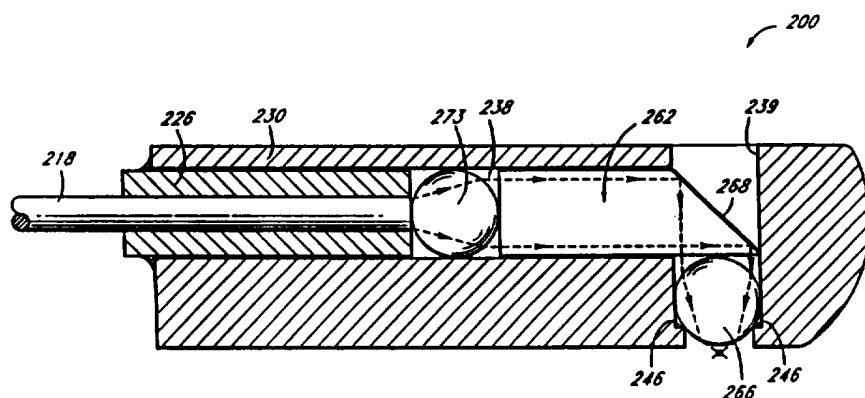




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US92/02871 (22) International Filing Date: 3 April 1992 (03.04.92) (30) Priority data: 681,318 4 April 1991 (04.04.91) US 680,815 4 April 1991 (04.04.91) US (71) Applicant: PREMIER LASER SYSTEMS, INC. [US/US]; 3 Morgan, Irvine, CA 92718 (US). (71)(72) Applicant and Inventor: COLVARD, Michael, D. [US/ US]; 1280 Piedra Morada, Pacific Palisades, CA 90272 (US). (72) Inventors: COZEAN, Colette ; 21581 Midcrest Street, El Toro, CA 92630 (US). AMIRKHANIAN, Barouj, D. ; 735 West California #103, Glendale, CA 91203 (US).		(74) Agents: ALTMAN, Daniel, E. et al.; Knobbe, Martens, Olson and Bear, 620 Newport Center Drive, 16th Floor, Newport Beach, CA 92660 (US). (81) Designated States: AT (European patent), AU, BE (Euro- pean patent), CA, CH (European patent), DE (Euro- pean patent), DK (European patent), ES (European pa- tent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (Euro- pean patent), MC (European patent), NL (European pa- tent), SE (European patent). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the</i> <i>claims and to be republished in the event of the receipt of</i> <i>amendments.</i> (88) Date of publication of the international search report: 12 November 1992 (12.11.92)
(54) Title: LASER SURGICAL PROBE		

**(57) Abstract**

A laser surgical apparatus is provided in which laser energy can be directed at an angle relative to the longitudinal axis of the probe. The probe (10) includes a reflecting surface (68, 268) directing the laser energy. The reflecting surface is transparent to visible light. In a preferred embodiment, the reflecting surface is on a rod (78, 262) cut at an angle (79, 262) to form a wedge, and a collimator (273) is used to collimate the light beam before it reaches the reflecting surface. Uses for the probes of the present invention are also provided in which the probes are used for laser surgical procedures, especially in the eye. In particularly preferred uses, the tissue contacted by laser light can be viewed during use of the probe by looking through the reflecting surface. An especially preferred use comprises an anterior capsulotomy. Procedures using a laser surgical probe are also provided disclosed in which laser energy can be directed at an angle relative to the longitudinal axis of the probe. In a preferred procedure, the laser probe is inserted into an internal portion of a mammal with a laser light beam being directed into the probe along a longitudinal axis. A reflecting surface on the probe reflects the laser light beam so that the beam exits the probe at an angle relative to the longitudinal axis, thereby directing the laser light onto tissue of the mammal. The tissue contacted by laser light can be viewed during the procedure by looking through the reflecting surface. A particularly preferred procedure comprises an anterior capsulotomy.

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INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 92/02871

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl.5 A 61 F 9/00 A 61 B 17/36		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl.5	A 61 F A 61 B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
2	Y WO,A,8903202 (SCHNEIDER) 20 April 1989, see figure 5; page 14, lines 28-32; page 19, paragraph 1; page 21, paragraph 3; page 25, paragraph 2	17,20- 23,27- 29,33- 39,42- 44 1
7	A --- Y US,A,4740047 (ABE) 26 April 1988, see figure 2; column 6, paragraph 2	17,20- 23,27- 29,33- 39,42- 44 1
11	A --- A US,A,4597380 (RAIF) 1 July 1986, see abstract --- -/-	1
¹⁰ Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "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) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "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 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "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		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
11-08-1992		28. 09. 92
International Searching Authority		Signature of Authorized Officer
EUROPEAN PATENT OFFICE		BARTON S.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		Relevant to Claim No.
Category	Citation of Document, with indication, where appropriate, of the relevant passages	
A	US,A,4718417 (KITTRELL) 12 January 1988, see figure 17; column 16, paragraphs 2,3; column 7, lines 58-64 ---	1,17
A	EP,A,0293126 (SCIENTIFIC GENERICS) 30 November 1988 ---	
A	EP,A,0392951 (LEVY) 17 October 1990 ---	
A	US,A,4625724 (SUZUKI) 2 December 1986 ---	
A	EP,A,0214712 (BARD) 18 March 1987 -----	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 92/02871

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

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

1. ☒ Claims Nos.: 18, 19, 24-26, 30-32, 40, 41, 45-85
because they relate to subject matter not required to be searched by this Authority, namely:
Please see PCT-Rule 39.1(iv).
2. ☐ Claims 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:
3. ☐ Claims Nos.:
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.

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

US 9202871

SA 59274

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 02/09/92
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A- 8903202	20-04-89	None	
US-A- 4740047	26-04-88	JP-A- 61219904	30-09-86
US-A- 4597380	01-07-86	None	
US-A- 4718417	12-01-88	CA-A- 1279901	05-02-91
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EP-A- 0392951	17-10-90	None	
US-A- 4625724	02-12-86	JP-A- 61031142	13-02-86
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		JP-A- 62034553	14-02-87
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