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(54) Title: MOUNTING SECTION FOR SOLAR PANELS

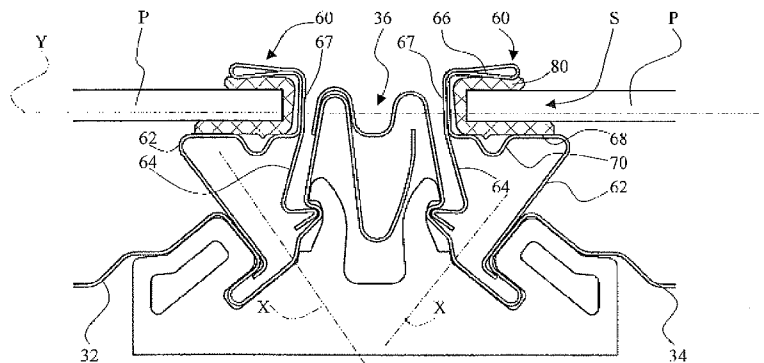


FIG. 3

(57) Abstract: A section bar is described for fixing solar panels to an underlying roof covering which is formed by the juxtaposition of plates which overlap to the side, the section bar having a cross section which comprises a seat (S) in which the end of a panel is held, and a part which is suitable for being snap-engaged onto the curved part of a rise (36) formed by a covering plate. The part which is engaged comprises two distinct portions which can be snap-engaged onto a respective curved part of the rise.

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MOUNTING SECTION FOR SOLAR PANELS

* * *

This invention relates to a mounting section for solar panels.

Industrial or residential roof coverings in the form of modular sheets increasingly require
5 the integration and coupling of photovoltaic panels to satisfy the growing need for alternative
energy sources.

To fix a panel to the covering a highly resistant and strong fixing system is needed,
particularly to resist the wind which could pull the panels off. Although they should as far as
possible avoid damaging the roof covering, which is the ultimate barrier for the infiltration of
10 water and other atmospheric agents, many systems require drilling or fixing that may damage
the roof covering itself. Every hole or slit weakens the roof, and long, expensive and
complicated repairs are necessary, above all in consideration of the fact that to do so the
photovoltaic system needs to be removed, compromising production.

The covering on which panels are mounted also requires a structure which guarantees access
15 during the inevitable periodical maintenance operations, when a person has to reach and walk
on the structure. The structure must support this weight but must also facilitate movement and
control/maintenance operations, which has not always been possible until now.

The main object of the invention is to improve the current state-of-the-art with a solar panel
fixing system which does not damage the roof.

20 A further object is to obtain a fixing system that is resistant to strong moving or lifting
forces.

In patent no. EP 1 885 968 the Applicant describes a covering structure for creating steel
sheet roof coverings. This roof covering (see references in this document) is formed by the
juxtaposition of profiled modules 2 which overlap to create a central protrusion (at the
25 channel 25).

A further object of the invention is to provide a fixing system which is preferably
compatible with the covering described in EP 1 885 968.

These objects are achieved with a section bar for fixing solar panels to an underlying roof
covering which is formed by the juxtaposition of plates which overlap to the side, the section
30 bar having a cross section which comprises a seat in which the end of a panel is held, and a

part which is suitable for being snap-engaged onto the curved part of a rise formed by a covering plate, characterised in that said part comprises two distinct portions which can be snap-engaged onto a respective curved part of the rise.

Further characteristics and advantages of the invention will be made clearer by the description of a fixing system, together with the attached drawings, in which:

figure 1 shows a three-dimensional extended view of a system according to the invention;

figure 2 shows a vertical section view of the system shown in fig. 1;

figure 3 shows an enlarged detail of fig. 2;

figure 4 shows a detail of fig. 3 with a component part in a initial fastening phase;

figure 5 shows the component part of fig. 4 in a final fastening phase.

Figures 1 and 2 show the covering 30 of a roof RF formed by section bars 32, 34 which are suitable for laying in a juxtaposed position and which, by being overlapped, create a rise 36. Section bars 60 according to the invention can be snap-fitted onto the rise 36, and are then used to fix the solar panels P to the underlying covering 30. The covering 30 is that described in EP 1 885 968, but for the purposes of the invention any covering in which channels or reliefs can be used to fix the section bar 60 is suitable.

Each section bar 60 has (a cross section which comprises) a panel-holding part, in which a seat S is formed which holds the end of the panel P, and a part, called the connecting part, which is suitable for snap-engaging onto a curved portion of the rise 36. This portion, in particular, in the figures is on the sides of the rise 36.

The connecting part comprises two distinct legs or end portions 62, 64 which can be snap-engaged onto the respective complementary curves of the rise 36. As it is simpler, easier and more reliable to mount, to fix the section bar 60 on only one side of the rise 36, the portions 62, 64 are configured to engage onto the same side of the rise 36 (but could also be coupled to the top or to both sides of the rise 36).

In fig. 5 the axial symmetry of the fixing system deriving from the use of two section bars 60 on the sides of one rise 36 can be seen. Clearly a panel P is fixed between two protrusions 36 with two section bars 60 mounted in a specular manner.

The portions 62, 64 are free ends of the section bar 60 and comprise C- or U-shaped end-folds facing outwards or inwards to the section bar 60. The purpose is to create hooked shapes or reliefs (folds in the portions 62, 64) which can then slot into or snap fit, by shape coupling, onto the grooves or protruding folds present on the side surface of the rise 36.

5 The seat S substantially has a C or U shaped section bar, and has two resting walls 66, 68, which support the larger surfaces of the panel P connected by a wall 67 which is approximately at right angles to them. The walls 66, 68 define the ends of the C or U, and are substantially parallel to each other and to a horizontal plane Y. The extension of the walls 66, 67, 68 can vary according to the size of the panel P and/or to best create one or more surfaces
10 which act as a support. Preferably filling means are inserted between the walls 66, 67, 68 and the panel P, e.g. a layer 80 of silicon or a rubber shim, even only along some section bars of the photovoltaic module in order to avoid damaging the fastened surface of the panel P.

Preferably the resting wall 68, the lower one, has a local shaping that forms a cavity 70 which acts as a drainage channel for any water infiltrating between the panel P and the section
15 bar 60. A similar functional cavity can also be obtained in the walls 67, 66.

To facilitate the spacing from the rise 36 and to improve the adaptation of the section bar 60 to any covering, each portion 62, 64 extends along one direction, see plane X, which is slanted with respect to the plane Y. This slant creates an angle which depends on the geometry of the covering plate to which the section bar must be fastened, and preferably
20 varies between 30 and 60 degrees, in particular it is 50 degrees. Therefore the portion 62 extends along the plane X by a distance approximately equal to that of the portion 64 plus a further length M (fig. 4), given approximately by the length of the wall 68 multiplied by $\sin(50^\circ)$.

For the same reasons, the portions 62, 64 run along the plane X as far as is needed for both
25 to end approximately on a common plane Z which is slanted with respect to the plane Y by a given angle. The resting walls 66, 68 should be maintained horizontal, adapting the slant of the section bar 60 to that of the side of the rise 36.

The overall geometric construction in any case depends on the slant of the side of the rise
36.

30 The element 60 should preferably be made from cold-drawn steel sheet using the same metal as the elements 32, 34, in order to prevent galvanic corrosion. Furthermore the use of

the same material, in the event of pre-painted elements, avoids differences in colour between one element and the other and reduces any unwanted visual impact.

CLAIMS

1. Section bar (60) for fixing solar panels (P) to an underlying roof covering (RF) which is formed by the juxtaposition of plates (32, 34) which overlap to the side, the section bar having a cross section which comprises
 - 5 a seat (S) in which the end of a panel is held, and
 - a part which is suitable for being snap-engaged onto the curved part of a rise (36) formed by a covering slab, **characterised in that** said part comprises two distinct portions (62, 64) which can be snap-engaged onto a respective curved part of the rise.
2. Section bar (60) according to claim 1, in which the snap-engageable portions are
 - 10 configured to be engaged onto the same side of the protrusion.
3. Section bar (60) according to claims 1 or 2, in which the snap-engageable portions are obtained on the free ends of the section bar.
4. Section bar (60) according to any of the preceding claims, in which the snap-engageable portions consist of C- or U-shaped folds facing outwards or inwards to the section bar.
5. Section bar (60) according to any of the preceding claims, in which said seat has a C- or
 - 15 U-shaped section and has supporting walls (66, 68) for the larger surface of the panel which are substantially parallel to each other.
6. Section bar (60) according to any of the preceding claims, comprising filling means (80) between the walls of the seat and the panel.
7. Section bar (60) according to claim 6, in which said filling means comprise a layer of
 - 20 silicon or a rubber shim.
8. Section bar (60) according to any of the preceding claims, in which one or each of the supporting walls (66, 68) has a local shaping (70) which forms a cavity which acts as a drainage channel for any water infiltrating between the panel and the section bar.
9. Section bar (60) according to any of the preceding claims, in which one or each of the free ends extends along a direction (X) which is slanted with respect to the plane (Y) containing the parallel walls (66, 68) of said seat.
 - 25
10. Section bar (60) according to claim 9, in which said slant is approximately 50 degrees.

11. Section bar (60) according to any of the preceding claims, in which the free ends are of a length which allows them to end on a common plane (Z) which is slanted with respect to the plane containing the parallel walls of said seat.

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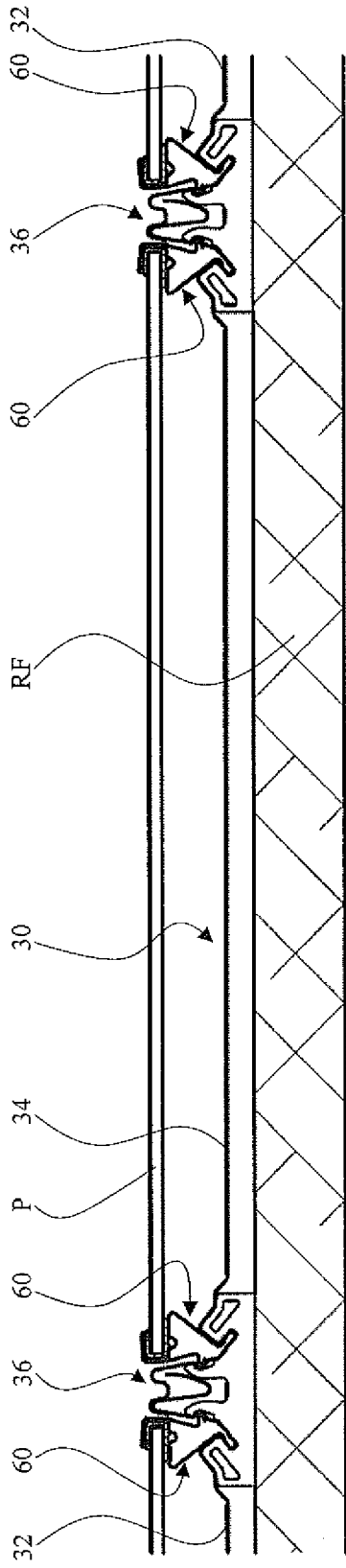


FIG. 1

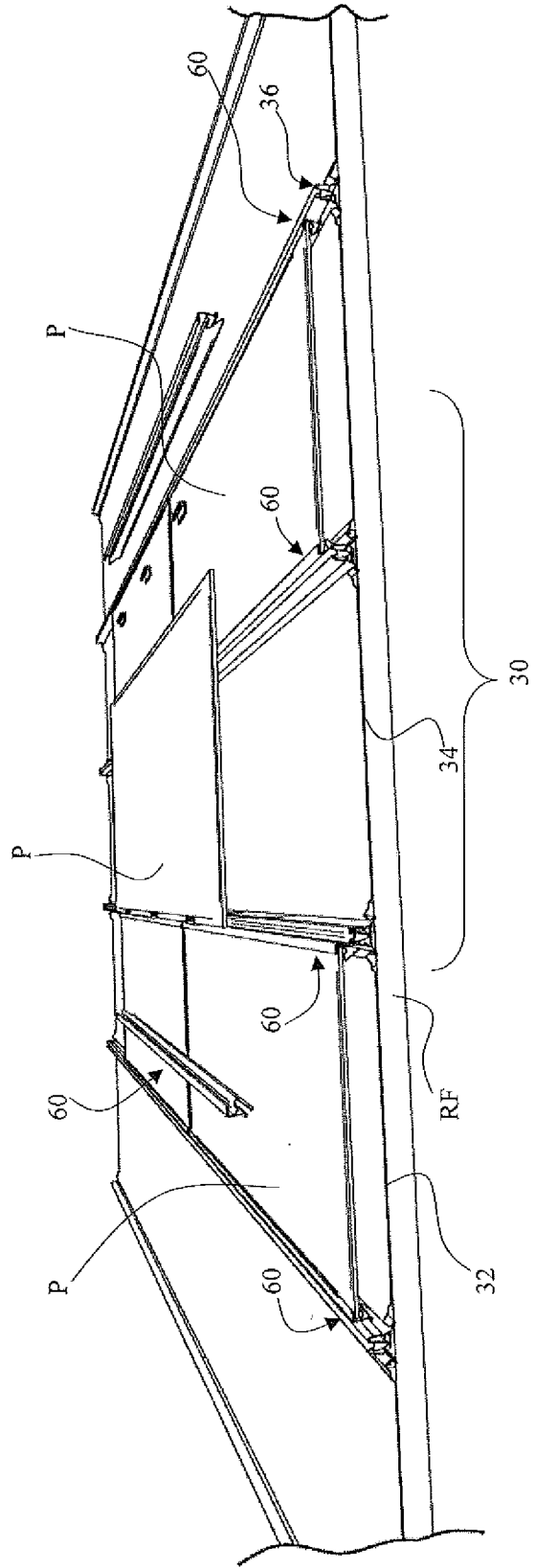


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/053093

A. CLASSIFICATION OF SUBJECT MATTER

INV. F24J2/52 H01L31/042 E04D3/36 E04D13/18
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24J H01L E04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 775 777 A2 (NIHON TEPPAN CO LTD [JP]) 18 April 2007 (2007-04-18) paragraphs [0023], [0033], [0050] - [0053]; figures 1, 4,7 -----	1,3-5
X	US 4 390 010 A (SKILLMAN DALE N [US]) 28 June 1983 (1983-06-28) column 3, line 40 - column 4, line 2; figures 3,4 -----	1,3,5,9
X	DE 202 09 892 U1 (MÄDER) 2 October 2002 (2002-10-02) page 3, line 24 -----	1-7
X	FR 2 561 362 A1 (RAFFINAGE CIE FRANCAISE [FR]) 20 September 1985 (1985-09-20) page 7, line 19 - page 9, line 4; figures 1-2b -----	1,3,5,9
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	DE 10 2005 019857 A1 (SCHMID RUDOLF [DE]) 26 January 2006 (2006-01-26) paragraph [0022] - paragraph [0032]; figures 1-6 -----	1-11
A	EP 1 885 968 B1 (ISCOM S P A [IT]) 18 February 2009 (2009-02-18) cited in the application paragraph [0035] - paragraph [0057]; figures 1-9 -----	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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