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Solar panel accommodating roof tile

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ABSTRACT

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A solar panel accommodating roof tile comprises a fixing plate having an accommodating area where a solar panel is stuck. The upper edge of the fixing plate is bent upward to form a fixing member. The lower edge of the fixing plate is bent downward to form a slope member. The left edge and right edge of the fixing plate are respectively extended to form lap-joint members. The accommodation area has a plurality of trenches parallel to the lap-joint members, and the trenches extend to the slope member. The solar panel accommodating roof tile is simple-structured and easy to assemble, wherefore the time and cost of installation is reduced. Further, the solar panel accommodating roof tile can replace the original roof tiles. The present invention not only overcomes the problems of the conventional solar panel support structure but also improves esthetics of the building.

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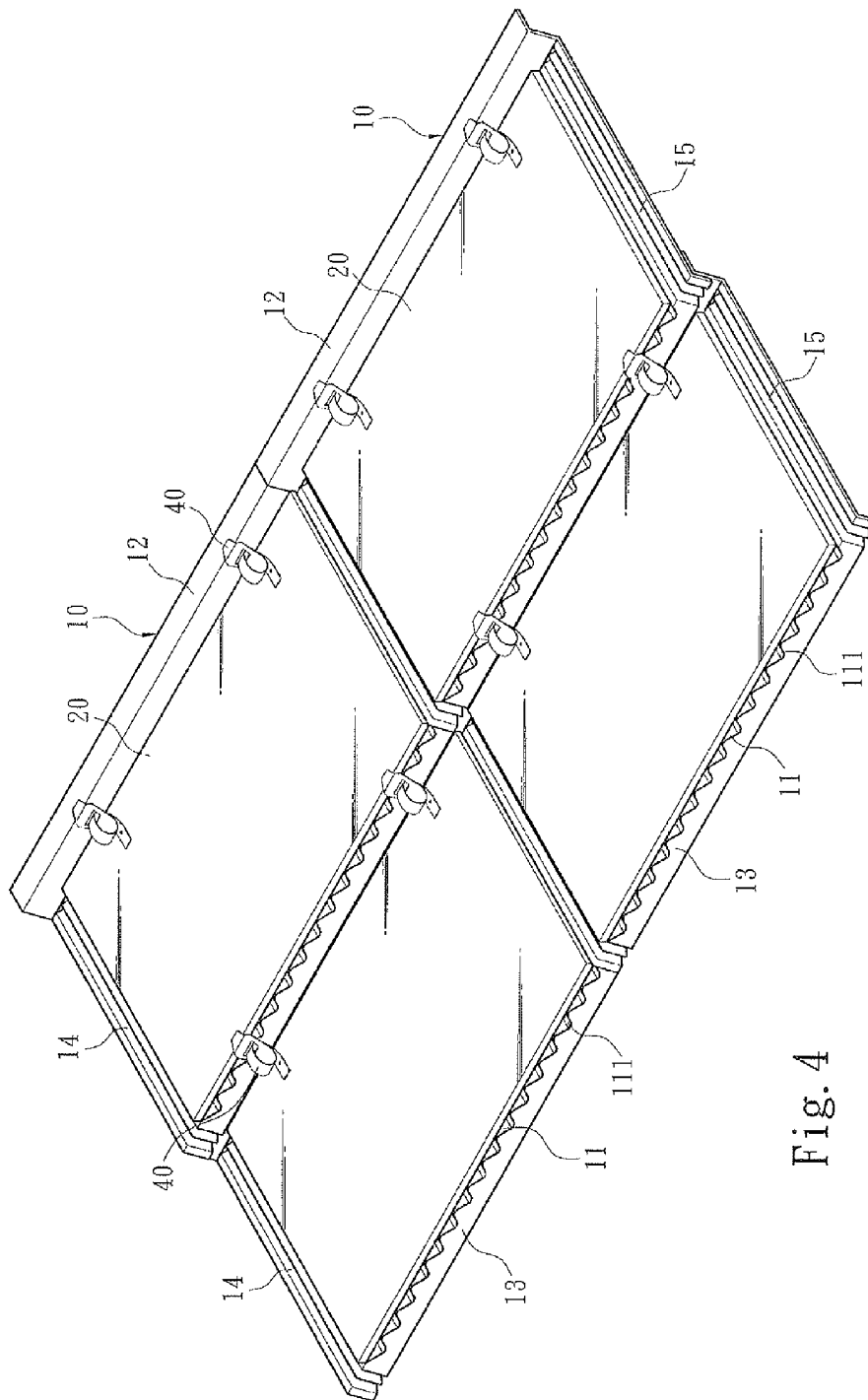


Fig. 4

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COMPLETE SPECIFICATION

FOR AN INNOVATION PATENT

ORIGINAL

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Invention Title: SOLAR PANEL ACCOMMODATING ROOF TILE

The following statement is a full description of this invention, including the best method of performing it known to us

2754261-1

SOLAR PANEL ACCOMMODATING ROOF TILE**BACKGROUND OF THE INVENTION**

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Field of the Invention

The present invention relates to a solar panel accommodating
10 structure, particularly to a solar panel accommodating structure that can
also function as a tile of a pitched roof.

Description of the Related Art

15

The conventional solar panel is usually a rectangular object fixed by a
support structure when it is installed on a roof. The conventional solar
panel support structure is complicated and has many components.
Therefore, it is troublesome to install solar panels in the conventional
20 support structures. Further, the conventional solar panel support structure
is less likely to satisfy weather-resistant and water-proof requirements.
The conventional solar panel support structure normally contains
transverse beams, longitudinal beams, vertical braces and oblique braces,
which are combined with various materials, such as connecting members.
25 Thus, the conventional solar panel support structure has many gaps
impairing waterproofness. In winter, water in gaps freezes and expands,

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and the conventional solar panel support structure may be damaged thereby. Further, the vertical braces are fixed in the roof and may damage the waterproof layer of the roof. Besides, it is hard to control the depth that the vertical braces penetrate the concrete. Thus is affected the flatness
5 of the base plane of the solar panel support structure, hindered the installation and degraded the entire appearance.

The solar panels are usually installed in a high and open place of a roof. The plate-like solar panels are likely to be blown away by a typhoon if the support structures do not fix the solar panels well, and the flying
10 solar panels may hurt persons or vehicles.

SUMMARY OF THE INVENTION

15 The primary objective* of the present invention is to provide a solar panel accommodating roof tile, which has a simple structure, whereby solar panels can be easily assembled, and whereby the material and installation cost is reduced.

Another objective of the present invention is to provide a solar panel
20 accommodating roof tile, which is simple-structured, free of gaps and waterproof, and which can replace the original tiles of the roof, and which can match well with the building and improve the esthetics of the building.

To achieve the abovementioned objectives, the present invention
25 proposes a solar panel accommodating roof tile, which comprises a fixing plate having an accommodating area where a solar panel is stuck. The

*This objective and the following objectives are those of at least preferred embodiments of the present innovation. It is not necessary for every embodiment to satisfy all stated objectives.

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upper edge of the fixing plate is bent upward to form a fixing member. The lower edge of the fixing plate is bent downward to form a slope member. The left edge and right edge of the fixing plate are respectively extended to form lap-joint members. The accommodation area has a plurality of trenches parallel to the lap-joint members, and the trenches extend to the slope member.

The two lap-joint members respectively have corrugated areas. Each of the corrugated areas has at least one curved section. The corrugated areas of the lap-joint members on the left edge and the right edge of different fixing plates can be lap-jointed via stacking the curved sections thereof.

The solar panel accommodating roof tile of the present invention has the following advantages:

1. The trenches on the fixing plate not only function as the junction boxes of the solar panels but also ventilate the bottom of the solar panels and dissipate heat lest sunlight raise the temperature of the solar panels and high temperature degrade the performance of power generation. The trenches can also drain water. Therefore, the trenches can protect the solar panel accommodating roof tile from being damaged by frozen water in the snowy area.
2. The solar panel accommodating roof tiles can be fixed to a plurality of horizontal fixing bars via the fixing members on the upper edges of the fixing plates. The slope members on the lower edges of the upper fixing plates overlap the fixing members on the upper edges of the lower fixing plates. The slope members can protect the fixing members and fixing bars from being wetted by rainwater and prolong

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the lifetime thereof.

3. The elastic pressing elements mechanically press the solar panels on the upper and lower fixing plates to prevent the solar panels from being blown away by wind.
- 5 4. The overlapped lap-joint members elongate the permeation path of rainwater lest rainwater permeate to the bottom of the fixing plate by the capillary action. The lap-joint members can also be lap-jointed with the surrounding materials of the house to prevent from rainwater permeation.

10

The solar panel accommodating roof tile of the present invention is simple-structured and easy to assemble, wherefore the time and cost of installation is reduced. Further, the present invention can replace the original roof tiles. Furthermore, the present invention can match well with
15 the building and improve the esthetics of the building. Therefore, the present invention not only overcomes the problems of conventional solar panel support structure but also improves the esthetics of the building.

20

BRIEF DESCRIPTION OF THE DRAWINGS

- Fig.1 is a perspective view schematically showing a solar panel accommodating roof tile according to one embodiment of the present invention;
- 25 Fig.2 is a sectional view schematically showing a solar panel accommodating roof tile according to one embodiment of the

present invention;

Fig.3 is another sectional view schematically showing a solar panel accommodating roof tile according to one embodiment of the present invention;

5 Fig.4 is a perspective view schematically showing the assemblage of solar panel accommodating roof tiles according to one embodiment of the present invention;

Fig.5 is a sectional view schematically showing the assemblage of solar panel accommodating roof tiles according to one embodiment of
10 the present invention; and

Fig.6 is a sectional view schematically showing the assemblage of solar panel accommodating roof tiles according to one embodiment of the present invention.

15

DETAILED DESCRIPTION OF THE INVENTION

Below, the embodiments are described in detail in cooperation with the attached drawings to make easily understood the technical contents
20 and characteristics of the present invention.

Refer to Fig.1 a perspective view schematically showing a solar panel accommodating roof tile according to one embodiment of the present invention. The solar panel accommodating roof tile of the present invention comprises a fixing plate 10 functioning as the baseplate. The
25 fixing plate 10 is made of a metallic material or a rigid material and has an accommodation area 11. The accommodation area 11 is used to

accommodate a solar panel 20. The solar panel 20 is stuck to the accommodation area 11.

Refer to Fig.2 and Fig.3 sectional views schematically showing a solar panel accommodating roof tile according to one embodiment of the present invention. The upper edge of the fixing plate 10 is bent upward to form a fixing member 12. The lower edge of the fixing plate 10 is bent downward to form a slope member 13.

The left edge and right edge of the fixing plate 10 are respectively extended to form a lap-joint member 14 and a lap-joint member 15. The lap-joint members 14 and 15 respectively have a corrugated area 141 and a corrugated area 151. The corrugated area 141 has at least one curved section 142. The corrugated area 151 has at least one curved section 152 matching the curved section 142. The corrugated area 141 can be lap-jointed with the corrugated area 152 via stacking the curved section 142 and the curved section 152.

The accommodation area 11 has a plurality of trenches 111 parallel to the lap-joint members 14 and 15. The trenches 111 extend to the slope member 13. The trenches 111 on the fixing plate 10 not only function as the junction boxes (not shown in the drawings) of the solar panels 20 but also ventilate the bottom of the solar panels 20 and dissipate heat lest sunlight raise the temperature of the solar panels 20 and high temperature degrade the performance of power generation. The trenches 111 can also drain water. Therefore, the trenches 111 can protect the solar panel accommodating roof tile from being damaged by frozen water in the snowy area.

Refer to Figs.4-6 respectively a perspective view and sectional views

schematically showing the assemblage of solar panel accommodating roof tiles according to one embodiment of the present invention. The solar panel accommodating roof tiles can be fixed to a plurality of horizontal fixing bars 30 via the fixing members 12 on the upper edges of the fixing plates 10. The fixing bar 30 is made of wood or a metallic material. Fixing elements 31, such as screws, penetrate the fixing members 12 and fasten the fixing members 12 to the fixing bars 30 firmly. The slope members 13 on the lower edges of the upper fixing plates 10 overlap the fixing members 12 on the upper edges of the lower fixing plates 10. The slope members 13 can guide rainwater flow downward to protect the fixing elements 31 and the fixing members 12 from being wetted by rainwater.

The adhesive that sticks the solar panels 20 to the fixing plates 10 will be deteriorated by aging. The solar panels 20 may be gradually loosened by wind. Therefore, elastic pressing elements 40 are installed on the slope members 13 to enhance the fixing of the upper and lower fixing plates 10 and mechanically press the solar panels 20 on the upper and lower fixing plates 10 lest the solar panels 20 be blown away by wind.

The left and right fixing plates 10 are lap-jointed via stacking the curved sections 142 of the corrugated area 141 of the lap-joint member 14 and the curved section 152 of the corrugated area 151 of the lap-joint member 15 on the fixing bar 30 one by one. The curved sections 142 of the corrugated area 141 and the curved section 152 of the corrugated area 151 can also elongate the permeation path of rainwater lest rainwater permeate to the bottom of the fixing plate 10 by the capillary action. In practice, the lap-joint members 14 and 15 can also be lap-jointed with the

surrounding materials of the house to prevent from rainwater permeation.

In conclusion, the solar panel accommodating roof tile of the present invention is simple-structured and easy to assemble, wherefore the cost of installation is reduced. Further, the present invention can replace the original roof tiles. Furthermore, the present invention can match well with the building and improve the esthetics of the building.

The embodiments described above are only to exemplify the present invention but not to limit the scope of the present invention. Any equivalent modification or variation according to the principles, structures and characteristics disclosed in the specification is to be also included within the scope of the present invention, which is based on the claims stated below.

The solar panel accommodating roof tile of the present invention is a novel structural design able to overcome the problems of the conventional technology. Therefore, the present invention possesses utility, novelty and non-obviousness and meets the condition for a patent.

The term “comprising” as used in this specification means “consisting at least in part of”. When interpreting each statement in this specification that includes the term “comprising”, features other than that or those prefaced by the term may also be present. Related terms such as “comprise” and “comprises” are to be interpreted in the same manner.

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The claims defining the innovation are as follows:

1. A solar panel accommodating roof tile comprising
 - a fixing plate having an accommodating area where a solar panel is stuck, wherein said fixing plate further comprises
 - 5 a fixing member formed via bending upward an upper edge of said fixing plate;
 - a slope member formed via bending downward an lower edge of said fixing plate;
 - lap-joint members respectively extending from a left edge and a
 - 10 right edge of said fixing plate; and
 - a plurality of parallel trenches formed on said accommodating area and extending to said slope member.
2. The solar panel accommodating roof tile according to claim 1, wherein said lap-joint member has a corrugated area.
- 15 3. The solar panel accommodating roof tile according to claim 2, wherein said corrugated area of said lap-joint member has at least one curved section.
4. The solar panel accommodating roof tile according to claim 2, wherein said corrugated area of said lap-joint member on said left
- 20 edge of one fixing plate can be lap-jointed to said corrugated area of said lap-joint member on said right edge of another said fixing plate.

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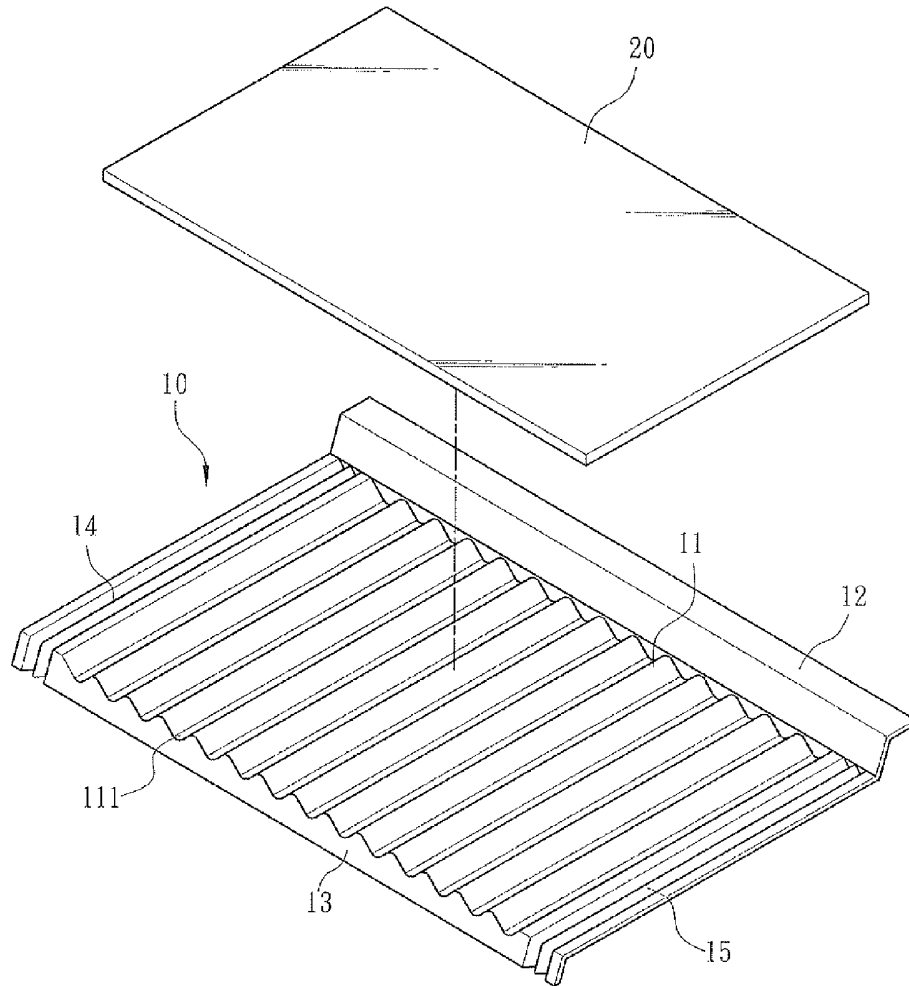


Fig. 1

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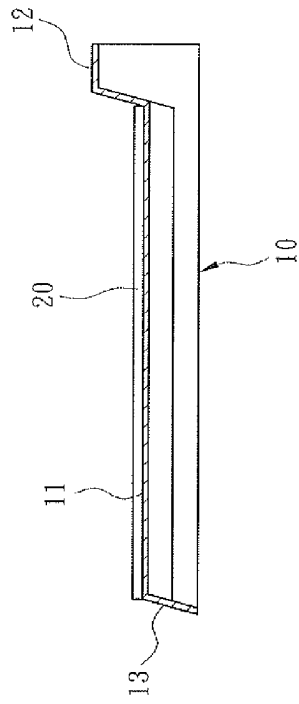


Fig. 2

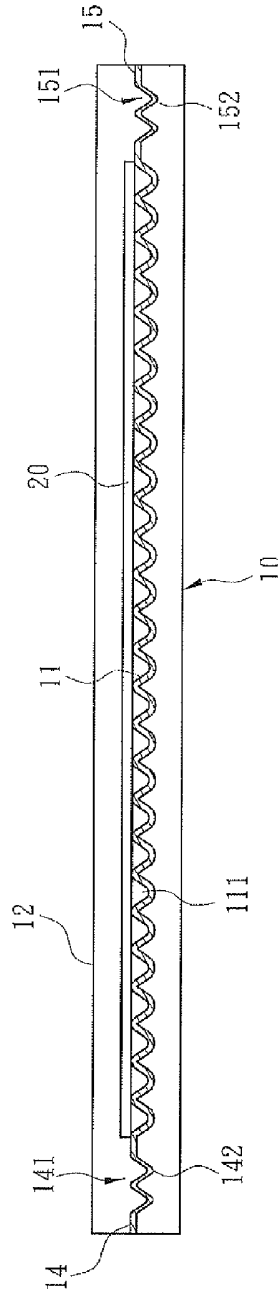


Fig. 3

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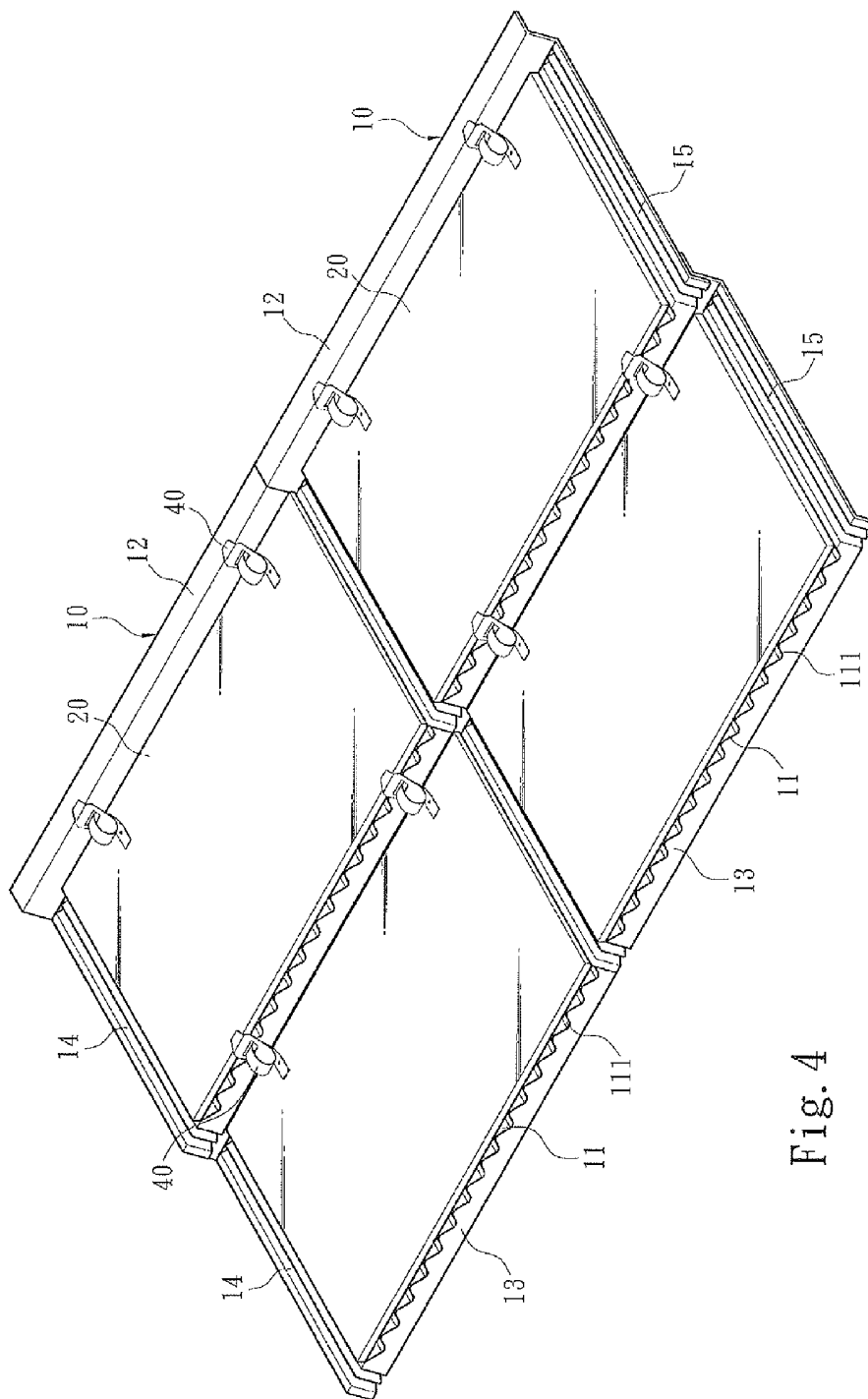


Fig. 4

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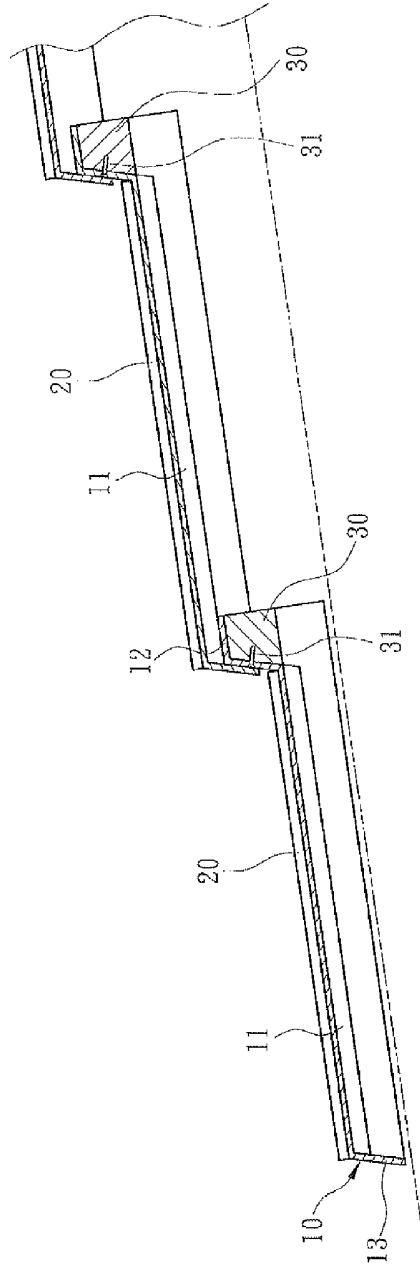


Fig. 5

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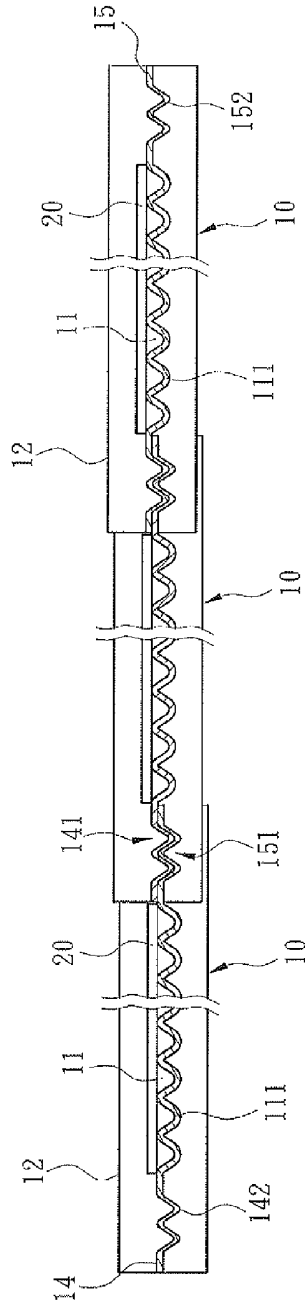


Fig. 6