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(54) PREFABRICATED WALL ELEMENT

(57) Prefabricated wall element comprising a first portion which substantially forms a first wall side of the wall element, and comprising a second portion (2) connected to the first portion, wherein the second portion (2) substantially forms a second wall side of the wall element situated opposite the first wall side, wherein the first portion comprises a surface extending opposite the first wall side and with several trenches (3), and that the second portion (2) fills these trenches (3) and covers the first portion, at the level of said surface, and method for forming such prefabricated wall element.

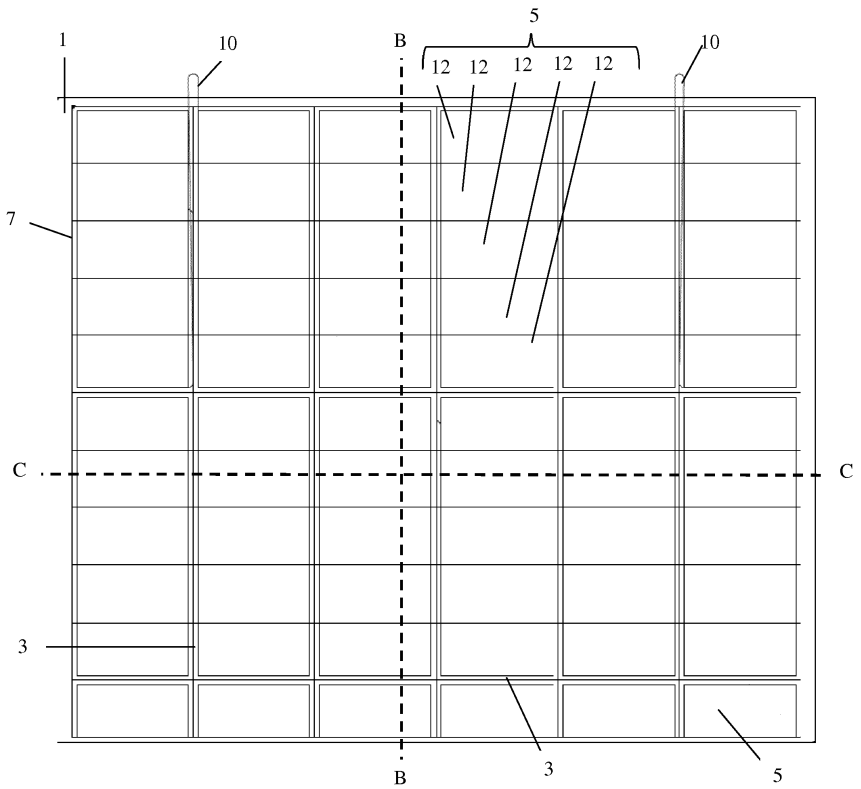

Fig. 10

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Description

[0001] The invention concerns on the one hand a method for the manufacture of a wall element, wherein the method comprises the following steps:

- placing building elements next to each other on a supporting surface to form a first portion, wherein the top surface of the first portion situated opposite the supporting surface comprises several trenches;
- applying a cement-containing binder to the top surface of the first portion to fill the trenches and form a layer on the top surface.

[0002] On the other hand, the invention concerns a prefabricated wall element comprising a first portion which substantially consists of several building elements placed next to and/or above each other, wherein this first portion substantially forms a first wall side of the wall element, and comprising a second portion connected to the first portion, wherein the second portion substantially forms a second wall side of the wall element situated opposite the first wall side, and wherein the second portion is made from a cement-containing binder, wherein the first portion comprises a surface extending opposite the first wall side and with several trenches, and that the second portion fills these trenches and covers the first portion, at the level of said surface.

[0003] A prefabricated wall element, also known as a prefab wall element, is a wall element which has been manufactured in advance. The term "wall element" may indicate a complete wall but may also indicate a portion of a wall. Depending on the total length of the wall to be installed, the wall is prefabricated as a whole, or two or more separate wall elements are prefabricated which are then joined to each other in situ to form one wall.

[0004] With wall elements both uninterrupted wall elements and wall elements in which openings are provided, for example for windows and/or doors, are indicated. Also, cut-outs may already be provided for cables and pipes, such as for example electricity cables, water pipes etc. They are usually straight wall elements, but bent wall elements and wall elements with a kink are also possible.

[0005] Such prefabricated wall elements are used both in industrial building and in residential building. They are delivered to site and may be placed directly in the desired position. Various advantages are associated with the use of prefabricated wall elements, in comparison with traditional building methods in which the walls are formed/masoned on site. Thus a prefabricated wall element can be quickly installed and attached to other structures, whereby little time is required to construct a building. By using prefabricated wall elements, builders are also less dependent on the weather. The production of the prefabricated wall elements may in fact take place indoors, for example in a shed. Even in poor weather conditions, a prefabricated wall element can be installed. There is no need to allow for drying times since prefabricated wall elements are normally delivered to site dry. Prefabricated wall elements can also be dried more quickly because it is easy to manage and control the drying time in a shed. Frost and wet periods therefore constitute less of a problem for constructing buildings made from prefabricated wall elements. Thanks to this, it is easier to observe a schedule previously produced, and penalties are avoided. Other tasks such as facade cladding, roof structures etc. can be carried out immediately after installation of the prefabricated wall elements. Prefabricated wall elements can also be produced more cheaply than a masonry walls. This is because the production of prefabricated wall elements is less labour-intensive and there is less material waste.

[0006] GB863599, WO2011/085447, GB650109, FR2657104 and EP0032519 describe methods for manufacturing wall elements comprising features as given in paragraph 1. Although the material loss here is more limited than in traditional building methods, there is still a great consumption and possible waste of the cement-containing binder used. Because of the deviating shapes of wall elements, it can here also be difficult to monitor the use of the binder. Also, the cement-containing binder has a certain liquidity. Thus a part of the binder will run to places where it is not required. This leads to a reduction in quality of the prefabricated wall element since binder will also be present on the formed wall element at places where it is not required. Also, a substantial quantity of cement-containing binder is required. These prefabricated wall elements contain proportionally a great amount of cement-containing binder.

[0007] The placing of the building elements on the supporting surface in the desired position also takes a lot of time.

[0008] Prefabricated wall elements may or may not be provided with window and/or door openings. Also, cut-outs may already be provided for cables and pipes, such as for example electricity cables, water pipes etc. As soon as openings or cut-outs are present, the production time increases enormously.

[0009] It is thus also an object of the invention to develop a method for the manufacture of a wall element wherein less cement-containing binder is required, and wherein this method allows rapid production of all types of wall elements.

[0010] This object is achieved by providing a method with the features indicated in the first paragraph, wherein to form at least one said building element, several core parts are connected to each other.

[0011] Preferably, more than half the building elements comprise several core parts connected to each other.

[0012] By first connecting to each other several core parts and hence forming larger building elements, it can be ensured that, in comparison with existing methods, fewer building elements need be positioned on the supporting surface to form the first portion, whereby fewer actions are required and the production time diminishes significantly.

[0013] Also, the necessary quantity of cement-containing binder can be controlled here. Thus said core parts can be connected to each other such that cement-containing binder can substantially not move between the core parts of one building element during application of a cement-containing binder to the top surface of the first portion.

[0014] The size and dimensions of a said building element comprising core parts can here easily be customised by selecting the number of core parts to be connected to each other. Using this method therefore, with relatively small and in some cases standard core parts, larger building elements with the desired dimensions can be formed. After connecting the core parts to each other, this whole can be processed until the building element with the desired dimensions is obtained. Thus one or more components of the connected core parts can be removed, for example cut out. Since a said assembly of connected core parts can be processed, fewer processing steps are required than if the core parts all had to be processed separately. Using this method therefore, wall elements comprising window openings, door openings, cut-outs and similar can be manufactured quickly and simply. Also, the core parts could be cut in advance and these then connected into a said building element. All this can easily be automated. It is for example possible to work with plans which are then read to determine which building elements must be formed in order to produce the desired wall element.

[0015] A cement-containing binder may mean concrete or another type of cement-containing mortar. The cement-containing binder is connected to the first portion and forms a second portion. The cement-containing binder is applied in a fluid state to the first portion so that the second portion, which is formed by drying of the cement-containing binder, adheres to the first portion and may even be partly absorbed by the first portion. The core parts may for example be stone elements such as masonry bricks. However the core parts may also be insulation panels, plastic elements, steel elements etc.

[0016] Preferably, the first portion has a mean compressive strength of at least 2 N/mm^2 or is constructed from building elements with a mean compressive strength of at least 2 N/mm^2. These building elements may for example be constructed from core parts with a mean compressive strength of at least 2 N/mm^2. Examples of types of core parts which have a mean compressive strength of more than 2 N/mm^2 are masonry units such as clay block bricks, building bricks, concrete bricks, cellular concrete bricks, sand-lime bricks (silicate bricks).

[0017] It is very easy to apply a binder to a top surface with trenches. In the case of a straight wall element, the supporting surface preferably extends substantially horizontally. With a curved wall element, the supporting surface is preferably arcuate. The binder runs into the trenches and on past the trenches when the trenches are full. When working with said building elements, the binder will substantially not run into undesirable locations and be present in the trenches or in the layer formed.

[0018] The binder applied dries and hardens and then forms a second portion. In the case of a substantially horizontal supporting surface, the binder will dry such that the top edge of the second portion extends substantially horizontally. After the binder has dried and hardened, the wall element can then be positioned vertically.

[0019] During or after application of the cement-containing binder, additional elements such as fixing plugs may be arranged in the binder. After the binder has hardened, these additional elements are then fixed in the binder. Insulation panels for example may be attached to the fixing plugs.

[0020] The core parts are preferably connected successively to each other to form the building element. The building element formed by the core parts preferably extends substantially vertically when the wall element is in position, and hence serves as a wall or part of a wall. Thus the core parts extend so that they have the maximum load-bearing capacity. Also, the building elements can be manufactured so simply that the formed wall element comprises more vertical trenches and hence the forces are conducted well to the foundation and/or the supporting structures.

[0021] Preferably, the core parts comprise masonry units. More preferably, all the core parts are masonry units. Masonry units ensure that the wall element has the appearance of a wall comprising masonry units, i.e. a wall which looks more like a traditional masonry wall. This may be desirable. Masonry units contribute to the rigidity and load-bearing capacity of the prefabricated wall element and are easy and quick to produce. Clay block bricks, building bricks, concrete bricks, silicate bricks and cellular concrete bricks are examples of masonry units. These masonry units may also be made from stone debris. Depending on the masonry units used, the prefabricated wall may have other properties.

[0022] In a preferred embodiment, to connect the core parts to a said building element, the core parts are glued to each other. By gluing the core parts to each other, they are quickly connected to each other so that a said building element can be formed rapidly. By gluing the core parts to each other, the building elements formed in this way also have a certain strength and load-bearing capacity. Preferably, the glue used to glue the core parts to each other differs from the cement-containing binder. This limits the quantity of cement-containing binder required. The core parts can be glued to each other such that no cement-containing binder can move between the core parts during application of the cement-containing binder to the top surface of the first portion.

[0023] Further preferably, the glue used to connect the core parts to each other is a two-component adhesive. This is a strong adhesive which allows rapid gluing of the core parts.

[0024] In a preferred embodiment, during the placing of the building elements next to each other on the supporting surface, the building elements are glued to each

other. The glue used for this is preferably the same as the glue used to connect the core parts to each other to a said building element if the core parts are glued. By also gluing the building elements, the building elements are connected to each other not only via the second portion but also by glue. This contributes to the rigidity, whereby these wall elements can be made very thin.

[0025] The core parts preferably comprise perforations, wherein after connection of the core parts to form a said building element, the peripheral perforations are sealed. The peripheral perforations are the perforations which are visible and hence open into the outer surface of the building element. These peripheral perforations are preferably sealed before a said building element is placed on the supporting surface. However, sealing may also take place while the building elements are placed next to each other. Core parts with perforations are lighter but are still sufficiently strong. In this way they are easier to handle and the wall element formed is lighter and hence easier to handle. In addition, less material is required to form these core parts. When core parts comprising perforations are connected to each other to form a building element, there is a chance that peripheral perforations will be present. Since the cement-containing binder applied to the first portion has a certain liquidity, there is therefore a chance that cement-containing binder will penetrate these perforations and hence more binder will be required. To avoid this, these peripheral perforations are sealed before application of the cement-containing binder.

[0026] Further preferably, the peripheral perforations are sealed with a tape. This is quick, and a tape such as an adhesive tape seals the perforations well.

[0027] In a preferred embodiment, the building elements comprise at least one cuboid-shaped base part, wherein during placing of the building elements next to each other, the building elements are placed so that the base parts of the building elements come to lie on the supporting surface and abut each other, and that the base part forms a protruding edge of the building element, so that said trenches extend between the adjacent building elements. Here, the cross-sections of the building element, taken parallel to the bottom surface of the base part, do not extend beyond the corresponding dimensions of said base part. The base part here forms a protruding part viewed in a plane parallel to the supporting surface. During manufacture of the wall element, because the base parts of the building elements which are at the bottom during production of the wall element, abut each other, there is less risk that binder will run past these base parts. With the base parts of the building elements abut each other is meant that they are situated substantially in contact with each other or at a limited distance from each other, so that the binder cannot leak through or only with difficulty. In some cases, the base parts placed next to each other are glued to each other. Because of these protruding base parts, trenches run between building elements placed next to each other.

[0028] Preferably, the building elements are placed next to each other on the supporting surface such that some of the trenches extend in a first direction and other trenches extend in a second direction substantially perpendicular to the first direction. When the wall element is positioned, these directions then extend preferably respectively horizontally and vertically. Then the vertical trenches preferably lie closer together than the horizontal trenches.

[0029] In a very preferred embodiment, one or more of the core parts, preferably all core parts, comprise:

- a bottom surface and a top surface, wherein the perpendicular projection of the top surface onto the bottom surface is situated within the dimensions of the bottom surface, and the surface area of the perpendicular projection of the top surface onto the bottom surface is smaller than the surface area of the bottom surface,
- walls for connecting the bottom surface to the top surface, wherein these walls comprise two upright side surfaces situated substantially parallel and opposite each other, wherein the side surfaces substantially form a right angle with the bottom surface, and to connect the core parts to form a said building element, the core parts are connected to each other successively such that the side surfaces of successive core parts abut each other so that the bottom surfaces and the top surfaces of the core parts each form a substantially continuous surface. Preferably, the bottom surface and the top surface extend substantially parallel to each other. The surface area of the bottom surface is then greater than the surface area of the top surface.

[0030] Such core parts, such as masonry units, can easily be produced in a continuous process. The bottom surface formed by the bottom surfaces of the connected core parts is here larger than the projection onto the bottom surface of the top surface formed by the top surfaces of the connected core parts. In this way, trenches are created when building elements consisting of such core parts are placed next to each other. Preferably, the bottom surface formed by the bottom surfaces of the connected core parts constitutes part of the above-mentioned base part. In some cases, additional processing steps may take place here after the core parts have been connected to each other. Preferably, the side surfaces of these core parts substantially abut each other over their entire surface area.

[0031] Further preferably, these core parts comprise perforations which extend in a direction substantially perpendicular to the side surfaces. These perforations then open into the side surfaces so that the perforations on side surfaces adjacent to each other are sealed. There are then fewer of the above-mentioned peripheral perforations which need to be sealed.

[0032] In a specific embodiment, the building elements

are configured such that in the direction from the supporting surface to the top surface of the first portion, the trenches first become wider and then they narrow again. Thus there is not only a chemical connection between the first portion and the second portion, but also a mechanical connection between the first portion and the second portion. Because the trenches narrow again in said direction, the second portion is also physically fixed in the trenches.

[0033] In another embodiment, the building elements are configured such that in the direction from the supporting surface to the top surface of the first portion, the trenches become wider. During application of the binder to the first portion, the stream of binder is then conducted down by gravity. Because the width of the trenches decreases, the binder is slowed down. The trenches may for example have an approximately wedge-shaped cross-section.

[0034] Preferably, the cement-containing binder is UHPC (Ultra High Performance Concrete) which may or may not contain fibres. The fibres may amongst others be steel fibres, carbon fibres, glass fibres or plastic fibres. UHPC has a high load-bearing capacity, whereby a second portion made from this binder has a high load-bearing capacity. Said layer of the second portion need therefore not be made as thick, and/or the first portion may be made thinner, whereby the wall elements may be made thinner. UHPC is also substantially airtight and watertight, whereby such a layer ensures that no water or air, or substantially no water or air, can penetrate into the prefabricated wall element. UHPC is relatively expensive. However, because the walls can be made thinner and/or less binder is required, this is compensated.

[0035] The second portion preferably has a mean compressive strength of at least 50 N/mm^2, further preferably at least 80 N/mm^2 and even more preferably at least 100 N/mm^2. A second portion made from UHPC may even have a mean compressive strength of more than 140 N/mm^2 or even more than 200 N/mm^2.

[0036] Preferably, the second portion has a ductility (fracture energy) of at least 15,000 N/m. Also it preferably has a tensile strength of at least 20 N/mm^2. This high ductility gives the second portion a certain flexibility, whereby the second portion will not crack as quickly and is able to absorb well and distribute forces which act on the wall element. If the second portion then also has a high compressive strength and tensile strength, the wall element may be made very thin. A wall comprising a first portion with a thickness of 9 cm and a UHPC layer of 1 cm, i.e. a total thickness of 10 cm, can serve as a load-bearing wall. The layer of UHPC may for example also be 2 cm thick, to then give a total thickness of 11 cm. For comparison, conventional load-bearing walls normally have a thickness of 14 cm.

[0037] The object is also achieved by the provision of a prefabricated wall element comprising a first portion which substantially consists of several building elements placed next to and/or above each other, wherein this first portion substantially forms a first wall side of the wall element, and comprising a second portion connected to the first portion, wherein the second portion substantially forms a second wall side of the wall element situated opposite the first wall side, and wherein the second portion is made from a cement-containing binder, wherein the first portion comprises a surface extending opposite the first wall side and with several trenches, and the second portion fills these trenches and covers the first portion, at the level of said surface, wherein at least one said building element comprises several core parts connected to each other.

[0038] The volume of the second portion is here limited since it is substantially absent between the core parts. This wall element therefore comprises a limited quantity of cement-containing binder.

[0039] Such a wall element may be supplied in any dimensions and sizes, since a said wall element comprising core parts can easily be customised by selecting the number of core parts to be connected to each other. A whole of connected core parts may also be processed into a suitable building element. The production of such wall elements may be partially or completely automated. Thus it is possible to work with plans which are read to determine which building elements must be formed in order to produce the desired wall element. By working with (standard) core parts, a wall element can easily be produced with the desired dimensions and/or the desired form. Thus for example, it may be desired to make the wall element continuous, or for the wall element to comprise window and/or door openings. These core parts may for example comprise masonry units, insulation panels, etc. Clay block bricks, building bricks, concrete bricks, silicate bricks and cellular concrete bricks are examples of masonry units. These masonry units may also be made from stone debris. Masonry units contribute to the rigidity and load-bearing capacity of the prefabricated wall element and are easy to produce.

[0040] In a preferred embodiment, the core parts of a said building element are glued using a second binder which differs from said cement-containing binder. This second binder may for example be a glue, such as a two-component adhesive. The core parts are quickly glued, whereby a said building element can rapidly be produced. In addition, the formed building element is also rigid. The quantity of cement-containing binder is here limited. This is useful if the cement-containing binder is for example UHPC which is a costly binder.

[0041] Further preferably, the building elements extending above and next to each other at the first wall side substantially abut each other, and, viewed from the first wall side to the second wall side, extend further at a distance from each other so that spaces are present between the building elements extending next to and above each other, wherein these spaces form said trenches. In some cases, further trenches may be created. Because of the specific form of the building elements, said trenches are present between the adjacent building elements.

These building elements may for example comprise protruding edges at the first side, wherein the edges of building elements placed next to each other abut each other. These edges are for example glued together, for example using the same adhesive as used to glue the core parts to each other. Further preferably, the various trenches from the various building elements run into each other.

[0042] The building elements may for example have substantially the form of a truncated pyramid (frustrum) with a rectangular bottom surface, so that the trenches have a wedge shape. The building elements may however also have the form of a truncated stepped pyramid with a rectangular bottom surface, so that the trenches also have the form of a stepped pyramid. At the rectangular bottom surface, there may be a slight deviation from said shape. Thus the bottom surface may form a protruding edge or rim relative to the rest of the building element. Another possibility is a cuboid-shaped building element with a rectangular bottom surface which forms a protruding edge or rim relative to the rest of the building element.

[0043] In a specific embodiment, the trenches become wider in the direction from the first wall side to the second wall side.

[0044] In another specific embodiment, in the direction from the first wall side to the second wall side, the trenches first become wider and then they narrow again. Also, the trenches may have other forms such as a cuboid shape.

[0045] In a preferred embodiment, some of the trenches extend in a first direction and the other trenches extend in a second direction substantially perpendicular to the first direction. When the wall element is positioned, these directions then preferably extend respectively horizontally and vertically. Then preferably the vertical trenches are closer together than the horizontal trenches.

[0046] Preferably, the prefabricated wall element is manufactured using a method as described above.

[0047] The invention is now explained in more detail below with reference to the detailed description which follows of a preferred embodiment of a wall element, and a method for manufacture of a wall element according to the invention. The purpose of the description is to give exclusively examples for clarification and indicate further advantages and features, and it should not therefore be interpreted as a restriction of the area of application of the invention or of the protective rights claimed in the claims.

[0048] In this detailed description, by means of reference numerals, reference is made to the attached drawings in which:

- figure 1 shows a perspective view of a first embodiment of a masonry brick which is used in the manufacture of a wall element according to the invention;
- figure 2 shows a top view of the masonry brick shown in figure 1;
- figure 3 shows a side view of the masonry brick shown in figure 1;
- figure 4 is a top view of a building element constructed from masonry bricks, wherein the masonry bricks are masonry bricks as shown in figures 1 to 3;
- figure 5 is a top view of a production step during manufacture of a wall element according to the invention, wherein in this production step, some building elements as shown in figure 4 have already been placed next to each other;
- figure 6 is a cross section along line A-A from figure 5;
- figure 7 shows a perspective view of a second embodiment of a masonry brick used in the manufacture of a wall element according to the invention;
- figure 8 shows a perspective view of a third embodiment of a masonry brick used in the manufacture of a wall element according to the invention;
- figure 9 shows a perspective view of a fourth embodiment of a masonry brick used in the manufacture of a wall element according to the invention;
- figure 10 is a top view of a production step during manufacture of a wall element according to the invention, wherein all building elements have already been placed on the supporting surface;
- figure 11 is a cross-section along line B-B of figure 10;
- figure 12 is a cross-section along line C-C of figure 10.

[0049] With reference to the figures, a wall element is described below together with a method for the manufacture of the wall element, wherein the method comprises the following steps:

- placing building elements (5) next to each other on a supporting surface (1) to form a first portion, wherein the top surface of the first portion situated opposite the supporting surface (1) comprises several trenches (3);
- applying a cement-containing binder to the top surface of the first portion to fill the trenches (3) and form a layer (4) on the top surface,

wherein to form several said building elements (5), several masonry bricks (12) are connected to each other.

[0050] Here various embodiments/types of masonry bricks (12) which may be used are shown (figures 1, 7 to 9). Also, other embodiments are possible.

[0051] As shown in figures 11, 12, the walls formed comprise a first portion which substantially forms a first wall side of the wall element, and a second portion (2) connected to the first portion, wherein the second portion (2) forms substantially a second wall side of the wall element situated opposite the first wall side. The first portion comprises a surface extending opposite the first wall side and with several trenches (3). The second portion (2) fills these trenches (3) and also forms a layer (4) which covers said surface of the first portion. This layer (4) is thus the part of the second portion (2) which is not situated in the trenches (3) and which, viewed in a direction per-

pendicular to the first wall side, extends between said surface of the first portion and the second wall side.

[0052] The second portion (2) is a concrete element (2) which is made of ultra-high performance fibre-reinforced concrete (UHPFRC).

[0053] The first portion consists of several building elements (5) placed next to and above each other which are glued together.

[0054] As shown in figures 10 to 12, several building elements (5) consist of several masonry bricks (12) glued to each other. These masonry bricks (12) have a mean compressive strength of at least 2 N/mm^2. Each masonry brick (12) has a first surface, the bottom surface, and a second surface (8a), the top surface, substantially parallel to this first surface, wherein the surface area of the top surface (8a) is smaller than the surface area of the bottom surface, and wherein viewed in a direction perpendicular to the bottom surface, the top surface (8a) is situated within the dimensions of the bottom surface. Each masonry brick (12) also comprises walls (11a, 11b) for connecting the bottom surface to the top surface (8a). These walls (11a, 11b) comprise two upright side surfaces (11b) situated substantially parallel to each other, wherein these side surfaces (11b) substantially form a right angle with the bottom surface and the top surface (8a). These walls (11a, 11b) also comprise trench-forming walls (11a) which are intended to form said trenches (3). The first surface forms part of a base structure (6a) which protrudes and thus forms two edges (7a). A said building element (5) is obtained by gluing the masonry bricks (12) to each other successively such that side surfaces (11b) of successive masonry bricks (12) abut each other completely, so that the bottom surfaces and top surfaces (8a) of the masonry bricks (12) form substantially continuous surfaces. Thus an element is produced substantially with the shape of a cuboid, with a base structure which protrudes and thus forms two edges. Then the masonry bricks (12) are processed to form a continuous edge (7). In this way, a building element (5) is obtained with the form of a cuboid with a base part (6), wherein the base part (6) has a continuous protruding edge (7). This continuous edge (7) may have 4 sides, but also 3 sides (see figure 10). Such a building element (5) is also shown in figure 4. As visible in figures 10 and 11, building elements (5) may also be present which are formed from one masonry brick (12).

[0055] The masonry bricks (12) comprise perforations (9) which open into said side surfaces (11b).

[0056] The trenches (3) extend between adjacent building elements (5). The structure of the masonry bricks (12) used determines the form of the trenches (3) between the adjacent building elements (5). In a first embodiment of the masonry bricks (12) shown in figures 1 to 3, cuboid-shaped trenches (3) are present between the building elements (5). This is clearly visible in figures 6, 11 and 12. In the second and third embodiments shown respectively in figures 7 and 8, in the direction from the bottom surface to the top surface (8a) of the masonry bricks (12), the trenches (3) first become wider and then they narrow again.

[0057] In the fourth embodiment of masonry bricks (12) shown in figure 9, the trenches (3) between the building elements (5) are wedge-shaped.

[0058] The trenches (3) run into each other and trenches (3) are present which extend horizontally and trenches (3) which extend vertically in the usage state of the wall. In the usage state of the wall therefore, there are trenches (3) both between the building elements (5) which extend above each other and trenches (3) between the building elements (5) which extend next to each other.

[0059] Such a wall element is formed as follows:

> A drawing is made of the wall element to be formed, whereupon from the drawing, it is determined which building elements (5) must be formed in order to be able to form this wall element.

[0060] The desired building elements (5) are formed as follows. Firstly, substantially identical masonry bricks (12) as described above and shown in figures 1 and 7 to 9 are taken. Each building element (5) is made from at least one masonry brick (12). In order to ensure smooth production of the wall element, there is always at least one building element (5) which is made from several masonry bricks (12). For this, these masonry bricks (12) are glued to each other and processed to form a building element (5) as described above. They are glued to each other using a two-component adhesive and the masonry bricks (12) are connected to each other with their mutually opposing side surfaces (11b). The perforations (9) of the outermost masonry brick (12) of the building element (5), which open into the outer surface of the building element (5), are sealed with a tape.

[0061] The building elements (5) are then placed next to each other on a horizontal supporting surface (1) according to bond. The building elements (5) are placed so that they can lie with their base parts (6) on the horizontal supporting surface (1) and the adjacent building elements (5) abut each other. The trench-forming side surfaces (11a) of the building elements (5) create trenches (3) between the adjacent building elements (5). Figure 11 shows how the building elements (5) are placed next to each other on the horizontal supporting surface (1).

[0062] When all building elements (5) have been placed on the horizontal supporting surface (1), holding elements (10) are arranged in the trenches (3). Then concrete is applied on top of the building elements (5). This concrete is applied to the top side of the building elements (5) at the level of the top surfaces (8) of the building elements (5). The concrete is poured in a semi-fluid state over the building elements (5) and under gravity runs into the desired position. During casting of the concrete, the concrete runs into the trenches (3). Because said peripheral perforations (9) are sealed, the concrete cannot run into the actual masonry bricks (12). After the trenches (3) have been filled with concrete, the top surfaces (8) of

the building elements (5) are covered and a layer (4) of concrete is formed. The cast concrete then dries and hardens to form the second portion (2). The holding elements (10) are partly cast into the concrete, whereby the wall element is easy to transport and bring into position by means of these holding elements (10).

[0063] Manufacture of the wall elements is preferably fully automated.

Claims

1. Method for the manufacture of a wall element, wherein the method comprises the following steps:

   - placing building elements (5) next to each other on a supporting surface (1) to form a first portion, wherein the top surface of the first portion situated opposite the supporting surface (1) comprises several trenches (3);
   - applying a cement-containing binder to the top surface of the first portion to fill the trenches (3) and form a layer (4) on the top surface,
   characterized in that to form at least one said building element (5), several core parts (12) are connected to each other.

2. Method according to Claim 1, **characterized in that** the core parts (12) comprise masonry units.

3. Method according to Claim 1 or 2, **characterized in that** to connect the core parts (12) to a said building element (5), the core parts (12) are glued to each other.

4. Method according to any of the preceding claims, **characterized in that** to connect the core parts (12) into a said building element (5), the core parts (12) are glued to each other with a two-component adhesive.

5. Method according to any of the preceding claims, **characterized in that** during the placing of the building elements (5) next to each other on the supporting surface (1), the building elements (5) are glued to each other.

6. Method according to any of the preceding claims, **characterized in that** the core parts (12) comprise perforations (9), wherein after connection of the core parts (12) to form a said building element (5), the peripheral perforations (9) are sealed.

7. Method according to Claim 6, **characterized in that** the peripheral perforations (9) are sealed with a tape.

8. Method according to any of the preceding claims, **characterized in that** the building elements (5) comprise at least one cuboid-shaped base part (6), wherein during placing of the building elements (5) next to each other, the building elements (5) are placed so that the base parts (6) of the building elements (5) come to lie on the supporting surface (1) and abut each other, and that the base part (6) forms a protruding edge (7) of the building element (5) so that said trenches (3) extend between the adjacent building elements (5).

9. Method according to any of the preceding claims, **characterized in that** one or more of the core parts (12)

   - comprise a bottom surface and a top surface (8a), wherein the perpendicular projection of the top surface onto the bottom surface is situated within the dimensions of the bottom surface, and the surface area of the perpendicular projection of the top surface onto the bottom surface is smaller than the surface area of the bottom surface,
   - comprise walls (11a, 11b) for connecting the bottom surface to the top surface (8a), wherein these walls comprise two upright side surfaces (11b) situated substantially parallel and opposite each other, wherein the side surfaces (11b) substantially form a right angle with the bottom surface,
   and that to connect the core parts (12) to form a said building element (5), the core parts (12) are connected to each other successively such that the side surfaces (11b) of successive core parts (12) abut each other so that the bottom surfaces and the top surfaces (8a) of the core parts (12) each form a substantially continuous surface.

10. Prefabricated wall element comprising a first portion which substantially consists of several building elements (5) placed next to and/or above each other, wherein this first portion substantially forms a first wall side of the wall element, and comprising a second portion (2) connected to the first portion, wherein the second portion (2) substantially forms a second wall side of the wall element situated opposite the first wall side, and wherein the second portion (2) is made from a cement-containing binder, wherein the first portion comprises a surface extending opposite the first wall side and with several trenches (3), and that the second portion (2) fills these trenches (3) and covers the first portion, at the level of said surface, **characterized in that** at least one said building element (5) comprises several core parts (12) connected to each other.

11. Prefabricated wall element according to Claim 10, **characterized in that** the core parts (12) comprise

masonry units.

12. Prefabricated wall element according to Claim 10 or 11, **characterized in that** the core parts (12) of a said building element (5) are glued using a second binder which differs from said cement-containing binder.

13. Prefabricated wall element according to any of Claims 10 to 12, **characterized in that** the building elements (5) extending above and next to each other, at the level of the first wall side, substantially abut each other and furthermore, viewed from the first wall side to the second wall side, extend at a distance from each other so that spaces are present in between the building elements (5) extending next to and above each other, wherein these spaces are said trenches (3).

14. Prefabricated wall element according to any of Claims 10 to 13, **characterized in that** in the direction from the first wall side to the second wall side, the trenches (3) first become wider and then they narrow again.

15. Prefabricated wall element according to any of Claims 10 to 14, **characterized in that** the prefabricated wall element is manufactured using a method according to any of Claims 1 to 9.

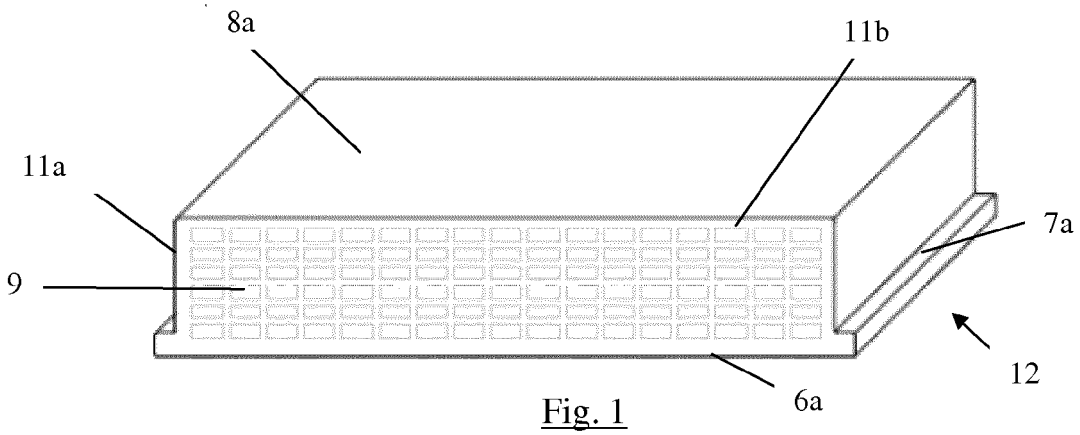

Fig. 1

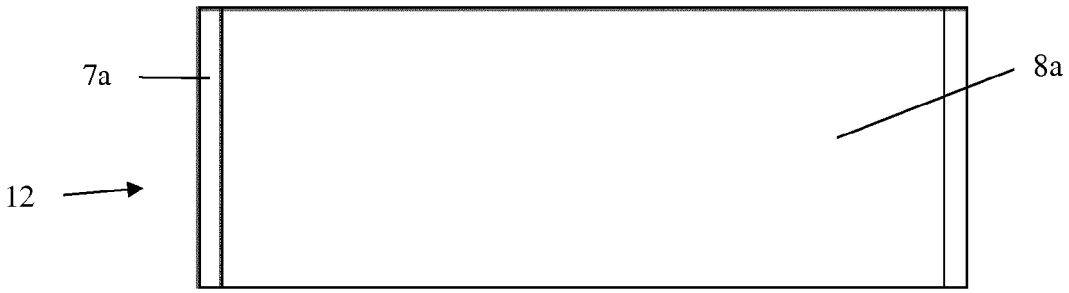

Fig. 2

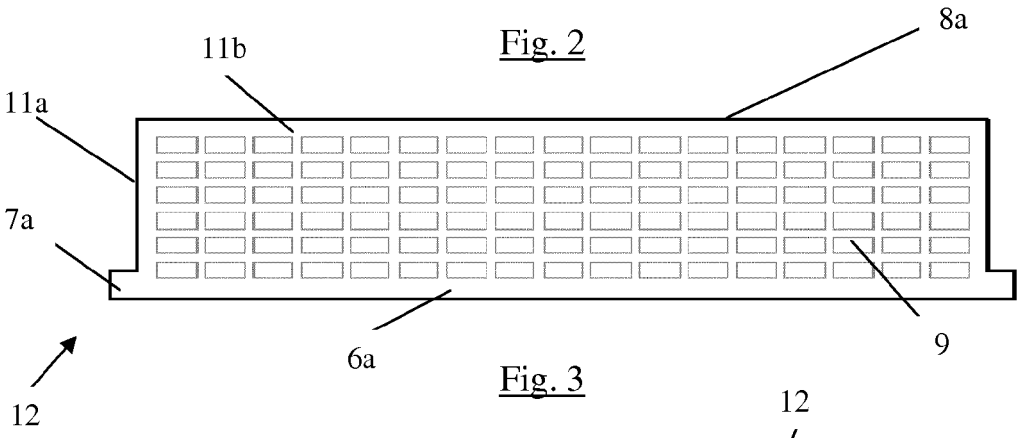

Fig. 3

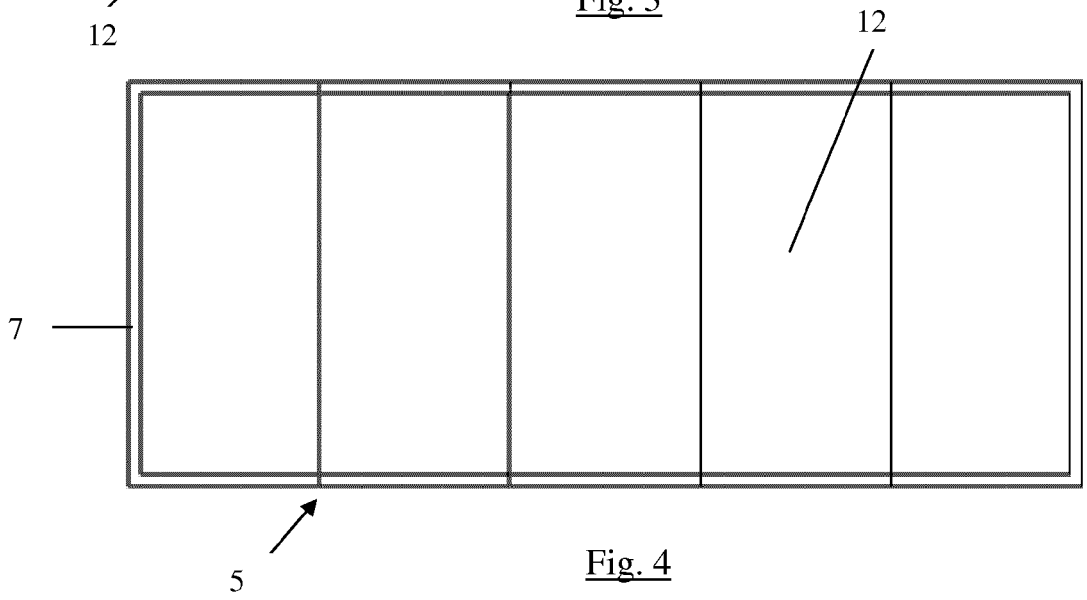

Fig. 4

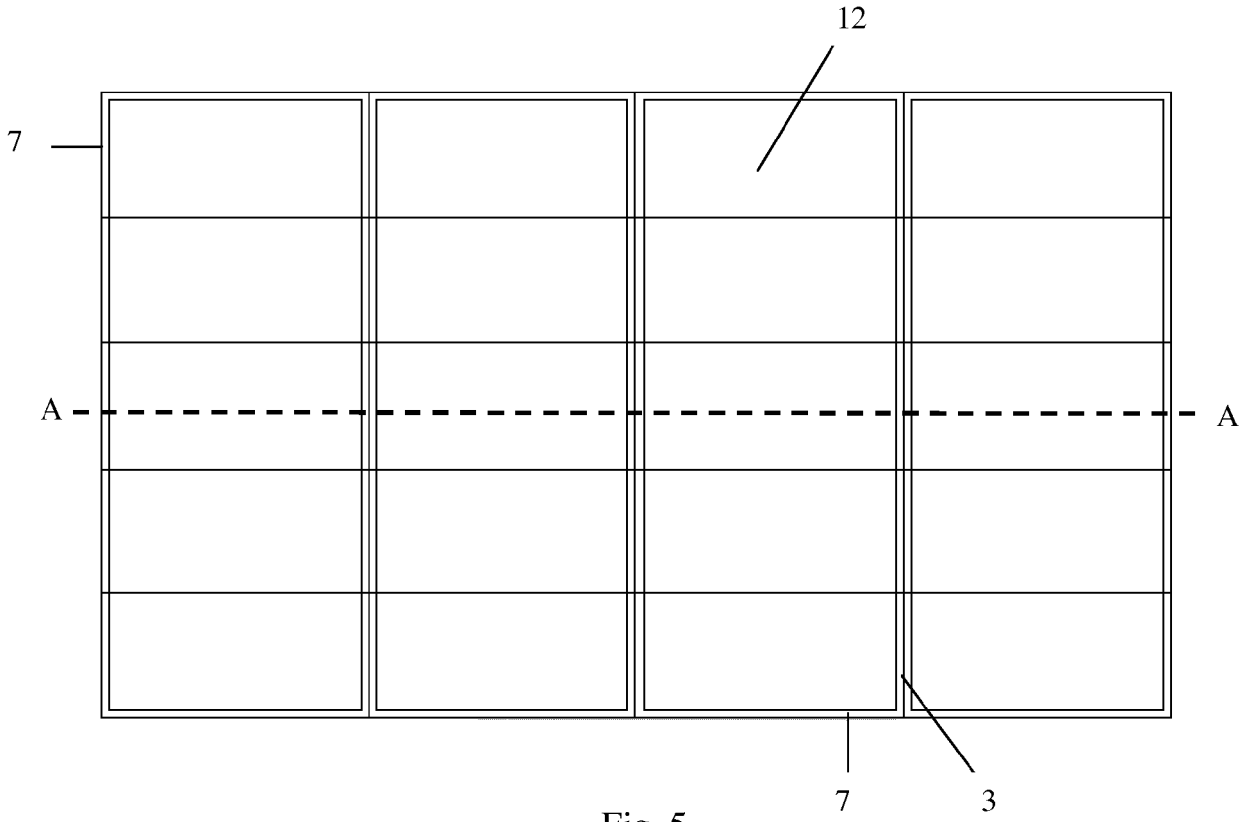

Fig. 5

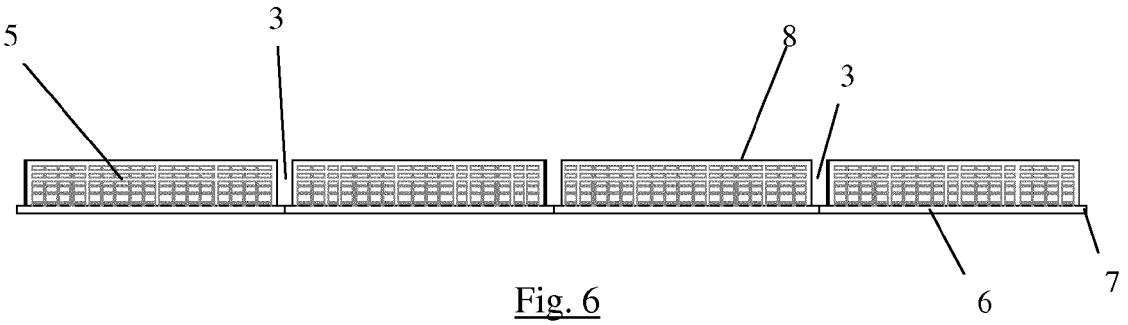

Fig. 6

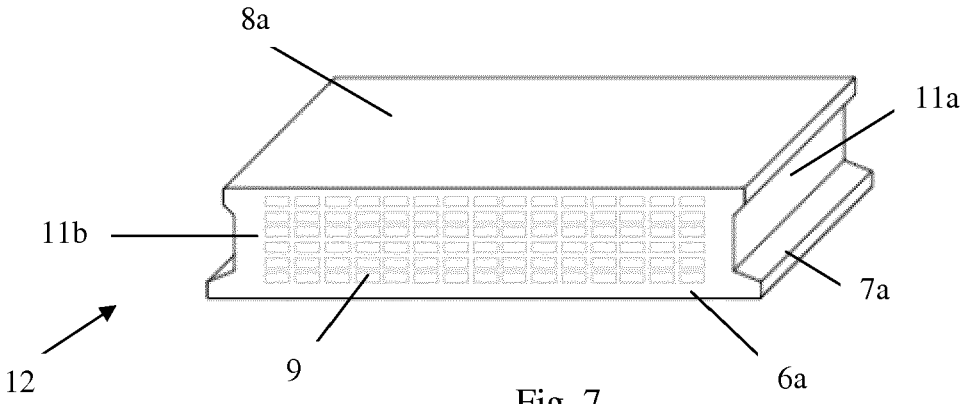

Fig. 7

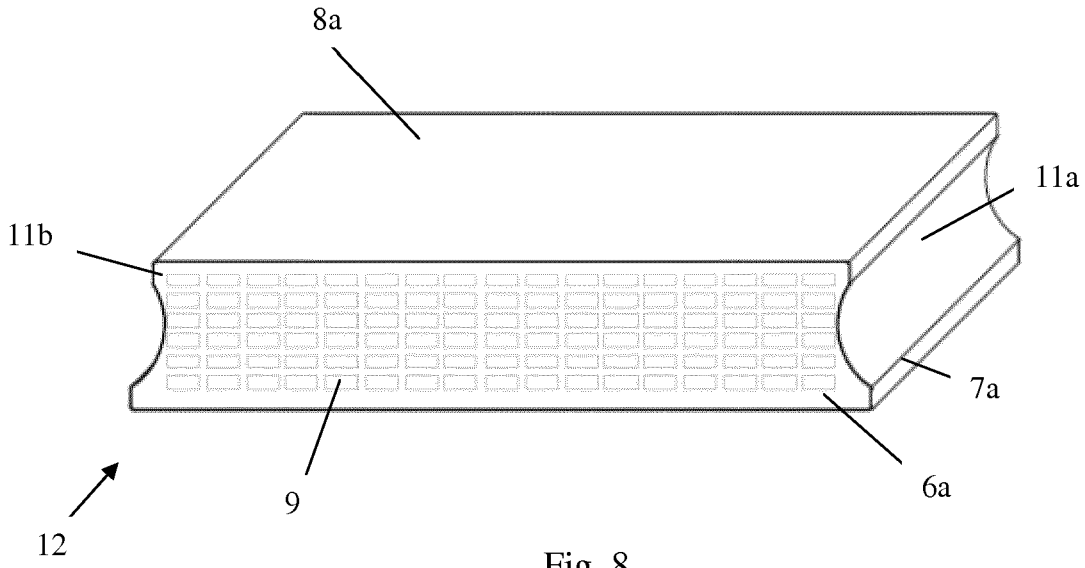

Fig. 8

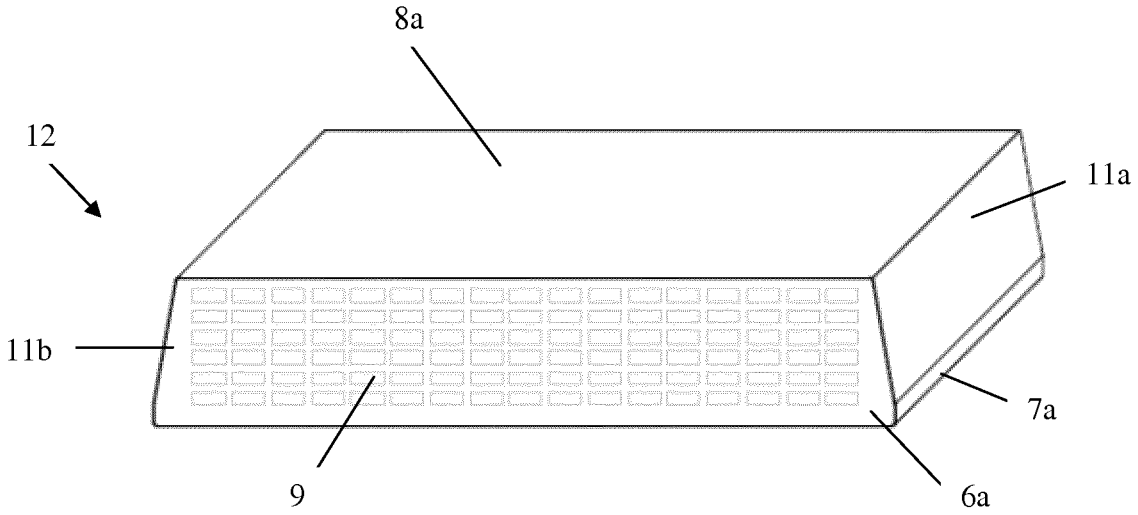

Fig. 9

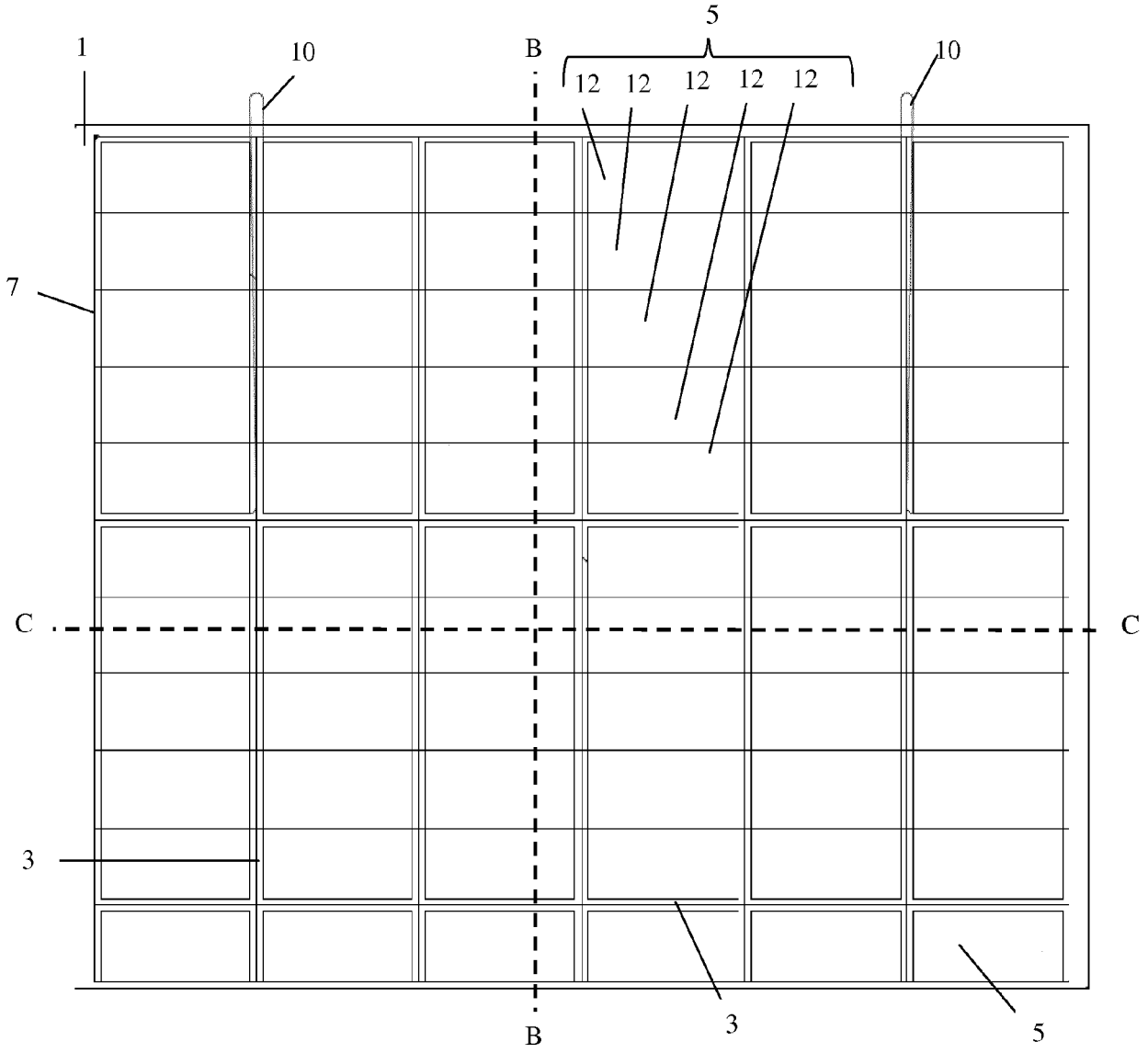

Fig. 10

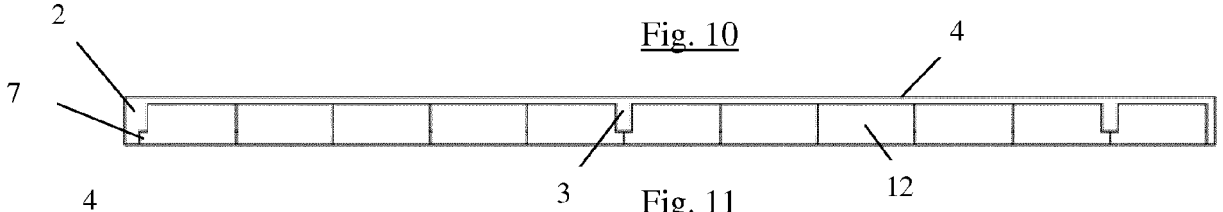

Fig. 11

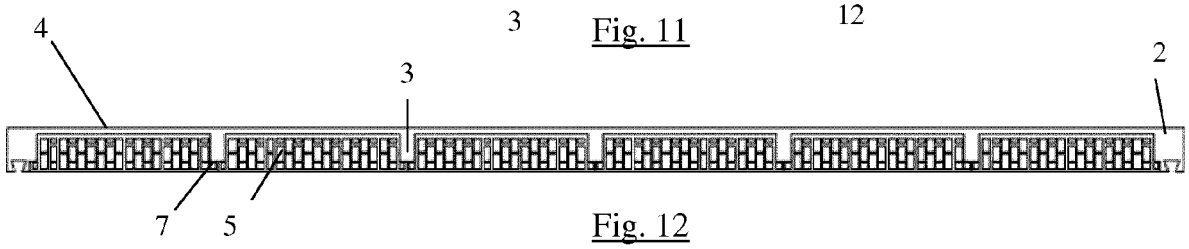

Fig. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 2101

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 February 2017	Vratsanou, Violandi

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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
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