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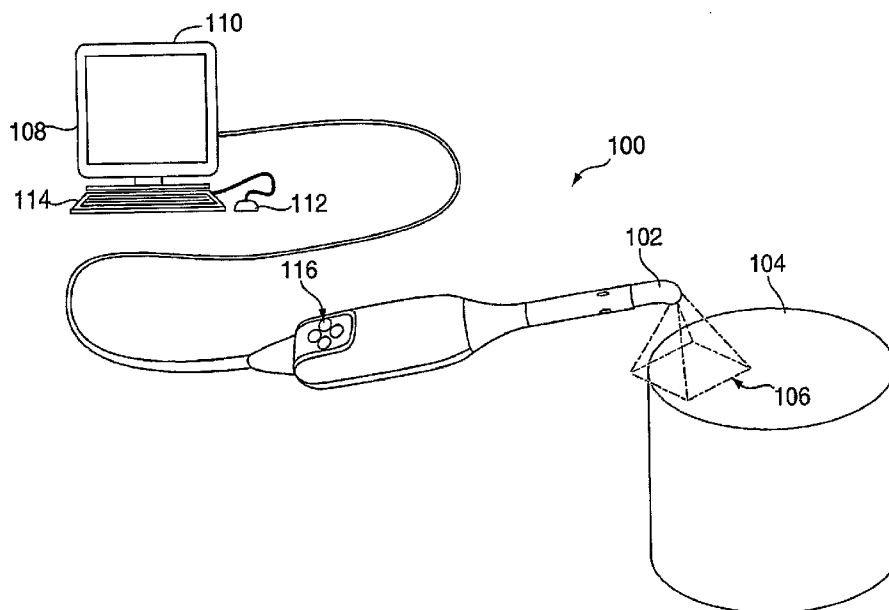
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(54) Title: THREE-DIMENSIONAL SCAN RECOVERY



(57) Abstract: A scanning system that acquires three-dimensional images as an incremental series of fitted three-dimensional data sets is improved by testing for successful incremental fits in real time and providing a variety of visual user cues and process modifications depending upon the relationship of newly acquired data to previously acquired data. The system may be used to aid in error-free completion of three-dimensional scans. The methods and systems described herein may also usefully be employed to scan complex surfaces including occluded or obstructed surfaces by maintaining a continuous three-dimensional scan across separated subsections of the surface. In one useful dentistry application, a full three-dimensional surface scan may be obtained for two dental arches in occlusion.



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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/001287

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06T7/00

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)

G06T A61C G01S

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 practical, search terms used)

EPO-Internal, WPI Data, COMPENDEX, IBM-TDB, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	US 2005/069188 A1 (RUBBERT RUDGER [DE] ET AL RUBBERT RUEDGER [DE] ET AL) 31 March 2005 (2005-03-31) abstract paragraph [0021] - paragraph [0024] paragraph [0114] - paragraph [0115] paragraph [0226] - paragraph [0227] paragraph [0234] paragraph [0244] - paragraph [0247] paragraph [0273] - paragraph [0274] paragraph [0295] paragraph [0302] - paragraph [0306] figures 4, 29-32, 36, 55, 56 <p style="text-align: center;">----- -/--</p>	66-101 33, 34 1-32

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 document 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

6 July 2007

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INTERNATIONAL SEARCH REPORT

International application No
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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.
X	US 2005/089213 A1 (GENG Z J [US]) 28 April 2005 (2005-04-28) abstract paragraph [0022] paragraph [0110] - paragraph [0111] figure 2	66,71
Y	US 2004/189686 A1 (TANGUAY DONALD O [US] ET AL TANGUAY JR DONALD O [US] ET AL) 30 September 2004 (2004-09-30)	33,34
A	abstract paragraph [0029] paragraph [0035] paragraph [0045] - paragraph [0052] paragraph [0066] - paragraph [0068] figures 1,3A-3C	81-101
Y	US 6 014 473 A (HOSSACK JOHN A [US] ET AL) 11 January 2000 (2000-01-11)	33,34
A	abstract column 12, line 43 - column 12, line 31 figure 20	66-101
A	US 6 012 458 A (MO LARRY Y L [US] ET AL) 11 January 2000 (2000-01-11) abstract column 5, line 35 - column 6, line 18	66-80

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/001287

Box 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 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 fee, this Authority did not invite payment of any additional fee.

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.:

1-34, 66-101

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- 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: 1-34, 66-101

creating a three-dimensional model of an object by
registration of a sequence of three-dimensional images;

2. claims: 35-65

creating a two-part three-dimensional model of two spatially
related objects;

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2007/001287

Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
US 2005069188	A1	31-03-2005	NONE	
US 2005089213	A1	28-04-2005	NONE	
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