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Abstract

A device for fastening of solar modules which have a frame with a profiled section and wherein a force-locked joint exists between the frame of the solar module and a support section, characterised in that between the support section and the frame of the solar module a form-locking and force-locking joint is produced by means of a clamping piece.
Patent claims

The claims defining the invention are as follows:

1. A device for fastening of solar modules which have a frame with a profiled section and wherein a force-locked joint exists between the frame of the solar module and a support section, characterised in that between the support section and the frame of the solar module a form-locking and force-locking joint is produced by means of a clamping piece.

2. A device according to claim 1, characterised in that in each case a plurality of clamping pieces join one side of the frame of the solar module with the support section.

3. A device according to claim 1, characterised in that the joint between the support section and the clamping piece is a force-locked and/or form-locked joint.

4. A device according to claim 1, characterised in that the joint between the frame of the solar module and the clamping piece is a form-locked and force-locked joint.

5. A device according to claim 1, characterised in that a C-section, having inward bent legs, with its opening facing in the direction of the support section is a component of the frame of the solar module, the support, which is a C-section with inward bent legs with its opening facing the direction of the frame, and the C-sections are joined with a clamping piece that joins in a force-locking and form-locking manner at least one leg of the C-section of the frame with a leg of the C-section of the support section.

6. A device according to claim 5, characterised in that the joint between the clamping piece and the C-section of the frame comprises a locking lug arranged on the clamping piece, which locking lug engages from behind an elbow of the leg of the C-section of the frame in a force-locking and form-locking manner and a stop for the C-section of the frame, which prevents a
AUSTRALIA
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COMPLETE SPECIFICATION
STANDARD PATENT

Applicant(s):
RegEn Energiesysteme GmbH

Invention Title:
DEVICE TO FASTEN SOLAR MODULES

The following statement is a full description of this invention, including the best method of performing it known to me/us:
Device to fasten solar modules

The invention concerns the fastening of solar modules which have a frame with a profiled section.

At this stage the fastening of framed solar modules is carried out by bolting the frame of the solar module to support sections, preferably C-sections, which are installed on roofs or other surfaces. Such a joining is elaborate during the installation due to the limited access to the places to be bolted.

In accordance with the present invention, there is provided a device for fastening of solar modules which have a frame with a profiled section and wherein a force-locked joint exists between the frame of the solar module and a support section, characterised in that between the support section and the frame of the solar module a form-locking and force-locking joint is produced by means of a clamping piece. Preferred constructions are subject matter of the sub-claims.

According to and embodiment of the invention the device to fasten solar modules which have a frame with a profiled section and where there is a force-locking joint between the frame of the solar module and a support section provides that between the support section and the frame of the solar module a form-locking and force-locking joint is produced by means of a clamping piece. At the same time one clamping piece or several clamping pieces may be used on each side of the frame of the solar module depending on the size of the solar module.

The clamping piece may even be longer, so that it could be described as a clamping rail.

According to an embodiment of the invention the joint between the support section and the clamping piece is constructed as a force-locking and/or form-locking joint. In the case of a force-locking joint the installation of the clamping piece(s) is preferably carried out prior to the installation of the solar module. Accordingly, prefabricated support sections with welded on or bolted on clamping pieces are delivered to the building site. The form-locking joint is preferably used when the support sections had already been installed or when they are placed onto the support sections before installation.
The joint between the frame of the solar module and the clamping piece is always a form-locking and force-locking joint.

The best known frames for solar modules have C-sections to make a joining feasible, while their opening is either perpendicular to the plane of the solar module or are parallel to the direction of the plane of the solar module. In the first case the legs of the C-section have a bent construction.

If a C-section, having inward bent legs, with its opening facing in the direction of the support section is a component of the frame of the solar module, then in a development of the invention a support section is used, which is a C-section with inward bent legs and its opening facing the direction of the frame of the solar module and the C-sections are joined with a clamping piece that joins in a force-locking and form-locking manner at least one leg of the C-section of the frame with a leg of the C-section of the support section.

In a preferred execution this is carried out by means of a locking lug provided on the clamping piece, which locking lug engages from behind an elbow of the leg of the C-section of the frame in a force-locking and form-locking manner and a stop for the C-section of the frame arranged on the clamping piece, what prevents a lateral movement of the C-section of the frame relative to the clamping piece in the plane of the cross-section of the C-section of the frame.

If a C-section, the lateral surface of a leg of which points in the direction of the support section, is a component of the frame of the solar module, then according to a development of the invention also a support section is used which is a C-section with inward bent legs and its opening facing the direction of the frame, wherein the C-sections are joined with a clamping piece that joins in a force-locking and form-locking manner at least one leg of the C-section of the frame with a leg of the C-section of the support section.

In this case the joint between the clamping piece and the C-section of the frame comprises a locking lug arranged on the clamping piece, which locking lug has a force-locking and form-locking effect on the inside of the leg and a stop for the C-section of the frame provided on the clamping piece, which stop prevents a lateral
movement of the C-section of the frame relative to the clamping piece in the plane of the cross-section of the C-section of the frame.

In both cases the joint between the clamping piece and the support section comprises a bent portion provided on the clamping piece, which engages from behind an elbow of a leg of the support section, and a stop for the support section arranged on the clamping piece thus preventing a lateral movement of the support section relative to the clamping piece in the plane of the cross-section of the support section of the frame.

A further development of the invention provides that two stops are provided both for the support section and the frame of the solar module, which stops prevent a lateral movement of the support section and of the C-section of the frame relative to the clamping piece in the plane of the cross-section of the sections. In this manner the locking lug is relieved from the forces which could dissolve the locked joint.

As usually several solar modules are installed, it is appropriate to match the support section and the clamping piece in such a manner that the external edge of the frame would not pass past the centre of the support section after a completed installation. In this manner one support section can be used for two solar modules.

In a further development of the invention in the cornice of the locking lug there is an inclined surface or an elastic plastic body is provided in the cornice, wherein the surface and the body are so dimensioned that the locking function of the locking lug is retained. By virtue of this construction it is achieved that no play can occur between the locking lug and the frame, therefore a tension will always exist between the locking lug and the frame.

The invention is explained below based on the drawings. They show in:

Fig.1 - an arrangement of the clamping piece when installing several solar modules,
Fig. 2 - a clamping piece with a stop for the frame of the solar module,

Fig. 3 - a clamping piece with two stops for the frame of the solar module,

Fig. 4 - an arrangement of the clamping piece when installing several solar modules, and

Fig. 5 - a clamping piece with a specially constructed locking lug.

The arrangement of the clamping piece illustrated in Fig. 1 is used particularly when installing several solar modules. A component of the frame 2 of the solar module 1 is a C-section having inward bent legs with its opening facing the support section 4. The support section 4 is a C-section with inward bent legs, which with its opening faces the frame 2 of the solar module 1. These C-sections are joined in a force-locking and form-locking manner with a clamping piece 3. For this purpose the clamping piece 3 has a locking lug 5 which in a force-locking and form-locking manner engages from behind an elbow 6 of the leg of the C-section of the frame 2.

A stop 7 for the C-section of the frame 2 of the solar module 1, provided on the clamping piece 3, prevents a lateral movement of the C-section of the frame 2 relative to the clamping piece 3 in the plane of the cross-section of the C-section of the frame 2.

The joint between the clamping piece 3 and the support section 4 comprises an angled portion 8 provided on the clamping piece 3, which angled portion engages from behind in a form-locking manner a bend of a leg 9 of the support section 4 and a stop 13 for the support section 4 provided on the clamping piece 3, which prevents a lateral movement of the support section 4 relative to the clamping piece 3 in the plane of the cross-section of the support section 4.

The support section 4 and the clamping piece 3 are matched to suit each other, so that the external edge of the frame 2 does not extend past the centre of the support section 4 after the completed installation. In this manner the support section 4 can be used for a further solar module, arranged to its left.
Fig. 2 shows an arrangement of the clamping piece also with only one stop 7 for the frame 2 of the solar module 1, as it is preferred at the end when several solar modules 1 are used. In this case the frame 2 of the solar module 1 completely covers the support section 4.

Fig. 3 shows a clamping piece 3 with two stops 7 for the frame 2 of the solar module 1, which prevent a lateral movement of the C-section of the frame 2 relative to the clamping piece 3 in the plane of the cross-section of the section. Thus the laterally acting loads, which could release the locked connection, will not affect the locking lug 5.

Fig. 4 shows an arrangement of the clamping piece when installing several solar modules 1, wherein the frame 10 of the solar module 1 is a C-section, the lateral surface of a leg of which points in the direction of the support section 4.

In this case the joint between the clamping piece 3 and the C-section of the frame 10 comprises a locking lug 5 provided on the clamping piece 3, which locking lug has a force-locking and form-locking effect on the inside of the leg 11, and a stop 7 for the C-section of the frame 10 provided on the clamping piece 3, which stop prevents a lateral movement of the C-section of the frame 10 relative to the clamping piece 3 in the plane of the cross-section of the C-section of the frame 10.

Fig. 5 shows that in the cornice 12 of the locking lug 5 an inclined surface or an elastic plastic body is arranged, wherein the surface and the body are so dimensioned that the locking function of the locking lug 5 is retained. By virtue of this construction it is achieved that a tension will always exist between the frames 2, 10 and the locking lug 5.
In the claims which follow and in the preceding summary of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprising" is used in the sense of "including", i.e. the features specified may be associated with further features in various embodiments of the invention.
The claims defining the invention are as follows:

1. A device for fastening of solar modules which have a frame with a profiled section and wherein a force-locked joint exists between the frame of the solar module and a support section, characterised in that between the support section and the frame of the solar module a form-locking and force-locking joint is produced by means of a clamping piece.

2. A device according to claim 1, characterised in that in each case a plurality of clamping pieces join one side of the frame of the solar module with the support section.

3. A device according to claim 1, characterised in that the joint between the support section and the clamping piece is a force-locked and/or form-locked joint.

4. A device according to claim 1, characterised in that the joint between the frame of the solar module and the clamping piece is a form-locked and force-locked joint.

5. A device according to claim 1, characterised in that a C-section, having inward bent legs, with its opening facing in the direction of the support section is a component of the frame of the solar module, the support, which is a C-section with inward bent legs with its opening facing the direction of the frame, and the C-sections are joined with a clamping piece that joins in a force-locking and form-locking manner at least one leg of the C-section of the frame with a leg of the C-section of the support section.

6. A device according to claim 5, characterised in that the joint between the clamping piece and the C-section of the frame comprises a locking lug arranged on the clamping piece, which locking lug engages from behind an elbow of the leg of the C-section of the frame in a force-locking and form-locking manner and a stop for the C-section of the frame, which prevents a
lateral movement of the C-section of the frame relative to the clamping piece in the plane of the cross-section of the C-section of the frame.

7. A device according to claim 1, characterised in that a C-section, the lateral surface of a leg of which points in the direction of the support section, is a component of the frame of the solar module, the support section is a C-section with inward bent legs with its opening facing the direction of the frame and the C-sections are joined with a clamping piece that joins in a force-locking and form-locking manner at least one leg of the C-section of the frame with a leg of the C-section of the support section.

8. A device according to claim 7, characterised in that the joint between the clamping piece and the C-section of the frame comprises a locking lug arranged on the clamping piece, which locking lug has a force-locking and form-locking effect on the inside of the leg and a stop for the C-section of the frame, which stop prevents a lateral movement of the C-section of the frame relative to the clamping piece in the plane of the cross-section of the C-section of the frame.

9. A device according to claim 5 or 7, characterised in that the joint between the clamping piece and the support section comprises a bent portion provided on the clamping piece, which engages from behind an elbow of a leg of the support section, and a stop for the support section, which prevents a lateral movement of the support section relative to the clamping piece in the plane of the cross-section of the support section of the frame.

10. A device according to claim 6, 8 or 9, characterised in that two stops are provided for the support section and the frame of the solar module, which stops prevent a lateral movement of the support section and of the C-section of the frame relative to the clamping piece in the plane of the cross-section of the sections.

11. A device according to claim 5 or 7, characterised in that the support section and the clamping piece are matched in such a manner that the external edge
of the frame would not pass past the centre of the support section after a completed installation.

12. A device according to claim 6 or 8, characterised in that the cornice of the locking lug has an inclined surface or an elastic plastic body is provided in the cornice, wherein the surface and the body are so dimensioned that the locking function of the locking lug is retained.

13. A device for fastening of solar modules substantially as herein described with reference to the accompanying drawings.

Dated this 18th day of July 2000

RegEn Energiesysteme GmbH
By their Patent Attorneys
GRIFFITH HACK
Fig. 2
Fig. 5