



(10) **Patent Number:** US RE45,416 E
(45) **Date of Reissued Patent:** Mar. 17, 2015

(56) **References Cited**

D61,466 S	9/1922	Foltz
2,767,756 A	10/1956	Niles
3,376,661 A	4/1968	Hulett
3,446,260 A	5/1969	Osher

(Continued)

FOREIGN PATENT DOCUMENTS

CA	2300241	9/2000
CH	689070	8/1997

(Continued)

OTHER PUBLICATIONS

Related U.S. Patent Documents

Reissue of:

(64) Patent No.: **7,735,725**
 Issued: **Jun. 15, 2010**
 Appl. No.: **11/160,548**
 Filed: **Jun. 28, 2005**

Derfler, "How Networks Work," Bestseller Edition 1996, Ziff-Davis Press, Emeryville, CA, all pages.

(Continued)

U.S. Applications:

(63) Continuation-in-part of application No. 10/711,720, filed on Sep. 30, 2004, now Pat. No. 7,996,324, and a continuation-in-part of application No. 10/708,545, filed on Mar. 10, 2004,

Primary Examiner — Daniel Hess
(74) Attorney, Agent, or Firm — Brundidge & Stanger, P.C.

(57) **ABSTRACT**

(Continued)

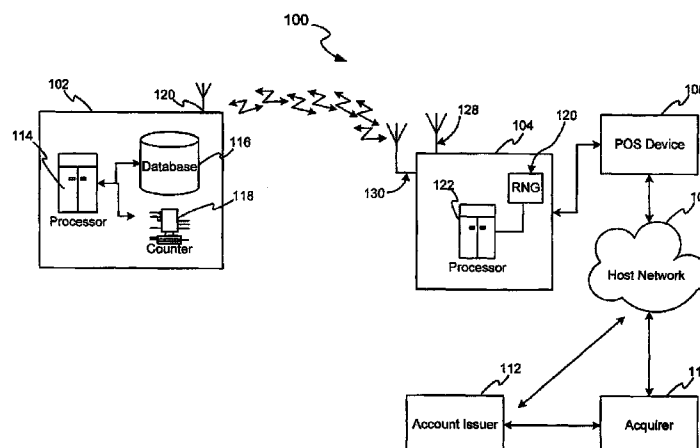
(51) **Int. Cl.**
H04L 9/32 (2006.01)
H04B 1/00 (2006.01)

(52) **U.S. Cl.**
USPC 235/380; 340/5.8; 340/5.9; 713/172

(58) **Field of Classification Search**
USPC 235/379, 380, 382; 340/5.8, 5.9;
705/21, 35-45; 713/172

See application file for complete search history.

45 Claims, 7 Drawing Sheets



Related U.S. Application Data

now Pat. No. 7,668,750, and a continuation-in-part of application No. 10/340,352, filed on Jan. 10, 2003, now Pat. No. 7,889,052, and a continuation-in-part of application No. 10/192,488, filed on Jul. 9, 2002, now Pat. No. 7,239,226.

- (60) Provisional application No. 60/507,803, filed on Sep. 30, 2003, provisional application No. 60/396,577, filed on Jul. 16, 2002, provisional application No. 60/304,216, filed on Jul. 10, 2001.

References Cited

U.S. PATENT DOCUMENTS

3,536,894 A	10/1970	Travioli	4,779,898 A	10/1988	Berning et al.
3,573,731 A	4/1971	Schwend	4,794,142 A	12/1988	Alberts et al.
3,725,647 A	4/1973	Retzky	4,795,894 A	1/1989	Sugimoto et al.
3,763,356 A	10/1973	Berler	4,801,790 A	1/1989	Solo
3,829,662 A	8/1974	Furahashi	4,816,653 A	3/1989	Anderl et al.
3,838,252 A	9/1974	Hynes et al.	4,829,690 A	5/1989	Andros
3,873,813 A	3/1975	Lahr et al.	4,837,422 A	6/1989	Dethloff et al.
3,894,756 A	7/1975	Ward	4,839,504 A	6/1989	Nakano
3,914,762 A	10/1975	Klensch	4,841,570 A	6/1989	Cooper
3,929,177 A	12/1975	Reis	4,849,617 A	7/1989	Ueda
3,955,295 A	5/1976	Mayer	4,852,911 A	8/1989	Hoppe
4,044,231 A	8/1977	Beck et al.	4,853,525 A	8/1989	Vogt et al.
4,048,737 A	9/1977	McDermott	4,863,819 A	9/1989	Drexler et al.
4,056,139 A	11/1977	Murt	4,868,849 A	9/1989	Tamaoki
4,058,839 A	11/1977	Darjany	4,884,507 A	12/1989	Levy
4,066,873 A	1/1978	Schatz	4,889,366 A	12/1989	Fabbiani
4,119,361 A	10/1978	Greenaway	4,897,533 A	1/1990	Lyszcza
4,202,491 A	5/1980	Suzuki	4,897,947 A	2/1990	Kass-Pious
4,206,965 A	6/1980	McGrew	4,910,521 A	3/1990	Mellon
4,222,516 A	9/1980	Badet et al.	4,917,292 A	4/1990	Drexler
4,277,863 A	7/1981	Faneuf	4,918,432 A	4/1990	Pauley et al.
4,318,554 A	3/1982	Anderson et al.	D307,979 S	5/1990	Purvis
4,356,646 A	11/1982	Johnson, Jr.	4,937,963 A	7/1990	Barnes
4,361,757 A	11/1982	Ehrat	D310,386 S	9/1990	Michels et al.
D270,303 S	8/1983	Zautner	4,984,270 A	1/1991	LaBounty
D270,546 S	9/1983	Malmberg	4,993,068 A	2/1991	Piosenka et al.
4,421,380 A	12/1983	McGrew	4,998,753 A	3/1991	Wichael
4,436,991 A	3/1984	Albert et al.	5,004,899 A	4/1991	Ueda
4,443,027 A	4/1984	McNeely et al.	5,010,243 A	4/1991	Fukushima et al.
4,450,535 A	5/1984	dePommery et al.	5,015,830 A	5/1991	Masuzawa et al.
4,453,074 A	6/1984	Weinstein	5,016,274 A	5/1991	Micali et al.
4,504,084 A	3/1985	Jauch	5,023,908 A	6/1991	Weiss
4,507,652 A	3/1985	Vogt et al.	5,025,372 A	6/1991	Burton et al.
D280,214 S	8/1985	Opel	5,052,328 A	10/1991	Eppenbach
4,538,059 A	8/1985	Rudland	5,068,894 A	11/1991	Hoppe
4,547,002 A	10/1985	Colgate, Jr.	5,096,228 A	3/1992	Rinderknecht
4,558,211 A	12/1985	Berstein	5,106,125 A	4/1992	Antes
4,563,024 A	1/1986	Blyth	5,111,033 A	5/1992	Fujita et al.
4,581,523 A	4/1986	Okuno	5,125,356 A	6/1992	Galante
4,582,985 A	4/1986	Lofberg	5,142,383 A	8/1992	Mallik
4,589,686 A	5/1986	McGrew	5,171,039 A	12/1992	Dusek
4,593,936 A	6/1986	Opel	5,175,416 A	12/1992	Mansvelt et al.
4,597,814 A	7/1986	Colgate, Jr.	5,180,902 A	1/1993	Schick et al.
4,641,017 A	2/1987	Lopata	5,192,947 A	3/1993	Neustein
4,643,452 A	2/1987	Chang	5,193,114 A	3/1993	Moseley
4,656,463 A	4/1987	Anders et al.	5,198,647 A	3/1993	Mizuta
4,663,518 A	5/1987	Borror et al.	5,202,826 A	4/1993	McCarthy
4,684,795 A	8/1987	Colgate, Jr.	5,206,488 A	4/1993	Teicher
4,692,394 A	9/1987	Drexler	5,208,110 A	5/1993	Smith et al.
4,694,148 A	9/1987	Diekemper et al.	5,217,844 A	6/1993	Fukushima et al.
4,697,073 A	9/1987	Hara	5,234,624 A	8/1993	Bauer et al.
4,697,363 A	10/1987	Gamm	5,245,329 A	9/1993	Gokcebay
4,700,055 A	10/1987	Kashkashian, Jr.	5,251,937 A	10/1993	Ojsler
4,711,690 A	12/1987	Haghir-Tehrani	5,256,473 A	10/1993	Kotani et al.
4,717,221 A	1/1988	McGrew	5,257,656 A	11/1993	McLeroy
4,725,719 A	2/1988	Oncken et al.	5,259,649 A	11/1993	Shomron
4,736,094 A	4/1988	Yoshida	5,272,326 A	12/1993	Fujita et al.
4,744,497 A	5/1988	O'Neal	5,276,311 A	1/1994	Hennige
4,747,147 A	5/1988	Sparrow	5,279,019 A	1/1994	Knickle
4,768,811 A	9/1988	Oshikoshi et al.	5,288,978 A	2/1994	Iijima
			5,300,764 A	4/1994	Hoshino et al.
			5,304,789 A	4/1994	Lob et al.
			5,308,121 A	5/1994	Gunn
			5,311,679 A	5/1994	Birch, Sr.
			5,321,751 A	6/1994	Ray et al.
			5,326,964 A	7/1994	Risser
			5,351,052 A	9/1994	d'Hont et al.
			5,351,142 A	9/1994	Cueli
			5,355,411 A	10/1994	MacDonald
			5,359,522 A	10/1994	Ryan
			5,365,551 A	11/1994	Snodgrass et al.
			5,383,687 A	1/1995	Suess et al.
			5,397,881 A	3/1995	Mannik
			5,410,142 A	4/1995	Tsuboi et al.
			5,412,192 A	5/1995	Hoss
			5,438,184 A	8/1995	Roberts et al.
			5,453,601 A	9/1995	d'Hont et al.
			5,461,217 A	10/1995	Claus
			5,461,219 A	10/1995	Cronvall

(56)

References Cited

U.S. PATENT DOCUMENTS

5,477,038 A	12/1995	Levine et al.	5,770,843 A	6/1998	Rose et al.
5,477,040 A	12/1995	Lalonde	5,773,812 A	6/1998	Kreft
5,478,629 A	12/1995	Norman	5,778,069 A	7/1998	Thomlinson
5,479,494 A	12/1995	Clitherow	5,778,173 A	7/1998	Apte
5,479,530 A	12/1995	Parameswaran et al.	5,786,587 A	7/1998	Colgate, Jr.
5,500,513 A	3/1996	Langhans et al.	5,789,733 A	8/1998	Jachimowicz et al.
5,503,434 A	4/1996	Gunn	5,791,474 A	8/1998	Hansen
5,506,395 A	4/1996	Eppley	5,796,831 A	8/1998	Paradinas et al.
5,513,272 A	4/1996	Bogosian, Jr.	5,799,087 A	8/1998	Rosen
5,513,525 A	5/1996	Schurmann	5,806,045 A	9/1998	Biorge et al.
5,514,860 A	5/1996	Berson	5,808,758 A	9/1998	Solmsdorf
5,516,153 A	5/1996	Kaule	5,815,252 A	9/1998	Price-Francis
5,518,810 A	5/1996	Nishihara et al.	5,815,657 A	9/1998	Williams et al.
5,520,230 A	5/1996	Sumner, III	5,823,359 A	10/1998	Harris et al.
5,521,966 A	5/1996	Friedes et al.	5,826,241 A	10/1998	Stein et al.
5,528,222 A	6/1996	Moskowitz et al.	5,826,242 A	10/1998	Montulli
5,533,656 A	7/1996	Bonaldi	5,826,243 A	10/1998	Musmanno et al.
5,534,857 A	7/1996	Laing et al.	5,838,257 A	11/1998	Lambropoulos
5,537,314 A	7/1996	Kanter	5,838,720 A	11/1998	Morelli
5,539,825 A	7/1996	Akiyama	5,838,812 A	11/1998	Pare, Jr.
5,541,582 A	7/1996	Wagner et al.	5,852,812 A	12/1998	Reeder
5,544,246 A	8/1996	Mandelbaum et al.	5,856,048 A	1/1999	Tahara et al.
5,548,291 A	8/1996	Meier et al.	5,857,079 A	1/1999	Claus et al.
5,555,877 A	9/1996	Lockwood et al.	5,857,152 A	1/1999	Everett
5,559,504 A	9/1996	Itsumi et al.	5,857,709 A	1/1999	Chock
5,559,887 A	9/1996	Davis et al.	5,859,419 A	1/1999	Wynn
5,569,897 A	10/1996	Masuda	5,859,587 A	1/1999	Alicot et al.
5,572,815 A	11/1996	Kovner	5,862,325 A	1/1999	Reed et al.
5,575,094 A	11/1996	Leake et al.	5,864,306 A	1/1999	Dwyer et al.
5,577,120 A	11/1996	Penzias	5,864,830 A	1/1999	Armetta et al.
5,577,121 A	11/1996	Davis et al.	5,865,470 A	2/1999	Thompson
5,577,609 A	11/1996	Hexter	5,869,822 A	2/1999	Meadows et al.
5,578,808 A	11/1996	Taylor	5,875,432 A	2/1999	Sehr
5,585,787 A	12/1996	Wallerstein	D406,861 S	3/1999	Leedy, Jr.
5,590,038 A	12/1996	Pitroda	5,878,138 A	3/1999	Yacobi
5,590,197 A	12/1996	Chen et al.	5,878,141 A	3/1999	Daly et al.
5,592,767 A	1/1997	Treske	5,878,337 A	3/1999	Joao et al.
5,594,227 A	1/1997	Deo	5,883,377 A	3/1999	Chapin, Jr.
5,602,918 A	2/1997	Chen et al.	5,883,810 A	3/1999	Franklin et al.
5,604,801 A	2/1997	Dolan et al.	5,884,271 A	3/1999	Pitroda
5,608,203 A	3/1997	Finkelstein et al.	5,884,280 A	3/1999	Yoshioka et al.
5,611,965 A	3/1997	Shouji et al.	5,884,292 A	3/1999	Baker et al.
5,613,001 A	3/1997	Bakhoun	5,884,310 A	3/1999	Brichta et al.
5,613,131 A	3/1997	Moss et al.	5,886,333 A	3/1999	Miyake
5,614,703 A	3/1997	Martin et al.	5,889,941 A	3/1999	Tushie et al.
5,621,199 A	4/1997	Calari et al.	D408,054 S	4/1999	Leedy, Jr.
5,641,050 A	6/1997	Smith et al.	5,892,211 A	4/1999	Davis et al.
5,649,118 A	7/1997	Carlisle et al.	5,897,622 A	4/1999	Blinn et al.
5,665,439 A	9/1997	Andersen et al.	5,898,838 A	4/1999	Wagner
5,668,876 A	9/1997	Falk et al.	5,900,954 A	5/1999	Katz et al.
D384,971 S	10/1997	Kawan	5,901,239 A	5/1999	Kamei
5,677,953 A	10/1997	Dolphin	5,903,875 A	5/1999	Kohara
5,689,100 A	11/1997	Carrithers	5,903,880 A	5/1999	Biffar
5,694,596 A	12/1997	Campbell	5,905,908 A	5/1999	Wagner
5,697,649 A	12/1997	Dames et al.	5,907,620 A	5/1999	Klemba et al.
5,700,037 A	12/1997	Keller	5,909,492 A	6/1999	Payne et al.
5,705,101 A	1/1998	Oi et al.	5,912,446 A	6/1999	Wong et al.
5,705,852 A	1/1998	Orihara et al.	5,913,203 A	6/1999	Wong et al.
5,710,421 A	1/1998	Kokubu	5,914,472 A	6/1999	Foladare et al.
5,715,399 A	2/1998	Bezos	5,915,016 A	6/1999	Savalle et al.
5,720,500 A	2/1998	Okazaki et al.	5,915,023 A	6/1999	Bernstein
5,724,424 A	3/1998	Gifford	5,915,973 A	6/1999	Hoehn-Saric et al.
5,725,098 A	3/1998	Seifert et al.	5,917,168 A	6/1999	Nakamura et al.
5,727,140 A	3/1998	Ohtomo et al.	5,917,913 A	6/1999	Wang
5,727,696 A	3/1998	Valiulis	5,917,925 A	6/1999	Moore
5,734,838 A	3/1998	Robinson et al.	5,918,216 A	6/1999	Miksovsky et al.
5,737,439 A	4/1998	Lapsley et al.	5,920,058 A	7/1999	Weber et al.
5,739,512 A	4/1998	Tognazzini	5,920,629 A	7/1999	Rosen
5,742,756 A	4/1998	Dillaway et al.	5,920,847 A	7/1999	Kolling et al.
5,742,845 A	4/1998	Wagner	5,923,734 A	7/1999	Taskell
5,745,571 A	4/1998	Zuk	5,923,884 A	7/1999	Peyret et al.
5,757,917 A	5/1998	Rose et al.	5,924,080 A	7/1999	Johnson
5,764,789 A	6/1998	Pare, Jr. et al.	5,924,624 A	7/1999	Martin
5,768,385 A	6/1998	Simon	5,928,788 A	7/1999	Riedl
5,769,457 A	6/1998	Warther	5,930,767 A	7/1999	Reber et al.
			5,930,777 A	7/1999	Barber
			5,932,870 A	8/1999	Berson
			5,933,328 A	8/1999	Wallace et al.
			5,936,226 A	8/1999	Aucsmith

(56)

References Cited

U.S. PATENT DOCUMENTS

5,936,227 A	8/1999	Truggelmann et al.	6,041,308 A	3/2000	Walker et al.
5,938,010 A	8/1999	Osterbye	6,041,410 A	3/2000	Hsu et al.
5,942,761 A	8/1999	Tuli	6,041,412 A	3/2000	Timson et al.
5,945,653 A	8/1999	Walker et al.	6,044,360 A	3/2000	Picciallo
5,949,044 A	9/1999	Walker et al.	6,044,388 A	3/2000	DeBellis et al.
5,949,335 A	9/1999	Maynard	6,050,494 A	4/2000	Song et al.
5,949,876 A	9/1999	Ginter et al.	6,050,605 A	4/2000	Mikelionis et al.
5,950,174 A	9/1999	Brendzel	6,058,418 A	5/2000	Kobata
5,950,179 A	9/1999	Buchanan et al.	6,060,815 A	5/2000	Nysen
5,953,710 A	9/1999	Fleming	6,061,344 A	5/2000	Wood, Jr.
5,955,951 A	9/1999	Wischerop et al.	6,061,789 A	5/2000	Hauser et al.
5,956,693 A	9/1999	Geerlings	6,064,751 A	5/2000	Smithies et al.
5,956,699 A	9/1999	Wong et al.	6,064,981 A	5/2000	Barni et al.
5,958,004 A	9/1999	Helland et al.	6,065,675 A	5/2000	Teicher
5,960,411 A	9/1999	Hartman et al.	6,068,184 A	5/2000	Barnett
5,960,416 A	9/1999	Block	6,068,193 A	5/2000	Kreft
5,963,915 A	10/1999	Kirsch	6,070,150 A	5/2000	Remington et al.
5,966,697 A	10/1999	Ferguson et al.	6,070,154 A	5/2000	Tavor et al.
5,968,570 A	10/1999	Paulucci	6,073,112 A	6/2000	Geerlings
5,969,318 A	10/1999	Mackenthun	6,073,236 A	6/2000	Kusakabe et al.
5,970,470 A	10/1999	Walker	6,076,078 A	6/2000	Camp et al.
5,970,471 A	10/1999	Hill	6,076,296 A	6/2000	Schaeffer
5,970,472 A	10/1999	Allsop et al.	6,078,906 A	6/2000	Huberman
5,970,473 A	10/1999	Gerszberg et al.	6,078,908 A	6/2000	Schmitz
5,970,475 A	10/1999	Barnes et al.	6,081,790 A	6/2000	Rosen
5,971,276 A	10/1999	Sano et al.	6,082,422 A	7/2000	Kaminski
5,973,475 A	10/1999	Combaluzier	6,084,967 A	7/2000	Kennedy et al.
5,974,238 A	10/1999	Chase, Jr.	6,085,976 A	7/2000	Sehr
5,978,348 A	11/1999	Tamura	6,086,971 A	7/2000	Haas et al.
5,979,757 A	11/1999	Tracy et al.	6,088,683 A	7/2000	Jalili
5,979,942 A	11/1999	Ivicic	6,088,717 A	7/2000	Reed et al.
5,982,293 A	11/1999	Everett et al.	6,088,755 A	7/2000	Kobayashi et al.
5,983,200 A	11/1999	Slotznick	6,088,797 A	7/2000	Rosen
5,983,207 A	11/1999	Turk et al.	6,089,611 A	7/2000	Blank
5,984,180 A	11/1999	Albrecht	6,091,835 A	7/2000	Smithies et al.
5,988,497 A	11/1999	Wallace	6,092,198 A	7/2000	Lanzy et al.
5,988,510 A	11/1999	Tuttle	6,095,413 A	8/2000	Tetro et al.
5,991,413 A	11/1999	Arditti et al.	6,095,567 A	8/2000	Buell
5,991,748 A	11/1999	Taskett	6,098,053 A	8/2000	Slater
5,995,014 A	11/1999	DiMaria	6,098,879 A	8/2000	Terranova
5,999,914 A	12/1999	Blinn et al.	6,099,043 A	8/2000	Story
6,000,832 A	12/1999	Franklin et al.	6,100,804 A	8/2000	Brady et al.
6,006,988 A	12/1999	Behrmann et al.	6,101,477 A	8/2000	Hohle et al.
6,009,412 A	12/1999	Storey	6,104,281 A	8/2000	Heinrich et al.
6,011,487 A	1/2000	Plocher	6,104,311 A	8/2000	Lastinger
6,012,143 A	1/2000	Tanaka	6,104,922 A	8/2000	Baumann
6,012,636 A	1/2000	Smith	6,107,920 A	8/2000	Eberhardt et al.
6,014,634 A	1/2000	Scroggie et al.	6,108,641 A	8/2000	Kenna et al.
6,014,635 A	1/2000	Harris et al.	6,112,191 A	8/2000	Burke
6,014,636 A	1/2000	Reeder	6,112,984 A	9/2000	Snively
6,014,646 A	1/2000	Vallee et al.	6,115,040 A	9/2000	Bladow et al.
6,014,648 A	1/2000	Brennan	6,115,458 A	9/2000	Taskett
6,014,650 A	1/2000	Zampese	6,116,655 A	9/2000	Thouin et al.
6,014,748 A	1/2000	Tushi et al.	6,116,736 A	9/2000	Stark et al.
6,016,476 A	1/2000	Maes et al.	6,120,461 A	9/2000	Smyth
6,016,482 A	1/2000	Molinari et al.	6,122,625 A	9/2000	Rosen
6,016,484 A	1/2000	Williams et al.	6,125,352 A	9/2000	Franklin et al.
6,018,718 A	1/2000	Walker et al.	D432,939 S	10/2000	Hooglander
RE36,580 E	2/2000	Bogosian, Jr.	6,128,604 A	10/2000	Sakamaki et al.
6,021,943 A	2/2000	Chastain	6,130,623 A	10/2000	MacLellan et al.
6,023,510 A	2/2000	Epstein	6,138,913 A	10/2000	Cyr et al.
6,024,286 A	2/2000	Bradley et al.	6,138,917 A	10/2000	Chapin, Jr.
6,024,385 A	2/2000	Goda	6,141,752 A	10/2000	Danes et al.
6,025,283 A	2/2000	Roberts	6,144,916 A	11/2000	Wood et al.
6,027,028 A	2/2000	Pieterse et al.	6,144,948 A	11/2000	Walker et al.
6,029,147 A	2/2000	Horadan et al.	6,148,093 A	11/2000	McConnell et al.
6,029,150 A	2/2000	Kravitz	6,148,484 A	11/2000	Andreae, Jr.
6,029,175 A	2/2000	Chow	6,154,879 A	11/2000	Pare et al.
6,029,890 A	2/2000	Austin	6,155,168 A	12/2000	Sakamoto
6,029,892 A	2/2000	Miyake	6,157,824 A	12/2000	Bailey
6,032,136 A	2/2000	Brake, Jr. et al.	6,163,771 A	12/2000	Walker et al.
6,032,866 A	3/2000	Knighton et al.	6,168,083 B1	1/2001	Berger et al.
6,036,100 A	3/2000	Asami	6,171,138 B1	1/2001	Lefebvre et al.
6,038,292 A	3/2000	Thomas	6,173,269 B1	1/2001	Solokl et al.
6,038,551 A	3/2000	Barlow et al.	6,173,272 B1	1/2001	Thomas et al.
			6,173,897 B1	1/2001	Halpern
			6,173,898 B1	1/2001	Mande
			6,173,899 B1	1/2001	Rozin
			6,177,859 B1	1/2001	Tuttle et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

6,181,287	B1	1/2001	Beigel	6,404,341	B1	6/2002	Reid
6,182,895	B1	2/2001	Albrecht	6,406,935	B2	6/2002	Kayanakis et al.
6,184,788	B1	2/2001	Middlemiss et al.	D460,455	S	7/2002	Pentz
6,185,307	B1	2/2001	Johnson, Jr.	6,419,158	B2	7/2002	Hooglander
6,189,779	B1	2/2001	Verdicchio et al.	6,421,650	B1	7/2002	Goetz et al.
6,189,787	B1	2/2001	Dorf	6,422,462	B1	7/2002	Cohen
6,195,006	B1	2/2001	Bowers et al.	6,422,472	B1	7/2002	Thevenot et al.
6,196,465	B1	3/2001	Awano	6,424,249	B1	7/2002	Houvener
6,197,396	B1	3/2001	Haas et al.	RE37,822	E	8/2002	Anthonyson
6,198,762	B1	3/2001	Krasnov	D461,477	S	8/2002	Pentz
6,199,079	B1	3/2001	Gupta et al.	6,427,910	B1	8/2002	Barnes et al.
6,199,762	B1	3/2001	Hohle	6,434,159	B1	8/2002	Woodward et al.
6,200,272	B1	3/2001	Linden	6,435,415	B1	8/2002	Calle
6,213,390	B1	4/2001	Oneda	6,438,235	B2	8/2002	Sims, III
6,213,391	B1	4/2001	Lewis	6,439,455	B1	8/2002	Everett et al.
6,219,639	B1	4/2001	Bakis et al.	D462,965	S	9/2002	Pentz
6,220,510	B1	4/2001	Everett et al.	D462,966	S	9/2002	Pentz et al.
6,222,914	B1	4/2001	McMullin	6,445,794	B1	9/2002	Shefi
6,223,977	B1	5/2001	Hill	6,446,862	B1	9/2002	Mann
6,224,109	B1	5/2001	Yang	6,457,000	B1	9/2002	Witkowski et al.
6,227,424	B1	5/2001	Roegner	6,460,696	B1	10/2002	Meyer
6,227,447	B1	5/2001	Campisano	6,471,127	B2	10/2002	Pentz et al.
6,233,348	B1	5/2001	Fujii et al.	6,480,825	B1	11/2002	Sharma et al.
6,240,989	B1	6/2001	Masoud	6,480,869	B1	11/2002	Fujioka
6,247,030	B1	6/2001	Suzuki	6,481,623	B1	11/2002	Grant et al.
6,248,199	B1	6/2001	Smulson	6,483,427	B1	11/2002	Werb
6,248,314	B1	6/2001	Nakashimada et al.	6,483,477	B1	11/2002	Plonka
6,250,554	B1	6/2001	Leo et al.	6,491,639	B1	12/2002	Turcott
6,250,557	B1	6/2001	Forslund et al.	6,494,367	B1	12/2002	Zacharias
6,255,031	B1	7/2001	Yao et al.	6,496,594	B1	12/2002	Prokoski
6,257,620	B1	7/2001	Kenney	6,501,832	B1	12/2002	Saylor et al.
6,263,316	B1	7/2001	Khan et al.	6,505,772	B1	1/2003	Mollett et al.
6,263,446	B1	7/2001	Kausik et al.	6,507,662	B1	1/2003	Brooks
6,265,977	B1	7/2001	Vega et al.	6,520,542	B2	2/2003	Thompson et al.
6,267,292	B1	7/2001	Walker et al.	6,523,292	B2	2/2003	Slavik
6,268,788	B1	7/2001	Gray	6,529,880	B1	3/2003	McKeen et al.
6,277,232	B1	8/2001	Wang et al.	6,539,101	B1	3/2003	Black
6,290,137	B1	9/2001	Kiekhaefer	D474,234	S	5/2003	Nelms et al.
6,293,462	B1	9/2001	Gangi	6,575,361	B1	6/2003	Graves et al.
6,295,522	B1	9/2001	Boesch	6,587,835	B1	7/2003	Treyz et al.
6,296,188	B1	10/2001	Kiekhaefer	6,588,673	B1	7/2003	Chan et al.
6,297,727	B1	10/2001	Nelson, Jr.	6,591,249	B2	7/2003	Zoka
6,304,223	B1	10/2001	Hilton et al.	6,598,024	B1	7/2003	Walker et al.
6,307,956	B1	10/2001	Black	6,601,622	B1	8/2003	Young
6,309,098	B1	10/2001	Wong	6,601,759	B2	8/2003	Fife et al.
6,315,195	B1	11/2001	Ramachandran	6,601,762	B2	8/2003	Piotrowski
6,315,206	B1	11/2001	Hansen et al.	6,608,551	B1	8/2003	Anderson et al.
6,317,750	B1	11/2001	Tortolani et al.	6,609,656	B1	8/2003	Elledge
6,317,755	B1	11/2001	Rakers et al.	6,609,658	B1	8/2003	Sehr
6,318,636	B1	11/2001	Reynolds et al.	6,623,039	B2	9/2003	Thompson et al.
6,325,293	B1	12/2001	Moreno	6,629,591	B1	10/2003	Griswold et al.
6,327,573	B1	12/2001	Walker et al.	6,631,849	B2	10/2003	Blossom
6,327,578	B1	12/2001	Linehan	6,636,620	B1	10/2003	Hoshino
6,329,920	B1	12/2001	Morrison et al.	6,636,833	B1	10/2003	Flitcroft et al.
6,330,544	B1	12/2001	Walker et al.	6,644,551	B2	11/2003	Clayman et al.
6,331,972	B1	12/2001	Harris et al.	6,651,168	B1	11/2003	Kao et al.
6,332,134	B1	12/2001	Foster	6,651,813	B2	11/2003	Vallans et al.
6,332,193	B1	12/2001	Glass et al.	6,651,892	B2	11/2003	Hooglander
D453,160	S	1/2002	Pentz et al.	6,657,614	B1	12/2003	Ito et al.
D453,161	S	1/2002	Pentz	6,671,358	B1	12/2003	Seidman et al.
6,336,095	B1	1/2002	Rosen	6,681,328	B1	1/2004	Harris et al.
6,338,048	B1	1/2002	Mori	6,681,926	B2	1/2004	De Volpi
6,339,384	B1	1/2002	Valdes-Rodriguez	6,684,269	B2	1/2004	Wagner
D453,337	S	2/2002	Pentz et al.	6,685,089	B2	2/2004	Terranova et al.
D453,338	S	2/2002	Pentz et al.	6,686,847	B1	2/2004	Mittler
D453,516	S	2/2002	Pentz	6,687,875	B1	2/2004	Suzuki
D454,910	S	3/2002	Smith et al.	6,690,930	B1	2/2004	Dupre
6,353,420	B1	3/2002	Chung	6,697,947	B1	2/2004	Matyas, Jr. et al.
6,353,811	B1	3/2002	Weissman	6,703,918	B1	3/2004	Kita
6,360,953	B1	3/2002	Lin et al.	6,704,039	B2	3/2004	Pena
6,378,073	B1	4/2002	Davis et al.	6,704,608	B1	3/2004	Azuma
D457,556	S	5/2002	Hochschild	6,708,375	B1	3/2004	Johnson
6,386,444	B1	5/2002	Sullivan	6,725,202	B1	4/2004	Hurta et al.
6,397,198	B1	5/2002	Hoffman et al.	6,732,919	B2	5/2004	Macklin et al.
6,402,026	B1	6/2002	Schwier	6,735,081	B1	5/2004	Bishop et al.
				6,747,546	B1	6/2004	Hikita et al.
				6,749,123	B2	6/2004	Lasch et al.
				6,751,805	B1	6/2004	Austion
				6,763,500	B2	7/2004	Black et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

6,764,014 B2	7/2004	Lasch et al.	7,172,112 B2	2/2007	Bonalle et al.
6,765,470 B2	7/2004	Shinzaki	7,184,747 B2	2/2007	Bogat
6,766,952 B2	7/2004	Luu	7,213,748 B2	5/2007	Tsuei et al.
6,769,718 B1	8/2004	Warther et al.	7,237,121 B2	6/2007	Cammack et al.
6,771,981 B1	8/2004	Zalewski et al.	7,239,226 B2	7/2007	Berardi et al.
6,786,400 B1	9/2004	Bucci	7,254,557 B1	8/2007	Gillin et al.
6,789,733 B2	9/2004	Terranova et al.	7,281,135 B2	10/2007	Black
6,793,141 B1	9/2004	Graham	7,287,271 B1	10/2007	Riggins
6,799,726 B2	10/2004	Stockhammer	7,287,695 B2	10/2007	Wankmueller
6,816,058 B2	11/2004	McGregor et al.	7,299,364 B2	11/2007	Noble et al.
6,819,219 B1	11/2004	Bolle et al.	7,303,120 B2	12/2007	Beenau et al.
6,823,910 B1	11/2004	Elnekaveh	7,314,164 B2	1/2008	Bonalle et al.
6,830,193 B2	12/2004	Tanaka	7,314,165 B2	1/2008	Bonalle et al.
6,834,270 B1	12/2004	Pagani et al.	7,318,550 B2	1/2008	Bonalle et al.
6,834,795 B1	12/2004	Rasmussen et al.	7,325,724 B2	2/2008	Bonalle et al.
6,839,840 B1 *	1/2005	Cooreman	7,341,181 B2	3/2008	Bonalle et al.
6,843,415 B2	1/2005	Vogler	7,363,504 B2	4/2008	Bonalle et al.
6,845,863 B1	1/2005	Riley	7,363,505 B2	4/2008	Black
6,851,617 B2	2/2005	Saint et al.	7,419,093 B1	9/2008	Blackson et al.
6,853,087 B2	2/2005	Neuhaus et al.	2001/0003071 A1	6/2001	Mansutti et al.
6,853,894 B1	2/2005	Kolls	2001/0013546 A1	8/2001	Ross
6,853,987 B1	2/2005	Cook	2001/0013551 A1	8/2001	Ramachandran
6,859,672 B2	2/2005	Roberts et al.	2001/0017584 A1	8/2001	Shinzaki
6,873,974 B1	3/2005	Schutzer	2001/0018660 A1	8/2001	Sehr
6,877,097 B2	4/2005	Hamid et al.	2001/0022446 A1	9/2001	Klure
6,883,715 B1	4/2005	Fruhauf et al.	2001/0029493 A1	10/2001	Pare et al.
6,895,310 B1	5/2005	Kolls	2001/0030238 A1	10/2001	Arisawa
6,898,299 B1	5/2005	Brooks	2001/0032192 A1	10/2001	Putta et al.
H2120 H	7/2005	Cudlitz	2001/0034720 A1	10/2001	Armes et al.
6,914,517 B2	7/2005	Kinsella	2001/0036301 A1	11/2001	Yamaguchi et al.
6,915,277 B1	7/2005	Manchester et al.	2001/0036835 A1	11/2001	Leedom, Jr.
6,920,560 B2	7/2005	Wallace	2001/0040507 A1	11/2001	Eckstein et al.
6,924,729 B1	8/2005	Aschauer et al.	2001/0045469 A1	11/2001	Hooglander
6,925,439 B1	8/2005	Pilroda	2001/0049628 A1	12/2001	Icho
6,925,565 B2	8/2005	Black	2001/0053239 A1	12/2001	Takhar
6,928,181 B2	8/2005	Brooks	2001/0055411 A1	12/2001	Black
6,931,538 B1	8/2005	Sawaguchi	2002/0002468 A1	1/2002	Spagna et al.
6,934,861 B2	8/2005	Haala	2002/0005774 A1	1/2002	Rudolph et al.
D509,243 S	9/2005	Hunter, Jr. et al.	2002/0014529 A1	2/2002	Tanaka
6,940,461 B2	9/2005	Nantz et al.	2002/0014952 A1	2/2002	Terranova
6,944,402 B1	9/2005	Baker et al.	2002/0016687 A1	2/2002	Felsenslein et al.
6,944,768 B2	9/2005	Siegel et al.	2002/0019807 A1	2/2002	Halpern
6,959,874 B2	11/2005	Bardwell	2002/0024590 A1	2/2002	Pena
6,961,448 B2	11/2005	Nichols et al.	2002/0026419 A1	2/2002	Maritzen et al.
6,970,583 B2	11/2005	Black	2002/0026575 A1	2/2002	Wheeler et al.
6,978,369 B2	12/2005	Wheeler et al.	2002/0030579 A1 *	3/2002	Albert et al.
6,978,933 B2	12/2005	Yap et al.	2002/0030581 A1	3/2002	Janiak et al.
6,986,099 B2	1/2006	Todd	2002/0036237 A1	3/2002	Atherton et al.
6,990,480 B1	1/2006	Burt	2002/0038818 A1	4/2002	Zingher et al.
6,994,262 B1	2/2006	Warther	2002/0040935 A1	4/2002	Weyant
7,003,497 B2	2/2006	Maes	2002/0040936 A1	4/2002	Wentker et al.
7,003,501 B2	2/2006	Ostroff	2002/0041093 A1	4/2002	Cox et al.
7,004,385 B1	2/2006	Douglass	2002/0042782 A1	4/2002	Albazz et al.
7,006,993 B1	2/2006	Cheong et al.	2002/0043566 A1	4/2002	Goodman et al.
7,049,962 B2	5/2006	Atherton et al.	2002/0046341 A1	4/2002	Kazaks et al.
7,051,925 B2	5/2006	Schwarz, Jr.	2002/0062249 A1	5/2002	Iannacci
7,059,159 B2	6/2006	Lanigan et al.	2002/0062284 A1	5/2002	Kawan
7,068,148 B2	6/2006	Shanks et al.	2002/0062291 A1	5/2002	Zoka
7,069,444 B2	6/2006	Lowensohn et al.	2002/0066784 A1	6/2002	Segal et al.
7,070,112 B2	7/2006	Beenau et al.	2002/0072349 A1	6/2002	Geiselman et al.
7,093,767 B2	8/2006	Faenza et al.	2002/0073025 A1	6/2002	Tanner et al.
7,096,204 B1	8/2006	Chen et al.	2002/0083320 A1	6/2002	Vatanen
7,096,494 B1	8/2006	Chen	2002/0087869 A1	7/2002	Kim
7,100,821 B2	9/2006	Rasti	2002/0095298 A1	7/2002	Ewing
7,102,523 B2	9/2006	Shanks et al.	2002/0095587 A1	7/2002	Doyle
7,103,575 B1	9/2006	Linehan	2002/0095588 A1	7/2002	Shigematsu et al.
7,108,190 B2	9/2006	Burgan et al.	2002/0097142 A1	7/2002	Janiak et al.
7,119,659 B2	10/2006	Bonalle et al.	2002/0099665 A1	7/2002	Burger et al.
7,127,672 B1	10/2006	Patterson et al.	2002/0107791 A1	8/2002	Nobrega et al.
7,131,574 B1	11/2006	Sciupac et al.	2002/0108062 A1	8/2002	Nakajima et al.
7,132,946 B2	11/2006	Waldner et al.	2002/0111919 A1	8/2002	Weller et al.
7,136,835 B1	11/2006	Flitcroft et al.	2002/0112177 A1	8/2002	Voltmer et al.
7,150,407 B1	12/2006	Berger et al.	2002/0125184 A1	9/2002	Bassinson
7,154,375 B2	12/2006	Beenau et al.	2002/0128977 A1	9/2002	Nambiar et al.
7,171,662 B1	1/2007	Misra et al.	2002/0129248 A1	9/2002	Wheeler et al.
			2002/0130186 A1	9/2002	Lasch et al.
			2002/0130187 A1	9/2002	Berg et al.
			2002/0133467 A1	9/2002	Hobson et al.
			2002/0133725 A1	9/2002	Roy et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2002/0138351	A1	9/2002	Houvener et al.	2003/0191949	A1	10/2003	Odagawa
2002/0138425	A1	9/2002	Shimizu et al.	2003/0195037	A1	10/2003	Vuong et al.
2002/0139839	A1	10/2002	Catan	2003/0197593	A1	10/2003	Siegel et al.
2002/0140542	A1	10/2002	Prokoski et al.	2003/0208439	A1	11/2003	Rast
2002/0147002	A1	10/2002	Trop et al.	2003/0223625	A1	12/2003	Hillhouse et al.
2002/0147600	A1	10/2002	Waters et al.	2003/0226041	A1	12/2003	Palmer et al.
2002/0149467	A1	10/2002	Calvesio et al.	2003/0229793	A1	12/2003	McCall et al.
2002/0152123	A1	10/2002	Giordano et al.	2003/0230514	A1	12/2003	Baker
2002/0153410	A1	10/2002	Santini	2003/0236704	A1	12/2003	Antonucci
2002/0153424	A1	10/2002	Li	2004/0006497	A1	1/2004	Nestor et al.
2002/0158747	A1	10/2002	McGregor et al.	2004/0006539	A1	1/2004	Royer et al.
2002/0163421	A1	11/2002	Wang et al.	2004/0011877	A1	1/2004	Reppermund
2002/0165931	A1	11/2002	Greer et al.	2004/0014457	A1	1/2004	Stevens
2002/0166897	A1	11/2002	Hooglander	2004/0016796	A1	1/2004	Hanna et al.
2002/0169673	A1	11/2002	Prorock et al.	2004/0017934	A1	1/2004	Kocher
2002/0175805	A9	11/2002	Armstrong et al.	2004/0019494	A1	1/2004	Ridgeway et al.
2002/0178063	A1	11/2002	Gravelle et al.	2004/0019564	A1	1/2004	Goldthwaite et al.
2002/0178124	A1	11/2002	Lewis	2004/0021552	A1	2/2004	Koo
2002/0178369	A1	11/2002	Black	2004/0024694	A1	2/2004	Lawrence et al.
2002/0179704	A1	12/2002	Deaton	2004/0026518	A1	2/2004	Kudo et al.
2002/0186133	A1	12/2002	Loof	2004/0030601	A1	2/2004	Pond et al.
2002/0186838	A1	12/2002	Brandys	2004/0031856	A1	2/2004	Atsmon et al.
2002/0188854	A1	12/2002	Heaven et al.	2004/0039814	A1	2/2004	Crabtree et al.
2002/0188855	A1	12/2002	Nakayama et al.	2004/0041021	A1	3/2004	Nugent et al.
2002/0190124	A1	12/2002	Piotrowski	2004/0041690	A1	3/2004	Yamagishi
2002/0191816	A1	12/2002	Maritzen et al.	2004/0044627	A1	3/2004	Russell et al.
2002/0192856	A1	12/2002	Halope et al.	2004/0046034	A1	3/2004	Ey Yamani et al.
2002/0193102	A1	12/2002	Hyypa et al.	2004/0049687	A1	3/2004	Orsini
2002/0194137	A1	12/2002	Park et al.	2004/0050930	A1	3/2004	Rose
2003/0001006	A1	1/2003	Lee	2004/0052406	A1	3/2004	Brooks
2003/0001755	A1	1/2003	Tiernay et al.	2004/0059923	A1	3/2004	ShamRao
2003/0004866	A1	1/2003	Huennekens et al.	2004/0061593	A1	4/2004	Lane
2003/0004881	A1	1/2003	Shinzaki et al.	2004/0062423	A1	4/2004	Doi
2003/0005310	A1	1/2003	Shinzaki	2004/0073792	A1	4/2004	Noble et al.
2003/0006901	A1	1/2003	Kim et al.	2004/0083184	A1	4/2004	Tsuei et al.
2003/0009382	A1	1/2003	D'Arbeloff et al.	2004/0083380	A1	4/2004	Janke
2003/0018567	A1	1/2003	Flitcroft et al.	2004/0084524	A1	5/2004	Ramachandran
2003/0018893	A1	1/2003	Hess	2004/0084542	A1	5/2004	DeYoe et al.
2003/0028481	A1	2/2003	Flitcroft et al.	2004/0089724	A1	5/2004	Lasch et al.
2003/0033697	A1	2/2003	Hicks et al.	2004/0098336	A1	5/2004	Flink
2003/0037264	A1	2/2003	Ezaki et al.	2004/0104266	A1	6/2004	Bolle et al.
2003/0037851	A1	2/2003	Hogganvik	2004/0104268	A1	6/2004	Bailey et al.
2003/0046237	A1	3/2003	Uberti	2004/0118930	A1	6/2004	Berardi et al.
2003/0046540	A1	3/2003	Nakamura et al.	2004/0124104	A1	7/2004	DeVolpi
2003/0047482	A1	3/2003	Jones et al.	2004/0124246	A1	7/2004	Allen et al.
2003/0054836	A1	3/2003	Michot	2004/0127256	A1	7/2004	Goldthwaite et al.
2003/0055727	A1	3/2003	Walker et al.	2004/0129787	A1	7/2004	Saito et al.
2003/0061172	A1	3/2003	Robinson	2004/0131237	A1	7/2004	Machida
2003/0074317	A1	4/2003	Hofi	2004/0133787	A1	7/2004	Doughty et al.
2003/0086591	A1	5/2003	Simon	2004/0136573	A1	7/2004	Sato
2003/0093187	A1	5/2003	Walker	2004/0144841	A1	7/2004	Tsukamoto et al.
2003/0097344	A1	5/2003	Chaum et al.	2004/0144846	A1	7/2004	Lasch et al.
2003/0106935	A1	6/2003	Burchette, Jr.	2004/0149287	A1	8/2004	Zulli
2003/0112120	A1	6/2003	Mark	2004/0155101	A1	8/2004	Royer et al.
2003/0115126	A1	6/2003	Pitroda	2004/0158723	A1	8/2004	Root
2003/0120626	A1	6/2003	Piotrowski	2004/0160310	A1	8/2004	Chen et al.
2003/0122120	A1	7/2003	Brazis et al.	2004/0161135	A1	8/2004	Sano et al.
2003/0123714	A1	7/2003	O'Gorman et al.	2004/0165753	A1	8/2004	Takhiri et al.
2003/0124294	A1	7/2003	Hodson et al.	2004/0169071	A1	9/2004	Burgan et al.
2003/0125054	A1	7/2003	Garcia	2004/0172541	A1	9/2004	Ando et al.
2003/0130820	A1	7/2003	Lane, III	2004/0176071	A1	9/2004	Gehrmann et al.
2003/0132132	A1	7/2003	Small	2004/0177045	A1	9/2004	Brown
2003/0132297	A1	7/2003	McCall et al.	2004/0178063	A1	9/2004	Mirchi et al.
2003/0149661	A1	8/2003	Mitchell et al.	2004/0180657	A1	9/2004	Yaqub et al.
2003/0149662	A1	8/2003	Shore	2004/0188519	A1	9/2004	Cassone
2003/0150911	A1	8/2003	Joseph	2004/0190757	A1	9/2004	Murphy et al.
2003/0152252	A1	8/2003	Kondo et al.	2004/0193676	A1	9/2004	Marks
2003/0153356	A1	8/2003	Liu et al.	2004/0195314	A1	10/2004	Lee
2003/0155416	A1	8/2003	Macklin et al.	2004/0199469	A1	10/2004	Barillova et al.
2003/0159044	A1	8/2003	Doyle et al.	2004/0202354	A1	10/2004	Togino
2003/0160074	A1	8/2003	Pineda	2004/0208343	A1	10/2004	Golden et al.
2003/0173408	A1	9/2003	Mosher, Jr. et al.	2004/0215575	A1	10/2004	Garrity
2003/0177102	A1	9/2003	Robinson	2004/0222803	A1	11/2004	Tartagni
2003/0178495	A1	9/2003	Jones et al.	2004/0230488	A1	11/2004	Beenau et al.
2003/0183695	A1	10/2003	Labree et al.	2004/0232220	A1	11/2004	Beenau et al.
				2004/0232224	A1	11/2004	Beenau et al.
				2004/0233039	A1	11/2004	Beenau et al.
				2004/0235450	A1	11/2004	Rosenberg
				2004/0236680	A1	11/2004	Luoffo et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2004/0236699	A1	11/2004	Beenau et al.	2005/0232471	A1	10/2005	Baer
2004/0236700	A1	11/2004	Beenau et al.	2005/0240778	A1	10/2005	Saito
2004/0236701	A1	11/2004	Beenau et al.	2005/0246292	A1	11/2005	Sarcanin
2004/0236819	A1	11/2004	Anali et al.	2005/0251688	A1	11/2005	Nanavati et al.
2004/0239480	A1	12/2004	Beenau et al.	2005/0261972	A1	11/2005	Black
2004/0240711	A1	12/2004	Hamza et al.	2005/0275505	A1	12/2005	Himmelstein
2004/0255168	A1	12/2004	Murashita et al.	2005/0278222	A1	12/2005	Northrup
2004/0257196	A1	12/2004	Kotzin	2006/0000892	A1	1/2006	Bonalle et al.
2004/0258282	A1	12/2004	Bjorn et al.	2006/0000893	A1	1/2006	Bonalle et al.
2005/0001711	A1	1/2005	Doughty et al.	2006/0000894	A1	1/2006	Bonalle et al.
2005/0004921	A1	1/2005	Beenau et al.	2006/0000895	A1	1/2006	Bonalle et al.
2005/0005172	A1	1/2005	Haala	2006/0000896	A1	1/2006	Bonalle et al.
2005/0011776	A1	1/2005	Nagel	2006/0000897	A1	1/2006	Bonalle et al.
2005/0017068	A1	1/2005	Zalewski et al.	2006/0000898	A1	1/2006	Bonalle et al.
2005/0018658	A1	1/2005	Ikeda et al.	2006/0000899	A1	1/2006	Bonalle et al.
2005/0020304	A1	1/2005	Shinzaki	2006/0005022	A1	1/2006	Wakamori et al.
2005/0021457	A1	1/2005	Johnson et al.	2006/0005042	A1	1/2006	Black
2005/0023157	A1	2/2005	Logan	2006/0016868	A1	1/2006	Bonalle et al.
2005/0033686	A1	2/2005	Pearl et al.	2006/0016869	A1	1/2006	Bonalle et al.
2005/0033687	A1	2/2005	Beenau et al.	2006/0016871	A1	1/2006	Bonalle et al.
2005/0033688	A1	2/2005	Pearl et al.	2006/0016874	A1	1/2006	Bonalle et al.
2005/0033689	A1	2/2005	Bonalle et al.	2006/0016875	A1	1/2006	Bonalle et al.
2005/0033992	A1	2/2005	Inabe	2006/0016877	A1	1/2006	Bonalle et al.
2005/0035192	A1	2/2005	Bonalle et al.	2006/0033609	A1	2/2006	Bridgelall
2005/0035847	A1	2/2005	Bonalle et al.	2006/0034492	A1	2/2006	Siegel et al.
2005/0036665	A1	2/2005	Higuchi	2006/0066444	A1	3/2006	Steeves
2005/0038718	A1	2/2005	Barnes et al.	2006/0069635	A1	3/2006	Ram et al.
2005/0040221	A1	2/2005	Schwarz, Jr.	2006/0071756	A1	4/2006	Steeves
2005/0045718	A1	3/2005	Bortolin et al.	2006/0080552	A1	4/2006	Lauper
2005/0050367	A1	3/2005	Burger et al.	2006/0095369	A1	5/2006	Hofi
2005/0054438	A1	3/2005	Rothschild et al.	2006/0104485	A1	5/2006	Miller et al.
2005/0058262	A1	3/2005	Timmins et al.	2006/0123240	A1	6/2006	Chaiken
2005/0060233	A1	3/2005	Bonalle et al.	2006/0136336	A1	6/2006	Drummond et al.
2005/0065842	A1	3/2005	Summers	2006/0156395	A1	7/2006	Fontaine
2005/0065872	A1	3/2005	Moebs et al.	2006/0158434	A1	7/2006	Zank et al.
2005/0071231	A1	3/2005	Beenau et al.	2006/0173291	A1	8/2006	Glossop
2005/0087597	A1	4/2005	Gotfried et al.	2006/0173791	A1	8/2006	Mann et al.
2005/0091325	A1	4/2005	Kuwana et al.	2006/0177061	A1	8/2006	Orsini et al.
2005/0097038	A1	5/2005	Yu et al.	2006/0178937	A1	8/2006	Rau et al.
2005/0098621	A1	5/2005	deSylva	2006/0190419	A1	8/2006	Bunn et al.
2005/0100199	A1	5/2005	Boshra	2006/0202835	A1	9/2006	Thibault
2005/0102524	A1	5/2005	Haala	2006/0208066	A1	9/2006	Finn et al.
2005/0103839	A1	5/2005	Hewel	2006/0213986	A1	9/2006	Register et al.
2005/0109836	A1	5/2005	Ben-Aissa	2006/0229988	A1	10/2006	Oshima et al.
2005/0113137	A1	5/2005	Rodriguez et al.	2006/0237528	A1	10/2006	Bishop et al.
2005/0116024	A1	6/2005	Beenau et al.	2006/0242423	A1	10/2006	Kussmaul
2005/0119978	A1	6/2005	Ales	2006/0278723	A1	12/2006	Dan et al.
2005/0122209	A1	6/2005	Black	2007/0008131	A1	1/2007	Doan et al.
2005/0123137	A1	6/2005	McCallum	2007/0046468	A1	3/2007	Davis
2005/0125312	A1	6/2005	Dearing et al.	2007/0057797	A1	3/2007	Waldner et al.
2005/0125343	A1	6/2005	Mendelovich	2007/0075841	A1	4/2007	Maltsev et al.
2005/0127164	A1	6/2005	Wankmueller	2007/0112957	A1	5/2007	Shastri et al.
2005/0137977	A1	6/2005	Wankmueller	2007/0119924	A1	5/2007	Register et al.
2005/0139669	A1	6/2005	Arnouse	2007/0241861	A1	10/2007	Venkatanna et al.
2005/0144133	A1	6/2005	Hoffman et al.	2007/0252001	A1	11/2007	Kail et al.
2005/0149358	A1	7/2005	Sacco et al.	2007/0252010	A1	11/2007	Gonzalez et al.
2005/0149926	A1	7/2005	Saltz	2007/0284432	A1	12/2007	Abouyounes
2005/0160271	A9	7/2005	Brundage et al.	2007/0296544	A1	12/2007	Beenau et al.
2005/0160790	A1	7/2005	Tanaka et al.	2007/0296551	A1	12/2007	Beenau et al.
2005/0165684	A1	7/2005	Jensen et al.	2007/0299782	A1	12/2007	Beenau et al.
2005/0166062	A1	7/2005	Sanchez-Cifuentes	2007/0299783	A1	12/2007	Beenau et al.
2005/0169504	A1	8/2005	Black	2008/0006691	A1	1/2008	Bonalle et al.
2005/0171787	A1	8/2005	Zagami	2008/0008359	A1	1/2008	Beenau et al.
2005/0171905	A1	8/2005	Wankmueller	2008/0008363	A1	1/2008	Bonalle et al.
2005/0180618	A1	8/2005	Black	2008/0010214	A1	1/2008	Bonalle et al.
2005/0187883	A1	8/2005	Bishop et al.	2008/0011830	A1	1/2008	Bonalle et al.
2005/0187916	A1	8/2005	Levin et al.	2008/0011831	A1	1/2008	Bonalle et al.
2005/0197923	A1	9/2005	Kilner et al.	2008/0013796	A1	1/2008	Bonalle et al.
2005/0203857	A1	9/2005	Friedman	2008/0013807	A1	1/2008	Bonalle et al.
2005/0207002	A1	9/2005	Liu et al.	2008/0015941	A1	1/2008	Beenau et al.
2005/0211784	A1	9/2005	Justin	2008/0015992	A1	1/2008	Bonalle et al.
2005/0212657	A1	9/2005	Simon	2008/0015993	A1	1/2008	Bonalle et al.
2005/0216424	A1	9/2005	Gandre et al.	2008/0015994	A1	1/2008	Bonalle et al.
2005/0221853	A1	10/2005	Silvester				
2005/0223230	A1	10/2005	Zick				

(56)

References Cited

U.S. PATENT DOCUMENTS

2008/0016002 A1 1/2008 Beenau et al.
 2008/0033722 A1 2/2008 Beenau et al.
 2008/0067242 A1 3/2008 Bonalle et al.
 2008/0072065 A1 3/2008 Bonalle et al.

FOREIGN PATENT DOCUMENTS

CH 689680 8/1999
 DE 2847756 5/1980
 DE 3636921 5/1981
 DE 3941070 6/1991
 DE 4339460 11/1993
 DE 4339460 C1 4/1995
 DE 29702538 4/1997
 DE 19741726 9/1997
 DE 10203926 1/2002
 EP 0181770 5/1986
 EP 0343829 11/1989
 EP 0354817 2/1990
 EP 0368570 5/1990
 EP 0388090 9/1990
 EP 0403134 12/1990
 EP 0411602 2/1991
 EP 0473998 3/1992
 EP 0481388 4/1992
 EP 0531605 3/1993
 EP 0552047 7/1993
 EP 0560318 9/1993
 EP 0568185 11/1993
 EP 917120 C1 5/1995
 EP 0657297 6/1995
 EP 0721850 7/1996
 EP 0735505 10/1996
 EP 0780839 6/1997
 EP 927945 C1 7/1997
 EP 0789316 8/1997
 EP 0854461 7/1998
 EP 0866420 9/1998
 EP 0894620 2/1999
 EP 0916519 5/1999
 EP 0917120 5/1999
 EP 0927945 7/1999
 EP 0949595 10/1999
 EP 949595 C1 10/1999
 EP 1017030 7/2000
 EP 1017030 A2 7/2000
 EP 1115095 7/2001
 EP 1345146 9/2003
 EP 1345146 A2 9/2003
 EP 1610273 12/2005
 GB 1371254 10/1974
 GB 2088110 6/1982
 GB 2108906 5/1985
 GB 2240948 8/1991
 GB 2281714 3/1995
 GB 2350021 11/2000
 GB 2350021 A 11/2000
 GB 2361790 10/2001
 JP 42005596 Y1 3/1967
 JP 61-100436 5/1986
 JP 62-043774 3/1987
 JP 62-264999 11/1987
 JP 63-071794 4/1988
 JP 63-098689 4/1988
 JP 63-072721 5/1988
 JP 63-175987 7/1988
 JP 64-004934 1/1989
 JP 64-087395 3/1989
 JP 64-087396 3/1989
 JP 64-087397 3/1989
 JP 02-130737 5/1990
 JP 02-252149 10/1990
 JP 03-290780 12/1991
 JP 42-005596 7/1992

JP 04-303692 10/1992
 JP 05-069689 3/1993
 JP 05-254283 10/1993
 JP 06-183187 7/1994
 JP 06-191137 7/1994
 JP 06-234287 8/1994
 JP 07-173358 7/1995
 JP 07-205569 8/1995
 JP 08-244385 9/1996
 JP 08-324163 12/1996
 JP 09-050505 2/1997
 JP 09-052240 2/1997
 JP 9050505 A 2/1997
 JP 09-274640 10/1997
 JP 10-129161 5/1998
 JP 10-289296 10/1998
 JP 10289296 A 10/1998
 JP 10302160 11/1998
 JP 10-334206 12/1998
 JP 10-340231 12/1998
 JP 10334206 A 12/1998
 JP 10340231 A 12/1998
 JP 11-175640 7/1999
 JP 11175640 A 7/1999
 JP 11-227367 8/1999
 JP 11-353425 12/1999
 JP 11353425 A 12/1999
 JP 2000-048153 2/2000
 JP 2000048153 A 2/2000
 JP 2000-163538 6/2000
 JP 2000-177229 6/2000
 JP 2000163538 A 6/2000
 JP 2000-194799 7/2000
 JP 2000194799 A 7/2000
 JP 2000-222176 8/2000
 JP 2000222176 A 8/2000
 JP 2000-252854 9/2000
 JP 2000252854 A 9/2000
 JP 2001-504406 4/2001
 JP 2001-134536 5/2001
 JP 2001134536 A 5/2001
 JP 2001-160105 6/2001
 JP 2001160105 A 6/2001
 JP 2001-315475 11/2001
 JP 2002-032687 1/2002
 JP 2002-109584 4/2002
 JP 2002109584 A 4/2002
 JP 2002-133335 5/2002
 JP 2002-133336 5/2002
 JP 2002-157530 5/2002
 JP 2002133335 A 5/2002
 JP 2002157530 A 5/2002
 JP 2002-163585 6/2002
 JP 2002-183443 6/2002
 JP 2002-274087 9/2002
 JP 2003-288646 10/2003
 JP 2003288646 A 10/2003
 JP 2004-164347 6/2004
 JP 2004-348478 12/2004
 WO 81/00776 3/1981
 WO 89/03760 5/1989
 WO 90/08661 8/1990
 WO 91/08910 6/1991
 WO 92/16913 10/1992
 WO 9535546 C1 12/1995
 WO 95/35546 12/1995
 WO 96/06409 2/1996
 WO 96/18972 6/1996
 WO 97/09688 3/1997
 WO 9740459 C1 10/1997
 WO 97/40459 10/1997
 WO 9821683 C1 5/1998
 WO 98/21683 5/1998
 WO 98/22291 5/1998
 WO 9845778 C1 10/1998
 WO 98/45778 10/1998
 WO 99/12136 3/1999
 WO 99/14055 3/1999
 WO 9921321 C1 4/1999

(56)

References Cited

FOREIGN PATENT DOCUMENTS

WO	WO 99/21321	4/1999
WO	WO 99/27492	6/1999
WO	9940548 C1	8/1999
WO	WO 99/40548	8/1999
WO	WO 99/47983	9/1999
WO	WO 99/49424	9/1999
WO	WO 00/49586	8/2000
WO	WO 00/73989	12/2000
WO	WO 01/13320	2/2001
WO	WO 01/18745	3/2001
WO	WO 01/25872	4/2001
WO	WO 01/55955	8/2001
WO	WO 01/78024	10/2001
WO	WO 01/86535	11/2001
WO	WO 01/86599	11/2001
WO	03007623 C1	1/2003
WO	WO 03/007623	1/2003
WO	WO 2004/052657	6/2004

OTHER PUBLICATIONS

White, "How Computers Work," Millennium Edition, 1999, Que Corporation, Indianapolis, IN, all pages.

Gralia, "How the Internet Works," Millennium Edition, 1999, Que Corporation, Indianapolis, IN, all pages.

Muller, "Desktop Encyclopedia of the Internet," 1999, Artech House Inc., Norwood, MA, all pages.

"The Bank Credit Card Business," American Bankers Association, 1996, all pages.

Menezes, et al., "Handbook of Applied Cryptography," 1997, CRC Press, Chapter 10.

U.S. Appl. No. 60/395,606, filed Jul. 15, 2002.

"Credit Card Offer Travelers New Benefit," PR Newswire, Aug. 5, 1987.

"Inside's Next Gen Smart Card: The French company plans to introduce an RFID card that uses a 16-bit microprocessor and new encryption technology," RFID Journal, Oct. 29, 2002.

"New Evidence about Positive Three-Tier Co-Pay Performance Presented at Express Scripts 2000 Outcomes Conference," PR Newswire Association, Inc., Jun. 28, 2000.

"Prestige Credit Cards: Those Pricey Plastics," Changing Times, Apr. 1986.

"Shell Introduces Optional Credit Card," The Associated Press, Sep. 3, 1985.

"Shell Introducing Expanded 'Signature' Credit Card," Tulsa Business Chronicle, Sep. 5, 1985.

"Shell-Oil: Introduces Shell Signature Travel and Entertainment Credit Card," Business Wire, Sep. 3, 1985.

"The Chase Manhattan Bank Today Announced a Comprehensive Program to Enhance the Value of All of its Credit Cards," PR Newswire, Dec. 18, 1986.

Carey, Gordon, "Multi-tier Copay," Pharmaceutical Executive, Feb. 2000.

Crumbaugh, Darlene M., "Effective Marketing Positions: Check card as consumer lifeline," Hoosier Banker, Apr. 1998, p. 10, vol. 82, issue 4.

Gabber, et al., "Agora: A Minimal Distributed Protocol for Electronic Commerce," USENIX Oakland, CA, Nov. 18, 1996.

Goldwasser, Joan, "Best of the Cash-Back Cards," Kiplinger's Personal Finance Magazine, Apr. 1999.

Kuntz, Mary, "Credit Cards as Good as Gold," Forbes, Nov. 4, 1985.

Lahey, Liam, "Microsoft Bolsters Rebate Structure," Computer Dealer News, Feb. 8, 2002.

Lamond, "Credit Card Transactions Real World and Online," Copyright 1996.

Nyman, Judy, "Free Income Tax Clinics are Opening as Apr. 30 Deadline Draws Nearer," The Toronto Star, Final Edition, Mar. 25, 1986.

Obel, Michael, "Oil Companies Push Marketing, Cost Cutting to Fortify Earnings," Oil & Gas Journal, Sep. 16, 1985.

Schmuckler, Eric, "Playing Your Cards Right," Forbes, Dec. 28, 1987.

"Core One Credit Union—Discover The Advantage," <http://coreone.org/2visa.html>, Copyright 2001 (last visited Oct. 9, 2002).

Non-Final Office Action issued Apr. 20, 2005 in U.S. Appl. No. 10/192,488.

Final Office Action issued Sep. 8, 2005 in U.S. Appl. No. 10/192,488.

Advisory Action issued Nov. 10, 2005 in U.S. Appl. No. 10/192,488.

Non-Final Office Action issued Jan. 18, 2006 in U.S. Appl. No. 10/192,488.

Final Office Action issued Sep. 25, 2006 in U.S. Appl. No. 10/192,488.

Notice of Allowance issued Feb. 2, 2007 in U.S. Appl. No. 10/192,488.

Examiner's Report dated Oct. 5, 2006 for AU2002318293.

Office Action dated Jun. 28, 2007 in CA 2,452,351.

Office Action dated Apr. 25, 2008 in CA 2,452,351.

Supplemental Search Report dated Nov. 16, 2004 for EP02748120.9.

Examination Report dated Mar. 8, 2005 for EP02748120.9.

Examination Report dated Feb. 8, 2006 for EP02748120.9.

Examination Report dated Oct. 24, 2007 for EP02748120.9.

Office Action dated Mar. 9, 2006 in JP2003-513257.

Office Action dated Oct. 20, 2006 in JP2003-513257.

Office Action dated Aug. 1, 2007 in JP2003-513257.

Office Action dated Jan. 29, 2008 in JP2003-513257.

Office Action dated Jul. 11, 2007 for MX PA/a/2004/000253.

Office Action dated Jan. 27, 2005 in NZ530497.

ISR dated Dec. 30, 2002 for PCT/US02/0219903.

Office Action dated Dec. 30, 2005 for CN02813783.3.

Office Action dated May 16, 2007 for CN02813783.3.

Non-Final Office Action mailed Feb. 8, 2008 in U.S. Appl. No. 10/340,352.

Final Office Action mailed Jun. 13, 2008 in U.S. Appl. No. 10/340,352.

Advisory Action mailed Aug. 19, 2008 in U.S. Appl. No. 10/340,352.

Office Action dated Jan. 29, 2007 for CA2458143.

Office Action dated Dec. 19, 2007 for CA2458143.

Supplemental Search Report dated May 26, 2006 for EP03763325.2.

Examination Report dated Oct. 26, 2006 for EP03763325.2.

Office Action dated Aug. 3, 2006 in JP2004-562629.

Office Action dated Mar. 8, 2007 in JP2004-562629.

Final Office Action dated Oct. 4, 2007 in JP2004-562629.

ISR dated Apr. 22, 2004 for PCT/US03/21279.

Office Action dated Oct. 4, 2007 for JP2007-026166.

Non-Final Office Action issued Mar. 26, 2008 in U.S. Appl. No. 10/905,005.

Non-Final Office Action issued Nov. 1, 2006 in U.S. Appl. No. 10/905,006.

Notice of Allowance issued Jul. 12, 2007 in U.S. Appl. No. 10/905,006.

Non-Final Office Action issued Jun. 20, 2006 in U.S. Appl. No. 10/318,480.

Notice of Allowance issued Jan. 24, 2007 in U.S. Appl. No. 10/318,480.

Supplemental Notice of Allowance issued Mar. 13, 2007 in U.S. Appl. No. 10/318,480.

ISR dated Apr. 22, 2004 for PCT/US03/21447.

Non-Final Office Action issued Nov. 22, 2005 in U.S. Appl. No. 10/876,822.

Final Office Action issued Aug. 3, 2006 in U.S. Appl. No. 10/876,822.

Non-Final Office Action issued Feb. 6, 2007 in U.S. Appl. No. 10/876,822.

Final Office Action issued Jul. 18, 2007 in U.S. Appl. No. 10/876,822.

Non-Final Office Action issued Jan. 28, 2008 in U.S. Appl. No. 10/876,822.

Final Office Action issued Aug. 22, 2008 in U.S. Appl. No. 10/876,822.

Non-Final Office Action issued Mar. 23, 2006 in U.S. Appl. No. 10/318,432.

Restriction Requirement issued Jan. 17, 2007 in U.S. Appl. No. 10/318,432.

(56)

References Cited

OTHER PUBLICATIONS

- Non-Final Office Action issued May 1, 2007 in U.S. Appl. No. 10/318,432.
 Non-Final Office Action issued Dec. 13, 2007 in U.S. Appl. No. 10/318,432.
 Non-Final Office Action issued Jun. 27, 2008 in U.S. Appl. No. 10/318,432.
 ISR dated Apr. 22, 2004 for PCT/US03/21280.
 Non-Final Office Action issued Mar. 10, 2008 in U.S. Appl. No. 11/160,627.
 Final Office Action issued Jun. 24, 2008 in U.S. Appl. No. 11/160,627.
 Advisory Action issued Aug. 6, 2008 in U.S. Appl. No. 11/160,627.
 Non-Final Office Action issued Jul. 8, 2005 in U.S. Appl. No. 10/708,839.
 Final Office Action issued Nov. 21, 2005 in U.S. Appl. No. 10/708,839.
 Advisory Action issued Feb. 9, 2006 in U.S. Appl. No. 10/708,839.
 Non-Final Office Action issued May 2, 2006 in U.S. Appl. No. 10/708,839.
 Final Office Action issued Jan. 25, 2007 in U.S. Appl. No. 10/708,839.
 Notice of Abandonment issued Oct. 11, 2007 in U.S. Appl. No. 10/708,839.
 Non-Final Office Action issued Sep. 17, 2006 in U.S. Appl. No. 10/708,585.
 Notice of Allowance issued May 11, 2007 in U.S. Appl. No. 10/708,585.
 Non-Final Office Action issued Nov. 28, 2005 in U.S. Appl. No. 10/708,823.
 Final Office Action issued May 17, 2006 in U.S. Appl. No. 10/708,823.
 Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,823.
 Non-Final Office Action issued May 13, 2008 in U.S. Appl. No. 10/708,545.
 ISR/WO dated Aug. 19, 2008 for PCT/US05/07905.
 Non-Final Office Action issued Sep. 17, 2006 in U.S. Appl. No. 10/708,550.
 Notice of Allowance issued May 11, 2007 in U.S. Appl. No. 10/708,550.
 ISR/WO dated Feb. 16, 2007 for PCT/US05/36848.
 IPRP (Ch 1) dated Apr. 26, 2007 for PCT/US05/36848.
 Non-Final Office Action issued Apr. 4, 2007 in U.S. Appl. No. 10/711,965.
 Non-Final Office Action issued Oct. 16, 2007 in U.S. Appl. No. 10/711,965.
 Final Office Action issued Mar. 28, 2008 in U.S. Appl. No. 10/711,965.
 Advisory Action issued Jul. 31, 2008 in U.S. Appl. No. 10/711,965.
 Final Office Action issued Aug. 18, 2008 in U.S. Appl. No. 10/711,965.
 Non-Final Office Action issued May 4, 2006 in U.S. Appl. No. 10/711,970.
 Notice of Allowance issued Feb. 2, 2007 in U.S. Appl. No. 10/711,970.
 ISR/WO dated Aug. 17, 2006 for PCT/US05/36828.
 IPRP (Ch 1) dated Apr. 26, 2007 for PCT/US05/36828.
 Non-Final Office Action issued Feb. 25, 2008 in U.S. Appl. No. 10/711,964.
 Final Office Action issued Jun. 30, 2008 in U.S. Appl. No. 10/711,964.
 Advisory Action issued Sep. 10, 2008 in U.S. Appl. No. 10/711,964.
 Non-Final Office Action issued Oct. 3, 2006 in U.S. Appl. No. 10/711,966.
 Final Office Action issued May 21, 2007 in U.S. Appl. No. 10/711,966.
 Non-Final Office Action issued Dec. 11, 2007 in U.S. Appl. No. 10/711,966.
 Non-Final Office Action issued Nov. 28, 2005 in U.S. Appl. No. 10/708,824.
 Final Office Action issued Mar. 24, 2005 in U.S. Appl. No. 10/611,563.
 Advisory Action issued May 18, 2005 in U.S. Appl. No. 10/611,563.
 Non-Final Office Action issued Jul. 27, 2005 in U.S. Appl. No. 10/611,563.
 Non-Final Office Action issued Nov. 16, 2005 in U.S. Appl. No. 10/611,563.
 Final Office Action issued May 31, 2006 in U.S. Appl. No. 10/611,563.
 Advisory Action issued Oct. 6, 2006 in U.S. Appl. No. 10/611,563.
 Non-Final Office Action issued Jan. 8, 2007 in U.S. Appl. No. 10/611,563.
 Non-Final Office Action issued Jun. 18, 2007 in U.S. Appl. No. 10/611,563.
 Notice of Allowance issued Sep. 24, 2007 in U.S. Appl. No. 10/611,563.
 ISR dated Mar. 26, 2004 for PCT/US03/34602.
 WO dated Oct. 13, 2004 for PCT/US03/34602.
 IPRP dated Jan. 20, 2005 for PCT/US03/34602.
 Office Action dated Feb. 16, 2005 for TW092131042.
 Office Action dated May 18, 2006 for AR 041912 A1.
 Office Action dated Mar. 8, 2007 for AR 041912 A1.
 Non-Final Office Action issued Apr. 1, 2008 in U.S. Appl. No. 10/810,473.
 Non-Final Office Action issued Oct. 17, 2007 in U.S. Appl. No. 10/710,611.
 Final Office Action issued May 28, 2008 in U.S. Appl. No. 10/710,611.
 Advisory Action issued Sep. 5, 2008 in U.S. Appl. No. 10/710,611.
 Non-Final Office Action issued Mar. 4, 2008 in U.S. Appl. No. 10/711,720.
 Final Office Action issued Jul. 23, 2008 in U.S. Appl. No. 10/711,720.
 Non-Final Office Action issued Jul. 17, 2005 in U.S. Appl. No. 10/708,548.
 Notice of Allowance issued Jan. 31, 2006 in U.S. Appl. No. 10/708,548.
 Non-Final Office Action issued Feb. 25, 2008 in U.S. Appl. No. 10/708,569.
 Non-Final Office Action issued Sep. 24, 2007 in U.S. Appl. No. 10/708,547.
 Final Office Action issued Feb. 14, 2008 in U.S. Appl. No. 10/708,547.
 Advisory Action issued Jul. 29, 2008 in U.S. Appl. No. 10/708,547.
 Non-Final Office Action issued Mar. 22, 2006 in U.S. Appl. No. 10/708,597.
 Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/708,597.
 Restriction Requirement issued Mar. 22, 2007 in U.S. Appl. No. 10/708,597.
 Non-Final Office Action issued Aug. 8, 2007 in U.S. Appl. No. 10/708,597.
 Final Office Action issued Mar. 17, 2008 in U.S. Appl. No. 10/708,597.
 Advisory Action issued Jul. 11, 2008 in U.S. Appl. No. 10/708,597.
 Non-Final Office Action issued Nov. 1, 2007 in U.S. Appl. No. 10/746,781.
 Final Office Action issued Jul. 10, 2008 in U.S. Appl. No. 10/746,781.
 Ex-Parte Quayle Action issued Dec. 14, 2005 in U.S. Appl. No. 10/708,549.
 Notice of Allowance issued May 8, 2006 in U.S. Appl. No. 10/708,549.
 Non-Final Office Action issued May 17, 2007 in U.S. Appl. No. 10/810,469.
 Final Office Action issued Jan. 11, 2008 in U.S. Appl. No. 10/810,469.
 Advisory Action issued Apr. 30, 2008 in U.S. Appl. No. 10/810,469.
 Notice of Allowance issued Aug. 5, 2008 in U.S. Appl. No. 10/810,469.

(56)

References Cited

OTHER PUBLICATIONS

Final Office Action issued Jul. 28, 2005 in U.S. Appl. No. 10/710,307.
 Final Office Action issued Nov. 21, 2005 in U.S. Appl. No. 10/710,307.
 Advisory Action issued Feb. 10, 2006 in U.S. Appl. No. 10/710,307.
 Non-Final Office Action issued May 2, 2006 in U.S. Appl. No. 10/710,307.
 Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/710,307.
 Advisory Action issued Jan. 5, 2007 in U.S. Appl. No. 10/710,307.
 Non-Final Office Action issued Apr. 10, 2007 in U.S. Appl. No. 10/710,307.
 Notice of Allowance issued Oct. 4, 2007 in U.S. Appl. No. 10/710,307.
 Supplemental Notice of Allowance issued Nov. 8, 2007 in U.S. Appl. No. 710,307.
 Final Office Action issued May 17, 2006 in U.S. Appl. No. 10/708,824.
 Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,824.
 Non-Final Office Action issued Dec. 13, 2005 in U.S. Appl. No. 10/708,825.
 Final Office Action issued May 11, 2006 in U.S. Appl. No. 10/708,825.
 Notice of Abandonment issued Jan. 25, 2007 in U.S. Appl. No. 10/708,825.
 Non-Final Office Action issued Nov. 29, 2005 in U.S. Appl. No. 10/708,826.
 Final Office Action issued May 17, 2006 in U.S. Appl. No. 10/708,826.
 Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,826.
 Non-Final Office Action issued Jan. 10, 2006 in U.S. Appl. No. 10/708,827.
 Final Office Action issued May 9, 2006 in U.S. Appl. No. 10/708,827.
 Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,827.
 Non-Final Office Action issued Jan. 27, 2006 in U.S. Appl. No. 10/708,828.
 Final Office Action issued Jul. 21, 2006 in U.S. Appl. No. 10/708,828.
 Notice of Abandonment issued Mar. 22, 2007 in U.S. Appl. No. 10/708,828.
 Non-Final Office Action issued Dec. 15, 2005 in U.S. Appl. No. 10/708,829.
 Final Office Action issued May 25, 2006 in U.S. Appl. No. 10/708,829.
 Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,829.
 Non-Final Office Action issued Nov. 27, 2006 in U.S. Appl. No. 10/708,832.
 Notice of Abandonment issued Aug. 16, 2007 in U.S. Appl. No. 10/708,832.
 Non-Final Office Action issued Jan. 20, 2006 in U.S. Appl. No. 10/708,834.
 Final Office Action issued May 25, 2006 in U.S. Appl. No. 10/708,834.
 Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,834.
 Non-Final Office Action issued Dec. 16, 2005 in U.S. Appl. No. 10/708,835.
 Final Office Action issued May 17, 2006 in U.S. Appl. No. 10/708,835.
 Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,835.
 Non-Final Office Action issued Dec. 16, 2005 in U.S. Appl. No. 10/708,836.
 Final Office Action issued May 25, 2006 in U.S. Appl. No. 10/708,836.

Notice of Abandonment issued Jan. 5, 2007 in U.S. Appl. No. 10/708,836.
 Non-Final Office Action issued Aug. 8, 2005 in U.S. Appl. No. 10/708,838.
 Final Office Action issued Nov. 29, 2005 in U.S. Appl. No. 10/708,838.
 Advisory Action issued Feb. 9, 2006 in U.S. Appl. No. 10/708,838.
 Non-Final Office Action issued Apr. 18, 2006 in U.S. Appl. No. 10/708,838.
 Notice of Abandonment issued Nov. 1, 2006 in U.S. Appl. No. 10/708,838.
 ISR/WO issued Jan. 29, 2008 in PCT/US06/22542.
 Non-Final Office Action issued Nov. 1, 2007 in U.S. Appl. No. 10/711,613.
 Restriction Requirement issued Aug. 17, 2008 in U.S. Appl. No. 10/711,613.
 Non-Final Office Action issued Dec. 9, 2003 in U.S. Appl. No. 10/242,584.
 Notice of Allowance issued Jul. 9, 2004 in U.S. Appl. No. 10/242,584.
 Office Action dated May 23, 2008 for JP2004-543166.
 ISR dated Mar. 17, 2003 for PCT/US02/32653.
 WO dated Aug. 27, 2004 for PCT/US02/32653.
 IPER dated Jan. 10, 2005 for PCT/US02/32653.
 Ex-Parte Quayle Action issued Jun. 6, 2005 in U.S. Appl. No. 10/710,484.
 Notice of Allowance issued Aug. 2, 2005 in U.S. Appl. No. 10/710,484.
 Non-Final Office Action issued May 17, 2005 in U.S. Appl. No. 10/711,773.
 Final Office Action issued Nov. 1, 2005 in U.S. Appl. No. 10/711,773.
 Advisory Action issued Feb. 15, 2006 in U.S. Appl. No. 10/711,773.
 Notice of Allowance issued May 17, 2006 in U.S. Appl. No. 10/711,773.
 ISR/WO dated Jun. 20, 2005 for PCT/US05/07195.
 IPRP (Ch 1) dated Apr. 19, 2007 for PCT/US05/07195.
 Non-Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/710,325.
 Notice of Abandonment issued Jun. 4, 2007 in U.S. Appl. No. 10/710,325.
 Non-Final Office Action issued Mar. 22, 2006 in U.S. Appl. No. 10/710,326.
 Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/710,326.
 Advisory Action issued Jan. 12, 2007 in U.S. Appl. No. 10/710,326.
 Non-Final Office Action issued May 1, 2007 in U.S. Appl. No. 10/710,326.
 Notice of Allowance issued Oct. 4, 2007 in U.S. Appl. No. 10/710,326.
 Supplemental Notice of Allowance issued Nov. 8, 2007 in U.S. Appl. No. 10/710,326.
 Non-Final Office Action issued May 1, 2008 in U.S. Appl. No. 11/861,347.
 Non-Final Office Action issued May 2, 2008 in U.S. Appl. No. 11/861,351.
 Non-Final Office Action issued May 1, 2008 in U.S. Appl. No. 11/861,354.
 Non-Final Office Action issued May 25, 2007 in U.S. Appl. No. 10/710,327.
 Notice of Allowance issued Nov. 13, 2007 in U.S. Appl. No. 10/710,327.
 Non-Final Office Action issued May 1, 2008 in U.S. Appl. No. 11/861,463.
 Non-Final Office Action issued May 8, 2008 in U.S. Appl. No. 11/861,481.
 Non-Final Office Action issued Sep. 21, 2006 in U.S. Appl. No. 10/710,328.
 Notice of Abandonment issued Jun. 28, 2007 in U.S. Appl. No. 10/710,328.
 Non-Final Office Action issued Sep. 19, 2006 in U.S. Appl. No. 10/710,329.
 Notice of Abandonment issued Aug. 23, 2007 in U.S. Appl. No. 10/710,329.

(56)

References Cited

OTHER PUBLICATIONS

Non-Final Office Action issued Mar. 9, 2006 in U.S. Appl. No. 10/710,330.
 Notice of Abandonment issued Nov. 17, 2006 in U.S. Appl. No. 10/710,330.
 Non-Final Office Action issued Jul. 29, 2005 in U.S. Appl. No. 10/710,331.
 Final Office Action issued Nov. 29, 2005 in U.S. Appl. No. 10/710,331.
 Advisory Action issued Feb. 9, 2006 in U.S. Appl. No. 10/710,331.
 Non-Final Office Action issued May 3, 2006 in U.S. Appl. No. 10/710,331.
 Notice of Abandonment issued Jan. 10, 2007 in U.S. Appl. No. 10/710,331.
 Non-Final Office Action issued Jul. 19, 2005 in U.S. Appl. No. 10/710,332.
 Final Office Action issued Nov. 21, 2005 in U.S. Appl. No. 10/710,332.
 Advisory Action issued Feb. 10, 2006 in U.S. Appl. No. 10/710,332.
 Non-Final Office Action issued May 3, 2006 in U.S. Appl. No. 10/710,332.
 Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/710,332.
 Advisory Action issued Jan. 5, 2007 in U.S. Appl. No. 10/710,332.
 Non-Final Office Action issued Apr. 20, 2007 in U.S. Appl. No. 10/710,332.
 Notice of Allowance issued Oct. 4, 2007 in U.S. Appl. No. 10/710,332.
 Supplemental Notice of Allowance issued Nov. 8, 2007 in U.S. Appl. No. 10/710,332.
 Non-Final Office Action issued May 2, 2008 in U.S. Appl. No. 11/861,600.
 Non-Final Office Action issued May 1, 2008 in U.S. Appl. No. 11/861,626.
 Non-Final Office Action issued Jan. 27, 2005 in U.S. Appl. No. 10/710,334.
 Final Office Action issued Sep. 30, 2005 in U.S. Appl. No. 10/710,334.
 Advisory Action issued Dec. 19, 2005 in U.S. Appl. No. 10/710,334.
 Non-Final Office Action issued Apr. 10, 2006 in U.S. Appl. No. 10/710,334.
 Notice of Abandonment issued Nov. 6, 2006 in U.S. Appl. No. 10/710,334.
 Non-Final Office Action issued Aug. 8, 2005 in U.S. Appl. No. 10/710,335.
 Final Office Action issued Dec. 15, 2005 in U.S. Appl. No. 10/710,335.
 Advisory Action issued Mar. 8, 2006 in U.S. Appl. No. 10/710,335.
 Non-Final Office Action issued May 9, 2006 in U.S. Appl. No. 10/710,335.
 Final Office Action issued Oct. 19, 2006 in U.S. Appl. No. 10/710,335.
 Advisory Action issued Jan. 12, 2007 in U.S. Appl. No. 10/710,335.
 Non-Final Office Action issued Apr. 19, 2007 in U.S. Appl. No. 10/710,335.
 Notice of Allowance issued Sep. 19, 2007 in U.S. Appl. No. 10/710,335.
 Non-Final Office Action issued Feb. 28, 2006 in U.S. Appl. No. 10/709,815.
 Notice of Allowance issued Sep. 26, 2006 in U.S. Appl. No. 10/709,815.
 Non-Final Office Action issued Jul. 10, 2008 in U.S. Appl. No. 11/163,595.
 Non-Final Office Action issued Jul. 12, 2005 in U.S. Appl. No. 10/708,822.
 Final Office Action issued Nov. 2, 2005 in U.S. Appl. No. 10/708,822.
 Advisory Action issued Dec. 20, 2005 in U.S. Appl. No. 10/708,822.
 Non-Final Office Action issued Apr. 17, 2006 in U.S. Appl. No. 10/708,822.

Final Office Action issued Oct. 19, 2006 in U.S. Appl. No. 10/708,822.
 Advisory Action issued Jan. 10, 2007 in U.S. Appl. No. 10/708,822.
 Non-Final Office Action issued Apr. 23, 2007 in U.S. Appl. No. 10/708,822.
 Notice of Allowance issued Sep. 19, 2007 in U.S. Appl. No. 10/708,822.
 ISR/WO dated Nov. 16, 2005 for PCT/US05/09452.
 IPRP dated Aug. 16, 2006 for PCT/US05/09452.
 IPRP dated Jan. 5, 2007 for PCT/US05/09452.
 Non-Final Office Action issued Jan. 22, 2008 in U.S. Appl. No. 11/858,958.
 Non-Final Office Action issued Jun. 6, 2005 in U.S. Appl. No. 10/708,830.
 Non-Final Office Action issued Oct. 4, 2005 in U.S. Appl. No. 10/708,830.
 Notice of Allowance issued Mar. 2, 2006 in U.S. Appl. No. 10/708,830.
 Supplemental Notice of Allowance issued Aug. 4, 2006 in U.S. Appl. No. 10/708,830.
 Non-Final Office Action issued May 15, 2007 in U.S. Appl. No. 10/708,831.
 Notice of Allowance issued Oct. 31, 2007 in U.S. Appl. No. 10/708,831.
 Notice of Abandonment issued Mar. 6, 2008 in U.S. Appl. No. 10/708,831.
 Non-Final Office Action issued Jun. 6, 2005 in U.S. Appl. No. 10/708,833.
 Notice of Allowance issued Dec. 9, 2005 in U.S. Appl. No. 10/708,833.
 Supplemental Notice of Allowance issued Feb. 23, 2006 in U.S. Appl. No. 10/708,833.
 Non-Final Office Action issued Mar. 22, 2006 in U.S. Appl. No. 10/708,837.
 Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/708,837.
 Advisory Action issued Jan. 12, 2007 in U.S. Appl. No. 10/708,837.
 Non-Final Office Action issued Apr. 23, 2007 in U.S. Appl. No. 10/708,837.
 Notice of Allowance issued Oct. 12, 2007 in U.S. Appl. No. 10/708,837.
 Supplemental Notice of Allowance issued Dec. 20, 2007 in U.S. Appl. No. 10/708,837.
 Non-Final Office Action issued Dec. 11, 2007 in U.S. Appl. No. 11/851,533.
 Final Office Action issued Jul. 25, 2008 in U.S. Appl. No. 11/851,533.
 Advisory Action issued Aug. 29, 2008 in U.S. Appl. No. 11/851,533.
 Non-Final Office Action issued Jan. 4, 2008 in U.S. Appl. No. 11/851,556.
 Final Office Action issued Jul. 31, 2008 in U.S. Appl. No. 11/851,556.
 Non-Final Office Action issued Jan. 10, 2008 in U.S. Appl. No. 10/708,840.
 Final Office Action issued Jul. 17, 2008 in U.S. Appl. No. 10/708,840.
 Advisory Action issued Sep. 5, 2008 in U.S. Appl. No. 10/708,840.
 Non-Final Office Action issued Feb. 8, 2008 in U.S. Appl. No. 11/851,580.
 Non-Final Office Action issued Feb. 11, 2008 in U.S. Appl. No. 11/851,623.
 Restriction Requirement issued Aug. 20, 2008 in U.S. Appl. No. 11/851,623.
 Non-Final Office Action issued Feb. 15, 2008 in U.S. Appl. No. 11/858,393.
 Non-Final Office Action issued Jan. 30, 2006 in U.S. Appl. No. 10/708,841.
 Final Office Action issued May 25, 2006 in U.S. Appl. No. 10/708,841.
 Notice of Allowance issued Oct. 6, 2006 in U.S. Appl. No. 10/708,841.
 Non-Final Office Action issued Mar. 11, 2008 in U.S. Appl. No. 11/164,352.

(56)

References Cited

OTHER PUBLICATIONS

Final Office Action issued Aug. 18, 2008 in U.S. Appl. No. 11/164,352.
 ISR/WO dated Jul. 11, 2008 for PCT/US06/07570.
 Non-Final Office Action issued Aug. 11, 2004 in U.S. Appl. No. 10/611,563.
 Supplemental Notice of Allowance issued Oct. 25, 2007 in U.S. Appl. No. 10/710,335.
 Non-Final Office Action issued May 1, 2008 in U.S. Appl. No. 11/862,268.
 Non-Final Office Action issued Aug. 4, 2008 in U.S. Appl. No. 11/306,617.
 ISR/WO dated Jul. 9, 2008 for PCT/US06/45362.
 Non-Final Office Action issued Jun. 24, 2008 in U.S. Appl. No. 11/161,295.
 Non-Final Office Action issued Sep. 8, 2005 in U.S. Appl. No. 10/906,732.
 Final Office Action issued Mar. 8, 2006 in U.S. Appl. No. 10/906,732.
 Advisory Action issued Jul. 5, 2006 in U.S. Appl. No. 10/906,732.
 Notice of Allowance issued Aug. 11, 2006 in U.S. Appl. No. 10/906,732.
 Non-Final Office Action issued Oct. 15, 2007 in U.S. Appl. No. 11/161,105.
 Final Office Action issued Apr. 21, 2008 in U.S. Appl. No. 11/161,105.
 Notice of Allowance issued Jul. 3, 2008 in U.S. Appl. No. 11/161,105.
 Non-Final Office Action issued Apr. 11, 2008 in U.S. Appl. No. 11/552,886.
 Final Office Action issued Aug. 6, 2008 in U.S. Appl. No. 11/552,886.
 Advisory Action issued Sep. 18, 2008 in U.S. Appl. No. 11/552,886.
 Office Action dated Mar. 6, 2008 for AU2005270228.
 Office Action dated Jun. 18, 2008 for AU2005270228.
 Office Action dated Apr. 14, 2008 for CA2570739.
 ISR/WO dated Oct. 10, 2006 for PCT/US05/19388.
 IPRP dated Mar. 15, 2007 for PCT/US05/19388.
 Non-Final Office Action issued Feb. 26, 2008 in U.S. Appl. No. 11/859,153.
 Notice of Allowance issued Jun. 20, 2008 in U.S. Appl. No. 11/859,153.
 Examination Report dated Jun. 22, 2007 for GB 0700319.7.
 Examination Report dated Nov. 22, 2007 for GB 0700319.7.
 Search Report dated May 23, 2008 for GB 0700319.7.
 Non-Final Office Action issued Feb. 26, 2008 in U.S. Appl. No. 11/859,171.
 Notice of Allowance issued Jun. 19, 2008 in U.S. Appl. No. 11/859,171.
 Examination Report dated Jun. 16, 2008 for SG200608843-9.
 Non-Final Office Action issued Jul. 29, 2005 in U.S. Appl. No. 10/710,308.
 Final Office Action issued Nov. 29, 2005 in U.S. Appl. No. 10/710,308.
 Advisory Action issued Feb. 10, 2006 in U.S. Appl. No. 10/710,308.
 Non-Final Office Action issued May 2, 2006 in U.S. Appl. No. 10/710,308.
 Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/710,308.
 Advisory Action issued Jan. 8, 2007 in U.S. Appl. No. 10/710,308.
 Non-Final Office Action issued May 1, 2007 in U.S. Appl. No. 10/710,308.
 Notice of Allowance issued Sep. 26, 2007 in U.S. Appl. No. 10/710,308.
 Supplemental Notice of Allowance issued Dec. 11, 2007 in U.S. Appl. No. 10/710,308.
 Non-Final Office Action issued Mar. 18, 2008 in U.S. Appl. No. 11/860,704.
 Notice of Allowance issued Jul. 3, 2008 in U.S. Appl. No. 11/860,704.

Non-Final Office Action issued Apr. 3, 2008 in U.S. Appl. No. 11/860,726.
 Notice of Allowance issued Jul. 14, 2008 in U.S. Appl. No. 11/860,726.
 Non-Final Office Action issued Jul. 19, 2005 in U.S. Appl. No. 10/710,309.
 Final Office Action issued Nov. 21, 2005 in U.S. Appl. No. 10/710,309.
 Advisory Action issued Feb. 10, 2006 in U.S. Appl. No. 10/710,309.
 Non-Final Office Action issued May 2, 2006 in U.S. Appl. No. 10/710,309.
 Notice of Abandonment issued Dec. 19, 2006 in U.S. Appl. No. 10/710,309.
 Non-Final Office Action issued May 6, 2005 in U.S. Appl. No. 10/710,310.
 Final Office Action issued Oct. 19, 2005 in U.S. Appl. No. 10/710,310.
 Advisory Action issued Dec. 29, 2005 in U.S. Appl. No. 10/710,310.
 Non-Final Office Action issued Apr. 5, 2006 in U.S. Appl. No. 10/710,310.
 Notice of Abandonment issued Oct. 20, 2006 in U.S. Appl. No. 10/710,310.
 Non-Final Office Action issued Sep. 19, 2006 in U.S. Appl. No. 10/710,311.
 Notice of Abandonment issued Jun. 28, 2007 in U.S. Appl. No. 10/710,311.
 Non-Final Office Action issued Feb. 9, 2006 in U.S. Appl. No. 10/710,315.
 Final Office Action issued Jul. 13, 2006 in U.S. Appl. No. 10/710,315.
 Notice of Abandonment issued Apr. 20, 2007 in U.S. Appl. No. 10/710,315.
 Non-Final Office Action issued Feb. 9, 2006 in U.S. Appl. No. 10/710,317.
 Final Office Action issued Jul. 18, 2006 in U.S. Appl. No. 10/710,317.
 Notice of Abandonment issued Mar. 22, 2007 in U.S. Appl. No. 10/710,317.
 Non-Final Office Action issued Sep. 19, 2006 in U.S. Appl. No. 10/710,319.
 Notice of Abandonment issued Aug. 9, 2007 in U.S. Appl. No. 10/710,319.
 Non-Final Office Action issued Mar. 9, 2006 in U.S. Appl. No. 10/710,323.
 Notice of Abandonment issued Dec. 12, 2006 in U.S. Appl. No. 10/710,323.
 Non-Final Office Action issued Oct. 10, 2006 in U.S. Appl. No. 10/710,324.
 Notice of Abandonment issued Oct. 11, 2007 in U.S. Appl. No. 10/710,324.
 American Express, "Private Payments (SM) ; A New Level of Security from American Express," American Express Website, Cards. "ISO Standards," available from <http://www.iso.ch/projects/loading.html>.
http://www.semiconductors.phillips.com/news/content/file_878.html, Apr. 7, 2003.
<http://www.palowireless.com/infotooth/whatis.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial/profiles.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial/radio.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial/baseband.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial/Imp.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial/hci.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial/12cap.asp>, Apr. 28, 2003.
<http://www.palowireless.com/infotooth/tutorial/rfcomm.asp>, Apr. 28, 2003.

(56)

References Cited

OTHER PUBLICATIONS

<http://www.palowireless.com/infotooth/tutorial/sdp.asp>, Apr. 28, 2003.

http://www.palowireless.com/infotooth/tutorial/k1_gap.asp, Apr. 28, 2003.

"Sony, Phillips to Test RFID Platform", RFID Journal, May 8, 2003. US Banker, Article 5, 1995, <http://www.banking.com/us-banker/art5>.

"Smart Card Technology and Applications"; <http://disc.cba.uh.edu/ulr-hirsch/fall96/lara.htm> (8 pages).

Financial Technology International Bulletin, V14, n1, p. 4, Sep. 1996.

Green, Thomas C., "American Express Offers temporary CC numbers for the web," Sep. 9, 2000, The Register, www.theregister.c.uk/c.cnn.com, U.S. News, "American Express to offer disposable credit card numbers," Sep. 8, 2000, Associated Press, www.cnn.c.

American Express, "Private Payments (SM) ; A New Level of Security from American Express," American Express Website, Cards, Aug. 22, 2001.

Martin, Zack, "One-Time Numbers Stop Web Hackers From Pilfering Data," Jan. 2001, Card Marketing, Thomson Financial, www.crdfrum.c.

The Dollar Stretcher, "Disposable Credit Card Numbers," Jan. 2001, CardRatings.org, www.stretcher.c.

ISO/IEC 7816-6:1996(E)—First Edition—May 15, 1996.

ISO/IEC 7816-4:1995(E)—First Edition—Sep. 1, 1995.

Goldman, J., "Internet Security, The Next Generation, When Software Encryption is not Enough," Web Techniques, Nov. 1997, pp. 43-46.

Simmons, J., "Smart Cards Hold the Key to Secure Internet Commerce," EC World, Dec. 1998, pp. 36-38.

Wayner, P., "Digital Cash," AP Professional, 1996, pp. 76-83, 85-100.

"ISO Standards," available from <http://www.iso.ch/projects/loading.html>, Oct. 18, 2000.

Turban, et al., "Using Smartcards in Electronic Commerce," Proc. 31st Annual Hawaii Inter. Conf. on System Sciences, vol. 4, 1998, pp. 62-69.

Dhem, et al., "SCALPS: Smart Card for Limited Payment Systems," IEEE Micro, Jun. 1996, pp. 42-51.

Smith, M.T., "Smart Cards: Integrating for Portable Complexity," Computer-Integrated Engineering, Aug. 1998, pp. 110-115.

PR Newswire (press release), "Providian Launches Nation's First Clear Chip Card," Sep. 12, 2000. The press release may be related to the art of the invention, but based upon the information in the press release, it is unclear if the press release is prior art. However, in an abundance of caution the Applicant desires to put the press release into the file wrapper.

Geer, et al., "Token-Mediated Certification and Electronic Commerce," Proc. 2nd USENIX Workshop on Electronic Commerce, Nov. 18-21, 1996, pp. 13-22.

Gobioff, et al., "Smart Cards in Hostile Environments," Proc. 2nd USENIX Workshop in Electronic Commerce, Nov. 18-21, 1996, pp. 23-28.

Fancher, C.H., "In Your Pocket Smartcards," IEEE Spectrum, Feb. 1997, pp. 47-53.

Blythe, I., "Smarter, More Secure Smartcards," BYTE, Jun. 1997, pp. 63-64.

Leach, Dr. J., "Dynamic Authentication for Smartcards," Computers and Security, vol. 14, No. 5, 1995, pp. 385-389.

Wu, et al., "Authenticating Passwords Over an Insecure Channel," Computers and Security, vol. 15, No. 5, 1996, pp. 431-439.

Manninger, et al., "Adapting an Electronic Purse for Internet Payments," ACISP '98 Proceedings, Jul. 13-15, 1998, pp. 205-214.

Yan, et al., "Banking on the Internet and Its Applications," Proc. 13th Annual Hawaii International Conference on System Sciences, vol. 4, 1997, pp. 275-284.

Transport Layer Security Working Group, "The SSL Protocol, Version 3.0," Nov. 18, 1996 (also available at <http://home.netscape.com/eng/ssl3/draft302.txt>).

Business Wire (press release), "Master Card E-Wallet," Jul. 11, 2000.

Obongo.com Website, "Obongo," Aug. 8, 2000 (Description of wallet toolbar also available at <http://www.obongo.com/chabi/website/index.htm>).

* cited by examiner

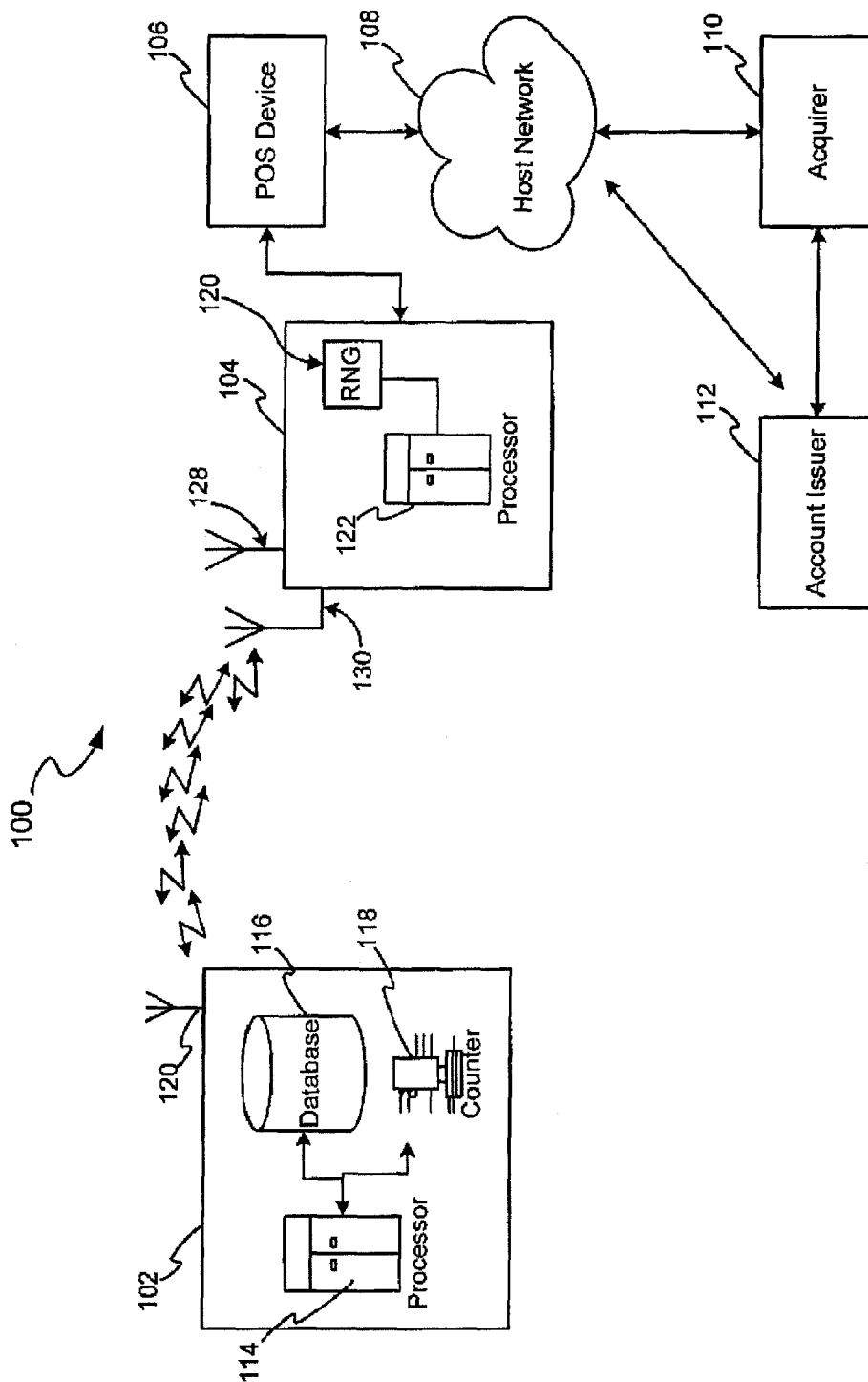


FIGURE 1

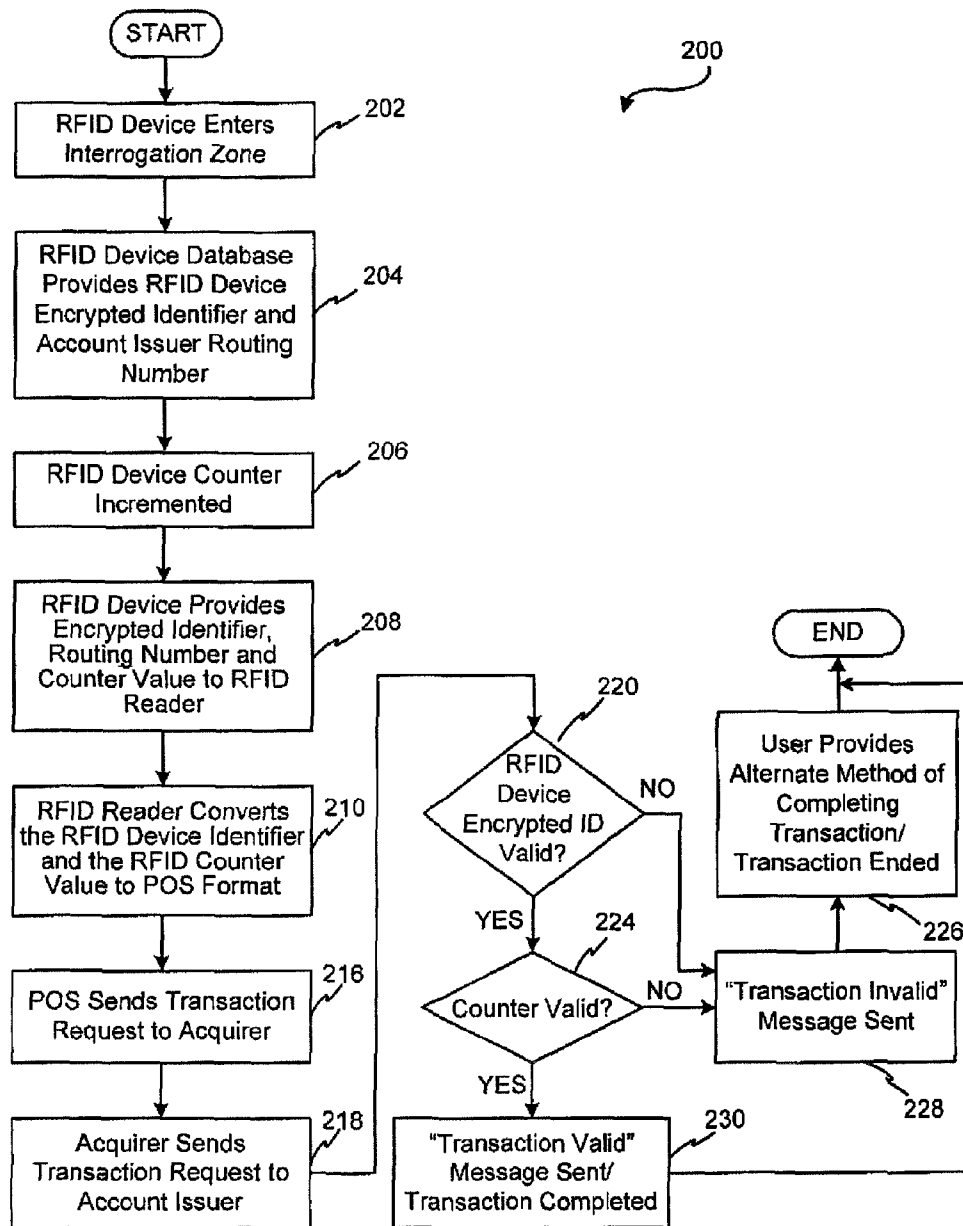
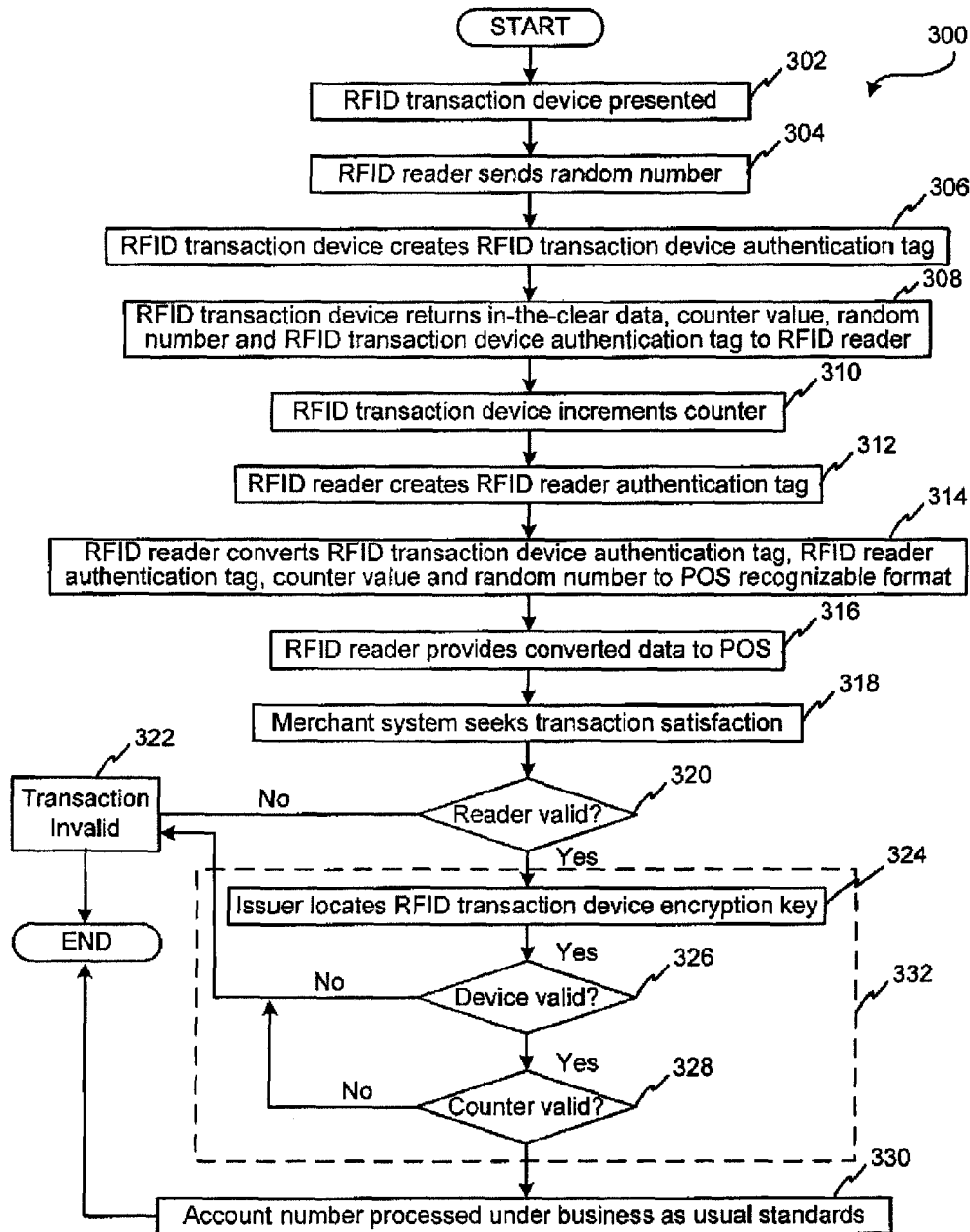


FIGURE 2

**FIGURE 3**

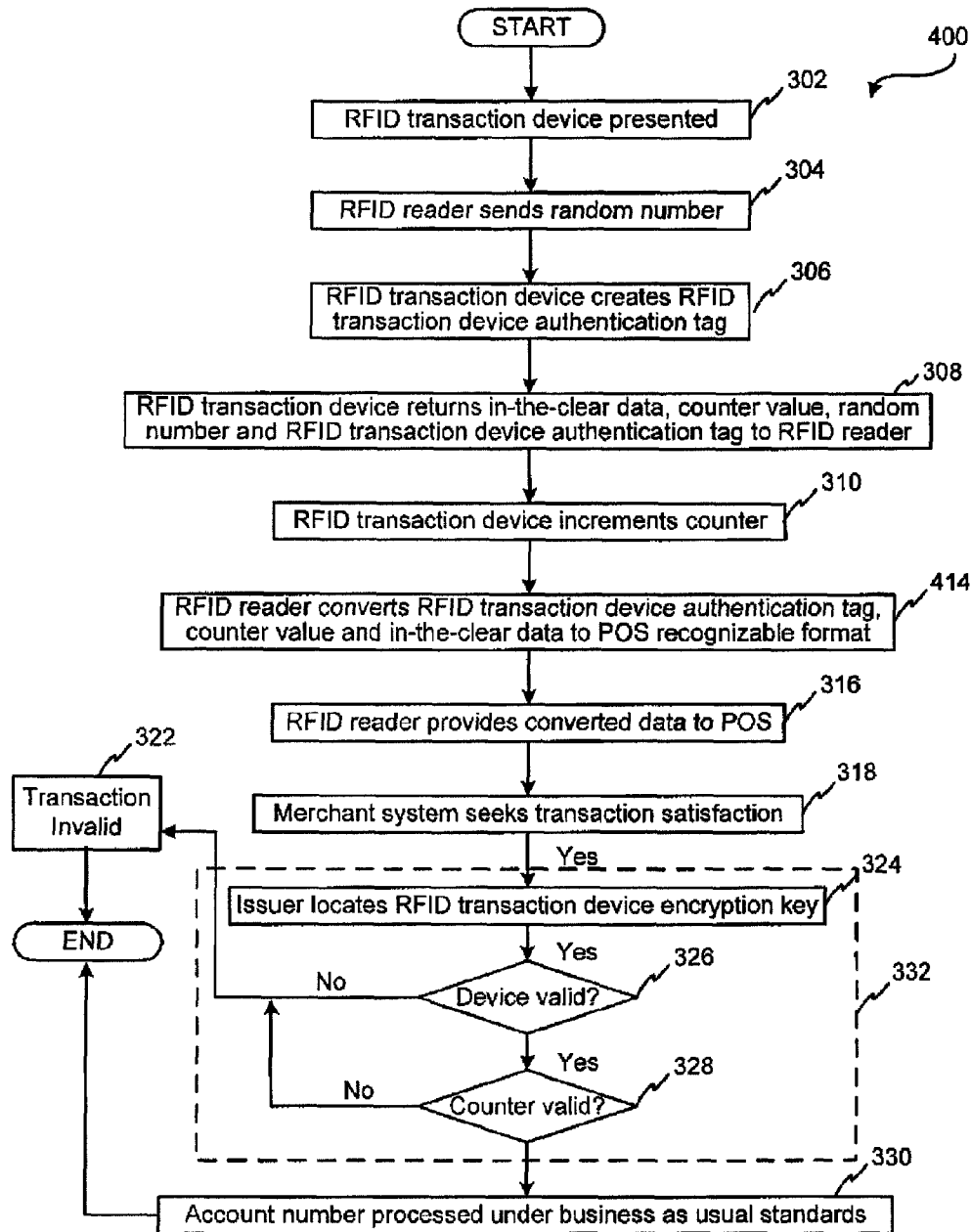


FIGURE 4

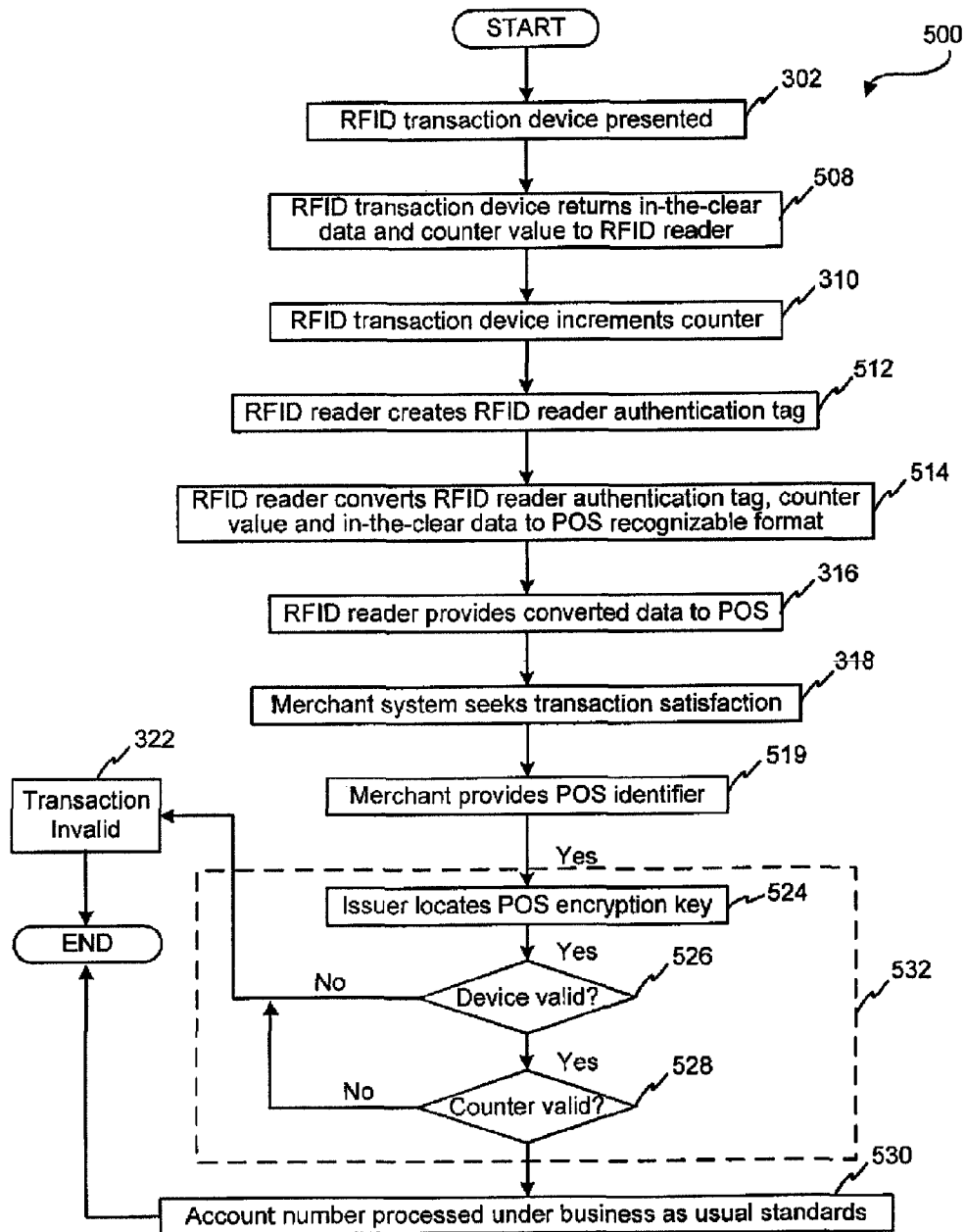


FIGURE 5

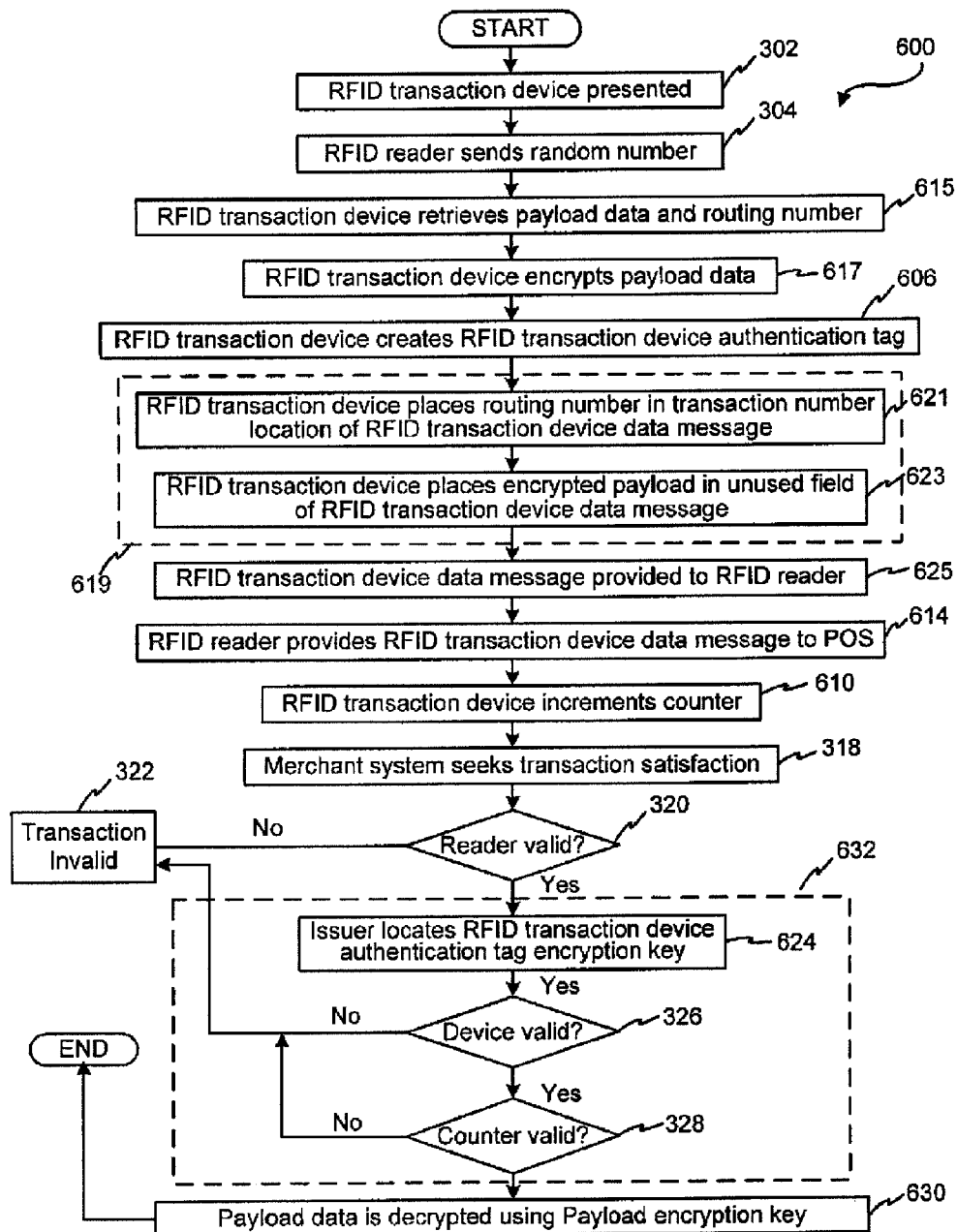


FIGURE 6

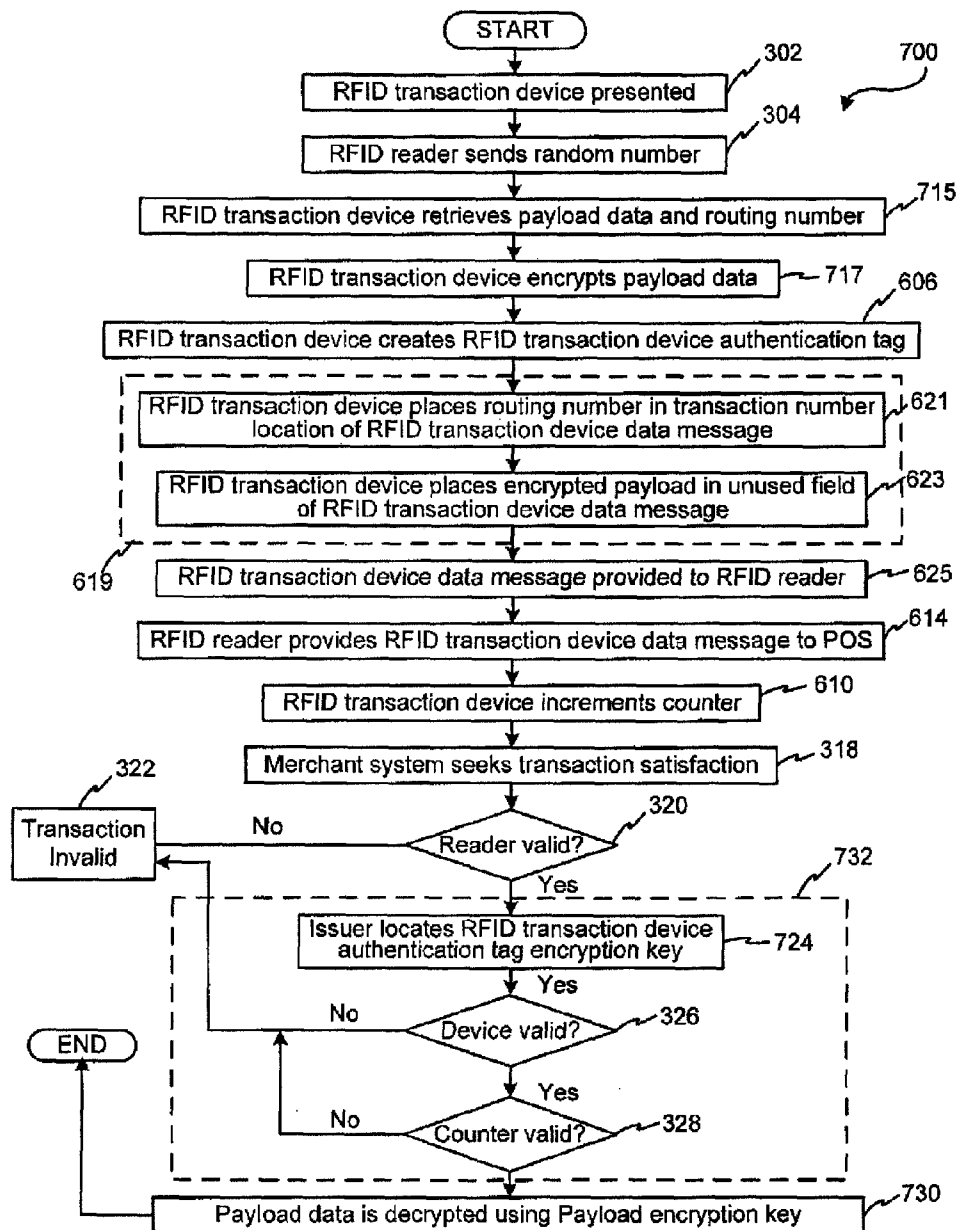


FIGURE 7

PROCESSING AN RF TRANSACTION USING A ROUTING NUMBER

Matter enclosed in heavy brackets [] appears in the original patent but forms no part of this reissue specification; matter printed in *italics* indicates the additions made by reissue; a claim printed with ~~strikethrough~~ indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

CROSS-REFERENCE TO RELATED APPLICATIONS

This invention ('548 application) is a Continuation-in-Part of U.S. patent application Ser. No. 10/711,720, entitled "SYSTEMS AND METHODS FOR MANAGING MULTIPLE ACCOUNTS ON A RF TRANSACTION DEVICE USING SECONDARY IDENTIFICATION INDICIA," filed Sep. 30, 2004. The '548 application is also a continuation-in-part of U.S. patent application Ser. No. 10/708,545, titled "SYSTEM AND METHOD FOR SECURING RF TRANSACTIONS USING A RADIO FREQUENCY IDENTIFICATION DEVICE INCLUDING A TRANSACTION COUNTER," filed Mar. 10, 2004. Both the '720 and '545 applications are non-provisional's of U.S. Provisional Application No. 60/507,803, filed Sep. 30, 2003. The '548 application is also a continuation-in-part of U.S. patent application Ser. No. 10/340,352, entitled "SYSTEM AND METHOD FOR INCENTING PAYMENT USING RADIO FREQUENCY IDENTIFICATION IN CONTACT AND CONTACTLESS TRANSACTIONS," filed Jan. 10, 2003. The '352 application is a non-provisional of U.S. Provisional Patent Application No. 60/396,577, filed Jul. 16, 2002. The '548 application is also a continuation-in-part of U.S. patent application Ser. No. 10/192,488, entitled "SYSTEM AND METHOD FOR PAYMENT USING RADIO FREQUENCY IDENTIFICATION IN CONTACT AND CONTACTLESS TRANSACTIONS," filed on Jul. 9, 2002, and has now issued as U.S. Pat. No. 7,239,226 on Jul. 3, 2007. The '488 is a non-provisional of U.S. Provisional Patent Application No. 60/304,216, filed Jul. 10, 2001. All of the above-listed applications are incorporated herein by reference.

FIELD OF INVENTION

This invention generally relates to a system and method for securing a Radio Frequency (RF) transaction using a RF operable transaction device, and more particularly, to securing a RF transaction using a Radio Frequency Identification (RFID) device module including a transactions counter.

BACKGROUND OF INVENTION

Like barcode and voice data entry, RFID is a contactless information acquisition technology. RFID systems are wireless, and are usually extremely effective in hostile environments where conventional acquisition methods fail. RFID has established itself in a wide range of markets, such as, for example, the high-speed reading of railway containers, tracking moving objects such as livestock or automobiles, and retail inventory applications. As such, RFID technology has become a primary focus in automated data collection, identification and analysis systems worldwide.

Of late, companies are increasingly embodying RFID data acquisition technology in portable devices identifiable by hand. For example, RFID modules are being placed in a fob or

tag for use in completing financial transactions. A typical fob includes a RF transponder and is typically a self-contained device which may be contained on any portable form factor. In some instances, a battery may be included with the fob to power the transponder, in which case the internal circuitry of the fob (including the transponder) may draw its operating power from the battery power source. Alternatively, the fob may exist independent of an internal power source. In this instance the internal circuitry of the fob (including the transponder) may gain its operating power directly from a RF interrogation signal provided by a RF reader. U.S. Pat. No. 5,053,774, issued to Schuermann, describes a typical transponder RF interrogation system which may be found in the prior art. The Schuermann patent describes in general the powering technology surrounding conventional transponder structures. U.S. Pat. No. 4,739,328 discusses a method by which a conventional transponder may respond to a RF interrogation signal. Other typical modulation techniques which may be used include, for example, ISO/IEC 14443 and the like.

In the conventional fob powering technologies used, the fob is typically activated upon presenting the fob in an interrogation signal. In this regard, the fob may be activated irrespective of whether the user desires such activation. These are called "passive" RFID devices. Alternatively, the fob may have an internal power source such that interrogation by the reader to activate the fob is not required. These RFID devices are termed "active" RFID devices.

One of the more visible uses of the RFID technology is found in the introduction of Exxon/Mobil's Speedpass® and Shell's EasyPay® products. These products use transponders placed in a fob or tag which enables automatic identification of the user when the fob is presented at a Point-of-Sale (POS) device. Fob identification data is typically passed to a third-party server database, where the identification data is referenced to a customer (e.g., user) credit or debit account. In an exemplary processing method, the server seeks authorization for the transaction by passing the transaction and account data to an authorizing entity, such as for example an "acquirer" or account issuer. Once the server receives authorization from the authorizing entity, the authorizing entity sends clearance to the point-of-sale device for completion of the transaction.

Minimizing fraud transactions in the RFID environment is typically important to the account issuer to lessen the loss associated with fraudulent RFID transaction device usage. One conventional method for securing RFID transactions involves requiring the device user to provide a secondary form of identification during transaction completion. For example, the RFID transaction device user may be asked to enter a personal identification number (PIN) into a keypad. The PIN may then be verified against a number associated with the user or the RFID transaction device, where the associated number is stored in an account issuer database. If the PIN number provided by the device user matches the associated number, then the transaction may be cleared for completion.

One problem with the conventional method of securing an RFID transaction is that the time for completing the transaction is increased. This is true since the RFID device user must delay the transaction to provide the alternate identification. The increased time for completing a transaction defeats one real advantage of the RFID transaction device, which is to permit expedient completion of a transaction since the account information may be passed to a reader without merchant involvement.

Another problem associated with conventional securing methods is that the customer identifying information (e.g.,

customer name, address, customer demographics, etc.) is susceptible to theft when transmitted from the RFID device to the RFID reader. Merchants often print the customer identifying information on a receipt for billing purposes. Alternatively, merchants store the customer identifying information for recordkeeping purposes, such as if the customer identifying information is needed to settle a transaction dispute. Typically, the merchant receives the customer identifying information from the RFID reader which receives the information from the RFID device as unencrypted data ("in-the-clear data"). The unencrypted data therefore may be intercepted by unscrupulous eavesdroppers bent on using the customer's identifying information for fraudulent purposes.

As such, a need exists for a method of securing a RFID transaction which does not increase the time needed to complete the transaction, and which method may be used without device user intervention. A further need exists for a system that secures customer identifying information transmitted in-the-clear.

SUMMARY OF INVENTION

Described herein is a system and method for securing RFID transactions which addresses the problems found in conventional transaction securing methods. The securing method described includes verifying a RFID transaction device counter, which may generate an indicia corresponding to the number of transactions conducted using a particular RFID transaction device. The method involves variously validating a RFID device authentication tag and a RFID reader authentication tag. The method further involves placing the routing number associated with a transaction account in the transmission data field typically reserved for the transaction account number, and placing encrypted card information (e.g., card number and/or expiration date) in an alternate unused field of a transaction request. One implementation will be to use the unused 16 characters at positions 64-79 of the Track 1 format as defined in ISO7813. The encrypted card information is decrypted at the issuer location using a decryption key correlated to the routing number transmitted in the transaction account number field.

In one exemplary embodiment, the invention discloses a system and method for verifying a RFID transaction device and RFID reader operable with a RF transaction system. The method involves presenting a RFID transaction system to a RFID reader, receiving a random number from the RFID reader, creating a RFID transaction device authentication tag using the random number and a counter value, providing the random number, counter value, and RFID transaction device authentication tag to a RFID reader, creating a RFID reader authentication tag using the counter random number, and/or RFID transaction device authentication tag, and providing the RFID reader and RFID transaction device for authentication.

Under a second embodiment, the invention involves verifying the RFID transaction device only. Still under another embodiment, the invention involves verifying the RFID reader without verifying the RFID transaction device.

In yet another embodiment of the invention, the method involves using the data transmission fields to secure a RF transmission. In general, the invention includes placing the routing number in the data transmission field typically reserved for the transaction account number, and forwarding the routing number and an encrypted transaction account number and expiration date to the RFID reader. The RFID reader then places the encrypted account number and expiration date in the data transmission field typically reserved for unused data, such as, for example, positions 64-79 of the 7813

Track 1 format, and forwards the data transmission to the merchant system. The merchant system receives the data transmission and forwards a transaction request to the transaction account issuer for transaction settlement. The account issuer may receive the transaction request and locate a transaction account decryption key useful for decrypting the information stored in the unused field, decrypt the transaction account information, and process the transaction request under issuer-defined business as usual standards.

In still another embodiment, the method involves using the data transmission fields to secure a RF transmission by placing the routing number in the data transmission field typically reserved for the transaction account number, and forwarding the routing number and an encrypted transaction account number, expiration date and customer identifying information to the RFID reader. The RFID reader then places the encrypted account number, expiration date, and customer identifying information in the data transmission field typically reserved for unused data and forwards the data transmission to the merchant system. The merchant system receives the data transmission and forwards a transaction request to the transaction account issuer for transaction settlement. The account issuer may receive the transaction request and locate a transaction account decryption key useful for decrypting the information stored in the unused field, decrypt the transaction account information, and process the transaction request under issuer-defined business as usual standards. The issuer may then forward the decrypted customer information to the merchant system for use in billing or record keeping.

These features and other advantages of the system and method, as well as the structure and operation of various exemplary embodiments of the system and method, are described below.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, wherein like numerals depict like elements, illustrate exemplary embodiments of the present invention, and together with the description, serve to explain the principles of the invention. In the drawings:

FIG. 1 illustrates an exemplary RFID-based system depicting exemplary components for use in RFID transaction completion in accordance with the present invention;

FIG. 2 illustrates an exemplary method for securing a RFID transaction using a counter-generated indicia in accordance with the present invention;

FIG. 3 depicts a flow diagram of an exemplary RFID transaction device and RFID reader authentication flow chart useful with this invention;

FIG. 4 depicts a flow diagram of an exemplary RFID transaction device authentication flow diagram useful with this invention;

FIG. 5 depicts a flow diagram of an exemplary RFID reader authentication flow diagram useful with this invention;

FIG. 6 depicts a flow diagram of an exemplary RFID transaction securing method using a transaction account routing number useful with this invention; and

FIG. 7 depicts a flow diagram of an exemplary RFID transaction securing method using a transaction account routing number and customer identifying information useful with this invention.

DETAILED DESCRIPTION

The present invention may be described herein in terms of functional block components, screen shots, optional selec-

tions and various processing steps. Such functional blocks may be realized by any number of hardware and/or software components configured to perform to specified functions. For example, the present invention may employ various integrated circuit components (e.g., memory elements, processing elements, logic elements, look-up tables, and the like), which may carry out a variety of functions under the control of one or more microprocessors or other control devices. Similarly, the software elements of the present invention may be implemented with any programming or scripting language such as C, C++, Java, COBOL, assembler, PERL, extensible markup language (XML), JavaCard and MULTOS with the various algorithms being implemented with any combination of data structures, objects, processes, routines or other programming elements. Further, it should be noted that the present invention may employ any number of conventional techniques for data transmission, signaling, data processing, network control, and the like. For a basic introduction on cryptography, review a text written by Bruce Schneier entitled "Applied Cryptography: Protocols, Algorithms, and Source Code in C," published by John Wiley & Sons (second edition, 1996), herein incorporated by reference.

In addition, many applications of the present invention could be formulated. The exemplary network disclosed herein may include any system for exchanging data or transacting business, such as the Internet, an intranet, an extranet, WAN, LAN, satellite communications, and/or the like. It is noted that the network may be implemented as other types of networks, such as an interactive television network (ITN).

Further still, the terms "Internet" or "network" may refer to the Internet, any replacement, competitor or successor to the Internet, or any public or private inter-network, intranet or extranet that is based upon open or proprietary protocols. Specific information related to the protocols, standards, and application software utilized in connection with the Internet may not be discussed herein. For further information regarding such details, see, for example, Dilip Naik, "Internet Standards and Protocols" (1998); "Java 2 Complete," various authors, (Sybex 1999); Deborah Ray and Eric Ray, "Mastering HTML 4.0" (1997); Loshin, "TCP/IP Clearly Explained" (1997). All of these texts are hereby incorporated by reference.

By communicating, a signal may travel to/from one component to another. The components may be directly connected to each other or may be connected through one or more other devices or components. The various coupling components for the devices can include but are not limited to the Internet, a wireless network, a conventional wire cable, an optical cable or connection through air, water, or any other medium that conducts signals, and any other coupling device or medium.

Where required, the system user may interact with the system via any input device such as, a keypad, keyboard, mouse, kiosk, personal digital assistant, handheld computer (e.g., Palm Pilot®, Blackberry®), cellular phone and/or the like. Similarly, the invention could be used in conjunction with any type of personal computer, network computer, work station, minicomputer, mainframe, or the like, running any operating system such as any version of Windows, Windows NT, Windows 2000, Windows 98, Windows 95, MacOS, OS/2, BeOS, Linux, UNIX, Solaris, or the like. Moreover, although the invention may frequently be described as being implemented with TCP/IP communications protocol, it should be understood that the invention could also be implemented using SNA, IPX, Appletalk, IPte, NetBIOS, OSI or any number of communications protocols. Moreover, the system contemplates the use, sale, or distribution of any goods,

services or information over any network having similar functionality described herein.

A variety of conventional communications media and protocols may be used for data links providing physical connections between the various system components. For example, the data links may be an Internet Service Provider (ISP) configured to facilitate communications over a local loop as is typically used in connection with standard modem communication, cable modem, dish networks, ISDN, Digital Subscriber Lines (DSL), or any wireless communication media. In addition, the merchant system, including a POS device and a host network, may reside on a local area network which interfaces to a remote network (not shown) for remote authorization of an intended transaction. The POS may communicate with the remote network via a leased line, such as a T1, D3 line, or the like. Such communications lines are described in a variety of texts, such as, "Understanding Data Communications," by Gilbert Held, which is incorporated herein by reference.

A transaction device identifier, as used herein, may include any identifier for a transaction device which may be correlated to a user transaction account (e.g., credit, charge debit, checking, savings, reward, loyalty, or the like) maintained by a transaction account provider (e.g., payment authorization center). A typical transaction account identifier (e.g., account number) may be correlated to a credit or debit account, loyalty account, or rewards account maintained and serviced by such entities as American Express, Visa and/or MasterCard, or the like.

To facilitate understanding, the present invention may be described with respect to a credit account. However, it should be noted that the invention is not so limited and other accounts permitting an exchange of goods and services for an account data value is contemplated to be within the scope of the present invention.

A transaction device identifier (e.g., account number) may be, for example, a sixteen-digit credit card number, although each credit provider has its own numbering system, such as the fifteen-digit numbering system used by American Express. Each company's credit card numbers comply with that company's standardized format such that the company using a sixteen-digit format will generally use four spaced sets of numbers, as represented by the number "0000 0000 0000 0000". In a typical example, the first five to seven digits are reserved for processing purposes and identify the issuing bank, card type and, etc. These first five to seven digits may be termed the "routing number" herein. The routing number may typically be included in the account number for use in indicating the transaction completion transmission route corresponding to an account issuer, funding source, or the like. Typically, the routing number may not be used for payment. In this example, the last sixteenth digit is used as a sum check for the sixteen-digit number. The intermediary eight-to-ten digits are used to uniquely identify the customer. The account number is stored as Track 1 and Track 2 data as defined in ISO/IEC 7813, and further may be made unique to the RFID transaction device.

In one exemplary embodiment, the transaction device identifier may include a unique RFID transaction device serial number and user identification number, as well as specific application applets. The transaction device identifier may be stored on a transaction device database located on the transaction device. The transaction device database may be configured to store multiple account numbers issued to the RFID transaction device user by the same or different account providing institutions. In addition, where the device identifier corresponds to a loyalty or rewards account, the RFID trans-

action device database may be configured to store the attendant loyalty or rewards points data.

In addition to the above, the transaction device identifier may be associated with any secondary form of identification configured to allow the consumer to interact or communicate with a payment system. For example, the transaction device identifier may be associated with, for example, an authorization/access code, personal identification number (PIN), Internet code, digital certificate, biometric data, and/or other secondary identification data used to verify a transaction device user identity.

It should be further noted that conventional components of RFID transaction devices may not be discussed herein for brevity. For instance, one skilled in the art will appreciate that the RFID transaction device and the RFID reader disclosed herein include traditional transponders for transmitting information between the device and the reader, antennas for facilitating RF data transmission, protocol sequence controllers or microprocessors for controlling the operation of the device or reader components, modulators/demodulators and the like for conditioning a RF data transmission to be read by the reader or device, which may be necessary for proper RFID data transmission. As such, those components are contemplated to be included in the scope of the invention.

It should be noted that the transfer of information in accordance with this invention, may be done in a format recognizable by a merchant system or account issuer. In that regard, by way of example, the information may be transmitted from the RFID device to the RFID reader, or from the RFID reader to the merchant system in magnetic stripe or multi-track magnetic stripe format. Because of the proliferation of devices using magnetic stripe format, the standards for coding information in magnetic stripe format were standardized by the International Standards Organization (ISO), which standards are incorporated herein by reference.

Typically, magnetic stripe information is formatted in three tracks. Certain industry information must be maintained on certain portion of the tracks, while other portions of the tracks may have open data fields. The contents of each track and the formatting of the information provided to each track is controlled by ISO standard ISO/IEC 7811. For example, the information must typically be encoded in binary. Track 1 is usually encoded with user information (name) in alphanumeric format. Track 2 is typically comprised of discretionary and nondiscretionary data fields. In one example, the nondiscretionary field may comprise 19 characters and the discretionary field may comprise 13 characters. Track 3 is typically reserved for financial transactions and includes enciphered versions of the user's personal identification number, country code, current units amount authorized per cycle, subsidiary accounts, and restrictions.

As such, where information is provided in accordance with this invention, it may be provided in magnetic stripe format track. For example, the counter values, authentication tags and encrypted identifiers, described herein, may be forwarded encoded in all or a portion of a data stream representing data encoded in, for example, track 2 or track 3 format.

Further still, various components may be described herein in terms of their "validity." In this context, a "valid" component is one which is authorized for use in completing a transaction request in accordance with the present invention. Contrarily, an "invalid" component is one which is not authorized for transaction completion. In addition, an invalid component may be one which is not recognized as being permitted for use on the secure RF system described herein.

FIG. 1 illustrates an exemplary secure RFID transaction system **100** in accordance with the present invention, wherein

exemplary components for use in completing a RF transaction are depicted. In general, system **100** may include a RFID transaction device **102** in RF communication with a RFID reader **104** for transmitting data there between. RFID reader **104** may be in further communication with a merchant point-of-sale (POS) device **106** for providing to POS **106** data received from RFID transaction device **102**. POS **106** may be in further communication with an acquirer **110** or an account issuer system **112** via a network **108** for transmitting a transaction request, including information received from RFID reader **104**, and receiving authorization concerning transaction completion.

Although point-of-interaction device (POS **106**) is described herein with respect to a merchant point-of-sale (POS) device, the invention is not to be so limited. Indeed, a merchant POS device is used herein by way of example, and the point-of-interaction device may be any device capable of receiving transaction device account data. In this regard, the POS may be any point-of-interaction device enabling the user to complete a transaction using transaction device **102**. POS device **106** may receive RFID transaction device **102** information and provide the information to host network **108** for processing. In one exemplary embodiment, POS device **106** may receive the transaction device information in ISO/IEC 8583 message format from RFID reader **104**.

As used herein, an "acquirer" may be a third-party entity including various databases and processors for facilitating the routing of the transaction request to an appropriate account issuer system **112**. Acquirer **112** may route the request to the account issuer in accordance with a routing number provided by RFID transaction device **102**. The "routing number" in this context may be a unique network address or any similar device for locating account issuer system **112** on network **108**. Traditional means of routing the payment request in accordance with the routing number are well understood. As such, the process for using a routing number to provide the payment request will not be discussed herein for brevity.

Additionally, account issuer system **112** ("account provider") may be any entity which provides a transaction account for facilitating completion of a transaction request. The transaction account may be any credit, debit, loyalty, direct debit, checking, or savings, or the like. The term "issuer" or "account provider" may refer to any entity facilitating payment of a transaction using a transaction device, and which includes systems permitting payment using at least one of a preloaded and non-preloaded transaction device. Typical issuers may be American Express, MasterCard, Visa, Discover, and the like. In the preloaded value processing context, an exchange value (e.g., money, rewards points, barter points, etc.) may be stored in a preloaded value database (not shown) for use in completing a requested transaction. The preloaded value database and thus the exchange value may not be stored on the transaction device itself, but may be stored remotely, such as, for example, at account issuer system **112** location. Further, the preloaded value database may be debited the amount of the transaction requiring the value to be replenished. The preloaded value may be any conventional value (e.g., monetary, rewards points, barter points, etc.) which may be exchanged for goods or services. In that regard, the preloaded value may have any configuration as determined by issuer system **112**.

RFID transaction device **102** may include a database **116** for storing transaction device information including the transaction device account number, customer identification, transaction device encryption and security keys, etc. The merchant database locations maintained on database **116** by server **110** are provided a distinct merchant identifier. Database dis-

cussed herein may be a graphical, hierarchical, relational, object-oriented or other database. In one embodiment, databases disclosed are a collection of ASCII or other text files. In another embodiment data is stored in a hierarchical file structure conforming to ISO 7816 file structure standards. Database information is suitably retrieved from the database and provided to transaction processing systems upon request via a server application, as described more fully below.

The database **116** may be in communication with a transaction device microprocessor **114** (e.g., protocol sequence controller) for use in controlling the operation of the internal circuits of RFID transaction device **102**. The protocol sequence controller **114** may be in communication with a RFID transaction device counter **118**. Counter **118** may be useful for tracking the number of transactions completed by a particular device **102**, as described below. Microprocessor **114** facilitates the counting of the transactions by facilitating the incrementing of the counter **118** each occurrence of device **102** usage. The RFID device **102** may further include a transponder (not shown) for use in receiving RF data and configuring the data to be readable by the device **102** circuitry.

In general, during operation of secure system **100**, RFID reader **104** may provide an interrogation signal to transaction device **102** for powering device **102** and receiving transaction device related data. The interrogation signal may be received at transaction device antenna **120** and may be received at a RFID transaction device transponder (not shown), which provides the interrogation signal to processor **114**. In response, transaction device processor **114** may retrieve a transaction device identifier from transaction device database **116** for providing to RFID reader **104** to complete a transaction request. Typically, the transaction device identifier may be encrypted prior to providing the device identifier to RFID reader **104**.

It should be noted that RFID reader **104** and RFID transaction device **102** may engage in mutual authentication prior to transferring any transaction device **102** data to RFID reader **104**. For a detailed explanation of a suitable mutual authentication process for use with the invention, please refer to commonly owned U.S. patent application Ser. No. 10/340,352, entitled "System and Method for Incenting Payment Using Radio Frequency Identification in Contact and Contactless Transactions," filed Jan. 10, 2003, incorporated by reference in its entirety.

In accordance with one embodiment of the present invention, a RF transaction using a RFID transaction device is secured by limiting the number of transactions which may be performed with a particular transaction device. Once the maximum transactions value is reached, the transaction device may automatically disable itself against further usage. Alternatively, account issuer system **112** may flag the transaction account correlating to the transaction device such that the account issuer system automatically prevents completion of transactions using the transaction device.

As such, RFID transaction device **102** in accordance with the present invention further includes a counter **118** for recording and reporting the number of transactions performed with a particular transaction device **102**. Counter **118** may be any device capable of being initiated with a beginning value and incrementing that value by a predetermined amount when the transaction device is presented for completion of a transaction. Counter **118** may be a discrete electronic device on the transponder, or may be a software or code-based counter as is found in the art.

The initial counter value may be any value from which other similar values may be measured. The value may take any form, such as, alpha, numeric, a formation of symbols, or any combination thereof.

To facilitate understanding, the following description discusses all values to be in numeric units (0, 1, 2, 3 . . . n). Thus, the counter values, the value amount to be incremented, the total transactions counted value, and the maximum transactions value, are all whole numbers.

It should be noted that account issuer system **112** may preset the initial counter value at any initial value as desired. Account issuer system **112** may also predetermine the value amount to be incremented by counter **118** when the transaction device is used to complete a transaction. Further, account issuer system **112** may assign different values to be incremented for each distinct transaction device **102**. Further still, account issuer system **112** may determine the maximum transactions value, which may be particular to each individual transaction device **102** issued by account issuer system **112**. Where counter **118** value equals a maximum transactions value, the system **100** prevents the usage of the transaction device **102** to complete additional transactions. Account issuer system **112** may prevent the usage of the transaction device **102** where the account issuer flags the transaction account corresponding to the transaction device **102**, thereby preventing authorization for using the account to complete transactions. Alternatively, the transaction device **102** may self-disable. For example, counter **118** value may trigger the transaction device processor **114** to provide a signal for preventing the transfer of the transaction device **102** identifier.

For example, account issuer system **112** may preset the initial counter value at 5 units and the counter value to be incremented at 10 units per transaction. Account issuer system **112** may determine that transaction device **102** may be used to complete a total transaction value of 20 transactions. Since counter **118** increments the counter value by the value to be incremented (e.g., 10 units) for each transaction, then for a total of 20 transactions permitted, the maximum transactions value will be 205 units. Once the counter value equals 205 units, then the operation of the transaction device **102** is disabled.

The operation of the exemplary embodiment described above, may be understood with reference to FIG. 1 and to the method of securing a RFID transaction described in FIG. 2. The operation may begin when RFID transaction device **102** is presented for completion of a transaction. Transaction device **102** may be placed in an interrogation field generated by RFID reader **104** (step 202). RFID reader **104** may interrogate RFID transaction device **102** enabling transaction device **102** operation. In response, RFID transaction device **102** may retrieve the transaction device **102** identifier, account issuer system **112** routing number and encrypted transaction device identifier from database **116** for providing to RFID reader **104** (step 204).

Once RFID transaction device **102** detects the interrogation signal provided by RFID reader **104**, counter **118** may increment its counter value (step 206). Counter **118** value may be incremented by an amount predetermined by account issuer system **112** (e.g., value amount to be incremented). The resulting counter **118** value after incrementing is the total transactions counted value.

Upon determining the total transactions counted value, RFID transaction device **102** may provide the total transactions counted value, the encrypted transaction device **102** identifier, and account issuer system **112** routing number to RFID reader **104** via RF transmission (step 208). RFID reader **104** may, in turn, convert the transaction device **102** identifier,

11

routing number, and total transactions counted value into merchant POS recognizable format and forward the converted information to merchant POS **106** (step **210**). The merchant system including POS **106** may then provide a transaction request to an acquirer **110** via network **106**. The transaction request may include the information received from the transaction device **102** along with information (e.g., amount, number of product, product/service identifier) concerning the transaction requested to be completed (step **216**). The transaction request may include information relative to RFID reader **104**.

Acquirer **110** may receive the transaction request and forward the transaction request to the appropriate account issuer system **112** in accordance with the routing number provided (step **218**). The account issuer may then identify that a transaction request is being provided that relates to a transaction device. For example, merchant POS **106** may provide a code appended to the transaction request specially configured for identifying a transaction device transaction which may be recognized by account issuer system **112**. Alternatively, the transaction device identifier, or a portion thereof, may be identified by account issuer system **112** as originating with a RFID transaction device **102**.

In one exemplary embodiment, account issuer system **112** receives the transaction device **102** identifier and checks to see if the transaction device identifier corresponds to a valid transaction account maintained on account issuer system **112** (step **220**). For example, account issuer system **112** may receive the encrypted transaction device identifier and locate the corresponding decryption key relating to the transaction account. If the encrypted ID is invalid, such as, for example, when account issuer system **112** is unable to locate the corresponding decryption key, account issuer system **112** may provide a "Transaction Invalid" message to POS **106** (step **228**). Transaction device **102** user may then be permitted to provide an alternate means of satisfying the transaction, or the transaction is ended (step **230**).

If the RFID transaction device encrypted identifier corresponding decryption key is located, the encrypted identifier is considered "valid" and account issuer system **112** may then use the corresponding decryption key to "unlock" or locate the transaction device account correlative to the transaction device **102**. Account issuer system **112** may then retrieve all information relating to the usage limits which have been predetermined by account issuer system **112**. Account issuer system **112** may be able to determine if a particular transaction device **102** has reached its limit of available transactions.

For example, account issuer system **112** may check to see if the total transactions counted value equals or exceeds the maximum transactions allowed (step **224**). If the maximum transactions allowed have been reached then the counter value is met or exceeded, and the transaction is considered "invalid." As such, account issuer system **112** may then provide a "Transaction Invalid" message to POS **106** (step **228**). In addition, account issuer system **112** may determine whether the total transactions counted value is the next expected value. If not, then the transaction is considered "invalid" and account issuer system **112** may also provide a "Transaction Invalid" message to POS **106** (step **228**). Transaction device **102** user may then be permitted to provide alternate means of completing the transaction (step **226**) or the transaction is ended.

Alternatively, where the total transactions counted value does not exceed or meet the maximum transactions allowed value, the counter value is considered valid and a "Transaction Valid" message is sent to merchant POS **106** (step **230**).

12

The merchant may then complete the transaction under business as usual standards as are employed by the merchant.

In accordance with the various embodiments described, the present invention addresses the problem of securing a RF transaction completed by a RFID transaction device. The invention provides a system and method for an account issuer to determine if a RFID transaction device is a valid device for completing a transaction on a RF transaction system. The account issuer can determine whether the transaction device is valid by verifying the transaction device counter, and encryption identifier. It should be noted, however, that the present invention contemplates various arrangements wherein the RFID reader may also be validated.

FIG. **3** illustrates another method **300** for usage of the RFID transaction device counter **118** value for securing a RF transaction. In accordance with the method depicted, RFID reader **104** includes a random number generator **120**, for producing a random number to be used in the secure transactions. Random number generator **120** may be in communication with a RFID reader microprocessor **122**, which may provide the generated random number to RFID transaction device **102** during transaction processing. Random number generator **120** may be any conventional random number generator as is found in the art.

Method **300** may begin when a user presents RFID transaction device **102** for transaction completion (step **302**). The user may, for example, place RFID transaction device **102** into the interrogation zone provided by a RFID reader **104**. The interrogation zone may be the area or zone defined by the interrogation signal cast by RFID reader **104**.

Upon presentment of the transaction device **102**, RFID reader **104** may provide the random number to RFID transaction device **102**. RFID transaction device **102** may receive the random number and use it to create a RFID transaction device authentication tag (step **306**). RFID transaction device **102** may receive the random number and use the random number, the counter value, transaction account number and the RFID transaction device encryption key to create a RFID transaction device authentication tag.

RFID transaction device **102** may provide the RFID transaction device authentication tag to RFID reader **104**. RFID transaction device **102** may also provide in-the-clear data, the counter value, random number to RFID reader **104**, along with the RFID transaction device authentication tag (step **308**). RFID transaction device processor **114** may increment counter **118** using any of the incrementing methods discussed above (step **310**).

RFID reader **104** may receive the data provided by RFID reader **104**, and use the data to create a RFID reader authentication key using a RFID reader encryption key (step **312**). RFID reader **104** may convert the in-the-clear data, random number, counter value, RFID transaction device authentication tag, and RFID reader authentication tag into a format readable by POS **106** (step **314**) and provide the converted data to POS **106** (step **316**).

POS **106** may seek satisfaction of the transaction (step **318**). For example, POS **106** may form a transaction request using the data received from RFID transaction device **102**, and RFID reader **104** encryption key and forward the transaction request to an acquirer **110** who may forward the transaction request to an account issuer system **112** using the routing number.

Account issuer system **112** may receive the transaction request and verify that RFID reader **104** and RFID transmission device **102** are valid. Account issuer system **112** may validate the RFID reader authentication tag by decrypting the RFID reader authentication tag using a RFID reader encryption

13

tion key stored on an account issuer database (not shown) (step 320). If the decryption is unsuccessful, then issuer system 112 may provide a "Transaction Invalid" message to POS 106 (step 322) and the transaction is terminated. Alternatively, if decryption is successful, issuer system 112 may seek to validate the RFID transaction device authentication tag (step 332).

For example, account issuer system 112 may use the RF transaction device account number to locate a RFID transaction device encryption key stored on issuer system 112 database (step 324) and use the RFID transaction device encryption key to decrypt the RFID transaction device authentication tag (step 326). If decryption is unsuccessful then issuer system 112 provides a "Transaction Invalid" message to POS 106 (step 322) and the transaction is terminated. Alternatively, if the decryption is successful, then issuer system 112 may validate the counter value (step 328). Issuer system 112 may compare the counter value to an expected counter value. In another exemplary embodiment, issuer system 112 may subject the counter value received from RFID transaction device 102 to an algorithm the results of which are validated against an expected counter value.

If the counter value is unsuccessfully validated, then issuer system 112 may provide a "Transaction Invalid" message to POS 106. Otherwise, issuer system 112 may process the RFID transaction account number under business as usual standards (step 330). In this way, the transaction is secured using a counter, by using the counter to validate a RFID transaction device authentication tag and a RFID reader authentication tag.

FIG. 4 illustrates another exemplary embodiment of the present invention wherein RFID transaction device 102 is validated using the counter value. In this exemplary embodiment, RFID transaction device 102 is presented (step 302) and RFID reader 104 sends a random number to RFID transaction device 102 (step 304). RFID transaction device 102 receives the random number and creates a RFID transaction device authentication tag using the random number, the in-the-clear data, and a counter value (step 306). RFID transaction device 102 may then provide the RFID transaction device authentication tag, random number, counter value, and in-the-clear data to RFID reader 104 (step 308). RFID transaction device 102 may increment the counter value by a predetermined value (step 310).

RFID reader 104 may receive the RFID transaction device authentication tag, in-the-clear data and counter value and convert the counter value, in-the-clear data and RFID transaction device authentication tag to a merchant POS 106 format (step 414). Merchant POS 106 may then provide the data received from RFID reader 104 to an issuer system 112 (step 316) for transaction satisfaction (step 318). Issuer system 112 may receive the data and verify the RFID transaction device authentication (step 332). For example, issuer system 112 may validate the RFID transaction authentication tag and the counter value in accordance with steps 324-330.

Under yet another embodiment, FIG. 5 illustrates an aspect of the invention wherein RFID reader 104 is validated, when RFID transaction device 102 is not. According to the invention RFID transaction device 102 is validated using the counter value. In this exemplary embodiment, RFID transaction device 102 is presented for transaction completion as described before (step 302). RFID transaction device 102 may then provide the counter and the in-the-clear data to RFID reader 104 (step 508). RFID transaction device 102 may increment the counter value by a predetermined value (step 310).

14

RFID reader 104 may receive the in-the-clear data and the counter value and prepare RFID reader authentication tag using a RFID reader encryption key (step 512). RFID reader 104 may then convert the in-the-clear data and RFID reader authentication tag to a merchant POS 106 format (step 514). Merchant POS 106 may then provide the data received from RFID reader 104 to an issuer system 112 for transaction satisfaction (step 318). In one exemplary embodiment, merchant POS 106 may provide issuer system 112 with a POS identifier associated with POS 106. Issuer system 112 may receive the POS identifier, and locate a related POS encryption key stored on an issuer system database (not shown). Issuer system 112 may receive the data and verify the RFID transaction device authentication (step 532). For example, issuer system 112 may validate the RFID transaction authentication tag and the counter value in accordance with steps 524-530, in similar manner as is described with respect to steps 324-330 above.

In yet another exemplary embodiment, the counter value is used in conjunction with a routing number to secure a RFID transaction. RFID transaction device 102 provides the routing number to POS 106 which may use the routing number to authenticate (e.g., validate) RFID transaction device 102 and/or decrypt an encrypted transaction account data. Under this method, and undetected by POS 106, the transaction device account number and expiration date (e.g., payload) is encrypted and placed in the unused field of the message provided by RFID reader 104 to POS 106. Issuer system 112 may receive the routing number and the encrypted transaction account data (e.g., transaction account number and expiration date), and use the routing number to validate the transaction device 102, or account number.

FIG. 6 depicts an exemplary method 600 for using the counter value, routing number and encrypted payload to secure a RFID transaction. RFID transaction device 102 may be presented to a RFID reader 104 for transaction completion (step 302), and RFID reader 104 may send a random number to RFID transaction device 102 (step 304). RFID transaction device 102 may receive the random number and retrieve the transaction account number and expiration date (e.g., payload data) associated with RFID transaction device 102, and the routing number associated with the payload data (step 615). RFID transaction device 102 may encrypt the payload (step 617) and create a RFID transaction device authentication tag using the random number, routing number associated with the transaction account number, the counter value, and encrypted payload data (step 606). RFID transaction device 102 may form a RFID transaction device data message including the RFID transaction device authentication tag, counter value, encrypted payload and routing number (step 619). RFID transaction device 102 may place the routing number in a location typically recognizable by POS 106 as the transaction account number (step 621). In this way, POS 106 is unaware that the data received in the ordinary transaction number field of the data message is a routing number. Additionally, RFID transaction device 102 may place the encrypted payload in the unused field of the RFID transaction device data message (step 623). RFID transaction device 102 may provide the data message to RFID reader 104 in the format discussed above (step 625), and RFID reader 104 may provide the data message to POS 106 in any POS recognizable format (step 614). RFID transaction device 102 may then increment the counter value (step 610). The merchant may then seek transaction satisfaction by forwarding the transaction to issuer system 112, for example (step 318).

RFID transaction device 102 may be validated (step 632) by validating the RFID transaction device authentication tag,

counter value or the like. For example, issuer system 112 may seek to validate the RFID transaction device authentication tag. Issuer system 112 may, for example, use the routing number to locate a corresponding RFID transaction device authentication tag decryption key stored on issuer system 112 database and use the RFID transaction device decryption key to decrypt the RFID transaction device authentication tag (step 624). If decryption is unsuccessful (step 326) then issuer system 112 provides a "Transaction Invalid" message to POS 106 (step 322) and the transaction is terminated. Alternatively, if the decryption is successful (step 326), then issuer system 112 may validate the counter value (step 328). Issuer system 112 may compare the counter value to an expected counter value. In another exemplary embodiment, issuer system 112 may subject the counter value received from RFID transaction device 102 to an algorithm the results of which are validated against an expected counter value.

If the counter value is unsuccessfully validated, then issuer system 112 may provide a "Transaction Invalid" message to POS 106 (step 322). Otherwise, issuer system 112 may process the RFID transaction account number under business as usual standards. In an alternate embodiment, upon validating the counter value and the RFID transaction device authentication tag, issuer system 112 may use the routing number to locate a decryption key for decrypting the encrypted payload (e.g., "payload encryption key") and decrypt the payload accordingly (step 630). Alternatively, the payload encryption key and the RFID authentication tag encryption key may be identical, substantially the same key, or different keys entirely.

Notably, since the routing number may be defined as the card number in the data transmitted from the RFID reader 104 to POS 106, the issuing system 112 may readily use the routing number to locate appropriate decryption keys. In this way, the transaction is secured using a counter, by using the counter to validate a RFID transaction device authentication tag and a RFID reader authentication tag.

FIG. 7 depicts yet another method 700 for securing a RF transaction wherein the customer identifying information (called "customer data" herein) is encrypted and provided in the data transmission field, and in one embodiment, in the portion of the data transmission field typically reserved for unused information. In a similar manner as is described with respect to FIG. 6, the routing number associated with a particular transaction account is placed in the data transmission field typically reserved for the transaction account number. Merchant POS 106 may be unaware of the content of the information stored in the transaction account and unused fields, such that the merchant system processes the transaction request as if the fields contained the information typically stored therein.

Operation of method 700 may be understood with reference to FIG. 7 and continued reference to FIGS. 1 and 6. Namely, method 700 may begin with RFID transaction device 102 being presented to a RFID reader 104 for transaction completion (step 302), and RFID reader 104 may send a random number to RFID transaction device 102 (step 304). RFID transaction device 104 may receive the random number and retrieve the transaction account number, expiration date (e.g., payload data), the customer identifying information (e.g., customer name) associated with RFID transaction device 102, and the routing number associated with the payload data (step 715). In this exemplary embodiment, the "payload data" is described as including the customer identification information. RFID transaction device 102 may encrypt the payload data (step 717) and create a RFID transaction device authentication tag using the random number, routing

number associated with the transaction account number, the counter value, and encrypted payload data (step 606). RFID transaction device 102 may form a RFID transaction device data message including the RFID transaction device authentication tag, counter value, encrypted payload and routing number (step 619). RFID transaction device 102 may place the routing number in a location typically recognizable by POS 106 as the transaction account number (step 621). In this way, POS 106 may be unaware that the data received in the ordinary transaction number field of the data message is a routing number. Additionally, RFID transaction device 102 may place the encrypted payload in the unused field of the RFID transaction device data message (step 623). RFID transaction device 102 may provide the data message to RFID reader 104 in the format discussed above (step 625), and RFID reader 104 may provide the data message to POS 106 in any POS recognizable format (step 614). RFID transaction device 102 may then increment the counter value (step 610). The merchant may then seek transaction satisfaction by forwarding the transaction to issuer system 112, for example (step 318).

RFID transaction device 102 may be validated (step 732) by validating the RFID transaction device authentication tag, counter value or the like. For example, issuer system 112 may seek to validate the RFID transaction device authentication tag. Issuer system 112 may, for example, use the routing number to locate a corresponding RFID transaction device authentication tag decryption key stored on issuer system 112 database and use the RFID transaction device decryption key to decrypt the RFID transaction device authentication tag (step 724). If decryption is unsuccessful (step 326), then issuer system 112 provides a "Transaction Invalid" message to POS 106 (step 322) and the transaction is terminated. Alternatively, if the decryption is successful (step 326), then issuer system 112 may validate the counter value (step 328). Issuer system 112 may compare the counter value to an expected counter value. In another exemplary embodiment, issuer system 112 may subject the counter value received from RFID transaction device 102 to an algorithm the results of which are validated against an expected counter value.

If the counter value is unsuccessfully validated, then issuer system 112 may provide a "Transaction Invalid" message to POS 106 (step 322). Otherwise, issuer system 112 may send a "Transaction Valid" message to the merchant system and process the RFID transaction account number under business as usual standards. In an alternate embodiment, upon validating the counter value and the RFID transaction device authentication tag, issuer system 112 may locate a decryption key for use in decrypting the payload. For example, the issuer system 112 may use the routing number to locate a payload decryption key for decrypting the encrypted payload (e.g., "payload encryption key") and decrypt the payload accordingly (step 630). Alternatively, the payload encryption key and the RFID authentication tag encryption key may be identical, substantially the same key, or different keys entirely.

Upon locating the appropriate decryption key, and successfully decrypting the transaction account authentication tag, issuer system 112 may retrieve the customer identifying information from the payload, and provide the customer identifying information to the merchant with the "Transaction valid" message (step 730). The customer identifying information may be provided to the merchant in an unencrypted format or in an encrypted format decryptable by the merchant system. The merchant may then use the customer identifying information to fulfill its billing and recordkeeping purposes.

17

As previously noted, since the routing number may be defined as the card number in the data transmitted from the RFID reader **104** to POS **106**, the issuing system **112** may readily use the routing number to locate appropriate decryption keys (step **624**). In this way, the transaction is secured by placing the customer identifying information in the unused field of the RF data transmission.

The preceding detailed description of exemplary embodiments of the invention makes reference to the accompanying drawings, which show the exemplary embodiment by way of illustration. While these exemplary embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, it should be understood that other embodiments may be realized and that logical and mechanical changes may be made without departing from the spirit and scope of the invention. For example, the RFID reader may include an RFID reader encrypted identifier stored in the reader database, which may be validated by the account issuer in similar manner as with the transaction device encrypted identifier. Moreover, the counter may increment the total transactions counted value by the predetermined incremental value at the completion of a successful transaction. In addition, the steps recited in any of the method or process claims may be executed in any order and are not limited to the order presented. Further, the present invention may be practiced using one or more servers, as necessary. Thus, the preceding detailed description is presented for purposes of illustration only and not of limitation, and the scope of the invention is defined by the preceding description, and with respect to the attached claims.

What is claimed is:

1. A method, comprising:
 - creating an encrypted authentication tag using a random number and at least one of a transaction account code, a routing number, or a counter value; and
 - transmitting the encrypted authentication tag and the routing number to a radio frequency identification (RFID) reader using a data transmission format comprising an account code field and an unallocated field, wherein the encrypted authentication tag is transmitted in the unallocated field of the data transmission format.
2. The method of claim **1**, further comprising receiving the random number from the RFID reader.
3. The method of claim **2**, further comprising transmitting an RFID reader authentication code to the RFID reader and receiving an encrypted RFID reader authentication code from the RFID reader.
4. The method of claim **3**, further comprising verifying the encrypted RFID reader authentication code for authentication of the RFID reader.
5. The method of claim **1**, wherein the encrypted authentication tag is created using the routing number.
6. The method of claim **1**, further comprising incrementing the counter value by at least one of a random amount or a predetermined amount.
7. The method of claim **1**, wherein the routing number is transmitted in a transaction account field.
8. The method of claim **7**, wherein the transaction account field is a primary account number (PAN) field as defined by ISO 8583.
9. The method of claim **7**, further comprising:
 - creating a payload data file by encrypting the transaction account code; and
 - transmitting the payload data file to the RFID reader in at least one of character positions 64-79 of a Track 1 format as defined in ISO 7813.

18

10. The method of claim **1**, wherein the unallocated field includes at least one of character positions 64-79 of a Track 1 format as defined in ISO 7813.

11. The method of claim **1**, wherein the unallocated field includes at least one of: a field separator (FS) field, an expiry date (ED) field, a service code (SC) field, a PIN verification value (PVV) field, a discretionary data (DD) field, an end sentinel (ES) field, or a longitude redundancy check (LRC) field, of a Track 1 format as defined in ISO 7813.

12. A radio frequency transaction device, comprising:

a processor configured to create an encrypted authentication tag and a routing number, wherein the processor is configured to create the encrypted authentication tag using at least one of a counter value, the routing number, or a transaction account code; and

a communication device configured to transmit the encrypted authentication tag using a data transmission format comprising an account code field and an unallocated field, wherein the encrypted authentication tag is configured to be transmitted in the unallocated field of the data transmission format.

13. The radio frequency transaction device of claim **12**, further comprising a memory configured to store customer identifying information, the counter value, the transaction account code, and an encryption key.

14. The radio frequency transaction device of claim **13**, wherein the processor is configured to create the encrypted authentication tag using at least one of the customer identifying information, the encryption key, the counter value, the routing number, or the transaction account code.

15. The radio frequency transaction device of claim **12**, further comprising a memory configured to store a payload data file.

16. The radio frequency transaction device of claim **15**, wherein the payload data file comprises an encrypted transaction account code.

17. A method, comprising:

receiving an encrypted account payload data file from a radio frequency (RF) transaction device using a data transmission format comprising an account code field and an unallocated field, wherein the encrypted account payload data file is transmitted in the unallocated field of the data transmission format;

receiving a routing number from the RF transaction device in a transaction account field, wherein the transaction account field does not contain a transaction account code; and

using the routing number to transmit the encrypted account payload data file to an account provider.

18. The method of claim **17**, further comprising:

providing a random number to the RF transaction device; and

receiving an encrypted authentication tag from the RF transaction device, wherein the encrypted authentication tag is generated using the random number and at least one of the transaction account code, the routing number, or a counter value.

19. The method of claim **18**, further comprising converting at least one of the encrypted authentication tag, the counter value, the random number, or the routing number into a merchant point of sale (POS) recognized format.

20. The method of claim **19**, wherein the merchant POS recognized format is ISO/IEC 8583 compatible.

21. The method of claim **18**, further comprising verifying the encrypted authentication tag using an authentication tag decryption key corresponding to an identification code received from the RF transaction device.

19

22. The method of claim 17, further comprising decrypting the encrypted account payload data file using a payload decryption key corresponding to an identification code received from the RF transaction device.

23. The method of claim 17, wherein the transaction account field is a primary account number (PAN) field as defined by ISO 8583.

24. The method of claim 17, wherein transmitting the encrypted account payload data file to an account provider is performed without having access to the transaction account code.

25. A method, comprising:

associating radio frequency (RF) transaction device data with a routing number;

receiving an encrypted authentication tag from a merchant in accordance with the routing number using a data transmission format comprising an account code field and an unallocated field, wherein the encrypted authentication tag is transmitted in the unallocated field of the data transmission format;

verifying the encrypted authentication tag using an authentication tag decryption key corresponding to the RF transaction device data; and

decrypting the encrypted authentication tag to process a transaction request.

26. The method of claim 25, wherein the authentication tag decryption key relates to the routing number.

27. The method of claim 25, further comprising:

decrypting the encrypted authentication tag to read a counter value; and

verifying the counter value to facilitate processing the transaction request.

28. The method of claim 27, further comprising receiving a payload data file from the merchant in accordance with the routing number.

29. A method, comprising:

associating radio frequency (RF) transaction device data with a routing number;

receiving an encrypted authentication tag and a payload data file from a merchant in accordance with the routing number;

verifying the encrypted authentication tag using an authentication tag decryption key corresponding to the RF transaction device data; and

decrypting the encrypted authentication tag to process a transaction request and to read a counter value; and verifying the counter value to facilitate processing the transaction request, wherein processing the transaction request comprises at least one of:

locating a payload decryption key using the routing number;

decrypting customer identifying information from the payload data file using the payload decryption key to create decrypted customer identifying information; or providing the decrypted customer identifying information to a merchant point of sale (POS) device for processing.

30. A method, comprising:

creating an encrypted authentication tag using a random number;

creating a payload data file by encrypting a transaction account code; and

transmitting the encrypted authentication tag and the payload data file to a radio frequency identification (RFID) reader using a data transmission format comprising an account code field and an unallocated field,

20

wherein the encrypted authentication tag and the payload data file is transmitted in the unallocated field of the data transmission format.

31. The method of claim 30, further comprising receiving the random number from the RFID reader.

32. The method of claim 31, further comprising transmitting an RFID reader authentication code to the RFID reader and receiving an encrypted RFID reader authentication code from the RFID reader.

33. The method of claim 32, further comprising verifying the encrypted RFID reader authentication code for authentication of the RFID reader.

34. The method of claim 30, wherein the creating the encrypted authentication tag further uses a routing number.

35. The method of claim 30, further comprising incrementing a counter value by at least one of a random amount or a predetermined amount.

36. The method of claim 30, wherein a routing number is transmitted in a transaction account field.

37. The method of claim 36, wherein the transaction account field is a primary account number (PAN) field as defined by ISO 8583.

38. The method of claim 36, further comprising:

creating a payload data file by encrypting the transaction account code; and

transmitting the payload data file to the RFID reader in at least one of character positions 64-79 of a Track 1 format as defined in ISO 7813.

39. The method of claim 30, wherein the unallocated field includes at least one of character positions 64-79 of a Track 1 format as defined in ISO 7813.

40. The method of claim 30, wherein the unallocated field includes at least one of:

a field separator (FS) field, an expiry date (ED) field, a service code (SC) field, a PIN verification value (PVV) field, a discretionary data (DD) field, an end sentinel (ES) field, or a longitude redundancy check (LRC) field, of a Track 1 format as defined in ISO 7813.

41. A radio frequency transaction device, comprising:

a processor configured to:

create an encrypted authentication tag using a routing number; and

create a payload data file by encrypting a transaction account code; and

a communication device configured to transmit the encrypted authentication tag and payload data file using a data transmission format comprising an account code field and an unallocated field,

wherein the encrypted authentication tag and the payload data file are configured to be transmitted in the unallocated field of the data transmission format.

42. The radio frequency transaction device of claim 41, further comprising a memory configured to store customer identifying information, a counter value, a transaction account code, and an encryption key.

43. The radio frequency transaction device of claim 42, wherein the processor is further configured to create the encrypted authentication tag using at least one of the customer identifying information, the encryption key, the counter value, the routing number, or the transaction account code.

44. The radio frequency transaction device of claim 41, further comprising a memory configured to store a payload data file.

45. The radio frequency transaction device of claim 44, wherein the payload data file comprises an encrypted transaction account code.

* * * * *