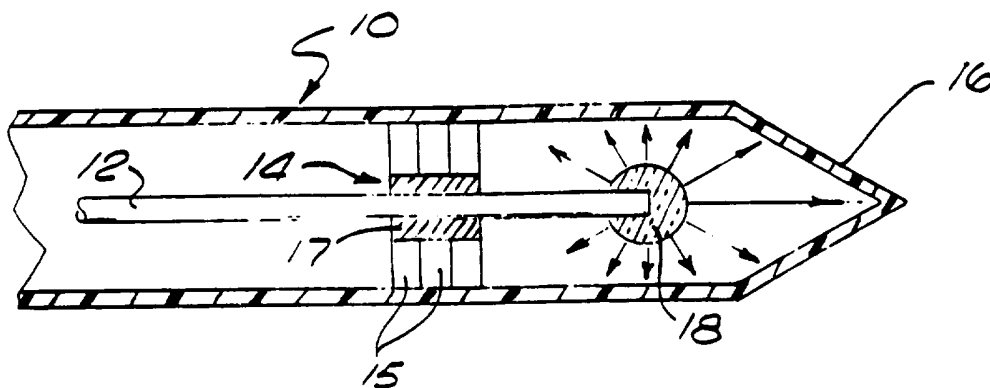




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁵ : A61N 5/06, A61B 17/36</p>	<p>A3</p>	<p>(11) International Publication Number: WO 92/17243 (43) International Publication Date: 15 October 1992 (15.10.92)</p>
<p>(21) International Application Number: PCT/US92/02385 (22) International Filing Date: 24 March 1992 (24.03.92) (30) Priority data: 681,225 5 April 1991 (05.04.91) US (71) Applicant: ARIA CORPORATION [US/US]; 2441 Ridgcrest S.E., Albuquerque, NM 87108 (US). (72) Inventors: CONN, Richard, L. ; 2405 Glenwood Ct., N.W., Albuquerque, NM 87107 (US). LOREE, Thomas, Robert ; 340 Calle Sierpe, Santa Fe, NM 87501 (US). BIGIO, Irving, Joseph ; 4444 Ridgeway Drive, Los Alamos, NM 87544 (US). STROBL, Karlheinz ; 1933 Otowi Road, Santa Fe, NM 87501 (US).</p>		<p>(74) Agent: BERLINER, Robert; Robbins, Dalgarn, Berliner & Carson, 201 North Figueroa Street, 5th Floor, Los Angeles, CA 90012 (US). (81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CI (OAPI patent), CM (OAPI patent), CS, DE, DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), GN (OAPI patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC (European patent), MG, ML (OAPI patent), MN, MR (OAPI patent), MW, NL, NL (European patent), NO, PL, RO, RU, SD, SE, SE (European patent), SN (OAPI patent), TD (OAPI patent), TG (OAPI patent). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 12 November 1992 (12.11.92)</p>

(54) Title: APPARATUS USING A LASER LUCENT NEEDLE



(57) Abstract

Apparatus formed of a laser lucid hollow, transparent needle (10) with an optical fiber (12) disposed within its interior. Means such as a spacer (14) can be used to retain the fiber in position within the needle. In a particular embodiment, the end of the needle adjacent to the energy transmitting end of the fiber is closed, and energy scatterers or diffusers (18) may be provided to alter the characteristics of the transmitted energy. In further embodiments, scattering or diffusing materials (32) are disposed within the walls and the closed end (16) of the needle to form a laser lucid apparatus customized to specific hyperthermia requirements. In other embodiments, the needle is open-ended for insertion of a specialized instrument for such uses as biopsies and spectroscopic tissue analyses. These procedures can be conducted before or after hyperthermia treatment of the tissue by replacing fiber in the needle casing with such a specialized instrument or vice-versa. A particular application facilitates the use of laser-induced hyperthermia to treat benign prostatic hypertrophy.

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INTERNATIONAL SEARCH REPORT

International Application No PCT/US 92/02385

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 N 5/06 A 61 B 17/36																	
II. FIELDS SEARCHED <div style="text-align: center; margin-top: 10px;">Minimum Documentation Searched⁷</div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 30%; padding: 5px;">Classification System</th> <th style="padding: 5px;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">Int. Cl. 5</td> <td style="padding: 5px; text-align: center;">A 61 B A 61 N A 61 F</td> </tr> </table> <div style="text-align: center; margin-top: 10px; font-size: small;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched⁸</div>			Classification System	Classification Symbols	Int. Cl. 5	A 61 B A 61 N A 61 F											
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III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 10%; padding: 5px;">Category¹⁰</th> <th style="width: 70%; padding: 5px;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 20%; padding: 5px;">Relevant to Claim No.¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">DE, A, 2826383 (EICHLER et al.) 20 December 1979, see page 4, lines 10-13, 24-28; claim 1; figures 1, 2, 7 ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 4736743 (DAIKUZONO) 12 April 1988, see column 3, lines 19-26; column 4, lines 12-22; figures 2, 3 ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">EP, A, 0394446 (ZOHZENKO et al.) 30 October 1990, see page 3, line 26 - page 4, line 6; figure ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 4950267 (ISHIHARA et al.) 21 August 1990, see column 4, lines 8-18; column 5, lines 33-42; figures 2, 4 -----</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> </tbody> </table>			Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	A	DE, A, 2826383 (EICHLER et al.) 20 December 1979, see page 4, lines 10-13, 24-28; claim 1; figures 1, 2, 7 ---	1	A	US, A, 4736743 (DAIKUZONO) 12 April 1988, see column 3, lines 19-26; column 4, lines 12-22; figures 2, 3 ---	1	A	EP, A, 0394446 (ZOHZENKO et al.) 30 October 1990, see page 3, line 26 - page 4, line 6; figure ---	1	A	US, A, 4950267 (ISHIHARA et al.) 21 August 1990, see column 4, lines 8-18; column 5, lines 33-42; figures 2, 4 -----	1
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IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 50%; padding: 5px;">Date of the Actual Completion of the International Search 25-08-1992</td> <td style="width: 50%; padding: 5px;">Date of Mailing of this International Search Report 24. 09. 92</td> </tr> <tr> <td style="padding: 5px;">International Searching Authority EUROPEAN PATENT OFFICE</td> <td style="padding: 5px;">Signature of Authorized Officer GLAS</td> </tr> </table>			Date of the Actual Completion of the International Search 25-08-1992	Date of Mailing of this International Search Report 24. 09. 92	International Searching Authority EUROPEAN PATENT OFFICE	Signature of Authorized Officer GLAS											
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INTERNATIONAL SEARCH REPORT

I. International application No.

PCT/US 92/02385

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.: 23-27
because they relate to subject matter not required to be searched by this Authority, namely:
See PCT-Rule 39.1(iv)- method for treatment of human body by therapy
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 9202385
SA 59860

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 15/09/92. 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
DE-A- 2826383	20-12-79	None	
US-A- 4736743	12-04-88	EP-A- 0292622	30-11-88
EP-A- 0394446	31-10-90	WO-A- 9004435	03-05-90
US-A- 4950267	21-08-90	JP-A- 1139081	31-05-89