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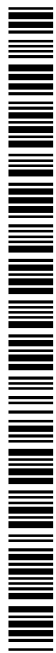
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(54) Title: RESONANT OPTICAL MODULATORS

(57) Abstract: A resonant optical modulator comprises a transmission fiber-optic waveguide, a circumferential-mode optical resonator transverse-coupled thereto, a modulator optical component transverse-coupled to the circumferential-mode resonator, and a modulator control component. A control signal applied to the modulator optical component through the modulator control component alters the round-trip optical loss of the circumferential-mode resonator, thereby altering the transmission of a resonant optical signal through the transmission fiber-optic waveguide. The modulator optical element may comprise an open waveguide or a closed waveguide (i.e., resonator). The resonator round-trip optical loss may be altered by altering the optical absorption/scattering of the modulator optical component, or by altering an optical resonance frequency of a resonant modulator optical component.



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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/49606**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : G02F 1/01, 1/295; G02B 6/26, 6/34, 6/42

US CL : 385/1, 2, 4, 8, 9, 10, 15, 129

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. : 385/1, 2, 4, 8, 9, 10, 15, 129; 359/333

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)

search terms: ring, resonator, taper, modulator, bifurcat

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,475,704 A (Lomashevich) 12 December 1995, (12.12.95) figure 1.	15
Y	US 5,138,676 A (Stowe et al.) 11 August 1992, (11.08.92) col. 23, lines 1-25	44, 67-69, 70-77, 82, 83

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

"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier document published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

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## 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.
X	US 5446579 A (Lomashevich) 29 August 1995,(29.08.95) col. 1 to col. 4, col. 6, line 35 to col. 8 line 68.	1-4, 7, 10, 11, 16, 17, 20, 21, 24, 2729, 33, 35, 37
Y		15, 19, 22, 23, 23, 25, 26, 30-32, 34, 38-83
Y	US 5,822,482 A (Atkeisson et al.) 13 October 1998,(13.10.98) col. 3, lines 9-18.	44, 67-69, 70-77, 82, 83
Y	US 5,751,873 A (Elias et al.) 12 May 1998, (12.05.98) col. 5, lines 29-44.	44, 67-69, 70-77, 82, 83
Y	US 5,666,447 A (Chuang et al.) 9 September 1997, (09.09.97) col. 5, lines 29-53.	44, 67-69, 70-77, 82, 83
Y	US 5,479,548 A (Cote et al.) 26 December 1995,(26.12.95) col. 1, lines 20-25.	44, 67-69, 70-77, 82, 83
Y	US 4,723, 827 A (Shaw et al.) 9 February 1988, (09.02.98) col. 8, lines 35-52.	78, 79
Y	US 4,515,431 A (Shaw et al.) 07 May 1985, (07.05.85) col. 15, lines 26-35.	78, 79
Y	US 4,142,775 A (Ramaswamy et al.) 06 March 1979, (06.03.79) col. 2, lines 33-48; col.4, lines 6-34.	78, 79
Y	US 6,108,465 A (Iida et al.) 22 August 2000,(22.08.00) col. 5, line 26 to col. 6, line 35.	8, 50-77, 81-83
Y	US 5,708,670 A (Pfeiffer) 13 January 1998 ,(13.01.98) col. 1, lines 25-47; col. 2, lines 1-23.	8, 50-77, 81-83
Y	US 5,546,414 A (Pfeiffer) 13 August 1996, (13.08.96) col. 1, lines 34-45 col. 2, lines 17-60.	8, 50-77, 81-83
Y	US 5,015,058 A (Thorncraft et al.) 14 May 1991, (14.05.91) col. 4, lines 15-30.	8, 50-77, 81-83