

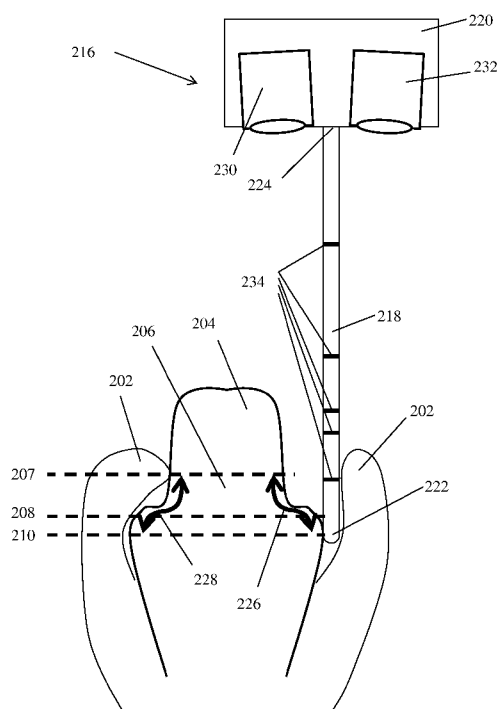


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- (71) **Applicant:** DENTLYTEC G.P.L. LTD [IL/IL]; 14 Mintz Street, 6951217 Tel-Aviv (IL).
- (72) **Inventors:** PESACH, Benny; 18 Shir HaShirim Street, 48072 Rosh HaAyin (IL). GRAD, Ygael; 14 Mintz Street, 69512 Tel-Aviv (IL). LEHR, Blanc Zach; 6 Zeev Rechter Street, Apt. 20, 6955106 Tel-Aviv (IL). MELAMED, Georgy; 20 HaRishonim Street, Apt. 5, 5250227 Ramat-Gan (IL).
- (74) **Agents:** G. E. EHRLICH (1995) LTD. et al.; 11 Mena-chem Begin Road, 5268104 Ramat Gan (IL).
- (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, LT, 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.
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[Continued on next page]

(54) **Title:** DEVICE AND METHOD FOR SUBGINGIVAL MEASUREMENT

FIG. 2A



(57) **Abstract:** A method for measuring regions of a tooth in a mouth including: measuring at least one surface point on a surface of the tooth with respect to an element mechanically coupled to said surface point; determining a location of at least one visible reference mechanically coupled to said surface point with respect to said element; estimating a location of said surface point with respect to said visible reference. A device used for such measuring may include a main body comprising a final optical element of an imager which defines an optical field of view directed in a first direction; and a measurement element coupled to said main body extending generally in said first direction; where a tip of said measurement element is sized and shaped to be inserted between a tooth and adjacent gingiva; where said optical field of view is sized to image at least part of a tooth.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

— *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))*

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

(88) Date of publication of the international search report:

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A61C19/04 A61C9/00
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)
A61C A61B

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, COMPENDEX, INSPEC, 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	EP 2 165 674 A1 (ORANGEDENTAL GMBH & CO KG [DE]) 24 March 2010 (2010-03-24)	1-16, 27-38, 42,44, 46-48
A	paragraphs [0013], [0017] - [0028] figures 1-2	39-41, 43,45, 49,53-56
X	----- US 2009/017416 A1 (NGUYEN BAO LUU [US] ET AL) 15 January 2009 (2009-01-15)	56
A	paragraphs [0049] - [0135] figures 1-48 ----- -/-	1-16, 30-50, 53-55



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

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"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

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Date of mailing of the international search report

02/09/2014

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

Authorized officer

Pisseloup, Arnaud

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL2013/051059

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.:
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.

INTERNATIONAL SEARCH REPORT

International application No

PCT/IL2013/051059

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 98/06352 A1 (NAVIMETRIC S L [ES]; ALBALAT ESTELA SALVADOR [ES]) 19 February 1998 (1998-02-19) page 2, line 22 - page 6, line 15 figure 1	1,3,30, 32,42, 44,49,56 2,4-16, 31, 33-41, 43, 45-48, 50,53-55
X A	----- US 2010/238279 A1 (THOMS MICHAEL [DE] ET AL) 23 September 2010 (2010-09-23) paragraphs [0007] - [0066] figures 1-7	30-33, 42-49, 53-55 1-7, 9-16, 27-29, 34-41,50
X A	----- US 5 257 184 A (MUSHABAC DAVID R [US]) 26 October 1993 (1993-10-26) cited in the application column 4, line 28 - column 15, line 57 figures 1-23	13-26, 57-60 51,52
A	----- JP H10 262996 A (AISIN SEIKI) 6 October 1998 (1998-10-06) paragraphs [0009] - [0021] figures 1-13	1-7,9-60
A	----- US 5 897 509 A (TODA MASATAKA [JP] ET AL) 27 April 1999 (1999-04-27) column 3, line 17 - column 10, line 45 figures 1-42	1-7,9-60
A	----- US 2006/154198 A1 (DURBIN DUANE [US] ET AL) 13 July 2006 (2006-07-13) paragraphs [0046] - [0106] figures 1-9	1-7,9-60
A	----- US 2008/160477 A1 (STOOKEY GEORGE K [US] ET AL) 3 July 2008 (2008-07-03) paragraphs [0027] - [0068] figures 1-14 -----	1-7,9-60

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IL2013/051059

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2165674	A1	24-03-2010	NONE
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-16, 27-50, 53-56

device measuring the depth of the sub-gingival sulcus of a tooth

2. claims: 17-26, 51, 52, 57-60

device modelling the sub-gingival shape of the teeth
