

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
22 February 2007 (22.02.2007)

PCT

(10) International Publication Number
WO 2007/020599 A3

- (51) International Patent Classification:
A61C 17/22 (2006.01) H02K 33/18 (2006.01)
- (21) International Application Number:
PCT/IB2006/052832
- (22) International Filing Date: 16 August 2006 (16.08.2006)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/708,693 16 August 2005 (16.08.2005) US
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AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

(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, 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).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

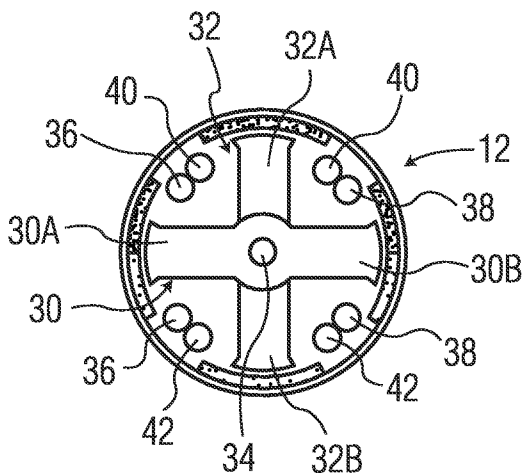
Published:

- with international search report

(88) Date of publication of the international search report:
7 June 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: RESONANT ACTUATOR FOR A PERSONAL CARE APPLIANCE HAVING A PROGRAMMABLE ACTUATION CAPABILITY



(57) Abstract: The drive system for a personal care appliance, such as a toothbrush, includes a first opposing pair of permanent magnet assemblies positioned longitudinally along the length of the internal surface of a cylindrical appliance housing(12), each first permanent magnet assembly having one portion with a north polarity and the other portion a south polarity, and a second pair of permanent magnet assemblies which are orthogonal to the first pair of permanent magnet assemblies, one second permanent magnet assembly having a plurality of abutting first parts along the length thereof, the parts alternating between a north polarity and a south polarity, the other second permanent magnet assembly having similar parts with reversed polarity. First and second armatures (30, 32) are mounted on, or a portion thereof forms, a spindle element (34) which extends along the length of and outward from the cylindrical housing. A plurality of drive windings (36,38,40,42) are positioned around the armatures in such a manner that application of current to the windings, under programmable control, produces axial and/or tangential movement of the spindle and the workpiece.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/052832

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61C17/22 H02K33/18

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)
H02K A61C

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005/062445 A (BRAUN GMBH [DE]; KRAUS BERNHARD [DE]; REICK HANSJOERG [DE]; SCHOBER UW) 7 July 2005 (2005-07-07) page 5, line 32 - page 8, line 30 -----	1-8
A	WO 2004/047670 A (MATSUSHITA ELECTRIC WORKS LTD [JP]; MOTOHASHI RYO [JP]; KUNITA TOMOHIR) 10 June 2004 (2004-06-10) page 7, line 16 - page 17, line 4; figures 2,5 -----	1,7,8
A	US 2001/043016 A1 (CHUN JANG SUNG [KR] ET AL) 22 November 2001 (2001-11-22) paragraph [0025] - paragraph [0035] ----- -/--	1,8

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See patent family annex.

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- * & * document member of the same patent family

Date of the actual completion of the international search

2 February 2007

Date of mailing of the international search report

12/02/2007

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/052832

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005/006538 A1 (BRAUN GMBH [DE]; KRAUS BERNHARD [DE]) 20 January 2005 (2005-01-20) page 5, line 5 - page 11, line 11 -----	1,8
A	WO 2004/049547 A (MATSUSHITA ELECTRIC WORKS LTD [JP]; HASEGAWA YUYA [JP]; HIRATA KATSUHI) 10 June 2004 (2004-06-10) & EP 1 566 879 A (MATSUSHITA ELECTRIC WORKS LTD [JP]) 24 August 2005 (2005-08-24) paragraph [0010] - paragraph [0028] -----	1,8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2006/052832

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2005062445	A	07-07-2005	CN 1886885 A	27-12-2006
			DE 10355446 A1	30-06-2005
			EP 1687887 A1	09-08-2006
			US 2006255665 A1	16-11-2006
WO 2004047670	A	10-06-2004	AU 2003282390 A1	18-06-2004
			CN 1691921 A	02-11-2005
			EP 1565123 A1	24-08-2005
			KR 20050037581 A	22-04-2005
			US 2005235438 A1	27-10-2005
US 2001043016	A1	22-11-2001	JP 3410455 B2	26-05-2003
			JP 2001333567 A	30-11-2001
			KR 20010006540 A	07-12-2001
WO 2005006538	A1	20-01-2005	DE 10330978 A1	10-02-2005
			EP 1641602 A1	05-04-2006
			US 2006175909 A1	10-08-2006
WO 2004049547	A	10-06-2004	AU 2003284670 A1	18-06-2004
			CA 2493603 A1	10-06-2004
			EP 1566879 A1	24-08-2005
			US 2005200207 A1	15-09-2005
EP 1566879	A	24-08-2005	AU 2003284670 A1	18-06-2004
			CA 2493603 A1	10-06-2004
			WO 2004049547 A1	10-06-2004
			US 2005200207 A1	15-09-2005