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(72) Inventor; and

(71) Applicant: ÖGÜTCÜ, Tarhan [TR/TR]; 15003 Sok No:10, Alaçati, Çesme/İzmir (TR).

(74) Agent: YETKİN PATENT VE DANIŞMANLIK LTD

ŞİRKETİ; Kavaklıdere Mah. Konur Sokak No:69/8, 06640 Bakanlıklar/Ankara (TR).

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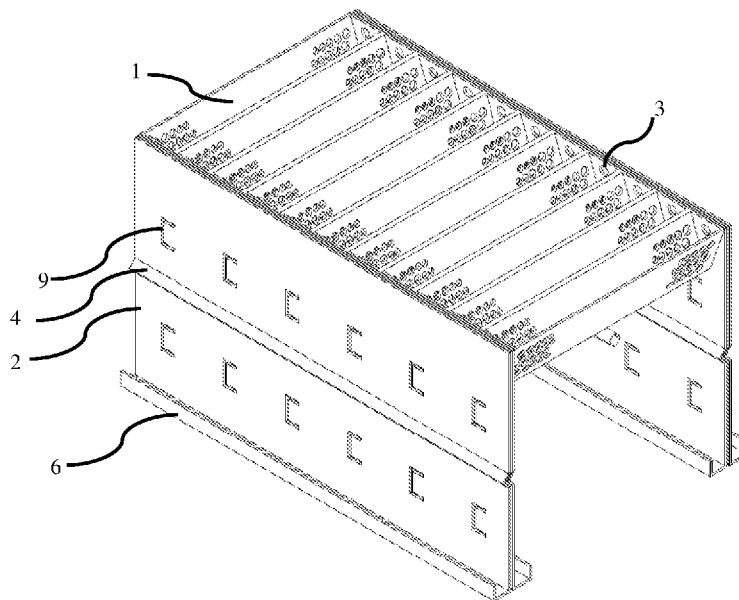


FIGURE 1

(57) Abstract: The invention relates to a composite modular flooring system for use in the construction industry. The invention aims to develop a composite lightweight modular flooring system that will enable the construction of lighter structures. The distinctive technical effect of the invention's composite modular flooring system is its lightweight design and low carbon footprint.



COMPOSITE MODULAR FLOORING SYSTEM

5 **Technical Field**

The invention relates to a composite modular flooring system for use in the construction industry.

10 **State of the Art**

Various flooring systems are commonly used in the construction and building industries. The flooring bears the most weight in a building. Therefore, beams and columns must be designed to carry both dead and live loads across the flooring. All of these factors contribute significantly to the building's overall weight. The existing column and beam sections become narrower as the slab is lightened. The stress on the main bearing columns will also decrease. However, in this technical field, there are 20 different types of flooring applications. The lightest of these is composite flooring, and its kilogram value per square meter is greater than 250. In this sense, the technical field requires the development of lightweight composite flooring.

The documents observed in the patent and literature search for the state of the art are summarized below.

25 The utility model application with the publication number CN204311629 U relates to composite flooring. During the construction phase, the composite flooring described in the document consists of layers of profiled steel plates that are secured to the concrete beam using a bent rib and drive pins. The shear-resistant curved rib comprises a vertical section and a transverse section, the vertical section and the transverse section are located inside the concrete beam. Furthermore, it is stated to be lightweight, quick, and easy to construct, and have a tighter structure.

The patent application numbered CN114075855 A relates to a wide-span, bidirectional, ribbed sandwich composite flooring. The composite flooring is made up of a bottom plate, a

longitudinal rib beam, a transverse rib beam, and a lightweight infill block. It is stated that the structure has high strength and heat preservation properties.

The utility model application with publication number CN215948625 U relates to composite flooring with a base plate consisting of steel sheets. According to the application, steel sheets and ribs are arranged along the length of the steel beams. A female-male form structure is formed at one end of the steel plate. It is intended to increase the load-bearing capacity in conjunction with concrete.

The utility model application with publication number CN208219948 U relates to a high-strength steel composite slab connected by a perforated plate that can be used on either a steel or concrete structure. On two sides of the welded high-strength steel beam, there is a main beam connection end plate and a plurality of plates for combined connection. The said plate has bent steel bars. A steel beam is located at the intersection of the welded high-strength steel. A pin bolt is provided at the joint between the two composite floor elements.

The patent application numbered TR 2015/01865 relates to a twisted perforated metal sheet application. It is stated that the invention can be used in areas such as suspended ceilings, walking platforms, stairs, steps, industrial shelves, storage, fences, safety barriers, ventilation filters, vacuum chambers, and sterilization.

As a result of the aforementioned disadvantages and the inadequacy of existing solutions on the subject, it has become necessary to make advancements in the relevant technical field.

Brief Description of the Invention

The present invention relates to a composite modular flooring system that meets the aforementioned requirements, eliminates all disadvantages, and provides some extra advantages.

The invention is inspired by the current state of the art and aims to solve the aforementioned disadvantages.

The invention aims to develop a composite lightweight modular flooring system that will enable the construction of lighter structures. The lightweight design of the inventive composite modular flooring system creates a distinct technical effect.

- 5 The composite modular flooring system is durable and enables the construction of earthquake-resistant structures.

The composite modular flooring system according to the invention reduces the amount of usable water, saves energy, and allows low emissions.

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The composite modular flooring system of the invention can carry the loads that it should carry alone, without the need for additional support. In the tests carried out within the scope of the invention, physical tests and ANSYS finite element analyses yielded positive results.

- 15 The invention's main effect is to make the use of concrete optional by incorporating sheet metal elements that provide the necessary strength. By eliminating the use of concrete, the overall lightness of the structure, water consumption, and concrete emissions are reduced. It can be used along with concrete to provide additional strength. In this way, the projects' carbon footprint is reduced.

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The structural and characteristic features, and all of the invention's advantages, will be better understood with the figures provided below and the detailed description written with references to these figures, and therefore the evaluation should be made by taking these figures and detailed description into consideration.

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Figures to Help Understand the Invention

Figure 1 shows the general view of the composite modular flooring system.

- 30 Figure 2 shows a two-dimensional view of the composite modular flooring system.

Figure 3 shows the view of the perforated plate from different angles.

Figure 4 shows the view of the components of the composite modular flooring system.

Figure 5 shows the general view of the composite modular flooring system.

Figure 6 shows the disassembled view of the composite modular flooring system.

5

Description of Reference Numbers

- 1 Perforated plate
- 2 Beam sheet
- 10 3 Connection hole
- 4 Step
- 5 Concrete area
- 6 Lower part
- 7 Support part
- 15 8 Intermediate support sheet
- 9 Locking slot
- 10 Gap

Detailed Description of the Invention

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In this detailed description, preferred embodiments of the inventive composite modular flooring system are described only for a better understanding of the subject matter.

The invention relates to a composite modular flooring system for use in the construction industry. The composite modular flooring system comprises at least two mutually positioned beam sheets (2). In a composite modular flooring system, the preferred number of beam sheets (2) is two. One or more perforated plates (1) are sandwiched between two beam sheets (2). In the invention, the perforated plate (1) is preferably zigzag in shape. In an alternative embodiment, the perforated plate (1) may have a sinusoidal shape to prevent deformation of the material to be placed thereon. The beam sheets (2) are preferably perpendicular to the ground, while the perforated plate (1) is preferably parallel to the ground. The perforated plate (1) is welded to the beam sheets (2) on both sides.

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Between the two beam sheets (2), the perforated plate (1) forms a concrete area (5) for the concrete to be poured to provide strength. The perforated plate (1) is perforated with a plurality of holes to reduce weight and improve concrete adhesion. When concrete is poured between two beam sheets (2), the adhesion of the concrete is increased by the perforated sheets (1), which are preferably configured in a zigzag pattern.

In order to allow the invention's composite modular flooring system to be modularly configured, one or more connection holes (3) are configured on the beam sheet (2). The connection holes (3) are opened to prevent them from separating due to incoming loads. In this sense, it also helps to build strength.

In the composite modular flooring system of the invention, there is a step (4) in the form of a projection on the beam sheet (2). The said step (4) preferably has a triangular form. However, it is also possible to use a circular step (4). When more than one composite modular floor system is used side by side, the steps (4) are configured as male and female so that the adjacent beam sheets (2) can support one another. In conclusion, in a composite modular flooring system, steps (4), which are projections on the beam sheet (2), face the same direction. In this manner, the steps (4) on the adjacent beam sheets (2) fit together in a male-female configuration.

At least one intermediate support sheet (8) is used to ensure that the adjacent beam sheets (2) adhere. The intermediate support sheet (8) sits between the contacting beam sheets (2) of the two adjacent composite modular flooring systems. In the invention, the intermediate support sheet (8) can be added to provide the load-bearing capacity as the distance between the beams increases. In this sense, an intermediate support sheet (8) can be added to the composite modular flooring system of the invention to increase the load-bearing capacity without changing the other parameters. The intermediate support sheet (8) contains at least a step (4), which is compatible with the beam sheet (2).

One or more locking slots (9) are provided on each beam sheet (2) in accordance with the objective of attachment. The direction of the locking slots (9) is reversed in two adjacent beam sheets (2). Counter-forming holds the locking slots (9) together. When an intermediate support sheet (8) is used, the intermediate support sheet (8) comprises a gap (10) between the

locking slots (9). The locking slots (9) are held together by passing through the gaps (10) on the intermediate support sheet (8). The gap (10) preferably has an oval shape.

5 The lower part (6) is obtained by shaping the beam sheet (2) at the point of contact with the floor on which the beam sheet (2) is located. In this way, it is possible to prevent tearing and provide strength in the composite modular flooring system.

10 In one embodiment of the invention, there is a support part (7) extending along all or at least part of the perforated plate (1) at the bottom of the perforated plate (1). The support part (7) is preferably in the form of a rod.

CLAIMS

1. For use in the construction industry including,
 - at least two beam sheets (2) positioned opposite each other,
 - 5 • one or more perforated plates (1) with perforations for reducing the weight and adhesion of the concrete, which extend between two beam sheets (2) to provide a concrete area (5) for pouring concrete,
 - one or more connection holes (3) on the beam sheet (2),
 - a step (4) configured in the form of a projection on the beam sheet (2), a composite
10 modular flooring system characterized in that it comprises;
 - steps on two beams sheets(2) facing in the same direction to provide a male-female form in the adjacent beam sheets (2)
2. The composite modular flooring system according to Claim 1, characterized in that the
15 perforated plate (1) is in zig-zag form.
3. The composite modular flooring system according to Claim 1, characterized in that the beam sheet (2) is perpendicular to the ground.
- 20 4. The composite modular flooring system according to Claim 1, characterized in that the perforated plate (1) is positioned parallel to the ground.
5. The composite modular flooring system according to Claim 1, characterized in that said
25 step (4) is in a triangular form.
6. The composite modular flooring system according to Claim 1, characterized in that said
 step (4) is circular.
7. The composite modular flooring system according to Claim 1 or Claim 5 or Claim 6,
30 characterized in that, when more than one composite modular flooring system is used side by side, the steps (4) are in the form of male and female so that the adjacent beam sheets (2) support each other.

8. The composite modular flooring system according to Claim 1, characterized in that it comprises at least one intermediate support sheet (8) between the contacting beam sheets (2) of the two adjacent composite modular flooring systems.
- 5 9. The composite modular flooring system according to Claim 1, characterized in that it comprises at least 4 steps (4) on the intermediate support sheet (8), which are compatible with step (4) on the beam sheet (2).
- 10 10. The composite modular flooring system according to Claim 1, characterized in that it comprises one or more locking slots (9) on the beam sheet (2).
11. The composite modular flooring system according to Claim 10, characterized in that the locking slots (9) in the two adjacent beam sheets (2) are opposite to each other to ensure the locking of the two adjacent beam sheets (2).
- 15 12. The composite modular flooring system according to Claim 11, characterized in that, in case of use of an intermediate support sheet (8), it comprises a gap (10) on the intermediate support sheet (8) in the area where the locking slots (9) coincide with each other in order for the lock slots (9) to interlock.
- 20 13. The composite modular flooring system according to Claim 1, characterized in that it comprises a lower part (6) obtained by shaping the beam sheet (2) at the point where the beam sheet (2) is in contact with the ground on which it is located.
- 25 14. The composite modular flooring system according to Claim 1, characterized in that it comprises a support part (7) extending along all or at least part of the perforated plate (1) at the bottom of the perforated plate (1).
- 30 15. The composite modular flooring system according to Claim 1, characterized in that the support part (7) is in the form of a rod.
16. The composite modular flooring system according to Claim 1, characterized in that said perforated plate (1) has a sinusoidal shape to prevent deformation of the material to be placed thereon.

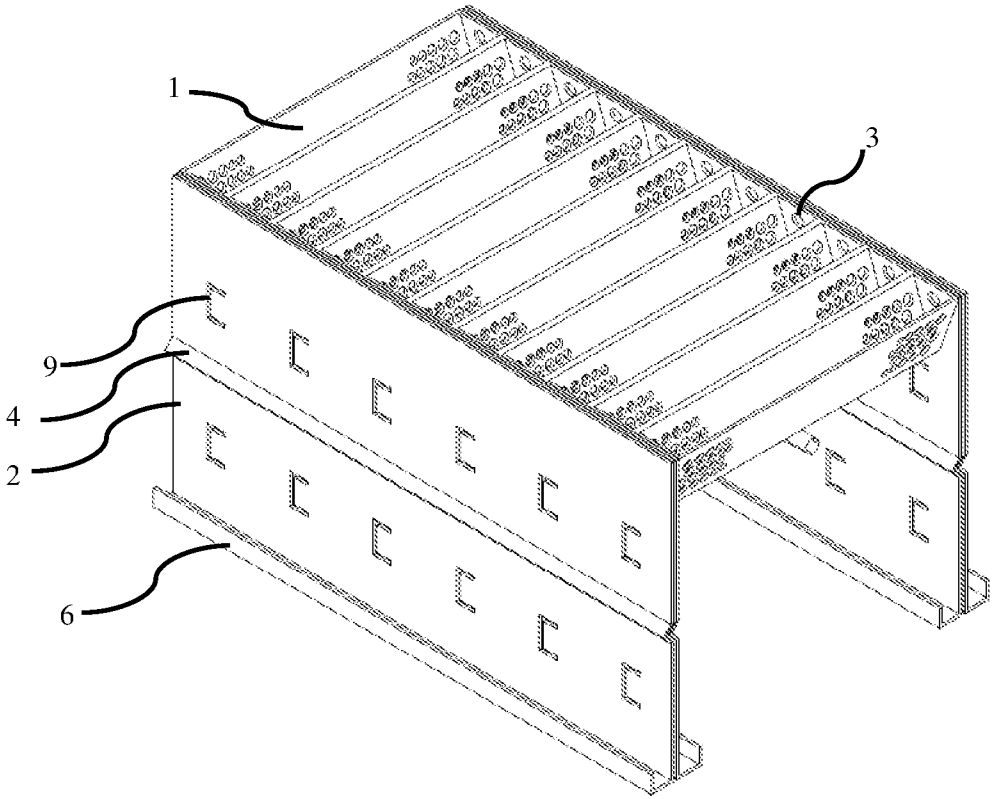


FIGURE 1

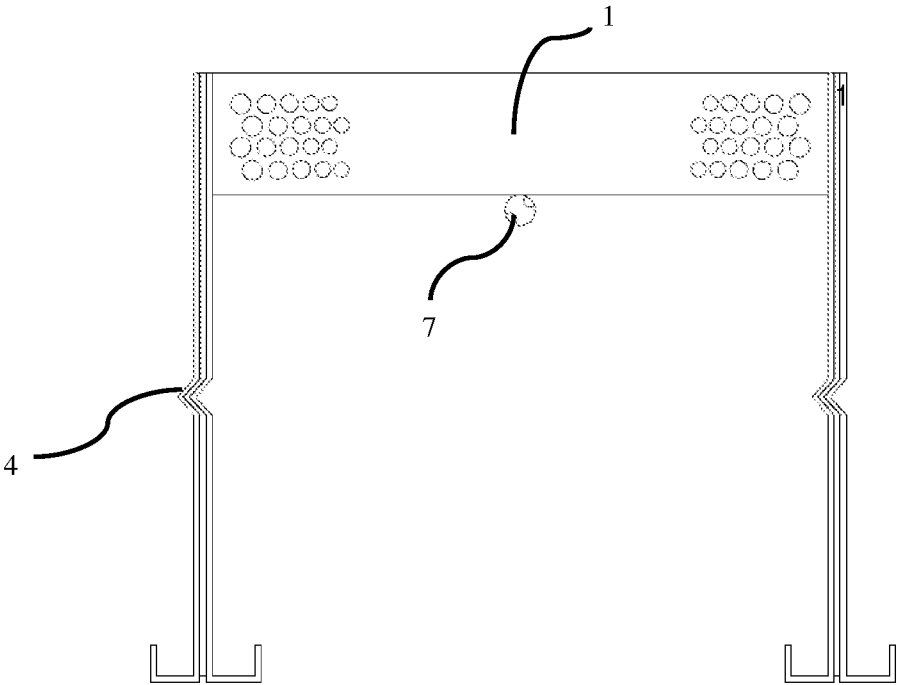


FIGURE 2

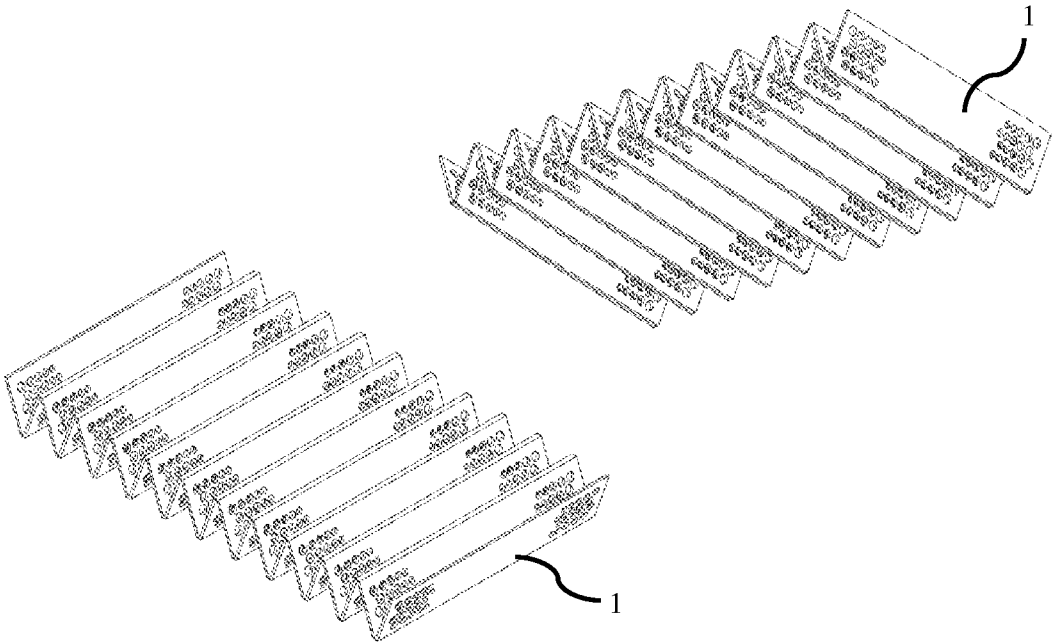


FIGURE 3

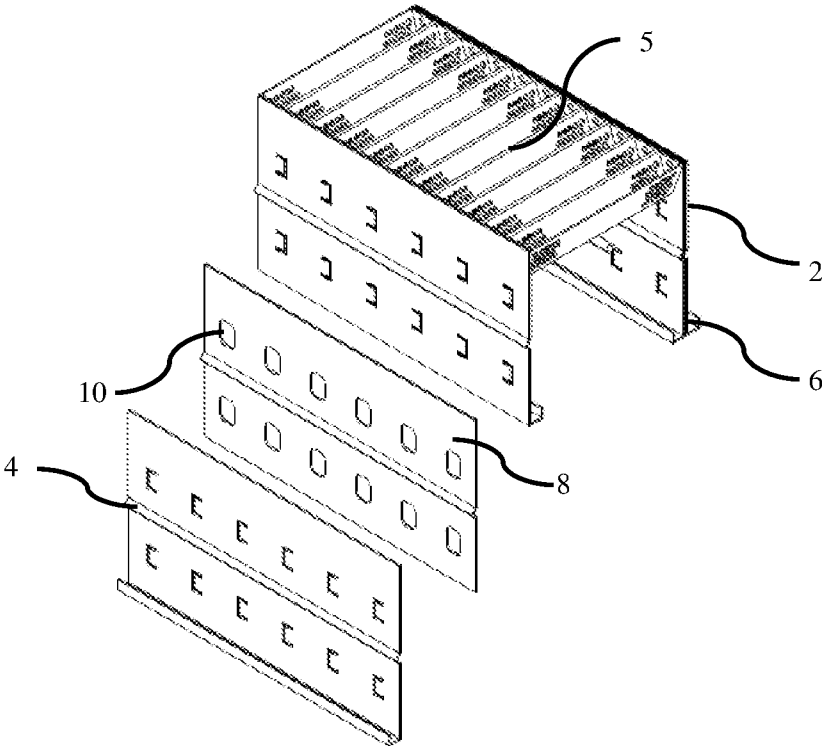


FIGURE 4

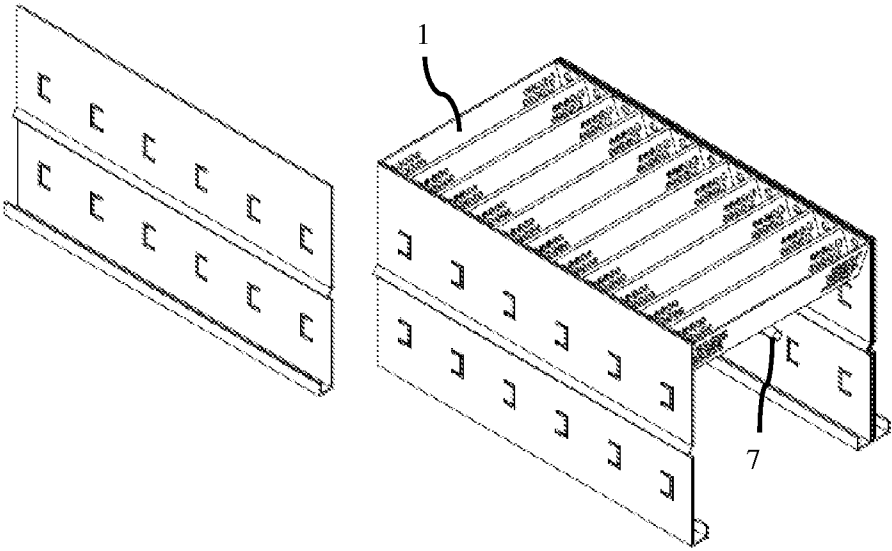


FIGURE 5

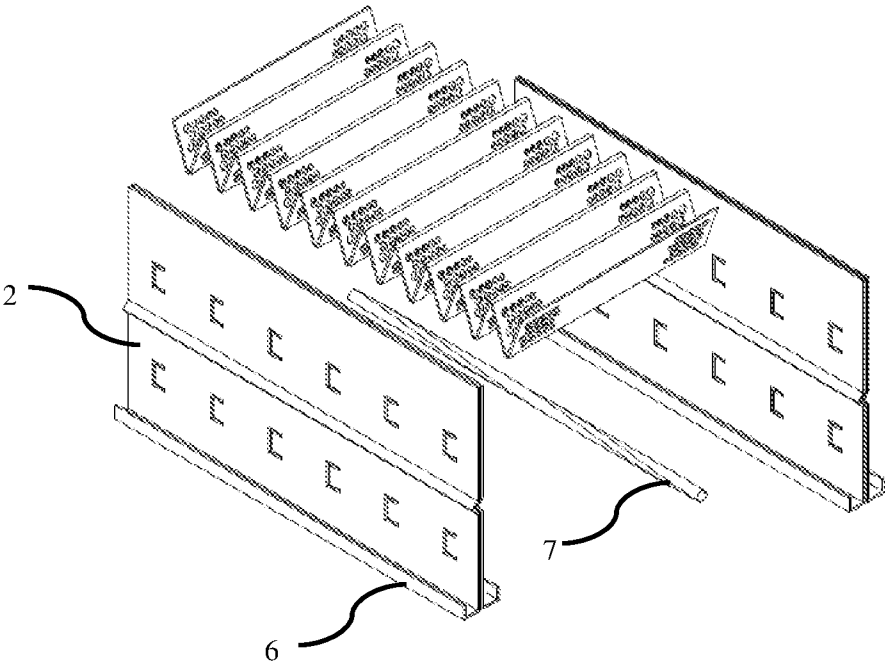


FIGURE 6