

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 September 2008 (12.09.2008)

PCT

(10) International Publication Number
WO 2008/109231 A3

- (51) International Patent Classification:
G02B 27/01 (2006.01)
- (21) International Application Number:
PCT/US2008/053752
- (22) International Filing Date:
12 February 2008 (12.02.2008)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
11/682,255 5 March 2007 (05.03.2007) US
- (71) Applicant (for all designated States except US): **THE BOEING COMPANY** [US/US]; 100 North Riverside Plaza, Chicago, Illinois 60606-2016 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **KELLY, Brian** [US/US]; 17304 Northeast 138th Street, Redmond, Washington 98052 (US). **ROMIG, Emma** [US/US]; 6378 Northeast Radford Drive #1211, Seattle, Washington 98115 (US).

- (74) Agents: **JOHNSON, Rosana S** et al.; The Boeing Company, PO Box 2515, MC 110-SD54, Seal Beach, CA 90740-1515 (US).
- (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, 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, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,

[Continued on next page]

(54) Title: ELECTRICALLY DIMMABLE COMBINER OPTICS FOR HEAD-UP DISPLAY

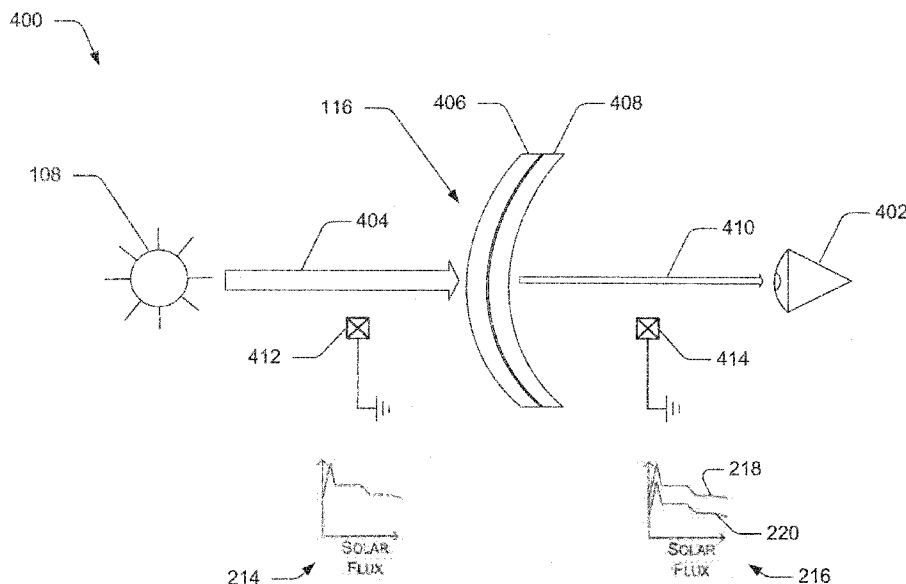


Fig. 4

(57) Abstract: Methods and systems for providing an electrically dimmable combiner optics for head-up displays are disclosed. In one embodiment, a dimmable head-up display (400) includes a display portion (408) configured to provide head-up display information to an operator (402). Additionally, a dimmable portion (406) is coupled to the display portion configured to change a transmissivity of the display portion from a first transmissivity level to a second transmissivity level. The dimmable portion (406) includes a plurality of dimmable segments of independent variable transmissivity. The head-up display (HUD) may include a light sensor (412, 414) to detect the light intensity of the environment surrounding the dimmable combiner (116).

WO 2008/109231 A3



NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG,
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

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

30 October 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/053752A. CLASSIFICATION OF SUBJECT MATTER
INV. G02B27/01

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 G01D B60K G09F

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 158 336 A (ELOP ELECTROOPTICS IND LTD [IL]) 28 November 2001 (2001-11-28) paragraphs [0002], [0011], [0012], [0018], [0020], [0021], [0023] - [0025], [0027] figure 1	1-8
X	DE 10 2006 006290 A1 (SIEMENS AG [DE]) 22 February 2007 (2007-02-22) paragraphs [0017], [0018], [0022] figure 1	1
X	GB 2 368 403 A (AUTOLIV DEV [SE]) 1 May 2002 (2002-05-01) page 2 page 6 - page 8 figure 2	1
	----- -/--	

 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 document 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 another 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.

& document member of the same patent family

Date of the actual completion of the international search

28 May 2008

Date of mailing of the international search report

12/08/2008

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

Hornung, André

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/053752

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2002 104017 A (KENWOOD CORP) 9 April 2002 (2002-04-09) paragraphs [0019], [0025], [0028] figure 1 abstract	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/053752

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:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. As all searchable claims could be searched without effort justifying an 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.:

see annex

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8

A dimmable HUD comprising a display and a segmented dimmable portion configured to change the transmissivity of the display.

2. claims: 9-17

A system comprising a dimmable combiner, a light sensor, a manual combiner control input, an imaging device and a control system for adjusting the transmissivity of the dimmable combiner based on either the signal from the light sensor, the imaging device and/or the manual input.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/053752

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1158336	A	28-11-2001	IL 136248 A US 2002008708 A1	31-08-2004 24-01-2002
DE 102006006290	A1	22-02-2007	EP 1915272 A1 WO 2007020158 A1	30-04-2008 22-02-2007
GB 2368403	A	01-05-2002	AU 9615601 A WO 0235276 A1	06-05-2002 02-05-2002
JP 2002104017	A	09-04-2002	NONE	