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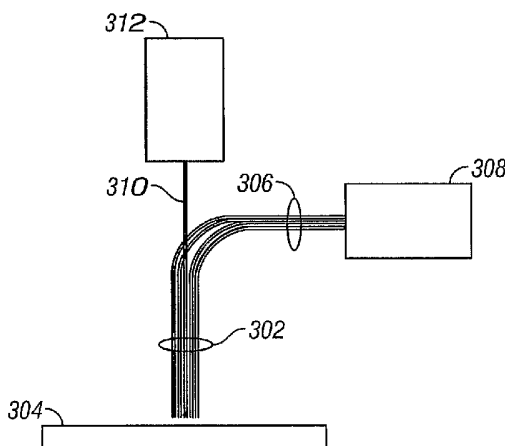
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SYSTEMS AND METHODS FOR MEASURING COLOR AND CONTRAST IN SPECULAR REFLECTIVE DEVICES



(57) Abstract: Disclosed herein are systems and methods for measuring color and contrast in specular reflective devices such as interferometric modulators. To make color and contrast determinations, light reflected from a specular reflective device may be measured in-line with illumination of the device. The measurements may include measuring the spectra of light reflected from the device being tested as well as from specular bright and dark standards. The spectra may be used to determine a reflectance spectrum and color parameters for the specular reflective device.

WO 2006/036411 A3

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/030378

A. CLASSIFICATION OF SUBJECT MATTER G02B26/00 G01J3/50 G02F1/21 G01N21/27		
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) G02B G01J G02F G01N		
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, PAJ, WPI Data, COMPENDEX		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	MILES M W: "Interferometric modulation: MOEMS as an enabling technology for high-performance reflective displays" PROCEEDINGS OF THE SPIE, SPIE, BELLINGHAM, VA, US, vol. 4985, 28 January 2003 (2003-01-28), pages 131-139, XP002324563 ISSN: 0277-786X page 135 - page 134; figure 9	1-4
Y	M. MILES ET AL.: "Digital Paper for reflective displays" JOURNAL OF THE SID, vol. 11, no. 1, 2003, pages 209-215, XP002358481 page 211 - page 213; figures 9,10 ----- -/--	1-4, 9-21, 30-37
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 document but 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	
"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)	"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.	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
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Name and mailing address of the ISA/ European Patent 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	Authorized officer Hambach, D	

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/030378

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>ANONYMOUS: "Reflection/backscattering Probes" INTERNET ARTICLE, [Online] pages 1-3, XP002358482 Retrieved from the Internet: URL: http://web.archive.org/web/20040619022333/www.oceanoptics.com/products/reflectio_nprobes.asp [retrieved on 2004-06-19] page 1</p>	1,3,4, 38-44
A	<p>ANONYMOUS: "S2000 Miniature Fiber Optic Spectrometer" INTERNET ARTICLE, [Online] pages 1-2, XP002358483 Retrieved from the Internet: URL: http://web.archive.org/web/20040617035842/www.oceanoptics.com/products/s2000.asp > [retrieved on 2004-06-17] page 1 - page 2</p>	1-4, 38-44
A	<p>US 6 055 090 A (MILES ET AL) 25 April 2000 (2000-04-25) column 3, line 39 - column 4, line 41; figure 8</p>	2
X	<p>PATENT ABSTRACTS OF JAPAN vol. 2000, no. 03, 30 March 2000 (2000-03-30) & JP 11 337412 A (IDEC IZUMI CORP), 10 December 1999 (1999-12-10) abstract</p>	1,3,4, 42-44
X	<p>WO 02/093116 A (COLOR-SPEC TECHNOLOGIES, INC; WAGNER, GREGG; ROBERT, STEWART; EMERSON,) 21 November 2002 (2002-11-21) page 6; figures 3,7</p>	1,42
X	<p>FR 2 516 785 A (BUREAU RECHERCHE GEOLOG MINIERE) 27 May 1983 (1983-05-27) page 5, lines 3-24; figure 1</p>	1,5-7
X	<p>PATENT ABSTRACTS OF JAPAN vol. 014, no. 011 (P-988), 11 January 1990 (1990-01-11) & JP 01 259243 A (SUMITOMO METAL MINING CO LTD; others: 01), 16 October 1989 (1989-10-16) abstract; figure 2</p>	1,5-7
Y	<p>US 6 347 009 B1 (TAKEUCHI ATSUSHI) 12 February 2002 (2002-02-12) column 5, lines 20-67; figures 1,4</p>	5-8
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/030378

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MILES M W: "A new reflective FPD technology using interferometric modulation" JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY, SOCIETY FOR INFORMATION DISPLAY, SAN JOSE, US, vol. 5, no. 4, 1997, pages 379-382, XP002358928 ISSN: 1071-0922	1
Y	pages 380-381	5-8
X	page 381, column 2, paragraph 3; figures 4,5	45-48
Y	pages 380-381	59-67
Y	ANONYMOUS: "Low-reflectivity Specular Reflectance Standard"[Online] XP002374848 Retrieved from the Internet: URL:http://web.archive.org/web/20040220134257/www.oceanoptics.com/Products/stan-ssh.asp> [retrieved on 2004-02-20]	10, 17-19, 32,60,61
A	the whole document	22-29
Y	ANONYMOUS: "High-reflectivity Specular Reflectance Standard"[Online] XP002374849 Retrieved from the Internet: URL:http://web.archive.org/web/20040220134330/www.oceanoptics.com/Products/stan.ssl.asp> [retrieved on 2004-02-20]	9-21, 30-37, 59-67
A	the whole document	22-29
A	GB 2 030 721 A (BUDAPESTI MUESZAKI AGYETEM) 10 April 1980 (1980-04-10) page 1, lines 58-64	11,61
A	US 2002/015215 A1 (MILES MARK W) 7 February 2002 (2002-02-07) paragraph [0050]; figures 3E-3G	46-48

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/030378

Box 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 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

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 an additional fee, this Authority did not invite payment of any additional fee.
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.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- 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: 1-4, 38-44

Fiber-optic colorimeter

2. claims: 5-8

Color measurement with Koehler illumination

3. claims: 9-37,49-58

Integrated bright and dark standard

4. claims: 45-48, 59-67

Quality test procedure for interferometric modulators

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/030378

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6055090	A	25-04-2000	NONE	
JP 11337412	A	10-12-1999	NONE	
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