

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 January 2003 (03.01.2003)

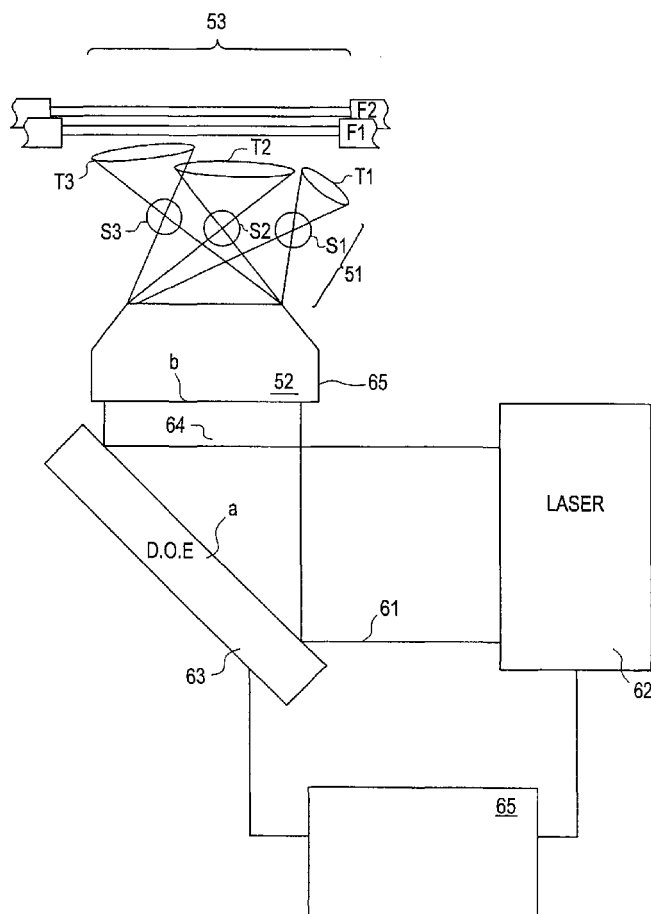
PCT

(10) International Publication Number
WO 03/001260 A1

- (51) International Patent Classification⁷: **G02B 6/28**
- (21) International Application Number: PCT/US02/19562
- (22) International Filing Date: 20 June 2002 (20.06.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
09/886,698 20 June 2001 (20.06.2001) US
10/118,532 8 April 2002 (08.04.2002) US
10/118,531 8 April 2002 (08.04.2002) US
10/118,709 8 April 2002 (08.04.2002) US
10/118,760 8 April 2002 (08.04.2002) US
- (71) Applicant (for all designated States except US): **ARRYX, INC.** [US/US]; 316 North Michigan Avenue, Chicago, IL 60601 (US).
- (71) Applicant and
(72) Inventor: **BRADLEY, Kenneth, A.** [US/US]; 555 W. Madison Street, Apt. 4309, Chicago, IL 60661 (US).
- (72) Inventor; and
(75) Inventor/Applicant (for US only): **LOPES, Ward** [US/US]; 1519 E. 54th Street, Apt. 4, Chicago, IL 60615 (US).
- (74) Agent: **EDWARDS, Jean, C.**; Sonnenschein Nath & Rosenthal, 1301 K St. N.W., 6th Floor, East Tower, Washington, D.C. 20005 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,

[Continued on next page]

(54) Title: OPTICAL SWITCHES AND ROUTERS AND OPTICAL FILTERS



(57) Abstract: Our invention relates generally to an optical switch (31) and an optical router (10) to rapidly route signals from particular channels (22, 24) within an optical band by using optical switches (20) which utilize a controlled whispering gallery mode (WGM) resonance of dielectric microspheres (S1, S2, S3) to optically switch signals. Another invention relates to optical filters which use a WGM resonate structure (150) to isolate and switch specific optical signals between waveguides (F1, F2). In other inventions, the filter (100) is switched "on/off" by signal loss within a WGM resonate structure (150) which disrupts the WGM resonance; the filter (100) isolates and switches a specific wavelength signal from among a group of signals of different wavelengths; and is switched "off" by adjusting the index of refraction of the resonate structure to become substantially similar to the index of refraction of the surrounding medium.



WO 03/001260 A1



SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VN, YU, ZA, ZM, ZW.

- (84) Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*

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.