

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 May 2006 (18.05.2006)

PCT

(10) International Publication Number
WO 2006/052908 A3

(51) International Patent Classification:

G02B 26/00 (2006.01)

(21) International Application Number:

PCT/US2005/040329

(22) International Filing Date:

8 November 2005 (08.11.2005)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10/983,353 8 November 2004 (08.11.2004) US

(71) Applicants (for all designated States except US):

STEREO DISPLAY, INC. [US/US]; Suite F, 980 East Orangethorpe Avenue, Anaheim, California 92801 (US).
ANGSTROM, INC. [KR/KR]; 128-1 Maesanro 3-ga, Paldal-gu, Suwon, Gyeonggi-do 442-852 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KIM, Tae Hyeon** [KR/KR]; Jindallae APT. 108-101, Wolpyeong-dong, Seogu, Daejeon 302-754 (KR). **BAEK, Sang Hyune** [KR/KR]; 73-1 Go-deung-dong, Paldal-gu, Suwon 442-880 (KR).

(74) Common Representative: **STEREO DISPLAY, INC.**; Suite F, 980 East Orangethorpe Avenue, Anaheim, California 92801 (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, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

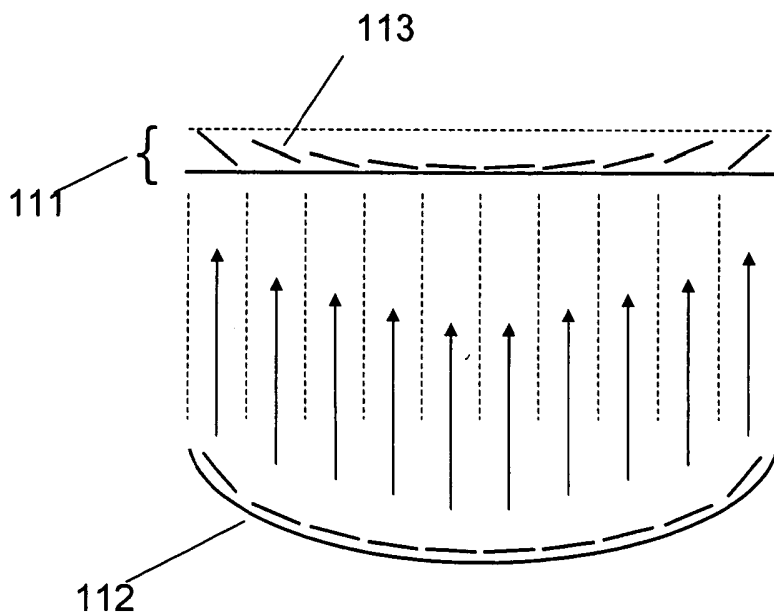
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report

[Continued on next page]

(54) Title: VARIABLE FOCAL LENGTH LENS COMPRISING MICROMIRRORS



(57) Abstract: A variable focal length lens (121) consists of many micromirrors (122) with degrees of freedom rotation and/or degrees of freedom translation and actuating components. As operating methods for the lens, the actuating components control the positions of micromirrors (122) electrostatically and/or electromagnetically. The optical efficiency of the variable focal length lens is increased by locating a mechanical structure upholding micromirrors and the actuating components under micromirrors. The lens (121) can correct aberration by controlling each micromirror independently. The lens (121) can also be of a desired arbitrary shape and/or size. The micromirrors (122) are arranged in a flat plane or in a curved plane with a predetermined curvature.

The electrodes determining the position of the micromirrors can be made of material with high electrical conductivity, preferably metal. The surface material of the micromirror is made of a material with high reflectivity such as aluminum, silver, and gold, which are coated with multi-layer dielectric material or antioxidant.



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

19 October 2006

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/40329

A. CLASSIFICATION OF SUBJECT MATTER

IPC: G02B 26/00(2006.01)

USPC: 359/291,846

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. : 359/291,846

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPAT DATA BASE, JPO, EPO, DERWENT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2,002,376 (MANNHEIMER) 21 May 1935 (21.05.1935), Figure 3, column 3, lines 1-25	1-3, 7-32 and 48 ----- 4-6 and 33-47
X, P	US 7,031,046 (KIM et al.) 18 April 2006 (18.04.2006), column 5- column 6	1-3, 7-32 and 48



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 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

18 May 2006 (18.05.2006)

Date of mailing of the international search report

26 JUL 2006

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

Authorized officer

Hung Dang (Assistant examiner: Tuyen Tra)

Telephone No. 571-272-2343

Facsimile No. (571) 273-3201