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(54) Title: PROPERTIES MEASUREMENT DEVICE

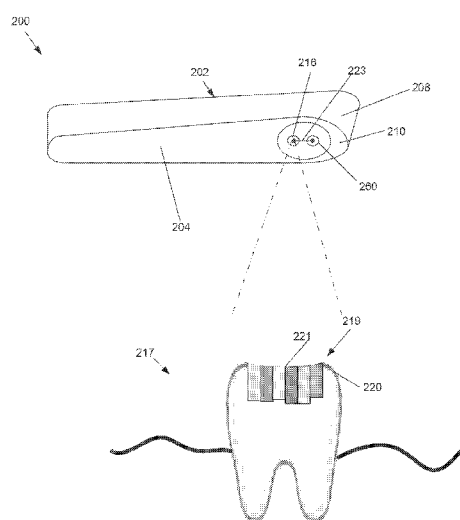


FIG. 2

(57) Abstract: An intra-oral optical scanning method for intra-oral optical scanning including projecting a pattern, the pattern including at least a first area illuminated by a first color of light and a second area illuminated by a second color of light and at least one non-illuminated area onto an intra-oral feature, making a first image of the first area, the second area and the non-illuminated area differentiating between the first color of light and the second color of light in the first image of the projected pattern, and determining from the image of the non-illuminated area at least one of an ambient light level, a level of scattered light, a level of light absorption and a level of light reflected from at least one of the first area and the second area. Related apparatus and methods are also described.

Published:

- *with international search report (Art. 21(3))*
- *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))*

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12 December 2019 (12.12.2019)

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B1/24 A61B5/103 G01B11/25 A61B1/00 A61B1/06
G06T7/521

ADD.

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)

A61B G01B G06T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2016/188939 A1 (SIRONA DENTAL SYSTEMS GMBH [DE]) 1 December 2016 (2016-12-01)	1-3
Y	claims 1-14; figures 1-3 & US 2018/299262 A1 (THIEL FRANK [DE] ET AL) 18 October 2018 (2018-10-18) paragraphs [0047] - [0048], [0051]; claims 1-14; figures 1-3 paragraph [0049]	9,22
X,P	----- WO 2018/073824 A1 (DENTLYTEC G P L LTD [IL]) 26 April 2018 (2018-04-26) page 32, line 20 - page 33, line 22; claims 1-55; figures 1-17 page 25, line 24 - page 28, line 15 page 8, lines 29-30 ----- -/-	1-3,9

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* 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 application or patent 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 when the document is taken alone

"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

Date of the actual completion of the international search

30 October 2019

Date of mailing of the international search report

11/11/2019

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IL2019/050464

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 026 034 A2 (STEINBICHLER OPTOTECHNIK GMBH [DE]) 18 February 2009 (2009-02-18) paragraph [0026]; claims 1-12; figure 1 paragraph [0030] paragraph [0034] paragraph [0040] -----	1
Y	US 6 549 288 B1 (MIGDAL ALEXANDER [US] ET AL) 15 April 2003 (2003-04-15) column 5, line 35 - column 6, line 65; claims 1-2,5; figures 1-8 column 7, lines 1-35 -----	9,22
X	US 2018/106593 A1 (ARDEN TERENCE [CA] ET AL) 19 April 2018 (2018-04-19) claims 1-15; figures 1-6 paragraph [0086] - paragraph [0087] paragraph [0080] - paragraph [0084] paragraph [0062] - paragraph [0063] paragraph [0064] - paragraph [0065] paragraph [0058] - paragraph [0061] paragraph [0071] - paragraph [0073] -----	40,41, 43,44
X	US 6 252 623 B1 (LU TAIWEI [US] ET AL) 26 June 2001 (2001-06-26) column 9, lines 46-54; claims 1-23; figures 1-6 column 9, lines 8-22 column 4, line 55 - column 6, line 22 -----	40-44

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL2019/050464

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 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.:

1-3, 9, 22, 40-44
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: 1-3, 9, 22

Method of intra oral scanning by projecting a
multiwavelength light pattern and correcting it

2. claims: 36-39

intra oral scanner having component defining a distance to
the imaged surface

3. claims: 40-44

3D imaging device using a projection and having a
non-circular aperture

4. claims: 4, 6-8

Correcting color based on second imaging or third imaging

5. claims: 14-16

Method for estimating enamel demineralization

6. claims: 17-21

Method to identify an intra-oral feature

7. claims: 23-28

Method to identify a manufacturer of a restoration

8. claims: 29-35

Method to produce a model to classify shade information

9. claims: 5, 10-13

Method using optical properties of surfaces below first area

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IL2019/050464

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2016188939 A1	01-12-2016	DE 102015209402 A1 EP 3298346 A1 JP 2018515759 A US 2018299262 A1 WO 2016188939 A1	24-11-2016 28-03-2018 14-06-2018 18-10-2018 01-12-2016
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