(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 May 2005 (19.05.2005)

PCT

(10) International Publication Number
WO 2005/045660 A3

(51) International Patent Classification[7]: G06F 3/033, G06K 11/18

(21) International Application Number:
PCT/US2004/037111

(22) International Filing Date:
4 November 2004 (04.11.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/701,817 4 November 2003 (04.11.2003) US

(71) Applicant *(for all designated States except US)*: **ELECTRONIC SCRIPTING PRODUCTS, INC.** [US/US]; 235 Alma Street, Palo Alto, CA 94301 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BUERMANN, Dale, H.** [US/US]; 1002 Mercedes Ave., Los Altos, CA 94022 (US). **GONZALEZ-BANOS, Hector, H.** [US/US]; 100 W. El Camino Real, Apt. 46, Mountain View, CA 94040 (US). **MANDELLA, Michael, J.** [US/US]; 379 Sun Ridge Lane, San Jose, CA 95123 (US). **CARL, Stewart, R.** [US/US]; 2334 Amherst Street, Palo Alto, CA 94306 (US).

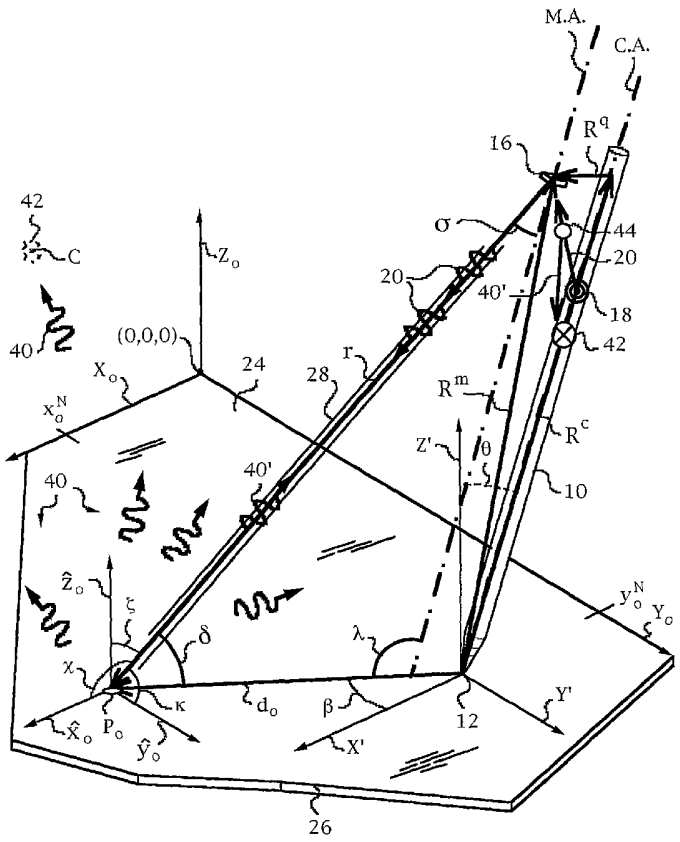
(74) Agent: **ALBOSZTA, Marek**; Lumen, 2345 Yale Street, 2nd Floor, Palo Alto, CA 94306 (US).

(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, 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, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(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),

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR DETERMINING AN INCLINATION OF AN ELONGATE OBJECT CONTACTING A PLANE SURFACE



(57) Abstract: An apparatus and method for determining an inclination angle θ between an axis of an elongate object such as a cane, a pointer or a jotting implement such as a pen, pencil, stylus or the like and a normal to a plane surface at times when a tip of the elongate object is contacting that plane surface. The apparatus has an emitter mounted on the object for illuminating the plane surface with a probe radiation at an angle σ with respect to the axis of the object. The apparatus also has a detector mounted on the elongate object for detecting a radiation characteristic of a scattered portion of the probe radiation returning from the plane surface and a computing unit for deriving the inclination angle θ from the radiation characteristic. A scanning arrangement, such as a uniaxial or biaxial scanner, or a light guiding optic can be used for varying angle σ, and the probe radiation can be emitted in the form of a scan beam. Preferably, the emitter and detector of the scattered portion of the probe radiation are integrated and the scattered portion of the probe radiation whose characteristic is being measured is the back-scattered portion. The radiation characteristic detected by the detector can be the intensity, polarization, time-of-flight or any combination thereof.

WO 2005/045660 A3

European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, 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*

(88) Date of publication of the international search report:
6 April 2006

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.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/037111

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F3/033 G06K11/18

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)
IPC 7 G06F G01B G01S B23Q

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.
X	US 5 850 058 A (TANO ET AL) 15 December 1998 (1998-12-15) column 6, line 1 - column 7, line 62 column 9, line 32 - line 39 figures 1-4	1,7-20
X	EP 0 886 234 A (YASHIMA ELECTRIC CO., LTD) 23 December 1998 (1998-12-23) the whole document	1,7-20

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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	Date of mailing of the international search report
19 July 2005	27/07/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Ciarelli, N

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2004/037111

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5850058 A	15-12-1998	JP 9146691 A	06-06-1997
EP 0886234 A	23-12-1998	JP 2942215 B2	30-08-1999
		JP 11007525 A	12-01-1999
		EP 0886234 A1	23-12-1998