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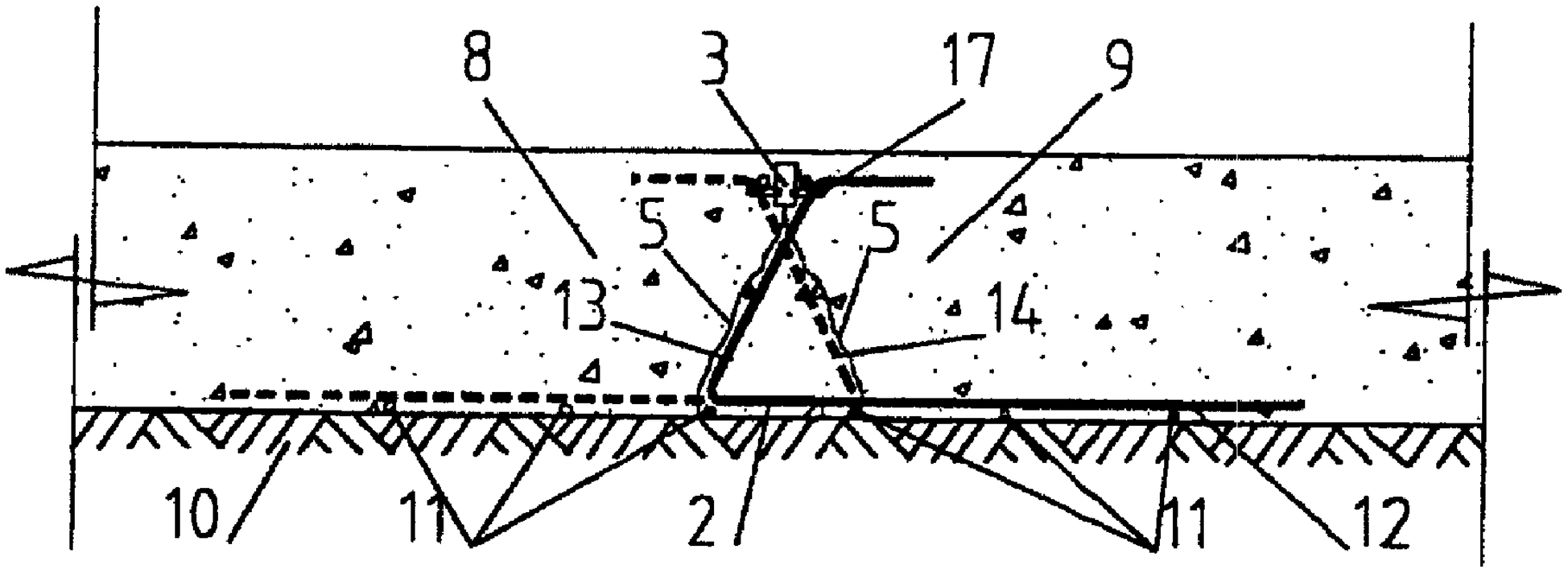
(54) Titre : PROCEDE D'EMBOITEMENT ARTICULE ENTRE LES DALLES EN BETON SUR PLACE
(54) Title: PROCESS FOR THE ARTICULATED IMBRICATION OF CONCRETE SLABS [I(IN SITU)



(57) Abrégé/Abstract:
A process for the on-site articulated imbrication between concrete slabs in which joints are formed, laying during the works, along the joint lines, a simple in mesh reinforcing device with a cutting and bending pattern already prepared in the workshops. In this ways advantage is taken from the shrinking phenomenon to obtain an alternative indentation along the joints of the adjacent slabs continuously in concrete, capable of satisfactorily producing a joint type link between them. The process is complemented with a concrete separating component facilitating crack formation and preventing the arrival of water to the platform and that may be fastened to the mentioned device. The invention is applicable to concrete paving on roads, motorways and port areas for the storage of goods, and allows road metalling to be designed without the need of bases and sub-bases.

ABSTRACT

A process for the on-site articulated imbrication between concrete slabs in which joints are formed, laying during the works, along the joint lines, a simple in mesh reinforcing device with a cutting and bending pattern already prepared in the workshops. In this way, advantage is taken from the shrinking phenomenon to obtain an alternative indentation along the joints of the adjacent slabs continuously in concrete, capable of satisfactorily producing a joint type link between them. The process is complemented with a concrete separating component facilitating crack formation and preventing the arrival of water to the platform and that may be fastened to the mentioned device. The invention is applicable to concrete paving on roads, motorways and port areas for the storage of goods, and allows road metalling to be designed without the need of bases and sub-bases.

PROCESS FOR THE ARTICULATED IMBRICATION OF CONCRETE SLABS ¢I(IN SITU)

Field of the Invention

Generally speaking, the present invention refers to an on-site articulated imbrication process between concrete slabs. More specifically, the invention refers to a joint formation process in on-site linear works and concrete paving like roads, streets, motorways, railways, channels and port and airport platforms together with the means for their execution.

Background of the Invention

Amongst the devices known in the art for forming joints in concrete pavings, the following can be cited

1) The distribution blocks described in Spanish Patent 438.002.

2) The classic plastic coated steel pins located towards the middle of the slab thickness such as, for example, those described in US Patent 3,437,017, have the drawback of creating strong, localized pressure resulting in a clearance of the space they occupy in the concrete, hence reducing their effectiveness. For this reason, either large slab thicknesses are necessary or lower base and sub-base layers. Moreover, the insertion of lateral pins has not yet given a satisfactory result.

3) The undulated plates, vertically arranged on the ground and fastened to it, require lateral feeding, reducing works yield and making another lateral access necessary. This solution has not given the expected result since the intended formation of teeth is not achieved and hence, load transmission is not obtained.

4) My Spanish applications P-9402515 "Coplanar Coupling System Between Concrete Slabs" filed on December 9th 1994, and P-9500530, "Joint System Between Concrete and Similar Slabs", filed on March 9th 1995, and my application PCT/ES95/00072, "Construction Process for Linear Concrete Works With Internal Gaps and Execution Devices"; filed on June 9th 1995. These systems require the load on the edges of adjacent slabs immediately after completing the superficial groove and before the concrete begins to shrink which sometimes causes more cracks than

desirable, provoking the insecurity of these systems. The process described herein is produced in a fully natural or automatic way and therefore is safe.

Summary of the Invention

By means of a device, the described process takes advantage of the concrete shrinking with the object of leaving the edges of the resulting slabs leaning over each other. It is complemented with a separating component preventing the arrival of water to the platform across these edges and may be fastened to the mentioned device.

In one aspect the invention provides a device for cooperating in the formation of joints in concrete paving with weakened zones on its upper part along the sites foreseen for the joints, said device being placeable on the ground of the surface to be paved at the said sites foreseen for the joints, said device including a plurality of inclined mesh parts in a common angle, in relation to and along a plane perpendicular to the ground at the site foreseen for the joint, but in opposite inclination direction in adjoining mesh parts, which predetermine that the cracking of the concrete will occur in the form of alternated inclined surfaces facilitating imbrication of the adjoining slabs.

Brief Description of the Drawings

A detailed description of the invention is given below referring to the attached drawings where:

Figure 1 represents the plan view of the mesh where the situation of the cuts made is observed.

Figure 2 shows a section perpendicular to the joint coinciding with a bent wire.

Figure 3 represents the perspective plan view of a mesh.

Figures 4 and 5 respectively show a section with another possible arrangement of the mesh and a plan view thereof, having omitted the hidden lines in Fig. 4.

Figure 6 represents the perspective view of an isolated slab, executed by the described process.

Figure 7 shows a section exclusively with the wires reinforcing the recessed zone and fastening the separating component.

Figure 8 is a plan view of the wires mentioned in Fig. 7.

Figure 9 shows the section with the device and the reinforcement of the recessed zone, having omitted the hidden lines.

Detailed Description of the Preferred Embodiment

In Figure 1, we see the plan view of mesh 2 to be used to create the joint of Figure 2, where the cuts 6 and 7 are indicated in the wires 11 to then bend the created parts 13 and 14, until leaving it with the shape shown in Figure 3.

In Figure 2, a corrugated steel mesh is shown over the ground 10 or next to it. The wires 11 of mesh 2 parallel to axis 1 will be cut in 6 and 7 alternatively on one of the other sides. The mesh parts 13 and 14 between two successive cuts of the same wires are bent around a parallel wire and near to axis 1 of mesh 2 until the projection of the parallel wire and further away from the axis remains on the other side.

The process described to form the teeth 13 and 14 of mesh 2 admits other alternatives.

In Figure 3, the parallel wires may be omitted, as well as those at a greater distance from the axis leaning on the ground and this part 12 of mesh 2 may be taken advantage of to provide a reinforcement of the recessed zone 15 (Figure 6) as seen in Figures 7 and 8, which may also be used for fastening, with a staple 17 or something similar, of the separating component 3, being located above the device object of the invention and being separated from it by a plastic part 18 or similar, according to Figure 9 in which the steel rounds not seen in the section do not appear.

These teeth 13 and 14 should be made of corrugated steel or another material that adheres to the concrete and with a higher modulus of elasticity.

In the upper part of the crossarm left by the portions of bent mesh 13 and 14, the separating component 3 is located which may be fastened to said portions, if reinforcement of the recessed zones 15 is omitted.

Once the concrete has been laid, thanks to component 5 which weakens the section in which it is located and to alternatively bent mesh portions 13 and 14, both the shrinkage suffered by the concrete while it sets and loads which are applied later on, will create a cracking surface 5 alternatively inclined according to the bent mesh

portions 13 and 14, forming recessed and exit zones 15 and 16 between slabs 8 and 9, left leaning over each other.

The wire 4, perpendicular to the axis 1 remaining between a recessed zone 15 and an exit zone 16 of a same slab, is not cut to serve as a joint between portions 13 and 14 which are formed in mesh 2, keeping it joined for it to be handled during displacement, location and robustness during concreting.

In Figure 4, a section is shown with another possible arrangement of mesh 2 for the formation of the joint. In this arrangement, the mesh axis coincides with a wire and the bent mesh portions 13 and 14 remain parallel to the ground.

In Figure 5, the perspective plan view of the previous mesh is shown, where it may be seen that in this case the wire without cut is that matching with axis 1 of mesh 2, the remaining cuts being similar to those of Figure 3.

The alternative embodiment shown in Figs. 4 and 5 would be applicable when the cracking of the concrete were to be produced basically by application of vertical loads in the weakened zone. In that case the cracked surfaces would form in inclined planes directed from the edges of blocks 13 and 14 towards the upper slit. Such alternative embodiment would not be applicable whenever cracking were to be expected due solely to shrinkage of the concrete which would follow a notably vertical line downwards from the upper slit.

The axis of component 3 will remain in the plane of axis 1 of the mesh perpendicular to the ground, the separating component being fastened to the bent mesh portions 13 and 14 and with its upper part flush or near to the paving surface. This closeness will make the execution of the superficial paving groove unnecessary, besides having the advantage of its correct location.

The separating component 3, besides weakening the section to form the cracking surface 5 which forms support zones 15 and 16 between slabs, may prevent the penetration of water through crack 5 by means of a waterproof joint, assuring that lines do not emerge due to the pumping effect.

The advantage provided by the process is that it eliminates the relative vertical movement between slabs due to the meshing produced between the surface aggregates resulting from cracking 5, so that pumping is also prevented. It also permits the execution of an upper aggregate layer without appearance of cracks in said layer.

This system not only replaces the traditional pins but permits to economize the base and sub-base layers which until now were necessary for heavy traffic.

The lateral sides of the slabs in which pins were normally not placed, may also be left with the proposed type of support, obtaining contour slab conditions which considerably reduce stresses, being possible to prepare slabs with less thickness but with the same structural resistance.

In Figure 6, the perspective view of an isolated slab is shown, where the resulting cracking surface 5 may be seen, forming recessed and exit zones 15 and 16 which intermesh with adjacent slabs.

The process is the same if the separating component 3 is installed perpendicular to the ground, leaning on it; and mesh 2, with its part parallel to the ground, next to the paving surface. This is how it would be if the slab were turned round.

The process is similar if the broken line, formed by the wire cut, is created by the separating component 3 and mesh 2 is cut according to axis 1.

CLAIMS:

1. A device for cooperating in the formation of joints in concrete paving with weakened zones on its upper part along the sites foreseen for the joints, said device being placeable on the ground of the surface to be paved at the said sites foreseen for the joints, said device including a plurality of inclined mesh parts in a common angle, in relation to and along a plane perpendicular to the ground at the site foreseen for the joint, but in opposite inclination direction in adjoining mesh parts, which predetermine that the cracking of the concrete will occur in the form of alternated inclined surfaces facilitating imbrication of the adjoining slabs.

2. A device according to claim 1, wherein metallic meshes in which wires are cut in a plurality of positions are located alternatively at each side of the plane perpendicular to the ground at the site foreseen for the joint and the zones comprised between two cutting positions are folded to form the inclined mesh parts.

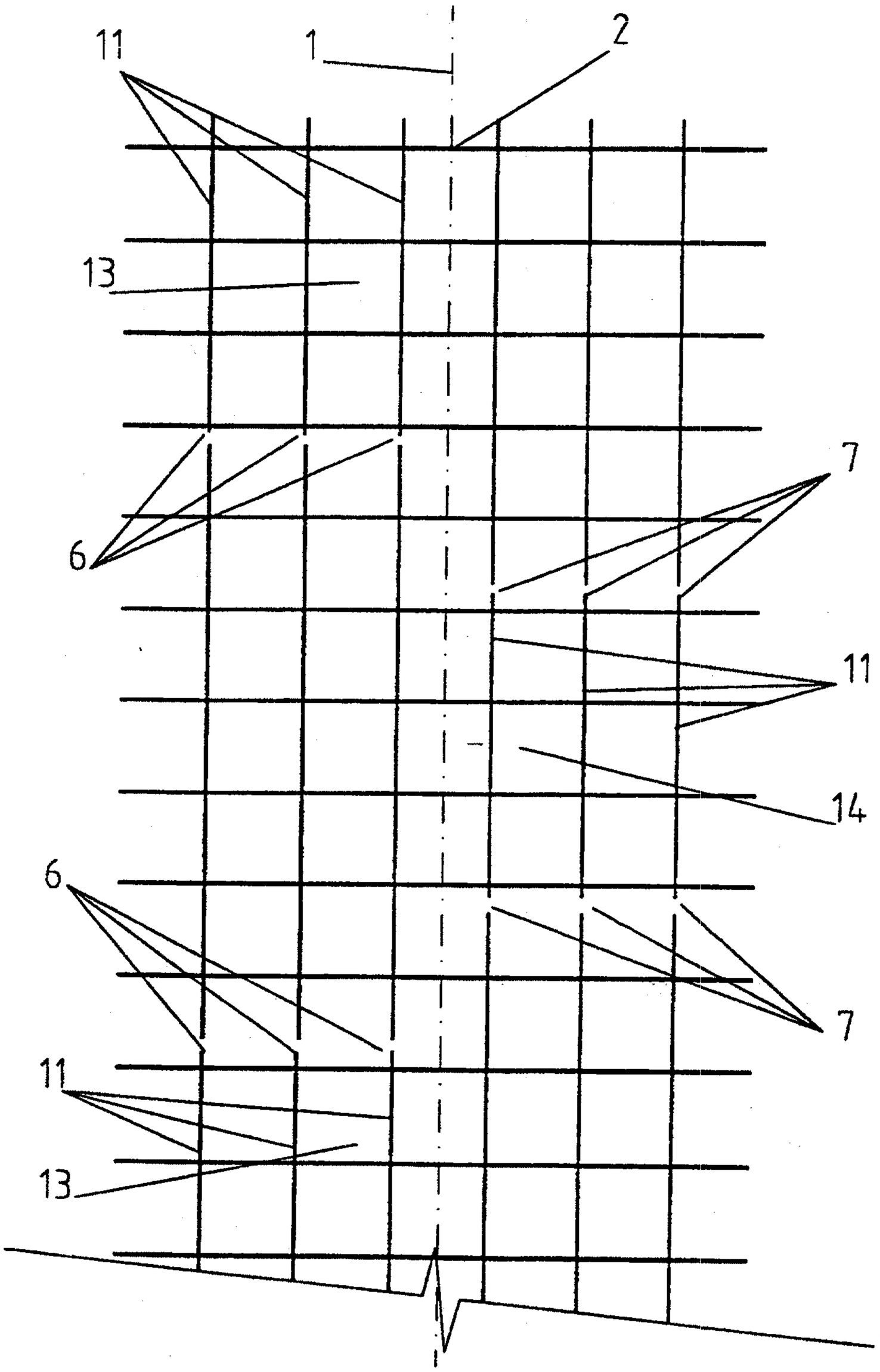


FIG. 1

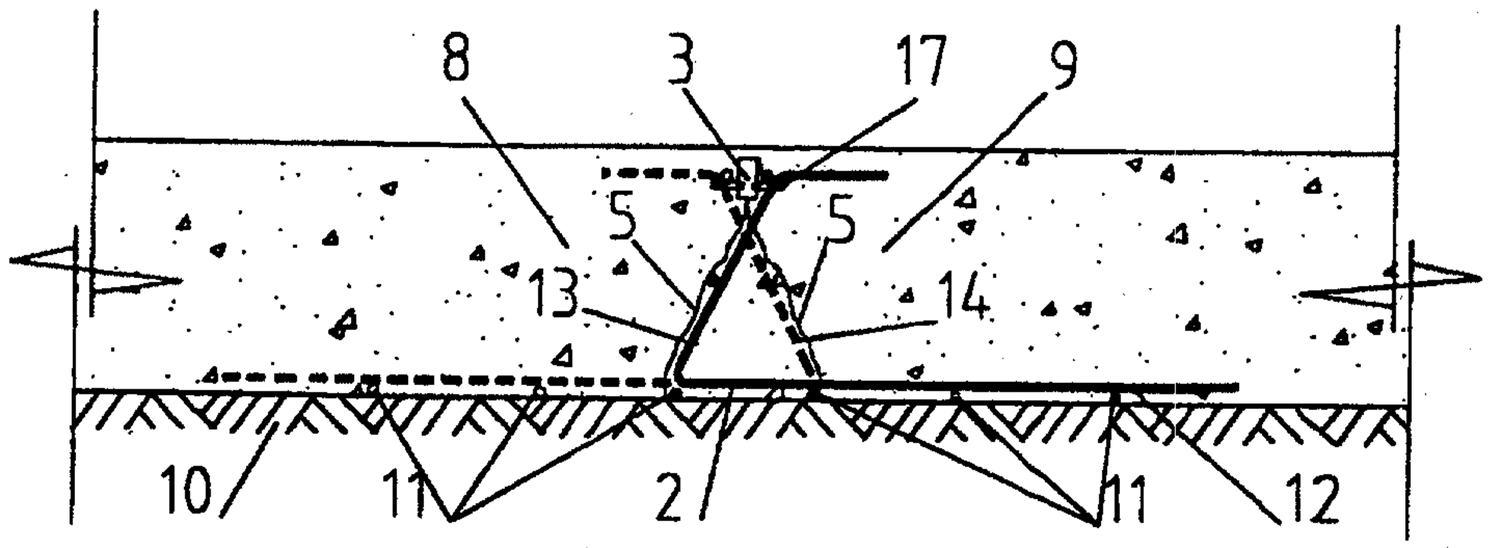


FIG. 2

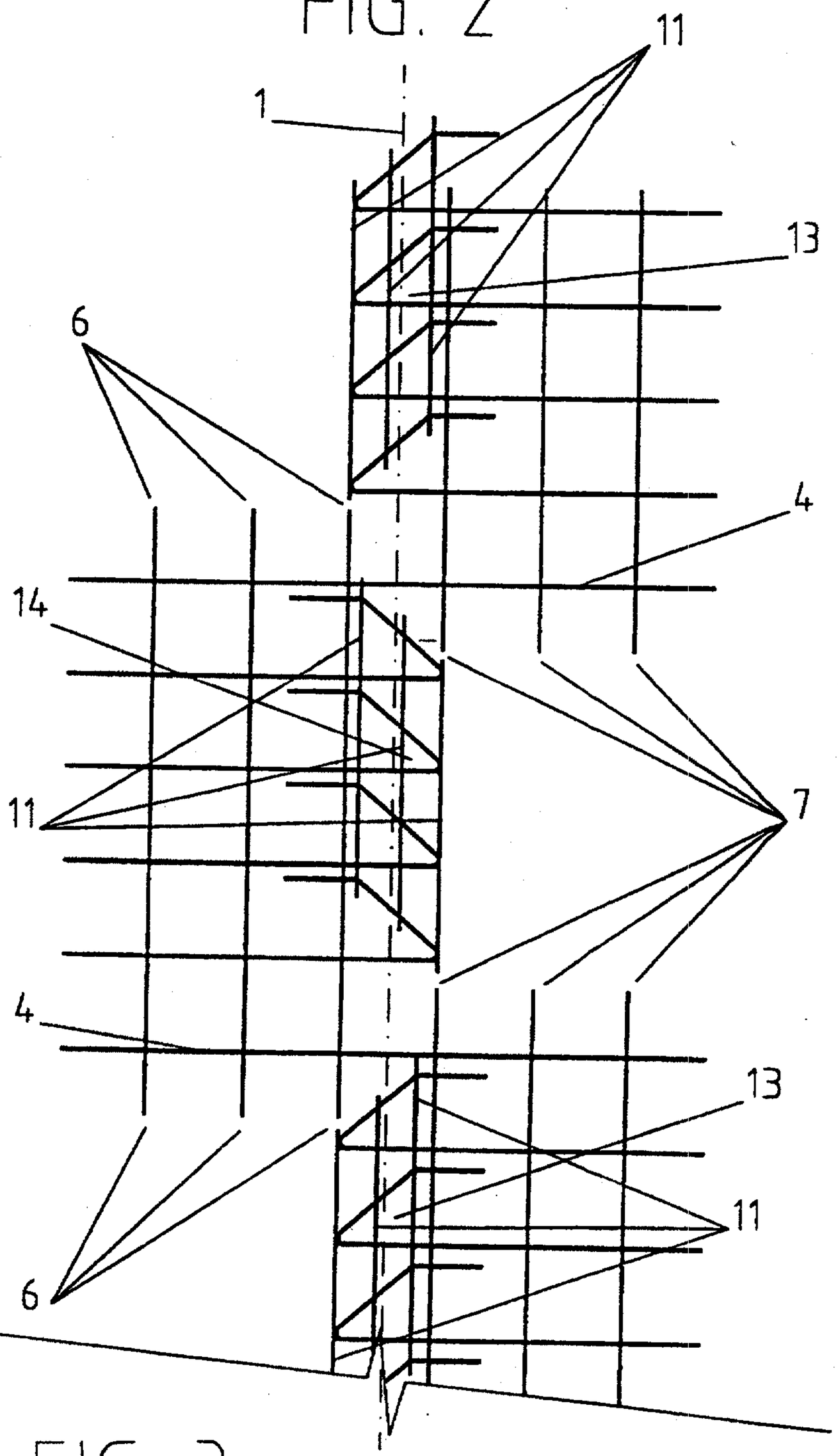


FIG 3

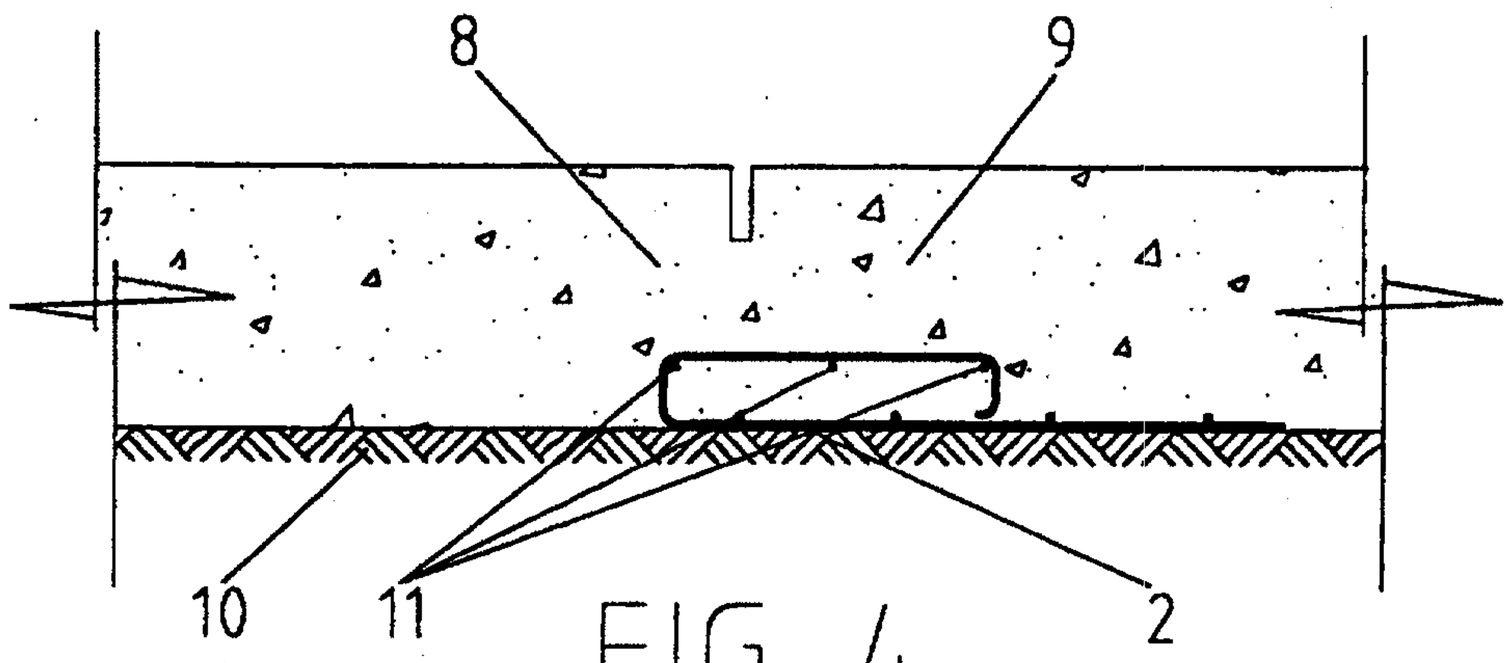


FIG. 4

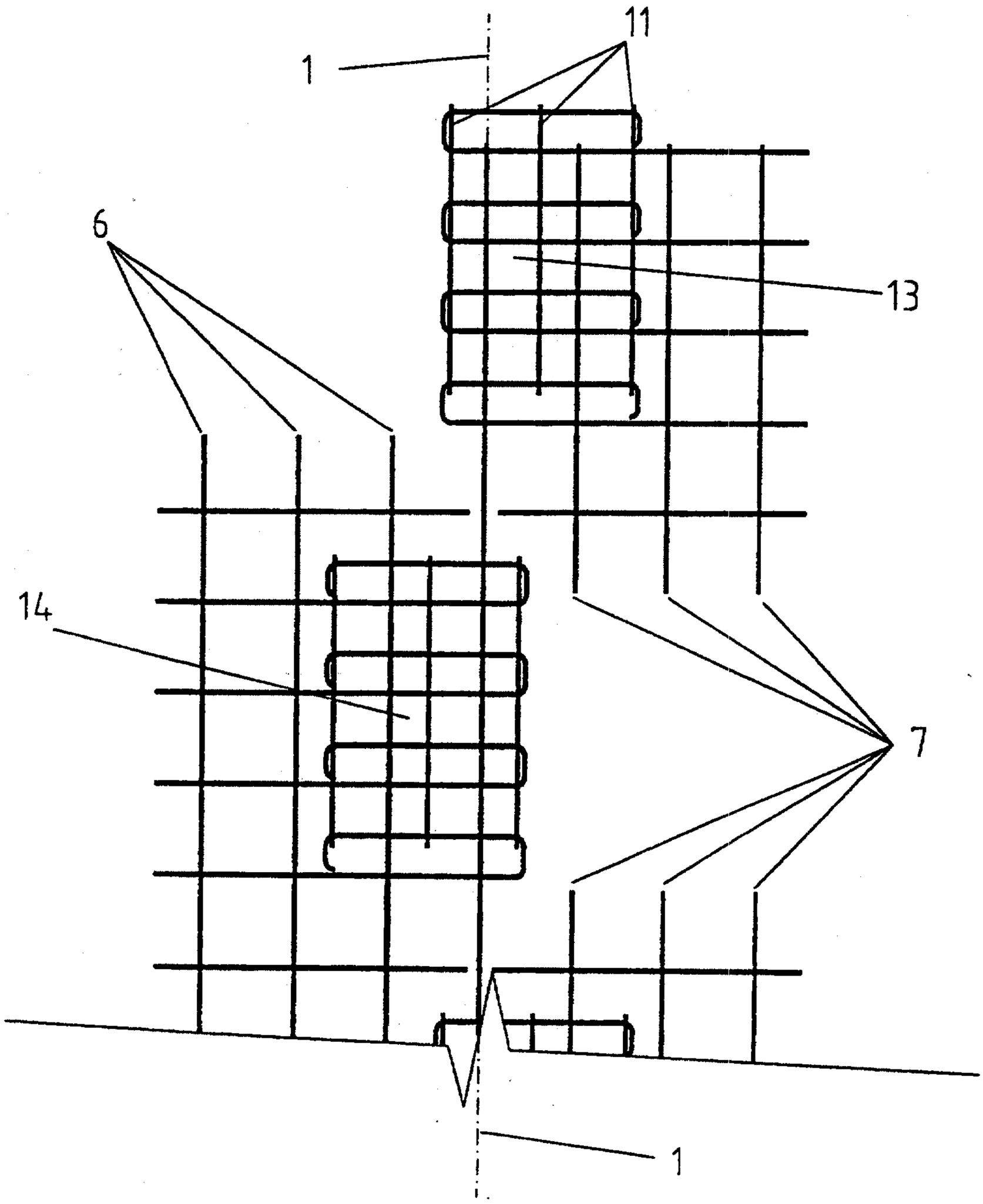


FIG. 5

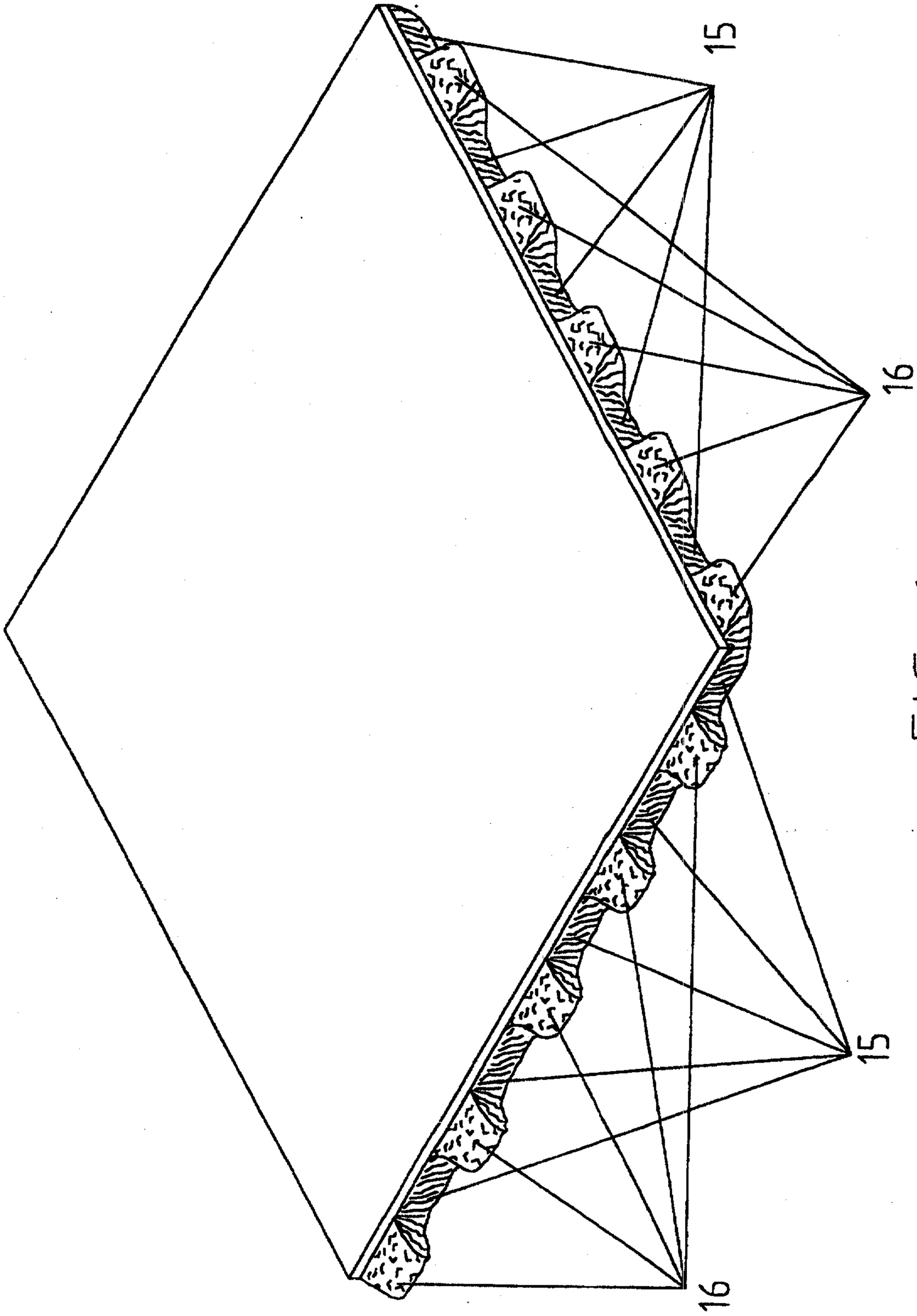


FIG. 6

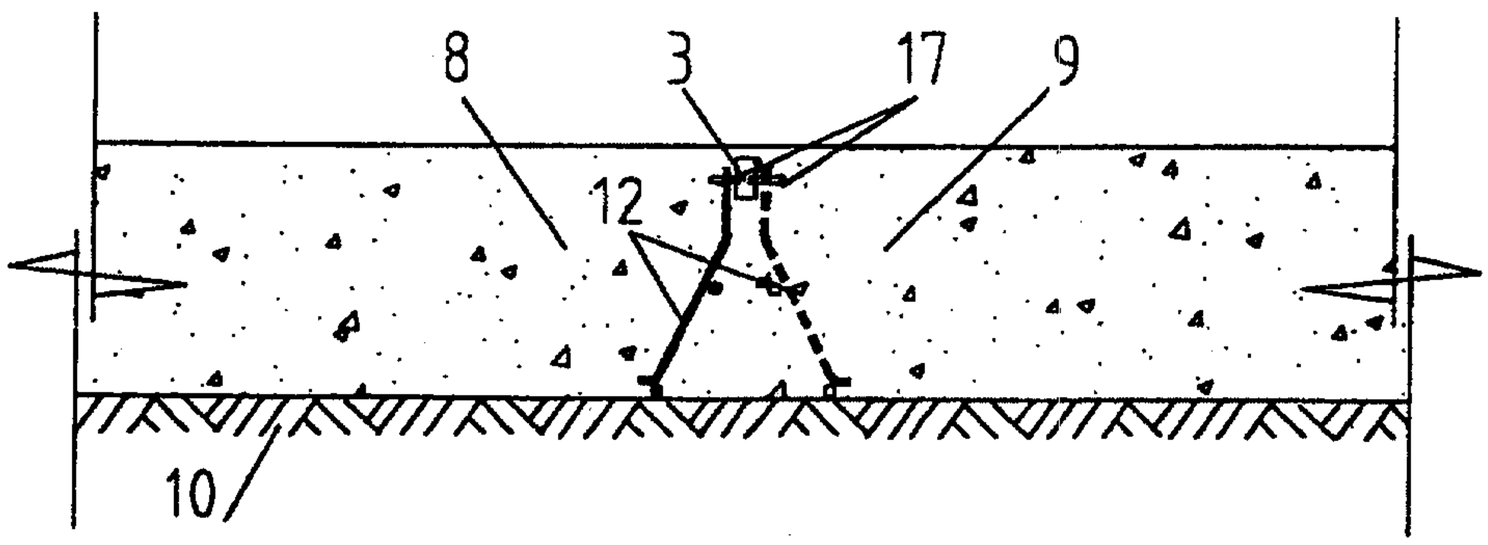


FIG. 7

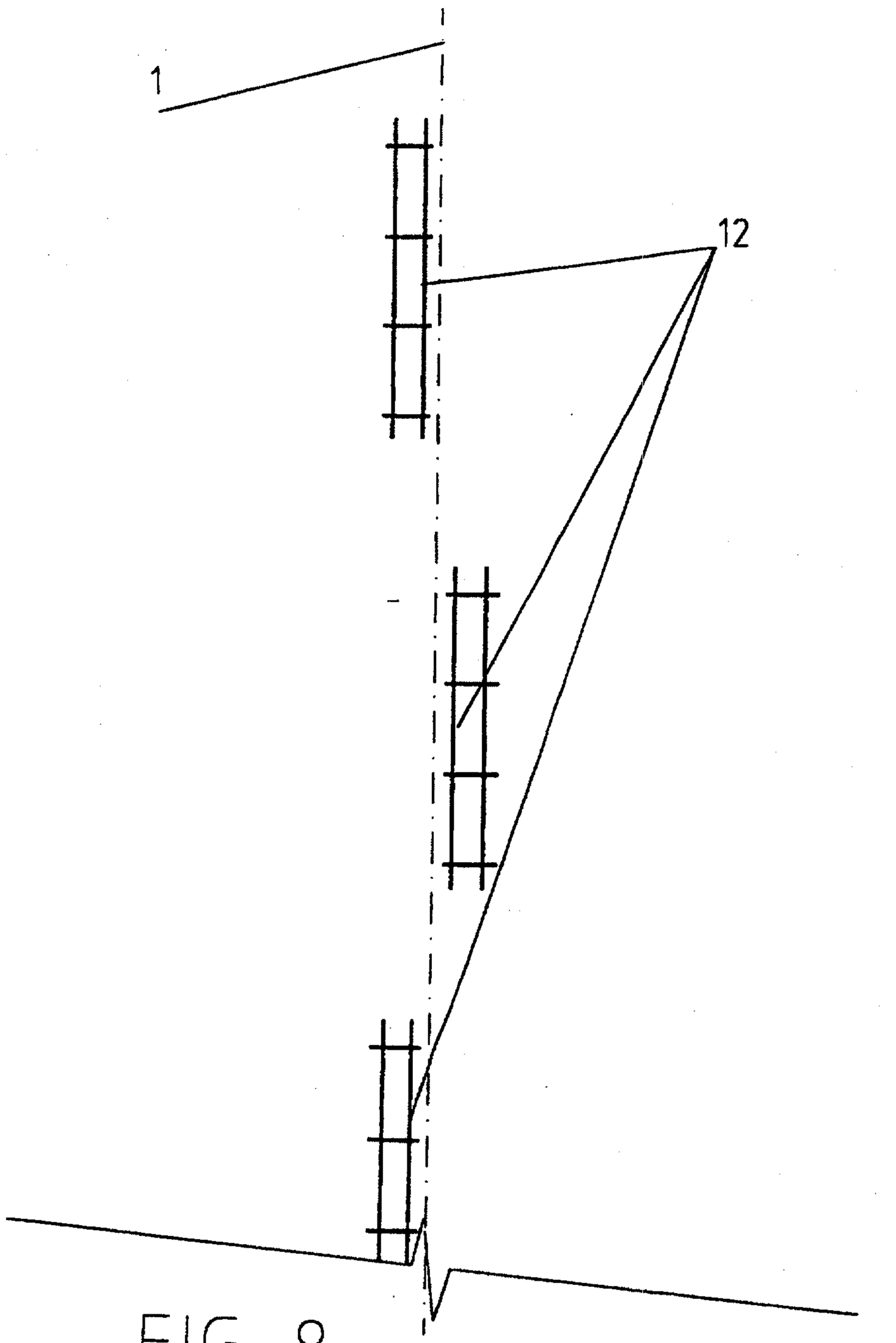


FIG. 8

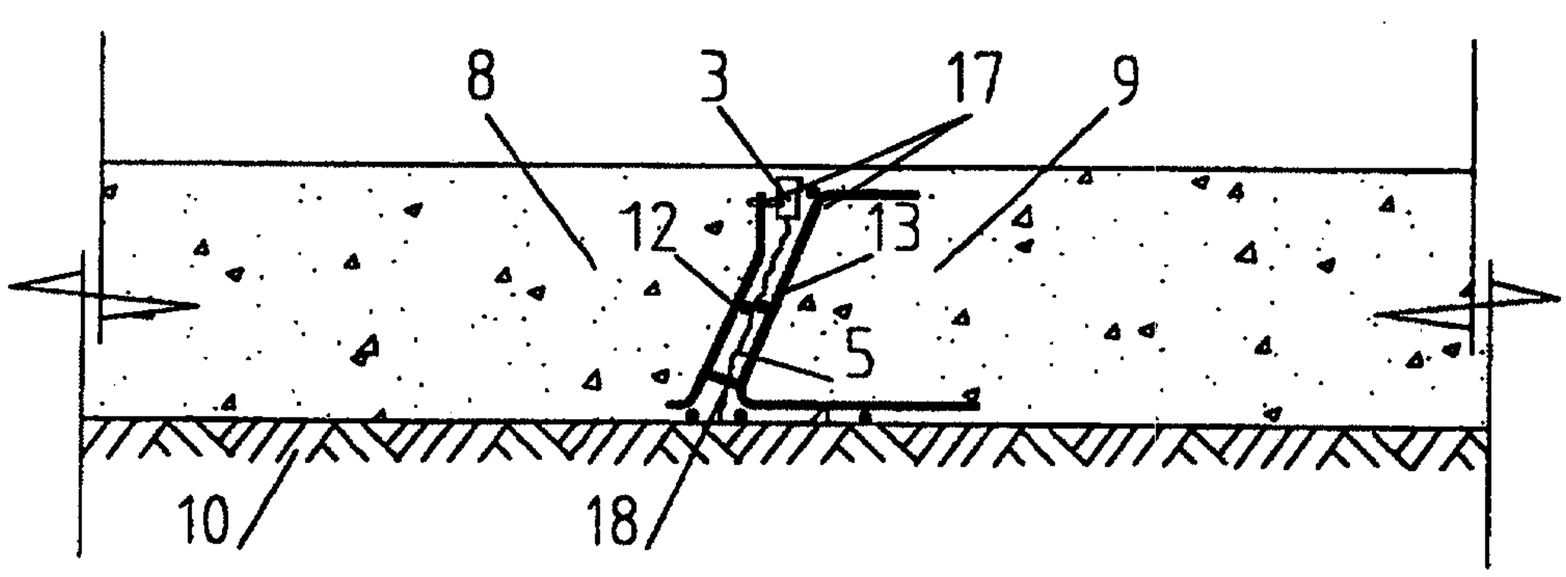
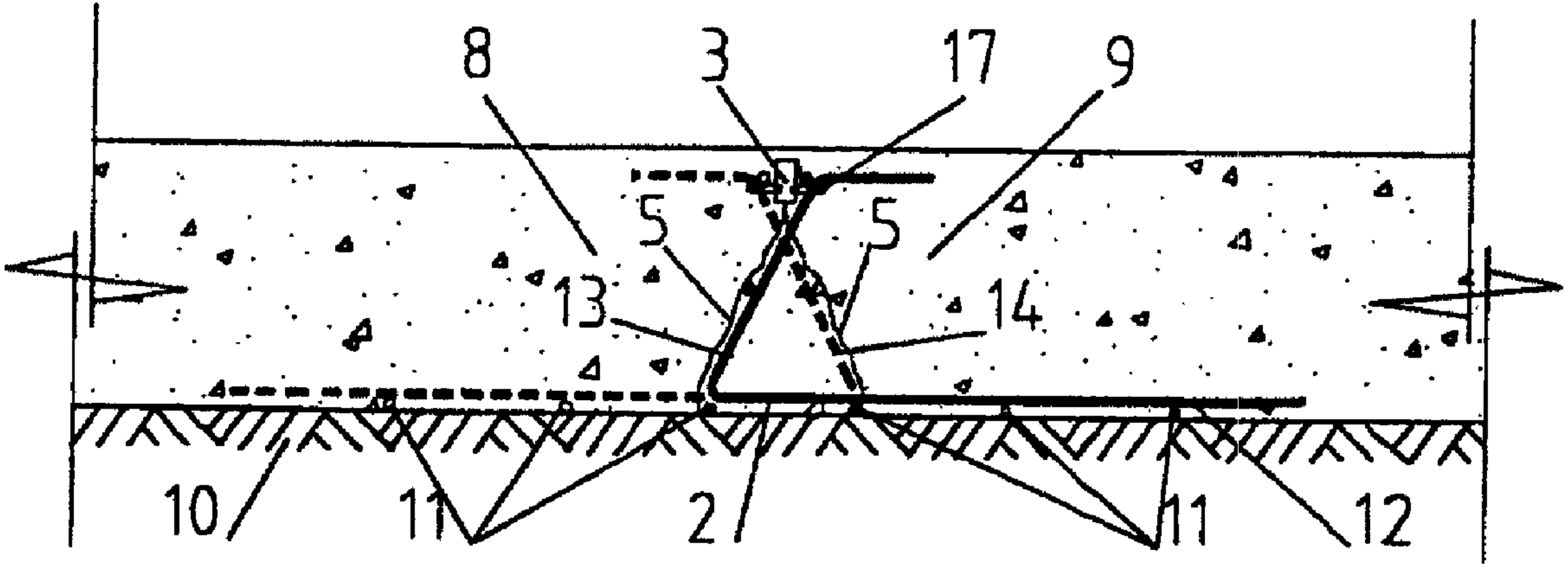


FIG. 9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