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(54) Facade, method for manufacturing a facade, table for use in the method and assembly of section elements for use in the method

(57) Method for prefabricating a facade (G), wherein, utilizing a table (T) provided with a profile surface (2), outer facade elements (5) are placed on the table (T) and interconnected by mortar or concrete mortar (11) to form an outer wall. Next, an inner wall (4) element is placed. The outer wall (5) and the inner wall element (4) are interconnected by an assembly of sections. The assembly, also forming part of the invention, comprises first (8) and second sections (12) and at least one connecting section (13,13'), capable of interconnecting a first section (8) and a second section (12). The invention also relates to a table (T) used for carrying out the method, which table is provided with a table top (1) which is swivellable about a horizontal axis (22) and which is provided with a profile surface (2).

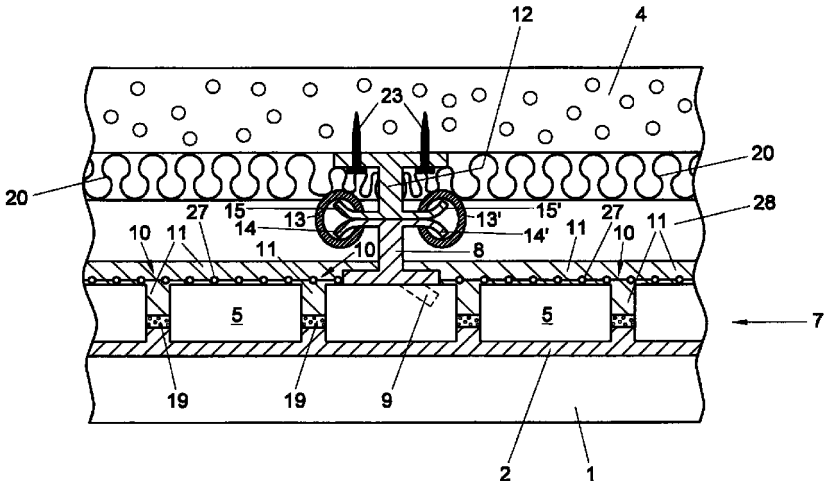

Fig. 2

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Description

[0001] The invention relates to the manufacture of a facade, more in particular a facade having an air cavity. During the construction of buildings, it is customary to manufacture the facades on the building site. Sometimes, prefabricated inner walls from concrete are used, in which the openings for windows and doors have already been provided. Apart from an inner wall, the facade is generally also provided with an outer wall. Typically, insulating material and an air cavity are incorporated between the inner wall and the outer wall. Hitherto, the manufacture of the outer wall has taken place on the building site. After the inner walls have been placed, the outer wall is gradually masoned up and the casings are fitted in the outer wall. This is a particularly time-consuming mode of operation, in particular when the outer wall is built up from bricks, which is usually the case. Moreover, the operation of masoning up an outer wall can only be performed by skilled persons. When the outer wall is given a considerable height, it is necessary to set up scaffolds in front of the outer wall to be built. The use of such scaffolds is cumbersome and moreover costly.

[0002] The object of the invention is to provide an entirely new method for manufacturing a facade without the above-described drawbacks.

[0003] According to the invention, a method for prefabricating a facade utilizing the table is provided, which table comprises a profile surface and support elements, wherein the facade comprises a prefabricated inner wall element and a number of outer facade elements, such as for instance bricks, windows, casings, ventilating grids, wood parts and the like, together forming an outer wall, wherein the profile surface is designed so that the positions of the outer facade elements are established thereby, wherein in a first method step, the outer facade elements are placed in the positions intended therefor on the profile surface, wherein first section elements are subsequently placed, extending over substantially the entire height of the outer wall and each comprising at least a number of anchoring elements extending into the joints between the outer facade elements, wherein a connecting substance, such as for instance mortar or concrete mortar, is subsequently applied over the outer facade elements, wherein the inner wall element is subsequently placed while resting on the support elements of the table, wherein the inner wall element is provided with second section elements which, after placement of the inner wall element, extend parallel to and abut against the first section elements, wherein each first and, abutting thereagainst, second section element are subsequently interconnected by at least one connecting section that is slid over a first flange of the first section element and a second flange of the second section element, wherein the inner wall element is provided, adjacent the bottom side, with at least one anchoring plate fixedly connected to the inner wall element, which anchoring plate is or can be connected to a foot via a support, said foot abutting against the bottom side of the lower outer facade elements, wherein the table is subsequently tilted into a vertical position.

[0004] With such a method, a complete facade can be prefabricated completely, provided with an inner wall, an air cavity and with an outer wall comprising casings, doors, windows, ventilating grids and the like. This means that after the prefabrication of the facade, this facade can be placed on a deep loader and transported to a building site, where it is to be brought into the desired end position in one operation by means of a crane. The use of scaffolds for brickwork can be dispensed with. Painting work for the casings or mounting operations for the placement of grids are dispensed with as well, because all these operations have already been performed before the facade is placed in its end position.

[0005] In accordance with a further elaboration of the invention, it is preferred that before the connecting substance is applied, at least one shrink mat be placed on the upwardly facing side of the outer facade elements, while during the application of the connecting substance, the at least one shrink mat is embedded in the connecting substance. The shrink mat embedded in the connecting substance provides a proper connection between the different outer facade elements. Preferably, such an amount of connecting substance is provided that the respective feet of the first section elements are embedded in the connecting substance. It is observed that in the building world, the term 'shrink mat' is a customary term for a gauze-shaped or grid-shaped element.

[0006] Preferably, in accordance with a further elaboration of the method according to the invention, before the connecting substance is poured, fine sand is strewn into the joints between the outer facade elements. Thus, during the pouring of the connecting substance, this connecting substance is prevented from fouling the front side of the placed facade elements. The fine sand holds back the connecting substance and, moreover, retains the water from the connecting substance due to the capillary action in the fine sand.

[0007] In accordance with a further elaboration of the invention, it is preferred that the connection between the at least one anchoring plate and the support of the foot be realized after the inner wall element has been placed. In this manner, it can readily be provided that the foot properly abuts against the bottom side of the lower outer facade elements, so that an proper support of the outer wall is guaranteed.

[0008] If necessary, insulating material can be applied after the inner wall element has been placed, the insulating material being clamped between the adjacent second section elements. In this manner, a completely prefabricated and insulated facade is obtained.

[0009] The invention also relates to an assembly intended for use in the method according to the inven-

tion, which assembly comprises a first section, a second section and at least one connecting section, wherein the first section comprises at least a number of anchoring elements intended for extending into the joints between the outer facade elements, wherein the first section is provided with at least one first flange, wherein the second section is provided with at least one second flange, wherein, in a mounted condition of the assembly, the at least one first flange extends parallel to and abuts against the second flange corresponding therewith, wherein the connecting section engages around the free ends of the first and the second flange. During placement of the inner wall, it should be arranged that the second sections mounted thereon extend parallel to and abut against the first sections that correspond therewith and that have already been fitted on the outer facade elements. The connection between the first and second sections can readily be established by sliding the connecting section over the free ends of the first and second flanges.

[0010] In accordance with a further elaboration of the invention, it is preferred that the free ends of the at least one first and the at least one second flange slightly recede from each other, the connecting section being designed as a tubular section having a longitudinal slot, said longitudinal slot having a width that substantially corresponds to the sum of the thicknesses of the first and the second flange. After placement of the connecting section, the free ends of the first and the second flange, slightly receding from each other, are included into the tubular section. It has thus become impossible for the tubular section to be slid from the free ends other than in the longitudinal direction of the tubular section. Thus, a reliable connection between the first and the second section is guaranteed.

[0011] The invention also relates to a table intended for use in the method according to the invention, which table comprises a table top having a profile surface, a number of support elements and a swivel construction, wherein by means of the swivel construction, the table is tiltable about a horizontal axis from a horizontal position into a vertical position. After the establishment of a connection between the inner wall and the outer wall by fitting the connecting sections, the table can be tilted from the horizontal position into the vertical position, after which the prefabricated facade can readily be placed on a deep loader by means of a crane. The support elements are intended for supporting the inner wall when the table is in the horizontal position. If so desired, the support elements located adjacent the lower edge of the facade can also be designed for supporting the facade in a vertical position of the table.

[0012] In accordance with a further elaboration of the invention, it is particularly favorable when the profile surface is removable from the table top. In that manner, various facades can be made on the same table, while a new type of facade can be manufactured merely be replacing the profile surface. To this end, the removable profile surface is preferably designed as a flexible rubber profile mat.

[0013] It is understood that the invention also relates to a facade obtained with the method according to the invention.

[0014] The invention will hereinafter be specified with reference to an exemplary embodiment shown in the accompanying drawings. In these drawings:

Fig. 1 is a sectional view of the table;
Fig. 2 is a partial sectional view of the table, taken on the line II-II of Fig. 1;
Fig. 3 is a perspective view of a portion of a first section element; and
Fig. 4 shows the bottom side of a prefabricated facade.

[0015] Fig. 1 clearly shows a sectional view of a facade G prefabricated on a table T. The table T is provided with a profile surface 2 and support elements 3, 3'. The facade G comprises a prefabricated inner wall element 4 and a number of outer facade elements 5, 6 which together form an outer wall 7. In the present exemplary embodiment, the wall 7 is built up from bricks 5 and a window 6. In a first method step, the outer facade elements 5, 6 are placed on the profile surface 2 in the positions intended therefor. The table top 1 of the table T is in a horizontal position. Next, first section elements 8 are positioned. The first section elements 8 extend over substantially the entire height of the outer wall and are provided with at least a number of anchoring elements 9, extending into the joints 10 between the outer facade elements 5, 6. For clarification, Fig. 3 represents a perspective view of a portion of a first section element 8. In the present exemplary embodiment, a number of shrink mats 27 are subsequently disposed on the upwardly facing side of the outer facade elements 5. Next, a connecting substance 11, such as, for instance, mortar or concrete mortar, is poured over the shrink mats 27, the outer facade elements 5, 6 and into the joints 10. In course of time, the connecting substance 11 has cured and the separate outer facade elements 5, 6 and the first section elements 8 have been interconnected by the shrink mats 27 and the connecting substance 11 to form one whole. Then, the inner wall element 4 can be placed. After placement, this inner wall element 4 rests on the support elements 3, 3' of the table T. The inner wall element 4 comprises second section elements 12 which, after placement of the inner wall element 4, extend parallel to and abut against the first section elements 8. The second section elements 12 can be attached to the inner wall element 4 for instance by means of bolts 23. Next, each first and, abutting thereagainst, second section element 8, 12 respectively can in the present exemplary embodiment be interconnected by in each case two connecting sections 13, 13', slid over a first flange 14, 14' of the first section 8 and a second flange 15, 15' of the second section 12. As

shown clearly in Figs. 1 and 4, the inner wall element 4 is provided, adjacent its bottom side 4a, with at least one anchoring plate 16, fixedly connected to the inner wall element 4. In the present exemplary embodiment, this anchoring plate 16 is fixedly connected to the inner wall element 4 by means of anchors 24. There is further provided a support 17 that connects the anchoring plate 16 to a foot 18. This foot 18 abuts against the bottom side 7a of the lower outer facade elements 5. After the connection between the anchoring plate 16 and the foot 18 has been established via a support 17 - this connection can for instance be formed by a welded joint 25 - the table T can be tilted into a vertical position. The facade G thus obtained, provided with an air cavity 28, can then be directly placed on a construction in the end position.

[0016] Preferably, the left and right lateral edges of the facade are designed so that the brickwork bond of two juxtaposed facade elements can continue. Two juxtaposed facades obtained by means of the method can then be formed into one whole by inserting bricks into the openings in the boundary line that looks like a zip fastener. After jointing, it can no longer be seen on the outside where the juxtaposed, prefabricated facades adjoin each other. In order to achieve this effect, whole bricks are used at the lateral edges of a facade to be prefabricated, to obtain a staggered edge.

[0017] Optionally, after the placement of the inner wall element 4, insulating material 20 may further be provided, which material is clamped between the adjoining second section elements 12. This is shown clearly in Fig. 2. Fig. 2 also clearly shows a sectional view of an assembly for use in the method. The assembly is formed by the first and the second section 8 and 12 respectively and, in the present exemplary embodiment, two connecting sections 13, 13'. As already indicated hereinabove, the first section 8 is provided with anchoring elements 9, intended for extending into the joints 10 between the outer facade elements 5, 6. The abutting and parallel flanges 14, 14', 15, 15' of the first and the second section 8 and 12 respectively slightly recede from each other. In the present exemplary embodiment, the connecting sections 13, 13' are designed as a tubular section provided with a longitudinal slot. The longitudinal slot has a width that substantially corresponds to the sum of the thicknesses of the first 14, 14' and second 15, 15' flanges. As the free ends of the flanges 14, 14' and 15, 15' recede from each other, it is impossible for the connecting sections 13, 13' to slip from the free ends. Only by displacing the connecting sections in their longitudinal direction can they be removed from the first and second sections.

[0018] As already indicated hereinabove, the table T is provided with a table top 1 having a profile surface 2. The table T is moreover provided with support elements 3, 3' and with a swivel construction 21. By means of the swivel construction 21, the table top 1 can be tilted about a horizontal axis 22 from a horizontal position into a vertical position. From this vertical position, a facade G manufactured on the table T can readily be lifted by means of a crane and placed on a deep loader. In the present exemplary embodiment, the profile surface 2 is removable from the table T in that it is designed as a flexible rubber profile mat. By means of guides 26, 26', the support elements 3, 3' are slidably connected to the table top 1, enabling walls of different dimensions to be manufactured thereby.

[0019] It is understood that the invention is not limited to the exemplary embodiment described, but that various modifications are possible within the framework of the invention.

Claims

1. A method for prefabricating a facade (G) utilizing a table (T), comprising a profile surface (2) and support elements (3, 3'), said facade (G) comprising a prefabricated inner wall element (4) and a number of outer facade elements (5, 6), such as for instance bricks (5), windows (6), casings, ventilating grids, wood parts and the like, together forming an outer wall (7), wherein the profile surface (2) is designed so that the positions of the outer facade elements (5, 6) are established thereby, wherein in a first method step, the outer facade elements (5, 6) are placed in the positions intended therefor on the profile surface (2), wherein first section elements (8) are subsequently placed, extending over substantially the entire height of the outer wall (7) and each comprising at least a number of anchoring elements (9) extending into the joints (10) between the outer facade elements (5, 6), wherein a connecting substance (11), such as for instance mortar or concrete mortar, is subsequently applied over the outer facade elements (5, 6) and into the joints (10), wherein the inner wall element (4) is subsequently placed while resting on the support elements (3, 3') of the table (T), wherein the inner wall element (4) is provided with second section elements (12) which, after placement of the inner wall element (4) , extend parallel to and abut against the first section elements (8) , wherein each first and, abutting thereagainst, second section element (8 and 12 respectively) are subsequently interconnected by at least one connecting section (13, 13') that is slid over a first flange (14, 14') of the first section element (8) and a second flange (15, 15') of the second section element (12), wherein the inner wall element (4) is provided, adjacent a bottom side (4a), with at least one anchoring plate (16) fixedly connected to the inner wall element (4), which anchoring plate (16) is or can be connected to a foot (18) via a support (17), said foot (18) abutting against the bottom side (7a) of the lower outer facade elements (5), wherein the table (T) is subsequently tilted into a vertical position.

2. A method according to claim 1, characterized in that before the connecting substance (11) is applied, at least one shrink mat (27) is placed on the upwardly facing side of the outer facade elements (5, 6), while during the application of the connecting substance (11), the at least one shrink mat (27) is embedded in the connecting substance (11).

3. A method according to claim 1 or 2, characterized in that before the connecting substance (11) is poured, a fine sand (19) is strewn into the joints between the outer facade elements (5, 6).

4. A method according to any one of claims 1-3, characterized in that the connection between the anchoring plate (16) and the support (17) of the foot is realized after the inner wall element (4) has been placed.

5. A method according to any one of claims 1-4, characterized in that after the inner wall element (4) has been placed, insulating material (20) is fitted, the insulating material (20) being clamped between the adjacent second section elements (12).

6. An assembly intended for use in the method according to any one of claims 1-5, said assembly comprising a first section (8), a second section (12) and at least one connecting section (13, 13'), wherein the first section (8) comprises at least a number of anchoring elements (9) intended for extending into the joints (10) between the outer facade elements (5, 6), wherein the first section (8) is provided with at least one first flange (14, 14'), wherein the second section (12) is provided with at least one second flange (15, 15'), wherein, in a mounted condition of the assembly, the at least one first flange (14, 14') extends parallel to and abuts at least partially against the second flange (15, 15') corresponding therewith, wherein the connecting section (13, 13') engages around the free ends of the first and the second flange.

7. An assembly according to claim 6, characterized in that the free ends of the at least one first and the at least one second flange (14, 14' and 15, 15' respectively) slightly recede from each other, wherein the connecting section (13, 13') is designed as a tubular section having a longitudinal slot, said longitudinal slot having a width that substantially corresponds to the sum of the thicknesses of the first (14, 14') and the second (15, 15') flange.

8. A table intended for use in the method according to any one of claims 1-5, said table (T) comprising a table top (1) having a profile surface (2), a number of support elements (3, 3') and a swivel construction (21), wherein by means of the swivel construction (21), the table top (1) is tiltable about a horizontal axis (22) from a horizontal position into a vertical position.

9. A table according to claim 8, characterized in that the profile surface (2) is removable from the table top (1).

10. A table according to claim 9, characterized in that the removable profile surface (2) is designed as a flexible rubber profile mat.

11. A facade obtained with the method according to any one of claims 1-5.

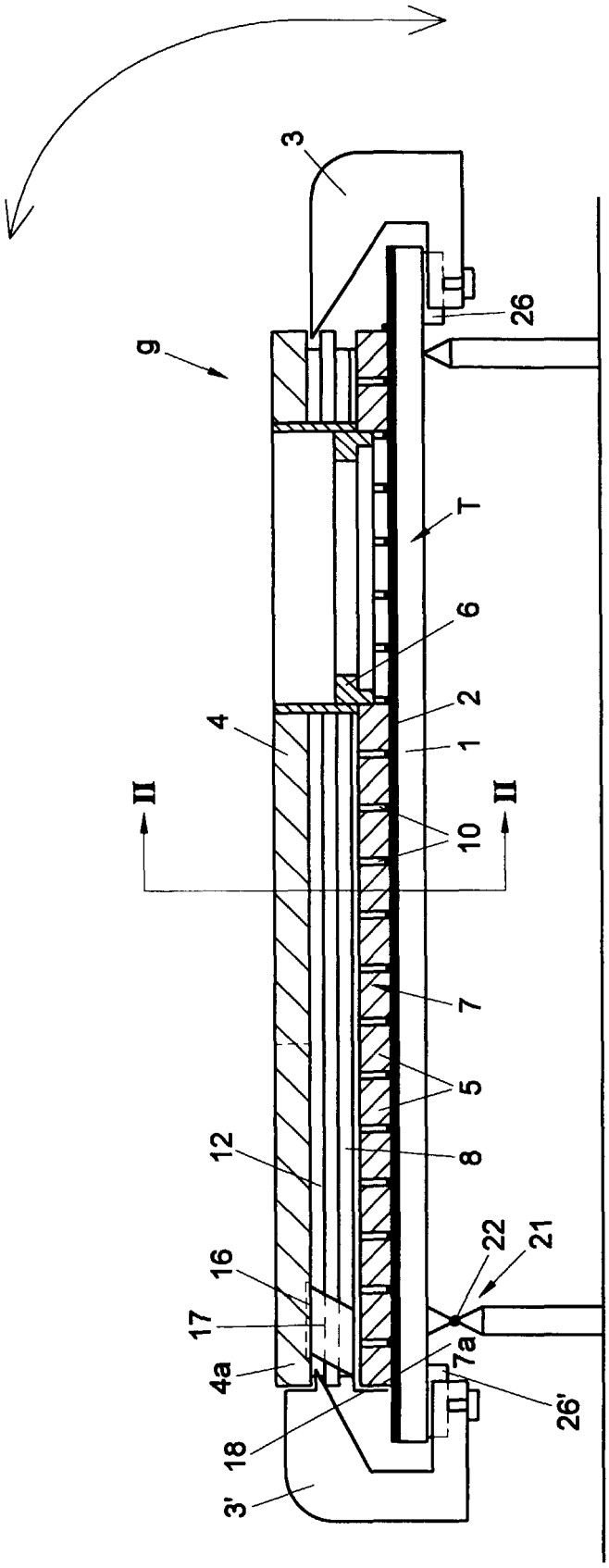


Fig. 1

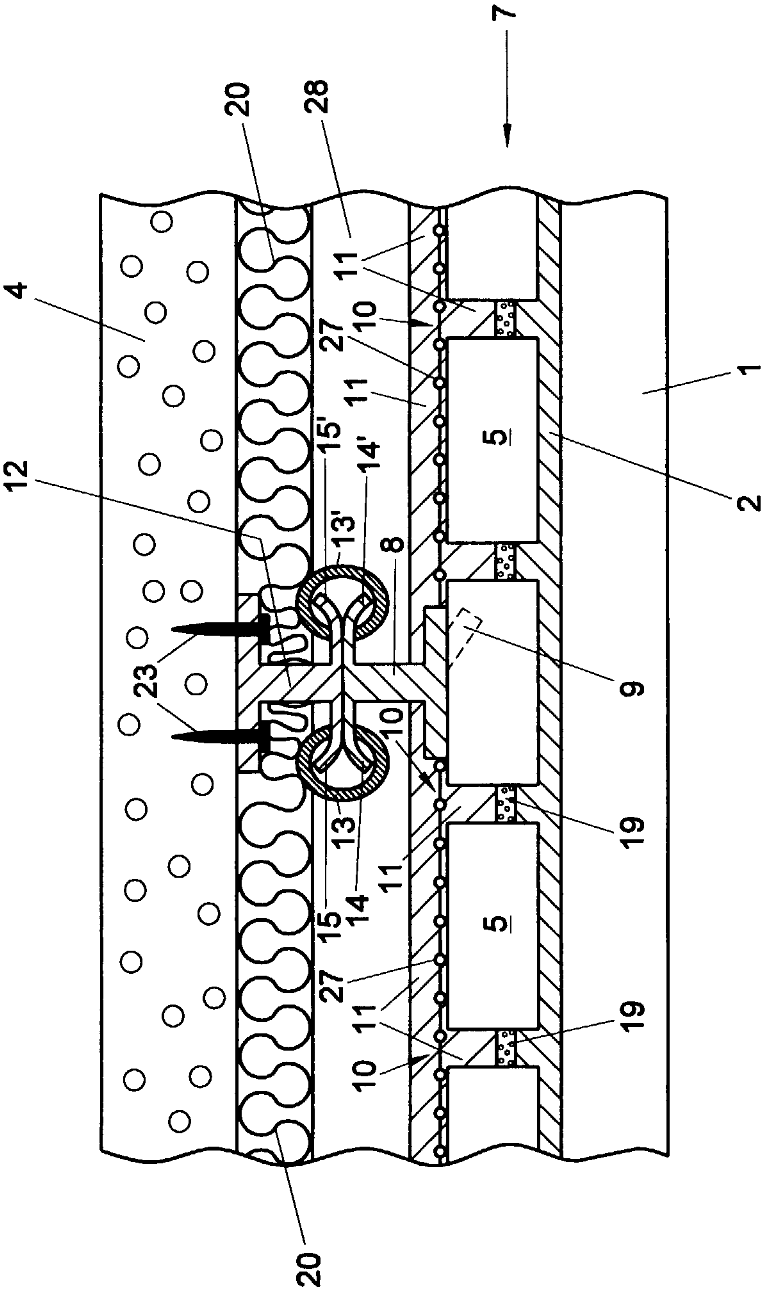


Fig. 2

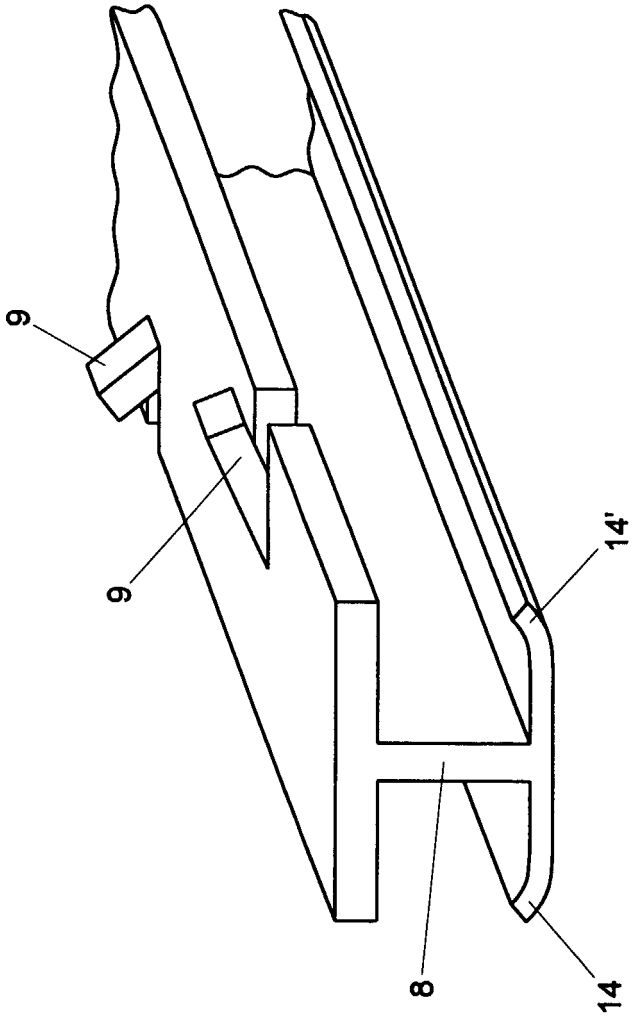
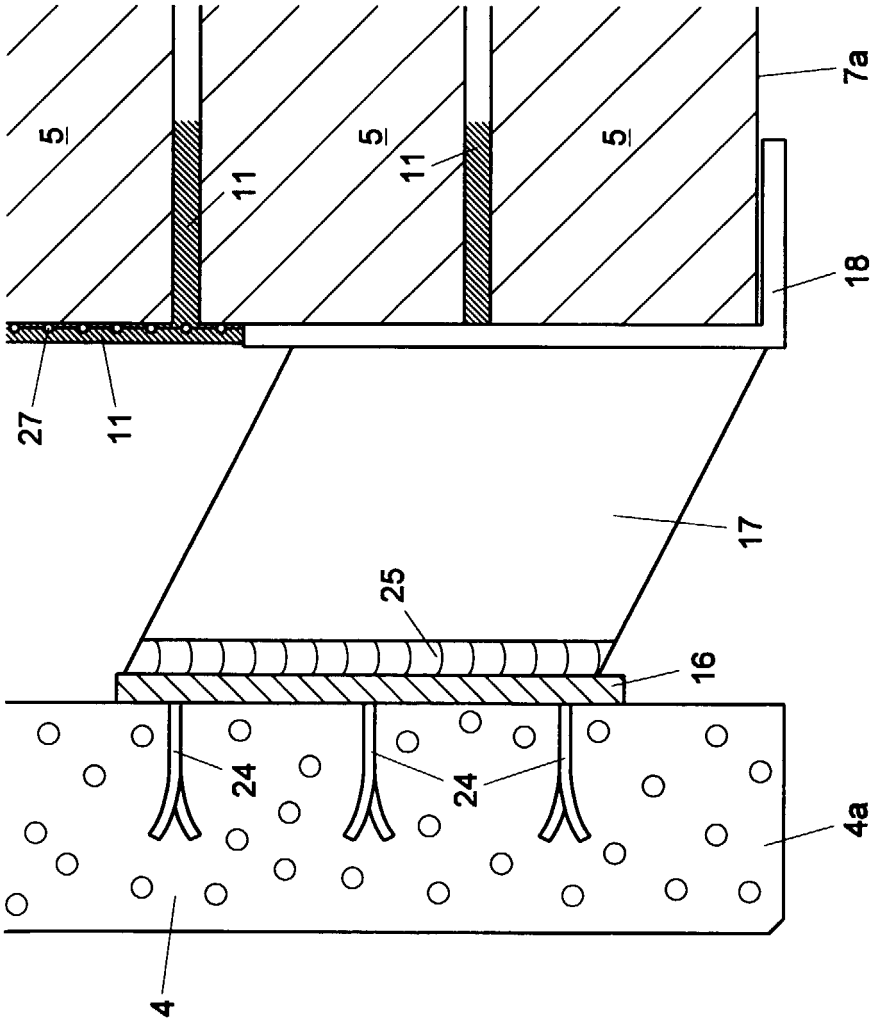


Fig. 3

Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 2434

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl7)
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TECHNICAL FIELDS SEARCHED (Int.Cl7)

B28B
E04F
E04C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 October 1999	Gourier, P

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