



US010258266B1

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

(10) **Patent No.:** **US 10,258,266 B1**
(45) **Date of Patent:** ***Apr. 16, 2019**

(54) **MULTI-STREAM DATA COLLECTION SYSTEM FOR NONINVASIVE MEASUREMENT OF BLOOD CONSTITUENTS**

(71) Applicant: **MASIMO CORPORATION**, Irvine, CA (US)

(72) Inventors: **Jeroen Poeze**, Rancho Santa Margarita, CA (US); **Marcelo Lamego**, Cupertino, CA (US); **Sean Merritt**, Lake Forest, CA (US); **Cristiano Dalvi**, Lake Forest, CA (US); **Hung Vo**, Fountain Valley, CA (US); **Johannes Bruinsma**, Opeinde (NL); **Ferdyan Lesmana**, Irvine, CA (US); **Massi Joe E. Kiani**, Laguna Niguel, CA (US); **Greg Olsen**, Trabuco Canyon, CA (US)

(73) Assignee: **MASIMO CORPORATION**, Irvine, CA (US)

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

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **16/212,537**

(22) Filed: **Dec. 6, 2018**

Related U.S. Application Data

(63) Continuation of application No. 14/981,290, filed on Dec. 28, 2015, which is a continuation of application (Continued)

(51) **Int. Cl.**
A61B 5/1455 (2006.01)
A61B 5/00 (2006.01)
A61B 5/145 (2006.01)

(52) **U.S. Cl.**
CPC **A61B 5/1455** (2013.01); **A61B 5/14532** (2013.01); **A61B 5/14546** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC . A61B 5/0205; A61B 5/1455; A61B 5/14551; A61B 5/14552; A61B 5/14532;
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,910,701 A 10/1975 Henderson et al.
4,114,604 A 9/1978 Shaw et al.
(Continued)

FOREIGN PATENT DOCUMENTS

EP 419223 3/1991
EP 1 518 494 3/2005
(Continued)

OTHER PUBLICATIONS

US 8,845,543 B2, 09/2014, Diab et al. (withdrawn)
(Continued)

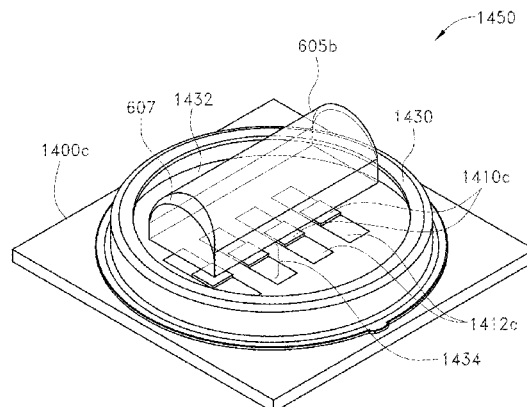
Primary Examiner — Eric F Winakur

Assistant Examiner — Chu Chuan Liu

(74) *Attorney, Agent, or Firm* — Knobbe Martens Olson & Bear LLP

(57) **ABSTRACT**

The present disclosure relates to noninvasive methods, devices, and systems for measuring various blood constituents or analytes, such as glucose. In an embodiment, a light source comprises LEDs and super-luminescent LEDs. The light source emits light at least wavelengths of about 1610 nm, about 1640 nm, and about 1665 nm. In an embodiment, the detector comprises a plurality of photodetectors arranged in a special geometry comprising one of a substantially (Continued)



linear substantially equal spaced geometry, a substantially linear substantially non-equal spaced geometry, and a substantially grid geometry.

19 Claims, 65 Drawing Sheets

Related U.S. Application Data

No. 12/829,352, filed on Jul. 1, 2010, now Pat. No. 9,277,880, which is a continuation of application No. 12/534,827, filed on Aug. 3, 2009, now abandoned, said application No. 12/829,352 is a continuation-in-part of application No. 12/497,528, filed on Jul. 2, 2009, now Pat. No. 8,577,431, which is a continuation-in-part of application No. 29/323,409, filed on Aug. 25, 2008, now Pat. No. Des. 621,516, and a continuation-in-part of application No. 29/323,408, filed on Aug. 25, 2008, now Pat. No. Des. 606,659, said application No. 12/829,352 is a continuation-in-part of application No. 12/497,523, filed on Jul. 2, 2009, now Pat. No. 8,437,825, which is a continuation-in-part of application No. 29/323,409, filed on Aug. 25, 2008, now Pat. No. Des. 621,516, and a continuation-in-part of application No. 29/323,408, filed on Aug. 25, 2008, now Pat. No. Des. 606,659.

(60) Provisional application No. 61/086,060, filed on Aug. 4, 2008, provisional application No. 61/086,108, filed on Aug. 4, 2008, provisional application No. 61/086,063, filed on Aug. 4, 2008, provisional application No. 61/086,057, filed on Aug. 4, 2008, provisional application No. 61/091,732, filed on Aug. 25, 2008, provisional application No. 61/078,228, filed on Jul. 3, 2008, provisional application No. 61/078,207, filed on Jul. 3, 2008.

(52) **U.S. Cl.**
 CPC *A61B 5/14552* (2013.01); *A61B 5/6816* (2013.01); *A61B 5/6826* (2013.01); *A61B 5/6829* (2013.01); *A61B 5/6838* (2013.01); *A61B 5/6843* (2013.01); *A61B 2562/0233* (2013.01); *A61B 2562/04* (2013.01); *A61B 2562/046* (2013.01); *A61B 2562/146* (2013.01)

(58) **Field of Classification Search**
 CPC . A61B 5/14546; A61B 5/6829; A61B 5/6843; A61B 5/6826; A61B 5/6816; A61B 5/6838
 See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,258,719 A 3/1981 Lewyn
 4,267,844 A 5/1981 Yamanishi
 4,438,338 A 3/1984 Stitt
 4,444,471 A 4/1984 Ford et al.
 4,653,498 A 3/1987 New, Jr. et al.
 4,655,225 A 4/1987 Dahne et al.
 4,684,245 A 8/1987 Goldring
 4,709,413 A 11/1987 Forrest
 4,755,676 A 7/1988 Gaalema et al.
 4,781,195 A 11/1988 Martin
 4,805,623 A 2/1989 Jöbsis
 4,880,304 A 11/1989 Jaeb et al.

5,028,787 A 7/1991 Rosenthal et al.
 5,035,243 A 7/1991 Muz
 5,041,187 A 8/1991 Hink et al.
 5,043,820 A 8/1991 Wyles et al.
 5,069,213 A 12/1991 Polczynski
 5,069,214 A 12/1991 Samaras et al.
 5,077,476 A 12/1991 Rosenthal
 5,086,229 A 2/1992 Rosenthal et al.
 5,099,842 A * 3/1992 Mannheimer A61B 5/14542
 600/323
 D326,715 S 6/1992 Schmidt
 5,122,925 A 6/1992 Inpy
 5,131,391 A 7/1992 Sakai et al.
 5,137,023 A 8/1992 Mendelson et al.
 5,159,929 A 11/1992 McMillen et al.
 5,163,438 A 11/1992 Gordon et al.
 5,222,295 A 6/1993 Dorris, Jr.
 5,222,495 A 6/1993 Clarke et al.
 5,222,496 A 6/1993 Clarke et al.
 5,249,576 A 10/1993 Goldberger et al.
 5,250,342 A 10/1993 Lang
 5,278,627 A 1/1994 Aoyagi et al.
 5,297,548 A 3/1994 Pologe
 5,319,355 A 6/1994 Russek
 5,337,744 A 8/1994 Branigan
 5,337,745 A 8/1994 Benaron
 5,341,805 A 8/1994 Stavridi et al.
 5,362,966 A 11/1994 Rosenthal et al.
 D353,195 S 12/1994 Savage et al.
 D353,196 S 12/1994 Savage et al.
 5,377,676 A 1/1995 Vari et al.
 D356,870 S 3/1995 Ivers et al.
 D359,546 S 6/1995 Savage et al.
 5,427,093 A 6/1995 Ogawa et al.
 5,431,170 A 7/1995 Mathews
 D361,840 S 8/1995 Savage et al.
 5,437,275 A 8/1995 Amundsen et al.
 5,441,054 A 8/1995 Tsuchiya
 D362,063 S 9/1995 Savage et al.
 5,452,717 A 9/1995 Branigan et al.
 D363,120 S 10/1995 Savage et al.
 5,456,252 A 10/1995 Vari et al.
 5,479,934 A 1/1996 Imran
 5,482,034 A 1/1996 Lewis et al.
 5,482,036 A 1/1996 Diab et al.
 5,490,505 A 2/1996 Diab et al.
 5,490,506 A 2/1996 Takatani et al.
 5,494,043 A 2/1996 O'Sullivan et al.
 5,511,546 A 4/1996 Hon
 5,533,511 A 7/1996 Kaspari et al.
 5,534,851 A 7/1996 Russek
 5,551,422 A 9/1996 Simonsen et al.
 5,553,615 A 9/1996 Carim et al.
 5,553,616 A 9/1996 Ham et al.
 5,561,275 A 10/1996 Savage et al.
 5,562,002 A 10/1996 Lalin
 5,590,649 A 1/1997 Caro et al.
 5,602,924 A 2/1997 Durand et al.
 D378,414 S 3/1997 Allen et al.
 5,625,458 A 4/1997 Alfano et al.
 5,632,272 A 5/1997 Diab et al.
 5,638,816 A 6/1997 Kiani-Azarbayjany et al.
 5,638,818 A 6/1997 Diab et al.
 5,645,440 A 7/1997 Tobler et al.
 5,676,143 A 10/1997 Simonsen et al.
 5,685,299 A 11/1997 Diab et al.
 D390,666 S 2/1998 Lagerlof
 D393,830 S 4/1998 Tobler et al.
 5,743,262 A 4/1998 Lepper, Jr. et al.
 5,750,927 A 5/1998 Baltazar
 5,752,914 A 5/1998 Delonzor et al.
 5,758,644 A 6/1998 Diab et al.
 5,760,910 A 6/1998 Lepper, Jr. et al.
 5,766,131 A 6/1998 Kondo et al.
 5,769,785 A 6/1998 Diab et al.
 5,782,757 A 7/1998 Diab et al.
 5,785,659 A 7/1998 Caro et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

5,810,734	A	9/1998	Caro et al.	6,430,525	B1	8/2002	Weber et al.
5,823,950	A	10/1998	Diab et al.	D463,561	S	9/2002	Fukatsu et al.
5,826,885	A	10/1998	Helgeland	6,463,311	B1	10/2002	Diab
5,830,131	A	11/1998	Caro et al.	6,470,199	B1	10/2002	Kopotic et al.
5,833,618	A	11/1998	Caro et al.	RE37,922	E	12/2002	Sharan
D403,070	S	12/1998	Maeda et al.	6,501,975	B2	12/2002	Diab et al.
5,851,178	A	12/1998	Aronow	6,505,059	B1	1/2003	Kollias et al.
5,860,919	A	1/1999	Kiani-Azarbayjany et al.	6,515,273	B2	2/2003	Al-Ali
5,890,929	A	4/1999	Mills et al.	6,519,487	B1	2/2003	Parker
5,902,235	A	5/1999	Lewis et al.	6,522,521	B2	2/2003	Mizuno et al.
5,903,357	A	5/1999	Colak	6,525,386	B1	2/2003	Mills et al.
5,904,654	A	5/1999	Wohltmann et al.	6,526,300	B1	2/2003	Kiani et al.
5,919,134	A	7/1999	Diab	6,541,756	B2	4/2003	Schulz et al.
5,934,925	A	8/1999	Tobler et al.	6,542,764	B1	4/2003	Al-Ali et al.
5,940,182	A	8/1999	Lepper, Jr. et al.	6,580,086	B1	6/2003	Schulz et al.
5,957,840	A	9/1999	Terasawa et al.	6,584,336	B1	6/2003	Ali et al.
D414,870	S	10/1999	Saltzstein et al.	6,595,316	B2	7/2003	Cybulski et al.
5,995,855	A	11/1999	Kiani et al.	6,597,932	B2	7/2003	Tian et al.
5,997,343	A	12/1999	Mills et al.	6,597,933	B2	7/2003	Kiani et al.
6,002,952	A	12/1999	Diab et al.	6,606,509	B2	8/2003	Schmitt
6,011,986	A	1/2000	Diab et al.	6,606,511	B1	8/2003	Ali et al.
6,027,452	A	2/2000	Flaherty et al.	D481,459	S	10/2003	Nahm
6,036,642	A	3/2000	Diab et al.	6,632,181	B2	10/2003	Flaherty et al.
6,045,509	A	4/2000	Caro et al.	6,636,759	B2	10/2003	Robinson
6,049,727	A	4/2000	Crothall	6,639,668	B1	10/2003	Trepagnier
6,067,462	A	5/2000	Diab et al.	6,639,867	B2	10/2003	Shim
6,081,735	A	6/2000	Diab et al.	6,640,116	B2	10/2003	Diab
6,088,607	A	7/2000	Diab et al.	6,643,530	B2	11/2003	Diab et al.
6,110,522	A	8/2000	Lepper, Jr. et al.	6,650,917	B2	11/2003	Diab et al.
6,124,597	A	9/2000	Shehada	6,654,624	B2	11/2003	Diab et al.
6,128,521	A	10/2000	Marro et al.	6,658,276	B2	12/2003	Kiani et al.
6,129,675	A	10/2000	Jay	6,661,161	B1	12/2003	Lanzo et al.
6,144,866	A	11/2000	Miesel et al.	6,668,185	B2	12/2003	Toida
6,144,868	A	11/2000	Parker	6,671,531	B2	12/2003	Al-Ali et al.
6,151,516	A	11/2000	Kiani-Azarbayjany et al.	6,678,543	B2	1/2004	Diab et al.
6,152,754	A	11/2000	Gerhardt et al.	6,681,133	B2	1/2004	Chaiken et al.
6,157,850	A	12/2000	Diab et al.	6,684,090	B2	1/2004	Ali et al.
6,165,005	A	12/2000	Mills et al.	6,684,091	B2	1/2004	Parker
6,172,743	B1	1/2001	Kley et al.	6,697,656	B1	2/2004	Al-Ali
6,181,958	B1	1/2001	Steuer et al.	6,697,657	B1	2/2004	Shehada et al.
6,184,521	B1	2/2001	Coffin, IV et al.	6,697,658	B2	2/2004	Al-Ali
6,206,830	B1	3/2001	Diab et al.	RE38,476	E	3/2004	Diab et al.
6,223,063	B1	4/2001	Chaiken et al.	6,699,194	B1	3/2004	Diab et al.
6,229,856	B1	5/2001	Diab et al.	6,714,804	B2	3/2004	Al-Ali et al.
6,232,609	B1	5/2001	Snyder et al.	RE38,492	E	4/2004	Diab et al.
6,236,872	B1	5/2001	Diab et al.	6,721,582	B2	4/2004	Trepagnier et al.
6,241,683	B1	6/2001	Macklem et al.	6,721,585	B1	4/2004	Parker
6,253,097	B1	6/2001	Aronow et al.	6,725,075	B2	4/2004	Al-Ali
6,256,523	B1	7/2001	Diab et al.	6,728,560	B2	4/2004	Kollias et al.
6,263,222	B1	7/2001	Diab et al.	6,735,459	B2	5/2004	Parker
6,278,522	B1	8/2001	Lepper, Jr. et al.	6,745,060	B2	6/2004	Diab et al.
6,278,889	B1	8/2001	Robinson	6,748,254	B2	6/2004	O'Neil et al.
6,280,213	B1	8/2001	Tobler et al.	6,760,607	B2	7/2004	Al-Ali
6,285,896	B1	9/2001	Tobler et al.	6,770,028	B1	8/2004	Ali et al.
6,301,493	B1	10/2001	Marro et al.	6,771,994	B2	8/2004	Kiani et al.
6,317,627	B1	11/2001	Ennen et al.	6,792,300	B1	9/2004	Diab et al.
6,321,100	B1	11/2001	Parker	6,813,511	B2	11/2004	Diab et al.
D452,012	S	12/2001	Phillips	6,816,010	B2	11/2004	Seetharaman et al.
6,325,761	B1	12/2001	Jay	6,816,241	B2	11/2004	Grubisic et al.
6,334,065	B1	12/2001	Al-Ali et al.	6,816,741	B2	11/2004	Diab
6,343,223	B1	1/2002	Chin et al.	6,822,564	B2	11/2004	Al-Ali
6,343,224	B1	1/2002	Parker	6,826,419	B2	11/2004	Diab et al.
6,345,194	B1	2/2002	Nelson et al.	6,830,711	B2	12/2004	Mills et al.
6,349,228	B1	2/2002	Kiani et al.	6,850,787	B2	2/2005	Weber et al.
6,353,750	B1	3/2002	Kimura et al.	6,850,788	B2	2/2005	Al-Ali
6,360,113	B1	3/2002	Dettling	6,852,083	B2	2/2005	Caro et al.
6,360,114	B1	3/2002	Diab et al.	D502,655	S	3/2005	Huang
6,360,115	B1	3/2002	Greenwald et al.	6,861,639	B2	3/2005	Al-Ali
D455,834	S	4/2002	Donars et al.	6,898,452	B2	5/2005	Al-Ali et al.
6,368,283	B1	4/2002	Xu et al.	6,912,413	B2	6/2005	Rantala et al.
6,371,921	B1	4/2002	Caro et al.	6,920,345	B2	7/2005	Al-Ali et al.
6,377,829	B1	4/2002	Al-Ali	D508,862	S	8/2005	Behar et al.
6,388,240	B2	5/2002	Schulz et al.	6,931,268	B1	8/2005	Kiani-Azarbayjany et al.
				6,934,570	B2	8/2005	Kiani et al.
				6,939,305	B2	9/2005	Flaherty et al.
				6,943,348	B1	9/2005	Coffin, IV
				6,950,687	B2	9/2005	Al-Ali

(56)

References Cited

U.S. PATENT DOCUMENTS

6,970,792	B1	11/2005	Diab	7,415,297	B2	8/2008	Al-Ali et al.
6,979,812	B2	12/2005	Al-Ali	7,428,432	B2	9/2008	Ali et al.
6,985,764	B2	1/2006	Mason et al.	7,438,683	B2	10/2008	Al-Ali et al.
6,993,371	B2	1/2006	Kiani et al.	7,440,787	B2	10/2008	Diab
D514,461	S	2/2006	Harju	7,454,240	B2	11/2008	Diab et al.
6,995,400	B2	2/2006	Mizuyoshi	7,467,002	B2	12/2008	Weber et al.
6,996,427	B2	2/2006	Ali et al.	7,469,157	B2	12/2008	Diab et al.
6,999,904	B2	2/2006	Weber et al.	7,471,969	B2	12/2008	Diab et al.
7,003,338	B2	2/2006	Weber et al.	7,471,971	B2	12/2008	Diab et al.
7,003,339	B2	2/2006	Diab et al.	7,483,729	B2	1/2009	Al-Ali et al.
7,015,451	B2	3/2006	Dalke et al.	7,483,730	B2	1/2009	Diab et al.
7,024,233	B2	4/2006	Ali et al.	7,489,958	B2	2/2009	Diab et al.
7,027,849	B2	4/2006	Al-Ali	7,496,391	B2	2/2009	Diab et al.
7,030,749	B2	4/2006	Al-Ali	7,496,393	B2	2/2009	Diab et al.
7,039,449	B2	5/2006	Al-Ali	D587,657	S	3/2009	Al-Ali et al.
7,041,060	B2	5/2006	Flaherty et al.	7,499,741	B2	3/2009	Diab et al.
7,044,918	B2	5/2006	Diab	7,499,835	B2	3/2009	Weber et al.
7,047,054	B2	5/2006	Benni	7,500,950	B2	3/2009	Al-Ali et al.
7,067,893	B2	6/2006	Mills et al.	7,509,153	B2	3/2009	Blank et al.
7,092,757	B2	8/2006	Larson et al.	7,509,154	B2	3/2009	Diab et al.
7,096,052	B2	8/2006	Mason et al.	7,509,494	B2	3/2009	Al-Ali
7,096,054	B2	8/2006	Abdul-Hafiz et al.	7,510,849	B2	3/2009	Schurman et al.
7,132,641	B2	11/2006	Schulz et al.	7,519,327	B2	4/2009	White
7,142,901	B2	11/2006	Kiani et al.	7,526,328	B2	4/2009	Diab et al.
7,149,561	B2	12/2006	Diab	7,530,942	B1	5/2009	Diab
D535,031	S	1/2007	Barrett et al.	7,530,949	B2	5/2009	Al Ali et al.
D537,164	S	2/2007	Shigemori et al.	7,530,955	B2	5/2009	Diab et al.
7,186,966	B2	3/2007	Al-Ali	7,563,110	B2	7/2009	Al-Ali et al.
7,190,261	B2	3/2007	Al-Ali	7,596,398	B2	9/2009	Al-Ali et al.
7,215,984	B2	5/2007	Diab	7,601,123	B2	10/2009	Tweed et al.
7,215,986	B2	5/2007	Diab	7,606,606	B2	10/2009	Laakkonen
7,221,971	B2	5/2007	Diab	D603,966	S	11/2009	Jones et al.
7,225,006	B2	5/2007	Al-Ali et al.	7,618,375	B2	11/2009	Flaherty
7,225,007	B2	5/2007	Al-Ali	D606,659	S	12/2009	Kiani et al.
RE39,672	E	6/2007	Shehada et al.	7,647,083	B2	1/2010	Al-Ali et al.
7,230,227	B2	6/2007	Wilcken et al.	D609,193	S	2/2010	Al-Ali et al.
D547,454	S	7/2007	Hsieh	7,657,294	B2	2/2010	Eghbal et al.
7,239,905	B2	7/2007	Kiani-Azarbayjany et al.	7,657,295	B2	2/2010	Coakley et al.
7,245,953	B1	7/2007	Parker	7,657,296	B2	2/2010	Raridan et al.
D549,830	S	8/2007	Behar et al.	D614,305	S	4/2010	Al-Ali et al.
7,254,429	B2	8/2007	Schurman et al.	RE41,317	E	5/2010	Parker
7,254,431	B2	8/2007	Al-Ali	7,726,209	B2	6/2010	Ruotoistenmäki
7,254,433	B2	8/2007	Diab et al.	7,729,733	B2	6/2010	Al-Ali et al.
7,254,434	B2	8/2007	Schulz et al.	7,734,320	B2	6/2010	Al-Ali
D550,364	S	9/2007	Glover et al.	7,761,127	B2	7/2010	Al-Ali et al.
D551,350	S	9/2007	Lorimer et al.	7,761,128	B2	7/2010	Al-Ali et al.
7,272,425	B2	9/2007	Al-Ali	7,764,982	B2	7/2010	Dalke et al.
7,274,955	B2	9/2007	Kiani et al.	D621,516	S	8/2010	Kiani et al.
D553,248	S	10/2007	Nguyen	7,791,155	B2	9/2010	Diab
D554,263	S	10/2007	Al-Ali	7,801,581	B2	9/2010	Diab
7,280,858	B2	10/2007	Al-Ali et al.	7,809,418	B2	10/2010	Xu
7,289,835	B2	10/2007	Mansfield et al.	7,822,452	B2	10/2010	Schurman et al.
7,292,883	B2	11/2007	De Felice et al.	RE41,912	E	11/2010	Parker
7,295,866	B2	11/2007	Al-Ali	7,844,313	B2	11/2010	Kiani et al.
D562,985	S	2/2008	Brefka et al.	7,844,314	B2	11/2010	Al-Ali
7,328,053	B1	2/2008	Diab et al.	7,844,315	B2	11/2010	Al-Ali
7,332,784	B2	2/2008	Mills et al.	7,862,523	B2	1/2011	Ruotoistenmaki
7,340,287	B2	3/2008	Mason et al.	7,865,222	B2	1/2011	Weber et al.
7,341,559	B2	3/2008	Schulz et al.	7,873,497	B2	1/2011	Weber et al.
7,343,186	B2	3/2008	Lamego et al.	7,880,606	B2	2/2011	Al-Ali
D566,282	S	4/2008	Al-Ali et al.	7,880,626	B2	2/2011	Al-Ali et al.
D567,125	S	4/2008	Okabe et al.	7,891,355	B2	2/2011	Al-Ali et al.
7,355,512	B1	4/2008	Al-Ali	7,894,868	B2	2/2011	Al-Ali et al.
7,356,365	B2	4/2008	Schurman	7,899,506	B2	3/2011	Xu et al.
7,365,923	B2	4/2008	Hargis et al.	7,899,507	B2	3/2011	Al-Ali et al.
D569,001	S	5/2008	Omaki	7,899,518	B2	3/2011	Trepagnier et al.
D569,521	S	5/2008	Omaki	7,904,132	B2	3/2011	Weber et al.
7,371,981	B2	5/2008	Abdul-Hafiz	7,909,772	B2	3/2011	Popov et al.
7,373,193	B2	5/2008	Al-Ali et al.	7,910,875	B2	3/2011	Al-Ali
7,373,194	B2	5/2008	Weber et al.	7,919,713	B2	4/2011	Al-Ali et al.
7,376,453	B1	5/2008	Diab et al.	7,937,128	B2	5/2011	Al-Ali
7,377,794	B2	5/2008	Al Ali et al.	7,937,129	B2	5/2011	Mason et al.
7,377,899	B2	5/2008	Weber et al.	7,937,130	B2	5/2011	Diab et al.
				7,941,199	B2	5/2011	Kiani
				7,951,086	B2	5/2011	Flaherty et al.
				7,957,780	B2	6/2011	Lamego et al.
				7,962,188	B2	6/2011	Kiani et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

7,988,637 B2	8/2011	Diab	8,437,825 B2	5/2013	Dalvi et al.
7,990,382 B2	8/2011	Kiani	8,455,290 B2	6/2013	Siskavich
7,991,446 B2	8/2011	Ali et al.	8,457,703 B2	6/2013	Al-Ali
8,000,761 B2	8/2011	Al-Ali	8,457,707 B2	6/2013	Kiani
8,008,088 B2	8/2011	Bellott et al.	8,463,349 B2	6/2013	Diab et al.
RE42,753 E	9/2011	Kiani-Azarbayjany et al.	8,466,286 B2	6/2013	Bellott et al.
8,019,400 B2	9/2011	Diab et al.	8,471,713 B2	6/2013	Poeze et al.
8,028,701 B2	10/2011	Al-Ali et al.	8,473,020 B2	6/2013	Kiani et al.
8,029,765 B2	10/2011	Bellott et al.	8,483,787 B2	7/2013	Al-Ali et al.
8,036,728 B2	10/2011	Diab et al.	8,489,364 B2	7/2013	Weber et al.
8,044,998 B2	10/2011	Heenan	8,498,684 B2	7/2013	Weber et al.
8,046,040 B2	10/2011	Ali et al.	8,504,128 B2	8/2013	Blank et al.
8,046,041 B2	10/2011	Diab et al.	8,509,867 B2	8/2013	Workman et al.
8,046,042 B2	10/2011	Diab et al.	8,515,509 B2	8/2013	Bruinsma et al.
8,048,040 B2	11/2011	Kiani	8,523,781 B2	9/2013	Al-Ali
8,050,728 B2	11/2011	Al-Ali et al.	8,529,301 B2	9/2013	Al-Ali et al.
RE43,169 E	2/2012	Parker	8,532,727 B2	9/2013	Ali et al.
8,118,620 B2	2/2012	Al-Ali et al.	8,532,728 B2	9/2013	Diab et al.
8,126,528 B2	2/2012	Diab et al.	D692,145 S	10/2013	Al-Ali et al.
8,126,531 B2	2/2012	Crowley	8,547,209 B2	10/2013	Kiani et al.
8,128,572 B2	3/2012	Diab et al.	8,548,548 B2	10/2013	Al-Ali
8,130,105 B2	3/2012	Al-Ali et al.	8,548,549 B2	10/2013	Schurman et al.
8,145,287 B2	3/2012	Diab et al.	8,548,550 B2	10/2013	Al-Ali et al.
8,150,487 B2	4/2012	Diab et al.	8,560,032 B2	10/2013	Al-Ali et al.
8,175,672 B2	5/2012	Parker	8,560,034 B1	10/2013	Diab et al.
8,180,420 B2	5/2012	Diab et al.	8,570,167 B2	10/2013	Al-Ali
8,182,443 B1	5/2012	Kiani	8,570,503 B2	10/2013	Vo et al.
8,185,180 B2	5/2012	Diab et al.	8,571,617 B2	10/2013	Reichgott et al.
8,190,223 B2	5/2012	Al-Ali et al.	8,571,618 B1	10/2013	Lamego et al.
8,190,227 B2	5/2012	Diab et al.	8,571,619 B2	10/2013	Al-Ali et al.
8,203,438 B2	6/2012	Kiani et al.	8,577,431 B2	11/2013	Lamego et al.
8,203,704 B2	6/2012	Merritt et al.	8,581,732 B2	11/2013	Al-Ali et al.
8,219,170 B2	7/2012	Hausmann et al.	8,584,345 B2	11/2013	Al-Ali et al.
8,224,411 B2	7/2012	Al-Ali et al.	8,588,880 B2	11/2013	Abdul-Hafiz et al.
8,228,181 B2	7/2012	Al-Ali	8,600,467 B2	12/2013	Al-Ali et al.
8,229,532 B2	7/2012	Davis	8,602,971 B2	12/2013	Farr
8,229,533 B2	7/2012	Diab et al.	8,606,342 B2	12/2013	Diab
8,233,955 B2	7/2012	Al-Ali et al.	8,615,290 B2	12/2013	Lin et al.
8,244,325 B2	8/2012	Al-Ali et al.	8,626,255 B2	1/2014	Al-Ali et al.
8,255,026 B1	8/2012	Al-Ali	8,630,691 B2	1/2014	Lamego et al.
8,255,027 B2	8/2012	Al-Ali et al.	8,634,889 B2	1/2014	Al-Ali et al.
8,255,028 B2	8/2012	Al-Ali et al.	8,641,631 B2	2/2014	Sierra et al.
8,260,577 B2	9/2012	Weber et al.	8,652,060 B2	2/2014	Al-Ali
8,265,723 B1	9/2012	McHale et al.	8,655,004 B2	2/2014	Prest et al.
8,274,360 B2	9/2012	Sampath et al.	8,663,107 B2	3/2014	Kiani
8,289,130 B2	10/2012	Nakajima et al.	8,666,468 B1	3/2014	Al-Ali
8,301,217 B2	10/2012	Al-Ali et al.	8,667,967 B2	3/2014	Al-Ali et al.
8,306,596 B2	11/2012	Schurman et al.	8,670,811 B2	3/2014	O'Reilly
8,310,336 B2	11/2012	Muhsin et al.	8,670,814 B2	3/2014	Diab et al.
8,315,683 B2	11/2012	Al-Ali et al.	8,676,286 B2	3/2014	Weber et al.
RE43,860 E	12/2012	Parker	8,682,407 B2	3/2014	Al-Ali
8,332,006 B2	12/2012	Naganuma et al.	RE44,823 E	4/2014	Parker
8,337,403 B2	12/2012	Al-Ali et al.	RE44,875 E	4/2014	Kiani et al.
8,346,330 B2	1/2013	Lamego	8,688,183 B2	4/2014	Bruinsma et al.
8,353,842 B2	1/2013	Al-Ali et al.	8,690,799 B2	4/2014	Telfort et al.
8,355,766 B2	1/2013	MacNeish, III et al.	8,700,112 B2	4/2014	Kiani
8,359,080 B2	1/2013	Diab et al.	8,702,627 B2	4/2014	Telfort et al.
8,364,223 B2	1/2013	Al-Ali et al.	8,706,179 B2	4/2014	Parker
8,364,226 B2	1/2013	Diab et al.	8,712,494 B1	4/2014	MacNeish, III et al.
8,364,389 B2	1/2013	Dorogusker et al.	8,715,206 B2	5/2014	Telfort et al.
8,374,665 B2	2/2013	Lamego	8,718,735 B2	5/2014	Lamego et al.
8,380,272 B2	2/2013	Barrett et al.	8,718,737 B2	5/2014	Diab et al.
8,385,995 B2	2/2013	Al-Ali et al.	8,718,738 B2	5/2014	Blank et al.
8,385,996 B2	2/2013	Smith et al.	8,720,249 B2	5/2014	Al-Ali
8,388,353 B2	3/2013	Kiani et al.	8,721,541 B2	5/2014	Al-Ali et al.
8,399,822 B2	3/2013	Al-Ali	8,721,542 B2	5/2014	Al-Ali et al.
8,401,602 B2	3/2013	Kiani	8,723,677 B1	5/2014	Kiani
8,405,608 B2	3/2013	Al-Ali et al.	8,740,792 B1	6/2014	Kiani et al.
8,414,499 B2	4/2013	Al-Ali et al.	8,754,776 B2	6/2014	Poeze et al.
8,418,524 B2	4/2013	Al-Ali	8,755,535 B2	6/2014	Telfort et al.
8,421,022 B2	4/2013	Rozenfeld	8,755,856 B2	6/2014	Diab et al.
8,423,106 B2	4/2013	Lamego et al.	8,755,872 B1	6/2014	Marinow
8,428,674 B2	4/2013	Duffy et al.	8,760,517 B2	6/2014	Sarwar et al.
			8,761,850 B2	6/2014	Lamego
			8,764,671 B2	7/2014	Kiani
			8,768,423 B2	7/2014	Shakespeare et al.
			8,771,204 B2	7/2014	Telfort et al.

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.