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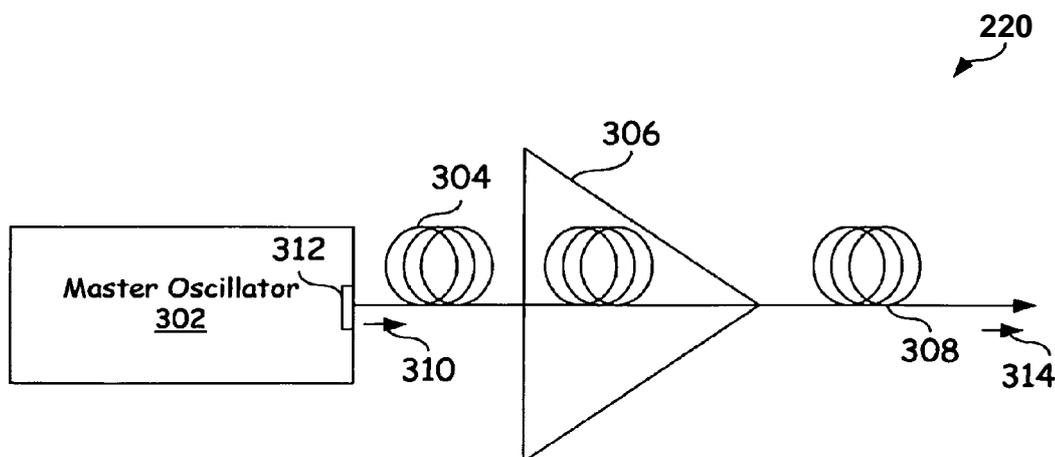
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(54) **Title:** FIBER LASER FOR ULTRASONIC LASER TESTING



(57) **Abstract:** Embodiments of the present invention relates to an improved laser for the optical detection of ultrasound. The primary task of this "first" detection laser is to illuminate the spot where a "second" laser is used to generate ultrasound in the part under test. The scattered light from the first laser is collected and analyzed with an interferometer to demodulate the surface vibrations caused by the return echoes of the ultrasound at the surface of the part. The improved detection laser (first laser) is constructed using a diode-pumped fiber laser to produce a high power single-frequency laser source.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
 INV. **G01N29/24** **G01N29/265** **G01H9/00** **G01N21/17** **C** **CORRECTED VERSION**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDSSEARCHED

Minimum documentation searched (classification system followed by classification symbols)
GOIN GOIH H04B

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 , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/073837 A (HRL LAB LLC [US]; PEPPER DAVID M [US]; DUNNING GILMORE J [US]) 19 September 2002 (2002-09-19)	1-3,14, 15, 27-29, 40,41
Y	abstract; figures 2-6 page 1, line 6 - page 12, line 4 -----	4-13, 16-26, 30-39
X	WO 99/61866 A (KONINKL PHILIPS ELECTRONICS NV [NL]; PHILIPS SVENSKA AB [SE]) 2 December 1999 (1999-12-02) abstract; figures 4-8 page 3, line 11 - page 4, line 22 ----- -/--	1,14,27

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- "E" earlier document but published on or after the international filing date
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- "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
- "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.
- "&" document member of the same patent family

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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 5 698 787 A (PARZUCHOWSKI HALINA M [US] ET AL) 16 December 1997 (1997-12-16) abstract; figures 1-6 column 3 » line 25 - column 4, line 54 column 5, line 37 - column 6, line 63 -----	27
Y	WO Θ /100363 A (LOCKHEED CORP [US]; DRAKE THOMAS E [US]) 4 December 2003 (2003-12-04) abstract paragraphs [0016] - [0023] -----	4-13, 16-26, 30-39
P,X	EP 1 742 049 A (TOKYO SHIBAURA ELECTRIC CO [JP]) 10 January 2007 (2007-01-10) abstract; figures 1-5 paragraphs [Θ 108] - [0141], [0197] - [0217] -----	1,4,14, 16,27,30

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2007/G16262
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Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
WO G2073837	A	19-09-2002	AU 2002306731 A1 EP 1382139 A2 JP 2005509130 T US 2002131050 A1	24-09-2002 21-01-2004 07-04-2005 19-09-2002
WO 9961866	A	02-12-1999	EP 1000316 A1 JP 2002516984 T US 6795198 B1	17-05-2000 11-06-2002 21-09-2004
us 5698787	A	16-12-1997	NONE	
WO 03100363	A	04-12-2003	AU 2003251304 A1 EP 1509978 A2	12-12-2003 02-03-2005
EP 1742049	A	10-01-2007	KR 20070006610 A US 2007157730 A1	11-01-2007 12-07-2007