



US009054421B2

(12) **United States Patent**
Puente Baliarda et al.

(10) **Patent No.:** **US 9,054,421 B2**
(45) **Date of Patent:** ***Jun. 9, 2015**

- (54) **MULTILEVEL ANTENNAE**
- (71) Applicant: **Fractus, S.A.**, Barcelona (ES)
- (72) Inventors: **Carles Puente Baliarda**, Sant Cugat del Valles (ES); **Carmen Borja Borau**, Barcelona (ES); **Jaume Anguera Pros**, Vinaros (ES); **Jordi Soler Castany**, Mataro (ES)
- (73) Assignee: **Fractus, S.A.**, Barcelona (ES)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 131 days.

(21) Appl. No.: **13/732,761**
(22) Filed: **Jan. 2, 2013**

(65) **Prior Publication Data**
US 2013/0194154 A1 Aug. 1, 2013

Related U.S. Application Data
(63) Continuation of application No. 13/669,916, filed on Nov. 6, 2012, now abandoned, which is a continuation of application No. 13/411,212, filed on Mar. 2, 2012, now Pat. No. 8,330,659, which is a continuation of
(Continued)

(51) **Int. Cl.**
H01Q 1/38 (2006.01)
H01Q 1/50 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC . **H01Q 1/50** (2013.01); **H01Q 1/36** (2013.01);
H01Q 1/38 (2013.01); **H01Q 5/0051** (2013.01);
(Continued)

(58) **Field of Classification Search**
USPC 343/700 MS, 702, 829, 846
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS

621,455 A 3/1899 Hess
646,850 A 4/1900 Lindemyer
(Continued)

FOREIGN PATENT DOCUMENTS

AU 2438199 9/1999
CA 2416437 1/2002
(Continued)

OTHER PUBLICATIONS

Document 0256—Plaintiff Fractus, S. A.’s answer to the counterclaims of defendants Research in Motion Ltd. and Research in Motion Corporation to the Second Amended Complaint. Susman Godfrey. Jan. 4, 2010.

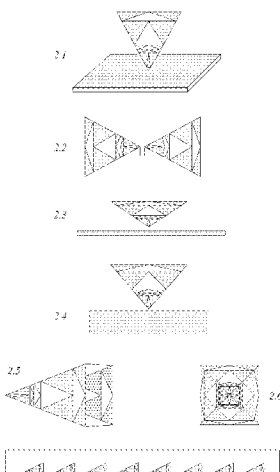
(Continued)

Primary Examiner — Tho G Phan
(74) *Attorney, Agent, or Firm* — Edell, Shapiro & Finnan LLC

(57) **ABSTRACT**

An apparatus includes an antenna element that operates in at least first and second non-overlapping frequency bands and has geometric elements arranged to define empty spaces in the antenna element to provide first and second winding current paths through the antenna element, the first and second winding current paths circumventing the empty spaces and respectively corresponding to the first and second frequency bands to provide the antenna element with multi-band behavior. The apparatus further includes a ground plane, with the antenna element being electrically coupled to the ground plane. The antenna element provides a substantially similar impedance level and radiation pattern in the first and second frequency bands. The geometric elements are arranged such that the antenna element does not comprise a group of single band antennas that respectively operate in the first and second frequency bands, and the antenna element is not a fractal type antenna element.

23 Claims, 14 Drawing Sheets



Related U.S. Application Data

application No. 13/044,189, filed on Mar. 9, 2011, now Pat. No. 8,154,463, which is a continuation of application No. 12/400,888, filed on Mar. 10, 2009, now Pat. No. 8,009,111, which is a continuation of application No. 11/780,932, filed on Jul. 20, 2007, now Pat. No. 7,528,782, which is a continuation of application No. 11/179,257, filed on Jul. 12, 2005, now Pat. No. 7,397,431, which is a continuation of application No. 11/102,390, filed on Apr. 8, 2005, now Pat. No. 7,123,208, which is a continuation of application No. 10/963,080, filed on Oct. 12, 2004, now Pat. No. 7,015,868, which is a continuation of application No. 10/102,568, filed on Mar. 18, 2002, now abandoned, which is a continuation of application No. PCT/ES99/00296, filed on Sep. 20, 1999.

(51) **Int. Cl.**

H01Q 1/36 (2006.01)
H01Q 5/00 (2006.01)
H01Q 9/04 (2006.01)
H01Q 9/06 (2006.01)
H01Q 9/28 (2006.01)
H01Q 9/40 (2006.01)
H01Q 5/01 (2006.01)

(52) **U.S. Cl.**

CPC **H01Q 9/04** (2013.01); **H01Q 9/0407** (2013.01); **H01Q 9/065** (2013.01); **H01Q 9/28** (2013.01); **H01Q 9/40** (2013.01); **H01Q 5/001** (2013.01); **H01Q 5/01** (2013.01)

(56)

References Cited

U.S. PATENT DOCUMENTS

2,759,183 A 8/1956 Woodward
 3,079,602 A 2/1963 Du Hamel
 3,521,284 A 7/1970 Shelton et al.
 3,599,214 A 8/1971 Altmayer
 3,605,102 A 9/1971 Frye
 3,622,890 A 11/1971 Fujimoto
 3,680,135 A 7/1972 Boyer
 3,683,376 A 8/1972 Pronovost
 3,689,929 A 9/1972 Moody
 3,818,490 A 6/1974 Leahy
 3,858,221 A 12/1974 Harrison et al.
 3,967,276 A 6/1976 Goubau
 3,969,730 A 7/1976 Fuchser
 4,021,810 A 5/1977 Urpo et al.
 4,024,542 A 5/1977 Ikawa et al.
 4,038,662 A 7/1977 Turner
 4,131,893 A 12/1978 Munson et al.
 4,141,014 A 2/1979 Sletten
 4,141,016 A 2/1979 Nelson
 4,157,548 A 6/1979 Kaloi
 4,218,682 A 8/1980 Yu
 4,243,990 A 1/1981 Nemit
 4,290,071 A 9/1981 Fenwick
 4,318,109 A 3/1982 Weathers
 4,356,492 A 10/1982 Kaloi
 4,398,199 A 8/1983 Makimoto
 4,424,500 A 1/1984 Viola et al.
 4,471,358 A 9/1984 Glasser
 4,471,493 A 9/1984 Schober
 4,504,834 A 3/1985 Garay et al.
 4,509,056 A 4/1985 Ploussios
 4,517,572 A 5/1985 Dixon
 4,518,968 A 5/1985 Hatley
 4,521,784 A 6/1985 Nemet
 4,527,164 A 7/1985 Cestaro et al.

4,543,581 A 9/1985 Nemet
 4,553,146 A 11/1985 Butler
 4,571,595 A 2/1986 Phillips et al.
 4,584,709 A 4/1986 Kneisel et al.
 4,590,614 A 5/1986 Erat
 4,608,572 A 8/1986 Blakney
 4,623,894 A 11/1986 Lee et al.
 4,656,642 A 4/1987 Apostolos et al.
 4,673,948 A 6/1987 Kuo
 4,709,239 A 11/1987 Herrick
 4,723,305 A 2/1988 Phillips et al.
 4,730,195 A 3/1988 Phillips et al.
 4,792,809 A 12/1988 Gilbert et al.
 4,794,396 A 12/1988 Pothier
 4,799,156 A 1/1989 Shavit et al.
 4,827,271 A 5/1989 Berneking
 4,839,660 A 6/1989 Hadzoglou
 4,843,468 A 6/1989 Drewery
 4,847,629 A 7/1989 Shimazaki
 4,849,766 A 7/1989 Inaba et al.
 4,857,939 A 8/1989 Shimazaki
 4,860,019 A 8/1989 Jiang
 4,890,114 A 12/1989 Egashira
 4,894,663 A 1/1990 Urbish et al.
 4,907,011 A 3/1990 Kuo
 4,912,481 A 3/1990 Mace et al.
 4,975,711 A 12/1990 Lee
 5,014,346 A 5/1991 Phillips
 5,030,963 A 7/1991 Tadama
 5,033,385 A 7/1991 Zeren
 5,046,080 A 9/1991 Lee et al.
 5,061,944 A 10/1991 Powers et al.
 5,074,214 A 12/1991 Zeren
 5,075,691 A 12/1991 Garay
 5,138,328 A 8/1992 Zibrik et al.
 5,164,980 A 11/1992 Bush et al.
 5,168,472 A 12/1992 Lockwood
 5,172,084 A 12/1992 Fiedziuszko et al.
 5,197,140 A 3/1993 Balmer
 5,200,756 A 4/1993 Feller
 5,210,542 A 5/1993 Pett et al.
 5,212,742 A 5/1993 Normile et al.
 5,212,777 A 5/1993 Gove et al.
 5,214,434 A 5/1993 Hsu
 5,218,370 A 6/1993 Blaese
 5,227,804 A 7/1993 Oda
 5,227,808 A 7/1993 Davis
 5,245,350 A 9/1993 Sroka
 5,248,988 A 9/1993 Makino
 5,255,002 A 10/1993 Day
 5,257,032 A 10/1993 Diamond et al.
 5,258,765 A 11/1993 Dorrie et al.
 5,262,791 A 11/1993 Tsuda et al.
 5,300,936 A 4/1994 Izadian
 5,307,075 A 4/1994 Huynh
 5,337,063 A 8/1994 Takahira
 5,337,065 A 8/1994 Bonnet
 5,347,291 A 9/1994 Moore
 5,355,144 A 10/1994 Walton
 5,355,318 A 10/1994 Dionnet et al.
 5,361,061 A 11/1994 Mays
 5,363,114 A 11/1994 Shoemaker
 5,373,300 A 12/1994 Jenness et al.
 5,394,163 A 2/1995 Bullen et al.
 5,402,134 A 3/1995 Miller et al.
 5,410,322 A 4/1995 Sonoda
 5,420,599 A 5/1995 Erkocevic
 5,422,651 A 6/1995 Chang
 5,438,357 A 8/1995 McNelley
 5,451,965 A 9/1995 Matsumoto
 5,451,968 A 9/1995 Emery
 5,453,751 A 9/1995 Tsukamoto et al.
 5,453,752 A 9/1995 Wang
 5,457,469 A 10/1995 Diamond et al.
 5,471,224 A 11/1995 Barkeshli
 5,493,702 A 2/1996 Crowley et al.
 5,495,261 A 2/1996 Baker et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

5,537,367	A	7/1996	Lockwood et al.	6,037,902	A	3/2000	Pinhas et al.
5,557,293	A	9/1996	McCoy	6,037,907	A	3/2000	Ha
5,559,524	A	9/1996	Takei et al.	6,039,583	A	3/2000	Korsunsky et al.
5,563,882	A	10/1996	Bruno et al.	6,040,803	A	3/2000	Spall
5,569,879	A	10/1996	Gloton	6,043,783	A	3/2000	Endo et al.
5,572,223	A	11/1996	Phillips	6,049,314	A	4/2000	Munson et al.
H1631	H	2/1997	Montgomery	6,054,953	A	4/2000	Lindmark
5,600,844	A	2/1997	Shaw et al.	6,057,801	A	5/2000	Desclos et al.
5,608,417	A	3/1997	De Vall	6,069,592	A	5/2000	Wass
5,619,205	A	4/1997	Johnson	6,072,434	A	6/2000	Papatheodorou
5,621,913	A	4/1997	Tuttle et al.	6,075,485	A	6/2000	Lilly et al.
5,627,550	A	5/1997	Sanad	6,075,494	A	6/2000	Milroy
5,646,635	A	7/1997	Cockson et al.	6,075,500	A	6/2000	Kurz et al.
5,646,637	A	7/1997	Miller	6,078,294	A	6/2000	Mitarai
5,657,028	A	8/1997	Sanad	6,081,237	A	6/2000	Sato et al.
5,672,345	A	9/1997	Curtiss	6,087,990	A	7/2000	Thill et al.
5,680,144	A	10/1997	Sanad	6,091,365	A	7/2000	Derneryd et al.
5,684,672	A	11/1997	Karidis et al.	6,094,179	A	7/2000	Davidson
5,703,600	A	12/1997	Burrell et al.	6,097,339	A	8/2000	Filipovic
5,710,458	A	1/1998	Iwasaki	6,097,345	A	8/2000	Walton
5,712,640	A	1/1998	Andou et al.	6,100,855	A	8/2000	Vinson et al.
5,734,352	A	3/1998	Seward et al.	6,104,347	A	8/2000	Snygg
5,742,258	A	4/1998	Kumpfbeck et al.	6,104,349	A	8/2000	Cohen
5,764,190	A	6/1998	Murch et al.	6,107,920	A	8/2000	Eberhardt et al.
5,767,811	A	6/1998	Mandai et al.	6,111,545	A	8/2000	Saari
5,767,814	A	6/1998	Conroy et al.	6,112,102	A	8/2000	Zhinong
5,790,080	A	8/1998	Apostolos	6,114,674	A	9/2000	Baugh et al.
5,798,688	A	8/1998	Schofield	6,122,533	A	9/2000	Zhang et al.
5,805,113	A	9/1998	Ogino et al.	6,124,830	A	9/2000	Yuanzhu
5,808,586	A	9/1998	Phillips et al.	6,127,977	A	10/2000	Cohen
5,809,433	A	9/1998	Thompson	6,130,651	A	10/2000	Yanagisawa et al.
5,821,907	A	10/1998	Zhu et al.	6,131,042	A	10/2000	Lee et al.
5,841,403	A	11/1998	West	6,133,879	A	10/2000	Grangeat
5,861,845	A	1/1999	Lee et al.	6,133,883	A	10/2000	Munson et al.
5,870,066	A	2/1999	Asakura et al.	6,140,966	A	10/2000	Pankinaho
5,872,546	A	2/1999	Ihara et al.	6,140,969	A	10/2000	Lindenmeier et al.
5,898,404	A	4/1999	Jou	6,140,975	A	10/2000	Cohen
5,903,240	A	5/1999	Kawahata et al.	6,141,540	A	10/2000	Richards et al.
5,913,174	A	6/1999	Casarez et al.	6,147,652	A	11/2000	Sekine
5,918,183	A	6/1999	Janky	6,147,655	A	11/2000	Roesner
5,926,139	A	7/1999	Korisch	6,154,176	A	11/2000	Fathy et al. 343/700 MS
5,926,141	A	7/1999	Lindenmeier et al.	6,154,180	A	11/2000	Padrick
5,926,208	A	7/1999	Noonen et al.	6,157,348	A	12/2000	Openlander
5,929,822	A	7/1999	Kumpfbeck et al.	6,160,513	A	12/2000	Davidson et al.
5,929,825	A	7/1999	Niu et al.	6,166,694	A	12/2000	Ying
5,936,583	A	8/1999	Sekine et al.	6,172,618	B1	1/2001	Hakozaki et al.
5,936,587	A	8/1999	Gudilev	6,175,333	B1	1/2001	Smith et al.
5,943,020	A	8/1999	Liebendoerfer et al.	6,181,281	B1	1/2001	Desclos et al.
5,945,954	A	8/1999	Johnson	6,195,048	B1	2/2001	Chiba et al.
5,963,871	A	10/1999	Zhinong et al.	6,198,442	B1	3/2001	Rutkowski et al.
5,966,097	A	10/1999	Fukasawa et al.	6,198,943	B1	3/2001	Sadler et al.
5,966,098	A	10/1999	Qi et al.	6,201,501	B1	3/2001	Arkko et al.
5,969,689	A	10/1999	Martek	6,204,826	B1	3/2001	Rutkowski et al.
5,973,648	A	10/1999	Lindenmeier	6,211,824	B1	4/2001	Holden et al.
5,973,651	A	10/1999	Suesada et al.	6,211,826	B1	4/2001	Aoki
5,982,337	A	11/1999	Newman et al.	6,211,834	B1	4/2001	Durham et al.
5,986,609	A	11/1999	Spall	6,211,889	B1	4/2001	Stoutamire
5,986,610	A	11/1999	Miron	6,215,447	B1	4/2001	Johnson
5,986,615	A	11/1999	Westfall et al.	6,215,474	B1	4/2001	Shah
5,990,838	A	11/1999	Burns et al.	6,218,989	B1	4/2001	Schneider et al.
5,995,052	A	11/1999	Sadler et al.	6,218,991	B1	4/2001	Sanad
5,995,064	A	11/1999	Yanagisawa	6,218,992	B1	4/2001	Sadler et al.
6,002,367	A	12/1999	Engblom et al.	6,222,497	B1	4/2001	Hu et al.
6,005,524	A	12/1999	Hayes et al.	6,236,366	B1	5/2001	Yamamoto et al.
6,008,764	A	12/1999	Ollikainen et al.	6,236,372	B1	5/2001	Lindenmeier et al.
6,008,774	A	12/1999	Wu	6,239,752	B1	5/2001	Blanchard
6,011,518	A	1/2000	Yamagishi	6,239,765	B1	5/2001	Johnson et al.
6,011,699	A	1/2000	Murray	6,243,592	B1	6/2001	Nakada et al.
6,014,114	A	1/2000	Westfall et al.	6,255,994	B1	7/2001	Saito
6,018,319	A	1/2000	Lindmark	6,255,995	B1	7/2001	Asano et al.
6,028,568	A	2/2000	Asakura et al.	6,259,407	B1	7/2001	Tran
6,031,495	A	2/2000	Simmons et al.	6,260,088	B1	7/2001	Gove et al.
6,031,499	A	2/2000	Dichter	6,266,023	B1	7/2001	Nagy et al.
				6,266,538	B1	7/2001	Waldron
				6,268,836	B1	7/2001	Faulkner et al.
				6,271,794	B1	8/2001	Geeraert
				6,281,846	B1	8/2001	Baliarda et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

6,288,680 B1 9/2001 Tsuru et al.
 6,292,154 B1 9/2001 Deguchi et al.
 6,297,711 B1 10/2001 Seward et al.
 6,300,910 B1 10/2001 Kim
 6,300,914 B1 10/2001 Yang
 6,304,220 B1 10/2001 Herve et al.
 6,304,222 B1 10/2001 Smith et al.
 6,307,511 B1 10/2001 Ying et al.
 6,307,512 B1 10/2001 Geeraert
 6,310,578 B1 10/2001 Ying
 6,317,083 B1 11/2001 Johnson et al.
 6,320,543 B1 11/2001 Ohata et al.
 6,323,811 B1 11/2001 Tsubaki et al.
 6,326,919 B1 12/2001 Diximus et al.
 6,326,927 B1 12/2001 Johnson et al.
 6,327,485 B1 12/2001 Waldron
 6,329,951 B1 12/2001 Wen et al.
 6,329,954 B1 12/2001 Fuchs et al.
 6,329,962 B2 12/2001 Ying
 6,333,716 B1 12/2001 Pontoppidan
 6,333,720 B1 12/2001 Gottl et al.
 6,342,861 B1 1/2002 Packard
 6,343,208 B1 1/2002 Ying
 6,346,914 B1 2/2002 Annamaa
 6,348,892 B1 2/2002 Annamaa et al.
 6,351,241 B1 2/2002 Wass
 6,352,434 B1 3/2002 Emmert
 6,353,443 B1 3/2002 Ying
 6,360,105 B2 3/2002 Nakada et al.
 6,362,790 B1 3/2002 Proctor, Jr. et al.
 6,366,243 B1 4/2002 Isohatala et al.
 6,367,939 B1 4/2002 Carter et al.
 6,373,447 B1 4/2002 Rostoker et al.
 6,377,217 B1 4/2002 Zhu et al.
 6,380,895 B1 4/2002 Moren et al.
 6,380,902 B2 4/2002 Duroux
 6,381,471 B1 4/2002 Dvorkin
 6,384,790 B2 5/2002 Dishart et al.
 6,384,793 B2 5/2002 Scordilis
 6,388,626 B1 5/2002 Gamalielsson et al.
 6,396,444 B1 5/2002 Goward
 6,400,339 B1 6/2002 Edvardsson et al.
 6,407,710 B2 6/2002 Keilen
 6,408,190 B1 6/2002 Ying
 6,417,810 B1 7/2002 Huels et al.
 6,417,816 B2 7/2002 Sadler et al.
 6,421,014 B1 7/2002 Sanad
 6,421,024 B1 7/2002 Stolle
 6,424,315 B1 7/2002 Glenn et al.
 6,429,818 B1 8/2002 Johnson et al.
 6,431,712 B1 8/2002 Turnbull
 6,445,352 B1 9/2002 Cohen
 6,452,549 B1 9/2002 Lo
 6,452,553 B1 9/2002 Cohen
 6,456,249 B1 9/2002 Johnson et al.
 6,470,174 B1 10/2002 Scheffe et al.
 6,476,766 B1 11/2002 Cohen
 6,480,158 B2 11/2002 Apostolos
 6,483,462 B2 11/2002 Weinberger
 6,489,925 B2 12/2002 Thursby
 6,492,952 B1 12/2002 Hu
 6,496,154 B2 12/2002 Gyenes
 6,498,586 B2 12/2002 Pankinaho
 6,498,588 B1 12/2002 Callaghan
 6,525,691 B2 2/2003 Varadan et al.
 6,538,604 B1 3/2003 Isohatala et al.
 6,539,608 B2 4/2003 McKinnon et al.
 6,545,640 B1 4/2003 Herve et al.
 6,552,690 B2 4/2003 Veerasamy
 6,570,538 B2 5/2003 Vaisanen
 6,603,434 B2 8/2003 Lindenmeier
 6,628,784 B1 9/2003 Montane Condemines
 6,639,560 B1 10/2003 Kadambi

6,693,603 B1 2/2004 Smith et al.
 6,697,024 B2 2/2004 Fuerst
 6,707,428 B2 3/2004 Gram
 6,727,855 B1* 4/2004 Nalbandian 343/700 MS
 6,741,210 B2 5/2004 Brachat et al.
 6,756,944 B2 6/2004 Tessier
 6,812,893 B2 11/2004 Waterman
 6,831,606 B2 12/2004 Sajadinia
 6,897,830 B2 5/2005 Bae
 6,937,191 B2 8/2005 Puente
 6,937,196 B2 8/2005 Korva
 6,943,730 B2 9/2005 Poilasne
 6,977,808 B2 12/2005 Lam
 6,980,158 B2 12/2005 Iguchi
 6,995,720 B2 2/2006 Shikata
 7,015,868 B2 3/2006 Puente
 7,047,040 B2 5/2006 Kim
 7,072,698 B2 7/2006 Underbrink
 7,075,483 B2 7/2006 Okado
 7,091,911 B2 8/2006 Qi
 7,095,372 B2 8/2006 Soler Castany et al.
 7,102,577 B2 9/2006 Richard
 7,116,273 B2 10/2006 Morikawa
 7,119,748 B2 10/2006 Autti
 7,123,208 B2 10/2006 Puente et al.
 7,126,537 B2 10/2006 Cohen
 7,202,818 B2 4/2007 Anguera Pros et al.
 7,209,081 B2 4/2007 Chang
 7,256,743 B2 8/2007 Korva
 7,256,751 B2 8/2007 Cohen
 7,265,724 B1 9/2007 Tan
 7,312,762 B2 12/2007 Baliarda et al.
 7,342,553 B2 3/2008 Soler
 7,388,549 B2 6/2008 Chiang
 7,394,432 B2 7/2008 Baliarda et al.
 7,397,431 B2 7/2008 Baliarda et al.
 7,403,159 B2 7/2008 Gooshchin
 7,403,165 B2 7/2008 Qi
 7,528,782 B2 5/2009 Baliarda et al.
 7,659,864 B2* 2/2010 Chen et al. 343/860
 7,663,556 B2 2/2010 Desclos
 7,755,546 B2 7/2010 Ishimiya
 7,903,034 B2 3/2011 Anguera
 7,911,014 B2 3/2011 Doan
 8,369,950 B2* 2/2013 Rawat et al. 607/32
 8,427,373 B2* 4/2013 Jiang et al. 343/700 MS
 2001/0011964 A1 8/2001 Sadler
 2001/0018793 A1 9/2001 McKinnon et al.
 2001/0050635 A1 12/2001 Weinberger
 2001/0050636 A1 12/2001 Weinberger
 2001/0050638 A1 12/2001 Ishitobi et al.
 2002/0000940 A1 1/2002 Moren et al.
 2002/0000942 A1 1/2002 Duroux
 2002/0025839 A1 2/2002 Usui
 2002/0036594 A1 3/2002 Gyenes
 2002/0058539 A1 5/2002 Underbrink
 2002/0105468 A1 8/2002 Tessier
 2002/0109633 A1 8/2002 Ow
 2002/0126054 A1 9/2002 Fuerst et al.
 2002/0126055 A1 9/2002 Lindenmeier et al.
 2002/0140615 A1 10/2002 Carles
 2002/0171601 A1 11/2002 Puente
 2002/0175866 A1 11/2002 Gram
 2002/0190904 A1 12/2002 Cohen
 2003/0160723 A1 8/2003 Cohen
 2003/0201942 A1 10/2003 Poilasne et al.
 2004/0145529 A1 7/2004 Iguchi et al.
 2006/0001576 A1 1/2006 Contopanagos
 2006/0033664 A1 2/2006 Soler
 2006/0077101 A1 4/2006 Puente
 2008/0252536 A1 10/2008 Anguera
 2013/0194153 A1* 8/2013 Puente Baliarda et al. ... 343/860

FOREIGN PATENT DOCUMENTS

CN 2224466 4/1996
 CN 1559093 12/2004

(56) References Cited					
FOREIGN PATENT DOCUMENTS					
DE	19511300	10/1996	JP	5129816	10/1991
DE	19929689	1/2001	JP	5007109	1/1993
DE	10206426	11/2002	JP	5147806	6/1993
DE	10138265	7/2003	JP	5267916	10/1993
DE	10204079	8/2003	JP	5308223	11/1993
EP	0096847	12/1983	JP	5347507	12/1993
EP	0297813	1/1989	JP	6037531	2/1994
EP	0358090	3/1990	JP	6085530	3/1994
EP	0431764	6/1991	JP	6204908	7/1994
EP	0543645	5/1993	JP	6252629	9/1994
EP	0590671	9/1993	JP	1997-246852	9/1997
EP	0571124	11/1993	JP	9252214	9/1997
EP	0688040	12/1995	JP	10093332	4/1998
EP	0765001	9/1996	JP	10163748	6/1998
EP	0753897	1/1997	JP	10-209744	8/1998
EP	0814536	12/1997	JP	10-303637	11/1998
EP	0856907	8/1998	JP	11-004113	1/1999
EP	0871238	10/1998	JP	11-027042	1/1999
EP	0892459	1/1999	JP	11088032	3/1999
EP	0902472	3/1999	JP	11136015	5/1999
EP	0929121	7/1999	JP	11-220319	8/1999
EP	0932219	7/1999	JP	11317610	11/1999
EP	0938158	8/1999	JP	2002-158529	5/2002
EP	0942488	9/1999	JP	3449484	9/2003
EP	0969375	1/2000	JP	2003283230	10/2003
EP	1024552	1/2000	NZ	508835	11/2002
EP	0986130	3/2000	RU	2170478	7/2001
EP	0997972	3/2000	SE	518988	12/2002
EP	0993070	4/2000	TW	554571	9/2003
EP	0997974	5/2000	WO	88/09065	11/1988
EP	1018777	7/2000	WO	93/12559	6/1993
EP	1018779	7/2000	WO	94/24722	10/1994
EP	1026774	8/2000	WO	94/24723	10/1994
EP	1063721	12/2000	WO	95/05012	2/1995
EP	1067627	1/2001	WO	95/11530	4/1995
EP	1071161	1/2001	WO	96/03783	2/1996
EP	1077508	2/2001	WO	96/04691	2/1996
EP	1079462	2/2001	WO	96/10276	4/1996
EP	1083624	3/2001	WO	96/27219	9/1996
EP	1094545	4/2001	WO	96/29755	9/1996
EP	1096602	5/2001	WO	96/38881	12/1996
EP	1148581	10/2001	WO	97/06578	2/1997
EP	1198027	10/2001	WO	97/11507	3/1997
EP	0749176	9/2002	WO	97/32355	9/1997
EP	1237224	9/2002	WO	97/33338	11/1997
EP	1258054	11/2002	WO	97/35360	11/1997
EP	1267438	12/2002	WO	97/47054	12/1997
EP	1326302	11/2003	WO	98/05088	2/1998
EP	1378961	1/2004	WO	98/12771	3/1998
EP	1317018	2/2004	WO	98/20578	5/1998
EP	1396906	3/2004	WO	98/31067	7/1998
EP	1401050	3/2004	WO	98/33234	7/1998
EP	1414106	4/2004	WO	98/36469	8/1998
EP	1424747	6/2004	WO	98/39814	9/1998
EP	1443595	8/2004	WO	99/03166	1/1999
EP	1453140	9/2004	WO	99/03167	1/1999
EP	1465291	10/2004	WO	99/03168	1/1999
EP	0843905	12/2004	WO	99/22420	5/1999
EP	1515392	3/2005	WO	99/25042	5/1999
ES	2112163	3/1998	WO	99/25044	5/1999
ES	2142280	5/2000	WO	99/27607	6/1999
ES	2156832	1/2002	WO	99/27608	6/1999
FR	2543744	10/1984	WO	99/31757	6/1999
FR	2704359	11/1994	WO	99/35691	7/1999
FR	2837339	9/2003	WO	99/43048	8/1999
GB	2112579	7/1983	WO	99/56345	11/1999
GB	2161026	1/1986	WO	99/56347	11/1999
GB	2215136	9/1989	WO	99/57785	11/1999
GB	2289163	11/1995	WO	99/60665	11/1999
GB	2317994	4/1998	WO	99/62139	12/1999
GB	2330951	5/1999	WO	99/65102	12/1999
GB	2355116	4/2001	WO	00/01028	1/2000
GB	2361584	10/2001	WO	00/03451	1/2000
			WO	00/03453	1/2000
			WO	00/08712	2/2000
			WO	00/22695	4/2000
			WO	00/30267	5/2000

Explore Litigation Insights

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

Real-Time Litigation Alerts



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

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

Advanced Docket Research



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

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

Analytics At Your Fingertips



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

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

API

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

LAW FIRMS

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

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

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.