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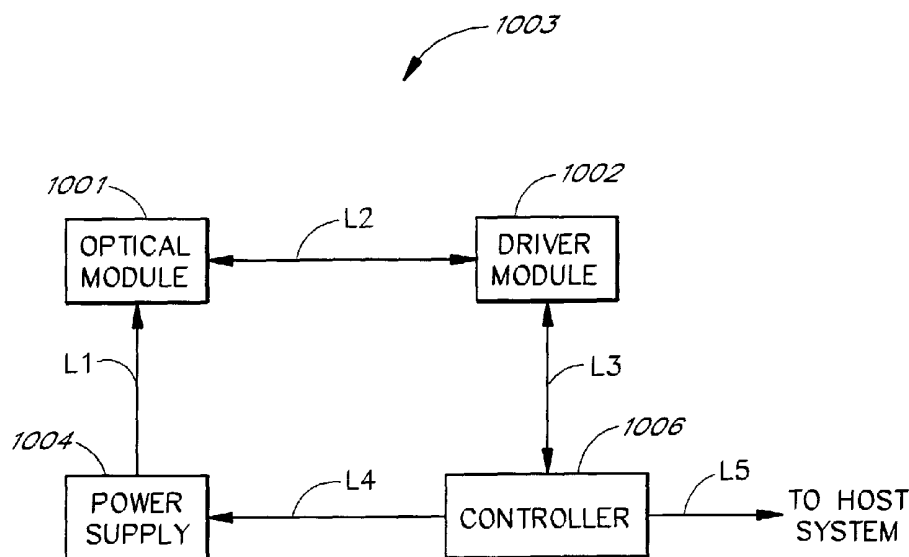
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- (74) Agent: ELDREDGE, John, W.; Stradling Yocca Carlson & Rauth, Suite 1600, 660 Newport Center Drive, Newport Beach, CA 92660-6441 (US).
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[Continued on next page]

(54) Title: BIOMETRIC SENSOR



(57) Abstract: A system and methods for sensing and imaging a fingerprint surface using an optical sensing device. The fingerprint system utilizes an optical detector to capture light selectively reflected by the relief features of the fingerprint surface. A number of different methods for lighting and positioning the sensor are described to desirably enhance the contrast and clarity of the rendered image and to improve accuracy in discriminating between fingerprints. A color filter system is also described that is integrated into fingerprint sensor and improves the quality of the resultant fingerprint image. Furthermore, a live finger sensing apparatus is shown to prevent the use of non-living or artifice finger substitutes with the sensor.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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.

(88) Date of publication of the international search report:

29 August 2002

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/07860

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G06K9/20 A61B5/117 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)

IPC 7 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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 869 822 A (MEADOWS II DEXTER L ET AL) 9 February 1999 (1999-02-09) column 8, line 19 - line 23 ---	18-25,46
X	US 6 002 786 A (LEHOMME FRANCIS ET AL) 14 December 1999 (1999-12-14) ---	31,32
A	column 3, line 67 -column 4, line 4 ---	1-30, 33-61
X	US 5 528 355 A (MAASE DANIEL F ET AL) 18 June 1996 (1996-06-18) ---	26-30, 33,60
A	column 4, line 66 -column 5, line 32 ---	1-25,31, 32,34-61
X	EP 0 851 380 A (SAGEM) 1 July 1998 (1998-07-01) abstract ---	33
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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

26 October 2001

Date of mailing of the international search report

18.06.2002

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/07860

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 018, no. 379 (P-1771), 15 July 1994 (1994-07-15) & JP 06 103369 A (MATSUMURA ELECTRON:KK), 15 April 1994 (1994-04-15) abstract	1-61
A	----- ICHIRO FUJIEDA; HIROSHI HAGA: "Fingerprint input based on scattered-light detection" APPLIED OPTICS, vol. 36, no. 35, 10 December 1997 (1997-12-10), pages 9152-9156, XP000828205 chapter 4. -----	1-61

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/07860

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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.:

1-61

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: 1-61

Fingerprint sensing, with arrangements to separate unwanted light from the light reflected by the surface of the finger

2. Claims: 62-133

Fingerprint sensor integrated with display or touch screen

3. Claims: 134-148

Fingerprint sensor, having electrodes to be contacted by skin and light generating elements connected to these electrodes.

4. Claims: 149-162,198-211

static electricity reducing electrode on surface of fingerprint sensor element

5. Claims: 163-197,212-246

arrangements in fingerprint sensor for verifying that finger is "live"

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/07860

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5869822	A	09-02-1999	NONE	

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JP 06103369	A	15-04-1994	NONE	
