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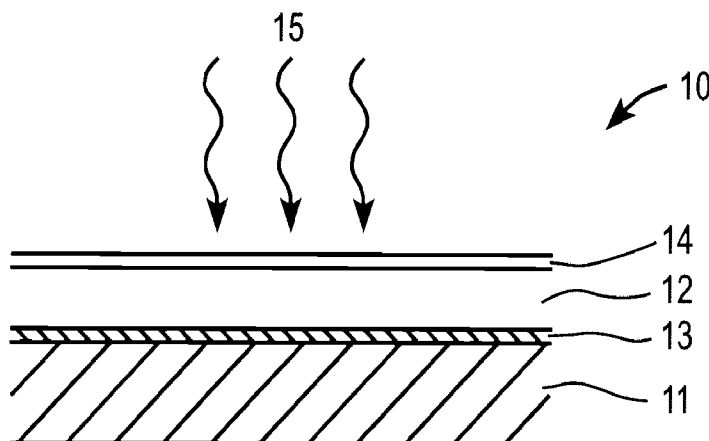
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(54) Title: THIN FILM SOLAR CELL WITH FINGER PATTERN



(57) Abstract: The present invention relates to thin film solar cell structures and methods of manufacturing them. In particular and in one aspect the present invention is related to apparatus and methods for forming a solar cell structure in which an insulator film is disposed over a region of a conductive contact layer, which is either adjacent or below the absorber layer.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/75295

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: H01L 25/00(2006.01),31/00(2006.01),31/04Z(2006.01),29/06(2006.01),35/24(2006.01),29/08(2006.01);H02N 6/00(2006.01)
 USPC: 136/243-265;257/10-40
 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)
 U.S. : 136/243-265; 257/10-40

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2006/0160261 A1 (SHEATS et al) 20 July 2006 (20.07.2006), entire document, especially figures 1A and 5F	1-5, 7-13, 15-20, 22, 24, 25, 27, 30, 35-37 ----- 6, 14, 21, 23, 26, 28, 29, 31-34
Y	US 6,566,162 B2 (YAMADA et al) 20 May 2003 (20.05.2003), whole document, especially c. 1, l. 27-47, c. 1, l. 51- c. 2, l. 6	6, 14, 21, 23, 26, 28, 29, 31-34
Y	US 5,021,099 (KIM et al) 4 June 1991 (04.06.1999), whole document, especially figure 4	1, 18
A	US 5,476,553 (HANOKA et al) 19 December 1995 (19.12.1995), whole document	1-37
A	US 5,800,631 (YAMADA et al) 01 September 1998 (01.09.1998), whole document	1-37

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	"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
"E" earlier application or patent published on or after the international filing date	"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
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"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	"&" document member of the same patent family

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

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Supplemental Box
In case the space in any of the preceding boxes is not sufficient.

Continuation of IPC:

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V. 2. Citations and Explanations:

Claims 1-5, 7-13, 15-20, 22, 24, 25, 27, 30 and 35-37 lack novelty under PCT Article 33(2) as being anticipated by SHEATS et al (PG PUB US 2006/0160261).

Regarding claim 1, SHEATS et al teaches a series of photovoltaic devices containing all the limitations of claim 1, shown in figures 1A and 5F. The substrate is reference number 103, top back electrode, or conductive contact layer, is reference number 108, the insulating layer is composed of portions 106 and 122, the absorber layer is shown in the inset picture of figure 1A as reference number 130 and the transparent conductive layer or electrode is reference number 136(all numbers shown are referenced in figure 1A). The fingers and bus bar are shown in figures 5F and 5I, with the limitations enumerated above, as reference number 520'.

Regarding claim 2, see figure 1A.

Regarding claim 3, see paragraph 3.

Regarding claim 4, see paragraph 42.

Regarding claim 5, see paragraph 42.

Regarding claims 7-10, see figure 1A.

Regarding claim 11, see paragraph 3.

Regarding claim 12, see paragraph 42.

Regarding claim 13, see paragraph 42.

Regarding claims 15-17, see figure 1A.

Regarding claim 18, SHEATS et al teaches all the pieces to compose the solar cell as stated above in the rejection of claim 1.

Figure 1 would make it clear the progression of creation would happen as the layers are shown, and therefore required by claim 18.

Regarding claim 19, see figure 1A.

Regarding claim 20, see paragraph 3.

Regarding claim 22, see paragraph 3.

Regarding claim 24, see figures 5.

Regarding claim 25, see paragraph 3.

Regarding claim 27, see figure 1A.

Regarding claim 30, see paragraph 3.

Regarding claims 35-37, see figure 1A.

Claims 6, 14, 21, 23, 26, 28, 29 and 31-34 lack an inventive step under PCT Article 33(3) as being obvious over SHEATS et al (US 2006/0160261 A1) in view of YAMADA et al (US 6,566,162 B2).