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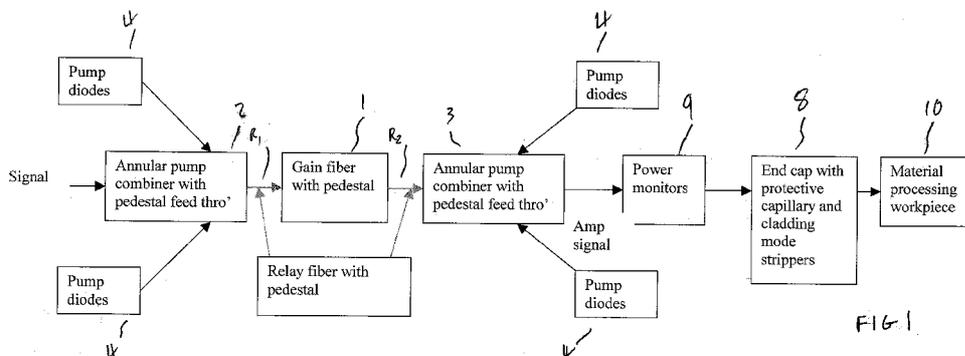
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(54) Title: FIBRE LASER SYSTEM



(57) Abstract: A fibre laser system is disclosed comprising an optical fibre, a part of which is doped with a rare earth to form an optical gain medium; at least one laser diode; means for applying pump radiation from the laser diode to the optical gain medium and for generating a laser beam and delivery fibre means for delivering a laser beam to a workpiece, wherein the fibre laser is provided with at least one means for protecting one or more components from damage caused by errant radiation. Several different means of protection are disclosed.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER  
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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)  
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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 practical, search terms used)

EPO-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X P, A	WO 2007/039893 A (ELBIT SYSTEMS ELECTRO OPTICS E [IL]; SACKS ZACHARY [IL]; SCHIFFER ZEEV) 12 April 2007 (2007-04-12) page 8, line 11 - page 10, line 19  page 26, lines 1-6 page 28, lines 24-27; claims 1,10; figures 1,20,21	1, 2, 8, 9, 25, 37, 47-50 3-7, 10-24, 26-36, 38-46
P, X	US 2007/041083 A1 (DI TEODORO FABIO [US] ET AL) 22 February 2007 (2007-02-22) paragraphs [0010], [0156], [0365]; figures 3,4,7,12	1-50

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See patent family annex.

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International application No

PCT/GB2007/050335

## C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
L	WO 2008/119340 A (FRAUNHOFER GES FORSCHUNG [DE]; BEYER ECKHARD [DE]; PFOHL PEER [DE]) 9 October 2008 (2008-10-09) abstract; figure 1	1
X	US 2001/017971 A1 (IWATA NORIKO [JP] ET AL) 30 August 2001 (2001-08-30) figure 4	25,37
A	WO 98/01784 A (PERMANOVA LASERSYSTEM AB [SE]; SANDSTROEM ULF [SE]; ROOS SVEN OLOV [SE]) 15 January 1998 (1998-01-15) abstract; figures 1,3	1-9,25, 37,47-50
A	US 2004/071409 A1 (BROWN JOE D [US]) 15 April 2004 (2004-04-15) paragraphs [0025], [0043]	1-9,25, 37,47-50
A	US 2005/025418 A1 (BROWN JOE D [US]) 3 February 2005 (2005-02-03) abstract; figures 6-8	1-50
A	US 6 434 302 B1 (FIDRIC BERNARD G [US] ET AL) 13 August 2002 (2002-08-13) cited in the application column 5, lines 21-50; figure 16	1,12-50
A	EP 0 353 870 A (BRITISH TELECOMM [GB]) 7 February 1990 (1990-02-07) cited in the application column 2, lines 16-49; figures 1-4	1,12-50
A	US 2005/105854 A1 (DONG LIANG [US] ET AL DONG LIANG [US] ET AL) 19 May 2005 (2005-05-19) the whole document	1,12-50
A	JP 09 211238 A (ANDO ELECTRIC) 15 August 1997 (1997-08-15)	1,8,9
A	WO 2005/029146 A (ITF TECHNOLOGIES OPTIQUES INC [CA]) 31 March 2005 (2005-03-31) the whole document	1-50

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/GB2007/050335
---

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007039893    A	12-04-2007	AU 2006298417 A1	12-04-2007
		EP 1941590 A2	09-07-2008
		KR 20080055974 A	19-06-2008
		US 2008267228 A1	30-10-2008
US 2007041083    A1	22-02-2007	US 2007091948 A1	26-04-2007
		US 7379237 B1	27-05-2008
		US 7379648 B1	27-05-2008
		US 7375877 B1	20-05-2008
		US 7436585 B1	14-10-2008
		US 7386211 B1	10-06-2008
WO 2008119340    A	09-10-2008	DE 102007017363 A1	16-10-2008
US 2001017971    A1	30-08-2001	CA 2331935 A1	23-08-2001
		EP 1136854 A2	26-09-2001
		JP 2001235637 A	31-08-2001
WO 9801784        A	15-01-1998	AT 290228 T	15-03-2005
		CZ 9804313 A3	16-06-1999
		DE 69732632 D1	07-04-2005
		DE 69732632 T2	29-12-2005
		EP 0910810 A1	28-04-1999
		ES 2239358 T3	16-09-2005
		HU 9902835 A2	28-12-1999
		JP 3699486 B2	28-09-2005
		JP 2000514930 T	07-11-2000
		KR 20000022476 A	25-04-2000
		RU 2180130 C2	27-02-2002
		SE 509706 C2	01-03-1999
		SE 9602666 A	06-01-1998
		US 6167177 A	26-12-2000
US 2004071409    A1	15-04-2004	US 2005196108 A1	08-09-2005
US 2005025418    A1	03-02-2005	NONE	
US 6434302        B1	13-08-2002	NONE	
EP 0353870        A	07-02-1990	AT 111234 T	15-09-1994
		AU 626562 B2	06-08-1992
		AU 3875489 A	05-02-1990
		CA 1321912 C	07-09-1993
		DE 68918024 D1	13-10-1994
		DE 68918024 T2	23-02-1995
		ES 2057129 T3	16-10-1994
		WO 9000751 A1	25-01-1990
		HK 137396 A	02-08-1996
		IE 62134 B1	14-12-1994
		JP 2672165 B2	05-11-1997
		JP 3505931 T	19-12-1991
		US 5129021 A	07-07-1992
US 2005105854    A1	19-05-2005	DE 112004002202 T5	28-09-2006
		US 2006093291 A1	04-05-2006
		WO 2005052640 A2	09-06-2005
JP 9211238        A	15-08-1997	NONE	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2007/050335

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005029146 A	31-03-2005	CA 2441918 A1	19-03-2005
		EP 1664869 A1	07-06-2006
		JP 2007506119 T	15-03-2007

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