

SUPPORT FRAME FOR SOLAR PANEL

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a support frame for a solar panel and more particularly, to a support frame that can be assembled quickly and capable of enhancing support effect.

2. Description of the Related Art

 With the rising awareness of environmental protection, green energy has also
10 become an important energy development direction of the country. Using the space on the roof to install solar panels to generate electricity is undoubtedly a feasible model for using space to develop green energy. Since solar panels require a large area of space for installation, using the roof receiving sunlight as a field for installing solar panels can achieve the purpose of making full use of the space.

15 During the process of installing solar panels, a lot of bolts and nuts are used to lock the solar panel support frame to the roof. For example, TW I740774 and TW M619347 both disclose related technologies of the support frames. However, the assembly way of using multiple bolts and nuts has the problems of cost increase, complex structure and troublesome assembly, and further, construction workers need to spend a
20 long time on the roof for assembly so as to result in longer working hours under the sun and increasing a chance of encountering strong winds, thus increasing the difficulty and danger of construction. In addition, since an external force is often applied to the support frame outdoors, the support effect of the support frame needs to be strengthened.

SUMMARY OF THE INVENTION

25 It is a primary objective of the present invention to provide a support frame for

a solar panel, which can save assembly time and enhance support effect.

To attain the above objective, the support frame of the present invention comprises a bottom plate, two bevel support members, two positioning members. The bevel support members have bottom ends thereof connected to two opposite ends of the bottom plate and extend inclinedly away from the bottom plate and stretched out along an extension direction of the bottom plate. The positioning plates have one ends thereof connected to the top ends of the bevel support members. The top surfaces of the positioning plates each have a first convex buckle portion extending along the extension direction of the bottom plate and a rivet nut hole arranged adjacent to the first convex buckle portion. The bevel support members each further have a second convex buckle portion protruding outwards and extending towards the positioning plate, and a fixing hole staggered with the second convex buckle portion.

It can be seen from the above that when the positioning plates support a channel steel through their top surfaces, the bevel support members are stretched out along the extension direction of the bottom plate due to the flexibility of metal. During stretching out of the bevel support members, the first convex buckle portions are engaged with corresponding structures of the channel steel (such as recesses). Thereafter, two rivet nuts are put in the rivet nut holes and forced to generate a partial deformation, such that the rivet nuts are clamped to the channel steel, thereby completing assembly of the channel steel. Thus, it is unnecessary to use excessive fasteners (such as bolts and nuts) during assembly of the channel steel. As such, the support frame of the present invention can achieve effects of reducing costs, saving assembly time, and improving construction safety. In addition, a connector can be hung on the second convex buckle portion of the support frame in advance. After the support frame is adjusted, the connector is screwed to the fixing hole through a bolt for enhancing support effect.

Preferably, the rivet nut hole is a hexagonal hole for use with a hexagonal rivet nut. In this way, the rivet nut can be positioned and prevented from rotating.

Preferably, the bottom plate further has a positioning groove for rest of a tip of a self-tapping screw. In this way, when the self-tapping screw is used, a situation of
5 slippage of the self-tapping screw can be reduced.

Other advantages and features of the present invention will be fully understood by reference to the following specification in conjunction with the accompanying drawings, in which like reference signs denote like components of structure.

BRIEF DESCRIPTION OF THE DRAWINGS

10 FIG. 1 is a perspective view of a support frame of the present invention.

FIG. 2 is a plane view of the support frame of the present invention used with a channel steel.

FIG. 3 is a plane view of the support frame of the present invention used with a connector.

15 FIG. 4 is a plane view of the support frame of the present invention used with a connector.

DETAILED DESCRIPTION OF THE INVENTION

First of all, it is to be mentioned that the technical features provided by the present invention are unlimited to the specific structure, usage and application thereof
20 described in the detailed description of the invention. It should be understood by those skilled in the related art that all the terms used in the contents of the specification are for illustrative description. The directional terms mentioned in the contents of the specification are also just for illustrative description on the basis of normal usage direction, not intended to limit the claimed scope.

25 Referring to FIGS. 1 and 2, a support frame 10 of the present invention

comprises a bottom plate 20, two bevel support members 30, two positioning plates 40, and two rivet nuts 60.

The bottom plate 20 has a base portion 21 provided with a fixing hole 22 and two leg portions 24. It is worth mentioning that the bottom plate 20 further has a positioning groove 23 for rest of a tip of a self-tapping screw. In this way, when the self-tapping screw is used, a situation of slippage of the self-tapping screw can be reduced. The leg portions 24 extend inclinedly downwards from two opposite sides of the base portion 21. It should be noted that the design of the leg portions 24 can enhance the overall strength of the bottom plate 20, such that the bottom plate 20 can use a thinner steel plate to achieve the required strength conditions.

The bevel support members 30 each have a bevel support portion 31 and two first wing portions 32 connected to two opposite long sides of the bevel support portion 31 for increasing the overall structural strength. As shown in FIG. 2, the bevel support members 30 are connected to two opposite ends of the base portion 21 of the bottom plate 20 through the bottom end of the bevel support portion 31 and inclined towards the extension direction of the bottom plate 20 and capable of being stretched out along the extension direction of the bottom plate 20.

The positioning plates 40 each have a bear portion 41 and two second wing portions 42. The bear portions 41 have one ends thereof connected to top ends of the bevel support portions 31 of the bevel support members 30 for supporting a channel steel 50 (as shown in FIG. 2). The second wing portions 42 are connected to two opposite long sides of the bear portion 41 for increasing the overall structural strength.

In addition, the bear portion 41 of each of the positioning plates 40 is provided with a first convex buckle portion 43, a through hole 45 corresponding to the first convex buckle portion 43, and a rivet nut hole 47 adjacent to the first convex buckle portion 43

by stamping. In this embodiment, the rivet nut hole 47 is a hexagonal hole for use with a hexagonal rivet nut to position the rivet nut 60 and prevent the rivet nut 60 from rotating. The first convex buckle portions 43 extend horizontally along the extension direction of the bottom plate 20 and have opposite extension directions. The rivet nut holes 47 are
5 used for installation of the rivet nuts 60 in a one-on-one manner.

It should be noted that the bevel support members 30 each further have a second convex buckle portion 33 protruding outwards and extending towards the positioning plate 40, and a fixing hole 34 staggered with the second convex buckle portion 33.

In actual use, the channel steel 50 has corresponding structures (such as
10 recesses, not shown) that can accommodate the first convex buckle portions 43, so when the bear portions 41 of the positioning plates 40 support the channel steel 50, the recesses of the channel steel 50 accommodate the first convex buckle portions 43 therein, but they are not engaged with each other. Thereafter, because of the weight of the channel steel 50, the bevel support members 30 are stretched out along the extension direction of the
15 bottom plate 20 through the flexibility of metal. During stretching out of the bevel support members 30, the first convex buckle portions 43 are engaged with the recesses of the channel steel 50, and then a tool is used to secure the rivet nuts 60 in the rivet nut holes 47, as shown in FIG. 2, such that the rivet nuts 60 are forced to generate a partial deformation so as to clamp to the channel steel 50, thereby completing assembly of the
20 channel steel 50.

Further, as shown in FIGS. 3 and 4, a connector 70 can be hung on the second convex buckle portion 33 of the support frame 10 in advance. After the support frame 10 is adjusted, the connector 70 is removed and screwed to the fixing hole 34 through a bolt for enhancing support effect.

25 As indicated above, the support frame 10 of the present invention can omit

excessive fasteners (such as bolts and nuts) when assembled with the channel steel 50 to reduce cost. In addition to save assembly time, the assembly time for construction workers on the roof can be reduced to achieve an effect of improving construction safety. Further, the connector 70 is used to connect the support frames 10 for increasing support effect.

WHAT IS CLAIMED IS:

1. A support frame for a solar panel, comprising:
 - a bottom plate;
 - two bevel support members having bottom ends thereof connected to two
 - 5 opposite ends of the bottom plate and extending inclinedly away from the bottom plate
 - and stretched out along an extension direction of the bottom plate; and
 - two positioning plates having one ends thereof connected to top ends of the
 - bevel support members, top surfaces of the positioning plates each having a first convex
 - buckle portion extending along the extension direction of the bottom plate and a rivet nut
 - 10 hole arranged adjacent to the first convex buckle portion;
 - wherein the bevel support members each further have a second convex buckle
 - portion protruding outwards and extending towards the positioning plate, and a fixing
 - hole staggered with the second convex buckle portion.
- 15 2. The support frame as claimed in claim 1, wherein the rivet nut hole is a
- hexagonal hole for use with a hexagonal rivet nut to position the rivet nut and prevent the
- rivet nut from rotating.
3. The support frame as claimed in claim 1, wherein the bottom plate further
- 20 has a positioning groove for rest of a tip of a self-tapping screw to reduce slippage of the
- self-tapping screw.