US007284266B1

(12) **United States Patent**
Morris et al.

(10) **Patent No.: US 7,284,266 B1**
(45) **Date of Patent: Oct. 16, 2007**

(54) **SYSTEM AND METHOD FOR SECURE BIOMETRIC IDENTIFICATION**

(75) Inventors: **Martin Morris**, Vista, CA (US); **Andrew Senyei**, La Jolla, CA (US); **Jeff Calcagno**, La Jolla, CA (US)

(73) Assignee: **Broadcom Corporation**, Irvine, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/531,720**

(22) Filed: **Mar. 21, 2000**

(51) **Int. Cl.**

G06F 15/16	(2006.01)
G06F 17/30	(2006.01)
G06F 7/04	(2006.01)
G06G 7/58	(2006.01)
G06K 19/00	(2006.01)
H04L 9/00	(2006.01)
H03M 1/68	(2006.01)
H04N 7/16	(2006.01)

(52) **U.S. Cl.** **726/9**; 713/186; 726/28

(58) **Field of Classification Search** 713/186, 713/159, 170; 705/61–64; 382/115; 726/28
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,611,290 A * 10/1971 Luisi et al. 382/125
3,699,519 A * 10/1972 Campbell 382/125

(Continued)

FOREIGN PATENT DOCUMENTS

EP 292249 A2 * 11/1988

(Continued)

OTHER PUBLICATIONS

Schneier, Bruce. Applied Cryptography, Second Edition, 1996 John Wiley & Sons, pp. 37 & 185-186.*

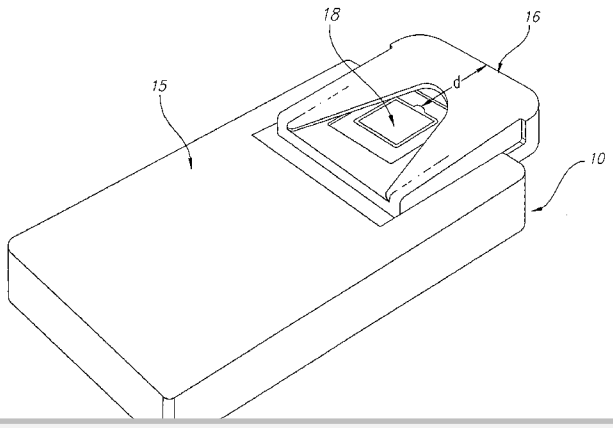
(Continued)

Primary Examiner—Gilberto Barrón, Jr.
Assistant Examiner—Michael J Simitoski
(74) *Attorney, Agent, or Firm*—McAndrews, Held & Malloy, Ltd.

(57) **ABSTRACT**

A system and method for secure biometric identification. The inventive system includes a mobile unit and a server. The mobile unit is adapted to receive biometric input and provide a first signal in response thereto. In the illustrative implementation, the mobile unit is a Personal Digital Assistant (PDA) and the biometric input is provided by a fingerprint sensor mounted thereon. A first transceiver is mounted on the PDA for transmitting the first signal and receiving a second signal in response thereto. The PDA is adapted to encrypt the first signal and decrypt the second signal. A secure device is mounted at the PDA. The secure device has two modes of operation: a first locked mode by which access thereto is prohibited and a second unlocked mode by which access thereto is enabled on receipt of the second signal. In the illustrative implementation, the secure device is an encrypted database for which the second signal is a decryption key. The server unit includes a second transceiver for receiving the first signal transmitted via the wireless link. The first and second transceivers are adapted to operate in accordance with the Bluetooth specification. The server is equipped with a system for authenticating the biometric data and providing the second signal in response thereto. The second signal is then communicated to the mobile unit where it is utilized to access the secure device, e.g., encrypted database.

13 Claims, 7 Drawing Sheets



U.S. PATENT DOCUMENTS

3,859,633	A *	1/1975	Ho et al.	382/125
4,210,899	A *	7/1980	Swonger et al.	382/125
4,405,829	A	9/1983	Rivest et al.	178/22.1
4,525,859	A *	6/1985	Bowles et al.	382/125
4,747,147	A *	5/1988	Sparrow	382/125
4,790,564	A *	12/1988	Larcher et al.	283/69
4,795,898	A *	1/1989	Bernstein et al.	235/487
4,817,183	A *	3/1989	Sparrow	382/125
5,237,614	A *	8/1993	Weiss	713/159
5,467,403	A *	11/1995	Fishbine et al.	382/116
5,469,506	A *	11/1995	Berson et al.	713/186
5,490,139	A	2/1996	Baker et al.	370/60
5,572,528	A	11/1996	Shuen	370/85.13
5,636,216	A	6/1997	Fox et al.	370/402
5,652,751	A	7/1997	Sharony	370/227
5,696,903	A	12/1997	Mahany	
5,699,353	A	12/1997	Kent	370/315
5,708,655	A	1/1998	Toth et al.	370/313
5,742,598	A	4/1998	Dunn et al.	370/393
5,754,547	A	5/1998	Nakazawa	370/401
5,812,531	A	9/1998	Cheung et al.	370/255
5,825,772	A	10/1998	Dobbins et al.	370/396
5,835,061	A	11/1998	Stewart	342/457
5,845,081	A	12/1998	Rangarajan et al.	395/200
5,850,592	A	12/1998	Ramanathan	
5,854,899	A	12/1998	Callon et al.	395/200
5,872,834	A *	2/1999	Teitelbaum	379/93.03
5,917,913	A *	6/1999	Wang	705/67
5,982,898	A *	11/1999	Hsu et al.	713/156
5,983,098	A	11/1999	Gerszberg et al.	455/426
6,016,476	A *	1/2000	Maes et al.	705/1
6,088,802	A *	7/2000	Bialick et al.	713/200
6,111,977	A *	8/2000	Scott et al.	382/124
6,307,956	B1 *	10/2001	Black	382/124
6,532,368	B1 *	3/2003	Hild et al.	455/515
6,581,161	B1 *	6/2003	Byford	173/182
2002/0049073	A1 *	4/2002	Bell	455/552

FOREIGN PATENT DOCUMENTS

WO	WO 99/14897	3/1999

OTHER PUBLICATIONS

Anderson, S. et al. "A Single Chip Sensor & Image Processor for Fingerprint Verification", 1991 IEEE Custom Integrated Circuits Conference.*

Chen, Z. et al. "A Topology-Based Matching Algorithm for Fingerprint Authentication", 1991 IEEE.*

Fitzgerald, Karen. "The quest for intruder-proof computer systems", Aug. 1989 IEEE Spectrum.*

Miller, Benjamin. "Vital Signs of Identity", Feb. 1994 IEEE Spectrum.*

Haartsen, Jaap, "Bluetooth—the universal radio interface for ad hoc, wireless connectivity", Ericsson Review, Se, Ericsson (3) : 110-117, (1998) .

Haartsen, Jaap, "Bluetooth-The universal radio interface for *ad hoc*, wireless connectivity," *Ericsson Review*, No. 3, pp. 110-117, (1998).

"Specification of the Bluetooth System, Core, Version 1.0B," *Bluetooth SIG Specifications*, pp. 18-42, (Dec. 1, 1999).

Specification of the Bluetooth System, pp. 1-1000, (Jul. 1999).

"PDMF System Manager's Guide PDMF-Ref-5.1," http://www.geneseo.edu/pmdf/sysman/book_1.html#chapter_1, (Mar. 16, 1999) .

* cited by examiner

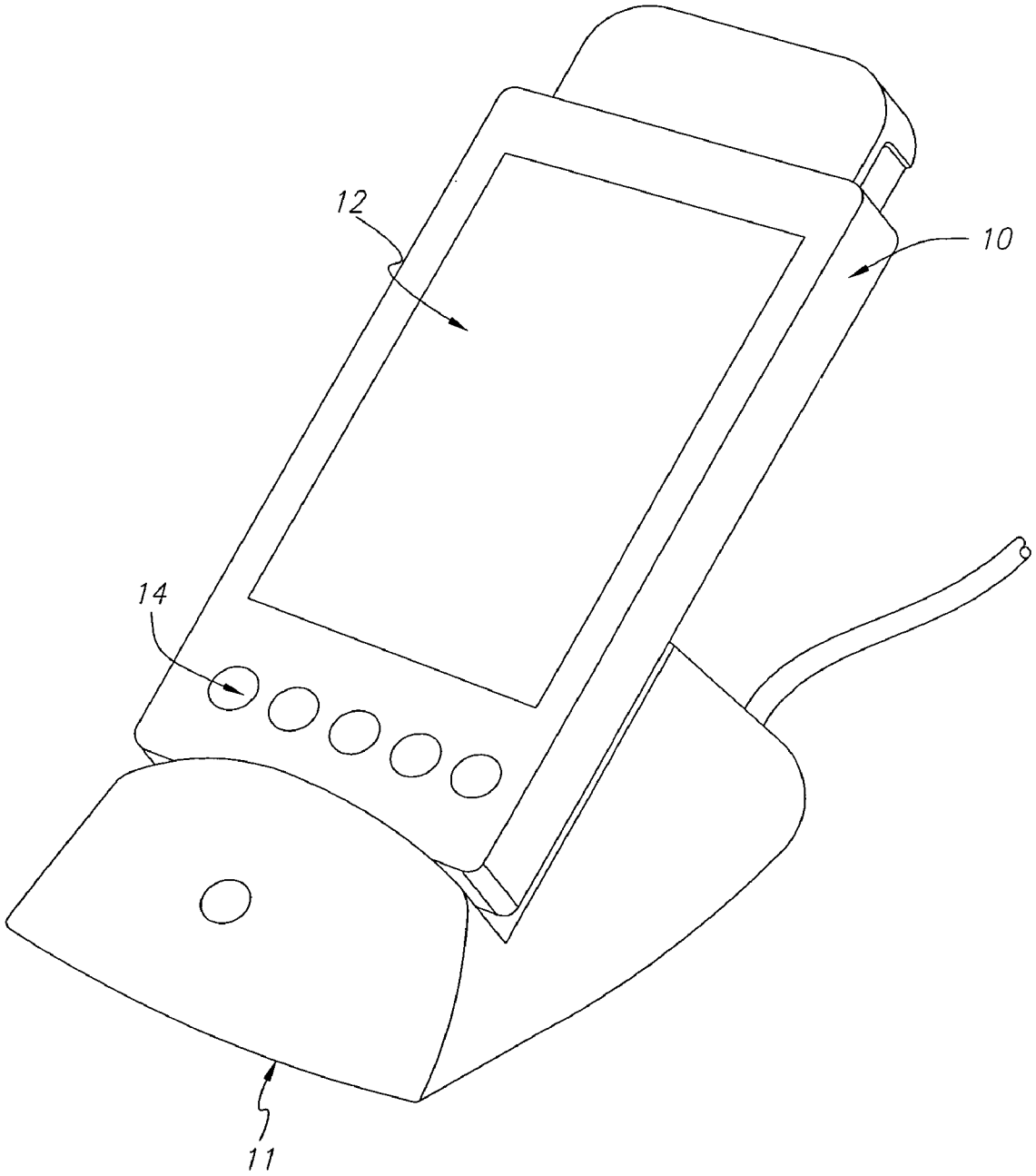


FIG. 1a

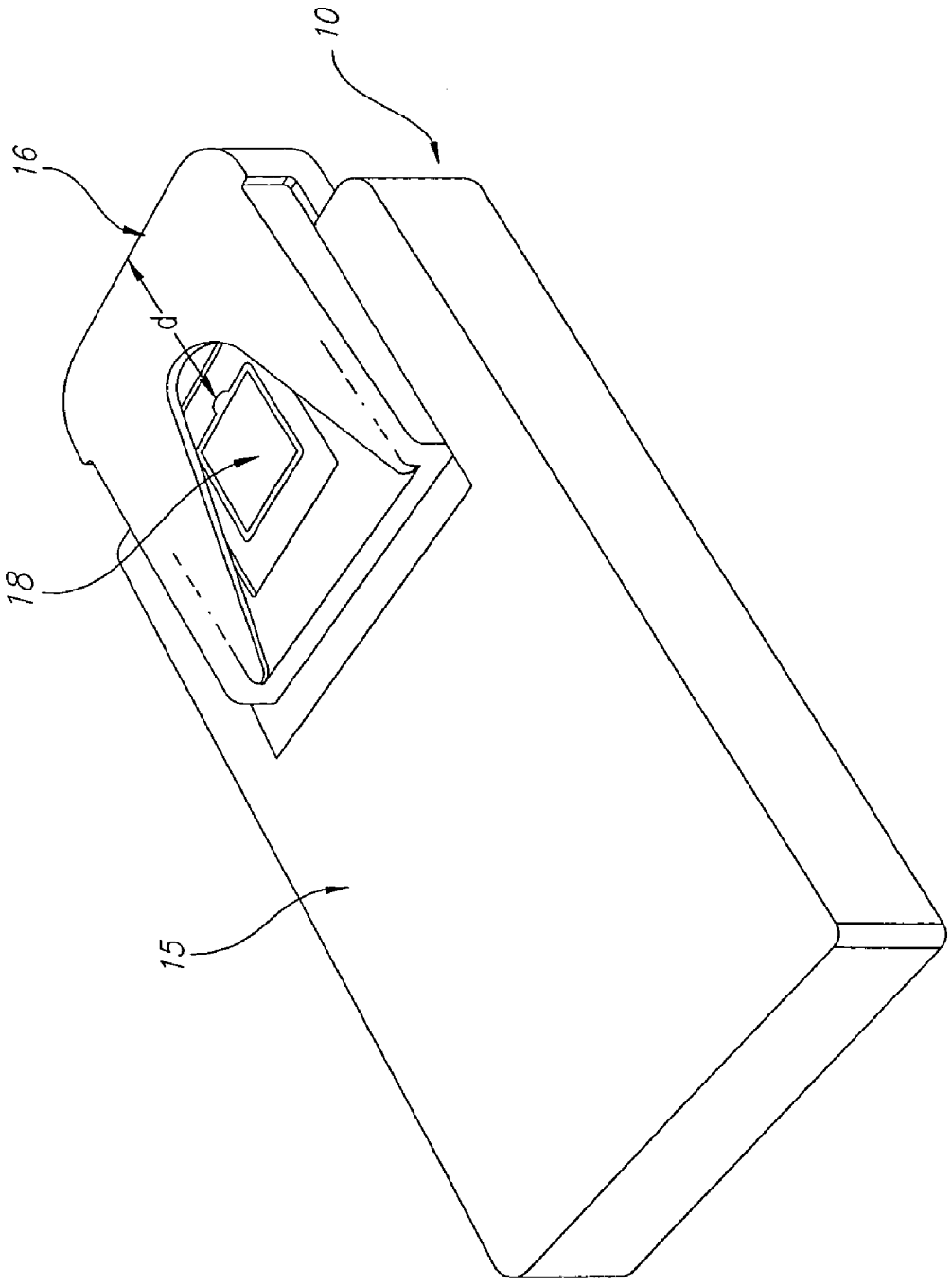
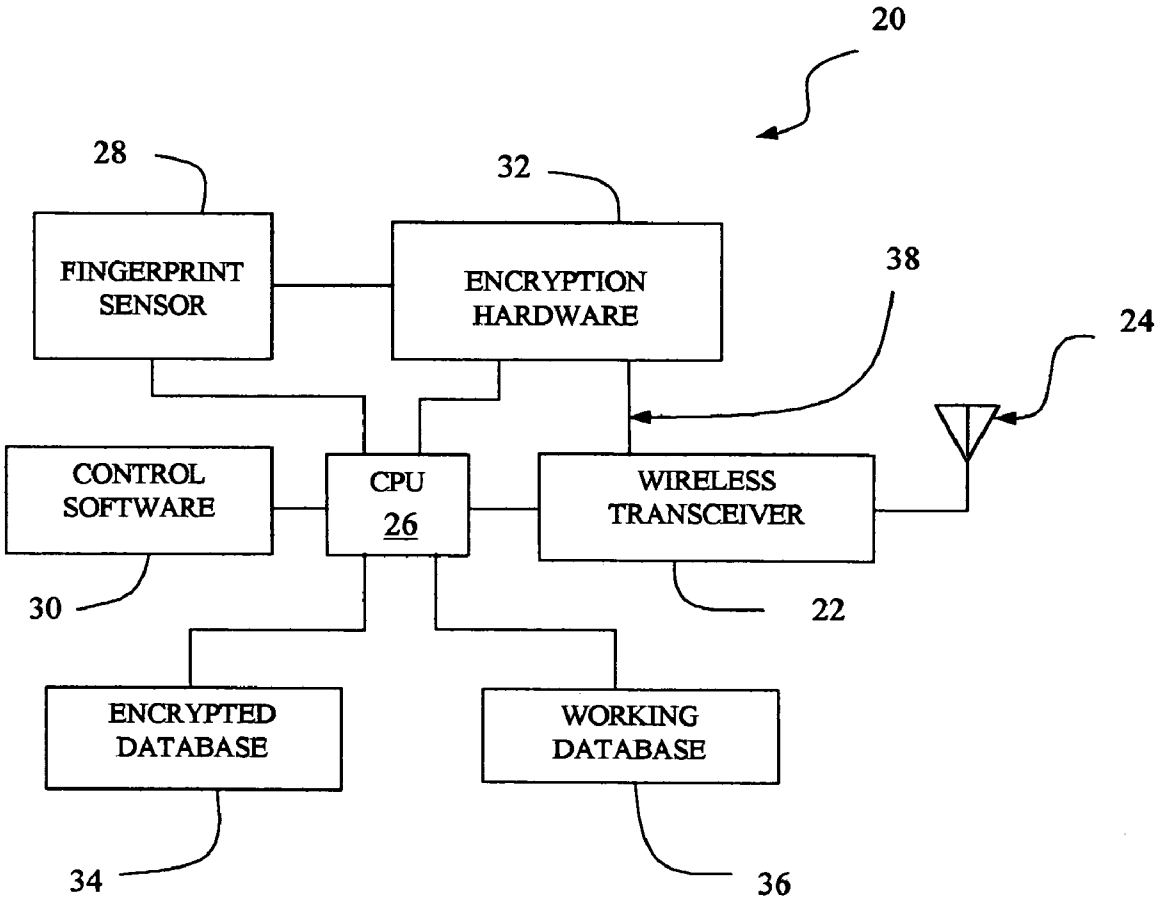


FIG. 1b

Fig. 2



DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.