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(12) # EUROPEAN PATENT APPLICATION

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(71) Applicant: **Makrakes, George**
71201 Heraklion, Crete (GR)

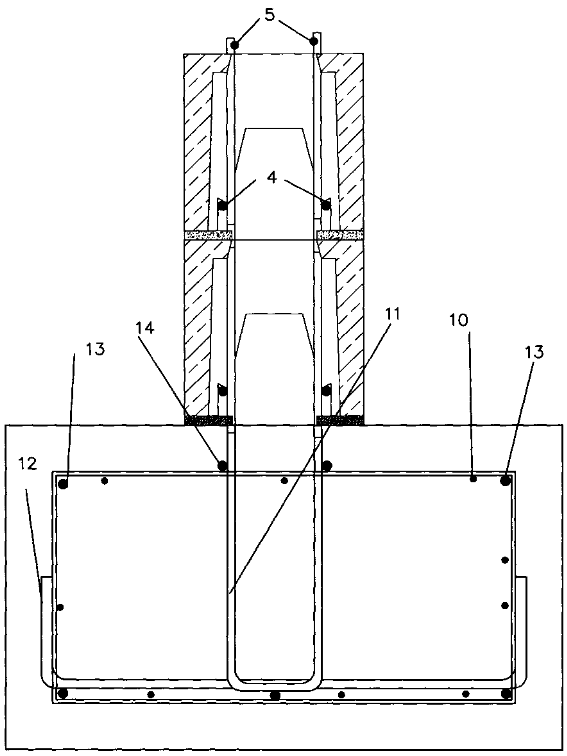
(72) Inventor: **Makrakes, George**
71201 Heraklion, Crete (GR)

(54) **Hollow masonry block with internal ribs**

(57) The invention concerns a construction component for building reinforced masonry, an implementation of which is a concrete block with transversal gaps longwise as well as vertically.

The block facilitates the spreading of mortar in the joints by providing sufficient breadth through widening of the leg of the concrete block, which forms a sort of flange (1). At the same time, it successfully incorporates the reinforcements in the non-widened part of the leg, by placing the horizontal ones (4) upwards in a groove created for this reason. As for the vertical reinforcements (5), they run through the flange through another appropriate groove (6)...

In a type of concrete block, a plate of insulating material is placed at one of the sides, its thickness varying, with the part of lowest thickness (8) being at the position of the ridge ribs (2). It is placed eccentrically and inwards, so that an external protective layer (15) of insulating material is created. It consists of appropriately configured pieces, interlocking with each other. The edge of the jointed pieces is chamfered, so that a trapezoid groove (18) is created to achieve binding of the exterior layer to the insulating plate.



Drawing 4.1

EP 1 726 727 A1

Description

[0001] The invention concerns a construction component for building reinforced masonry, an implementation of which is a concrete block with transversal gaps longwise as well as vertically.

[0002] Concrete blocks have been used for many years and they are widespread in the construction of any type of masonry, such as load-bearing (reinforced or non-reinforced) masonry, concrete-filling masonry etc. They have been manufactured using materials that range from lightweight aggregates such as pumice to heavyweight ones such as limestone or siliceous limestone inert materials. Those are shaped in many forms (whether compact or with gaps) and come in various sizes.

[0003] Various types of concrete blocks with transversal gaps longwise and vertically have already been used in a number of countries.

[0004] As described below, this invention presents the following advantages, compared to the current level of technique.

[0005] It makes possible to place a double reinforcement grate at the sidewalls of the masonry work, at parts where the thickness of concrete blocks is limited, by ensuring the required laps at the same time. In other words, it facilitates the spreading of mortar in the joints by providing sufficient breadth through widening of the leg of the concrete block, which forms a sort of "flange". At the same time, it successfully incorporates the reinforcements in the non-widened part of the leg, by placing the horizontal ones upwards in a groove created for this reason. As for the vertical reinforcements, they run through the flange through another appropriate groove. Thus, in a way, the reinforcements are flush-fitted under the flange and the perpendicular transversal space of the masonry remains free for the pouring and the vibration of the concrete.

[0006] If the type of concrete block fitted with a plate of heat-insulating material is used, the masonry constructed has already been heat-insulated. Two types of concrete blocks used for the implementation of the present invention are described below, using drawings that clarify those two specific implementations, which are referred to as type A and type B.

[0007] Drawings 1.1. and 1.2 depict type A, which is the non-insulated type. More specifically, these are the sectional plan in drawing 1.1 and the section 1-1 in drawing 1.2. Type B, which is the heat-insulated type, is depicted in drawings 2.1 and 2.2. More specifically, these are the sectional plan in drawing 2.1 and the section 2-2 in drawing 2.2. In drawings 3.1, 3.2 and 3.3 the insulating plate is depicted: 3.1 depicts the face from the exterior side, 3.2 depicts the sectional plan and 3.3. depicts the face from the interior side. Drawing 4.1 depicts a typical section of the masonry created using type A, with the reinforcements in their specific positions. Moreover, the foundation of the masonry with its reinforcements is also shown.

[0008] The drawings depict a concrete block with transversal gaps longwise as well as vertically.

[0009] The upper part of the concrete block leg is widened to create a sufficiently broad flange (1). The creation of a flange facilitates the spreading of the joint mortar, without reducing the section of the concrete. At the ridge ribs (2) a wedge - shaped recess is created with the hollow parts facing down, where the horizontal reinforcement (4) is placed upwards, which is suitably fastened. At the same time, the required lap of the horizontal reinforcement is ensured. Subsequently, in order to achieve the abutment of the horizontal reinforcement against the vertical one (5) for any diameter, a triangular recess (6) is created on the flange.

[0010] Drawing 2.3 depicts the insulating plate (7). The insulating plate is fitted in the concrete block during the forming of the latter in the mould. The plate's thickness varies, its minimum thickness (8) being at the points of the ridge ribs. The insulating material plate consists of pieces that are suitably shaped and interlock with each other. The various pieces are distinguished according to their thickness, in low thickness pieces (16) and high thickness pieces (17). The edge of the jointed pieces is chamfered, so that a trapezoid groove (18) is created during their joining; when the latter is filled, it contributes to the binding of the exterior layer to the insulating plate. The height of low thickness pieces is smaller than that of high thickness pieces, so that a rectangular hole (19) is created at the lower part of the plate during their joining. When it is filled, this rectangular hole contributes to the binding of the exterior layer to the rest of the concrete block.

[0011] For a more thorough description of the invention and in order to analyze its advantages, we will describe its application to a small building (dimensions, material, and reinforcements are indicatory).

a) dimensions - materials

[0012] The dimensions of concrete blocks are for type A. Those are 19X19X39cm, which are the most common in this country. For a joint thickness of 1 cm they "build" 20X20X40cm, whereas for type B, they build 24X19X39 (the additional 5 cm of width are due to the heat-insulating plate). The construction material is lightweight concrete of pumice aggregates that abound in the area of Southern Aegean, whereas the heat-insulating plate (highest thickness: 5cm, lowest thickness: 2,5cm) is manufactured of distended polystyrene weighing 25kg/m^3.

b) design - marking

[0013] The load-bearing walls of the building are fitted into a 20X20 cm grid. The interior walls of the building are of type A, whereas the exterior ones are of type B (insulated). The outer margin of the exterior walls of the building is displaced by 5cm outwards in relation to the grid, due to the higher thickness of the type B concrete blocks.

c) formwork and foundation reinforcements (drawing 4.1)

[0014] The foundation of load-bearing walls is a foundation strap, which is 60cm wide and 35cm high. The reinforcements are placed in relation to the margins of the walls and in relation to the grid of the building, as in drawing (4.1). More specifically: 1) a reinforcement cage (10) made of a Q196 mesh (with 20cm square holes), whose dimensions are 40X25 cm, is shaped with a metal plate folder. The transverse irons of the cage Φ4/20 are used as distance spacers for placing the vertical reinforcement and the transverse reinforcement of the foundation strap. 2) Grooves (11) for the vertical reinforcement Φ8 are placed every 20 cm, as shown in the drawing. 3) A transverse reinforcement Φ12/20 (12) is placed as shown in the drawing and 4) a longitudinal reinforcement 4Φ8 (13) is placed in the corners of the cage as assembly reinforcement, whereas 2Φ8 is placed at appropriate positions (14), at 14 and 15 cm from the margin of the building grid, to serve as guides for placing grooves for the vertical reinforcement.

d) wall construction and placing of reinforcements

[0015] For each wall and for each row of concrete blocks, the horizontal reinforcement (4) 2Φ8 is placed first at each row and, subsequently, the concrete blocks are built. After the construction of each row is completed, the horizontal reinforcements are fastened in their position, being either supported or fastened on the upper part of the concrete block. After building the first three rows, the grooves for the vertical reinforcement are fastened on the horizontal one.

[0016] After the construction of the wall is complete, the vertical reinforcement 2Φ8/20 is placed running through all its height; at this point, the grooves alongside should be calculated for another floor, at the predetermined recesses of the flange. Subsequently, the vertical reinforcement is fastened on the horizontal (at least at the iron rods of the two upper rows). Formwork, reinforcement of the bedplate, as well as concrete pouring follow.

e) Door and window openings

[0017] As it is easily understood, the openings of the doors and the windows are fitted in the grid of 20cm across, as well as vertically. To achieve openings outside the grid, a brick doorpost (hanging post) is completed up to the desired width and a concrete coursing joint is added at the sill of the window to achieve the desired height (the lintel remains steady). For instance, in order to build a window of a 90X130cm opening, a 100X140cm opening must be left in the masonry, which is fitted in the 20X20 cm grid. Secondly, a coursing joint of 10cm is created in the window-sill and then a 10cm hanging post is built (a vertical-hole brick).

f) door and window lintels

[0018] The door and window lintels are pre-manufactured of two isosceles angular 2L90X90 cm of structural steel St37.

Claims

1. Construction component for building reinforced masonry with transversal gaps longwise as well as vertically, so that it is divided into two parts, bound with ridge ribs (2). This component is **characterized by** the fact that the upper part of the leg of the construction component is widened to create a flange (1) of sufficient width for spreading the mortar in the joints. At the transversal ribs (2), a specific wedge-shaped recess (3) is created with the hollow parts facing down, where the horizontal reinforcement (4) is fastened upwards and a slot is created in the flange (1), so that the abutment of the horizontal reinforcement against the vertical one (5) is possible for any diameter, and so that its required lap is also ensured.

2. The construction component for building reinforced masonry - as referred to in claim (1)- is **characterized by** the fact that it consists of a plate of insulating material (7), which is placed at the one side of the construction component and its thickness varies, with the part of lowest thickness (8) being at the position of the ridge ribs (2) and at the side of the construction component, where it is placed eccentrically and inwards, so that an external protective layer (15) of insulating material is created. The plate of the insulating material also consists of appropriately shaped pieces, interlocking with each other. Those pieces are distinguished into low thickness pieces (16) and high thickness pieces (17), accordingly. The height of low thickness pieces is smaller than that of high thickness pieces, so that a rectangular hole (19) is created at the lower part of the plate during their joining. When it is filled, this rectangular hole contributes to the binding of the exterior layer to the rest of the concrete block. Moreover, The edge of the jointed pieces is chamfered, so that a trapezoid groove (18) is created during their joining; when the latter is filled, it contributes to the binding of the exterior layer to the insulating plate.

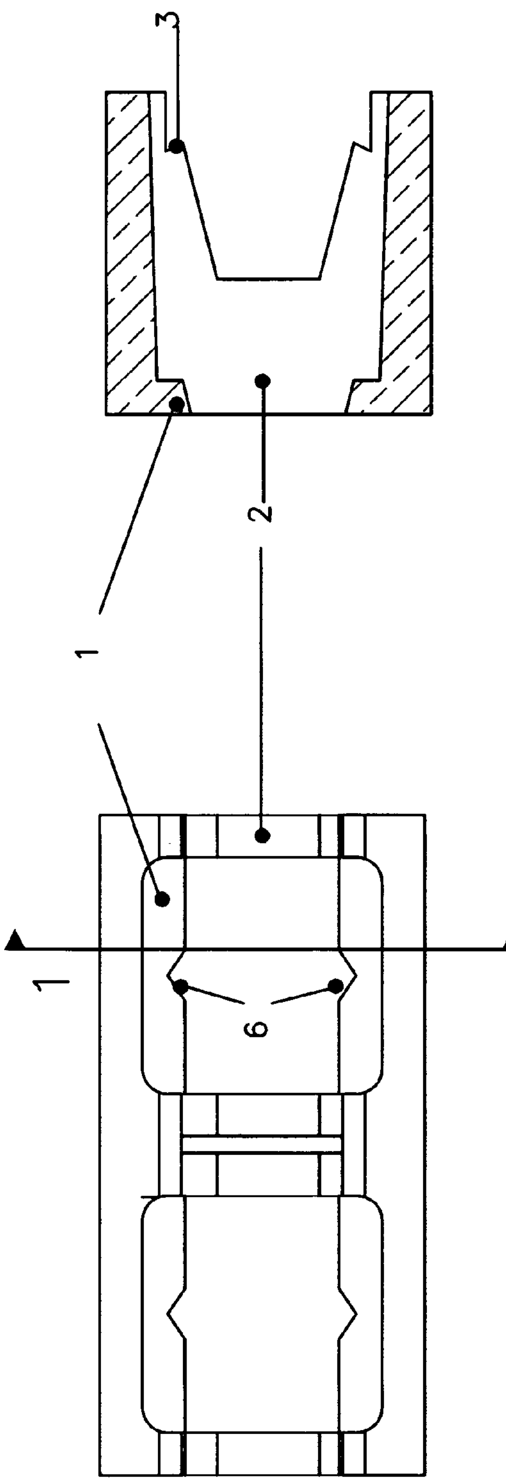
3. The construction component for building reinforced masonry according to claims (1) and (2) is **characterized by** the fact that at the side where the insulating plate is placed there is no creation of a flange.

4. The construction component for building reinforced masonry according to claim (1) is **characterized by**

the fact that the shape of the recess in the flange is triangular.

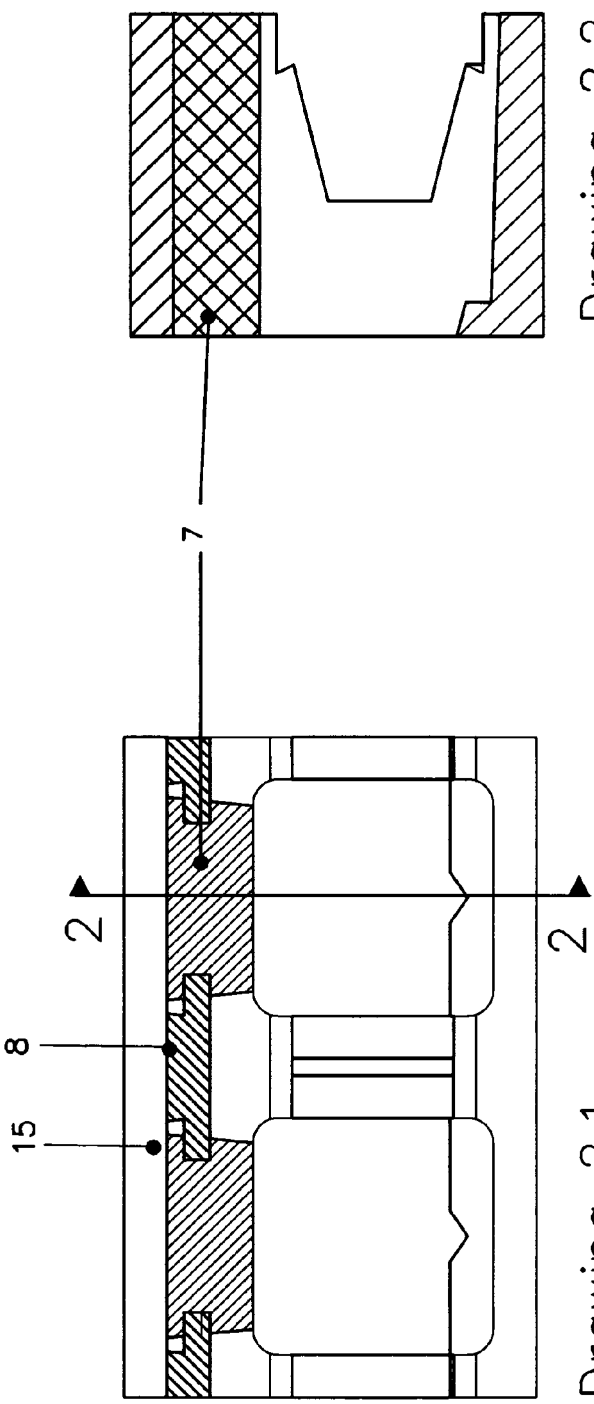
5. The construction component for building reinforced masonry according to claim (1) is **characterized by** the fact that the horizontal reinforcement is fastened at the specific wedge-shaped recess (3), supported with a special fitting.

6. The construction component for building reinforced masonry according to claim (1) is **characterized by** the fact that the horizontal reinforcement is fastened at the specific wedge-shaped recess (3), with its binding on the upper part of the transversal rib.



Drawing 1.1

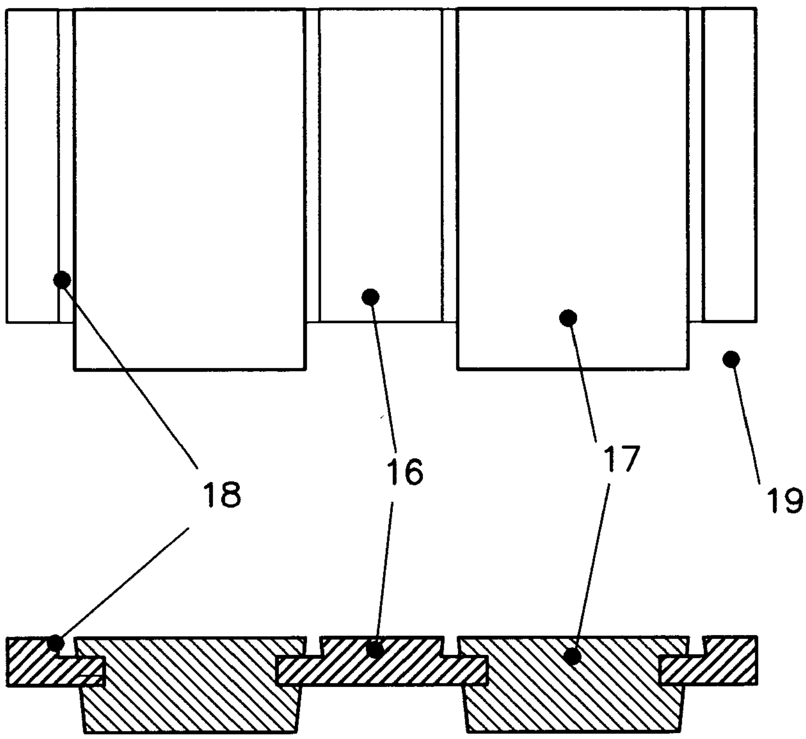
Drawing 1.2



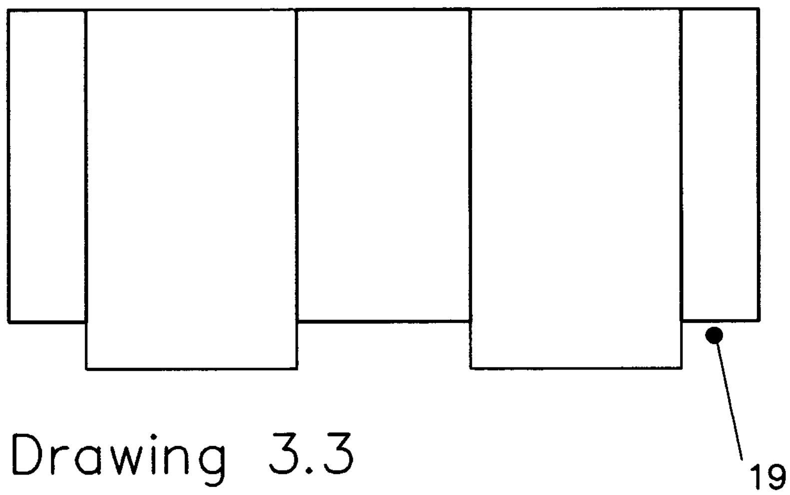
Drawing 2.1

Drawing 2.2

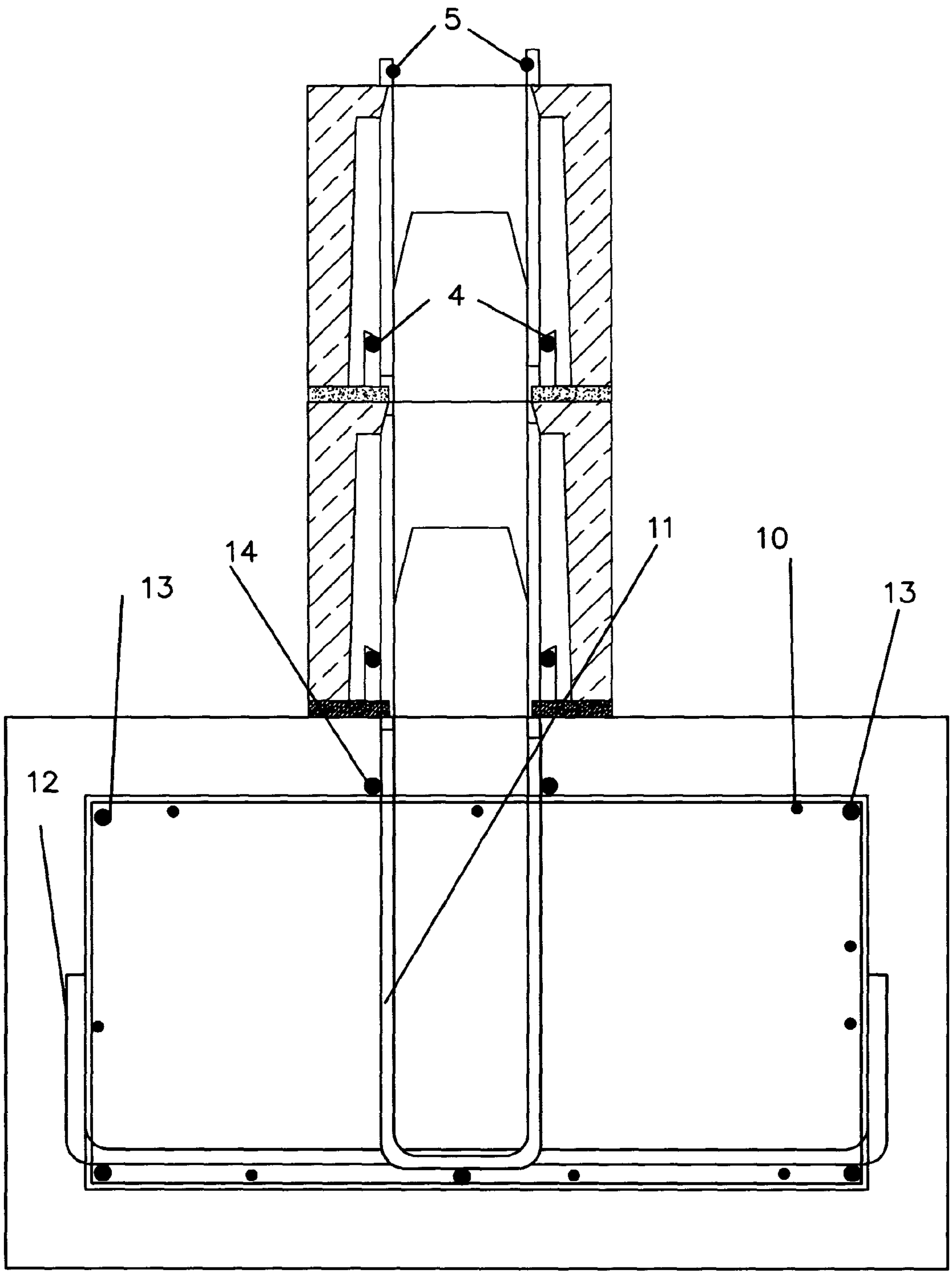
Drawing 3.1



Drawing 3.2



Drawing 3.3



Drawing 4.1

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EUROPEAN SEARCH REPORT

Application Number
EP 06 38 6010

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E04B
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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	4 October 2006	Khera, Daljit

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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2

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 38 6010

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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