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- (71) Applicant (for all designated States except US): **AVE-DRO, INC.** [US/US]; 230 Third Avenue, Waltham, MA 02451 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **MULLER, David** [US/US]; 87 Chestnut Street, Boston, MA 02108 (US).
- (74) Agent: **KAUFMAN, Marc, S.**; Nixon Peabody LLP, 401 9th Street NW, Suite 900, Washington, DC 20004-2128 (US).
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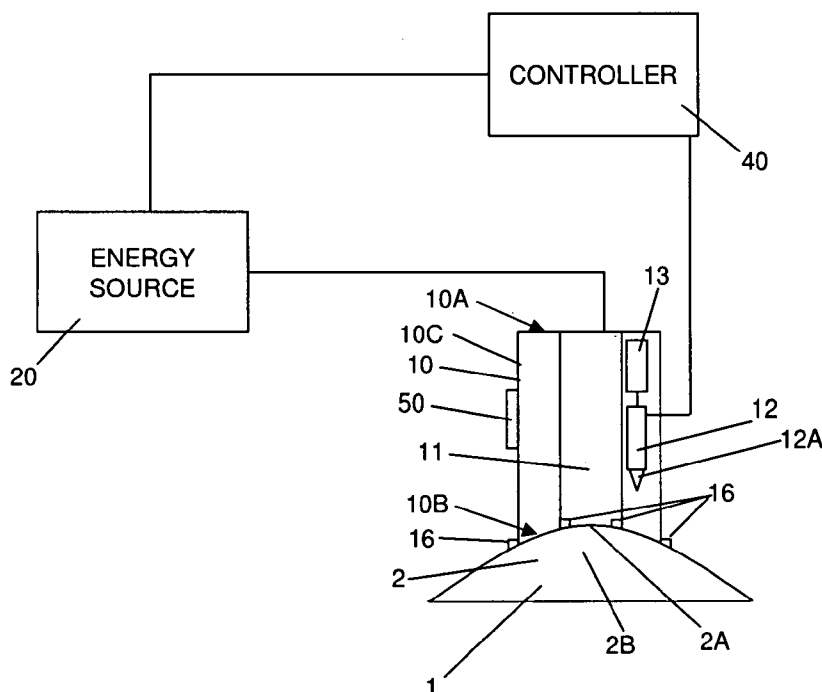


FIG. 1

(57) Abstract: A system for applying therapy to an eye selectively applies coolant to the corneal surface to minimize heat-related damage to the corneal surface during thermokeratoplasty. Embodiments may include an energy source, a conducting element, a coolant supply, and at least one coolant delivery element. The conducting element is operably connected to the energy source and extends from a proximal end to a distal end. The conducting element directs energy from the energy source to the distal end, which is positionable at the eye. The coolant delivery elements are in communication with the coolant supply and are operable to deliver a micro-controlled pulse of coolant to the distal end.

WO 2009/012490 A3

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2008/070640

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - A61B 18/04 (2008.04) USPC - 606/31 According to International Patent Classification (IPC) or to both national classification and IPC</p>																																			
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC(8) - A61B 17/36, 18/04 (2008.04) USPC - 606/5, 31</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) MicroPatent, GooglePatent</p>																																			
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>US 2004/0111086 A1 (TREMBLY) 10 June 2004 (10.06.2004) entire document</td> <td>1-28, 57-71, 112-114</td> </tr> <tr> <td>Y</td> <td>US 6,402,739 B1 (NEEV) 11 June 2002 (11.06.2002) entire document</td> <td>1-28, 57-71, 112-114</td> </tr> <tr> <td>Y</td> <td>US 6,520,956 B1 (HUANG) 18 February 2003 (18.02.2003) entire document</td> <td>6, 41, 44-46, 80-82</td> </tr> <tr> <td>Y</td> <td>US 6,334,074 B1 (SPERTELL) 25 December 2001 (25.12.2001) entire document</td> <td>7-8</td> </tr> <tr> <td>Y</td> <td>US 7,141,049 B2 (STERN et al) 28 November 2006 (28.11.2006) entire document</td> <td>9, 11-12, 18-20, 36-37, 49-51, 72-93</td> </tr> <tr> <td>Y</td> <td>US 4,381,007 A (DOSS) 26 April 1983 (26.04.1983) entire document</td> <td>15, 46, 58-59, 72-93</td> </tr> <tr> <td>Y</td> <td>US 4,881,543 A (TREMBLY et al) 21 November 1989 (21.11.1989) entire document</td> <td>25</td> </tr> <tr> <td>Y</td> <td>US 2007/0074722 A1 (GIROUX et al) 05 April 2007 (05.04.2007) entire document</td> <td>113-114</td> </tr> <tr> <td>X</td> <td>US 6,162,210 A (SHADDUCK) 19 December 2000 (19.12.2000) entire document</td> <td>29-32, 34-35, 38-40, 42-43, 47-48, 52-57, 68, 112</td> </tr> <tr> <td>Y</td> <td></td> <td>33, 36-37, 41, 44-46, 49-51</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	US 2004/0111086 A1 (TREMBLY) 10 June 2004 (10.06.2004) entire document	1-28, 57-71, 112-114	Y	US 6,402,739 B1 (NEEV) 11 June 2002 (11.06.2002) entire document	1-28, 57-71, 112-114	Y	US 6,520,956 B1 (HUANG) 18 February 2003 (18.02.2003) entire document	6, 41, 44-46, 80-82	Y	US 6,334,074 B1 (SPERTELL) 25 December 2001 (25.12.2001) entire document	7-8	Y	US 7,141,049 B2 (STERN et al) 28 November 2006 (28.11.2006) entire document	9, 11-12, 18-20, 36-37, 49-51, 72-93	Y	US 4,381,007 A (DOSS) 26 April 1983 (26.04.1983) entire document	15, 46, 58-59, 72-93	Y	US 4,881,543 A (TREMBLY et al) 21 November 1989 (21.11.1989) entire document	25	Y	US 2007/0074722 A1 (GIROUX et al) 05 April 2007 (05.04.2007) entire document	113-114	X	US 6,162,210 A (SHADDUCK) 19 December 2000 (19.12.2000) entire document	29-32, 34-35, 38-40, 42-43, 47-48, 52-57, 68, 112	Y		33, 36-37, 41, 44-46, 49-51
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<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																																			
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"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</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"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</td> </tr> <tr> <td>"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)</td> <td>"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</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&amp;" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"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	"E" earlier application or patent but published on or after the international filing date	"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	"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)	"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	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed																								
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<p>Date of the actual completion of the international search 11 December 2008</p>		<p>Date of mailing of the international search report <b>22 DEC 2008</b></p>																																	
<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer: <i>Blaine R. Copenheaver</i> Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>																																	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/070640

**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
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 No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet.

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 additional fees, this Authority did not invite payment of additional fees.
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.:  
1-93 and 112-114

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/070640

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,319,273 B1 (CHEN et al) 20 November 2001 (20.11.2001) entire document	33
A	US 7,130,835 B2 (COX et al) 31 October 2006 (31.10.2006) entire document	1-93 and 112-114
A	US 5,779,696 A (BERRY et al) 14 July 1998 (14.07.1998) entire document	1-93 and 112-114
A	US 2007/0161976 A1 (TREMBLY) 12 July 2007 (12.07.2007) entire document	1-93 and 112-114

INTERNATIONAL SEARCH REPORT

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This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-93 and 112-114, drawn to a coolant supply and delivery system for the conductive element.

Group II, claims 94-111, drawn to a vacuum ring.

Group III, claims 115-120, drawn to a thermal diffusion time and a coolant supply for the eye.

The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: a coolant supply and delivery system for the conductive element as claimed therein is not present in the invention of Groups II and III. The special technical feature of the Group II invention: a vacuum ring as claimed therein is not present in the invention of Groups I or III. The special technical feature of the Group III invention: a thermal diffusion time of a coolant supply for the eye as claimed therein is not present in the invention of Groups I or II.

The limitation of "a system for applying therapy to an eye comprising an energy conductive element adapted to deliver energy to an eye" is not considered a novel linking special technical feature as this limitation is clearly disclosed by US 6,319,273 B1 (CHEN et al) 20 November 2001 (20.11.2001) abstract.

Since none of the special technical features of the Group I, II or III inventions are found in more than one of the inventions, unity of invention is lacking.