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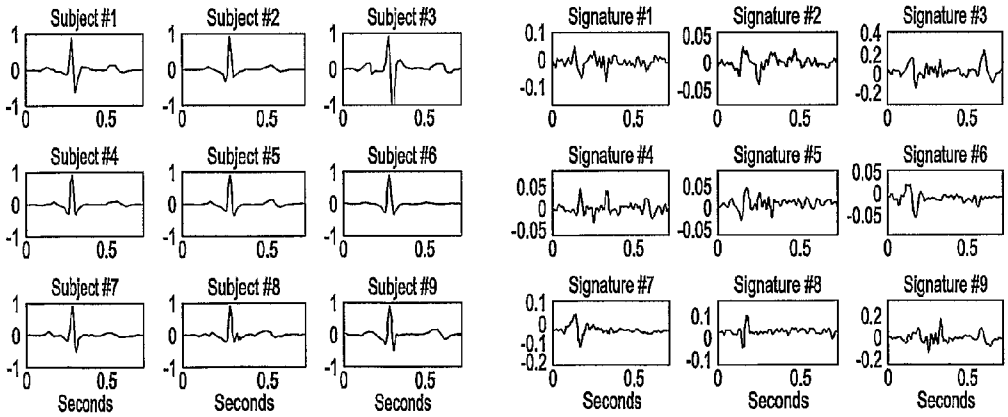
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, 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.

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21 February 2008

(54) **Title:** METHOD AND APPARATUS FOR ELECTRO-BIOMETRIC IDENTITY RECOGNITION



ORIGINAL ELECTROCARDIOGRAPHIC SIGNALS (LEFT)
COMMON-ELIMINATED DERIVED SIGNATURES (RIGHT)

(57) **Abstract:** A method and apparatus for electro-biometric identity recognition or verification that produces and stores a first biometric signature that identifies a specific individual by forming the difference between a representation of the heartbeat pattern of the specific individual and a stored representation of common features of the heartbeat patterns of a plurality of individuals; after the producing step, the method and apparatus obtains a representation of the heartbeat pattern of a selected individual and produces a second biometric signature by forming the difference between the heartbeat pattern of the selected individual and the stored representation of common features of the heartbeat patterns of the plurality of individuals; it then compares the second biometric signature with the first biometric signature to determine whether the selected individual is the specific individual. The apparatus and method may be employed as a stand-alone unit or as part of another device pursuant to the many applications described herein.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. G06K9/00

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)
G06K

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, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SHEN T W ET AL: "One-lead ECG for identity verification" SECOND JOINT EMBS-BMES CONFERENCE 2002. CONFERENCE PROCEEDINGS. 24TH. ANNUAL INTERNATIONAL CONFERENCE OF THE ENGINEERING IN MEDICINE AND BIOLOGY SOCIETY. ANNUAL FALL MEETING OF THE BIOMEDICAL ENGINEERINGSOCIETY. HOUSTON, TX, OCT. 23 - 26, 2002, ANNUA, vol. VOL. 1 OF 3. CONF. 24, 23 October 2002 (2002-10-23), pages 62-63, XP010621210 ISBN: 0-7803-7612-9 the whole document ----- -/--	122,123

[X] Further documents are listed in the continuation of Box C.

[X] 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	Date of mailing of the international search report
11 May 2007	25/05/2007

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	Deltorn, Jean-Marc

INTERNATIONAL SEARCH REPORT

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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.
A	WO 03/000015 A (SCIENCE APPLIC INT CORP [US]; WIEDERHOLD MARK D [US]; MEYER RODNEY P [) 3 January 2003 (2003-01-03) claims 1-28 paragraph [0035] - paragraph [0064]	97-122
A	KIL, D.H. AND SHIN F.B.: "Pattern recognition and prediction with applications to signal characterization" 1996, AIP PRESS , XP002433292 pages 22-26: section 2.1.2 "Adaptive Noise Filtering"	97-122
A	BIEL L ET AL: "ECG analysis: a new approach in human identification" INSTRUMENTATION AND MEASUREMENT TECHNOLOGY CONFERENCE, 1999. IMTC/99. PROCEEDINGS OF THE 16TH IEEE VENICE, ITALY 24-26 MAY 1999, PISCATAWAY, NJ, USA,IEEE, US, 24 May 1999 (1999-05-24), pages 557-561, XP010340258 ISBN: 0-7803-5276-9 the whole document	97-122
A	US 2003/128867 A1 (BENNETT RICHARD [US]) 10 July 2003 (2003-07-10) the whole document	97-122
A	US 6 040 783 A (HOUVENER ROBERT C [US] ET AL) 21 March 2000 (2000-03-21) the whole document	97-122
A	US 2002/138768 A1 (MURAKAMI RICK V [US] ET AL) 26 September 2002 (2002-09-26) the whole document	97-122
A	WO 2004/012388 A (LANGE DANIEL H [IL]; MCINNIS PATRICIA [US]) 5 February 2004 (2004-02-05) the whole document	97-122

INTERNATIONAL SEARCH REPORT

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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. [X] Claims Nos.: 1-96
because they relate to subject matter not required to be searched by this Authority, namely:

Following communication (dated 29-03-2007) by the representant, the search was limited to independent claims 97, 109 and 122, and their dependent claims.

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:

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.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2005/003281

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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