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(54) Title: PORTABLE SOLAR CHARGER

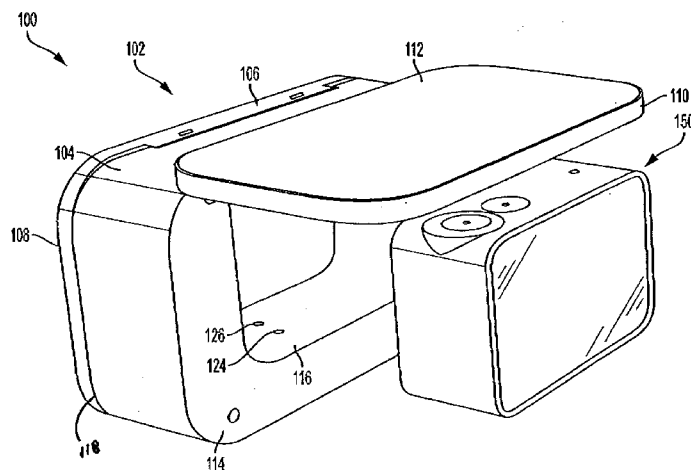


FIG. 1

(57) Abstract: A portable solar charger (102, 500, 600) comprising a body (104, 502, 602) having a first side (114); a charger battery (304) positioned within the body (104); a first solar panel (112, 512, 612) pivotally coupled to the body, wherein in a rest position the first solar panel lays adjacent to and substantially overlaps the first side and in an open position the first solar panel does not substantially overlap the first side; a second solar panel (108, 508, 608) pivotally coupled to the body (104); and a power management circuit, wherein the first solar panel and the second solar panel are electrically coupled to charge the charger battery, and wherein the power management circuit is structured to transfer electrical energy from the charger battery to an electrical load responsive to the charge command signal.

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,  
KM, ML, MR, NE, SN, TD, TG).

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## INTERNATIONAL SEARCH REPORT

International application No.  
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| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>IPC(8) - H02J 7/35 (2018.01)<br>CPC - H02J 7/355                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                             |                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                             |                                                                                            |
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>See Search History Document<br>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br>See Search History Document<br>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br>See Search History Document                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                             |                                                                                            |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                             |                                                                                            |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                          | Relevant to claim No.                                                                      |
| X<br>---<br>Y<br>---<br>A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | US 2012/0313569 A1 (CURRAN) 13 December 2012 (13.12.2012), entire document, especially Title, Figs 6 and 8, paras [0048]-[0050]                                                                                             | 1 and 8<br>-----<br>2-7, 9-15, 17, 19/(1-15, 17-18)<br>-----<br>16, 19/(16)                |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DE 19533760 A1 (FUJI FILM CO., LTD.) 05 September 1996 (05.09.1996), entire document, especially translation of Abstract, page 5, lines 36-44, page 6, lines 1-2 and 8-18, and page 10, lines 10-13, and Figs 1-2, 3, and 5 | 2-7,9-10,19/(1-15, 17-18)                                                                  |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 2015/0256026 A1 (RYBKIEWICZ) 10 September 2015 (10.09.2015), entire document, especially Abstract, Figs 2-3, and paras [0030]-[0032]                                                                                     | 9, 10, 19/(9-10)                                                                           |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 2009/0039827 A1 (FOWLER) 12 February 2009 (12.02.2009), entire document, especially Abstract, Figs 1 and 8, and para [0029]                                                                                              | 11-13, 19/(11-13)                                                                          |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 2012/0092827 A1 (LUO) 19 April 2012 (19.04.2012), entire document, especially Abstract and Fig 6+                                                                                                                        | 14, 15, 19/(14-15)                                                                         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 2011/0204843 A1 (FOSTER) 25 August 2011 (25.08.2011), entire document, especially Abstract, Fig 10, and para [0080]                                                                                                      | 17, 18, 19/(17-18)                                                                         |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                             |                                                                                            |
| * Special categories of cited documents:<br>"A" document defining the general state of the art which is not considered to be of particular relevance<br>"E" earlier application or patent but published on or after the international filing date<br>"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)<br>"O" document referring to an oral disclosure, use, exhibition or other means<br>"P" document published prior to the international filing date but later than the priority date claimed<br>"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<br>"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<br>"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<br>"&" document member of the same patent family |                                                                                                                                                                                                                             |                                                                                            |
| Date of the actual completion of the international search<br>21 April 2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                             | Date of mailing of the international search report<br><b>15 MAY 2018</b>                   |
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-8300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                             | Authorized officer:<br>Lee W. Young<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 16/01824

## 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:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ 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:
  
3. ☐ 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:  
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-19 drawn to a portable solar charger with a body having a first side, a charger battery positioned within the body, a touch control element supported by the body and configured to generate a charge command signal, first and second solar panels pivotally coupled to the body, wherein in a rest position the first solar panel lays adjacent to and substantially overlaps the first side and in an open position the first solar panel does not substantially overlap the first side, a power management circuit communicatively coupled to the touch control element, wherein the first solar panel and the second solar panel are electrically coupled to charge the charger battery, and wherein the power management circuit is structured to transfer electrical energy from the charger battery to an electrical load responsive to the charge command signal.

.\*-Continued in Supplemental Box-.\*

1. ☐ 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 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 report covers 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.:  
1-19

### 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.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 16/01824

## -\*-Box IV.2 - Observations where unity of invention is lacking--\*

Group II: Claims 20-29 drawn to a portable solar charger and method with a body having a first side, a second side opposite the first side, and a plurality of walls perpendicular to the first side and defining a cavity therebetween, wherein the cavity is configured to receive therein a camera, a charger battery positioned within the body, first and second solar panels pivotally coupled to the body, wherein in a rest position the first solar panel lays adjacent to and overlaps the first side, wherein in a rest position the second solar panel lays adjacent-to and overlaps the second side, wherein in an open position the first solar panel and the second solar panel lie on a common plane, and a power management circuit, wherein the first solar panel and the second solar panel are electrically coupled to charge the charger battery, and wherein the power management circuit is structured to transfer electrical energy from the charger battery to the camera.

The invention listed as group I and group II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Group I requires the special technical feature of a touch control element supported by the body and configured to generate a charge command signal and operatively coupled to the power management circuit, not required by group II.

Group II requires the special technical feature of a cavity configured to receive therein a camera, a second solar panel that lays adjacent -to and overlaps a second side in a rest position, and wherein in an open position the first solar panel and the second solar panel lie on a common plane, not required by group I.

The only features shared by groups I and II that would otherwise unify the groups, is a portable solar charger with body having a first side, a charger battery positioned within the body, first and second solar panels pivotally coupled to the body, wherein in a rest position the first solar panel lays adjacent to and substantially overlaps the first side, and a power management circuit, wherein the first solar panel and the second solar panel are electrically coupled to charge the charger battery, and wherein the power management circuit is structured to transfer electrical energy from the charger battery to an electrical load. However these technical features do not represent a contribution over prior art, because the shared technical feature is anticipated by US2012/0313569 A1 to Curran (hereinafter 'Curran').

Curran teaches a portable solar charger (Title) with body (main support frame 20, 600, 870, Fig. 1, 5A, 8) having a first side (top), a charger battery positioned within the body (battery bank 770, Fig. 6; battery drawer 850, Fig. 8), first and second solar panels pivotally coupled to the body (solar panels in array 60, Fig. 1, array 860, Fig. 8), wherein in a rest position the first solar panel lays adjacent to and substantially overlaps the first side (side edges of array panels lay adjacent the top in a storage position, Fig. 8), and a power management circuit (controller 740, Fig. 6), wherein the first solar panel and the second solar panel are electrically coupled to charge the charger battery, (Fig. 6, para. [0048] disclosed battery charging) and wherein the power management circuit is structured to transfer electrical energy from the charger battery to an electrical load (electrical output 750, Fig. 6, para. [0048]).

As the common technical feature was known in the art at the time of the invention, this cannot be considered a common technical feature that would otherwise unify the groups.

Therefore, Groups I and II lack unity under PCT Rule 13.