

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 October 2011 (06.10.2011)

PCT

(10) International Publication Number
WO 2011/121048 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/EP2011/054962

(22) International Filing Date:
30 March 2011 (30.03.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/318,899 30 March 2010 (30.03.2010) US

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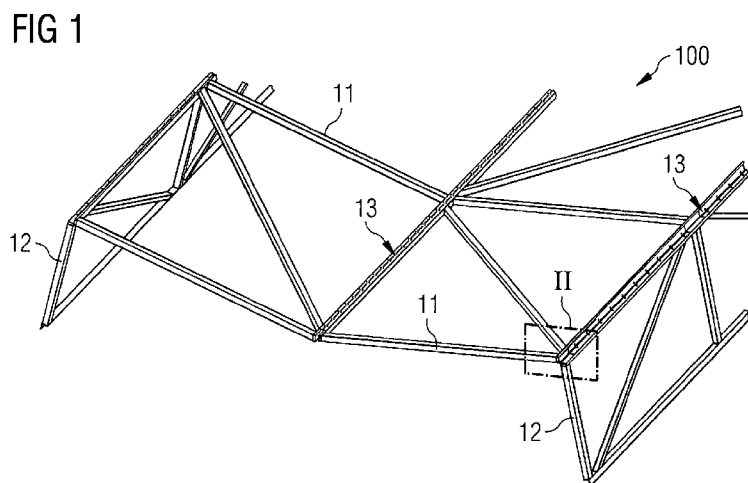
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) Title: HINGE FOR A SOLAR SUPPORT STRUCTURE, ARRANGEMENT WITH THE HINGE AND METHOD FOR MANUFACTURING THE ARRANGEMENT



(57) Abstract: The invention refers to a hinge for a solar support structure, an arrangement with the hinge and a method for manufacturing the arrangement. The hinge comprises a thin bendable strip attachable to at least two frames of the solar support structure such, that the frames can execute a link motion relatively to each other via a bending of the hinge. Moreover an arrangement with the hinge and a method for manufacturing the arrangement are disclosed.



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Description

**HINGE FOR A SOLAR SUPPORT STRUCTURE, ARRANGEMENT WITH THE
HINGE AND METHOD FOR MANUFACTURING THE ARRANGEMENT**

5

BACKGROUND OF THE INVENTION

1. Field of the Invention

10 The invention relates to a hinge for a solar support structure, an arrangement with the hinge and a method for manufacturing the arrangement.

The invention is in the technical field of solar energy.

15 More particularly, the present invention is in the technical field of structures for solar collectors; more particularly the present invention is in the technical field of foldable structure elements for solar energy collectors.

20 2. Description of the Related Art

Conventional solar collectors comprise large scale 3D space frame and truss structures. Due to their large size and high volume these frame and truss structures are difficult to ship
25 and maneuver. Hence these frame and truss structures usually built or assembled on site.

This usually requires special machines, tools, skilled workers and fasteners of various kinds.

30

SUMMARY OF THE INVENTION

It is an object of the invention to provide a support structure for large solar collectors. It is another object of

the invention to provide a method for manufacturing a support structure.

These objects are achieved by the inventions specified in the
5 claims.

A hinge for a solar support structure is provided, wherein the hinge comprises at least one thin bendable strip attachable to at least two frames of the solar support
10 structure such, that the frames can execute a link motion relatively to each other via a bending of the strip. The strip is elastically and/or plastically deformable (bendable).

15 Also provided is an arrangement with at least one hinge and with at least two frames of a solar support structure, wherein the hinge is attached to the frames such, that the frames can execute a link motion relatively to each other via a bending of the strip.

20 Additionally a method for manufacturing the arrangement is provided. The method comprises following steps: providing at least one thin bendable strip and providing at least two frames of a solar support structure and bringing the strip
25 and the frames together such, that the frames can execute a link motion relatively to each other via a bending of the strip.

The frames can be made of metal (steel, aluminum, etc.) or
30 any other sufficiently rigid and strong material such as high-strength plastic, composite material and the like.

The hinge can comprise one or more bendable strips. The strip comprises a strip material with sufficiently plastic

deformation/elongation properties. Preferably the strip material is selected from the group consisting of metal, high strength plastic and fabric. Other strip materials or combinations of different strip materials are possible, too.

5

Strips consisting of a metal are potentially weldable. Hence in a preferred embodiment of the arrangement the strip material is metal and the strip is attached to the frames by a weld. Thereby the metals steel and aluminum are

10

advantageous.

The present invention is an integral hinge for large solar collector structures. This structure enables an easy and cost effective manufacturing. It allows shipping and handling of large volume frames or trusses at a collapsed, folded state, which is relatively flat. The structure is volume saving in storage and shipping. Additionally the structure can easily be installed on site without the need of special tools, additional parts or fasteners, welding or gluing processes and /or surface finishing on site. With the aid of the hinge a keeping of high rigidity and backlash/rattle free connection between the frames is possible. This is advantageous for the solar collectors' geometrical accuracy and stiffness.

25

BIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the deployed state of the arrangement with the main construction components.

30

Fig. 2 is an enlarged perspective view of the components of Fig. 1.

Fig. 3 is a perspective view of the collapsed state of main construction components.

Fig. 4 is an enlarged perspective view of the components of
5 Fig. 3.

Fig. 5 is a side view of the deployed state of the main construction components.

10 Fig. 6a and 6b are enlarged side views of the components of Fig. 5.

Fig. 7 is a side view of the collapsed state of the main construction components.

15

Fig. 8a and 8b are enlarged side views of the components of Fig. 7.

DETAILED DESCRIPTION OF THE INVENTION

20

Given is an arrangement 100 with a 3D space frame constructed of relatively flat welded frames of two types of frames 11 and 12. These frames 11, 12 are attached to each other by means of the integral hinge 13. Figures 1 and 2 show the
25 construction at its deployed state - as it would be installed in the field.

The frames 11, 12 consist of steel. The hinge 13 comprises at least one thin bendable strip 130. The strip material is
30 steel. The strip 130 is attached to adjacent frames 11, 12 such, that the frames 11, 12 can execute a link motion relatively to each other via a bending of the strip 130.

In further detail, referring figures 3 and 4, the integral hinge 13 is welded to the frames 11, 12 as a flat strip 130. The complete arrangement 100 is collapsed (folded).

5 The method for manufacturing the arrangement 100 comprises following steps: providing at least one thin bendable strip and providing at least two frames of a solar support structure and bringing the strip and the frames together such, that the frames can execute a link motion relatively to
10 each other via a bending of the strip. The bringing together comprises the welding. The strip is attached to the frames by a weld.

Patent claims

1. Hinge (13) for a solar support structure, wherein the hinge (13) comprises at least one thin bendable strip (130) attachable to at least two frames (11, 12) of the solar support structure such, that the frames (11, 12) can execute a link motion relatively to each other via a bending of the strip (130).
5
- 10 2. Hinge according to claim 1, wherein the strip (130) is elastically and/or plastically deformable.
3. Hinge according to claim 1 or 2, wherein the strip (130) comprises a strip material, which is selected from the group consisting of metal, high strength plastic and fabric.
15
4. Hinge according to claim 3, wherein the metal is selected from the group consisting of aluminum and steel.
- 20 5. Arrangement (100) with at least one hinge (13) according to one of the claims 1 to 4 and with at least two frames (11, 12) of a solar support structure, wherein the hinge (13) is attached to the frames (11, 12) such, that the frames (11, 12) can execute a link motion relatively to each other via a bending of the strip (130).
25
6. Arrangement according to claim 5, wherein the strip material is metal and the strip is attached to the frames by a weld.
30
7. Method for manufacturing the arrangement according claim 6, the method comprising:

- providing at least one thin bendable strip (130) and providing at least two frames (11, 12) of a solar support structure;
- bringing the strip (130) and the frames (11, 12) together
5 such, that the frames (11, 12) can execute a link motion relatively to each other via a bending of the strip (130).

FIG 1

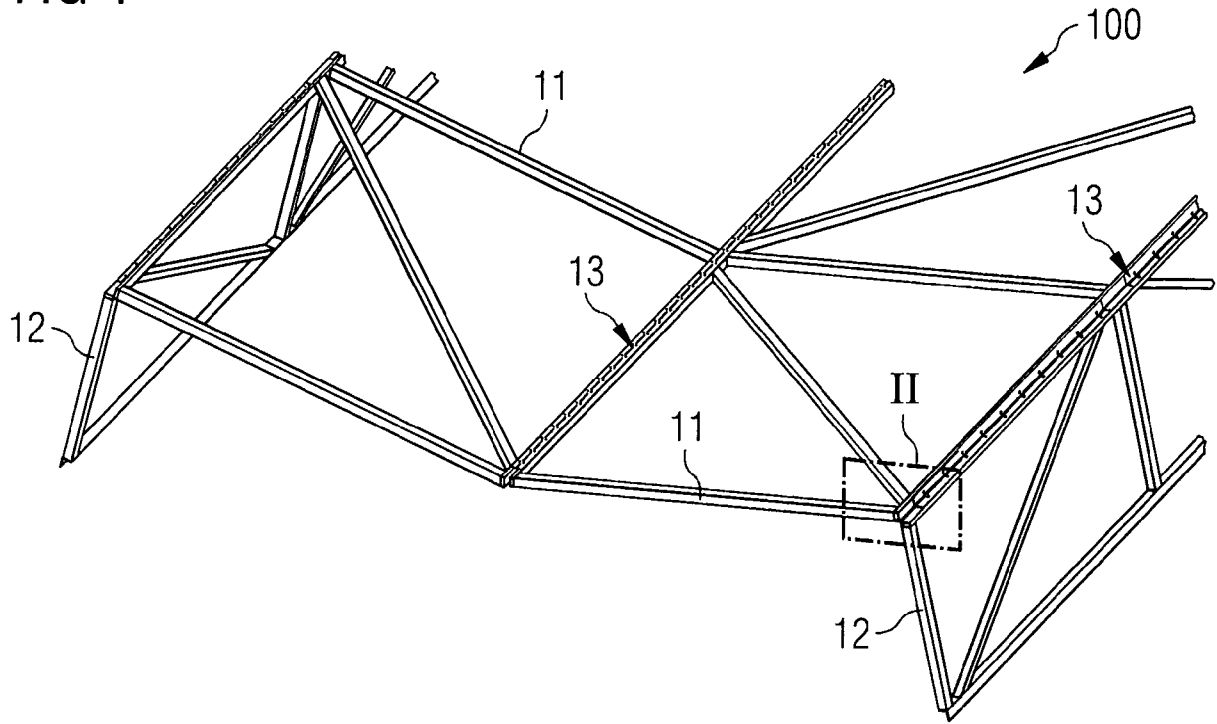


FIG 2

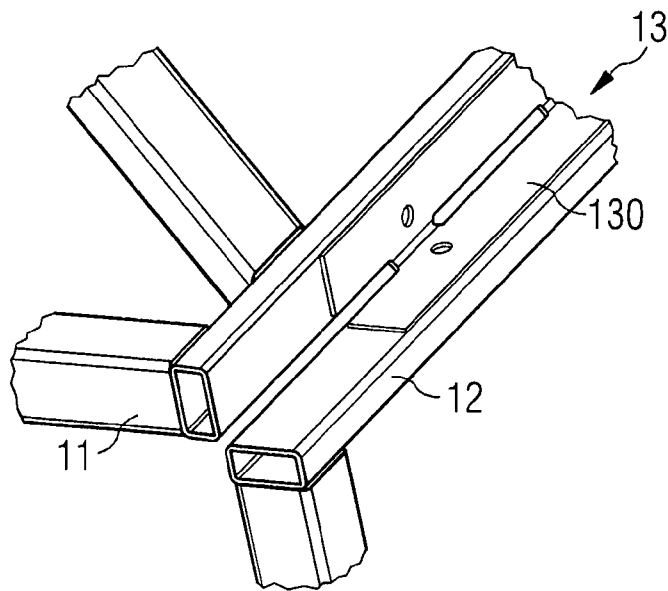


FIG 3

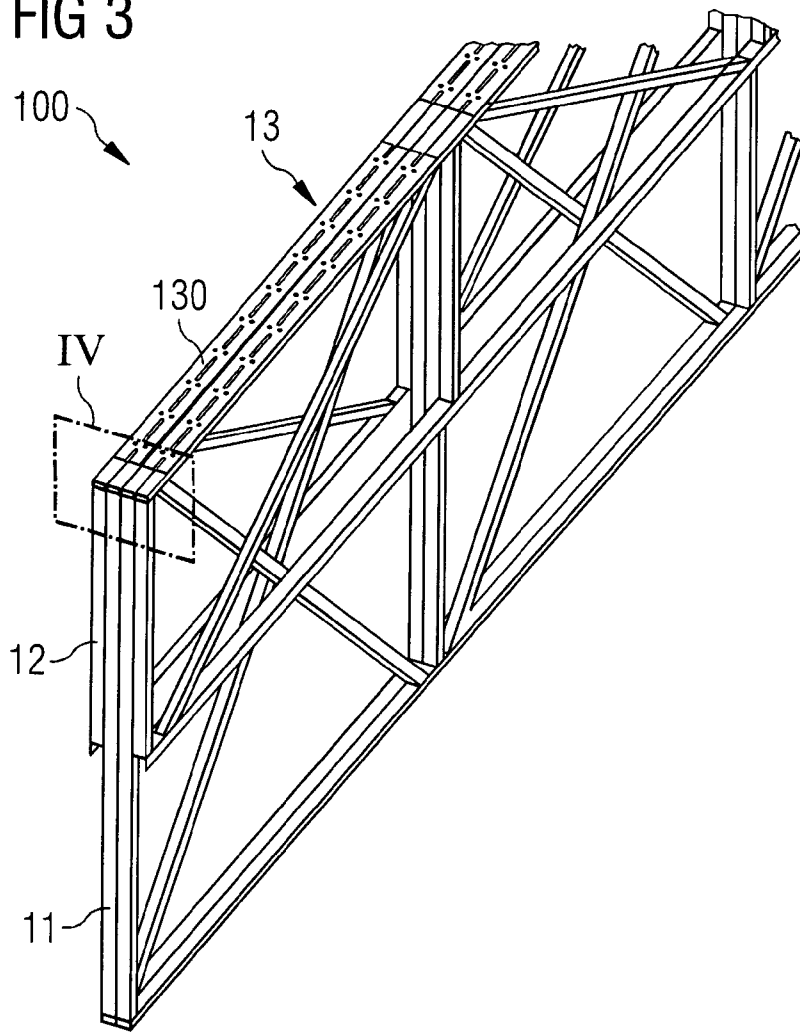


FIG 4

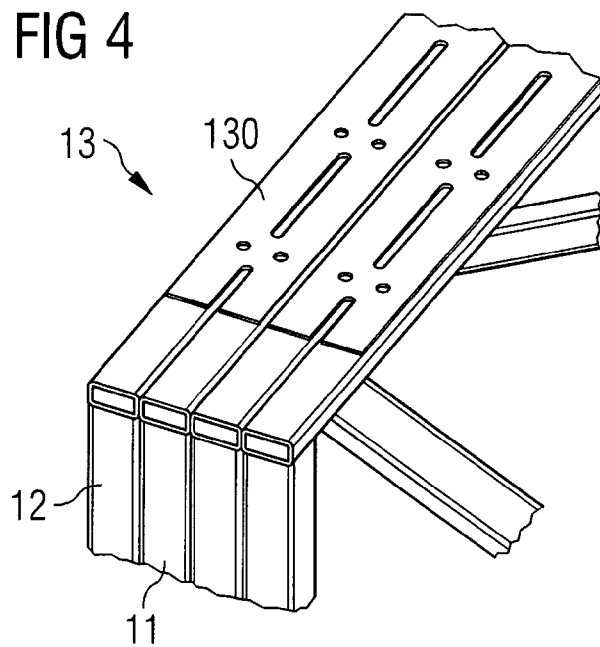


FIG 5

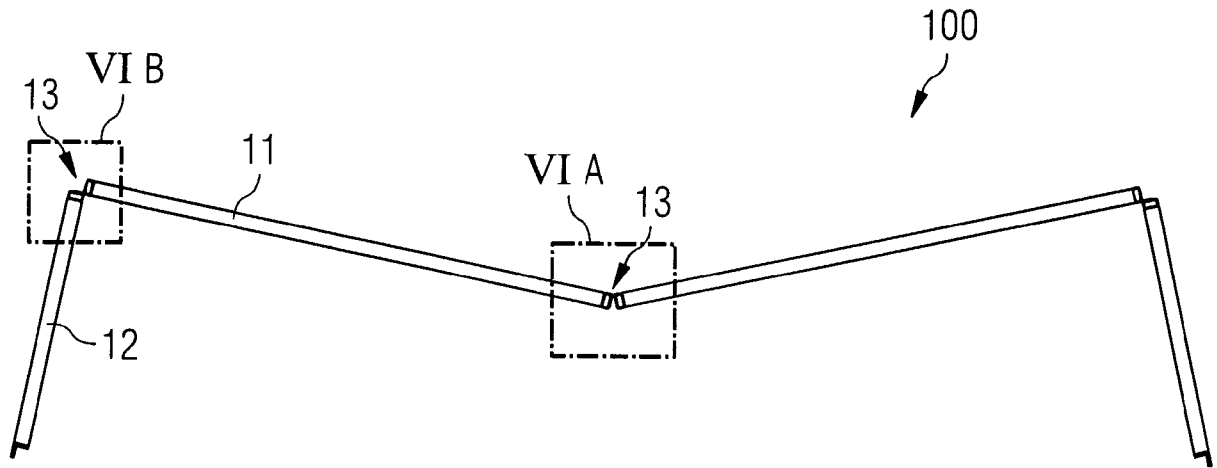
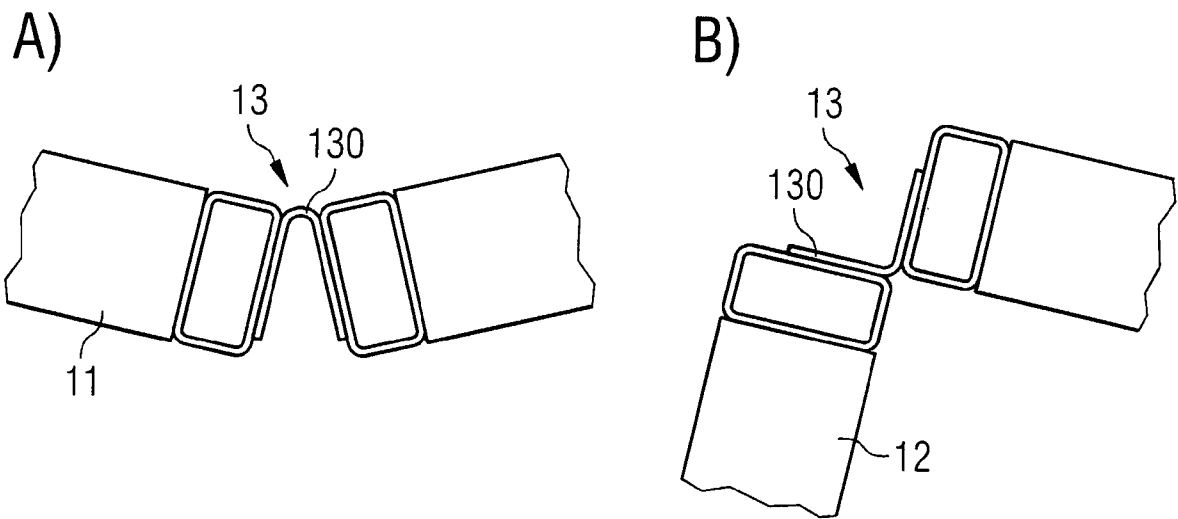


FIG 6



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FIG 7

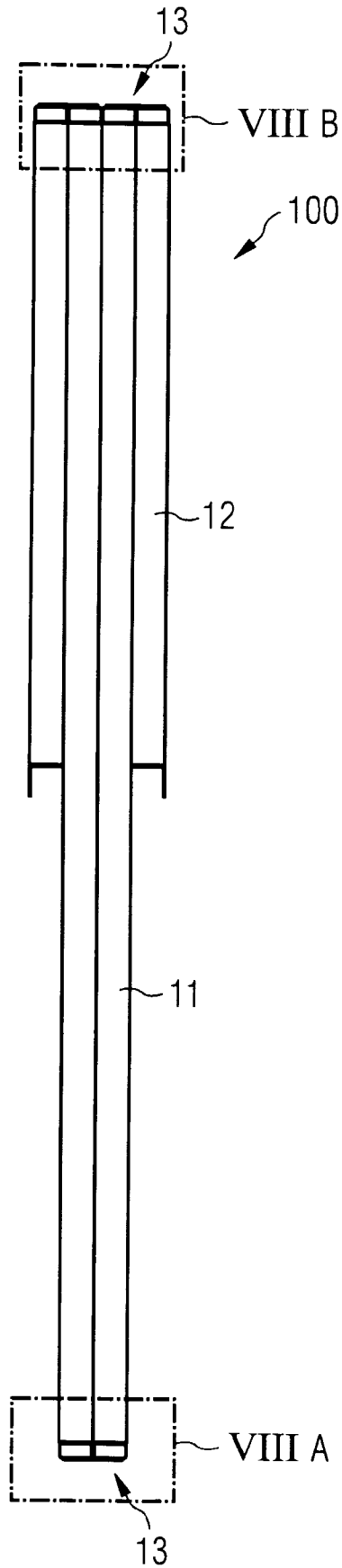


FIG 8

