

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
29 December 2011 (29.12.2011)

PCT

(10) International Publication Number  
**WO 2011/163079 A3**

(51) International Patent Classification:  
*H01L 31/042* (2006.01) *H01L 31/18* (2006.01)

(74) Agent: GREEN, Julianne; 2590 Walsh Ave., Santa Clara, CA 95051 (US).

(21) International Application Number:  
PCT/US2011/040894

(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.

(22) International Filing Date:  
17 June 2011 (17.06.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
12/820,415 22 June 2010 (22.06.2010) US

(71) Applicant (for all designated States except US): MIA-SOLÉ [US/US]; 2590 Walsh Ave., Santa Clara, CA 95051 (US).

(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,

(72) Inventor; and

(75) Inventor/Applicant (for US only): SHUFFLEBOTHAM, Paul [CA/US]; 1574 Willowdale Dr., San Jose, CA 95118 (US).

[Continued on next page]

(54) Title: FLEXIBLE PHOTOVOLTAIC MODULES IN A CONTINUOUS ROLL

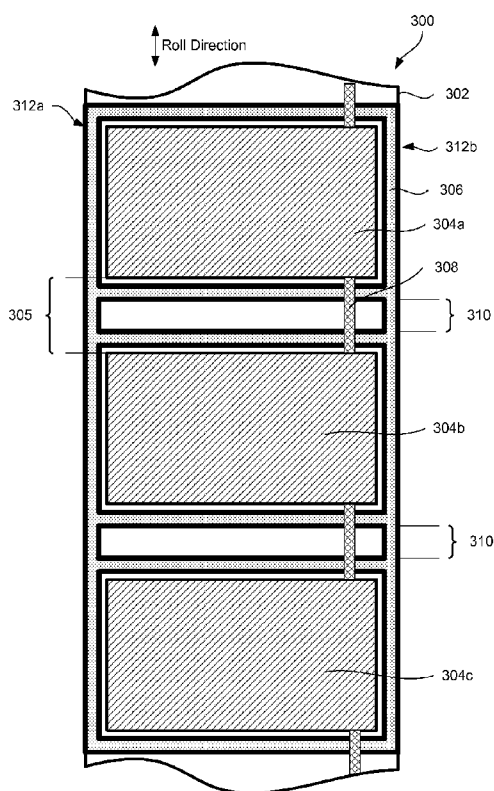


FIG. 3A

(57) Abstract: Provided are novel flexible photovoltaic assemblies and installation techniques. The assemblies include multiple flexible photovoltaic (PV) modules that are electrically connected and individually sealed. The modules may be sealed using a flexible material that provides protection from the environment and/or mechanical support to the cells and modules. These assemblies can be bent and even rolled. Each PV module is individually sealed with a cut-off area is provided between two consecutive modules for separating the modules. The design allows separating any number of modules from a roll without compromising any module. The modules are electrically interconnected with each other while in the roll. As such, when a set of modules is separated from a roll, all modules in a set are electrically interconnected as well as having an integral mechanical structure. The assemblies allow easy cut-to-fit installation on rooftops or other points of installation.

WO 2011/163079 A3



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments (Rule 48.2(h))*

**Published:**

— *with international search report (Art. 21(3))*

**(88) Date of publication of the international search report:**

12 April 2012

**A. CLASSIFICATION OF SUBJECT MATTER*****H01L 31/042(2006.01)i, H01L 31/18(2006.01)i***

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)

H01L 31/042; H01L 31/0376; H01L 21/28; H01L 31/05; H01L 31/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; Keywords: flexible photovoltaic module, roll, sheet, connector

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0255585 A1 (SHAIKH MOHAMMED SALEEM et al.) 15 October 2009 See abstract; fig.8; pars.0021-0023	1-31
A	US 2005-0268962 A1 (RUSSELL GAUDIANA et al.) 08 December 2005 See abstract; fig.1; pars.0010-0037	1-31
A	US 2008-0314432 A1 (PAULSON PUTHUR et al.) 25 December 2008 See abstract; fig.8; pars.0004-0006	1-31

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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 invention

"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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

02 FEBRUARY 2012 (02.02.2012)

Date of mailing of the international search report

**09 FEBRUARY 2012 (09.02.2012)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office  
Government Complex-Daejeon, 189 Cheongsa-ro,  
Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHOI, Jinho

Telephone No. 042 481 5406



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2011/040894**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009-0255585 A1	15. 10. 2009	WO 2009-126943 A2	15. 10. 2009
		WO 2009-126943 A3	15. 10. 2009
		WO 2009-126943 A3	14. 01. 2010
US 2005-0268962 A1	08. 12. 2005	AU 2001-52013 A1	12. 11. 2001
		AU 2001-52014 A1	12. 11. 2001
		AU 2001-52015 A1	20. 11. 2001
		AU 2003-207680 A1	02. 09. 2003
		AU 2003-207681 A1	02. 09. 2003
		AU 2003-207682 A1	02. 09. 2003
		AU 2003-207682 A8	02. 09. 2003
		AU 2003-212832 A1	02. 09. 2003
		AU 2003-212832 A8	02. 09. 2003
		AU 2003-214912 A1	02. 09. 2003
		AU 2003-232901 A1	02. 12. 2003
		CA 2456213 A1	20. 02. 2003
		CA 2465152 A1	15. 05. 2003
		CA 2473225 A1	07. 08. 2003
		CA 2474487 A1	07. 08. 2003
		CA 2474491 A1	07. 08. 2003
		CA 2474494 A1	07. 08. 2003
		CA 2482579 A1	27. 11. 2003
		CN 101304073 A	12. 11. 2008
		CN 101304073 B	29. 09. 2010
		CN 101304073 C0	12. 11. 2008
		CN 1278433 C0	04. 10. 2006
		CN 1426607 A0	25. 06. 2003
		CN 1426608 A0	25. 06. 2003
		CN 1541425 A	27. 10. 2004
		CN 1541425 C0	27. 10. 2004
		CN 1582501 A	16. 02. 2005
		CN 1582501 C0	16. 02. 2005
		CN 1643630 C0	20. 07. 2005
		CN 1643705 C0	20. 07. 2005
		CN 1643706 C0	20. 07. 2005
		CN 1653627 C0	10. 08. 2005
		EP 1277245 A1	22. 01. 2003
		EP 1277245 B1	13. 09. 2006
		EP 1277246 A1	22. 01. 2003
		EP 1277246 B1	21. 04. 2010
		EP 1284027 A1	19. 02. 2003
		EP 1388829 A2	11. 02. 2004
		EP 1388829 A3	02. 01. 2008
		EP 1415352 A1	06. 05. 2004
EP 1451880 A1	01. 09. 2004		
EP 1454366 A2	08. 09. 2004		
EP 1470562 A2	27. 10. 2004		
EP 1470563 A2	27. 10. 2004		
EP 1470597 A2	27. 10. 2004		

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2011/040894**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		EP 1470597 B1	03.03.2010
		EP 1470598 A2	27.10.2004
		EP 1474720 A1	10.11.2004
		EP 1506582 A1	16.02.2005
		EP 1506582 B1	22.12.2010
		EP 1514318 A2	16.03.2005
		EP 1602068 A1	07.12.2005
		EP 1606845 A2	21.12.2005
		EP 1606846 A2	21.12.2005
		EP 1606846 B1	27.10.2010
		EP 1959466 A2	20.08.2008
		EP 1959466 A3	17.09.2008
		EP 2209147 A1	21.07.2010
		JP 04-128528 B2	30.07.2008
		JP 04-546733 B2	09.07.2010
		JP 04-644427 B2	10.12.2010
		JP 2003-533033 A	05.11.2003
		JP 2003-533034 A	05.11.2003
		JP 2004-537446 A	16.12.2004
		JP 2005-509258 A	07.04.2005
		JP 2005-512344 A	28.04.2005
		JP 2005-516364 A	02.06.2005
		JP 2005-516365 A	02.06.2005
		JP 2005-516370 A	02.06.2005
		JP 2005-516371 A	02.06.2005
		JP 2005-526404 A	02.09.2005
		JP 2005-530351 A	06.10.2005
		JP 2005-535050 A	17.11.2005
		JP 2006-510921 A	30.03.2006
		JP 2006-521700 A	21.09.2006
		JP 2006-523369 A	12.10.2006
		JP 2011-205149 A	13.10.2011
		KR 10-1024876 B1	31.03.2011
		KR 10-1036539 B1	24.05.2011
		US 2003-0140959 A1	31.07.2003
		US 2003-0159729 A1	28.08.2003
		US 2003-0188776 A1	09.10.2003
		US 2003-0188777 A1	09.10.2003
		US 2003-0189402 A1	09.10.2003
		US 2003-0192583 A1	16.10.2003
		US 2003-0192584 A1	16.10.2003
		US 2003-0192585 A1	16.10.2003
		US 2003-0230337 A1	18.12.2003
		US 2004-0025933 A1	12.02.2004
		US 2004-0025934 A1	12.02.2004
		US 2004-0031520 A1	19.02.2004
		US 2004-0094196 A1	20.05.2004
		US 2004-0187911 A1	30.09.2004
		US 2004-0233502 A1	25.11.2004
		US 2005-0011550 A1	20.01.2005

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2011/040894**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2005-0019414 A1	27.01.2005
		US 2005-0039790 A1	24.02.2005
		US 2005-0040374 A1	24.02.2005
		US 2005-0045851 A1	03.03.2005
		US 2005-0067006 A1	31.03.2005
		US 2005-0067007 A1	31.03.2005
		US 2005-0122469 A1	09.06.2005
		US 2005-0126623 A1	16.06.2005
		US 2005-0189014 A1	01.09.2005
		US 2005-0211292 A1	29.09.2005
		US 2005-0211294 A1	29.09.2005
		US 2005-0257827 A1	24.11.2005
		US 2005-0284513 A1	29.12.2005
		US 2006-0005876 A1	12.01.2006
		US 2006-0011233 A1	19.01.2006
		US 2006-0011894 A1	19.01.2006
		US 2006-0076048 A1	13.04.2006
		US 2006-0090791 A1	04.05.2006
		US 2006-0107996 A1	25.05.2006
		US 2007-0012349 A1	18.01.2007
		US 2007-0102040 A1	10.05.2007
		US 2007-0107776 A1	17.05.2007
		US 2007-0131277 A1	14.06.2007
		US 2007-0251570 A1	01.11.2007
		US 2008-0217587 A1	11.09.2008
		US 2009-0272934 A1	05.11.2009
		US 2010-0255624 A1	07.10.2010
		US 2011-0095236 A1	28.04.2011
		US 6706963 B2	16.03.2004
		US 6812399 B2	02.11.2004
		US 6858158 B2	22.02.2005
		US 6900382 B2	31.05.2005
		US 6913713 B2	05.07.2005
		US 6924427 B2	02.08.2005
		US 6933436 B2	23.08.2005
		US 6949400 B2	27.09.2005
		US 7022910 B2	04.04.2006
		US 7094441 B2	22.08.2006
		US 7186911 B2	06.03.2007
		US 7196834 B2	27.03.2007
		US 7205473 B2	17.04.2007
		US 7220914 B2	22.05.2007
		US 7351907 B2	01.04.2008
		US 7414188 B2	19.08.2008
		US 7572974 B2	11.08.2009
		US 7586035 B2	08.09.2009
		US 7589276 B2	15.09.2009
		US 7622667 B2	24.11.2009
		US 7871543 B2	18.01.2011
		US 7894694 B2	22.02.2011

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2011/040894**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 7932464 B2	26.04.2011
		US 8071874 B2	06.12.2011
		WO 01-84644 A1	08.11.2001
		WO 01-84645 A1	08.11.2001
		WO 01-86734 A1	15.11.2001
		WO 03-015189 A1	20.02.2003
		WO 03-041177 A1	15.05.2003
		WO 03-050886 A2	19.06.2003
		WO 03-050886 A3	19.06.2003
		WO 03-065392 A2	07.08.2003
		WO 03-065392 A3	07.08.2003
		WO 03-065393 A2	07.08.2003
		WO 03-065393 A3	07.08.2003
		WO 03-065394 A2	07.08.2003
		WO 03-065394 A3	07.08.2003
		WO 03-065471 A2	07.08.2003
		WO 03-065471 A3	07.08.2003
		WO 03-065472 A2	07.08.2003
		WO 03-065472 A3	07.08.2003
		WO 03-069394 A1	21.08.2003
		WO 03-098715 A1	27.11.2003
		WO 03-107453 A2	24.12.2003
		WO 03-107453 A3	24.12.2003
		WO 2004-017256 A1	26.02.2004
		WO 2004-086462 A2	07.10.2004
		WO 2004-086462 A3	07.10.2004
		WO 2004-086464 A2	07.10.2004
		WO 2004-086464 A3	07.10.2004
		WO 2005-018808 A1	03.03.2005
		WO 2005-083730 A1	09.09.2005
US 2008-0314432 A1	25.12.2008	TW 200917507 A	16.04.2009
		WO 2008-156755 A2	24.12.2008
		WO 2008-156755 A3	19.02.2009
		WO 2008-156755 A3	24.12.2008