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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
13 March 2008 (13.03.2008)

PCT

(10) International Publication Number
WO 2008/030681 A2

(51) International Patent Classification:
G01B 11/02 (2006.01)

(21) International Application Number:
PCT/US2007/075463

(22) International Filing Date: 8 August 2007 (08.08.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/843,209 8 September 2006 (08.09.2006) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, 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, HU, IE, IS, IT, LT, LU, LV, MC, MT, 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:

— *without international search report and to be republished upon receipt of that report*

WO 2008/030681 A2

(54) **Title:** INTERFEROMETRIC OPTICAL POSITION ENCODER EMPLOYING SPATIAL FILTERING OF DIFFRACTION ORDERS FOR IMPROVED ACCURACY

(57) **Abstract:** An optical position encoder employs spatial filtering of diffraction orders other than +/- 1st diffraction orders for greater accuracy. The encoder includes a light source, a scale including a diffractive scale pattern, an optical detector adjacent to the scale, and first and second spaced-apart diffraction gratings between the light source and the scale. The gratings and scale are configured to spatially separate +/- 1st diffraction orders from other diffraction orders and to direct the +/- 1st diffraction orders along respective optical paths. The optical paths diverge from the first grating to respective locations on the second grating that are separated by more than the beam width of the source light beam. The optical paths further converge from the locations on the second grating to an area of the scale adjacent to the detector, and then extend from the area of the scale to the detector to create an interference pattern as a function of the relative position between the scale and the light source. Preferably, higher diffraction orders are separated by total internal reflection at the first diffraction grating.