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Simon, Y.; 2615 Heritage Park Circle, San Jose, CA 95132 (CN).

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(74) Agents: ISRAELSEN, R., Burns et al.; Workman, Nydegger & Seeley, 1000 Eagle Gate Tower, 60 East South Temple, Salt Lake City, UT 84111 (US).

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(71) Applicant: FINISAR CORPORATION [US/US]; 1308 Moffet Park Drive, Sunnyvale, CA 94089-1133 (US).

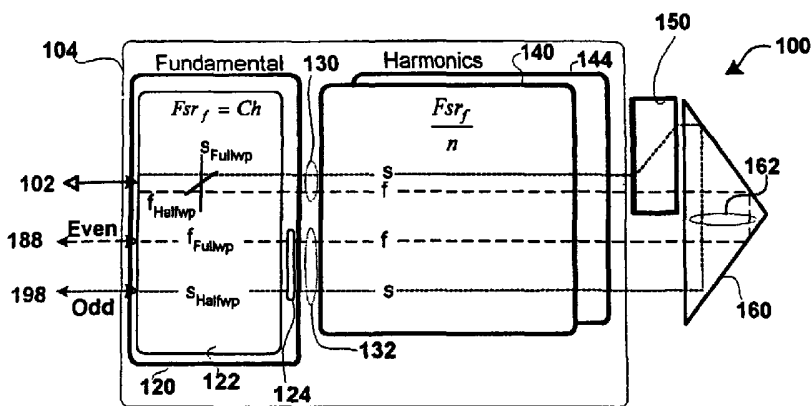
(72) Inventors: XIE, Ping; 10118 Crescent Court, Cupertino, CA 95014 (US). BETTMAN, R., Brad; 415 Bush Street, Mountain View, CA 94041 (US). RONG, Haisheng; 4261 Norwalk Drive #Y104, San Jose, CA 95129 (CN). ZHANG, Kevin; 3560 Flora Vista Avenue, Apt. 318, Santa Clara, CA 95051 (US). MAO, Yalan; 11620 Wildflower Court, Cupertino, CA 95014 (US). WANG, Wei; 1291 Starglo Place, San Jose, CA 95131 (CN). WU,

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(54) Title: METHOD AND APPARATUS FOR AN OPTICAL MULTIPLEXER AND DEMULTIPLEXER WITH AN OPTICAL PROCESSING LOOP



(57) Abstract: An optical device that can be used in a range of telecommunications applications including optical multiplexers/demultiplexers and optical routers. The optical device includes an optical processing loop which allows multi-stage performance characteristics to be achieved with a single physical filtration stage. Optical processing on the first leg and second legs of the loop is asymmetrical thereby improving the integrity of the optical signals by effecting complementary chromatic dispersion on the first and second legs. In an embodiment of the invention the optical device includes a fundamental filter cell, a retro reflector and a sputter/combiner. The fundamental filter cell filters optical signals propagating on each of two legs of an optical loop which intersects the fundamental filter cell. The fundamental filter cell operates as a full waveplate to the odd set of channels and a half waveplate to the even set of channels on a selected one of the two legs and as a half waveplate to the odd set of channels and a full waveplate to the even set of channels on a remaining one of the two legs. The retro reflector optically couples with the fundamental filter cell to reflect the optical signals from one of the two legs to another of the two legs to form the optical loop. The sputter/combiner optically couples between the fundamental filter cell and the retro reflector to split or combine the odd set of channels and the even set of channels depending on the propagation direction of the optical signals along the optical loop.

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**A. CLASSIFICATION OF SUBJECT MATTER**

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 US CL : 359/497, 498

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. : 359/497, 498, 124, 127

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 EAST, BRS TEXT

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,208,444 B1 (WONG et al.) 27 March 2001 (27.03.2001) see fig. 4.	1-22
Y	US 6,040,932 A (DUCK et al.) 21 March 2000 (21.03.2000), see fig. 10, col. 2, 44-60 and 64-67	1-22

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"
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"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
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Mail Stop PCT, Attn: ISA/US  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Authorized officer

Hien Phan

Telephone No. 703-308-0956