(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 August 2010 (19.08.2010)

PCT

(10) International Publication Number
WO 2010/093975 A3

(51) International Patent Classification:
G02B 3/10 (2006.01) *G02C 7/04* (2006.01)
A61F 2/12 (2006.01) *G02B 5/18* (2006.01)
G02C 7/06 (2006.01)

(21) International Application Number:
PCT/US2010/024165

(22) International Filing Date:
12 February 2010 (12.02.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/207,409 12 February 2009 (12.02.2009) US

(71) Applicant *(for all designated States except US)*: **THE ARIZONA BOARD OF REGENTS ON BEHALF OF THE UNIVERSITY OF ARIZONA** [US/US]; University Services Bldg., Rm. 204, P.O. Box 210158, 888 N. Euclid Avnue, Tucson, Arizona 85721-0158 (US).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **SCHWIEGERLING, James, T.** [US/US]; 5771 N. Placita Angelica, Tucson, Arizona 85718 (US).

(74) Agents: **DAVISON, Barry, L.** et al.; 1201 Third Avenue, Suite 2200, Seattle, Washington 98101-3045 (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, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

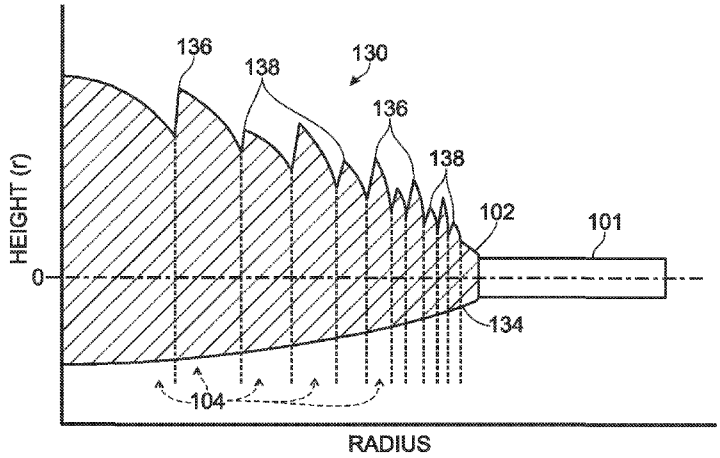
— *with international search report (Art. 21(3))*

— *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))*

[Continued on next page]

(54) Title: DIFFRACTIVE TRIFOCAL LENS

Fig. 4



(57) Abstract: A diffractive multifocal lens is disclosed, comprising an optical element having at least one diffractive surface, the surface profile comprising a plurality of annular concentric zones. The optical thickness of the surface profile changes monotonically with radius within each zone, while a distinct step in optical thickness at the junction between adjacent zones defines a step height. The step heights for respective zones may differ from one zone to another periodically so as to tailor diffraction order efficiencies of the optical element. In one example of a trifocal lens, step heights alternate between two values, the even-numbered step heights being lower than the odd-numbered step heights. By plotting a topographical representation of the diffraction efficiencies resulting from such a surface profile, step heights may be optimized to direct a desired level of light power into the diffraction orders corresponding to near, intermediate, and distance vision, thereby optimizing the performance of the multifocal lens.

WO 2010/093975 A3

(88) Date of publication of the international search report:
2 December 2010