

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 May 2006 (11.05.2006)

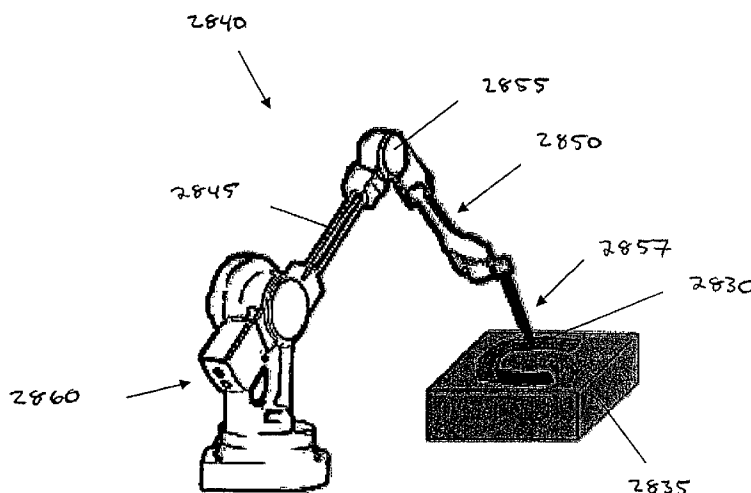
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(10) International Publication Number
WO 2006/050452 A3

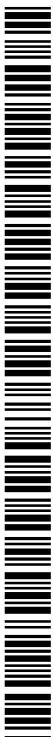
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| <p>(51) International Patent Classification:
<i>G06F 19/00</i> (2006.01) <i>G06F 15/00</i> (2006.01)</p> <p>(21) International Application Number:
PCT/US2005/039715</p> <p>(22) International Filing Date:
2 November 2005 (02.11.2005)</p> <p>(25) Filing Language: English</p> <p>(26) Publication Language: English</p> <p>(30) Priority Data:</p> <table border="0"> <tr><td>10/979,823</td><td>2 November 2004 (02.11.2004)</td><td>US</td></tr> <tr><td>10/979,497</td><td>2 November 2004 (02.11.2004)</td><td>US</td></tr> <tr><td>10/979,504</td><td>2 November 2004 (02.11.2004)</td><td>US</td></tr> <tr><td>10/979,824</td><td>2 November 2004 (02.11.2004)</td><td>US</td></tr> <tr><td>11/013,156</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/013,160</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/013,158</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/013,159</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/013,157</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/013,154</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/013,155</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/013,152</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/012,924</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> </table> | 10/979,823 | 2 November 2004 (02.11.2004) | US | 10/979,497 | 2 November 2004 (02.11.2004) | US | 10/979,504 | 2 November 2004 (02.11.2004) | US | 10/979,824 | 2 November 2004 (02.11.2004) | US | 11/013,156 | 14 December 2004 (14.12.2004) | US | 11/013,160 | 14 December 2004 (14.12.2004) | US | 11/013,158 | 14 December 2004 (14.12.2004) | US | 11/013,159 | 14 December 2004 (14.12.2004) | US | 11/013,157 | 14 December 2004 (14.12.2004) | US | 11/013,154 | 14 December 2004 (14.12.2004) | US | 11/013,155 | 14 December 2004 (14.12.2004) | US | 11/013,152 | 14 December 2004 (14.12.2004) | US | 11/012,924 | 14 December 2004 (14.12.2004) | US | <table border="0"> <tr><td>11/013,145</td><td>14 December 2004 (14.12.2004)</td><td>US</td></tr> <tr><td>11/050,126</td><td>3 February 2005 (03.02.2005)</td><td>US</td></tr> <tr><td>11/074,301</td><td>7 March 2005 (07.03.2005)</td><td>US</td></tr> <tr><td>11/074,299</td><td>7 March 2005 (07.03.2005)</td><td>US</td></tr> <tr><td>60/673,851</td><td>22 April 2005 (22.04.2005)</td><td>US</td></tr> <tr><td>60/676,546</td><td>29 April 2005 (29.04.2005)</td><td>US</td></tr> <tr><td>11/258,465</td><td>24 October 2005 (24.10.2005)</td><td>US</td></tr> </table> <p>(71) Applicant (for all designated States except US): ALIGN TECHNOLOGY, INC. [US/US]; 881 Martin Avenue, Santa Clara, CA 95050 (US).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): WEN, Huafeng [US/US]; 2117 Gossamer Avenue, Redwood City, California 94065 (US). LIU, Frank, Zhenhuan [US/US]; 353 St. Martin Street, Redwood City, California 94065 (US). LIU, Gang [CN/CA]; 4890 Edouard-Montpetit, Suite 5, Montreal, Quebec H3W 1P8 (CA).</p> <p>(74) Agent: SNYDER, Todd N.; Paul, Hastings, Janofsky & Walker LLP, P.O. Box 919092, San Diego, California 92191 (US).</p> <p>(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,</p> | 11/013,145 | 14 December 2004 (14.12.2004) | US | 11/050,126 | 3 February 2005 (03.02.2005) | US | 11/074,301 | 7 March 2005 (07.03.2005) | US | 11/074,299 | 7 March 2005 (07.03.2005) | US | 60/673,851 | 22 April 2005 (22.04.2005) | US | 60/676,546 | 29 April 2005 (29.04.2005) | US | 11/258,465 | 24 October 2005 (24.10.2005) | US |
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| 11/013,160 | 14 December 2004 (14.12.2004) | US | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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(54) Title: METHODS AND APPARATUSES FOR MANUFACTURING DENTAL ALIGNERS



(57) Abstract: Methods and apparatus for building physical and/or digital dental models are described herein. Methods and apparatus that can be utilized within the process of building a physical and/or digital dental model are also disclosed herein. In one implementation, individual physical tooth models are created and then arranged into a tooth arch to serve as the underlying template for fabricating a dental aligner. A registration feature may be implemented on each of the physical tooth models to track the positions of the individual physical tooth models relative to the other tooth models in the tooth arch. In one application, information regarding the registration features is mapped from the digital space into the physical space and vice versa. By tracking changes in the registration features, one can arrange individual physical tooth models to form a physical tooth arch that reflects the arrangement of the teeth in a digital tooth model.



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CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

(88) Date of publication of the international search report:
29 May 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/39715

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: **G06F 19/00** (2006.01); **G06F 15/00** (2006.01)

USPC: 433/201.1, 214, 223, 172-176, 215; 700/498
 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)
 U.S. : 433/201.1, 214, 223, 172-176, 215; 700/498

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,788,986 B1 (TRABER et al) 07 September 2004 (07.09.2004), entire document.	1-434
A	US 6,049,743 A (BABA) 11 April 2000 (11.04.2000), entire document.	1-434
A	US 5,347,454 A (MUSHABAC) 13 September 1994 (13.09.1994), entire document.	1-434

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Date of the actual completion of the international search 02 August 2006 (02.08.2006)	Date of mailing of the international search report 27 OCT 2006
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