(19) World Intellectual Property Organization

International Bureau



- | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1881 | 1

(43) International Publication Date 26 July 2007 (26.07.2007)

(10) International Publication Number WO 2007/084517 A3

(51) International Patent Classification:

 F24J 2/08 (2006.01)
 F24J 2/52 (2006.01)

 F24J 2/12 (2006.01)
 H01L 31/042 (2006.01)

 F24J 2/38 (2006.01)
 H01L 31/052 (2006.01)

(21) International Application Number:

PCT/US2007/001159

(22) International Filing Date: 17 January 2007 (17.01.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/759,778 17 January 2006 (17.01.2006) US

(71) Applicant (for all designated States except US): SO-LIANT ENERGY, INC. [US/US]; 133 North San Gabriel Boulevard, Suite 205, Pasadena, California 91107 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): HINES, Braden, E. [US/US]; 627 Linda Vista Avenue, Pasadena, California 91105 (US). JOHNSON, JR., Richard, L. [US/US]; 6106 Walkers Ferry Lane, Suffolk, Virginia 23435 (US). IRWIN, Philip, C. [US/US]; 40 Suffolk Avenue, Sierra Madre, California 91024 (US). (74) Agents: PARINS, Paul, J. et al.; KAGAN BINDER, PLLC, Suite 200, Maple Island Building, 221 Main Street North, Stillwater, Minnesota 55082 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, 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, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

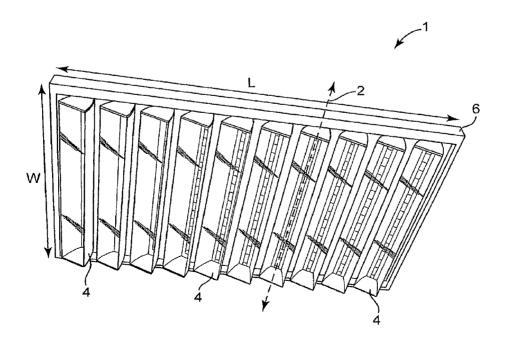
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

[Continued on next page]

(54) Title: CONCENTRATING SOLAR PANEL AND RELATED SYSTEMS AND METHODS



(57) Abstract: The present invention relates to photovoltaic concentrating modules and related concentrating solar systems and methods. In particular, the present invention relates to concentrating modules, especially modules having a convenient size and market acceptance of traditional flat photovoltaic solar panels.

- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 21 February 2008

International application No PCT/US2007/001159

A. CLASSIFICATION OF SUBJECT MATTER
INV. F24J2/08 F24J2/12 F24J2/38 F24J2/52 H01L31/042 H01L31/052 According to International Patent Classification (IPC) or to both national classification and IPC Minimum documentation searched (classification system followed by classification symbols) F24J H01L 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 Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. X US 6 020 554 A (KAMINAR NEIL R [US] ET AL) 1 - 271 February 2000 (2000-02-01) columns 2-5; figures 1-4 X US 4 297 521 A (JOHNSON STEVEN A) 1-4.6-9.27 October 1981 (1981-10-27) 11 - 1416-27 columns 4-6; figures 2-6 X US 4 187 123 A (DIGGS RICHARD E [US]) 1-4,6,7, 5 February 1980 (1980-02-05) 9,11-13, 15-27 columns 2-4; figures 1-5 US 4 210 121 A (STARK VIRGIL [US]) X 1-4,6-9,1 July 1980 (1980-07-01) 11-14, 16-27 columns 8-12; figures 1,11,18 -/--X X Further documents are listed in the continuation of Box C. See patent family annex. Special categories of cited documents: 'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the "A" document defining the general state of the art which is not considered to be of particular relevance earlier document but published on or after the international "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) 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 docu-ments, such combination being obvious to a person skilled in the art. "O' document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed *&* document member of the same patent family Date of the actual completion of the international search Date of mailing of the international search report 7 September 2007 20/12/2007

Authorized officer

Merkt, Andreas

Form PCT/ISA/210 (second sheet) (April 2005)

4

Name and mailing address of the ISA/

European Palent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016

International application No
PCT/US2007/001159

| (Continua | tion). DOCUMENTS CONSIDERED TO BE RELEVANT | 101/03200//001139 |
|-----------|--|--|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| (| US 2003/201008 A1 (LAWHEED PAUL [US]) 30 October 2003 (2003-10-30) | 1-4, 11-13, 16, 22-24, 26,27 |
| | paragraphs [0061] - [0069], [0115] - [0119]; figures 1,26-28 | 20,27 |
| Ρ,Χ | WO 2006/114457 A (SOL3G S L [ES]; PARDELL VILELLA RICARD [ES]) 2 November 2006 (2006-11-02) the whole document | 1-27 |
| Ρ,Χ | WO 2006/120475 A (WHITFIELD SOLAR LTD [GB]; WEATHERBY CLIVE KEITH [GB]; BENTLEY ROGER WI) 16 November 2006 (2006-11-16) the whole document | 1-27 |
| | · | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

International application No. PCT/US2007/001159

| Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet) |
|--|
| This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons: |
| Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely: |
| Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically: |
| Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a). |
| Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet) |
| This International Searching Authority found multiple inventions in this international application, as follows: |
| see additional sheet |
| As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims. |
| 2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees. |
| 3. As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.: |
| 4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-27 |
| Remark on Protest The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee. |
| The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation. |
| No protest accompanied the payment of additional search fees. |

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-27

A photovoltaic power system with an adapted support structure and a method of providing it

2. claims: 28-30

A photovoltaic concentrator module with a reflective trough a photovoltaic cell wherein the trough has a triple function.

3. claim: 31

A photovoltaic power system with a support structure and a special improved design of concentrator modules.

information on patent family members

International application No PCT/US2007/001159

| Patent document cited in search report | | Publication date | Patent family member(s) | | Publication date |
|---|----|---------------------|-------------------------|-------------------------|--------------------------|
| US 6020554 | A | 01-02-2000 | AU WO | 3353400 A 0057486 A1 | 09-10-2000 28-09-2000 |
| US 4297521 | A | 27-10-1981 | IL | 58924 A | 29-02-1984 |
| US 4187123 | Α | 05-02-1980 | NONE | | |
| US 4210121 | Α | 01-07-1980 | AU | 517681 B2 | 20-08-1981 |
| US 2003201008 | A1 | 30-10-2003 | NONE | | |
| WO 2006114457 | A | 02-11-2006 | ES | 2267382 A1 | 01-03-2007 |
| WO 2006120475 | Α | 16-11-2006 | NONE | : | |