



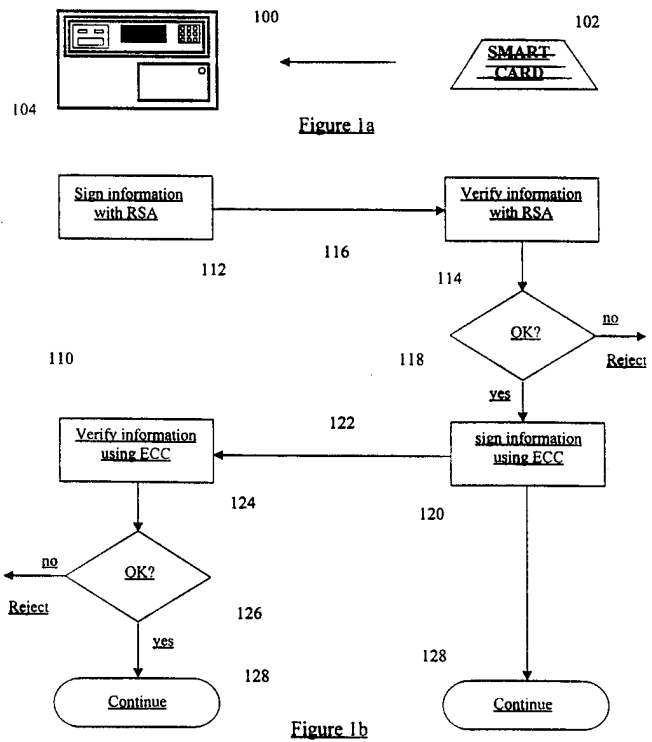
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/CA98/00056 (22) International Filing Date: 3 February 1998 (03.02.98) (30) Priority Data: 9702152.1 3 February 1997 (03.02.97) GB (71) Applicant: CERTICOM CORP. [CA/CA]; Suite 103, 200 Matheson Boulevard West, Mississauga, Ontario L5R 3L7 (CA). (72) Inventor: VANSTONE, Scott, A.; 539 Sandbrook Court, Waterloo, Ontario N2T 2H4 (CA). (74) Agents: ORANGE, John, R., S. et al.; Orange & Associates, Toronto Dominion Bank Tower, Suite 3600, Toronto-Dominion Centre, P.O. Box 190, Toronto, Ontario M5K 1H6 (CA).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 10 December 1998 (10.12.98)</p>	

(54) Title: DATA CARD VERIFICATION SYSTEM

(57) Abstract

A method of verifying a pair of correspondents in electronic transaction, the correspondents each including first and second signature schemes and wherein the first signature scheme is computationally more difficult in signing than verifying and the second signature scheme is computationally more difficult in verifying than signing. The method comprises the step of the first correspondent signing information according to the first signature scheme and transmitting the first signature to the second correspondent, the second correspondent verifying the first signature received from the first correspondent, wherein the verification is performed according to the first signature scheme. The second correspondent then signs information according to the second signature scheme and transmits the second signature to the first correspondent, the first correspondent verifies the second signature received from the second correspondent, wherein the verification is performed according to the second signature algorithm; the transaction is rejected if either verification fails. The method thereby allows one of the correspondents to participate with relatively little computing power while maintaining security of the transaction.



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INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 98/00056

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G07F7/10

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 6 G07F H04L

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MIYAJI A: "ELLIPTIC CURVES SUITABLE FOR CRYPTOSYSTEMS" IEICE TRANSACTIONS ON FUNDAMENTALS OF ELECTRONICS, COMMUNICATIONS AND COMPUTER SCIENCES, vol. E77-A, no. 1, 1 January 1994, pages 98-104, XP000439669 see the whole document ---	1-6
A	EP 0 588 339 A (NIPPON TELEGRAPH & TELEPHONE) 23 March 1994 see abstract; claims; figures ---	1-6
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Date of the actual completion of the international search

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Name and mailing address of the ISA

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

Authorized officer

Guivol, 0

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Inter. Journal Application No

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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	<p>SCHNORR C P: "EFFICIENT SIGNATURE GENERATION BY SMART CARDS" JOURNAL OF CRYPTOLOGY, vol. 4, no. 3, 1 January 1991, pages 161-174, XP000574352 see the whole document</p>	1-6
A	<p>US 5 218 637 A (ANGEBAUD DIDIER ET AL) 8 June 1993 see the whole document</p>	1,2,5,6
A	<p>WO 91 16691 A (JONHIG LTD) 31 October 1991 see page 5, line 25 - page 6, line 7 see page 15, line 28 - page 18, line 6; claims 7-11; figures 4,5</p>	1-6
A	<p>KENJI KOYAMA ET AL: "ELLIPTIC CURVE CRYPTOSYSTEMS AND THEIR APPLICATIONS" IEICE TRANSACTIONS ON INFORMATION AND SYSTEMS, vol. E75 - D, no. 1, 1 January 1992, pages 50-57, XP000301174 see the whole document</p>	1-6
A	<p>WALEFFE D DE ET AL: "CORSAIR: A SMART CARD FOR PUBLIC KEY CRYPTOSYSTEMS" ADVANCES IN CRYPTOLOGY - PROCEEDINGS OF CRYPTO, SANTA BARBARA, AUG. 11 - 15, 1990, no. CONF. 10, 1 January 1990, pages 502-513, XP000260013 MENEZES A J;VANSTONE S A see the whole document</p>	1,2,4-6
A	<p>US 4 748 668 A (SHAMIR ADI ET AL) 31 May 1988 see abstract; figures</p>	1,5,6
A	<p>FR 2 536 928 A (FRANCE ETAT) 1 June 1984 see the whole document</p>	1
A	<p>KOBLITZ N: "ELLIPTIC CURVE CRYPTOSYSTEMS" MATHEMATICS OF COMPUTATION, vol. 48, no. 177, January 1987, pages 203-209, XP000671098</p>	
A	<p>US 4 890 323 A (BEKER HENRY J ET AL) 26 December 1989</p>	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA 98/00056

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
EP 0588339	A	23-03-1994	JP 6103425 A	15-04-1994
			JP 6103426 A	15-04-1994
			JP 6162289 A	10-06-1994
			JP 6162287 A	10-06-1994
			JP 6161354 A	07-06-1994
			EP 0856821 A	05-08-1998
			EP 0856822 A	05-08-1998
			US 5396558 A	07-03-1995
			US 5446796 A	29-08-1995
			US 5502765 A	26-03-1996
US 5218637	A	08-06-1993	FR 2620248 A	10-03-1989
			FR 2663141 A	13-12-1991
			AU 2197188 A	23-03-1989
			CA 1295706 A	11-02-1992
			DE 3876741 A	28-01-1993
			EP 0311470 A	12-04-1989
			FI 884082 A, B,	08-03-1989
			JP 1133092 A	25-05-1989
			KR 9608209 B	20-06-1996
			US 5140634 A	18-08-1992
			DE 69108786 D	18-05-1995
			DE 69108786 T	16-11-1995
			EP 0461983 A	18-12-1991
			JP 6084026 A	25-03-1994
WO 9116691	A	31-10-1991	AT 127949 T	15-09-1995
			AU 653721 B	13-10-1994
			AU 7664491 A	11-11-1991
			CA 2058982 A	13-10-1991
			CN 1057535 A, B	01-01-1992
			DE 69112975 D	19-10-1995
			DE 69112975 T	29-02-1996
			DK 479982 T	13-11-1995
			EP 0479982 A	15-04-1992
			ES 2034929 T	16-11-1995
			GR 92300099 T	16-03-1993
			GR 3017457 T	31-12-1995
			HK 175596 A	27-09-1996
			NO 303198 B	08-06-1998

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA 98/00056

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9116691 A		PL 169723 B US 5623547 A US 5778067 A	30-08-1996 22-04-1997 07-07-1998

US 4748668 A	31-05-1988	AU 592207 B AU 7526687 A DE 3782099 A EP 0252499 A JP 2511464 B JP 63101987 A	04-01-1990 14-01-1988 12-11-1992 13-01-1988 26-06-1996 06-05-1988

FR 2536928 A	01-06-1984	NONE	

US 4890323 A	26-12-1989	AU 590082 B AU 7326487 A EP 0246823 A GB 2190820 A, B HK 78690 A JP 63010839 A	26-10-1989 26-11-1987 25-11-1987 25-11-1987 12-10-1990 18-01-1988
