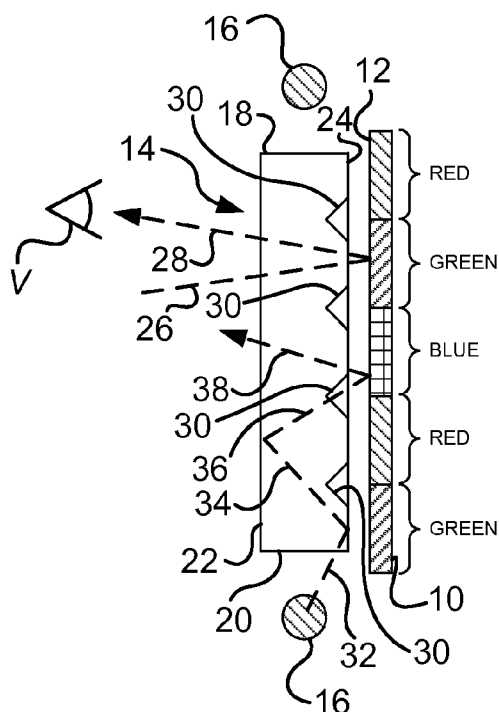




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- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

[Continued on next page]

(54) Title: ILLUMINATOR FOR REFLECTIVE DISPLAYS

**FIG. 2**

(57) Abstract: An illuminator for a reflective display (10) incorporates a light guide (14) having substantially transparent front and rear planar surfaces which overlap the display's viewing surface when the surfaces are substantially parallel and adjacent to the viewing surface. A light source (16) emits light into the light guide. A plurality of light redirecting structures (30) is distributed on the light guide's rear surface. The structures are shaped to redirect through the light guide toward the viewing surface light rays which encounter the structures. Most light rays emitted into the light guide by the light source which do not encounter any of the structures are confined within the light guide by total internal reflection. Most light rays emitted into the light guide by the light source which encounter any of the structures are re-directed through the light guide toward the viewing surface, substantially uniformly illuminating the display in a low ambient light environment.



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

Published:**Declarations under Rule 4.17:**

- *as to the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
- *of inventorship (Rule 4.17(iv))*

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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31 January 2013

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/028128

A. CLASSIFICATION OF SUBJECT MATTER
INV. G02B6/00 F21V8/00
ADD.

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

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 341 009 A2 (SEIKO EPSON CORP [JP]) 3 September 2003 (2003-09-03) paragraphs [0001] - [0046], [0088] - [0103]; figures 1,2,6,7,10,11,12,37,45 -----	1-8,10, 11,16, 17,21
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Y	EP 2 187 247 A2 (SAMSUNG ELECTRONICS CO LTD [KR]) 19 May 2010 (2010-05-19) paragraph [0031] - paragraph [0044]; figure 1 -----	9

☐ 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 application or patent 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

5 June 2012

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/028128

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 all searchable 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.:

1-11, 16, 17, 21

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: 1-11, 16, 17, 21

Illuminator for a reflective display having a light source and a light guide having light redirecting structures of a certain density facing the display, the light source being an organic LED, and corresponding method

2. claims: 12-15

Illuminator for a reflective display having a light source and a light guide having light redirecting structures of a certain density facing the display, the redirecting structures being pockets in the light guide which are filled with air or a material having a refractive index different from the light guide

3. claims: 18-20, 22-24

Illuminator for a reflective display having a light source and a light guide having light redirecting structures of a certain density facing the display, and an optical sensor providing a value representative of the intensity of ambient light for use in controlling the intensity of the light source, and corresponding method

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/028128

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