

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
17 April 2008 (17.04.2008)

PCT

(10) International Publication Number
WO 2008/045123 A3

(51) International Patent Classification:
A63B 37/12 (2006.01)

(21) International Application Number:
PCT/US2007/001581

(22) International Filing Date: 22 January 2007 (22.01.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/761,513 23 January 2006 (23.01.2006) US

(71) Applicants (for all designated States except US): **RENSSELAER POLYTECHNIC INSTITUTE** [US/US]; 110 8th Street, Troy, NY 12180-3590 (US). **CALIFORNIA INSTITUTE OF TECHNOLOGY** [US/US]; 1200 E. California Boulevard, MS 201-85, Pasadena, CA 91125 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LEZEC, Henri** [US/US]; Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12180-3590 (US). **MCMAHON, James, Jay** [US/US]; Rensselaer Polytechnic Institute, 110 8th Street,

Troy, NY 12180-3590 (US). **AJAYAN, Pulickel, M.** [IN/US]; Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12180-3590 (US). **NALAMASU, Omkaram** [US/US]; Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12180-3590 (US).

(74) Agents: **RADOMSKY, Leon** et al.; Foley & Lardner LLP, Washington Harbour, 3000 K St., NW Suite 500, Washington, DC 20007 (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, ME, 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,

[Continued on next page]

(54) Title: NANOFABRICATED OPTICAL INTERFERENCE ARRAY

Figure 2A

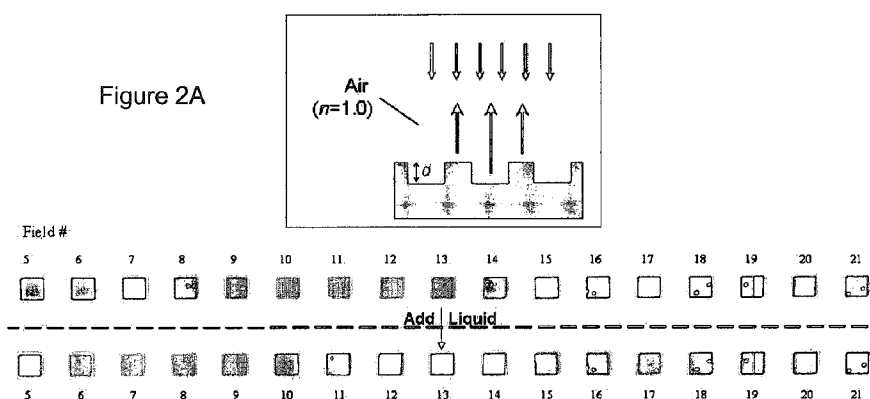
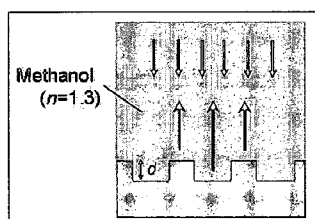


Figure 2B



(57) Abstract: A display or sensor device includes a nano-stepped or nano-dimpled solid surface. The device produces a color readout in response to an optical interference effect between light reflected from a bottom and a top of a step or a dimple of the surface. The device is adapted to detect a change in the reflected light in response to a presence of a fluid and/or a change in a property of the fluid. A fluid source is adapted to deliver or remove a transmissive fluid to or from the step or dimple, which causes a change in the color readout or reflectance spectrum.

WO 2008/045123 A3



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

(88) Date of publication of the international search report:
27 November 2008

Published:

- *with international search report*
- *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

(15) Information about Correction:

Previous Correction:
see Notice of 7 August 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/01581

A. CLASSIFICATION OF SUBJECT MATTER IPC: A63B 37/12(2006.01) USPC: 473/379 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. : 473/379 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) EAST				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
T	US 2006/0145326 A1 (TRAN) 06 July 2006 (06.07.2006) claim 1-20	1-30		
P	US2006/0157684 A1 (DECKER) 20 July 2006 (20.07.2006) Claims 1-34	1-30		
P	US 2006/0145326 A1 (TRAN) 6 July 2006 (06.07.2006) claims 1-20	1-30		
<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Further documents are listed in the continuation of Box C. </div> <div> <input type="checkbox"/> See patent family annex. </div> </div>				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top;"> <p>“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</p> <p>“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</p> <p>“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</p> <p>“&” document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“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</p> <p>“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</p> <p>“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</p> <p>“&” document member of the same patent family</p>
<p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“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</p> <p>“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</p> <p>“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</p> <p>“&” document member of the same patent family</p>			
Date of the actual completion of the international search 20 August 2008 (20.08.2008)		Date of mailing of the international search report <div style="font-size: 1.5em; font-weight: bold;">24 SEP 2008</div>		
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer Eugene Kim Telephone No. (571) 272-4463		