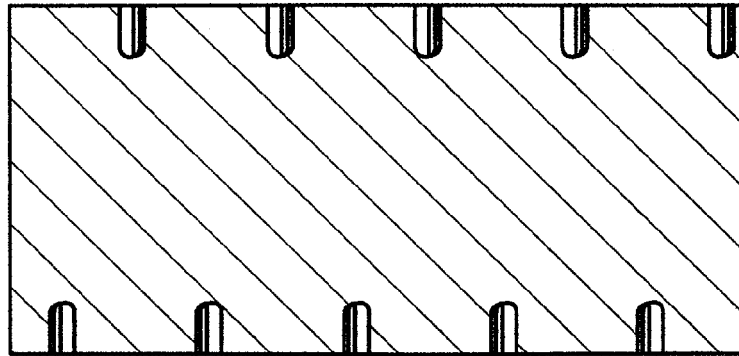
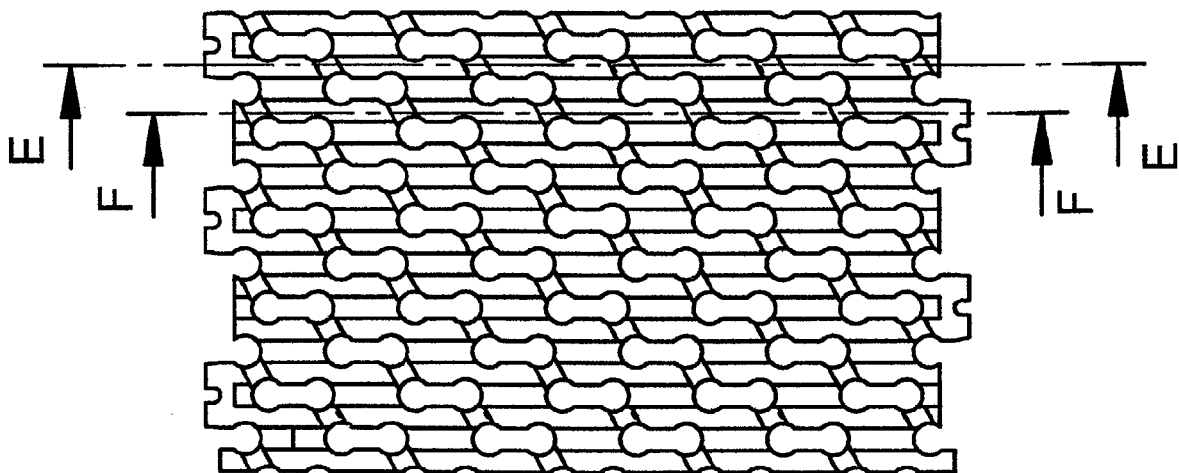


Fig. 9



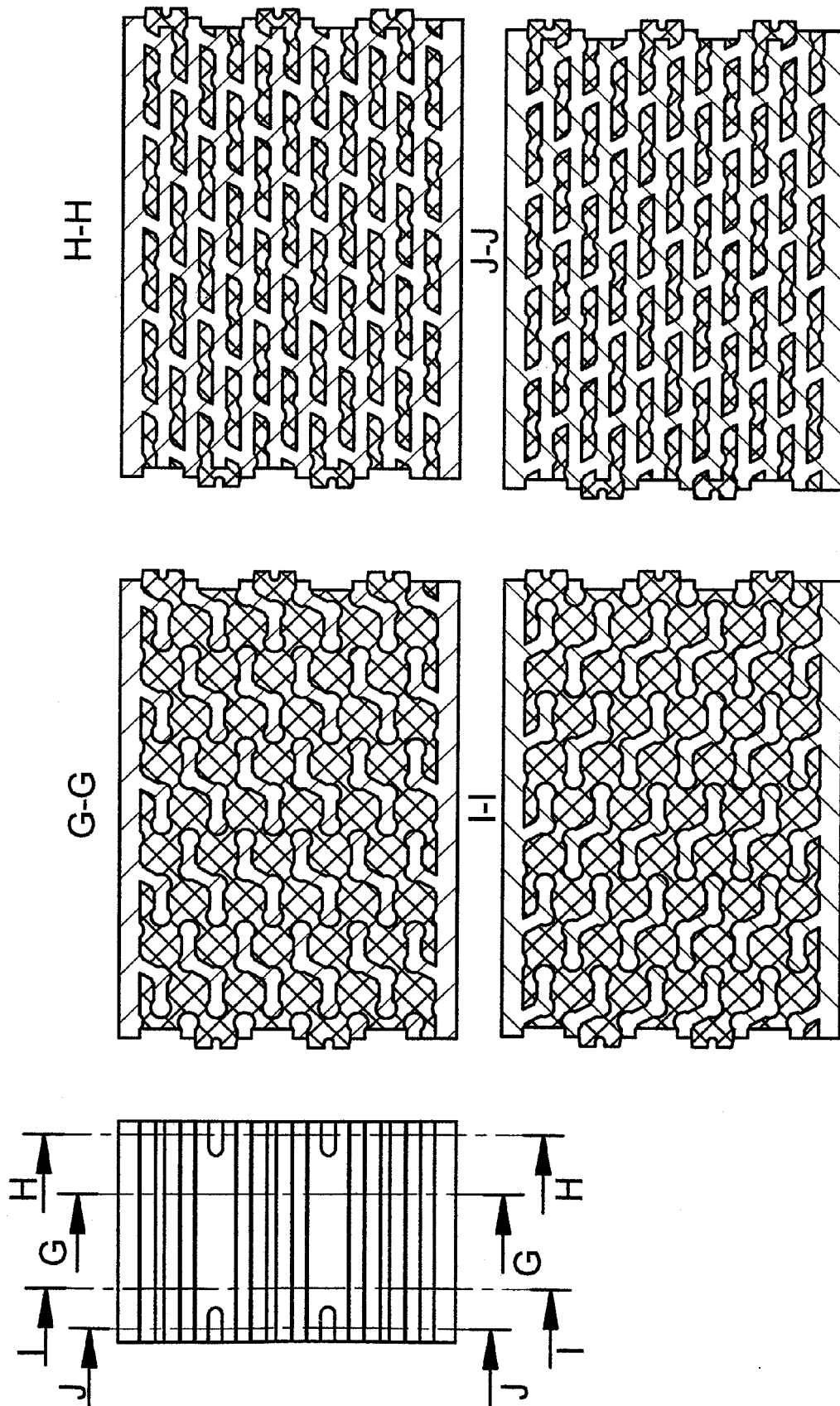


Fig. 10

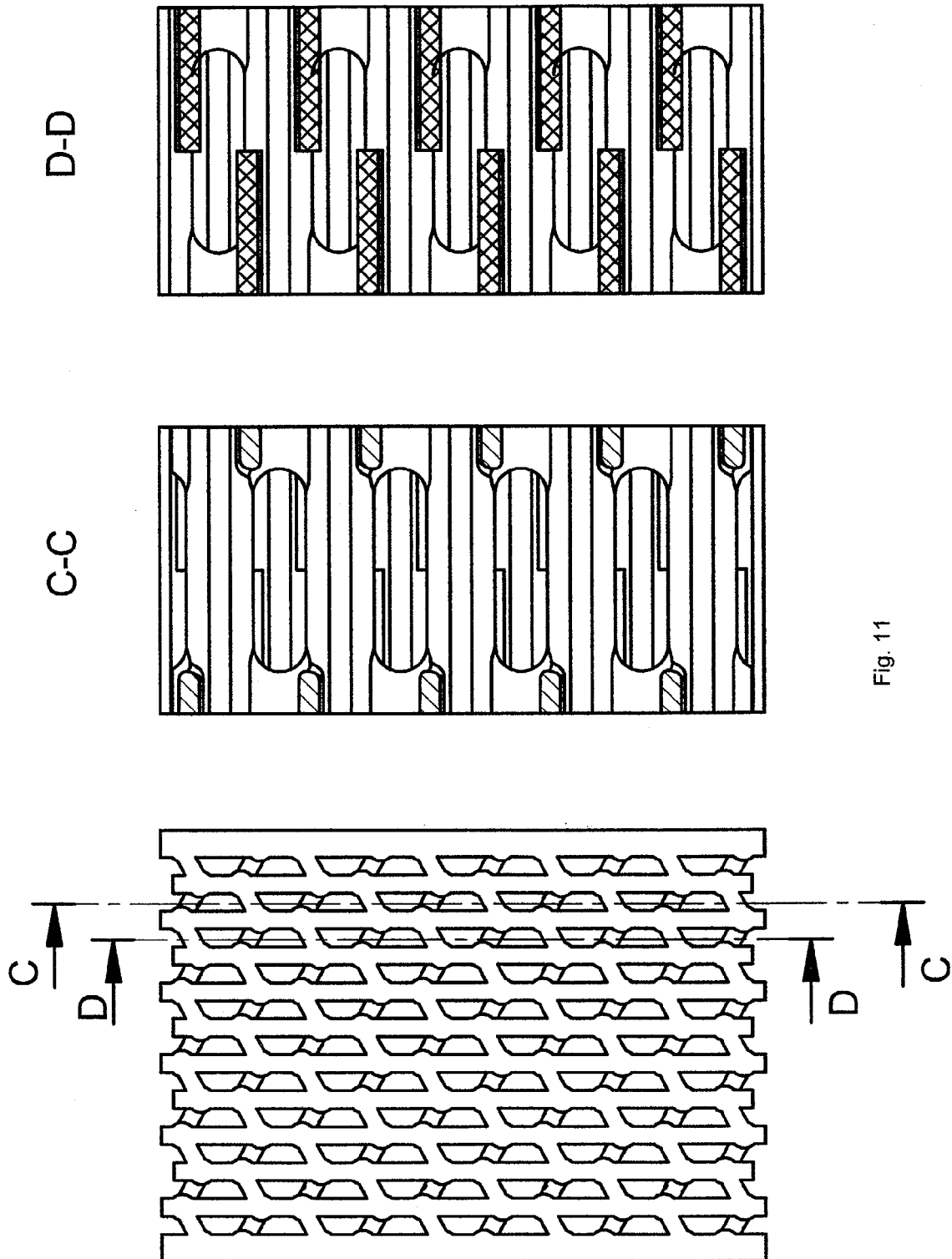
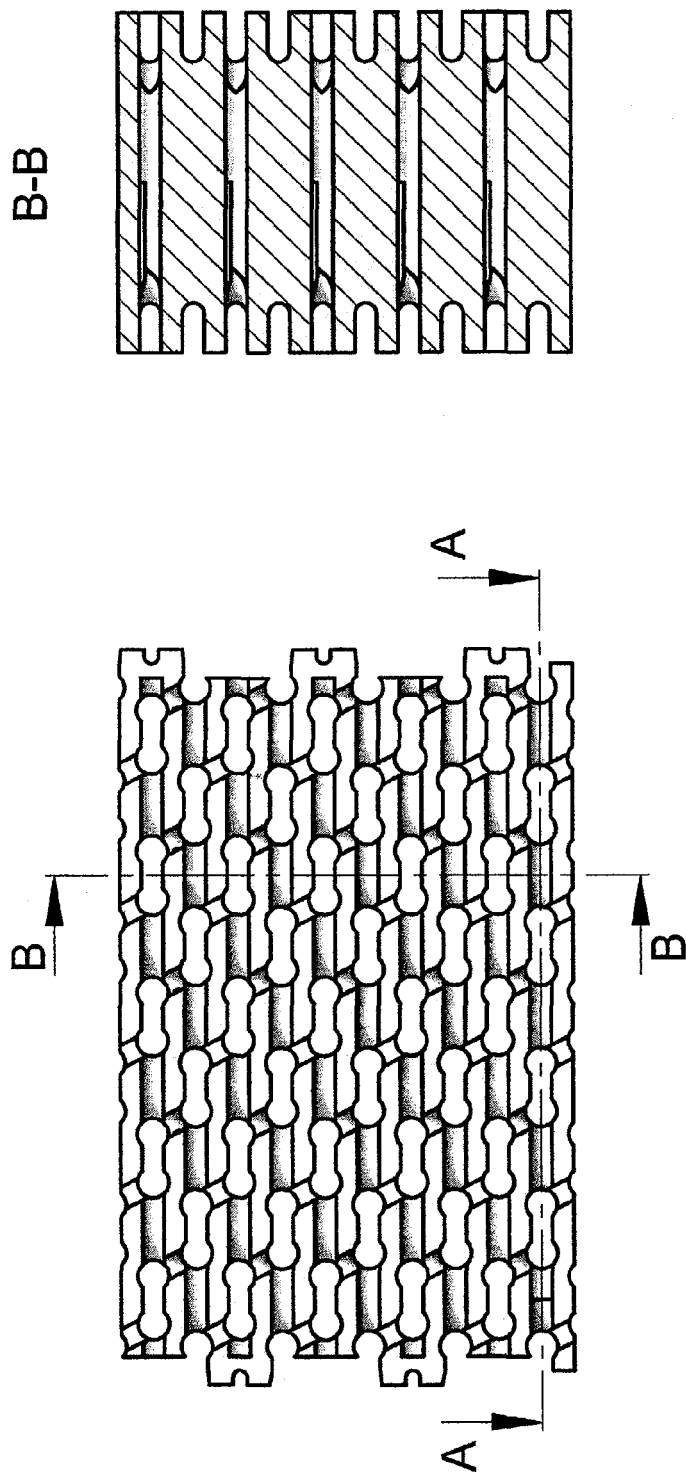


Fig. 11



B-B

A-A

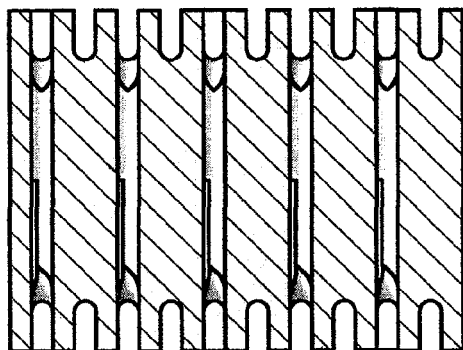
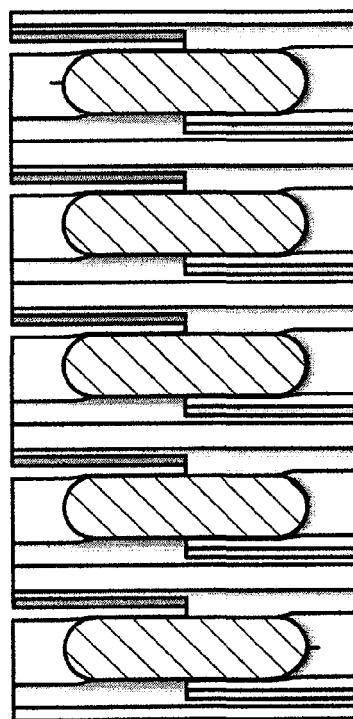


Fig. 12

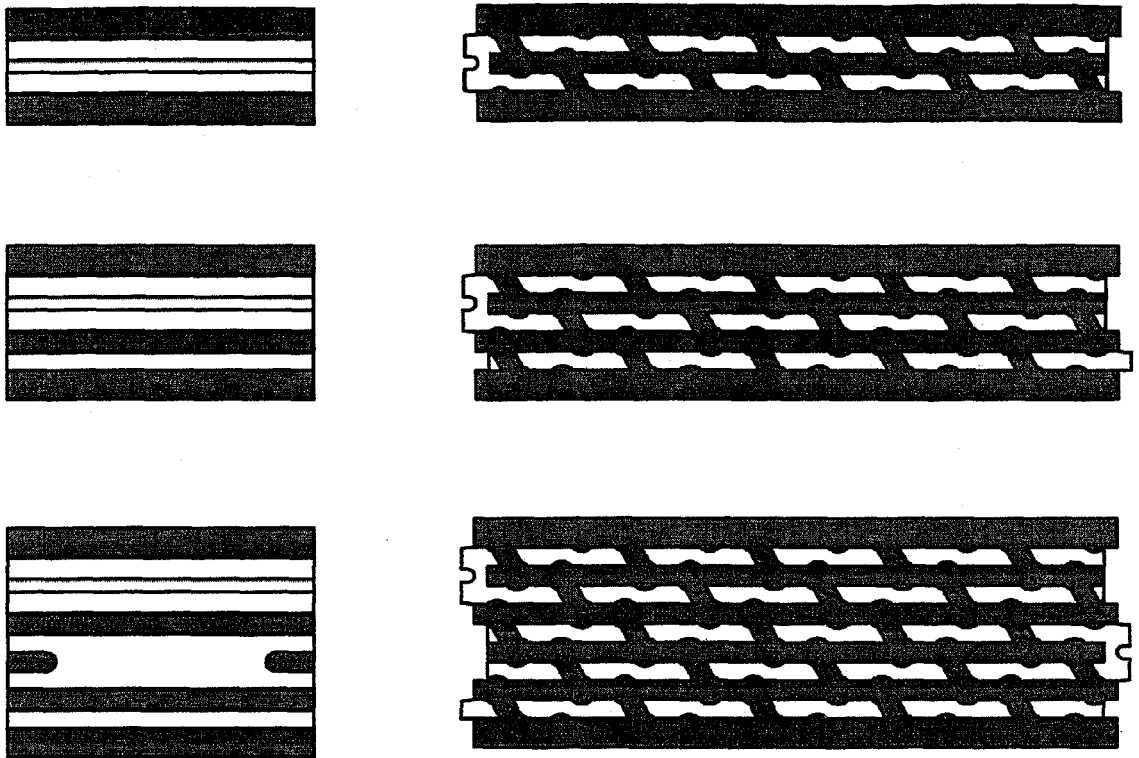


Fig. 13

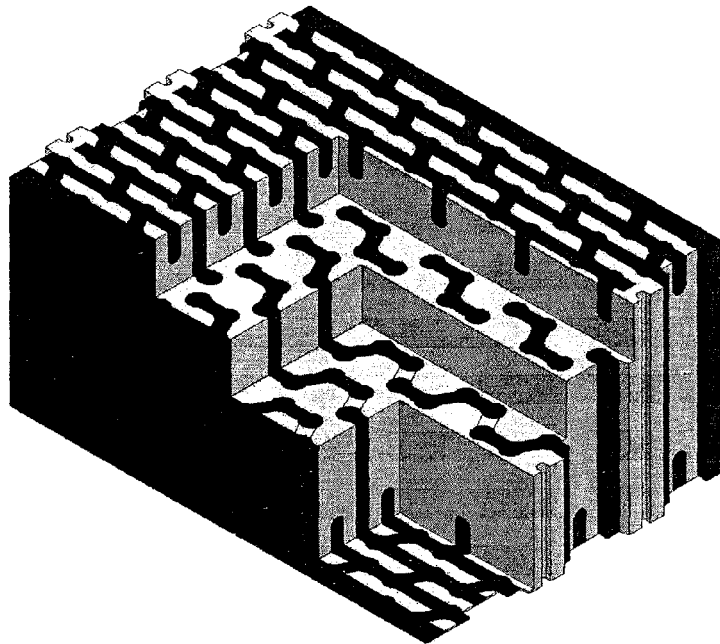


Fig. 14



European Patent
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Application Number
EP 05 46 0011

DOCUMENTS CONSIDERED TO BE RELEVANT			
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Place of search Munich		Date of completion of the search 17 March 2006	Examiner Vratsanou, V
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EUROPEAN SEARCH REPORT

Application Number
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