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(54) Title: OPTICAL AMPLIFIER HAVING AUTOMATIC GAIN CONTROL

(57) Abstract: A method and apparatus is provided for automatically controlling the gain of an optical amplifier. The method begins by generating a first control signal based on a feed-forward error signal and a second control signal based on the feedback error signal. Next, the pump source is adjusted in accordance with the control signals. In this way both the speed of a feed-forward arrangement and the accuracy of a feedback arrangement can be achieved.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/27118

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01S 3/00

US CL : 359/341.41

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. : 359/341.41, 341.4, 341.42

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,923,462 A (van der Plaats) 13 July 1999 (13.07.1999), Fig. 1.	1-13, 18-19, 21-25, 30-31
X, P ---	US 6,377,394 B1 (Drake et al.) 23 April 2002, Fig. 4	1-13, 18-19, 33-35
Y, P		14, 20-32
Y, E	US 6,356,386 B1 (Denkin et al.) 12 March 2002, Fig. 1, Fig. 2, Fig. 5B, col. 14.	14, 20-32

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	
"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 application or patent 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

International application No.

PCT/US02/27118

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claim 8 depends upon claim 8. However, Erbium rare-earth doped fiber amplifiers are disclosed in the prior art. See claim 7.
3. ☒ Claim Nos.: 8
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐

The additional search fees were accompanied by the applicant's protest.

☐

No protest accompanied the payment of additional search fees.