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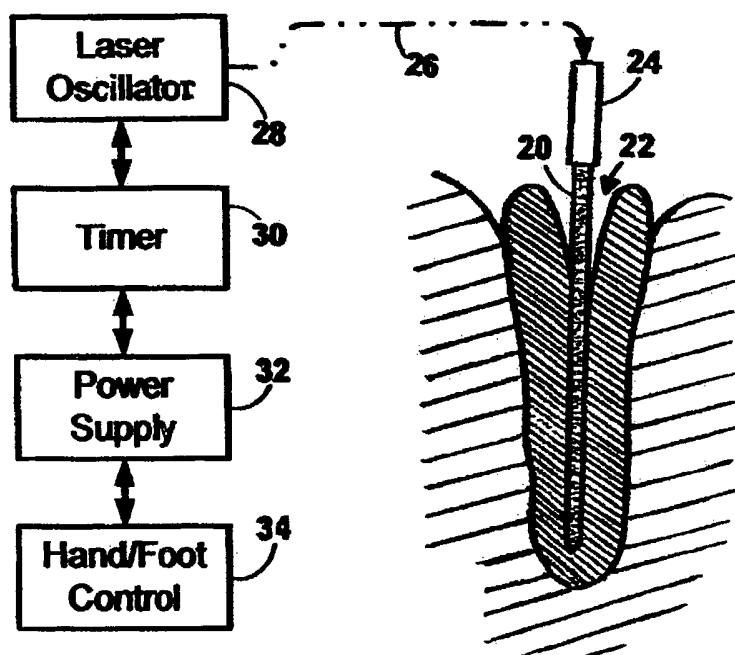
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ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: INSTRUMENT FOR DELIVERY OF OPTICAL ENERGY TO THE DENTAL ROOT CANAL SYSTEM FOR HID-  
DEN BACTERIAL AND LIVE BIOFILM THERMOLYSIS



(57) Abstract: A system and process for thermolytic eradication of bacteria and biofilm in the root canal (22) of a human tooth involve an elongated and flexible optical probe (20) and a laser oscillator (28) that provides the probe with low infrared energy. The optical probe is sufficiently long for insertion into substantially the entire length of the root canal of the tooth. The optical probe causes lateral dispersion of the radiation from the probe throughout the root canal. The radiation is provided at an energy density and for a period of time that are necessary to selectively target bacteria and live biofilm in the dentinal tubules of an entire root canal system, at once, thereby (a) inhibiting creation of a blackbody "hot tip" and (a) inducing laser interstitial thermotherapy (LITT) within the root-canal space.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/20520

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61C 5/02, 3/00

US CL : 433/224, 29

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. : 433/224, 29, 215; 606/13, 15, 16

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,622,501 A (LEVY) 22 April 1997 (22.04.1997), column 4, lines 23-26; column 6, lines 13-16, 35-37.	1-22
Y	US 4,979,900 A (OKAMOTO et al) 25 December 1990 (25.12.1990), column 1, lines 16-18; column 6, line 7.	1-22
Y	US 5,374,266 A (KATAOKA et al) 20 December 1994 (20.12.1994), column 2, line 36.	1-5, 7, 12-22
Y	US 5,300,067 A (NAKAJIMA et al) 05 April 1994 (05.04.1994), see entire document.	1-5, 7, 12-22
Y	US 5,741,247 A (RIZOIU et al) 21 April 1998 (21.04.1998), see entire document.	1-5, 7, 12-22
A	US 5,971,755 A (LIEBERMANN et al) 26 October 1999 (26.10.1999), see entire document.	1-22
A	US 5,968,039 A (DEUTSCH et al) 19 October 1999 (19.10.1999), see entire document.	1-22
A	US 6,162,052 A (KOKUBU) 19 December 2000 (19.12.2000), see entire document.	1-22
A	US 6,679,837 B2 (DAIKUZONO) 20 January 2004 (20.01.2004), see entire document.	1-22



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:		"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
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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.
A	JP 2002-17757 A (KATAOKA et al) 22 January 2002 (22.01.2002), see entire document.	1-22
A	US 5,324,200 A (VASSILIADIS et al) 28 January 1994 (28.01.1994), see entire document.	1-22
A	US 5,503,559 A (VARI) 02 April 1996 (02.04.1996), see entire document.	1-22
A	US 5,897,314 A (HACK et al) 27 April 1999 (27.04.1999), see entire document.	1-22

## INTERNATIONAL SEARCH REPORT

International application No.  
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Continuation of B. FIELDS SEARCHED Item 3:

EAST: USPAT; EPO; JPO; DERWENT; USOCR

search terms: ((root ADJ canal) or endodontic) SAME (laser or optic or optical or light); Nd: YAG same nm; Bacteria NEAR biofilm  
NEAR eradicating NEAR system human NEAR tooth NEAR optical NEAR probe; system same optical same fiber same connected same  
ingress same proximal same optical same probe same root same canal; (system same optical same fiber same connected same laser same  
oscillator same ingress same proximal same optical same probe same root same canal) and apical; (fiber same (optic or optical) same  
(sapphire or zirconium)) and (dental or dentistry)