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(54) **FRAME FOR SOLAR MODULE**

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(57) **ABSTRACT**

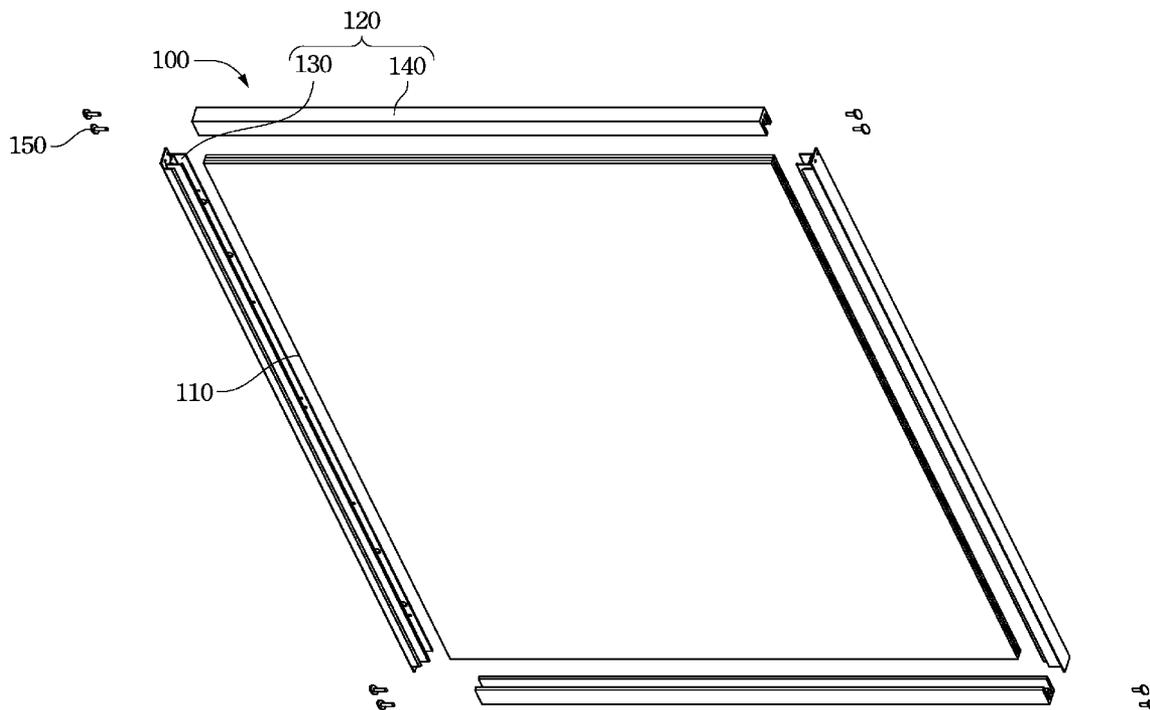
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A frame for solar module to fix a solar panel within is disclosed. The frame for solar panel includes two first fastening members arranged at two opposite sides of the solar panel, two second fastening members arranged at another two opposite sides of the solar panel, and plural screws to screw the first fastening members and the second fastening members. Each first fastening member and each second fastening member includes a supporting portion for supporting the solar panel, a base portion, a connecting portion for connecting the supporting portion and the base portion, and a beam disposed between the supporting portion and the base portion.

(22) Filed: **Dec. 24, 2010**

Related U.S. Application Data

(60) Provisional application No. 61/291,403, filed on Dec. 31, 2009.



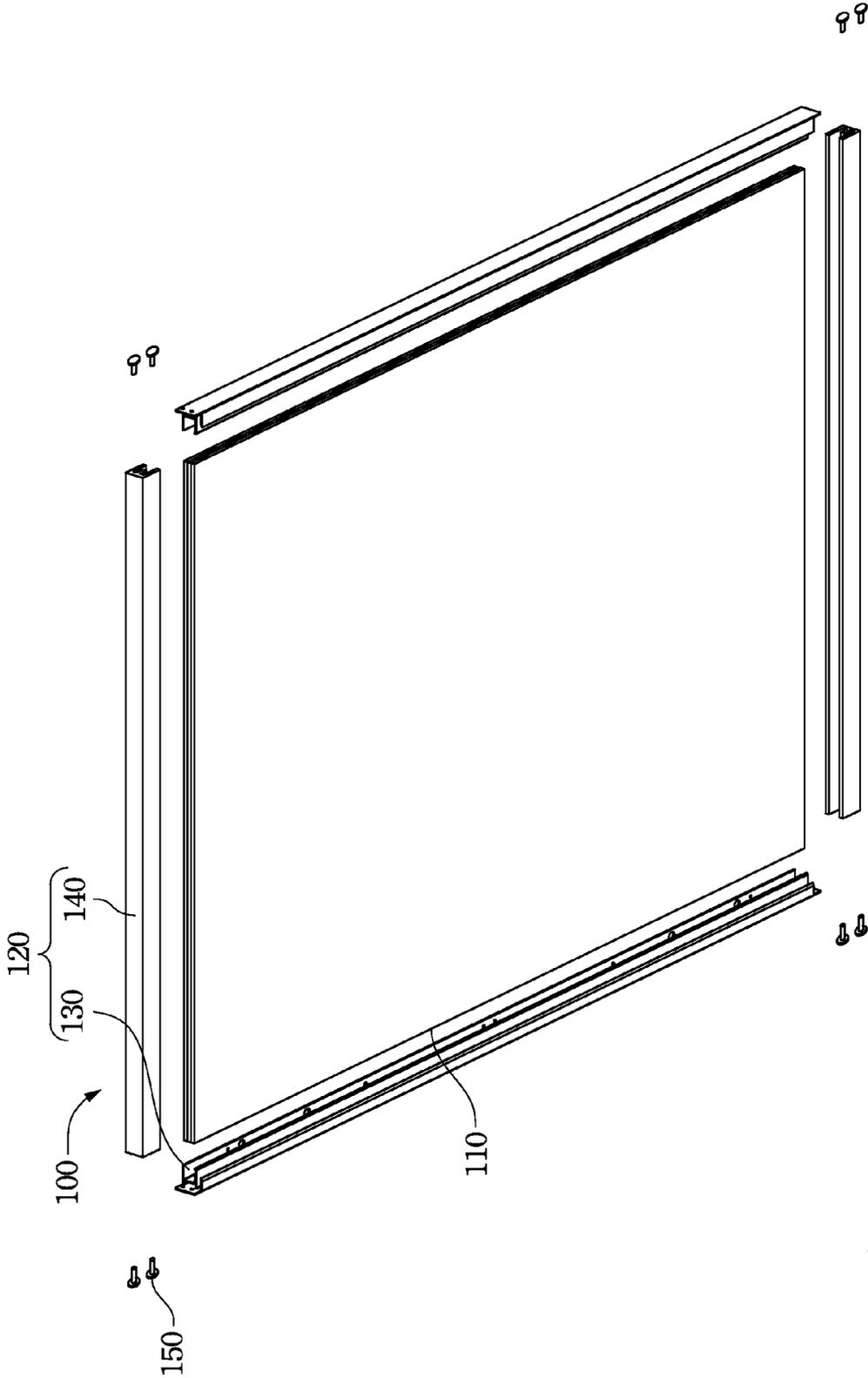


Fig. 1

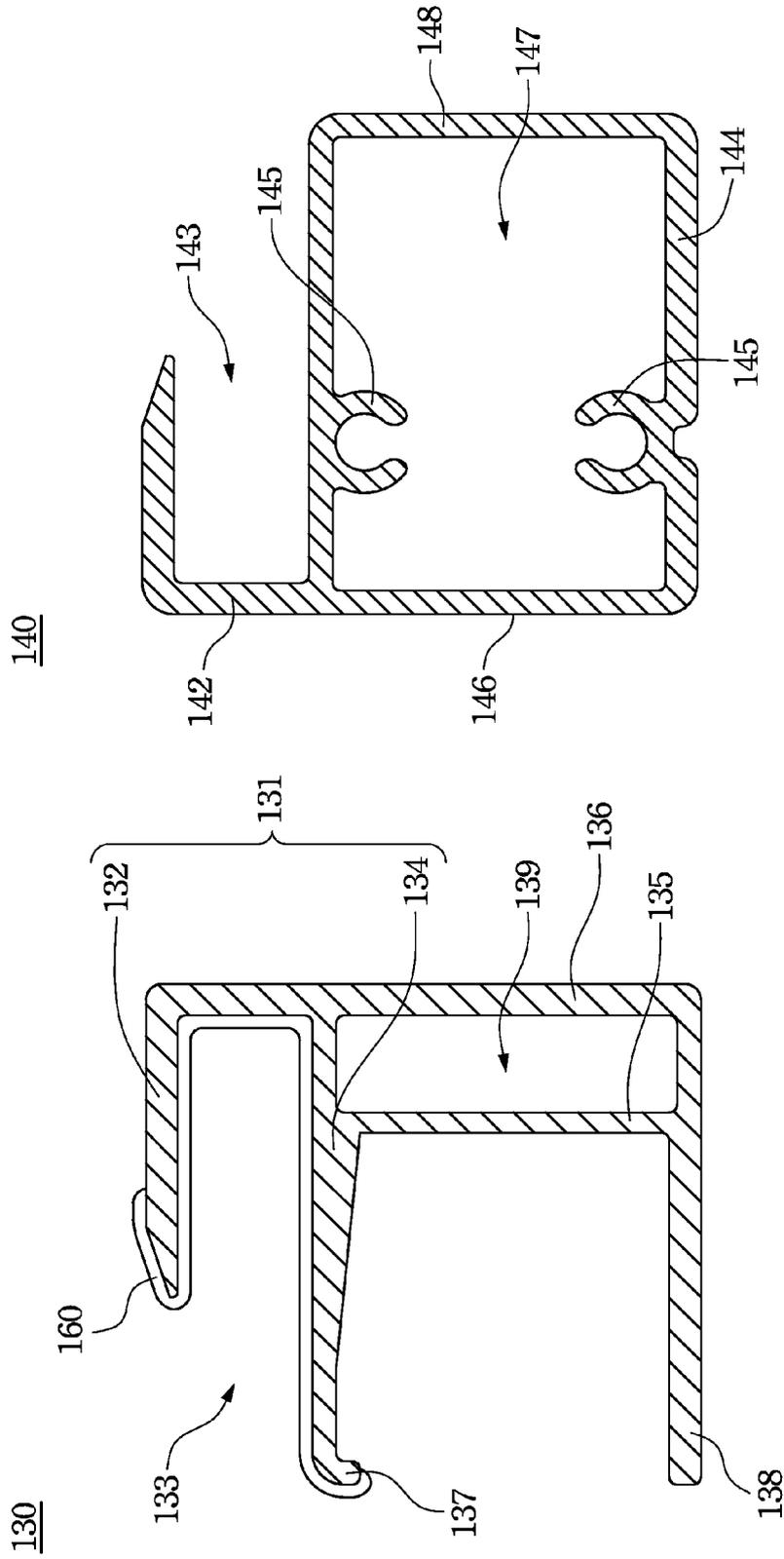


Fig. 3

Fig. 2

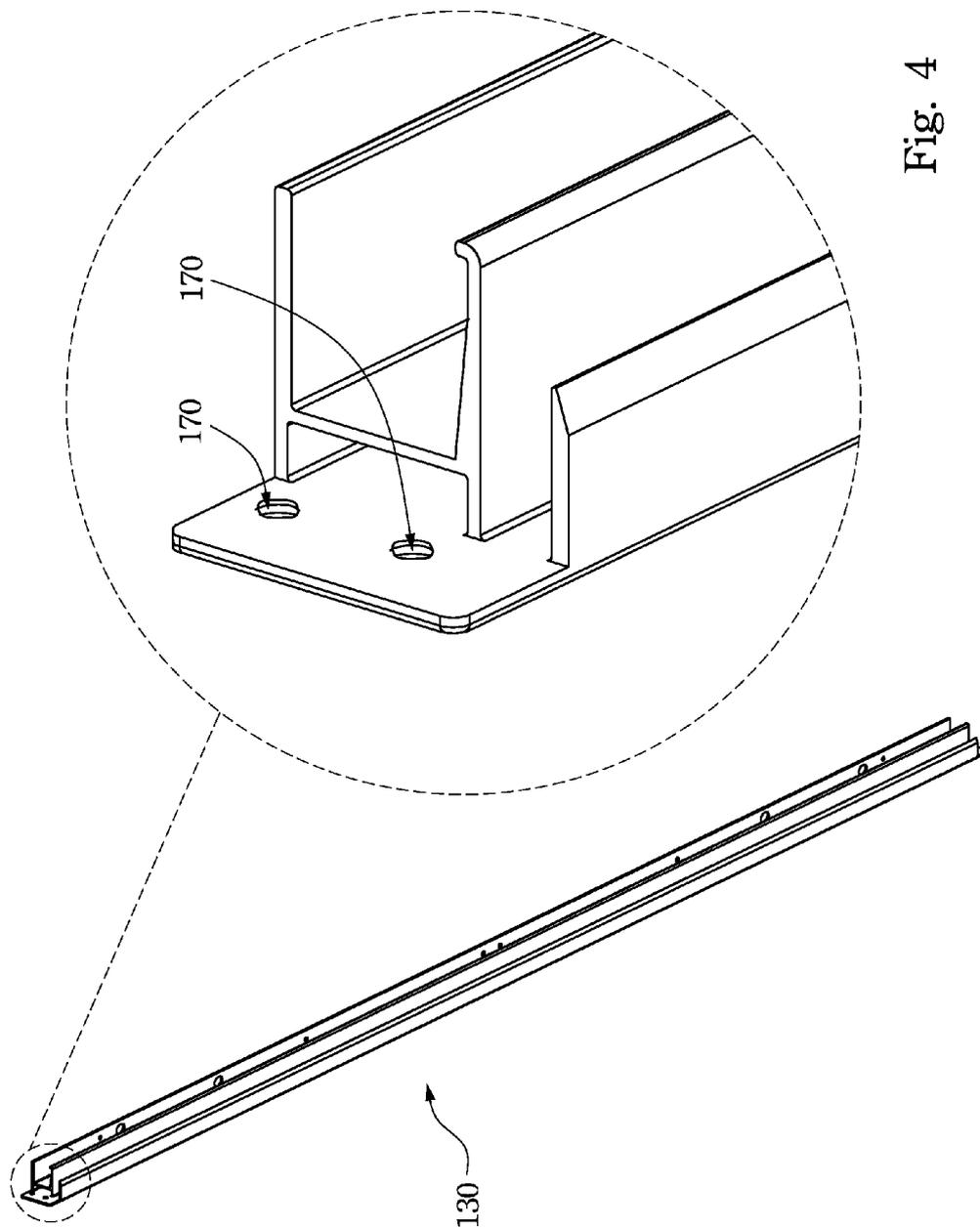


Fig. 4

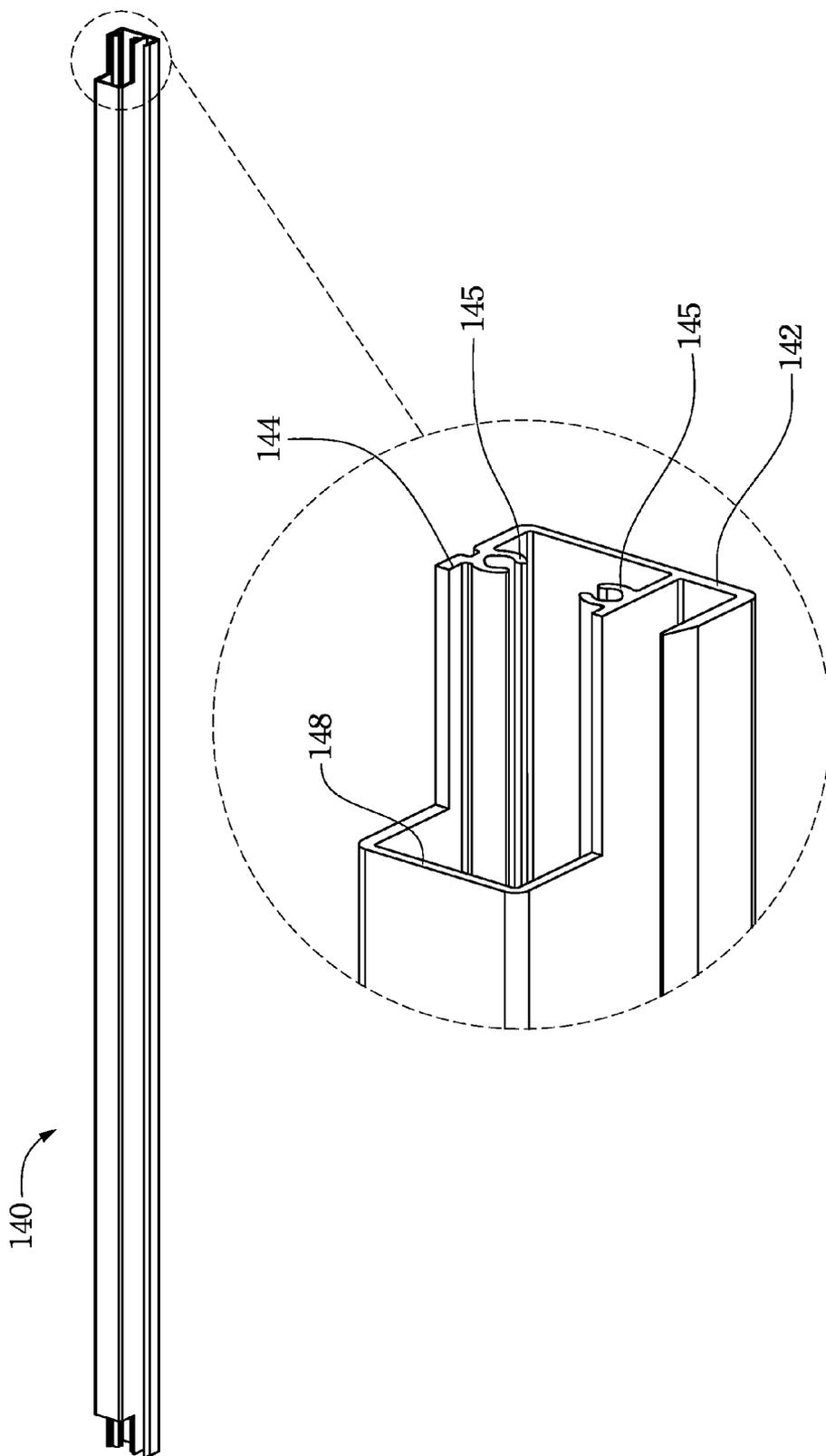


Fig. 5

FRAME FOR SOLAR MODULE

RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Ser. No. 61/291,403, filed Dec. 31, 2009, which is herein incorporated by reference.

BACKGROUND

[0002] 1. Field of Invention

[0003] The present invention relates to a solar module. More particularly, the present invention relates to a frame for solar module.

[0004] 2. Description of Related Art

[0005] The increasing scarcity and the realization of the ecological and safety problems associated with non-renewable energy resources such as coal, petroleum and uranium, have made it essential that increased use be made of alternate non-depletable energy resources such as solar energy. Solar energy use has been limited in the past to special applications due in part to the high cost of manufacturing devices capable of producing significant amounts of photovoltaic energy. The improvement in manufacturing technology for fabricating the solar panel in mass production has greatly promoted the use of solar energy.

[0006] Significant environmental benefits are also realized from solar energy production, for example, reduction in air pollution from burning fossil fuels, reduction in water and land use from power generation plants, and reduction in the storage of waste byproducts. Solar energy produces no noise, and has few moving components.

[0007] The solar module mainly includes a solar panel and a frame to fix the solar panel within. The efficiency and the reliability of assembly of the solar module would be decided by the structure of the frame. Therefore, there is a need to design the frame of the solar module, which can improve the efficiency and the reliability of assembly of the solar module.

SUMMARY

[0008] An embodiment of the invention provides a frame for solar module to fix a solar panel within. The frame for solar panel includes two first fastening members arranged at two opposite sides of the solar panel, two second fastening members arranged at another two opposite sides of the solar panel, and plural screws to screw the first fastening members and the second fastening members. Each first fastening member and each second fastening member includes a supporting portion for supporting the solar panel, a base portion, a connecting portion for connecting the supporting portion and the base portion, and a beam disposed between the supporting portion and the base portion.

[0009] Each supporting portion has a groove, and the solar panel is assembled in the groove. Each supporting portion of the first fastening member has a first flange and the second flange. The solar panel is sandwiched between the first flange and the second flange. The beams of the first fastening members connect the second flanges and the base portions. Each first fastening member may optionally include a gasket disposed between the solar panel and the supporting portion. Each second flange has a hook for hooking the gasket. Each second fastening frame includes plural screwing portions disposed on the base portion and the supporting portion. Each first fastening member has plural screw holes disposed corresponding to the screwing portions, and the screws screw the

screwing portions on the screw holes. The cross-section shape of each screwing portion can be C-shaped. The screwing portions can be disposed between the beams and the connecting portions. The material of the first fastening members and the second fastening members can be aluminum.

[0010] The beams of the first fastening members and the second fastening members of the invention could highly increase the bending strength of the frame for the solar module, so that the thickness of the metal sheet of the first fastening members and the second fastening members can be reduced. The first fastening members and the second fastening members are fixed by screws, thereby the first fastening members and the second fastening members are fixed firmly and better positioned. The support portion, the base portion, the connecting portion and the beam of each first and second fastening member are made integrated. The first fastening members and the second fastening members are made of metal, which can provide a grounding interface to the solar panel.

[0011] It is to be understood that both the foregoing general description and the following detailed description are by examples, and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying drawings are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings,

[0013] FIG. 1 is a schematic diagram of an embodiment of a solar module utilizing the frame of the invention;

[0014] FIG. 2 is a cross-section diagram of the first fastening member of the frame in FIG. 1;

[0015] FIG. 3 is a cross-section diagram of the second fastening member of the frame in FIG. 1;

[0016] FIG. 4 is an oblique diagram of the first fastening member of the invention; and

[0017] FIG. 5 is an oblique diagram of the second fastening member of the invention.

DESCRIPTION OF THE EMBODIMENTS

[0018] Reference will now be made in detail to the present embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

[0019] Refer to FIG. 1. FIG. 1 is a schematic diagram of an embodiment of a solar module utilizing the frame of the invention. The solar module 100 includes a solar panel 110 and a frame 120 to fix the solar panel 110. The solar panel 110 is a rectangle panel. The frame 120 includes plural fastening members encircled the solar panel 110 and coupled to each other to fix the solar panel 110 within. The frame 120 has two first fastening members 130 disposed at two opposite sides of the solar panel 110. The frame 120 has two second fastening members 140 disposed at other two opposite sides of the solar panel 110. The solar module 100 further includes plural screws 150 to screw the first fastening members 130 to the second fastening members 140.

[0020] Refer to FIG. 2. FIG. 2 is a cross-section diagram of the first fastening member of the frame in FIG. 1. The first

fastening member 130 has a first supporting portion 131, a first base portion 138, and a first connecting portion 136 for connecting the first supporting portion 131 and the first base portion 138. The first supporting portion 131 has a first groove 133. The solar panel (not shown) is assembled in the first groove 133. The first supporting portion 131 has a first flange 132 and a second flange 134. The second flange 134 is used to support the solar panel thereon, and the first flange 132 is used to position the solar panel. The first groove 133 is formed between the first flange 132 and the second flange 134. The solar panel is sandwiched between the first flange 132 and the second flange 134.

[0021] The first fastening member 130 has a first beam 135. The first beam 135 is disposed between the second flange 134 and the first base portion 138. In this embodiment, the opposite sides of the first beam 135 connect the second flange 134 and the first base portion 138 respectively. A cavity 139 is formed between the first beam 135 and the first connecting portion 136 and between the second flange 134 and the first base portion 138. The first beam 135 can further support the solar panel and increase the bending strength of the first fastening member 130.

[0022] The frame for solar module may further include a gasket 160 disposed between the solar panel and the support portion 131 for cushion. The gasket 160 can be made of an elastic material, such as a rubber material or a polymer material, which can prevent the solar panel from damage by directly contacting the first fastening member 130. The second flange 134 has a hook 137 to hook the gasket 160. The first fastening member 130 can be made of metal sheet. The first fastening member 130 can be made of aluminum.

[0023] Refer to FIG. 3. FIG. 3 is a cross-section diagram of the second fastening member of the frame in FIG. 1. The second fastening member 140 includes a second supporting portion 142, a second base portion 144, and a second connecting portion 146 to connect the second supporting portion 142 and the second base portion 144. The second supporting portion 142 has a second groove 143, and the solar panel (not shown) is assembled in the second groove 143. The second fastening member 140 has a second beam 148 disposed between the second supporting portion 142 and the second base portion 144. The opposite sides of the second beam 148 connect the second supporting portion 142 and the second base portion 144 respectively. A cavity 147 is formed between the second beam 148 and the second connecting portion 146. The second beam 148 can further support the solar panel and increase the bending strength of the second fastening member 140.

[0024] The second fastening member 140 further includes plural screwing portions 145. The screwing portions 145 are disposed on the second supporting portion 142 and the second base portion 144. The cross-section shape of the screwing portion 145 is a C-shaped. The screwing portion 145 is arranged between the second beam 148 and the second connecting portion 146. The second fastening member 140 can be made of metal sheet. The material of the second fastening member 140 can be aluminum.

[0025] Refer to FIG. 4 and FIG. 5 simultaneously. FIG. 4 is an oblique diagram of the first fastening member of the invention. FIG. 5 is an oblique diagram of the second fastening member of the invention. The second fastening member 140 has plural screwing portions 145 disposed between the second supporting portion 142 and the second base portion 144. The second beam 148 connects the second supporting portion

142 and the second base portion 144 to enhance the bending strength of the second fastening member 140.

[0026] The first fastening member 130 has plural screw holes 170 disposed corresponding to the screwing portions 145 of the second fastening members 140. The screws 150 in FIG. 1 screw the screwing portions 145 on the screw holes 170 to screw the first fastening member 130 to the second fastening member 140.

[0027] The beams of the first fastening members and the second fastening members of the invention could highly increase the bending strength of the frame for the solar module, so that the thickness of the metal sheet of the first fastening members and the second fastening members can be reduced. The first fastening members and the second fastening members are fixed by screws, thereby the first fastening members and the second fastening members are fixed firmly and better positioned. The support portion, the base portion, the connecting portion and the beam of each first and second fastening member are made integrated. The first fastening members and the second fastening members are made of metal, which can provide a grounding interface to the solar panel.

[0028] Although the present invention has been described in considerable detail with reference to certain embodiments thereof, other embodiments are possible. Therefore, the spirit and scope of the appended claims should not be limited to the description of the embodiments contained herein.

[0029] It will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the present invention without departing from the scope or spirit of the invention. In view of the foregoing, it is intended that the present invention cover modifications and variations of this invention provided they fall within the scope of the following claims and their equivalents.

What is claimed is:

1. A frame for solar module to fix a solar panel within, the frame comprising:

two first fastening members arranged at two opposite sides of the solar panel;

two second fastening members arranged at another two opposite sides of the solar panel, each first fastening member and each second fastening member comprising:

a supporting portion for supporting the solar panel;

a base portion;

a connecting portion for connecting the supporting portion and the base portion; and

a beam disposed between the supporting portion and the base portion; and

a plurality of screws for screwing the first fastening members to the second fastening members.

2. The frame for solar module of claim 1, wherein each supporting portion comprises a groove, and the solar panel is assembled in the groove.

3. The frame for solar module of claim 1, wherein each supporting portion of the first fastening member comprises a first flange and a second flange, and the solar panel is sandwiched between the first flange and the second flange.

4. The frame for solar module of claim 3, wherein the beams of the first fastening members connect the second flanges and the base portions.

5. The frame for solar module of claim 4, wherein each first fastening member comprises a gasket disposed between the solar panel and the supporting portion.

6. The frame for solar module of claim 5, wherein each second flange has a hook for hooking the gasket.

7. The frame for solar module of claim 1, wherein each second fastening frame comprises a plurality of screwing portions disposed on the base portion and the supporting portion.

8. The frame for solar module of claim 7, wherein each first fastening member comprises a plurality of screw holes disposed corresponding to the screwing portions, and the screws screw the screwing portions on the screw holes.

9. The frame for solar module of claim 7, wherein the cross-section shape of each screwing portion is C-shaped.

10. The frame for solar module of claim 7, wherein the screwing portions are disposed between the beams and the connecting portions.

11. The frame for solar module of claim 1, wherein a material of the first fastening members and the second fastening members is aluminum.

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