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- (25) **Filing Language:** English
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- (71) **Applicant: CARESTREAM HEALTH, INC.** [US/US];  
150 Verona Street, Rochester, NY 14608 (US).
- (72) **Inventors:** WU, **Yingqian**; c/o Carestream Health, INC.,  
Patent Legal Staff, 150 Verona Street, Rochester, NY  
14608 (US). WANG, **Wei**; c/o Carestream Health, INC.,  
Patents Legal Staff, 150 Verona Street, Rochester, NY  
14608 (US). WONG, **Victor, C** ; c/o Carestream Health,  
INC., Patent Legal Staff, 150 Verona Street, Rochester,  
NY 14608 (US). ZHANG, **Yan**; c/o Carestream Health,  
INC., Patent Legal Staff, 150 Verona Street, Rochester,  
NY 14608 (US).
- (81) **Designated States** (*unless otherwise indicated, for every  
kind of national protection available*): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (*unless otherwise indicated, for every  
kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Published:**

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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

- (88) **Date of publication of the international search report:**  
27 October 2016



WO 2016/073569 A3

(54) **Title:** VIDEO DETECTION OF TOOTH CONDITION USING GREEN AND RED FLUORESCENCE

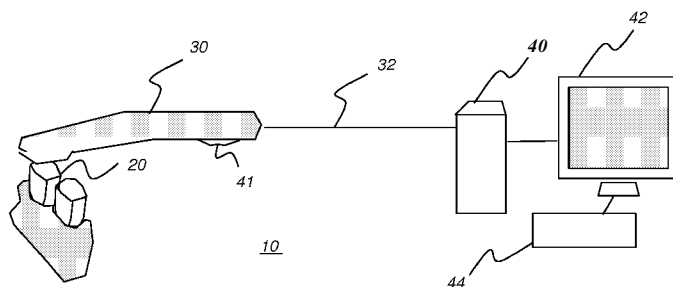


FIG. 1

(57) **Abstract:** A system and method for imaging a tooth. The method illuminates the tooth and acquires fluorescence image data from the tooth. A risk condition for the tooth is calculated according to the fluorescence image data. Two or more display colors are mapped to areas of the tooth according to the calculated risk condition to form a pseudo-color mapped tooth that is displayed.

INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2015/058977

<p>A. CLASSIFICATION OF SUBJECT MATTER INV. A61B5/Q0 ADD.</p> <p>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) A61B A61C G06T</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) EPO-Internal , WPI Data</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>X</td> <td>US 5 306 144 A (HIBST RAIMUND [DE] ET AL) 26 April 1994 (1994-04-26) column 3, line 67 - column 4, line 28 column 5, line 3 - line 5 -----</td> <td>1-5</td> </tr> <tr> <td>X</td> <td>US 2008/058786 AI (BOYDEN EDWARD S [US] ET AL) 6 March 2008 (2008-03-06) paragraphs [0176] , [0177] , [0375] -----</td> <td>1-5</td> </tr> <tr> <td>Y</td> <td>US 2007/121786 AI (OKAWA SHINICHI [JP] ET AL) 31 May 2007 (2007-05-31) paragraphs [0209] , [0210] -----  - / - -</td> <td>1-5</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 5 306 144 A (HIBST RAIMUND [DE] ET AL) 26 April 1994 (1994-04-26) column 3, line 67 - column 4, line 28 column 5, line 3 - line 5 -----	1-5	X	US 2008/058786 AI (BOYDEN EDWARD S [US] ET AL) 6 March 2008 (2008-03-06) paragraphs [0176] , [0177] , [0375] -----	1-5	Y	US 2007/121786 AI (OKAWA SHINICHI [JP] ET AL) 31 May 2007 (2007-05-31) paragraphs [0209] , [0210] -----  - / - -	1-5
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<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.      <input checked="" type="checkbox"/> See patent family annex.</p>														
<p>* Special categories of cited documents :</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="vertical-align: top;"> <p>"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</p> <p>"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</p> <p>"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</p> <p>"&amp;" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&amp;" document member of the same patent family</p>										
<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&amp;" document member of the same patent family</p>													
<p>Date of the actual completion of the international search</p> <p>19 August 2016</p>		<p>Date of mailing of the international search report</p> <p>13/09/2016</p>												
<p>Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016</p>		<p>Authorized officer</p> <p>Knupl ing, Mori t z</p>												

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/058977

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 93 17 984 U1 (KALTENBACH & VOIGT [DE]) 23 March 1995 (1995-03-23) page 2, 1 line 26 - line 31 column 3, line 10 - line 21 page 4, 1 line 26 - line 31 page 6, 1 line 15 - line 22 -----	1-5
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A	US 2009/185712 A1 (WONG VICTOR C [US] ET AL) 23 July 2009 (2009-07-23) paragraphs [0039], [0042], [0047], [0049], [0079] -----	21
A	US 2013/038710 A1 (INGLESE JEAN-MARC [FR] ET AL) 14 February 2013 (2013-02-14) paragraphs [0050] - [0052] -----	21

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2015/058977

## 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.: **6-20**  
because they relate to subject matter not required to be searched by this Authority, namely:  
**Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery**  
**Rule 39.1(iv) PCT - Method for treatment of the human or animal 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 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 additional 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 an 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.:

### 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.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5

Combined video imaging and treatment tool

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2. claims: 21-31

Methods of image processing to generate a risk score image.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2015/058977
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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			WO 2013022583 A2 14-02-2013