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(71) Applicant: **CORNING INCORPORATED** [US/US]; 1 Riverfront Plaza, Corning, NY 14831 (US).

(72) Inventors: **BARTOLINI, Glenn, D.**; 37 Everett Street, Waltham, MA 02453 (US). **BHATIA, Vikram**; 30 Pond Crest, Painted Post, NY 14870 (US). **WIGLEY, Peter, G.**; 2802 Pwoderhouse Road, Corning, NY 14830 (US).

(74) Agent: **AGON, Juliana**; Corning Incorporated, SP TI 3 1, Corning, NY 14831 (US).

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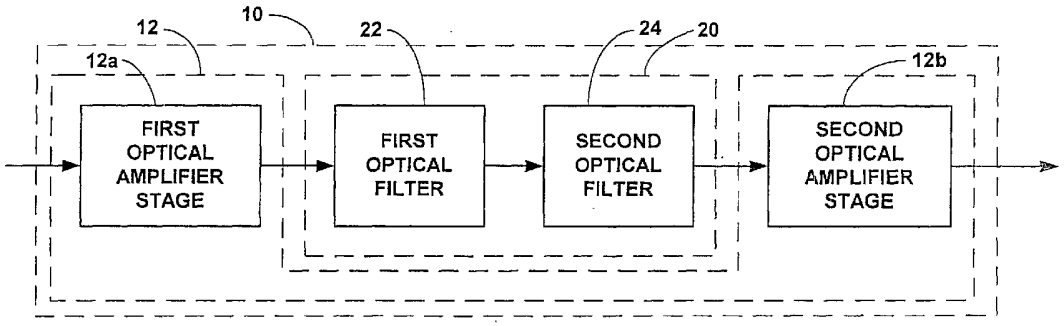
(54) Title: THERMAL RIPPLE-COMPENSATING, GAIN-FLATTENING FILTER FOR AN OPTICAL AMPLIFIER



(57) Abstract: An optical device including an optical amplifier (12) to amplify optical signals received through an optical input, and to supply the amplified optical signals from an optical output, and an optical filter component (20) to compensate for variations in the gain spectrum of the optical amplifier (12) that occur as a function of wavelength and operating temperature. The optical filter component includes a first optical filter (22) having an athermalized transmission spectrum and a second optical filter (24) having a transmission (or insertion loss) spectrum that varies as a function of operating temperature.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/07766

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04B 10/12
US CL : 359/337.1; 359/337.2

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. : 359/337.1; 359/337.2; 359/339;

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)
IEEE: athermal; temperature compensation; narrow-band, gain flattening; temperature independent

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,049,414 A (ESPINDOLA et al) 11 April 2000 (19.04.2000), column 4, lines 25-40; column 5, line 59-Clumn 6, line 10; column 4, line 59-column 5, line 23.	1, 2, 4, 6-8, and 10
X --- Y	FLUDGER et al. Fundamental Noise Limits in Broadband Raman Amplifiers. OFC 2001. 17-22 March 2001, Vol. 1, pages MA5/1-MA5/3	1, 2, 4, and 10 --- 3
X --- Y	US 5,706,125 A (Nakano) 6 January 1998 (6.01.1998), Column 6, line 60-Clumn 7, line 11.	1, 2, 4, and 10 --- 5
X --- Y	SHIMOJO et al. Compensation of L-band Gain-Wavelength Characteristics Using Linear and Second-Order Variable Gain Equalizers.OAA.12 July 2000 (12.7.2000) page OWA3-2171	1, 2, 4, and 10 --- 3 and 9
A	US 5,699,468 A (FARIES et al) 16 December 1997 (16.12.1997)	
A	US 5,007,705 A (MOREY et al) 16 April 1991 (16.04.1991)	

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,703,978 A (DiGiovanni et al) 30 December 1997 (30.12.1997)	
A	US 5,740,292 A (STRASSER et al) 14 April 1998 (14.04.1998)	
P	US 6,311,004 B1 (KENNEY et al.) 30 October 2001 (30.10.2001)	
A	US 5,042,898 A (MOREY et al) 27 August 1991 (27.8.1991)	
A	US 5,757,540 A (JUDKINS et al) 26 May 1998 (26.05.1998)	
A	US 6,141,130 A (IP) 31 October 2000 (31.10.2000).	
A	US 5,900,970 A (Kakui) 4 May 1999 (4.5.1999)	
A	NAKAGAWA et al. 1580 nm Band Erbium-Doped Fiber Amplifier Employing Novel Temperature Compensation Technique. OFCC 2000. 7-10 March 2000, Vol. 2, pages 108-110.	
A	ROTTWITT et al. Detailed Analysis of Taman Amplifiers for Long Haul Transmission. OFCC 1998. 22-27 March 1998, pages 30-31. ISBN 1-55752-521-8	
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A	KOKUBUN et al. Temperature-Independent Optical filter at 1.55 mu m Wavelength Using a Silica-Based Athermal Waveguide. Electronic Letters.19 February 1998, Vol. 34, No. 4, pages 367-369.	