

PHOTOVOLTAIC PANEL FASTENER AND PHOTOVOLTAIC PANEL MODULE
MOUNTING DEVICE

Technical field of the invention

The present invention generally relates to a fastener. More particularly, it relates to a photovoltaic panel fastener for fastening a photovoltaic panel module to a support structure, and a device for mounting a
5 photovoltaic panel module including such fasteners.

Prior art

With respect to conventional energy sources, solar energy is practical to use and not very costly.
10 Photovoltaic solar panels are used to directly convert solar energy into electric energy in order to power electric equipment or provide electric energy to the power grid. Generally, the assembly frame for maintaining and fastening the solar panel is installed on a support
15 structure, a guide rail or a wall plate of the building, or installed on the ground by threaded fasteners and supports.

As shown in figure 1, the assembly frame 10 of the photovoltaic solar panel is mainly fastened to the

support structure 20 of the photovoltaic panel by bolts 30 and nuts 40. The nut 40 is generally placed in the cavity of the assembly frame 10, and the bolt 30 is inserted into the support structure 20 and adapted to the nut 40 placed in the assembly frame 10 to attach the assembly frame 10 to the support structure 20. Given that the space for housing the nut 40 in the assembly frame 10 is limited, it is not favourable to the precise positioning of the nut 40 during the mounting process, which makes quickly finding a position of alignment of the bolt 30 and of the nut 40 difficult. Moreover, the nut 40 is easy to rotate in the assembly frame 10 during the mounting process, and the clamping force cannot be controlled, which makes the entirety of the mounting process long and tedious, and the stability of the assembly cannot be guaranteed.

Disclosure of the invention

The object of the invention is to propose a photovoltaic panel fastener with a simple structure and practical operation, in order to effectively reduce the cost of labour and of production.

For this purpose, according to one aspect of the present invention, a photovoltaic panel fastener is provided. It is configured to cooperate with threaded fasteners to fasten the assembly frame of the photovoltaic panel to a support structure. The photovoltaic panel fastener comprises:

- a main body, the main body being substantially parallel to the mounting plane of the support structure;
- a threaded connector, the threaded connector extending perpendicularly to the main body and having a

passage to receive the threaded fastener, and the inner wall of the passage of which is provided with an inner thread to cooperate with the outer thread of the threaded fastener;

5 - a pair of clamping elements extending respectively from the end surface of the main body and which are disposed along the first direction and symmetrical with respect to the central axis of the threaded connector, so as to be suitable for clamping the assembly frame; and

10 - a pair of support elements, the pair of support elements being disposed along the second direction and symmetrical with respect to the central axis of the threaded connector, wherein each support element is respectively connected to a clamping element and
15 extending beyond the free end of the clamping element to bear against the mounting plane of the support structure, and the second direction is perpendicular to the first direction.

Advantageously, the threaded connector which adapts
20 to the threaded fastener is disposed directly on the photovoltaic panel fastener. It suffices to screw the threaded fastener into the threaded connector to carry out a fast fastening, without having to handle the threaded connector in the assembly frame, this
25 facilitating the installation and the disassembly and thus reducing the cost of labour with less time necessary. Moreover, the support elements and the clamping elements are disposed symmetrically in two directions perpendicular to one another, which makes the structure
30 of the photovoltaic panel fasteners more compact and improves the overall resistance.

The invention can further comprise one or more of the following features.

In some embodiments, the threaded connector and the pair of clamping elements are disposed on the same side
5 of the main body, and the pair of support elements are spaced apart so that they do not interfere with the outer circumference of the threaded connector; or the threaded connector and the pair of clamping elements are respectively arranged on both sides of the main body, and
10 the spacing between the pair of support elements is less than the outer diameter of the corresponding threaded fastener.

In some embodiments, the support element is configured to be substantially in the shape of a U and
15 comprises a first support part extending towards the main body, a second support part for bearing against the mounting plane of the support structure, and a support link part between the first support part and the second support part, wherein the second support part is
20 connected with the clamping element via a bridge in the shape of an arc.

In some embodiments, the bridge in the shape of an arc is folded towards the inside from the free end of the clamping element to extend up to the second support part.

25 The structure of the support element of the invention allows to increase the zone of contact between the support element and the mounting plane of the support structure, thus reinforcing the stability of the support. Moreover, the support elements and the clamping elements
30 are connected by bridges in the shape of an arc, this allowing to have a desired fastening resistance.

In some embodiments, the support element is provided with a reinforcing rib extending from the first support part to the second support part.

5 In some embodiments, the clamping element is provided with a notch to reduce the rigidity of the clamping element.

In some embodiments, the photovoltaic panel fastener has a first state, called preassembly state, and a second state, called fastening state: in the first state, the support element and the main body are separated by a first space, and in the second state, the support element bears against the main body under the action of a clamping force.

15 The first space first allows a visual verification in various states. The main body allows to provide a support when the support element bears against the main, which further reinforces the overall resistance of the photovoltaic panel fastener.

20 In some embodiments, the fastening force is applied by screwing the threaded fastener into the threaded connector along the passage.

According to another aspect of the present invention, a device for mounting a photovoltaic panel module is provided. The mounting device comprises an assembly frame for the installation of photovoltaic panels, a support structure and at least one photovoltaic panel fastener according to the present invention. In this mounting device, the assembly frame further comprises a frame body and a photovoltaic panel clamping slot provided on the top of the frame body. The frame body comprises a cavity provided with an opening for receiving the photovoltaic panel fastener. A pair of clamping elements of the

photovoltaic panel fastener are configured to be stopped against an inner stop surface in the cavity when they are inserted into the cavity via the slot. When the photovoltaic panel fastener is in the preassembly state, there is a second space between the clamping element and the inner stop surface. When the photovoltaic panel fastener is in the fastening state, the clamping elements bear against the inner stop surface under the action of the clamping force.

10 In some embodiments, the support structure is provided with a mounting hole corresponding to the slot, so that the threaded fastener can be coupled with the threaded connector while passing through the mounting hole and the slot, hence the fastening force is applied by screwing of the threaded fastener of the support structure into the threaded connector of the photovoltaic panel fastener.

In some embodiments, the width of the support element of the photovoltaic panel fastener is configured to be less than or equal to that of the slot.

20 The photovoltaic panel fasteners proposed have a simple and compact structure, requiring a reduced space. Advantageously, the panel fasteners are easy to adjust and mount/disassemble on the support structure and the assembly frame allowing to save the mounting costs and improve the efficiency of the work. The fastener of the photovoltaic panel in the device for mounting the photovoltaic panel module allows to easily obtain a stable and reliable installation, which is adapted to numerous circumstances.

Brief description of the drawings

The other features and advantages of the present invention will be better understood via the following optional implementations described in detail in relation to the appended drawings. The same signs in the appended
5 drawings identify the same components or similar components, in which:

Figure 1 illustrates a device for mounting a photovoltaic panel module known from the prior art;

Figure 2a is a perspective view of a frame for
10 mounting photovoltaic panels according to an embodiment of the present invention; Figure 2b is an orthographic view of the assembly frame shown in figure 2a;

Figure 3a is a perspective view of a support structure according to an embodiment of the present
15 invention, showing an assembled threaded fastener;

Figure 3b is an orthographic view of the support structure shown in figure 3a;

Figure 4a is a perspective view of a photovoltaic panel fastener according to an embodiment of the present
20 invention;

Figure 4b is another perspective view of a photovoltaic panel fastener;

Figure 4c is an orthographic view of the photovoltaic panel fastener on a support-element side;

25 Figure 4d is an orthographic view of the photovoltaic panel fastener on the clamping-element side;

Figure 4e is a top view of the photovoltaic panel fastener;

30 Figure 4f is a bottom view of the photovoltaic panel fastener;

Figure 5a is a perspective view of the photovoltaic panel fastener installed on the support structure in the first state;

Figure 5b is a cross-sectional view in the state
5 shown in Figure 5a;

Figure 5c is another cross-sectional view in the state shown in figure 5a;

Figure 6a is a perspective view of the assembly frame mounted on the support structure, the fastening
10 elements of the photovoltaic panel being housed in its cavity in a second state;

Figure 6b is a cross-sectional view of the state shown in figure 6a;

Figure 7a is a perspective view of the photovoltaic
15 panel fastener and of the threaded fastener in a third state for attaching the assembly frame and the support structure;

Figure 7b is a cross-sectional view in the state shown in figure 7a.

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Description of the embodiments

The embodiments are described in detail below. It must be understood that the specific embodiments described are simply illustrative of specific
25 implementations of the present invention, and are in no way limiting. The structural position of each component, such as above, below, at the top and at the bottom, is not absolute, but relative. When the various parts are disposed as indicated in the drawing, these expressions
30 of direction are appropriate, but when the position of each part in the drawing changes, these expressions of direction also change accordingly.

The photovoltaic panel fastener according to the present invention is used to attach the assembly frame of the photovoltaic panel and the support structure. In the embodiments described below, an assembly frame and a support structure are illustrated as an example, but it must be understood that the photovoltaic panel fastener of the present invention is also applicable to assembly frames and support structures with other similar structures.

In reference first of all to figures 2a and 2b, an assembly frame 10 is visible. The assembly frame 10 has, for example, an elongated structure, and comprises a frame body 11 and a photovoltaic panel clamping slot 12 provided on the upper part of the frame body 11. The frame body 11 comprises a cavity 112 provided with an opening 111 for receiving photovoltaic panel fasteners, the opening 111 extending over the length of the assembly frame 10. The side of the frame body 11 on which the opening 111 is provided comprises an outer contact surface 113 configured to come in contact with the support structure, and an inner stop surface 114 located in the cavity 112, the inner stop surface 114 being used to cooperate with the corresponding parts of the photovoltaic panel fasteners.

Figures 3a and 3b show a support structure 20. The support structure 20 is, for example, in the shape of a C, comprising a mounting surface 21 that can come in contact with the outer contact surface 113 of the assembly frame 10. The mounting surface 21 includes a mounting hole (as illustrated in figure 5c) which corresponds to the opening 111 for receiving threaded fasteners. Optionally, the threaded fastener is a bolt 30 with a nut 31 as shown

in the drawing. In some embodiments, a washer 50 is provided between the nut 31 of the bolt 30 and the support structure 20. The dowel section of the bolt 30 can be connected to the photovoltaic panel fastener by passing through the mounting hole 22 and the opening 111 of the assembly frame 10, so as to fasten the assembly frame 10 to the support structure 20.

According to the present invention, the threaded connector is integrated onto the fastener of the photovoltaic panel, and the engagement between the bolt and the threaded fastener can be obtained by actuating the bolt on the support structure. In this way, the narrow operating space on the assembly frame is converted into a larger space on the support structure, which is practical for the assembly and the disassembly by the operator. Moreover, in comparison to existing structures, the photovoltaic panel fastener of the present invention has an increased overall resistance, so that the assembled photovoltaic panel module is more stable and reliable, and can adapt to various circumstances.

Figures 4a to 4f show a photovoltaic panel fastener 60 according to one embodiment. The photovoltaic panel fastener 60 mainly comprises a main body 61, a threaded connector 62, a pair of clamping elements 63 and a pair of support elements 64. The main body 61 is substantially parallel to the mounting surface 21 of the support structure 20, and the threaded connector 62 extends perpendicularly to the main body 61 and includes a passage 622 for receiving the bolt 30 (as illustrated in figure 4e). The inner wall of the passage 622 is provided with an inner thread 621 cooperating with the outer thread 32 of the bolt 30 (as illustrated in figure 5b).

As shown in figure 4c, a pair of clamping elements 63 respectively extend from the end surface of the main body 61 and are disposed symmetrically with respect to the central axis XX of the threaded connector 62 according to a first direction D1 to carry out the clamping of the assembly frame 10. As shown in figure 4d, a pair of support elements 64 are disposed symmetrically with respect to the central axis XX of the threaded connector 62 along a second direction D2. The second direction D2 is perpendicular to the first direction D1, as illustrated in figure 4e. Each support element 64 is respectively connected to a clamping element 63 and extends beyond the free end of the clamping rib 63 to bear against the mounting surface 21 of the support structure 20. In this way, the clamping elements and the support elements can be arranged in a compact manner, so that the space occupied by the photovoltaic panel fasteners is reduced, which is particularly advantageous for the narrow space of the assembly frame. Moreover, the symmetrical arrangement of the clamping elements and of the support elements also makes the structural design simpler, and at the same time, the force is uniformly distributed for the support and the clamping. In the following description, just one of the clamping elements and one support element are described for more clarity.

In the embodiment illustrated, the threaded connector 62 is presented as an example in the form of a nut having a circular transverse cross-section. It must be understood that the outer peripheral shape of the threaded connector is not limited to that shown in the drawing, and can also have a square or other shape, as

long as its inner thread is adapted to be compatible with the outer thread of the bolt.

In some embodiments not shown, the threaded connector 62 and the pair of clamping elements 63 can be
5 arranged on the same side of the main body 61, that is to say that both are located under the main body 61 in the orientation shown in the drawings so as to reduce the bulk of the photovoltaic panel fasteners. In this way, the pair of support elements 64 do not interfere with the
10 outer circumference of the threaded connector. In the embodiment shown in the drawing, the threaded connector 62 and the pair of clamping elements 63 are respectively arranged on both sides of the main body 61. In this way, the space between the pair of support elements 64 is
15 advantageously less than the outer diameter of the bolt 30. In this way, the fasteners of the photovoltaic panel can be sheathed onto the bolts 30 shown in figures 3a and 3b, so that the ends of the bolts 30 are inserted between the support elements 64 and maintained, in order for the
20 fastener of the photovoltaic panel 60 to be preinstalled on the support structure 20.

As shown in figures 4a to 4f and 5b, in some embodiments, the support element 64 is configured to be substantially in the shape of a U. It comprises a first
25 support part 641 extending towards the main body 61, a second support part 642 to be stopped against the mounting surface 21 of the support structure 20 and a support link part 643 between the first support part 641 and the second support part 642. The second support part
30 642 and the clamping element 63 are connected by a bridge 65 in the shape of an arc. In this way, an enlarged contact zone between the support element 64 and the

mounting surface 21 of the support structure 20 can be obtained via the second support part 642, and an effect of reliable support can be obtained. The manner in which the bridge in the shape of an arc 65 is used to link the support element 64 and the clamping element 63 also allows to obtain the desired fastening resistance, which will be more clearly understood with the detailed description below. Advantageously, as shown in figure 4c, the bridge in the shape of an arc 65 is folded towards the inside from the free end of the clamping element 63 to extend up to the second support part 642. In this way, the support element 64 does not interfere with the locking rib 63 when it is deformed under stress. Moreover, this also allows to configure the width of the support element 64 so as to be less than or equal to the width of the opening 111 of the assembly frame 10 without affecting the installation with the assembly frame 10.

In order to give the support element 64 an increased structural resistance, a reinforcing rib 644 extending from the first support part 641 to the second support part 642 is advantageously provided on the support element 64. Optionally, the reinforcing rib 644 can extend continuously from the first support part 641 through the support link part 643 and to the second support part 642 as shown in the drawing. Alternatively, the reinforcing rib can be shaped like a structure with multiple sections extending in a discontinuous manner, that is to say that independent reinforcing ribs are formed on the first support part 641, the support link part 643 and the second support part 642. This can also increase the resistance of the support elements.

In some embodiments, notches are provided on the clamping element 63 to reduce the rigidity of the clamping element. In the embodiment shown in figures 4a and 4b, the notch 66 can be formed at the free end of the clamping element 63 and adjacent to the bridge in the shape of an arc 65. This allows to reduce the insertion force required during the assembly of the assembly frame 10 and the photovoltaic panel fastener 60. Alternatively, more than one notch can be provided, and the notch can be provided in any suitable position on the clamping element. The notch can for example be formed by an opening in the median position at the clamping element.

Advantageously, the photovoltaic panel fastener according to the present invention can have a preassembly state and a fastening state. Figure 4c shows that when the fastener of the photovoltaic panel is not fastened, that is to say in the preassembly state, the structure in the shape of a U of the support element 64 defines a first space d1 formed between the first support part 641 and the main body 61. Once the fastening force has been applied and in the fastening state, the first support part 641 bears against the main body 61 under the action of the fastening force, and the first space d1 is no longer visible. In other words, the main body 61 allows to provide a support; and from the point of view of the operator, the first space d1 can be viewed directly to know whether the fastening has been obtained, so that the fastening force can be applied in a controlled manner. The application of an excessive force can be avoided, thus avoiding damaging the parts. In some embodiments, the fastening force mentioned above is applied by screwing of the bolt 30 into the threaded connector 62

along the passage 622 d. This is described in detail below.

That which follows describes the other embodiment of the photovoltaic panel fastener, which is applied to the device for mounting the photovoltaic panel module, in relation to figures 5a to 7b.

In the embodiment illustrated, the device for mounting the photovoltaic panel module comprises the assembly frame 10, the support structure 20 and the photovoltaic panel fastener 60 as described above. Once the bolts 30 have been installed on the support structure 20 as shown in figures 3a and 3b, and as shown in figures 5a to 5c, the fasteners 60 of the photovoltaic panel can be engaged onto the bolts 30 via the top of the mounting surface 21 of the support structure 20. The bolt 30 is engaged with a part of the inner thread 621 of the threaded connector 62, and figure 5b shows that the bolt 30 is clamped by the support link part 643 of a pair of support elements. The photovoltaic panel fastener 60 is thus in the first state of preliminary positioning, or in the unstressed preassembly state. There is a first space d1 between the first support part 641 of the support element 64 and the main body 61, as shown by figure 5b. In parallel, the second support part 642 comes in contact with the mounting plane 21 of the support structure 20 without undergoing an outside force. Moreover, the operator can manually rotate the fastener of the photovoltaic panel to position it in the desired direction. Because of this structural design, the photovoltaic panel fastener 60 and the support structure 20 can be considered as preassembled components in some embodiments, for example, preassembled on the support

structure 20. A plurality of bolts 30 and of photovoltaic panel fasteners 60 can thus be applied to various types of assemblies. For example, the photovoltaic panel is generally a rectangular structure, and at least four photovoltaic panel fasteners 60 on the two support structures 20 are necessary to attach the photovoltaic panel. The preassembled components mentioned above can efficiently reduce the assembly time in the first steps of the assembly.

Then, as shown in figures 6a and 6b, the assembly frame 10 with the opening downwards is mounted to the fastener of the photovoltaic panel, in the direction of the arrow of figure 6a. As described above, the clamping elements 63 are configured to clamp the assembly frame 10. For this reason, the pair of clamping elements 63 of the photovoltaic panel fastener can be configured to be stopped against the inner stop surface 114 in the cavity 112 when they are inserted into the cavity via the slot. This means that (i) when the assembly frame 10 is inserted downward, its bottom comes in contact and presses the surface of the pair of clamping elements 63, (ii) the pair of clamping elements 63 deform towards one another until the assembly frame 10 has completely passed through, (iii) the outer contact surface 113 of the bottom is in contact with the mounting plane 21 of the support structure, and (iv) the clamping element 63 is put back in place and is stopped against the inner stop surface 114. This is also why the notch is provided on the clamping element 63: to reduce the rigidity, thus facilitating the assembly of the frame insert. At this moment, the photovoltaic panel fastener is in the second assembly state in the cavity of the assembly frame, but

is still in an unstressed preassembly state, and there is a first space d1 between the first support part 641 and the main body 61. Moreover, figures 6a and 6b show that a second space d2 is also formed between the clamping element 63 and the inner stop surface 114. Consequently, the assembly frame 10 can for example be moved horizontally along the mounting surface 21, in the orientation shown in figure 6b to adjust the position in order to ensure the accuracy of the positioning.

When it is put in place, as shown by figures 7a and 7b, the operator can further rotate the bolt 30 upward in the direction of the arrow from below the support structure. In this way, the threaded connector 62 of the fastener of the photovoltaic panel moves downward under the action of the engagement until the clamping element 63 bears against the inner stop surface 114 of the assembly frame 10. The second space d2 is thus no longer visible, and a torque is applied during the rotation of the bolt to obtain the desired fastening force. The arrangement of the bridge in the shape of an arc is such that when a torque is applied to deform the support element, the bridge in the shape of an arc is also deformed accordingly, thus giving the support element a wider deformation interval. In other words, this constitutes a clamping force interval. Moreover, with respect to the rigid contact, the existence of a bridge in the shape of an arc also makes the bolt 30 less liable to become defective after having been clamped. At this moment, the photovoltaic panel fastener is in the third state of fastening of the assembly frame 10 and of the support structure 20, which is the fastening state from which the fastening effect is obtained. As visible in the

drawing, the first space d1 is no longer visible, a support part 641 and the main body 61 bear against one another, which reinforces the overall resistance of the fastener of the photovoltaic panel, and makes the fastening more stable and reliable. Moreover, in the fastening state, the existence of the bridge in the shape of an arc also allows the assembly frame to have a certain elasticity according to the clamping axis, which further has an anti-vibration effect.

10 However, during disassembly, the bolt 30 can be rotated in the reverse direction under the support structure 20, so that the threaded connector 62 of the photovoltaic panel fastener 60 moves upward under the action of the threaded engagement and goes back to the state shown in figure 6a.

15 The disassembly operation can thus be implemented accordingly, which is practical and fast. It is noted that, with respect to the methods for fastening a photovoltaic panel known from the prior art, the photovoltaic panel fastener according to the present invention has a simple structure and is easy to manufacture. The forces to be applied to carry out the fastening are smaller, and the implementation is simpler, while obtaining a stable connection during the installation.

25 It must be understood here that the embodiment shown in the drawing only shows the optional architecture, shape, size and arrangement of the various optional components of the device for attaching a photovoltaic panel to a photovoltaic panel module according to the present invention, but this is only an illustration and this is not of a limiting nature. Other shapes,

dimensions and arrangements can also be adopted without going beyond the idea and the scope of the present invention.

5 The technical content and the technical features of the present invention have been described above. However, it is understood that in the spirit of the present invention, a person skilled in the art can make various changes and improvements to the concept described above, but they all fall within the scope of protection of the
10 present invention. The description of the embodiments mentioned above is illustrative rather than restrictive, and the scope of protection of the present invention is determined by the claims.

CLAIMS

1. Photovoltaic panel fastener (60), capable of cooperating with threaded fasteners to fasten an assembly frame (10) of the photovoltaic panel to a support structure (20), characterised in that the photovoltaic panel fastener comprises:
- 5 - a main body (11), said main body (11) being substantially parallel to a mounting surface (21) of the support structure (20);
- 10 - a threaded connector (62), the threaded connector (62) extending perpendicularly to the main body (11) and having a passage (622) provided with an inner thread to receive a threaded fastener;
- 15 - a pair of clamping elements (63), the pair of clamping elements (63) extending respectively from an end surface of the main body (61) and being disposed along the first direction and symmetrical with respect to a central axis of the threaded connector (62), so as to be suitable for clamping the assembly frame (10); and
- 20 - a pair of support elements (64), the pair of support elements (64) being disposed along the second direction and symmetrical with respect to the central axis of the threaded connector (62), hence each support element (64) is respectively connected to a clamping element (63) and extends beyond the free end of the clamping element (63)
- 25 to bear against the mounting surface (21) of the support structure (20), and the second direction is perpendicular to the first direction.
2. Photovoltaic panel fastener (60) according to claim 1,
- 30 wherein the threaded connector (62) and the pair of

clamping elements (63) are disposed on the same side of the main body (10), and the pair of support elements (64) are spaced apart so that they do not interfere with the outer circumference of the threaded connector (62); or
5 alternatively the threaded connector (62) and the pair of clamping elements (63) are respectively arranged on both sides of the main body (10), the spacing between the pair of support elements (64) being less than the outer diameter of the threaded fastener.

10

3. Photovoltaic panel fastener (60) according to claim 1, wherein the support element (64) is arranged to be substantially in the shape of a U and comprises a first support part (641) extending towards the main body (61),
15 a second support part (642) for bearing against the mounting surface (21) of the support structure (20), and a support link part between the first support part (641) and the second support part (642), hence the second support part (642) is connected with the clamping element
20 (63) via a bridge in the shape of an arc (65).

25

4. Photovoltaic panel fastener (60) according to claim 3, wherein the bridge in the shape of an arc (65) is folded towards the inside from the free end of the clamping
element (63) to extend up to the second support part (642).

30

5. Photovoltaic panel fastener (60) according to claim 3, wherein the support element (64) is provided with a reinforcing rib (644) extending from the first support
part (641) to the second support part (642).

6. Photovoltaic panel fastener according to claim 2, wherein the clamping element (63) is provided with a notch (66) to reduce the rigidity of the clamping element (63).

5

7. Photovoltaic panel fastener (60) according to any one of claims 1 to 6, wherein the photovoltaic panel fastener (60) can have a first state, called preassembly state, and a second state, called fastening state:

10 in the first state, the support element (64) and the main body (61) are separated by a first space;

in the second state, the support element (64) bears against the part of the main body (61) under the action of a clamping force.

15

8. Photovoltaic panel fastener (60) according to claim 7, wherein the fastening force is applied by screwing the threaded fastener into the connector (62).

20 9. Device for mounting a photovoltaic panel module, comprising an assembly frame (10) for the installation of photovoltaic panels, a support structure and at least one photovoltaic panel fastener (60) according to any one of claims 1 to 8, characterised in that:

25 the assembly frame (10) comprises a frame body (11) and a photovoltaic panel clamping slot (12) provided on an upper part of the frame body (11), and the frame body (11) comprises a cavity (112) provided with an opening (111) for receiving the photovoltaic panel fastener (60);

30 a pair of clamping elements (63) of the photovoltaic panel fastener (60) are configured to be stopped against

an inner stop surface (114) when they are inserted into the cavity via the slot (12),

wherein the clamping element (63) and the inner stop surface (114) are separated by a second space (d2) in the preassembly state, and the clamping elements (63) bear against the inner stop surface (114) under the action of the clamping force in the fastening state.

10. Mounting device according to claim 9, wherein the support structure (20) is provided with a mounting hole (22) that corresponds to the slot (12), so that the threaded fastener can be coupled with the threaded connector (62) while passing through the mounting hole (22) and the slot (12), hence the fastening force is applied by screwing of the threaded fastener by the support structure (20) into the threaded connector (62) of the photovoltaic panel (60).

11. Mounting device according to claim 9, wherein the support (64) of the photovoltaic panel fastener (60) has a width that is less than or equal to that of the slot (12).