



US00D854151S

(12) **United States Design Patent** (10) **Patent No.:** **US D854,151 S**  
**Shelton, IV et al.** (45) **Date of Patent:** **\*\* Jul. 16, 2019**

(54) **SURGICAL INSTRUMENT SHAFT**

FOREIGN PATENT DOCUMENTS

(71) Applicant: **Ethicon LLC**, Guaynabo, PR (US)

AU 2008207624 A1 3/2009  
AU 2010214687 A1 9/2010

(72) Inventors: **Frederick E. Shelton, IV**, Hillsboro, OH (US); **Gregory J. Bakos**, Mason, OH (US); **Jason L. Harris**, Lebanon, OH (US)

(Continued)

(73) Assignee: **Ethicon LLC**, Guaynabo, PR (US)

OTHER PUBLICATIONS

(\*\*) Term: **15 Years**

Qiu Li Loh et al.: "Three-Dimensional Scaffolds for Tissue Engineering Applications: Role of Porosity and Pore Size", *Tissue Engineering Part B—Reviews*, vol. 19, No. 6, Dec. 1, 2013, pp. 485-502.

(21) Appl. No.: **29/609,083**

(Continued)

(22) Filed: **Jun. 28, 2017**

*Primary Examiner* — Wan Laymon  
*Assistant Examiner* — Clint A Samuel

(51) **LOC (11) Cl.** ..... **24-02**

(52) **U.S. Cl.**  
USPC ..... **D24/145**

(57) **CLAIM**

(58) **Field of Classification Search**  
USPC ..... D24/127, 133, 143, 145, 146, 147;  
227/175.1, 179.1

The ornamental design for a surgical instrument shaft, as shown and described.

CPC ..... A61B 17/10; A61B 17/068; A61B 17/122;  
A61B 17/115; A61B 17/072; A61B 17/07207; A61B 17/064; A61B 17/0469;  
A61B 17/320092; A61B 2017/2925;  
A61B 2017/00017; A61B 2017/320093;  
A61B 2017/320094; A61B 2017/320095;  
A61B 2017/320097; A61M 2039/0223  
See application file for complete search history.

**DESCRIPTION**

(56) **References Cited**

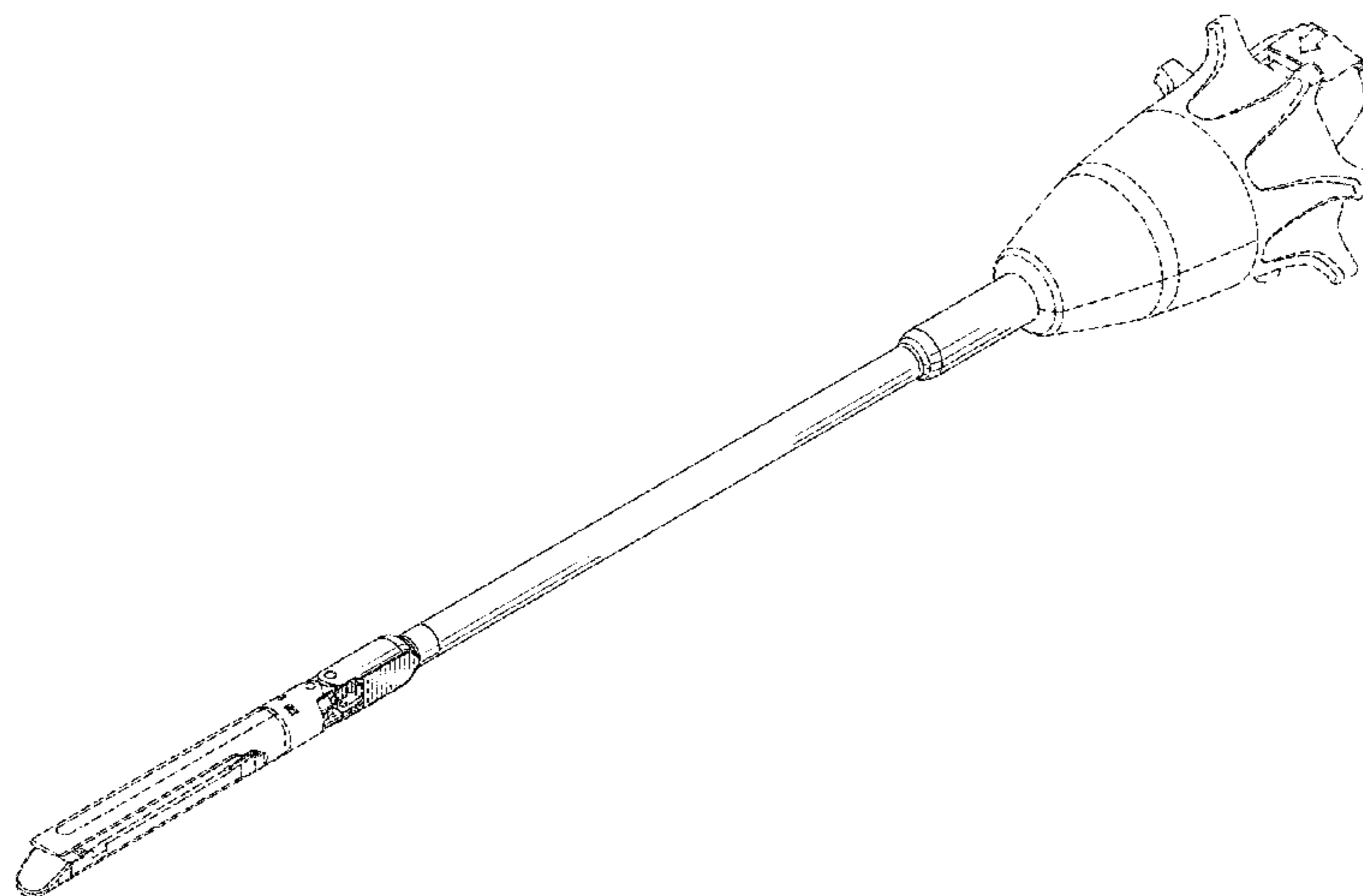
U.S. PATENT DOCUMENTS

66,052 A 6/1867 Smith  
662,587 A 11/1900 Blake  
670,748 A 3/1901 Weddeler  
719,487 A 2/1903 Minor  
804,229 A 11/1905 Hutchinson  
951,393 A 3/1910 Hahn  
1,306,107 A 6/1919 Elliott  
1,314,601 A 9/1919 McCaskey  
1,677,337 A 7/1928 Grove

FIG. 1 is a perspective view of a surgical instrument shaft. FIG. 2 is a top plan view of the surgical instrument shaft of FIG. 1. FIG. 3 is a bottom plan view of the surgical instrument shaft of FIG. 1. FIG. 4 is a left elevation view of the surgical instrument shaft of FIG. 1. FIG. 5 is a right elevation view of the surgical instrument shaft of FIG. 1. FIG. 6 is a front elevation view of the surgical instrument shaft of FIG. 1; and, FIG. 7 is a rear elevation view of the surgical instrument shaft of FIG. 1. In all figures, broken lines illustrate environmental structures and form no part of the claimed design.

(Continued)

**1 Claim, 4 Drawing Sheets**



(56)

## References Cited

## U.S. PATENT DOCUMENTS

1,794,907 A	3/1931	Kelly	3,746,002 A	7/1973	Haller
1,849,427 A	3/1932	Hook	3,747,603 A	7/1973	Adler
1,944,116 A	1/1934	Stratman	3,751,902 A	8/1973	Kingsbury et al.
1,954,048 A	4/1934	Jeffrey et al.	3,752,161 A	8/1973	Bent
2,037,727 A	4/1936	La Chapelle	3,799,151 A	3/1974	Fukaumi et al.
2,132,295 A	10/1938	Hawkins	3,808,452 A	4/1974	Hutchinson
2,161,632 A	6/1939	Nattenheimer	3,815,476 A	6/1974	Green et al.
2,211,117 A	8/1940	Hess	3,819,100 A	6/1974	Noiles et al.
2,214,870 A	9/1940	West	3,821,919 A	7/1974	Knohl
2,224,882 A	12/1940	Peck	3,836,171 A	9/1974	Hayashi et al.
2,318,379 A	5/1943	Davis et al.	3,837,555 A	9/1974	Green
2,329,440 A	9/1943	La Place	3,841,474 A	10/1974	Maier
2,377,581 A	6/1945	Shaffrey	3,851,196 A	11/1974	Hinds
2,441,096 A	5/1948	Happe	3,863,639 A	2/1975	Kleaveland
2,448,741 A	9/1948	Scott et al.	3,883,624 A	5/1975	McKenzie et al.
2,450,527 A	10/1948	Smith	3,885,491 A	5/1975	Curtis
2,526,902 A	10/1950	Ruble	3,892,228 A	7/1975	Mitsui
2,527,256 A	10/1950	Jackson	3,894,174 A	7/1975	Cartun
2,578,686 A	12/1951	Fish	3,902,247 A	9/1975	Fleer et al.
2,638,901 A	5/1953	Sugarbaker	3,940,844 A	3/1976	Colby et al.
2,674,149 A	4/1954	Benson	3,944,163 A	3/1976	Hayashi et al.
2,711,461 A	6/1955	Happe	3,950,686 A	4/1976	Randall
2,742,955 A	4/1956	Dominguez	3,952,747 A	4/1976	Kimmell, Jr.
2,804,848 A	9/1957	O'Farrell et al.	3,955,581 A	5/1976	Spasiano et al.
2,808,482 A	10/1957	Zanichkowsky et al.	3,959,879 A	6/1976	Sellers
2,853,074 A	9/1958	Olson	RE28,932 E	8/1976	Noiles et al.
2,887,004 A	5/1959	Stewart	3,972,734 A	8/1976	King
2,957,353 A	10/1960	Lewis	3,981,051 A	9/1976	Brumlik
2,959,974 A	11/1960	Emrick	4,025,216 A	5/1977	Hives
3,032,769 A	5/1962	Palmer	4,027,746 A	6/1977	Kine
3,060,972 A	10/1962	Sheldon	4,034,143 A	7/1977	Sweet
3,075,062 A	1/1963	Iaccarino	4,054,108 A	10/1977	Gill
3,078,465 A	2/1963	Bobrov	4,060,089 A	11/1977	Noiles
3,079,606 A	3/1963	Bobrov et al.	4,066,133 A	1/1978	Voss
3,080,564 A	3/1963	Strekopitov et al.	4,100,820 A	7/1978	Evett
3,166,072 A	1/1965	Sullivan, Jr.	4,106,446 A	8/1978	Yamada et al.
3,180,236 A	4/1965	Beckett	4,108,211 A	8/1978	Tanaka
3,196,869 A	7/1965	Schöll	4,111,206 A	9/1978	Vishnevsky et al.
3,204,731 A	9/1965	Bent et al.	4,127,227 A	11/1978	Green
3,266,494 A	8/1966	Brownrigg et al.	4,129,059 A	12/1978	Van Eck
3,269,630 A	8/1966	Fleischer	4,132,146 A	1/1979	Uhlig
3,269,631 A	8/1966	Takaro	4,135,517 A	1/1979	Reale
3,275,211 A	9/1966	Hirsch et al.	4,154,122 A	5/1979	Severin
3,317,103 A	5/1967	Cullen et al.	4,169,990 A	10/1979	Lerdman
3,317,105 A	5/1967	Astafjev et al.	4,180,285 A	12/1979	Reneau
3,357,296 A	12/1967	Lefever	4,185,701 A	1/1980	Boys
3,359,978 A	12/1967	Smith, Jr.	4,190,042 A	2/1980	Sinnreich
3,480,193 A	11/1969	Ralston	4,198,734 A	4/1980	Brumlik
3,490,675 A	1/1970	Green et al.	4,198,982 A	4/1980	Fortner et al.
3,494,533 A	2/1970	Green et al.	4,207,898 A	6/1980	Becht
3,499,591 A	3/1970	Green	4,213,562 A	7/1980	Garrett et al.
3,503,396 A	3/1970	Pierie et al.	4,226,242 A	10/1980	Jarvik
3,509,629 A	5/1970	Kidokoro	4,239,431 A	12/1980	Davini
3,551,987 A	1/1971	Wilkinson	4,241,861 A	12/1980	Fleischer
3,568,675 A	3/1971	Harvey	4,244,372 A	1/1981	Kapitanov et al.
3,572,159 A	3/1971	Tschanz	4,250,436 A	2/1981	Weissman
3,583,393 A	6/1971	Takahashi	4,261,244 A	4/1981	Becht et al.
3,589,589 A	6/1971	Akopov	4,272,002 A	6/1981	Moshofsky
3,598,943 A	8/1971	Barrett	4,272,662 A	6/1981	Simpson
3,608,549 A	9/1971	Merrill	4,274,304 A	6/1981	Curtiss
3,618,842 A	11/1971	Bryan	4,274,398 A	6/1981	Scott, Jr.
3,638,652 A	2/1972	Kelley	4,275,813 A	6/1981	Noiles
3,640,317 A	2/1972	Panfili	4,278,091 A	7/1981	Borzone
3,643,851 A	2/1972	Green et al.	4,289,131 A	9/1981	Mueller
3,650,453 A	3/1972	Smith, Jr.	4,289,133 A	9/1981	Rothfuss
3,661,666 A	5/1972	Foster et al.	4,290,542 A	9/1981	Fedotov et al.
3,662,939 A	5/1972	Bryan	D261,356 S	10/1981	Robinson
3,688,966 A	9/1972	Perkins et al.	4,296,654 A	10/1981	Mercer
3,695,646 A	10/1972	Mommsen	4,296,881 A	10/1981	Lee
3,709,221 A	1/1973	Riely	4,304,236 A	12/1981	Conta et al.
3,717,294 A	2/1973	Green	4,305,539 A	12/1981	Korolkov et al.
3,727,904 A	4/1973	Gabbey	4,312,363 A	1/1982	Rothfuss et al.
3,734,207 A	5/1973	Fishbein	4,312,685 A	1/1982	Riedl
3,740,994 A	6/1973	De Carlo, Jr.	4,317,451 A	3/1982	Cerwin et al.
3,744,495 A	7/1973	Johnson	4,319,576 A	3/1982	Rothfuss
			4,321,002 A	3/1982	Froehlich
			4,321,746 A	3/1982	Grinage
			4,328,839 A	5/1982	Lyons et al.
			4,331,277 A	5/1982	Green

(56)

## References Cited

## U.S. PATENT DOCUMENTS

4,340,331 A	7/1982	Savino	4,569,346 A	2/1986	Poirier
4,347,450 A	8/1982	Colligan	4,569,469 A	2/1986	Mongeon et al.
4,349,028 A	9/1982	Green	4,571,213 A	2/1986	Ishimoto
4,350,151 A	9/1982	Scott	4,573,468 A	3/1986	Conta et al.
4,353,371 A	10/1982	Cosman	4,573,469 A	3/1986	Golden et al.
4,357,940 A	11/1982	Muller	4,573,622 A	3/1986	Green et al.
4,361,057 A	11/1982	Kochera	4,576,165 A	3/1986	Green et al.
4,366,544 A	12/1982	Shima et al.	4,576,167 A	3/1986	Noiles
4,373,147 A	2/1983	Carlson, Jr.	4,580,712 A	4/1986	Green
4,376,380 A	3/1983	Burgess	4,585,153 A	4/1986	Faila et al.
4,379,457 A	4/1983	Gravener et al.	4,586,501 A	5/1986	Claracq
4,380,312 A	4/1983	Landrus	4,586,502 A	5/1986	Bedi et al.
4,382,326 A	5/1983	Rabuse	4,589,416 A	5/1986	Green
4,383,634 A	5/1983	Green	4,589,870 A	5/1986	Citrin et al.
4,393,728 A	7/1983	Larson et al.	4,591,085 A	5/1986	Di Giovanni
4,396,139 A	8/1983	Hall et al.	RE32,214 E	7/1986	Schramm
4,397,311 A	8/1983	Kanshin et al.	4,597,753 A	7/1986	Turley
4,402,445 A	9/1983	Green	4,600,037 A	7/1986	Hatten
4,406,621 A	9/1983	Bailey	4,604,786 A	8/1986	Howie, Jr.
4,408,692 A	10/1983	Sigel et al.	4,605,001 A	8/1986	Rothfuss et al.
4,409,057 A	10/1983	Molenda et al.	4,605,004 A	8/1986	Di Giovanni et al.
4,415,112 A	11/1983	Green	4,606,343 A	8/1986	Conta et al.
4,416,276 A	11/1983	Newton et al.	4,607,638 A	8/1986	Crainich
4,417,890 A	11/1983	Dennehey et al.	4,608,981 A	9/1986	Rothfuss et al.
4,423,456 A	12/1983	Zaidenweber	4,610,250 A	9/1986	Green
4,428,376 A	1/1984	Mericle	4,610,383 A	9/1986	Rothfuss et al.
4,429,695 A	2/1984	Green	4,612,933 A	9/1986	Brinkerhoff et al.
4,430,997 A	2/1984	DiGiovanni et al.	D286,180 S	10/1986	Korthoff
4,434,796 A	3/1984	Karapetian et al.	D286,442 S	10/1986	Korthoff et al.
4,438,659 A	3/1984	Desplats	4,617,914 A	10/1986	Ueda
4,442,964 A	4/1984	Becht	4,619,262 A	10/1986	Taylor
4,448,194 A	5/1984	DiGiovanni et al.	4,619,391 A	10/1986	Sharkany et al.
4,451,743 A	5/1984	Suzuki et al.	D287,278 S	12/1986	Spreckelmeier
4,452,376 A	6/1984	Klieman et al.	4,628,459 A	12/1986	Shinohara et al.
4,454,887 A	6/1984	Kruger	4,629,107 A	12/1986	Fedotov et al.
4,461,305 A	7/1984	Cibley	4,632,290 A	12/1986	Green et al.
4,467,805 A	8/1984	Fukuda	4,633,861 A	1/1987	Chow et al.
4,469,481 A	9/1984	Kobayashi	4,633,874 A	1/1987	Chow et al.
4,470,414 A	9/1984	Imagawa et al.	4,634,419 A	1/1987	Kreizman et al.
4,471,780 A	9/1984	Menges et al.	4,635,638 A	1/1987	Weintraub et al.
4,471,781 A	9/1984	Di Giovanni et al.	4,641,076 A	2/1987	Linden
4,473,077 A	9/1984	Noiles et al.	4,642,618 A	2/1987	Johnson et al.
4,475,679 A	10/1984	Fleury, Jr.	4,643,173 A	2/1987	Bell et al.
4,478,220 A	10/1984	Di Giovanni et al.	4,643,731 A	2/1987	Eckenhoff
4,480,641 A	11/1984	Faila et al.	4,646,722 A	3/1987	Silverstein et al.
4,485,816 A	12/1984	Krumme	4,646,745 A	3/1987	Noiles
4,485,817 A	12/1984	Swiggett	4,652,820 A	3/1987	Maresca
4,486,928 A	12/1984	Tucker et al.	4,654,028 A	3/1987	Suma
4,488,523 A	12/1984	Shichman	4,655,222 A	4/1987	Florez et al.
4,489,875 A	12/1984	Crawford et al.	4,662,555 A	5/1987	Thornton
4,493,983 A	1/1985	Taggart	4,663,874 A	5/1987	Sano et al.
4,499,895 A	2/1985	Takayama	4,664,305 A	5/1987	Blake, III et al.
4,500,024 A	2/1985	DiGiovanni et al.	4,665,916 A	5/1987	Green
D278,081 S	3/1985	Green	4,667,674 A	5/1987	Korthoff et al.
4,503,842 A	3/1985	Takayama	4,669,647 A	6/1987	Storace
4,505,272 A	3/1985	Utyamyshev et al.	4,671,278 A	6/1987	Chin
4,505,273 A	3/1985	Braun et al.	4,671,280 A	6/1987	Dorband et al.
4,505,414 A	3/1985	Filipi	4,671,445 A	6/1987	Barker et al.
4,506,671 A	3/1985	Green	4,672,964 A	6/1987	Dee et al.
4,512,038 A	4/1985	Alexander et al.	4,675,944 A	6/1987	Wells
4,520,817 A	6/1985	Green	4,676,245 A	6/1987	Fukuda
4,522,327 A	6/1985	Korthoff et al.	4,679,460 A	7/1987	Yoshigai
4,526,174 A	7/1985	Froehlich	4,679,719 A	7/1987	Kramer
4,527,724 A	7/1985	Chow et al.	4,684,051 A	8/1987	Akopov et al.
4,530,357 A	7/1985	Pawloski et al.	4,688,555 A	8/1987	Wardle
4,530,453 A	7/1985	Green	4,691,703 A	9/1987	Auth et al.
4,531,522 A	7/1985	Bedi et al.	4,693,248 A	9/1987	Faila
4,532,927 A	8/1985	Miksza, Jr.	4,698,579 A	10/1987	Richter et al.
4,540,202 A	9/1985	Amphoux et al.	4,700,703 A	10/1987	Resnick et al.
4,548,202 A	10/1985	Duncan	4,705,038 A	11/1987	Sjostrom et al.
4,556,058 A	12/1985	Green	4,708,141 A	11/1987	Inoue et al.
4,560,915 A	12/1985	Soultanian	4,709,120 A	11/1987	Pearson
4,565,109 A	1/1986	Tsay	4,715,520 A	12/1987	Roehr, Jr. et al.
4,565,189 A	1/1986	Mabuchi	4,719,917 A	1/1988	Barrows et al.
4,566,620 A	1/1986	Green et al.	4,721,099 A	1/1988	Chikama
			4,724,840 A	2/1988	McVay et al.
			4,727,308 A	2/1988	Huljak et al.
			4,728,020 A	3/1988	Green et al.
			4,728,876 A	3/1988	Mongeon et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

4,729,260 A	3/1988	Dudden	4,944,443 A	7/1990	Oddsens et al.
4,730,726 A	3/1988	Holzwarth	4,946,067 A	8/1990	Kelsall
4,741,336 A	5/1988	Failla et al.	4,948,327 A	8/1990	Crupi, Jr.
4,743,214 A	5/1988	Tai-Cheng	4,949,707 A	8/1990	LeVahn et al.
4,744,363 A	5/1988	Hasson	4,951,860 A	8/1990	Peters et al.
4,747,820 A	5/1988	Hornlein et al.	4,951,861 A	8/1990	Schulze et al.
4,750,902 A	6/1988	Wuchinich et al.	4,955,959 A	9/1990	Tompkins et al.
4,752,024 A	6/1988	Green et al.	4,957,212 A	9/1990	Duck et al.
4,754,909 A	7/1988	Barker et al.	4,962,877 A	10/1990	Hervas
4,761,326 A	8/1988	Barnes et al.	4,964,559 A	10/1990	Deniega et al.
4,763,669 A	8/1988	Jaeger	4,964,863 A	10/1990	Kanshin et al.
4,767,044 A	8/1988	Green	4,965,709 A	10/1990	Ngo
D297,764 S	9/1988	Hunt et al.	4,973,274 A	11/1990	Hirukawa
4,773,420 A	9/1988	Green	4,973,302 A	11/1990	Armour et al.
4,777,780 A	10/1988	Holzwarth	4,978,049 A	12/1990	Green
4,781,186 A	11/1988	Simpson et al.	4,978,333 A	12/1990	Broadwin et al.
4,784,137 A	11/1988	Kulik et al.	4,979,952 A	12/1990	Kubota et al.
4,787,387 A	11/1988	Burbank, III et al.	4,984,564 A	1/1991	Yuen
D298,967 S	12/1988	Hunt	4,986,808 A	1/1991	Broadwin et al.
4,790,225 A	12/1988	Moody et al.	4,987,049 A	1/1991	Komamura et al.
4,790,314 A	12/1988	Weaver	4,988,334 A	1/1991	Hornlein et al.
4,805,617 A	2/1989	Bedi et al.	4,995,877 A	2/1991	Ams et al.
4,805,823 A	2/1989	Rothfuss	4,995,959 A	2/1991	Metzner
4,807,628 A	2/1989	Peters et al.	4,996,975 A	3/1991	Nakamura
4,809,695 A	3/1989	Gwathmey et al.	5,002,543 A	3/1991	Bradshaw et al.
4,815,460 A	3/1989	Porat et al.	5,002,553 A	3/1991	Shiber
4,817,643 A	4/1989	Olson	5,005,754 A	4/1991	Van Overloop
4,817,847 A	4/1989	Redtenbacher et al.	5,009,661 A	4/1991	Michelson
4,819,853 A	4/1989	Green	5,012,411 A	4/1991	Policastro et al.
4,821,939 A	4/1989	Green	5,014,898 A	5/1991	Heidrich
4,827,911 A	5/1989	Broadwin et al.	5,014,899 A	5/1991	Presty et al.
4,828,542 A	5/1989	Hermann	5,015,227 A	5/1991	Broadwin et al.
4,828,944 A	5/1989	Yabe et al.	5,018,515 A	5/1991	Gilman
4,830,855 A	5/1989	Stewart	5,018,657 A	5/1991	Pedlick et al.
4,833,937 A	5/1989	Nagano	5,024,652 A	6/1991	Dumenek et al.
4,834,720 A	5/1989	Blinkhorn	5,024,671 A	6/1991	Tu et al.
4,838,859 A	6/1989	Strassmann	5,025,559 A	6/1991	McCullough
4,844,068 A	7/1989	Arata et al.	5,027,834 A	7/1991	Pruitt
4,848,637 A	7/1989	Pruitt	5,030,226 A	7/1991	Green et al.
4,856,078 A	8/1989	Konopka	5,031,814 A	7/1991	Tompkins et al.
4,860,644 A	8/1989	Kohl et al.	5,035,040 A	7/1991	Kerrigan et al.
4,862,891 A	9/1989	Smith	5,038,109 A	8/1991	Goble et al.
4,863,423 A	9/1989	Wallace	5,038,247 A	8/1991	Kelley et al.
4,865,030 A	9/1989	Polyak	5,040,715 A	8/1991	Green et al.
4,868,530 A	9/1989	Ahs	5,042,707 A	8/1991	Taheri
4,869,414 A	9/1989	Green et al.	5,061,269 A	10/1991	Muller
4,869,415 A	9/1989	Fox	5,062,491 A	11/1991	Takeshima et al.
4,873,977 A	10/1989	Avant et al.	5,062,563 A	11/1991	Green et al.
4,875,486 A	10/1989	Rapoport et al.	5,065,929 A	11/1991	Schulze et al.
4,880,015 A	11/1989	Nierman	5,071,052 A	12/1991	Rodak et al.
4,890,613 A	1/1990	Golden et al.	5,071,430 A	12/1991	de Salis et al.
4,892,244 A	1/1990	Fox et al.	5,074,454 A	12/1991	Peters
4,893,622 A	1/1990	Green et al.	5,077,506 A	12/1991	Krause
4,894,051 A	1/1990	Shiber	5,079,006 A	1/1992	Urquhart
4,896,584 A	1/1990	Stoll et al.	5,080,556 A	1/1992	Carreno
4,896,678 A	1/1990	Ogawa	5,083,695 A	1/1992	Foslien et al.
4,900,303 A	2/1990	Lemelson	5,084,057 A	1/1992	Green et al.
4,903,697 A	2/1990	Resnick et al.	5,088,979 A	2/1992	Filipi et al.
4,909,789 A	3/1990	Taguchi et al.	5,088,997 A	2/1992	Delahuera et al.
4,915,100 A	4/1990	Green	5,089,606 A	2/1992	Cole et al.
4,919,679 A	4/1990	Averill et al.	5,094,247 A	3/1992	Hernandez et al.
4,921,479 A	5/1990	Grayzel	5,098,004 A	3/1992	Kerrigan
4,925,082 A	5/1990	Kim	5,098,360 A	3/1992	Hirota
4,928,699 A	5/1990	Sasai	5,100,042 A	3/1992	Gravener et al.
4,930,503 A	6/1990	Pruitt	5,100,420 A	3/1992	Green et al.
4,930,674 A	6/1990	Barak	5,104,025 A	4/1992	Main et al.
4,931,047 A	6/1990	Broadwin et al.	5,104,397 A	4/1992	Vasconcelos et al.
4,931,737 A	6/1990	Hishiki	5,104,400 A	4/1992	Berguer et al.
4,932,960 A	6/1990	Green et al.	5,106,008 A	4/1992	Tompkins et al.
4,933,800 A	6/1990	Yang	5,108,368 A	4/1992	Hammerslag et al.
4,933,843 A	6/1990	Scheller et al.	5,109,722 A	5/1992	Hufnagle et al.
D309,350 S	7/1990	Sutherland et al.	5,111,987 A	5/1992	Moeinzadeh et al.
4,938,408 A	7/1990	Bedi et al.	5,116,349 A	5/1992	Aranyi
4,941,623 A	7/1990	Pruitt	D327,323 S	6/1992	Hunt
4,943,182 A	7/1990	Hoblingre	5,119,009 A	6/1992	McCaleb et al.
			5,122,156 A	6/1992	Granger et al.
			5,124,990 A	6/1992	Williamson
			5,129,570 A	7/1992	Schulze et al.
			5,137,198 A	8/1992	Nobis et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

5,139,513 A	8/1992	Segato	5,264,218 A	11/1993	Rogozinski
5,141,144 A	8/1992	Foslien et al.	5,268,622 A	12/1993	Philipp
5,142,932 A	9/1992	Moya et al.	5,271,543 A	12/1993	Grant et al.
5,155,941 A	10/1992	Takahashi et al.	5,271,544 A	12/1993	Fox et al.
5,156,315 A	10/1992	Green et al.	RE34,519 E	1/1994	Fox et al.
5,156,609 A	10/1992	Nakao et al.	5,275,322 A	1/1994	Brinkerhoff et al.
5,156,614 A	10/1992	Green et al.	5,275,323 A	1/1994	Schulze et al.
5,158,567 A	10/1992	Green	5,275,608 A	1/1994	Forman et al.
D330,699 S	11/1992	Gill	5,279,416 A	1/1994	Malec et al.
5,163,598 A	11/1992	Peters et al.	5,281,216 A	1/1994	Klicek
5,168,605 A	12/1992	Bartlett	5,282,806 A	2/1994	Haber et al.
5,170,925 A	12/1992	Madden et al.	5,282,829 A	2/1994	Hermes
5,171,247 A	12/1992	Hughett et al.	5,284,128 A	2/1994	Hart
5,171,249 A	12/1992	Stefanchik et al.	5,285,381 A	2/1994	Iskarous et al.
5,171,253 A	12/1992	Klieman	5,285,945 A	2/1994	Brinkerhoff et al.
5,173,053 A	12/1992	Swanson et al.	5,286,253 A	2/1994	Fucci
5,173,133 A	12/1992	Morin et al.	5,289,963 A	3/1994	McGarry et al.
5,176,677 A	1/1993	Wuchinich	5,290,271 A	3/1994	Jernberg
5,176,688 A	1/1993	Narayan et al.	5,290,310 A	3/1994	Makower et al.
5,187,422 A	2/1993	Izenbaard et al.	5,292,053 A	3/1994	Bilotti et al.
5,188,102 A	2/1993	Idemoto et al.	5,293,024 A	3/1994	Sugahara et al.
5,188,111 A	2/1993	Yates et al.	5,297,714 A	3/1994	Kramer
5,190,517 A	3/1993	Zieve et al.	5,304,204 A	4/1994	Bregen
5,190,544 A	3/1993	Chapman et al.	D347,474 S *	5/1994	Olson ..... D24/145
5,190,560 A	3/1993	Woods et al.	5,307,976 A	5/1994	Olson et al.
5,192,288 A	3/1993	Thompson et al.	5,308,576 A	5/1994	Green et al.
5,195,505 A	3/1993	Josefsen	5,309,387 A	5/1994	Mori et al.
5,195,968 A	3/1993	Lundquist et al.	5,309,927 A	5/1994	Welch
5,197,648 A	3/1993	Gingold	5,312,023 A	5/1994	Green et al.
5,197,649 A	3/1993	Bessler et al.	5,312,024 A	5/1994	Grant et al.
5,197,966 A	3/1993	Sommerkamp	5,312,329 A	5/1994	Beaty et al.
5,197,970 A	3/1993	Green et al.	5,313,935 A	5/1994	Kortenbach et al.
5,200,280 A	4/1993	Karasa	5,313,967 A	5/1994	Lieber et al.
5,201,750 A	4/1993	Hochoerl et al.	5,314,424 A	5/1994	Nicholas
5,205,459 A	4/1993	Brinkerhoff et al.	5,314,445 A	5/1994	Heidmueller nee Degwitz et al.
5,207,697 A	5/1993	Carusillo et al.	5,314,466 A	5/1994	Stern et al.
5,209,747 A	5/1993	Knoepfler	5,318,221 A	6/1994	Green et al.
5,209,756 A	5/1993	Seedhom et al.	5,320,627 A	6/1994	Sorensen et al.
5,211,649 A	5/1993	Kohler et al.	D348,930 S	7/1994	Olson
5,211,655 A	5/1993	Hasson	5,326,013 A	7/1994	Green et al.
5,217,457 A	6/1993	Delahuerga et al.	5,329,923 A	7/1994	Lundquist
5,217,478 A	6/1993	Rexroth	5,330,487 A	7/1994	Thornton et al.
5,219,111 A	6/1993	Bilotti et al.	5,330,502 A	7/1994	Hassler et al.
5,220,269 A	6/1993	Chen et al.	5,331,971 A	7/1994	Bales et al.
5,221,036 A	6/1993	Takase	5,332,142 A	7/1994	Robinson et al.
5,221,281 A	6/1993	Klicek	5,333,422 A	8/1994	Warren et al.
5,222,945 A	6/1993	Basnight	5,333,772 A	8/1994	Rothfuss et al.
5,222,963 A	6/1993	Brinkerhoff et al.	5,333,773 A	8/1994	Main et al.
5,222,975 A	6/1993	Crainich	5,334,183 A	8/1994	Wuchinich
5,222,976 A	6/1993	Yoon	5,336,130 A	8/1994	Ray
5,223,675 A	6/1993	Taft	5,336,229 A	8/1994	Noda
D338,729 S	8/1993	Sprecklemeier et al.	5,336,232 A	8/1994	Green et al.
5,234,447 A	8/1993	Kaster et al.	5,339,799 A	8/1994	Kami et al.
5,236,424 A	8/1993	Imran	5,341,724 A	8/1994	Vatel
5,236,440 A	8/1993	Hlavacek	5,341,807 A	8/1994	Nardella
5,239,981 A	8/1993	Anaplotis	5,341,810 A	8/1994	Dardel
5,240,163 A	8/1993	Stein et al.	5,342,380 A	8/1994	Hood
5,242,457 A	9/1993	Akopov et al.	5,342,381 A	8/1994	Tidemand
5,244,462 A	9/1993	Delahuerga et al.	5,342,385 A	8/1994	Norelli et al.
5,246,156 A	9/1993	Rothfuss et al.	5,342,395 A	8/1994	Jarrett et al.
5,246,443 A	9/1993	Mai	5,342,396 A	8/1994	Cook
5,253,793 A	10/1993	Green et al.	5,343,382 A	8/1994	Hale et al.
5,258,007 A	11/1993	Spetzler et al.	5,343,391 A	8/1994	Mushabac
5,258,008 A	11/1993	Wilk	5,344,059 A	9/1994	Green et al.
5,258,009 A	11/1993	Connors	5,344,060 A	9/1994	Gravener et al.
5,258,010 A	11/1993	Green et al.	5,344,454 A	9/1994	Clarke et al.
5,258,012 A	11/1993	Luscombe et al.	5,346,504 A	9/1994	Ortiz et al.
5,259,366 A	11/1993	Reydel et al.	5,348,259 A	9/1994	Blanco et al.
5,259,835 A	11/1993	Clark et al.	5,350,355 A	9/1994	Sklar
5,260,637 A	11/1993	Pizzi	5,350,388 A	9/1994	Epstein
5,261,877 A	11/1993	Fine et al.	5,350,391 A	9/1994	Iacovelli
5,261,922 A	11/1993	Hood	5,350,400 A	9/1994	Esposito et al.
5,263,629 A	11/1993	Trumbull et al.	5,352,229 A	10/1994	Goble et al.
5,263,937 A	11/1993	Shipp	5,352,235 A	10/1994	Koros et al.
5,263,973 A	11/1993	Cook	5,352,238 A	10/1994	Green et al.
			5,354,250 A	10/1994	Christensen
			5,354,303 A	10/1994	Spaeth et al.
			5,356,006 A	10/1994	Alpern et al.
			5,356,064 A	10/1994	Green et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,358,506 A	10/1994	Green et al.	5,422,567 A	6/1995	Matsunaga
5,358,510 A	10/1994	Luscombe et al.	5,423,471 A	6/1995	Mastri et al.
5,359,231 A	10/1994	Flowers et al.	5,423,809 A	6/1995	Klicek
D352,780 S	11/1994	Glaeser et al.	5,423,835 A	6/1995	Green et al.
5,359,993 A	11/1994	Slater et al.	5,425,745 A	6/1995	Green et al.
5,360,305 A	11/1994	Kerrigan	5,427,298 A	6/1995	Tegtmeier
5,360,428 A	11/1994	Hutchinson, Jr.	5,431,322 A	7/1995	Green et al.
5,364,001 A	11/1994	Bryan	5,431,323 A	7/1995	Smith et al.
5,364,002 A	11/1994	Green et al.	5,431,654 A	7/1995	Nic
5,364,003 A	11/1994	Williamson, IV	5,431,668 A	7/1995	Burbank, III et al.
5,366,133 A	11/1994	Geiste	5,433,721 A	7/1995	Hooven et al.
5,366,134 A	11/1994	Green et al.	5,437,681 A	8/1995	Meade et al.
5,366,479 A	11/1994	McGarry et al.	5,438,302 A	8/1995	Goble
5,368,015 A	11/1994	Wilk	5,439,155 A	8/1995	Viola
5,368,592 A	11/1994	Stern et al.	5,439,156 A	8/1995	Grant et al.
5,369,565 A	11/1994	Chen et al.	5,439,479 A	8/1995	Shichman et al.
5,370,645 A	12/1994	Klicek et al.	5,441,191 A	8/1995	Linden
5,372,124 A	12/1994	Takayama et al.	5,441,193 A	8/1995	Gravener
5,372,596 A	12/1994	Klicek et al.	5,441,483 A	8/1995	Avitall
5,372,602 A	12/1994	Burke	5,441,494 A	8/1995	Ortiz
5,374,277 A	12/1994	Hassler	5,443,197 A	8/1995	Malis et al.
5,375,588 A	12/1994	Yoon	5,443,463 A	8/1995	Stern et al.
5,376,095 A	12/1994	Ortiz	5,444,113 A	8/1995	Sinclair et al.
5,379,933 A	1/1995	Green et al.	5,445,155 A	8/1995	Sieben
5,381,649 A	1/1995	Webb	5,445,304 A	8/1995	Plyley et al.
5,381,782 A	1/1995	DeLaRama et al.	5,445,604 A	8/1995	Lang
5,381,943 A	1/1995	Allen et al.	5,445,644 A	8/1995	Pietrafitta et al.
5,382,247 A	1/1995	Cimino et al.	5,447,265 A	9/1995	Vidal et al.
5,383,880 A	1/1995	Hooven	5,447,417 A	9/1995	Kuhl et al.
5,383,881 A	1/1995	Green et al.	5,447,513 A	9/1995	Davison et al.
5,383,882 A	1/1995	Buess et al.	5,449,355 A	9/1995	Rhum et al.
5,383,888 A	1/1995	Zvenyatsky et al.	5,449,365 A	9/1995	Green et al.
5,383,895 A	1/1995	Holmes et al.	5,449,370 A	9/1995	Vaitekunas
5,388,568 A	2/1995	van der Heide	5,452,836 A	9/1995	Huitema et al.
5,389,098 A	2/1995	Tsuruta et al.	5,452,837 A	9/1995	Williamson, IV et al.
5,389,102 A	2/1995	Green et al.	5,454,378 A	10/1995	Palmer et al.
5,389,104 A	2/1995	Hahnen et al.	5,454,822 A	10/1995	Schob et al.
5,391,180 A	2/1995	Tovey et al.	5,454,827 A	10/1995	Aust et al.
5,392,979 A	2/1995	Green et al.	5,456,401 A	10/1995	Green et al.
5,395,030 A	3/1995	Kuramoto et al.	5,456,917 A	10/1995	Wise et al.
5,395,033 A	3/1995	Byrne et al.	5,458,279 A	10/1995	Plyley
5,395,034 A	3/1995	Allen et al.	5,458,579 A	10/1995	Chodorow et al.
5,395,312 A	3/1995	Desai	5,462,215 A	10/1995	Viola et al.
5,395,384 A	3/1995	Duthoit et al.	5,464,013 A	11/1995	Lemelson
5,397,046 A	3/1995	Savage et al.	5,464,144 A	11/1995	Guy et al.
5,397,324 A	3/1995	Carroll et al.	5,464,300 A	11/1995	Crainich
5,400,267 A	3/1995	Denen et al.	5,465,819 A	11/1995	Weilant et al.
5,403,276 A	4/1995	Schechter et al.	5,465,894 A	11/1995	Clark et al.
5,403,312 A	4/1995	Yates et al.	5,465,895 A	11/1995	Knodel et al.
5,404,106 A	4/1995	Matsuda	5,465,896 A	11/1995	Allen et al.
5,404,870 A	4/1995	Brinkerhoff et al.	5,466,020 A	11/1995	Page et al.
5,404,960 A	4/1995	Wada et al.	5,467,911 A	11/1995	Tsuruta et al.
5,405,072 A	4/1995	Zlock et al.	5,468,253 A	11/1995	Bezwada et al.
5,405,073 A	4/1995	Porter	5,470,006 A	11/1995	Rodak
5,405,344 A	4/1995	Williamson et al.	5,470,007 A	11/1995	Plyley et al.
5,405,360 A	4/1995	Tovey	5,470,008 A	11/1995	Rodak
5,407,293 A	4/1995	Crainich	5,470,009 A	11/1995	Rodak
5,408,409 A	4/1995	Glassman et al.	5,470,010 A	11/1995	Rothfuss et al.
5,409,498 A	4/1995	Braddock et al.	5,471,129 A	11/1995	Mann
5,409,703 A	4/1995	McAnalley et al.	5,472,132 A	12/1995	Savage et al.
D357,981 S	5/1995	Green et al.	5,472,442 A	12/1995	Klicek
D358,645 S *	5/1995	Ryan ..... D24/140	5,473,204 A	12/1995	Temple
5,411,481 A	5/1995	Allen et al.	5,474,057 A	12/1995	Makower et al.
5,411,508 A	5/1995	Bessler et al.	5,474,223 A	12/1995	Viola et al.
5,413,107 A	5/1995	Oakley et al.	5,474,566 A	12/1995	Alesi et al.
5,413,267 A	5/1995	Solyntjes et al.	5,476,206 A	12/1995	Green et al.
5,413,268 A	5/1995	Green et al.	5,476,479 A	12/1995	Green et al.
5,413,272 A	5/1995	Green et al.	5,476,481 A	12/1995	Schondorf
5,413,573 A	5/1995	Koivukangas	5,478,003 A	12/1995	Green et al.
5,415,334 A	5/1995	Williamson et al.	5,478,354 A	12/1995	Tovey et al.
5,415,335 A	5/1995	Knodell, Jr.	5,480,089 A	1/1996	Blewett
5,417,203 A	5/1995	Tovey et al.	5,480,409 A	1/1996	Riza
5,417,361 A	5/1995	Williamson, IV	5,482,197 A	1/1996	Green et al.
5,419,766 A	5/1995	Chang et al.	5,483,952 A	1/1996	Aranyi
5,421,829 A	6/1995	Olichney et al.	5,484,095 A	1/1996	Green et al.
			5,484,398 A	1/1996	Stoddard
			5,484,451 A	1/1996	Akopov et al.
			5,485,947 A	1/1996	Olson et al.
			5,485,952 A	1/1996	Fontayne

(56)

References Cited

U.S. PATENT DOCUMENTS

5,487,499 A	1/1996	Sorrentino et al.	5,562,682 A	10/1996	Oberlin et al.
5,487,500 A	1/1996	Knodel et al.	5,562,690 A	10/1996	Green et al.
5,489,058 A	2/1996	Plyley et al.	5,562,701 A	10/1996	Huitema et al.
5,489,256 A	2/1996	Adair	5,562,702 A	10/1996	Huitema et al.
5,489,290 A	2/1996	Furnish	5,563,481 A	10/1996	Krause
5,490,819 A	2/1996	Nicholas et al.	5,564,615 A	10/1996	Bishop et al.
5,492,671 A	2/1996	Krafft	5,569,161 A	10/1996	Ebling et al.
5,496,312 A	3/1996	Klicek	5,569,270 A	10/1996	Weng
5,496,317 A	3/1996	Goble et al.	5,569,284 A	10/1996	Young et al.
5,497,933 A	3/1996	DeFonzo et al.	5,571,090 A	11/1996	Sherts
5,498,838 A	3/1996	Furman	5,571,100 A	11/1996	Goble et al.
5,501,654 A	3/1996	Failla et al.	5,571,116 A	11/1996	Bolanos et al.
5,503,320 A	4/1996	Webster et al.	5,571,285 A	11/1996	Chow et al.
5,503,635 A	4/1996	Sauer et al.	5,571,488 A	11/1996	Beerstecher et al.
5,503,638 A	4/1996	Cooper et al.	5,573,169 A	11/1996	Green et al.
5,505,363 A	4/1996	Green et al.	5,573,543 A	11/1996	Akopov et al.
5,507,426 A	4/1996	Young et al.	5,574,431 A	11/1996	McKeown et al.
5,509,596 A	4/1996	Green et al.	5,575,054 A	11/1996	Klinzing et al.
5,509,916 A	4/1996	Taylor	5,575,789 A	11/1996	Bell et al.
5,511,564 A	4/1996	Wilk	5,575,799 A	11/1996	Bolanos et al.
5,514,129 A	5/1996	Smith	5,575,803 A	11/1996	Cooper et al.
5,514,149 A	5/1996	Green et al.	5,575,805 A	11/1996	Li
5,514,157 A	5/1996	Nicholas et al.	5,577,654 A	11/1996	Bishop
5,518,163 A	5/1996	Hooven	5,578,052 A	11/1996	Koros et al.
5,518,164 A	5/1996	Hooven	5,579,978 A	12/1996	Green et al.
5,520,609 A	5/1996	Moll et al.	5,580,067 A	12/1996	Hamblin et al.
5,520,634 A	5/1996	Fox et al.	5,582,611 A	12/1996	Tsuruta et al.
5,520,678 A	5/1996	Heckele et al.	5,582,617 A	12/1996	Klieman et al.
5,520,700 A	5/1996	Beyar et al.	5,582,907 A	12/1996	Pall
5,522,817 A	6/1996	Sander et al.	5,583,114 A	12/1996	Barrows et al.
5,522,831 A	6/1996	Sleister et al.	5,584,425 A	12/1996	Savage et al.
5,527,264 A	6/1996	Moll et al.	5,586,711 A	12/1996	Plyley et al.
5,527,320 A	6/1996	Carruthers et al.	5,588,579 A	12/1996	Schnut et al.
5,529,235 A	6/1996	Boiarski et al.	5,588,580 A	12/1996	Paul et al.
D372,086 S	7/1996	Grasso et al.	5,588,581 A	12/1996	Conlon et al.
5,531,305 A	7/1996	Roberts et al.	5,591,170 A	1/1997	Spievack et al.
5,531,744 A	7/1996	Nardella et al.	5,591,187 A	1/1997	Dekel
5,531,856 A	7/1996	Moll et al.	5,597,107 A	1/1997	Knodel et al.
5,533,521 A	7/1996	Granger	5,599,151 A	2/1997	Daum et al.
5,533,581 A	7/1996	Barth et al.	5,599,279 A	2/1997	Slotman et al.
5,533,661 A	7/1996	Main et al.	5,599,344 A	2/1997	Paterson
5,535,934 A	7/1996	Boiarski et al.	5,599,350 A	2/1997	Schulze et al.
5,535,935 A	7/1996	Vidal et al.	5,599,852 A	2/1997	Scopelianos et al.
5,535,937 A	7/1996	Boiarski et al.	5,601,224 A	2/1997	Bishop et al.
5,540,375 A	7/1996	Bolanos et al.	5,601,573 A	2/1997	Fogelberg et al.
5,540,705 A	7/1996	Meade et al.	5,601,604 A	2/1997	Vincent
5,541,376 A	7/1996	Ladtchow et al.	5,602,449 A	2/1997	Krause et al.
5,541,489 A	7/1996	Dunstan	5,603,443 A	2/1997	Clark et al.
5,542,594 A	8/1996	McKean et al.	5,605,272 A	2/1997	Witt et al.
5,542,949 A	8/1996	Yoon	5,605,273 A	2/1997	Hamblin et al.
5,543,119 A	8/1996	Sutter et al.	D378,611 S *	3/1997	Croley ..... D24/144
5,543,695 A	8/1996	Culp et al.	5,607,094 A	3/1997	Clark et al.
5,544,802 A	8/1996	Crainich	5,607,095 A	3/1997	Smith et al.
5,547,117 A	8/1996	Hamblin et al.	5,607,433 A	3/1997	Polla et al.
5,549,583 A	8/1996	Sanford et al.	5,607,450 A	3/1997	Zvenyatsky et al.
5,549,621 A	8/1996	Bessler et al.	5,607,474 A	3/1997	Athanasiou et al.
5,549,627 A	8/1996	Kieturakis	5,609,285 A	3/1997	Grant et al.
5,549,628 A	8/1996	Cooper et al.	5,609,601 A	3/1997	Kolesa et al.
5,549,637 A	8/1996	Crainich	5,611,709 A	3/1997	McAnulty
5,551,622 A	9/1996	Yoon	5,613,499 A	3/1997	Palmer et al.
5,553,624 A	9/1996	Francese et al.	5,613,937 A	3/1997	Garrison et al.
5,553,675 A	9/1996	Pitzen et al.	5,613,966 A	3/1997	Makower et al.
5,553,765 A	9/1996	Knodel et al.	5,614,887 A	3/1997	Buchbinder
5,554,148 A	9/1996	Aebischer et al.	5,615,820 A	4/1997	Viola
5,554,169 A	9/1996	Green et al.	5,618,294 A	4/1997	Aust et al.
5,556,020 A	9/1996	Hou	5,618,303 A	4/1997	Marlow et al.
5,556,416 A	9/1996	Clark et al.	5,618,307 A	4/1997	Donlon et al.
5,558,533 A	9/1996	Hashizawa et al.	5,619,992 A	4/1997	Guthrie et al.
5,558,665 A	9/1996	Kieturakis	5,620,289 A	4/1997	Curry
5,558,671 A	9/1996	Yates	5,620,326 A	4/1997	Younker
5,560,530 A	10/1996	Bolanos et al.	5,620,452 A	4/1997	Yoon
5,560,532 A	10/1996	DeFonzo et al.	5,624,398 A	4/1997	Smith et al.
5,561,881 A	10/1996	Klinger et al.	5,624,452 A	4/1997	Yates
5,562,239 A	10/1996	Boiarski et al.	5,626,587 A	5/1997	Bishop et al.
5,562,241 A	10/1996	Knodel et al.	5,626,595 A	5/1997	Sklar et al.
			5,628,446 A	5/1997	Geiste et al.
			5,628,743 A	5/1997	Cimino
			5,628,745 A	5/1997	Bek
			5,630,539 A	5/1997	Plyley et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,630,540 A	5/1997	Blewett	5,700,276 A	12/1997	Benecke
5,630,541 A	5/1997	Williamson, IV et al.	5,702,387 A	12/1997	Arts et al.
5,630,782 A	5/1997	Adair	5,702,408 A	12/1997	Wales et al.
5,632,432 A	5/1997	Schulze et al.	5,702,409 A	12/1997	Rayburn et al.
5,632,433 A	5/1997	Grant et al.	5,704,087 A	1/1998	Strub
5,633,374 A	5/1997	Humphrey et al.	5,704,534 A	1/1998	Huitema et al.
5,634,584 A	6/1997	Okorochoa et al.	5,706,997 A	1/1998	Green et al.
5,636,779 A	6/1997	Palmer	5,706,998 A	1/1998	Plyley et al.
5,636,780 A	6/1997	Green et al.	5,707,392 A	1/1998	Kortenbach
5,639,008 A	6/1997	Gallagher et al.	5,709,334 A	1/1998	Sorrentino et al.
D381,077 S *	7/1997	Hunt ..... D24/145	5,709,335 A	1/1998	Heck
5,643,291 A	7/1997	Pier et al.	5,709,680 A	1/1998	Yates et al.
5,643,294 A	7/1997	Tovey et al.	5,709,706 A	1/1998	Kienzle et al.
5,643,319 A	7/1997	Green et al.	5,711,472 A	1/1998	Bryan
5,645,209 A	7/1997	Green et al.	5,712,460 A	1/1998	Carr et al.
5,647,526 A	7/1997	Green et al.	5,713,128 A	2/1998	Schrenk et al.
5,647,869 A	7/1997	Goble et al.	5,713,505 A	2/1998	Huitema
5,649,937 A	7/1997	Bito et al.	5,713,895 A	2/1998	Lontine et al.
5,649,956 A	7/1997	Jensen et al.	5,713,896 A	2/1998	Nardella
5,651,491 A	7/1997	Heaton et al.	5,713,920 A	2/1998	Bezwada et al.
5,651,762 A	7/1997	Bridges	5,715,604 A	2/1998	Lanzoni
5,651,821 A	7/1997	Uchida	5,715,987 A	2/1998	Kelley et al.
5,653,373 A	8/1997	Green et al.	5,715,988 A	2/1998	Palmer
5,653,374 A	8/1997	Young et al.	5,716,366 A	2/1998	Yates
5,653,677 A	8/1997	Okada et al.	5,718,359 A	2/1998	Palmer et al.
5,653,721 A	8/1997	Knodel et al.	5,718,360 A	2/1998	Green et al.
5,655,698 A	8/1997	Yoon	5,718,548 A	2/1998	Cotellessa
5,657,417 A	8/1997	Di Troia	5,718,714 A	2/1998	Livneh
5,657,429 A	8/1997	Wang et al.	5,720,744 A	2/1998	Eggleston et al.
5,657,921 A	8/1997	Young et al.	D393,067 S	3/1998	Geary et al.
5,658,238 A	8/1997	Suzuki et al.	5,724,025 A	3/1998	Tavori
5,658,281 A	8/1997	Heard	5,725,536 A	3/1998	Oberlin et al.
5,658,298 A	8/1997	Vincent et al.	5,725,554 A	3/1998	Simon et al.
5,658,300 A	8/1997	Bito et al.	5,728,110 A	3/1998	Vidal et al.
5,658,307 A	8/1997	Exconde	5,728,113 A	3/1998	Sherts
D384,413 S *	9/1997	Zlock ..... D24/145	5,728,121 A	3/1998	Bimbo et al.
5,662,258 A	9/1997	Knodel et al.	5,730,758 A	3/1998	Allgeyer
5,662,260 A	9/1997	Yoon	5,732,821 A	3/1998	Stone et al.
5,662,662 A	9/1997	Bishop et al.	5,732,871 A	3/1998	Clark et al.
5,662,667 A	9/1997	Knodel	5,732,872 A	3/1998	Bolduc et al.
5,665,085 A	9/1997	Nardella	5,733,308 A	3/1998	Daugherty et al.
5,667,517 A	9/1997	Hooven	5,735,445 A	4/1998	Vidal et al.
5,667,526 A	9/1997	Levin	5,735,848 A	4/1998	Yates et al.
5,667,527 A	9/1997	Cook	5,735,874 A	4/1998	Measamer et al.
5,669,544 A	9/1997	Schulze et al.	5,738,474 A	4/1998	Blewett
5,669,904 A	9/1997	Platt, Jr. et al.	5,738,629 A	4/1998	Moll et al.
5,669,907 A	9/1997	Platt, Jr. et al.	5,738,648 A	4/1998	Lands et al.
5,669,918 A	9/1997	Balazs et al.	5,741,271 A	4/1998	Nakao et al.
5,673,840 A	10/1997	Schulze et al.	5,743,456 A	4/1998	Jones et al.
5,673,841 A	10/1997	Schulze et al.	5,747,953 A	5/1998	Philipp
5,673,842 A	10/1997	Bittner et al.	5,749,889 A	5/1998	Bacich et al.
5,674,286 A	10/1997	D'Alessio et al.	5,749,893 A	5/1998	Vidal et al.
5,678,748 A	10/1997	Plyley et al.	5,749,968 A	5/1998	Melanson et al.
5,680,981 A	10/1997	Mililli et al.	5,752,644 A	5/1998	Bolanos et al.
5,680,982 A	10/1997	Schulze et al.	5,752,965 A	5/1998	Francis et al.
5,680,983 A	10/1997	Plyley et al.	5,752,970 A	5/1998	Yoon
5,681,341 A	10/1997	Lunsford et al.	5,755,717 A	5/1998	Yates et al.
5,683,349 A	11/1997	Makower et al.	5,758,814 A	6/1998	Gallagher et al.
5,685,474 A	11/1997	Seeber	5,762,255 A	6/1998	Chrisman et al.
5,686,090 A	11/1997	Schilder et al.	5,762,256 A	6/1998	Mastri et al.
5,688,270 A	11/1997	Yates et al.	5,766,188 A	6/1998	Igaki
5,690,269 A	11/1997	Bolanos et al.	5,766,205 A	6/1998	Zvenyatsky et al.
5,692,668 A	12/1997	Schulze et al.	5,769,303 A	6/1998	Knodel et al.
5,693,020 A	12/1997	Rauh	5,769,748 A	6/1998	Eyerly et al.
5,693,042 A	12/1997	Boiarski et al.	5,769,791 A	6/1998	Benaron et al.
5,693,051 A	12/1997	Schulze et al.	5,769,892 A	6/1998	Kingwell
5,695,494 A	12/1997	Becker	5,772,379 A	6/1998	Evensen
5,695,502 A	12/1997	Pier et al.	5,772,578 A	6/1998	Heimberger et al.
5,695,504 A	12/1997	Gifford, III et al.	5,772,659 A	6/1998	Becker et al.
5,695,524 A	12/1997	Kelley et al.	5,776,130 A	7/1998	Buysse et al.
5,697,542 A	12/1997	Knodel et al.	5,778,939 A	7/1998	Hok-Yin
5,697,543 A	12/1997	Burdorff	5,779,130 A	7/1998	Alesi et al.
5,697,909 A	12/1997	Eggers et al.	5,779,131 A	7/1998	Knodel et al.
5,697,943 A	12/1997	Sauer et al.	5,779,132 A	7/1998	Knodel et al.
5,700,270 A	12/1997	Peysner et al.	5,782,396 A	7/1998	Mastri et al.
			5,782,397 A	7/1998	Koukline
			5,782,748 A	7/1998	Palmer et al.
			5,782,749 A	7/1998	Riza
			5,782,859 A	7/1998	Nicholas et al.



(56)

References Cited

U.S. PATENT DOCUMENTS

5,784,934 A	7/1998	Izumisawa	5,865,638 A	2/1999	Trafton
5,785,232 A	7/1998	Vidal et al.	5,868,361 A	2/1999	Rinderer
5,785,647 A	7/1998	Tompkins et al.	5,868,760 A	2/1999	McGuckin, Jr.
5,787,897 A	8/1998	Kieturakis	5,868,790 A	2/1999	Vincent et al.
5,791,231 A	8/1998	Cohn et al.	5,871,135 A	2/1999	Williamson, IV et al.
5,792,135 A	8/1998	Madhani et al.	5,873,885 A	2/1999	Weidenbenner
5,792,162 A	8/1998	Jolly et al.	5,876,401 A	3/1999	Schulze et al.
5,792,165 A	8/1998	Klieman et al.	5,878,193 A	3/1999	Wang et al.
5,792,573 A	8/1998	Pitzen et al.	5,878,607 A	3/1999	Nunes et al.
5,794,834 A	8/1998	Hamblin et al.	5,878,937 A	3/1999	Green et al.
5,796,188 A	8/1998	Bays	5,878,938 A	3/1999	Bittner et al.
5,797,536 A	8/1998	Smith et al.	5,881,777 A	3/1999	Bassi et al.
5,797,537 A	8/1998	Oberlin et al.	5,891,094 A	4/1999	Masterson et al.
5,797,538 A	8/1998	Heaton et al.	5,891,160 A	4/1999	Williamson, IV et al.
5,797,637 A	8/1998	Ervin	5,891,558 A	4/1999	Bell et al.
5,797,906 A	8/1998	Rhum et al.	5,893,506 A	4/1999	Powell
5,797,927 A	8/1998	Yoon	5,893,835 A	4/1999	Witt et al.
5,797,941 A	8/1998	Schulze et al.	5,893,878 A	4/1999	Pierce
5,797,959 A	8/1998	Castro et al.	5,894,979 A	4/1999	Powell
5,799,857 A	9/1998	Robertson et al.	5,897,552 A	4/1999	Edwards et al.
5,800,379 A	9/1998	Edwards	5,897,562 A	4/1999	Bolanos et al.
5,800,423 A	9/1998	Jensen	5,899,824 A	5/1999	Kurtz et al.
5,804,726 A	9/1998	Geib et al.	5,899,914 A	5/1999	Zirps et al.
5,804,936 A	9/1998	Brodsky et al.	5,901,895 A	5/1999	Heaton et al.
5,806,676 A	9/1998	Wasgien	5,902,312 A	5/1999	Frater et al.
5,807,376 A	9/1998	Viola et al.	5,903,117 A	5/1999	Gregory
5,807,378 A	9/1998	Jensen et al.	5,904,647 A	5/1999	Ouchi
5,807,393 A	9/1998	Williamson, IV et al.	5,904,693 A	5/1999	Dicesare et al.
5,809,441 A	9/1998	McKee	5,904,702 A	5/1999	Ek et al.
5,810,721 A	9/1998	Mueller et al.	5,906,577 A	5/1999	Beane et al.
5,810,811 A	9/1998	Yates et al.	5,906,625 A	5/1999	Bito et al.
5,810,846 A	9/1998	Virnich et al.	5,907,211 A	5/1999	Hall et al.
5,810,855 A	9/1998	Rayburn et al.	5,908,402 A	6/1999	Blythe
5,813,813 A	9/1998	Daum et al.	5,908,427 A	6/1999	McKean et al.
5,814,055 A	9/1998	Knodel et al.	5,909,062 A	6/1999	Krietzman
5,814,057 A	9/1998	Oi et al.	5,911,353 A	6/1999	Bolanos et al.
5,816,471 A	10/1998	Plyley et al.	5,915,616 A	6/1999	Viola et al.
5,817,084 A	10/1998	Jensen	5,916,225 A	6/1999	Kugel
5,817,091 A	10/1998	Nardella et al.	5,918,791 A	7/1999	Sorrentino et al.
5,817,093 A	10/1998	Williamson, IV et al.	5,919,198 A	7/1999	Graves, Jr. et al.
5,817,109 A	10/1998	McGarry et al.	5,921,956 A	7/1999	Grinberg et al.
5,817,119 A	10/1998	Klieman et al.	5,924,864 A	7/1999	Loge et al.
5,820,009 A	10/1998	Melling et al.	5,928,137 A	7/1999	Green
5,823,066 A	10/1998	Huitema et al.	5,928,256 A	7/1999	Riza
5,824,333 A	10/1998	Scopelianos et al.	5,931,847 A	8/1999	Bittner et al.
5,826,776 A	10/1998	Schulze et al.	5,931,853 A	8/1999	McEwen et al.
5,827,271 A	10/1998	Buyse et al.	5,937,951 A	8/1999	Izuchukwu et al.
5,827,298 A	10/1998	Hart et al.	5,938,667 A	8/1999	Peyser et al.
5,829,662 A	11/1998	Allen et al.	5,941,442 A	8/1999	Geiste et al.
5,830,598 A	11/1998	Patterson	5,941,890 A	8/1999	Voegele et al.
5,833,690 A	11/1998	Yates et al.	5,944,172 A	8/1999	Hannula
5,833,695 A	11/1998	Yoon	5,944,715 A	8/1999	Goble et al.
5,833,696 A	11/1998	Whitfield et al.	5,946,978 A	9/1999	Yamashita
5,836,503 A	11/1998	Ehrenfels et al.	5,947,984 A	9/1999	Whipple
5,836,960 A	11/1998	Kolesa et al.	5,947,996 A	9/1999	Logeman
5,839,369 A	11/1998	Chatterjee et al.	5,948,030 A	9/1999	Miller et al.
5,839,639 A	11/1998	Sauer et al.	5,948,429 A	9/1999	Bell et al.
5,843,021 A	12/1998	Edwards et al.	5,951,301 A	9/1999	Younker
5,843,096 A	12/1998	Igaki et al.	5,951,516 A	9/1999	Bunyan
5,843,097 A	12/1998	Mayenberger et al.	5,951,552 A	9/1999	Long et al.
5,843,122 A	12/1998	Riza	5,951,574 A	9/1999	Stefanchik et al.
5,843,132 A	12/1998	Ilvento	5,951,581 A	9/1999	Saadat et al.
5,843,169 A	12/1998	Taheri	5,954,259 A	9/1999	Viola et al.
5,846,254 A	12/1998	Schulze et al.	5,964,394 A	10/1999	Robertson
5,847,566 A	12/1998	Marritt et al.	5,964,774 A	10/1999	McKean et al.
5,849,011 A	12/1998	Jones et al.	5,966,126 A	10/1999	Szabo
5,849,020 A	12/1998	Long et al.	5,971,916 A	10/1999	Koren
5,849,023 A	12/1998	Mericle	5,973,221 A	10/1999	Collyer et al.
5,851,179 A	12/1998	Ritson et al.	D416,089 S *	11/1999	Barton ..... D24/145
5,853,366 A	12/1998	Dowlatshahi	5,976,122 A	11/1999	Madhani et al.
5,855,311 A	1/1999	Hamblin et al.	5,977,746 A	11/1999	Hershberger et al.
5,855,583 A	1/1999	Wang et al.	5,980,248 A	11/1999	Kusakabe et al.
5,860,581 A	1/1999	Robertson et al.	5,984,949 A	11/1999	Levin
5,860,975 A	1/1999	Goble et al.	5,988,479 A	11/1999	Palmer
5,865,361 A	2/1999	Milliman et al.	5,990,379 A	11/1999	Gregory
			5,993,466 A	11/1999	Yoon
			5,997,528 A	12/1999	Bisch et al.
			5,997,552 A	12/1999	Person et al.
			6,001,108 A	12/1999	Wang et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,003,517 A	12/1999	Sheffield et al.	6,083,223 A	7/2000	Baker
6,004,319 A	12/1999	Goble et al.	6,083,234 A	7/2000	Nicholas et al.
6,004,335 A	12/1999	Vaitekunas et al.	6,083,242 A	7/2000	Cook
6,007,521 A	12/1999	Bidwell et al.	6,086,544 A	7/2000	Hibner et al.
6,010,054 A	1/2000	Johnson et al.	6,086,600 A	7/2000	Kortenbach
6,010,513 A	1/2000	Tormala et al.	6,090,106 A	7/2000	Goble et al.
6,010,520 A	1/2000	Pattison	6,093,186 A	7/2000	Goble
6,012,494 A	1/2000	Balazs	6,099,537 A	8/2000	Sugai et al.
6,013,076 A	1/2000	Goble et al.	6,099,551 A	8/2000	Gabbay
6,015,406 A	1/2000	Goble et al.	6,102,271 A	8/2000	Longo et al.
6,015,417 A	1/2000	Reynolds, Jr.	6,104,162 A	8/2000	Sainsbury et al.
6,017,322 A	1/2000	Snoke et al.	6,104,304 A	8/2000	Clark et al.
6,017,354 A	1/2000	Culp et al.	6,106,511 A	8/2000	Jensen
6,017,356 A	1/2000	Frederick et al.	6,109,500 A	8/2000	Alli et al.
6,018,227 A	1/2000	Kumar et al.	6,110,187 A	8/2000	Donlon
6,019,745 A	2/2000	Gray	6,113,618 A	9/2000	Nic
6,022,352 A	2/2000	Vandewalle	6,117,148 A	9/2000	Ravo et al.
6,023,641 A	2/2000	Thompson	6,117,158 A	9/2000	Measamer et al.
6,024,708 A	2/2000	Bales et al.	6,119,913 A	9/2000	Adams et al.
6,024,741 A	2/2000	Williamson, IV et al.	6,120,433 A	9/2000	Mizuno et al.
6,024,748 A	2/2000	Manzo et al.	6,120,462 A	9/2000	Hibner et al.
6,024,750 A	2/2000	Mastri et al.	6,123,241 A	9/2000	Walter et al.
6,024,764 A	2/2000	Schroepel	6,123,701 A	9/2000	Nezhat
6,027,501 A	2/2000	Goble et al.	H1904 H	10/2000	Yates et al.
6,030,384 A	2/2000	Nezhat	6,126,058 A	10/2000	Adams et al.
6,032,849 A	3/2000	Mastri et al.	6,126,359 A	10/2000	Dittrich et al.
6,033,105 A	3/2000	Barker et al.	6,126,670 A	10/2000	Walker et al.
6,033,378 A	3/2000	Lundquist et al.	6,131,789 A	10/2000	Schulze et al.
6,033,399 A	3/2000	Gines	6,131,790 A	10/2000	Piraka
6,033,427 A	3/2000	Lee	6,132,368 A	10/2000	Cooper
6,036,667 A	3/2000	Manna et al.	6,139,546 A	10/2000	Koenig et al.
6,037,724 A	3/2000	Buss et al.	6,142,149 A	11/2000	Steen
6,037,927 A	3/2000	Rosenberg	6,142,933 A	11/2000	Longo et al.
6,039,733 A	3/2000	Buyse et al.	6,147,135 A	11/2000	Yuan et al.
6,039,734 A	3/2000	Goble	6,149,660 A	11/2000	Laufer et al.
6,042,601 A	3/2000	Smith	6,151,323 A	11/2000	O'Connell et al.
6,042,607 A	3/2000	Williamson, IV et al.	6,152,935 A	11/2000	Kammerer et al.
6,043,626 A	3/2000	Snyder et al.	6,155,473 A	12/2000	Tompkins et al.
6,045,560 A	4/2000	McKean et al.	6,156,056 A	12/2000	Kearns et al.
6,047,861 A	4/2000	Vidal et al.	6,157,169 A	12/2000	Lee
6,049,145 A	4/2000	Austin et al.	6,159,146 A	12/2000	El Gazayerli
6,050,172 A	4/2000	Corves et al.	6,159,200 A	12/2000	Verdura et al.
6,050,472 A	4/2000	Shibata	6,159,224 A	12/2000	Yoon
6,050,989 A	4/2000	Fox et al.	6,162,208 A	12/2000	Hipps
6,050,990 A	4/2000	Tankovich et al.	6,162,220 A	12/2000	Nezhat
6,050,996 A	4/2000	Schmaltz et al.	6,162,537 A	12/2000	Martin et al.
6,053,390 A	4/2000	Green et al.	6,165,175 A	12/2000	Wampler et al.
6,053,899 A	4/2000	Slanda et al.	6,165,184 A	12/2000	Verdura et al.
6,053,922 A	4/2000	Krause et al.	6,165,188 A	12/2000	Saadat et al.
6,054,142 A	4/2000	Li et al.	6,167,185 A	12/2000	Smiley et al.
RE36,720 E	5/2000	Green et al.	6,168,605 B1	1/2001	Measamer et al.
6,056,735 A	5/2000	Okada et al.	6,171,305 B1	1/2001	Sherman
6,056,746 A	5/2000	Goble et al.	6,171,316 B1	1/2001	Kovac et al.
6,059,806 A	5/2000	Hoegerle	6,171,330 B1	1/2001	Benchetrit
6,062,360 A	5/2000	Shields	6,173,074 B1	1/2001	Russo
6,063,025 A	5/2000	Bridges et al.	6,174,308 B1	1/2001	Goble et al.
6,063,050 A	5/2000	Manna et al.	6,174,309 B1	1/2001	Wrublewski et al.
6,063,095 A	5/2000	Wang et al.	6,174,318 B1	1/2001	Bates et al.
6,063,097 A	5/2000	Oi et al.	6,175,290 B1	1/2001	Forsythe et al.
6,063,098 A	5/2000	Houser et al.	6,179,195 B1	1/2001	Adams et al.
6,065,679 A	5/2000	Levie et al.	6,179,776 B1	1/2001	Adams et al.
6,065,919 A	5/2000	Peck	6,181,105 B1	1/2001	Cutolo et al.
6,066,132 A	5/2000	Chen et al.	6,182,673 B1	2/2001	Kindermann et al.
6,066,151 A	5/2000	Miyawaki et al.	6,185,356 B1	2/2001	Parker et al.
6,068,627 A	5/2000	Orszulak et al.	6,186,142 B1	2/2001	Schmidt et al.
6,071,233 A	6/2000	Ishikawa et al.	6,187,003 B1	2/2001	Buyse et al.
6,074,386 A	6/2000	Goble et al.	6,190,386 B1	2/2001	Rydell
6,074,401 A	6/2000	Gardiner et al.	6,193,129 B1	2/2001	Bittner et al.
6,077,280 A	6/2000	Fossum	6,197,042 B1	3/2001	Ginn et al.
6,077,286 A	6/2000	Cuschieri et al.	6,200,330 B1	3/2001	Benderev et al.
6,077,290 A	6/2000	Marini	6,202,914 B1	3/2001	Geiste et al.
6,079,606 A	6/2000	Milliman et al.	6,206,894 B1	3/2001	Thompson et al.
6,080,181 A	6/2000	Jensen et al.	6,206,897 B1	3/2001	Jamiolkowski et al.
6,082,577 A	7/2000	Coates et al.	6,206,904 B1	3/2001	Ouchi
6,083,191 A	7/2000	Rose	6,209,414 B1	4/2001	Uneme
			6,210,403 B1	4/2001	Klicek
			6,213,999 B1	4/2001	Platt, Jr. et al.
			6,214,028 B1	4/2001	Yoon et al.
			6,220,368 B1	4/2001	Ark et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,221,007 B1	4/2001	Green	6,355,699 B1	3/2002	Vyakarnam et al.
6,221,023 B1	4/2001	Matsuba et al.	6,356,072 B1	3/2002	Chass
6,223,100 B1	4/2001	Green	6,358,224 B1	3/2002	Tims et al.
6,223,835 B1	5/2001	Habedank et al.	6,358,263 B2	3/2002	Mark et al.
6,224,617 B1	5/2001	Saadat et al.	6,358,459 B1	3/2002	Ziegler et al.
6,228,080 B1	5/2001	Gines	6,364,877 B1	4/2002	Goble et al.
6,228,081 B1	5/2001	Goble	6,364,888 B1	4/2002	Niemeyer et al.
6,228,083 B1	5/2001	Lands et al.	6,370,981 B2	4/2002	Watarai
6,228,084 B1	5/2001	Kirwan, Jr.	6,371,114 B1	4/2002	Schmidt et al.
6,228,089 B1	5/2001	Wahrburg	6,373,152 B1	4/2002	Wang et al.
6,228,098 B1	5/2001	Kayan et al.	6,377,011 B1	4/2002	Ben-Ur
6,231,565 B1	5/2001	Tovey et al.	6,383,201 B1	5/2002	Dong
6,234,178 B1	5/2001	Goble et al.	6,387,092 B1	5/2002	Burnside et al.
6,237,604 B1	5/2001	Burnside et al.	6,387,113 B1	5/2002	Hawkins et al.
6,238,384 B1	5/2001	Peer	6,387,114 B2	5/2002	Adams
6,241,139 B1	6/2001	Milliman et al.	6,391,038 B2	5/2002	Vargas et al.
6,241,140 B1	6/2001	Adams et al.	6,392,854 B1	5/2002	O'Gorman
6,241,723 B1	6/2001	Heim et al.	6,394,998 B1	5/2002	Wallace et al.
6,245,084 B1	6/2001	Mark et al.	6,398,779 B1	6/2002	Buysse et al.
6,248,116 B1	6/2001	Chevillon et al.	6,398,781 B1	6/2002	Goble et al.
6,248,117 B1	6/2001	Blatter	6,398,797 B2	6/2002	Bombard et al.
6,249,076 B1	6/2001	Madden et al.	6,402,766 B2	6/2002	Bowman et al.
6,249,105 B1	6/2001	Andrews et al.	6,406,440 B1	6/2002	Stefanchik
6,250,532 B1	6/2001	Green et al.	6,406,472 B1	6/2002	Jensen
6,251,485 B1	6/2001	Harris et al.	6,409,724 B1	6/2002	Penny et al.
6,254,534 B1	7/2001	Butler et al.	H2037 H	7/2002	Yates et al.
6,254,619 B1	7/2001	Garabet et al.	6,412,639 B1	7/2002	Hickey
6,254,642 B1	7/2001	Taylor	6,413,274 B1	7/2002	Pedros
6,258,107 B1	7/2001	Balazs et al.	6,416,486 B1	7/2002	Wampler
6,261,286 B1	7/2001	Goble et al.	6,416,509 B1	7/2002	Goble et al.
6,261,679 B1	7/2001	Chen et al.	6,419,695 B1	7/2002	Gabbay
6,264,086 B1	7/2001	McGuckin, Jr.	6,423,079 B1	7/2002	Blake, III
6,264,087 B1	7/2001	Whitman	RE37,814 E	8/2002	Allgeyer
6,264,617 B1	7/2001	Bales et al.	6,428,070 B1	8/2002	Takanashi et al.
6,270,508 B1	8/2001	Klieman et al.	6,428,487 B1	8/2002	Burdorff et al.
6,270,916 B1	8/2001	Sink et al.	6,429,611 B1	8/2002	Li
6,273,876 B1	8/2001	Klima et al.	6,430,298 B1	8/2002	Kettl et al.
6,273,897 B1	8/2001	Dalessandro et al.	6,432,065 B1	8/2002	Burdorff et al.
6,277,114 B1	8/2001	Bullivant et al.	6,436,097 B1	8/2002	Nardella
6,280,407 B1	8/2001	Manna et al.	6,436,107 B1	8/2002	Wang et al.
6,293,927 B1	9/2001	McGuckin, Jr.	6,436,110 B2	8/2002	Bowman et al.
6,293,942 B1	9/2001	Goble et al.	6,436,122 B1	8/2002	Frank et al.
6,296,640 B1	10/2001	Wampler et al.	6,439,439 B1	8/2002	Rickard et al.
6,302,311 B1	10/2001	Adams et al.	6,439,446 B1	8/2002	Perry et al.
6,302,743 B1	10/2001	Chiu et al.	6,440,146 B2	8/2002	Nicholas et al.
6,305,891 B1	10/2001	Burlingame	6,441,577 B2	8/2002	Blumenkranz et al.
6,306,134 B1	10/2001	Goble et al.	D462,758 S	9/2002	Epstein et al.
6,306,149 B1	10/2001	Meade	6,443,973 B1	9/2002	Whitman
6,306,424 B1	10/2001	Vyakarnam et al.	6,445,530 B1	9/2002	Baker
6,309,397 B1	10/2001	Julian et al.	6,447,518 B1	9/2002	Krause et al.
6,309,403 B1	10/2001	Minor et al.	6,447,523 B1	9/2002	Middleman et al.
6,312,435 B1	11/2001	Wallace et al.	6,447,799 B1	9/2002	Ullman
6,315,184 B1	11/2001	Whitman	6,447,864 B2	9/2002	Johnson et al.
6,319,510 B1	11/2001	Yates	6,450,391 B1	9/2002	Kayan et al.
6,320,123 B1	11/2001	Reimers	6,450,989 B2	9/2002	Dubrul et al.
6,322,494 B1	11/2001	Bullivant et al.	6,454,781 B1	9/2002	Witt et al.
6,324,339 B1	11/2001	Hudson et al.	6,458,077 B1	10/2002	Boebel et al.
6,325,799 B1	12/2001	Goble	6,458,147 B1	10/2002	Cruise et al.
6,325,805 B1	12/2001	Ogilvie et al.	6,460,627 B1	10/2002	Below et al.
6,325,810 B1	12/2001	Hamilton et al.	6,468,275 B1	10/2002	Wampler et al.
6,328,498 B1	12/2001	Mersch	6,468,286 B2	10/2002	Mastri et al.
6,330,965 B1	12/2001	Milliman et al.	6,471,106 B1	10/2002	Reining
6,331,181 B1	12/2001	Tierney et al.	6,471,659 B2	10/2002	Eggers et al.
6,331,761 B1	12/2001	Kumar et al.	6,478,210 B2	11/2002	Adams et al.
6,333,029 B1	12/2001	Vyakarnam et al.	6,482,200 B2	11/2002	Shippert
6,334,860 B1	1/2002	Dorn	6,482,217 B1	11/2002	Pintor et al.
6,334,861 B1	1/2002	Chandler et al.	6,485,490 B2	11/2002	Wampler et al.
6,336,926 B1	1/2002	Goble	6,485,503 B2	11/2002	Jacobs et al.
6,338,737 B1	1/2002	Toledano	6,485,667 B1	11/2002	Tan
6,343,731 B1	2/2002	Adams et al.	6,486,286 B1	11/2002	McGall et al.
6,346,077 B1	2/2002	Taylor et al.	6,488,196 B1	12/2002	Fenton, Jr.
6,348,061 B1	2/2002	Whitman	6,488,197 B1	12/2002	Whitman
D454,951 S	3/2002	Bon	6,488,659 B1	12/2002	Rosenman
6,352,503 B1	3/2002	Matsui et al.	6,491,201 B1	12/2002	Whitman
6,352,532 B1	3/2002	Kramer et al.	6,491,690 B1	12/2002	Goble et al.
			6,491,701 B2	12/2002	Tierney et al.
			6,492,785 B1	12/2002	Kasten et al.
			6,494,885 B1	12/2002	Dhindsa
			6,494,896 B1	12/2002	D'Alessio et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,498,480 B1	12/2002	Manara	6,616,686 B2	9/2003	Coleman et al.
6,500,176 B1	12/2002	Truckai et al.	6,619,529 B2	9/2003	Green et al.
6,500,194 B2	12/2002	Benderev et al.	6,620,111 B2	9/2003	Stephens et al.
6,503,139 B2	1/2003	Coral	6,620,166 B1	9/2003	Wenstrom, Jr. et al.
6,503,257 B2	1/2003	Grant et al.	6,625,517 B1	9/2003	Bogdanov et al.
6,503,259 B2	1/2003	Huxel et al.	6,626,834 B2	9/2003	Dunne et al.
6,505,768 B2	1/2003	Whitman	6,629,630 B2	10/2003	Adams
6,506,197 B1	1/2003	Rollero et al.	6,629,974 B2	10/2003	Penny et al.
6,510,854 B2	1/2003	Goble	6,629,988 B2	10/2003	Weadock
6,511,468 B1	1/2003	Cragg et al.	6,635,838 B1	10/2003	Kornelson
6,512,360 B1	1/2003	Goto et al.	6,636,412 B2	10/2003	Smith
6,514,252 B2	2/2003	Nezhat et al.	6,638,108 B2	10/2003	Tachi
6,516,073 B1	2/2003	Schulz et al.	6,638,285 B2	10/2003	Gabbay
6,517,528 B1	2/2003	Pantages et al.	6,638,297 B1	10/2003	Huitema
6,517,535 B2	2/2003	Edwards	RE38,335 E	11/2003	Aust et al.
6,517,565 B1	2/2003	Whitman et al.	6,641,528 B2	11/2003	Torii
6,517,566 B1	2/2003	Hovland et al.	6,644,532 B2	11/2003	Green et al.
6,520,971 B1	2/2003	Perry et al.	6,645,201 B1	11/2003	Uttley et al.
6,520,972 B2	2/2003	Peters	6,646,307 B1	11/2003	Yu et al.
6,522,101 B2	2/2003	Malackowski	6,648,816 B2	11/2003	Irion et al.
6,524,180 B1	2/2003	Simms et al.	6,648,901 B2	11/2003	Fleischman et al.
6,527,782 B2	3/2003	Hogg et al.	6,652,595 B1	11/2003	Nicolo
6,527,785 B2	3/2003	Sancoff et al.	D484,243 S	12/2003	Ryan et al.
6,532,958 B1	3/2003	Buan et al.	D484,595 S	12/2003	Ryan et al.
6,533,157 B1	3/2003	Whitman	D484,596 S	12/2003	Ryan et al.
6,533,723 B1	3/2003	Lockery et al.	6,656,177 B2	12/2003	Truckai et al.
6,533,784 B2	3/2003	Truckai et al.	6,656,193 B2	12/2003	Grant et al.
6,535,764 B2	3/2003	Imran et al.	6,659,940 B2	12/2003	Adler
6,539,816 B2	4/2003	Kogiso et al.	6,663,623 B1	12/2003	Oyama et al.
6,543,456 B1	4/2003	Freeman	6,663,641 B1	12/2003	Kovac et al.
6,545,384 B1	4/2003	Pelrine et al.	6,666,854 B1	12/2003	Lange
6,547,786 B1	4/2003	Goble	6,666,875 B1	12/2003	Sakurai et al.
6,550,546 B2	4/2003	Thurler et al.	6,667,825 B2	12/2003	Lu et al.
6,551,333 B2	4/2003	Kuhns et al.	6,669,073 B2	12/2003	Milliman et al.
6,554,861 B2	4/2003	Knox et al.	6,670,806 B2	12/2003	Wendt et al.
6,555,770 B2	4/2003	Kawase	6,671,185 B2	12/2003	Duval
6,558,378 B2	5/2003	Sherman et al.	D484,977 S	1/2004	Ryan et al.
6,558,379 B1	5/2003	Batchelor et al.	6,676,660 B2	1/2004	Wampler et al.
6,558,429 B2	5/2003	Taylor	6,677,687 B2	1/2004	Ho et al.
6,561,187 B2	5/2003	Schmidt et al.	6,679,269 B2	1/2004	Swanson
6,565,560 B1	5/2003	Goble et al.	6,679,410 B2	1/2004	Wursch et al.
6,566,619 B2	5/2003	Gillman et al.	6,681,978 B2	1/2004	Geiste et al.
6,569,085 B2	5/2003	Kortenbach et al.	6,681,979 B2	1/2004	Whitman
6,569,171 B2	5/2003	DeGuillebon et al.	6,682,527 B2	1/2004	Strul
6,578,751 B2	6/2003	Hartwick	6,682,528 B2	1/2004	Frazier et al.
6,582,364 B2	6/2003	Butler et al.	6,682,544 B2	1/2004	Mastri et al.
6,582,427 B1	6/2003	Goble et al.	6,685,698 B2	2/2004	Morley et al.
6,582,441 B1	6/2003	He et al.	6,685,727 B2	2/2004	Fisher et al.
6,583,533 B2	6/2003	Pelrine et al.	6,689,153 B1	2/2004	Skiba
6,585,144 B2	7/2003	Adams et al.	6,692,507 B2	2/2004	Pugsley et al.
6,585,664 B2	7/2003	Burdorff et al.	6,692,692 B2	2/2004	Stetzel
6,587,750 B2	7/2003	Gerbi et al.	6,695,198 B2	2/2004	Adams et al.
6,588,643 B2	7/2003	Bolduc et al.	6,695,199 B2	2/2004	Whitman
6,588,931 B2	7/2003	Betzner et al.	6,695,774 B2	2/2004	Hale et al.
6,589,118 B1	7/2003	Soma et al.	6,696,814 B2	2/2004	Henderson et al.
6,589,164 B1	7/2003	Flaherty	6,697,048 B2	2/2004	Rosenberg et al.
6,592,538 B1	7/2003	Hotchkiss et al.	6,698,643 B2	3/2004	Whitman
6,592,597 B2	7/2003	Grant et al.	6,699,177 B1	3/2004	Wang et al.
6,594,552 B1	7/2003	Nowlin et al.	6,699,214 B2	3/2004	Gellman
6,596,296 B1	7/2003	Nelson et al.	6,699,235 B2	3/2004	Wallace et al.
6,596,304 B1	7/2003	Bayon et al.	6,704,210 B1	3/2004	Myers
6,596,432 B2	7/2003	Kawakami et al.	6,705,503 B1	3/2004	Pedicini et al.
6,599,323 B2	7/2003	Melican et al.	6,709,445 B2	3/2004	Boebel et al.
D478,665 S	8/2003	Isaacs et al.	6,712,773 B1	3/2004	Viola
D478,986 S	8/2003	Johnston et al.	6,716,223 B2	4/2004	Leopold et al.
6,601,749 B2	8/2003	Sullivan et al.	6,716,232 B1	4/2004	Vidal et al.
6,602,252 B2	8/2003	Mollenauer	6,716,233 B1	4/2004	Whitman
6,602,262 B2	8/2003	Griego et al.	6,720,734 B2	4/2004	Norris
6,603,050 B2	8/2003	Heaton	6,722,550 B1	4/2004	Ricordi et al.
6,605,078 B2	8/2003	Adams	6,722,552 B2	4/2004	Fenton, Jr.
6,605,669 B2	8/2003	Awokola et al.	6,723,087 B2	4/2004	O'Neill et al.
6,605,911 B1	8/2003	Klesing	6,723,091 B2	4/2004	Goble et al.
6,607,475 B2	8/2003	Doyle et al.	6,723,109 B2	4/2004	Solingen
6,611,793 B1	8/2003	Burnside et al.	6,726,697 B2	4/2004	Nicholas et al.
6,613,069 B2	9/2003	Boyd et al.	6,726,706 B2	4/2004	Dominguez
			6,729,119 B2	5/2004	Schnipke et al.
			6,736,825 B2	5/2004	Blatter et al.
			6,736,854 B2	5/2004	Vadurro et al.
			6,740,030 B2	5/2004	Martone et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,743,230 B2	6/2004	Lutze et al.	6,843,403 B2	1/2005	Whitman
6,744,385 B2	6/2004	Kazuya et al.	6,843,789 B2	1/2005	Goble
6,747,121 B2	6/2004	Gogolewski	6,843,793 B2	1/2005	Brock et al.
6,747,300 B2	6/2004	Nadd et al.	6,846,307 B2	1/2005	Whitman et al.
6,749,560 B1	6/2004	Konstorum et al.	6,846,308 B2	1/2005	Whitman et al.
6,749,600 B1	6/2004	Levy	6,846,309 B2	1/2005	Whitman et al.
6,752,768 B2	6/2004	Burdorff et al.	6,847,190 B2	1/2005	Schaefer et al.
6,752,816 B2	6/2004	Culp et al.	6,849,071 B2	2/2005	Whitman et al.
6,754,959 B1	6/2004	Guiette, III et al.	6,850,817 B1	2/2005	Green
6,755,195 B1	6/2004	Lemke et al.	6,852,122 B2	2/2005	Rush
6,755,338 B2	6/2004	Hahnen et al.	6,852,330 B2	2/2005	Bowman et al.
6,755,843 B2	6/2004	Chung et al.	6,853,879 B2	2/2005	Sunaoshi
6,756,705 B2	6/2004	Pulford, Jr.	6,858,005 B2	2/2005	Ohline et al.
6,758,846 B2	7/2004	Goble et al.	6,859,882 B2	2/2005	Fung
6,761,685 B2	7/2004	Adams et al.	RE38,708 E	3/2005	Bolanos et al.
6,762,339 B1	7/2004	Klun et al.	D502,994 S	3/2005	Blake, III
6,764,445 B2	7/2004	Ramans et al.	6,861,142 B1	3/2005	Wilkie et al.
6,766,957 B2	7/2004	Matsuura et al.	6,861,954 B2	3/2005	Levin
6,767,352 B2	7/2004	Field et al.	6,863,668 B2	3/2005	Gillespie et al.
6,767,356 B2	7/2004	Kanner et al.	6,863,694 B1	3/2005	Boyce et al.
6,769,590 B2	8/2004	Vresh et al.	6,866,178 B2	3/2005	Adams et al.
6,769,594 B2	8/2004	Orban, III	6,866,671 B2	3/2005	Tierney et al.
6,770,027 B2	8/2004	Banik et al.	6,867,248 B1	3/2005	Martin et al.
6,770,070 B1	8/2004	Balbierz	6,869,430 B2	3/2005	Balbierz et al.
6,770,072 B1	8/2004	Truckai et al.	6,869,435 B2	3/2005	Blake, III
6,773,409 B2	8/2004	Truckai et al.	6,872,214 B2	3/2005	Sonnenschein et al.
6,773,438 B1	8/2004	Knodel et al.	6,874,669 B2	4/2005	Adams et al.
6,775,575 B2	8/2004	Bommannan et al.	6,877,647 B2	4/2005	Green et al.
6,777,838 B2	8/2004	Miekka et al.	6,878,106 B1	4/2005	Herrmann
6,780,151 B2	8/2004	Grabover et al.	6,884,392 B2	4/2005	Malkin et al.
6,780,180 B1	8/2004	Goble et al.	6,884,428 B2	4/2005	Binette et al.
6,783,524 B2	8/2004	Anderson et al.	6,887,710 B2	5/2005	Call et al.
6,786,382 B1	9/2004	Hoffman	6,889,116 B2	5/2005	Jinno
6,786,864 B2	9/2004	Matsuura et al.	6,893,435 B2	5/2005	Goble
6,786,896 B1	9/2004	Madhani et al.	6,894,140 B2	5/2005	Roby
6,788,018 B1	9/2004	Blumenkranz	6,899,538 B2	5/2005	Matoba
6,790,173 B2	9/2004	Saadat et al.	6,899,593 B1	5/2005	Moeller et al.
6,793,652 B1	9/2004	Whitman et al.	6,905,057 B2	6/2005	Swayze et al.
6,793,661 B2	9/2004	Hamilton et al.	6,905,497 B2	6/2005	Truckai et al.
6,793,663 B2	9/2004	Kneifel et al.	6,905,498 B2	6/2005	Hooven
6,793,669 B2	9/2004	Nakamura et al.	6,908,472 B2	6/2005	Wiener et al.
6,796,921 B1	9/2004	Buck et al.	6,911,033 B2	6/2005	de Guillebon et al.
6,802,822 B1	10/2004	Dodge	6,911,916 B1	6/2005	Wang et al.
6,802,843 B2	10/2004	Truckai et al.	6,913,579 B2	7/2005	Truckai et al.
6,802,844 B2	10/2004	Ferree	6,913,608 B2	7/2005	Liddicoat et al.
6,805,273 B2	10/2004	Bilotti et al.	6,913,613 B2	7/2005	Schwarz et al.
6,806,808 B1	10/2004	Watters et al.	6,921,397 B2	7/2005	Corcoran et al.
6,808,525 B2	10/2004	Latterell et al.	6,921,412 B1	7/2005	Black et al.
6,810,359 B2	10/2004	Sakaguchi	6,923,093 B2	8/2005	Ullah
6,814,741 B2	11/2004	Bowman et al.	6,923,803 B2	8/2005	Goble
6,817,508 B1	11/2004	Racenet et al.	6,923,819 B2	8/2005	Meade et al.
6,817,509 B2	11/2004	Geiste et al.	6,926,716 B2	8/2005	Baker et al.
6,817,974 B2	11/2004	Cooper et al.	6,928,902 B1	8/2005	Eyssallenne
6,818,018 B1	11/2004	Sawhney	6,929,641 B2	8/2005	Goble et al.
6,820,791 B2	11/2004	Adams	6,929,644 B2	8/2005	Truckai et al.
6,821,273 B2	11/2004	Mollenauer	6,931,830 B2	8/2005	Liao
6,821,282 B2	11/2004	Perry et al.	6,932,218 B2	8/2005	Kosann et al.
6,821,284 B2	11/2004	Sturtz et al.	6,932,810 B2	8/2005	Ryan
6,827,246 B2	12/2004	Sullivan et al.	6,936,042 B2	8/2005	Wallace et al.
6,827,712 B2	12/2004	Tovey et al.	6,936,948 B2	8/2005	Bell et al.
6,827,725 B2	12/2004	Batchelor et al.	D509,297 S	9/2005	Wells
6,828,902 B2	12/2004	Casden	D509,589 S	9/2005	Wells
6,830,174 B2	12/2004	Hillstead et al.	6,939,358 B2	9/2005	Palacios et al.
6,831,629 B2	12/2004	Nishino et al.	6,942,662 B2	9/2005	Goble et al.
6,832,998 B2	12/2004	Goble	6,942,674 B2	9/2005	Belef et al.
6,834,001 B2	12/2004	Myono	6,945,444 B2	9/2005	Gresham et al.
6,835,173 B2	12/2004	Couvillon, Jr.	6,945,981 B2	9/2005	Donofrio et al.
6,835,199 B2	12/2004	McGuckin, Jr. et al.	6,951,562 B2	10/2005	Zwirnmann
6,835,336 B2	12/2004	Watt	6,953,138 B1	10/2005	Dworak et al.
6,836,611 B2	12/2004	Popovic et al.	6,953,139 B2	10/2005	Milliman et al.
6,837,846 B2	1/2005	Jaffe et al.	6,953,461 B2	10/2005	McClurken et al.
6,837,883 B2	1/2005	Moll et al.	6,957,758 B2	10/2005	Aranyi
6,838,493 B2	1/2005	Williams et al.	6,958,035 B2	10/2005	Friedman et al.
6,840,423 B2	1/2005	Adams et al.	6,959,851 B2	11/2005	Heinrich
6,841,967 B2	1/2005	Kim et al.	6,959,852 B2	11/2005	Shelton, IV et al.
			6,960,107 B1	11/2005	Schaub et al.
			6,960,163 B2	11/2005	Ewers et al.
			6,960,220 B2	11/2005	Marino et al.
			6,962,587 B2	11/2005	Johnson et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,963,792 B1	11/2005	Green	7,052,454 B2	5/2006	Taylor
6,964,363 B2	11/2005	Wales et al.	7,052,494 B2	5/2006	Goble et al.
6,966,907 B2	11/2005	Goble	7,052,499 B2	5/2006	Steger et al.
6,966,909 B2	11/2005	Marshall et al.	7,055,730 B2	6/2006	Ehrenfels et al.
6,968,908 B2	11/2005	Tokunaga et al.	7,055,731 B2	6/2006	Shelton, IV et al.
6,969,385 B2	11/2005	Moreyra	7,056,284 B2	6/2006	Martone et al.
6,969,395 B2	11/2005	Eskuri	7,056,330 B2	6/2006	Gayton
6,971,988 B2	12/2005	Orban, III	7,059,331 B2	6/2006	Adams et al.
6,972,199 B2	12/2005	Lebouitz et al.	7,059,508 B2	6/2006	Shelton, IV et al.
6,974,435 B2	12/2005	Daw et al.	7,063,671 B2	6/2006	Couvillon, Jr.
6,974,462 B2	12/2005	Sater	7,063,712 B2	6/2006	Vargas et al.
6,978,921 B2	12/2005	Shelton, IV et al.	7,064,509 B1	6/2006	Fu et al.
6,978,922 B2	12/2005	Bilotti et al.	7,066,879 B2	6/2006	Fowler et al.
6,981,628 B2	1/2006	Wales	7,066,944 B2	6/2006	Laufer et al.
6,981,941 B2	1/2006	Whitman et al.	7,067,038 B2	6/2006	Trokhon et al.
6,981,978 B2	1/2006	Gannoe	7,070,083 B2	7/2006	Jankowski
6,984,203 B2	1/2006	Tartaglia et al.	7,070,559 B2	7/2006	Adams et al.
6,984,231 B2	1/2006	Goble et al.	7,070,597 B2	7/2006	Truckai et al.
6,986,451 B1	1/2006	Mastri et al.	7,071,287 B2	7/2006	Rhine et al.
6,988,649 B2	1/2006	Shelton, IV et al.	7,075,770 B1	7/2006	Smith
6,988,650 B2	1/2006	Schwemberger et al.	7,077,856 B2	7/2006	Whitman
6,989,034 B2	1/2006	Hammer et al.	7,080,769 B2	7/2006	Vresh et al.
6,990,731 B2	1/2006	Haytayan	7,081,114 B2	7/2006	Rashidi
6,990,796 B2	1/2006	Schnipke et al.	7,083,073 B2	8/2006	Yoshie et al.
6,993,200 B2	1/2006	Tastl et al.	7,083,075 B2	8/2006	Swayze et al.
6,993,413 B2	1/2006	Sunaoshi	7,083,571 B2	8/2006	Wang et al.
6,994,708 B2	2/2006	Manzo	7,083,615 B2	8/2006	Peterson et al.
6,995,729 B2	2/2006	Govari et al.	7,083,619 B2	8/2006	Truckai et al.
6,996,433 B2	2/2006	Burbank et al.	7,083,620 B2	8/2006	Jahns et al.
6,997,931 B2	2/2006	Sauer et al.	7,083,626 B2	8/2006	Hart et al.
6,997,935 B2	2/2006	Anderson et al.	7,087,049 B2	8/2006	Nowlin et al.
6,998,736 B2	2/2006	Lee et al.	7,087,054 B2	8/2006	Truckai et al.
6,998,816 B2	2/2006	Wieck et al.	7,087,071 B2	8/2006	Nicholas et al.
7,000,818 B2	2/2006	Shelton, IV et al.	7,090,637 B2	8/2006	Danitz et al.
7,000,819 B2	2/2006	Swayze et al.	7,090,673 B2	8/2006	Dycus et al.
7,000,911 B2	2/2006	McCormick et al.	7,090,683 B2	8/2006	Brock et al.
7,001,380 B2	2/2006	Goble	7,090,684 B2	8/2006	McGuckin, Jr. et al.
7,001,408 B2	2/2006	Knodel et al.	7,091,412 B2	8/2006	Wang et al.
7,004,174 B2	2/2006	Eggers et al.	7,094,202 B2	8/2006	Nobis et al.
7,007,176 B2	2/2006	Goodfellow et al.	7,094,247 B2	8/2006	Monassevitch et al.
7,008,433 B2	3/2006	Voellmicke et al.	7,094,916 B2	8/2006	DeLuca et al.
7,008,435 B2	3/2006	Cummins	7,096,972 B2	8/2006	Orozco, Jr.
7,009,039 B2	3/2006	Yayon et al.	7,097,089 B2	8/2006	Marczyk
7,011,657 B2	3/2006	Truckai et al.	7,097,644 B2	8/2006	Long
7,014,640 B2	3/2006	Kemppainen et al.	7,097,650 B2	8/2006	Weller et al.
7,018,357 B2	3/2006	Emmons	7,098,794 B2	8/2006	Lindsay et al.
7,018,390 B2	3/2006	Turovskiy et al.	7,100,949 B2	9/2006	Williams et al.
7,021,669 B1	4/2006	Lindermeir et al.	7,101,187 B1	9/2006	Deconinck et al.
7,023,159 B2	4/2006	Gorti et al.	7,101,394 B2	9/2006	Hamm et al.
7,025,064 B2	4/2006	Wang et al.	7,104,741 B2	9/2006	Krohn
7,025,732 B2	4/2006	Thompson et al.	7,108,695 B2	9/2006	Witt et al.
7,025,743 B2	4/2006	Mann et al.	7,108,701 B2	9/2006	Evens et al.
7,025,775 B2	4/2006	Gadberry et al.	7,108,709 B2	9/2006	Cummins
7,028,570 B2	4/2006	Ohta et al.	7,111,768 B2	9/2006	Cummins et al.
7,029,435 B2	4/2006	Nakao	7,111,769 B2	9/2006	Wales et al.
7,029,439 B2	4/2006	Roberts et al.	7,112,214 B2	9/2006	Peterson et al.
7,030,904 B2	4/2006	Adair et al.	RE39,358 E	10/2006	Goble
7,032,798 B2	4/2006	Whitman et al.	7,114,642 B2	10/2006	Whitman
7,032,799 B2	4/2006	Viola et al.	7,116,100 B1	10/2006	Mock et al.
7,033,356 B2	4/2006	Latterell et al.	7,118,020 B2	10/2006	Lee et al.
7,035,716 B2	4/2006	Harris et al.	7,118,528 B1	10/2006	Piskun
7,035,762 B2	4/2006	Menard et al.	7,118,563 B2	10/2006	Weckwerth et al.
7,036,680 B1	5/2006	Flannery	7,118,582 B1	10/2006	Wang et al.
7,037,314 B2	5/2006	Armstrong	7,119,534 B2	10/2006	Butzmann
7,037,344 B2	5/2006	Kagan et al.	7,121,446 B2	10/2006	Arad et al.
7,041,088 B2	5/2006	Nawrocki et al.	7,121,773 B2	10/2006	Mikiya et al.
7,041,102 B2	5/2006	Truckai et al.	7,122,028 B2	10/2006	Looper et al.
7,041,868 B2	5/2006	Greene et al.	7,125,403 B2	10/2006	Julian et al.
7,043,852 B2	5/2006	Hayashida et al.	7,125,409 B2	10/2006	Truckai et al.
7,044,350 B2	5/2006	Kameyama et al.	7,126,303 B2	10/2006	Farritor et al.
7,044,352 B2	5/2006	Shelton, IV et al.	7,126,879 B2	10/2006	Snyder
7,044,353 B2	5/2006	Mastri et al.	7,128,253 B2	10/2006	Mastri et al.
7,046,082 B2	5/2006	Komiya et al.	7,128,254 B2	10/2006	Shelton, IV et al.
7,048,687 B1	5/2006	Reuss et al.	7,128,748 B2	10/2006	Mooradian et al.
7,048,745 B2	5/2006	Tierney et al.	7,131,445 B2	11/2006	Amoah
			7,133,601 B2	11/2006	Phillips et al.
			7,134,587 B2	11/2006	Schwemberger et al.
			7,135,027 B2	11/2006	Delmotte
			7,137,980 B2	11/2006	Buysse et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

7,137,981 B2	11/2006	Long	7,235,302 B2	6/2007	Jing et al.
7,139,016 B2	11/2006	Squilla et al.	7,237,708 B1	7/2007	Guy et al.
7,140,527 B2	11/2006	Ehrenfels et al.	7,238,195 B2	7/2007	Viola
7,140,528 B2	11/2006	Shelton, IV	7,238,901 B2	7/2007	Kim et al.
7,141,055 B2	11/2006	Abrams et al.	7,239,657 B1	7/2007	Gunnarsson
7,143,923 B2	12/2006	Shelton, IV et al.	7,241,288 B2	7/2007	Braun
7,143,924 B2	12/2006	Scirica et al.	7,241,289 B2	7/2007	Braun
7,143,925 B2	12/2006	Shelton, IV et al.	7,246,734 B2	7/2007	Shelton, IV
7,143,926 B2	12/2006	Shelton, IV et al.	7,247,161 B2	7/2007	Johnston et al.
7,146,191 B2	12/2006	Kerner et al.	7,249,267 B2	7/2007	Chapuis
7,147,138 B2	12/2006	Shelton, IV	7,252,641 B2	8/2007	Thompson et al.
7,147,139 B2	12/2006	Schwemberger et al.	7,252,660 B2	8/2007	Kunz
7,147,140 B2	12/2006	Wukusick et al.	7,255,012 B2	8/2007	Hedtke
7,147,637 B2	12/2006	Goble	7,255,696 B2	8/2007	Goble et al.
7,147,648 B2	12/2006	Lin	7,256,695 B2	8/2007	Hamel et al.
7,147,650 B2	12/2006	Lee	7,258,262 B2	8/2007	Mastri et al.
7,150,748 B2	12/2006	Ebbutt et al.	7,258,546 B2	8/2007	Beier et al.
7,153,300 B2	12/2006	Goble	7,260,431 B2	8/2007	Libbus et al.
7,155,316 B2	12/2006	Sutherland et al.	7,265,374 B2	9/2007	Lee et al.
7,156,863 B2	1/2007	Sonnenschein et al.	7,267,677 B2	9/2007	Johnson et al.
7,159,750 B2	1/2007	Racenet et al.	7,267,679 B2	9/2007	McGuckin, Jr. et al.
7,160,296 B2	1/2007	Pearson et al.	7,272,002 B2	9/2007	Drapeau
7,160,299 B2	1/2007	Baily	7,273,483 B2	9/2007	Wiener et al.
7,161,036 B2	1/2007	Oikawa et al.	7,275,674 B2	10/2007	Racenet et al.
7,161,580 B2	1/2007	Bailey et al.	7,276,044 B2	10/2007	Ferry et al.
7,163,563 B2	1/2007	Schwartz et al.	7,276,068 B2	10/2007	Johnson et al.
7,166,133 B2	1/2007	Evans et al.	7,278,562 B2	10/2007	Mastri et al.
7,168,604 B2	1/2007	Milliman et al.	7,278,563 B1	10/2007	Green
7,170,910 B2	1/2007	Chen et al.	7,278,949 B2	10/2007	Bader
7,171,279 B2	1/2007	Buckingham et al.	7,278,994 B2	10/2007	Goble
7,172,104 B2	2/2007	Scirica et al.	7,282,048 B2	10/2007	Goble et al.
7,172,593 B2	2/2007	Trieu et al.	7,286,850 B2	10/2007	Frielink et al.
7,172,615 B2	2/2007	Morriss et al.	7,287,682 B1	10/2007	Ezzat et al.
7,174,636 B2	2/2007	Lowe	7,289,139 B2	10/2007	Amling et al.
7,179,223 B2	2/2007	Motoki et al.	7,293,685 B2	11/2007	Ehrenfels et al.
7,179,267 B2	2/2007	Nolan et al.	7,295,893 B2	11/2007	Sunaoshi
7,182,239 B1	2/2007	Myers	7,295,907 B2	11/2007	Lu et al.
7,182,763 B2	2/2007	Nardella	7,296,722 B2	11/2007	Ivanko
7,183,737 B2	2/2007	Kitagawa	7,296,724 B2	11/2007	Green et al.
7,187,960 B2	3/2007	Abreu	7,297,149 B2	11/2007	Vitali et al.
7,188,758 B2	3/2007	Viola et al.	7,300,373 B2	11/2007	Jinno et al.
7,189,207 B2	3/2007	Viola	7,300,450 B2	11/2007	Vleugels et al.
7,190,147 B2	3/2007	Gileff et al.	7,303,106 B2	12/2007	Milliman et al.
7,195,627 B2	3/2007	Amoah et al.	7,303,107 B2	12/2007	Milliman et al.
7,196,911 B2	3/2007	Takano et al.	7,303,108 B2	12/2007	Shelton, IV
D541,418 S *	4/2007	Schechter ..... D24/144	7,303,502 B2	12/2007	Thompson
7,199,537 B2	4/2007	Okamura et al.	7,303,556 B2	12/2007	Metzger
7,202,576 B1	4/2007	Dechene et al.	7,306,597 B2	12/2007	Manzo
7,202,653 B2	4/2007	Pai	7,308,998 B2	12/2007	Mastri et al.
7,204,404 B2	4/2007	Nguyen et al.	7,311,238 B2	12/2007	Liu
7,204,835 B2	4/2007	Latterell et al.	7,313,430 B2	12/2007	Urquhart et al.
7,207,233 B2	4/2007	Wadge	7,314,473 B2	1/2008	Jinno et al.
7,207,471 B2	4/2007	Heinrich et al.	7,322,859 B2	1/2008	Evans
7,207,472 B2	4/2007	Wukusick et al.	7,322,975 B2	1/2008	Goble et al.
7,207,556 B2	4/2007	Saitoh et al.	7,322,994 B2	1/2008	Nicholas et al.
7,208,005 B2	4/2007	Frecker et al.	7,324,572 B2	1/2008	Chang
7,210,609 B2	5/2007	Leiboff et al.	7,326,203 B2	2/2008	Papineau et al.
7,211,081 B2	5/2007	Goble	7,326,213 B2	2/2008	Benderev et al.
7,211,084 B2	5/2007	Goble et al.	7,328,828 B2	2/2008	Ortiz et al.
7,211,092 B2	5/2007	Hughett	7,328,829 B2	2/2008	Arad et al.
7,211,979 B2	5/2007	Khatib et al.	7,330,004 B2	2/2008	DeJonge et al.
7,213,736 B2	5/2007	Wales et al.	7,331,340 B2	2/2008	Barney
7,214,224 B2	5/2007	Goble	7,331,343 B2	2/2008	Schmidt et al.
7,215,517 B2	5/2007	Takamatsu	7,331,403 B2	2/2008	Berry et al.
7,217,285 B2	5/2007	Vargas et al.	7,331,406 B2	2/2008	Wottreng, Jr. et al.
7,220,260 B2	5/2007	Fleming et al.	7,331,969 B1	2/2008	Inganas et al.
7,220,272 B2	5/2007	Weadock	7,334,717 B2	2/2008	Rethy et al.
7,225,959 B2	6/2007	Patton et al.	7,334,718 B2	2/2008	McAlister et al.
7,225,963 B2	6/2007	Scirica	7,335,199 B2	2/2008	Goble et al.
7,225,964 B2	6/2007	Mastri et al.	7,336,045 B2	2/2008	Clermonts
7,226,450 B2	6/2007	Athanasidou et al.	7,336,048 B2	2/2008	Lohr
7,229,408 B2	6/2007	Douglas et al.	7,336,184 B2	2/2008	Smith et al.
7,234,624 B2	6/2007	Gresham et al.	7,337,774 B2	3/2008	Webb
7,235,072 B2	6/2007	Sartor et al.	7,338,505 B2	3/2008	Belson
7,235,089 B1	6/2007	McGuckin, Jr.	7,338,513 B2	3/2008	Lee et al.
			7,341,555 B2	3/2008	Ootawara et al.
			7,341,591 B2	3/2008	Grinberg
			7,343,920 B2	3/2008	Toby et al.
			7,344,532 B2	3/2008	Goble et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,344,533 B2	3/2008	Pearson et al.	7,438,718 B2	10/2008	Milliman et al.
7,346,344 B2	3/2008	Fontaine	7,439,354 B2	10/2008	Lenges et al.
7,346,406 B2	3/2008	Brotto et al.	7,441,684 B2	10/2008	Shelton, IV et al.
7,348,763 B1	3/2008	Reinhart et al.	7,441,685 B1	10/2008	Boudreaux
7,348,875 B2	3/2008	Hughes et al.	7,442,201 B2	10/2008	Pugsley et al.
RE40,237 E	4/2008	Bilotti et al.	7,443,547 B2	10/2008	Moreno et al.
7,351,258 B2	4/2008	Ricotta et al.	7,448,525 B2	11/2008	Shelton, IV et al.
7,354,447 B2	4/2008	Shelton, IV et al.	7,451,904 B2	11/2008	Shelton, IV
7,354,502 B2	4/2008	Polat et al.	7,455,208 B2	11/2008	Wales et al.
7,357,287 B2	4/2008	Shelton, IV et al.	7,455,676 B2	11/2008	Holsten et al.
7,357,806 B2	4/2008	Rivera et al.	7,455,682 B2	11/2008	Viola
7,361,168 B2	4/2008	Makower et al.	7,461,767 B2	12/2008	Viola et al.
7,361,195 B2	4/2008	Schwartz et al.	7,462,187 B2	12/2008	Johnston et al.
7,364,060 B2	4/2008	Milliman	7,464,845 B2	12/2008	Chou
7,364,061 B2	4/2008	Swayze et al.	7,464,846 B2	12/2008	Shelton, IV et al.
7,368,124 B2	5/2008	Chun et al.	7,464,847 B2	12/2008	Viola et al.
7,371,210 B2	5/2008	Brock et al.	7,464,849 B2	12/2008	Shelton, IV et al.
7,371,403 B2	5/2008	McCarthy et al.	7,467,740 B2	12/2008	Shelton, IV et al.
7,377,918 B2	5/2008	Amoah	7,467,849 B2	12/2008	Silverbrook et al.
7,377,928 B2	5/2008	Zubik et al.	7,472,814 B2	1/2009	Mastri et al.
7,380,695 B2	6/2008	Doll et al.	7,472,815 B2	1/2009	Shelton, IV et al.
7,380,696 B2	6/2008	Shelton, IV et al.	7,472,816 B2	1/2009	Holsten et al.
7,384,403 B2	6/2008	Sherman	7,473,221 B2	1/2009	Ewers et al.
7,384,417 B2	6/2008	Cucin	7,473,253 B2	1/2009	Dycus et al.
7,386,365 B2	6/2008	Nixon	7,473,263 B2	1/2009	Johnston et al.
7,386,730 B2	6/2008	Uchikubo	7,476,237 B2	1/2009	Taniguchi et al.
7,388,217 B2	6/2008	Buschbeck et al.	7,479,608 B2	1/2009	Smith
7,388,484 B2	6/2008	Hsu	7,481,347 B2	1/2009	Roy
7,391,173 B2	6/2008	Schena	7,481,348 B2	1/2009	Marczyk
7,394,190 B2	7/2008	Huang	7,481,349 B2	1/2009	Holsten et al.
7,396,356 B2	7/2008	Mollenauer	7,481,824 B2	1/2009	Boudreaux et al.
7,397,364 B2	7/2008	Govari	7,485,124 B2	2/2009	Kuhns et al.
7,398,707 B2	7/2008	Morley et al.	7,485,133 B2	2/2009	Cannon et al.
7,398,907 B2	7/2008	Racenet et al.	7,485,142 B2	2/2009	Milo
7,398,908 B2	7/2008	Holsten et al.	7,487,899 B2	2/2009	Shelton, IV et al.
7,400,107 B2	7/2008	Schneider et al.	7,489,055 B2	2/2009	Jeong et al.
7,400,752 B2	7/2008	Zacharias	7,490,749 B2	2/2009	Schall et al.
7,401,000 B2	7/2008	Nakamura	7,491,232 B2	2/2009	Bolduc et al.
7,401,721 B2	7/2008	Holsten et al.	7,494,039 B2	2/2009	Racenet et al.
7,404,449 B2	7/2008	Birmingham et al.	7,494,499 B2	2/2009	Nagase et al.
7,404,508 B2	7/2008	Smith et al.	7,494,501 B2	2/2009	Ahlberg et al.
7,404,509 B2	7/2008	Ortiz et al.	7,500,979 B2	3/2009	Hueil et al.
7,404,822 B2	7/2008	Viart et al.	7,501,198 B2	3/2009	Barlev et al.
7,407,074 B2	8/2008	Ortiz et al.	7,503,474 B2	3/2009	Hillstead et al.
7,407,075 B2	8/2008	Holsten et al.	7,506,790 B2	3/2009	Shelton, IV
7,407,076 B2	8/2008	Racenet et al.	7,506,791 B2	3/2009	Omaits et al.
7,407,077 B2	8/2008	Ortiz et al.	7,507,202 B2	3/2009	Schoellhorn
7,407,078 B2	8/2008	Shelton, IV et al.	7,510,107 B2	3/2009	Timm et al.
7,408,310 B2	8/2008	Hong et al.	7,510,534 B2	3/2009	Burdorff et al.
7,410,085 B2	8/2008	Wolf et al.	7,510,566 B2	3/2009	Jacobs et al.
7,410,086 B2	8/2008	Ortiz et al.	7,513,407 B1	4/2009	Chang
7,410,483 B2	8/2008	Danitz et al.	7,513,408 B2	4/2009	Shelton, IV et al.
7,413,563 B2	8/2008	Corcoran et al.	7,517,356 B2	4/2009	Heinrich
7,416,101 B2	8/2008	Shelton, IV et al.	7,524,320 B2	4/2009	Tierney et al.
7,418,078 B2	8/2008	Blanz et al.	7,527,632 B2	5/2009	Houghton et al.
RE40,514 E	9/2008	Mastri et al.	7,530,984 B2	5/2009	Sonnenschein et al.
7,419,080 B2	9/2008	Smith et al.	7,530,985 B2	5/2009	Takemoto et al.
7,419,081 B2	9/2008	Ehrenfels et al.	7,533,906 B2	5/2009	Luetzgen et al.
7,419,321 B2	9/2008	Tereschouk	7,534,259 B2	5/2009	Lashinski et al.
7,419,495 B2	9/2008	Menn et al.	7,540,867 B2	6/2009	Jinno et al.
7,422,136 B1	9/2008	Marczyk	7,542,807 B2	6/2009	Bertolero et al.
7,422,138 B2	9/2008	Bilotti et al.	7,546,939 B2	6/2009	Adams et al.
7,422,139 B2	9/2008	Shelton, IV et al.	7,546,940 B2	6/2009	Milliman et al.
7,424,965 B2	9/2008	Racenet et al.	7,547,312 B2	6/2009	Bauman et al.
7,427,607 B2	9/2008	Suzuki	7,549,563 B2	6/2009	Mather et al.
D578,644 S	10/2008	Shumer et al.	7,549,564 B2	6/2009	Boudreaux
7,431,188 B1	10/2008	Marczyk	7,549,998 B2	6/2009	Braun
7,431,189 B2	10/2008	Shelton, IV et al.	7,552,854 B2	6/2009	Wixey et al.
7,431,230 B2	10/2008	McPherson et al.	7,553,173 B2	6/2009	Kowalick
7,431,694 B2	10/2008	Stefanchik et al.	7,553,275 B2	6/2009	Padget et al.
7,431,730 B2	10/2008	Viola	7,554,343 B2	6/2009	Bromfield
7,434,715 B2	10/2008	Shelton, IV et al.	7,556,185 B2	7/2009	Viola
7,434,717 B2	10/2008	Shelton, IV et al.	7,556,186 B2	7/2009	Milliman
7,435,249 B2	10/2008	Buysse et al.	7,556,647 B2	7/2009	Drews et al.
7,438,209 B1	10/2008	Hess et al.	7,559,449 B2	7/2009	Viola
			7,559,450 B2	7/2009	Wales et al.
			7,559,452 B2	7/2009	Wales et al.
			7,559,937 B2	7/2009	de la Torre et al.
			7,561,637 B2	7/2009	Jonsson et al.



(56)

References Cited

U.S. PATENT DOCUMENTS

7,562,910 B2	7/2009	Kertesz et al.	7,673,781 B2	3/2010	Swayze et al.
7,563,269 B2	7/2009	Hashiguchi	7,673,782 B2	3/2010	Hess et al.
7,563,862 B2	7/2009	Sieg et al.	7,673,783 B2	3/2010	Morgan et al.
7,565,993 B2	7/2009	Milliman et al.	7,674,253 B2	3/2010	Fisher et al.
7,566,300 B2	7/2009	Devierre et al.	7,674,255 B2	3/2010	Braun
7,567,045 B2	7/2009	Fristedt	7,674,263 B2	3/2010	Ryan
7,568,603 B2	8/2009	Shelton, IV et al.	7,674,270 B2	3/2010	Layer
7,568,604 B2	8/2009	Ehrenfels et al.	7,682,307 B2	3/2010	Danitz et al.
7,568,619 B2	8/2009	Todd et al.	7,682,367 B2	3/2010	Shah et al.
7,575,144 B2	8/2009	Ortiz et al.	7,682,686 B2	3/2010	Curro et al.
7,578,825 B2	8/2009	Huebner	7,686,201 B2	3/2010	Csiky
7,583,063 B2	9/2009	Dooley	7,686,804 B2	3/2010	Johnson et al.
7,586,289 B2	9/2009	Andruk et al.	7,686,826 B2	3/2010	Lee et al.
7,588,174 B2	9/2009	Holsten et al.	7,688,028 B2	3/2010	Phillips et al.
7,588,175 B2	9/2009	Timm et al.	7,691,098 B2	4/2010	Wallace et al.
7,588,176 B2	9/2009	Timm et al.	7,691,103 B2	4/2010	Fernandez et al.
7,588,177 B2	9/2009	Racenet	7,691,106 B2	4/2010	Schenberger et al.
7,591,783 B2	9/2009	Boulais et al.	7,694,864 B2	4/2010	Okada et al.
7,591,818 B2	9/2009	Bertolero et al.	7,694,865 B2	4/2010	Scirica
7,593,766 B2	9/2009	Faber et al.	7,695,485 B2	4/2010	Whitman et al.
7,597,229 B2	10/2009	Boudreaux et al.	7,699,204 B2	4/2010	Viola
7,597,230 B2	10/2009	Racenet et al.	7,699,835 B2	4/2010	Lee et al.
7,597,693 B2	10/2009	Garrison	7,699,844 B2	4/2010	Utley et al.
7,597,699 B2	10/2009	Rogers	7,699,846 B2	4/2010	Ryan
7,598,972 B2	10/2009	Tomita	7,699,856 B2	4/2010	Van Wyk et al.
7,600,663 B2	10/2009	Green	7,699,859 B2	4/2010	Bombard et al.
7,604,150 B2	10/2009	Boudreaux	7,699,860 B2	4/2010	Huitema et al.
7,604,151 B2	10/2009	Hess et al.	7,703,653 B2	4/2010	Shah et al.
7,604,668 B2	10/2009	Farnsworth et al.	7,705,559 B2	4/2010	Powell et al.
7,607,557 B2	10/2009	Shelton, IV et al.	7,708,180 B2	5/2010	Murray et al.
7,611,038 B2	11/2009	Racenet et al.	7,708,181 B2	5/2010	Cole et al.
7,611,474 B2	11/2009	Hibner et al.	7,708,182 B2	5/2010	Viola
7,615,003 B2	11/2009	Stefanchik et al.	7,708,758 B2	5/2010	Lee et al.
7,615,067 B2	11/2009	Lee et al.	7,712,182 B2	5/2010	Zeiler et al.
7,617,961 B2	11/2009	Viola	7,713,190 B2	5/2010	Brock et al.
7,624,902 B2	12/2009	Marczyk et al.	7,714,239 B2	5/2010	Smith
7,624,903 B2	12/2009	Green et al.	7,714,334 B2	5/2010	Lin
7,625,370 B2	12/2009	Hart et al.	7,717,312 B2	5/2010	Beetel
7,630,841 B2	12/2009	Comisky et al.	7,717,313 B2	5/2010	Criscuolo et al.
7,631,793 B2	12/2009	Rethy et al.	7,717,846 B2	5/2010	Zirps et al.
7,631,794 B2	12/2009	Rethy et al.	7,717,873 B2	5/2010	Swick
7,635,074 B2	12/2009	Olson et al.	7,717,915 B2	5/2010	Miyazawa
7,635,922 B2	12/2009	Becker	7,718,180 B2	5/2010	Karp
7,637,409 B2	12/2009	Marczyk	7,718,556 B2	5/2010	Matsuda et al.
7,637,410 B2	12/2009	Marczyk	7,721,930 B2	5/2010	McKenna et al.
7,638,958 B2	12/2009	Philipp et al.	7,721,931 B2	5/2010	Shelton, IV et al.
7,641,091 B2	1/2010	Olson et al.	7,721,933 B2	5/2010	Ehrenfels et al.
7,641,092 B2	1/2010	Kruszynski et al.	7,721,934 B2	5/2010	Shelton, IV et al.
7,641,093 B2	1/2010	Doll et al.	7,721,936 B2	5/2010	Shalton, IV et al.
7,641,095 B2	1/2010	Viola	7,722,527 B2	5/2010	Bouchier et al.
7,641,671 B2	1/2010	Crainich	7,722,607 B2	5/2010	Dumbauld et al.
7,644,783 B2	1/2010	Roberts et al.	7,722,610 B2	5/2010	Viola et al.
7,644,848 B2	1/2010	Swayze et al.	7,725,214 B2	5/2010	Diolaiti
7,645,230 B2	1/2010	Mikkaichi et al.	7,726,171 B2	6/2010	Langlotz et al.
7,648,457 B2	1/2010	Stefanchik et al.	7,726,537 B2	6/2010	Olson et al.
7,648,519 B2	1/2010	Lee et al.	7,726,538 B2	6/2010	Holsten et al.
7,650,185 B2	1/2010	Maile et al.	7,726,539 B2	6/2010	Holsten et al.
7,651,017 B2	1/2010	Ortiz et al.	7,727,954 B2	6/2010	McKay
7,651,498 B2	1/2010	Shifrin et al.	7,728,553 B2	6/2010	Carrier et al.
7,654,431 B2	2/2010	Hueil et al.	7,729,742 B2	6/2010	Govari
7,655,004 B2	2/2010	Long	7,731,072 B2	6/2010	Timm et al.
7,655,288 B2	2/2010	Bauman et al.	7,731,073 B2	6/2010	Wixey et al.
7,655,584 B2	2/2010	Biran et al.	7,731,724 B2	6/2010	Huitema et al.
7,656,131 B2	2/2010	Embrey et al.	7,735,703 B2	6/2010	Morgan et al.
7,658,311 B2	2/2010	Boudreaux	7,736,254 B2	6/2010	Schena
7,658,312 B2	2/2010	Vidal et al.	7,736,306 B2	6/2010	Brustad et al.
7,658,705 B2	2/2010	Melvin et al.	7,736,374 B2	6/2010	Vaughan et al.
7,659,219 B2	2/2010	Biran et al.	7,738,971 B2	6/2010	Swayze et al.
7,662,161 B2	2/2010	Briganti et al.	7,740,159 B2	6/2010	Shelton, IV et al.
7,665,646 B2	2/2010	Prommersberger	7,742,036 B2	6/2010	Grant et al.
7,665,647 B2	2/2010	Shelton, IV et al.	7,743,960 B2	6/2010	Whitman et al.
7,669,746 B2	3/2010	Shelton, IV	7,744,624 B2	6/2010	Bettuchi
7,669,747 B2	3/2010	Weisenburgh, II et al.	7,744,627 B2	6/2010	Orban, III et al.
7,670,334 B2	3/2010	Hueil et al.	7,744,628 B2	6/2010	Viola
7,673,780 B2	3/2010	Shelton, IV et al.	7,747,146 B2	6/2010	Milano et al.
			D620,108 S *	7/2010	Eitenmueller ..... D24/133
			7,748,587 B2	7/2010	Haramiishi et al.
			7,748,632 B2	7/2010	Coleman et al.
			7,749,204 B2	7/2010	Dhanaraj et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

7,751,870 B2	7/2010	Whitman	7,832,612 B2	11/2010	Baxter, III et al.
7,753,245 B2	7/2010	Boudreaux et al.	7,833,234 B2	11/2010	Bailly et al.
7,753,246 B2	7/2010	Scirica	7,835,823 B2	11/2010	Sillman et al.
7,753,904 B2	7/2010	Shelton, IV et al.	7,836,400 B2	11/2010	May et al.
7,757,924 B2	7/2010	Gerbi et al.	7,837,079 B2	11/2010	Holsten et al.
7,758,612 B2	7/2010	Shipp	7,837,080 B2	11/2010	Schwemberger
7,762,462 B2	7/2010	Gelbman	7,837,081 B2	11/2010	Holsten et al.
7,762,998 B2	7/2010	Birk et al.	7,837,425 B2	11/2010	Saeki et al.
7,766,207 B2	8/2010	Mather et al.	7,837,685 B2	11/2010	Weinberg et al.
7,766,209 B2	8/2010	Baxter, III et al.	7,837,694 B2	11/2010	Tethrake et al.
7,766,210 B2	8/2010	Shelton, IV et al.	7,838,789 B2	11/2010	Stoffers et al.
7,766,821 B2	8/2010	Brunnen et al.	7,839,109 B2	11/2010	Carmen, Jr. et al.
7,766,894 B2	8/2010	Weitzner et al.	7,841,503 B2	11/2010	Sonnenschein et al.
7,770,658 B2	8/2010	Ito et al.	7,842,025 B2	11/2010	Coleman et al.
7,770,773 B2	8/2010	Whitman et al.	7,842,028 B2	11/2010	Lee
7,770,774 B2	8/2010	Mastri et al.	7,843,158 B2	11/2010	Prisco
7,770,775 B2	8/2010	Shelton, IV et al.	7,845,533 B2	12/2010	Marczyk et al.
7,770,776 B2	8/2010	Chen et al.	7,845,534 B2	12/2010	Viola et al.
7,771,396 B2	8/2010	Stefanchik et al.	7,845,535 B2	12/2010	Scircia
7,772,720 B2	8/2010	McGee et al.	7,845,536 B2	12/2010	Viola et al.
7,772,725 B2	8/2010	Siman-Tov	7,845,537 B2	12/2010	Shelton, IV et al.
7,775,972 B2	8/2010	Brock et al.	7,846,085 B2	12/2010	Silverman et al.
7,776,037 B2	8/2010	Odom	7,846,149 B2	12/2010	Jankowski
7,776,060 B2	8/2010	Mooradian et al.	7,848,066 B2	12/2010	Yanagishima
7,776,065 B2	8/2010	Griffiths et al.	7,850,623 B2	12/2010	Griffin et al.
7,778,004 B2	8/2010	Nerheim et al.	7,850,642 B2	12/2010	Moll et al.
7,779,737 B2	8/2010	Newman, Jr. et al.	7,850,982 B2	12/2010	Stopek et al.
7,780,054 B2	8/2010	Wales	7,854,735 B2	12/2010	Houser et al.
7,780,055 B2	8/2010	Scirica et al.	7,854,736 B2	12/2010	Ryan
7,780,309 B2	8/2010	McMillan et al.	7,857,183 B2	12/2010	Shelton, IV
7,780,663 B2	8/2010	Yates et al.	7,857,184 B2	12/2010	Viola
7,780,685 B2	8/2010	Hunt et al.	7,857,185 B2	12/2010	Swayze et al.
7,784,662 B2	8/2010	Wales et al.	7,857,186 B2	12/2010	Baxter, III et al.
7,784,663 B2	8/2010	Shelton, IV	7,857,813 B2	12/2010	Schmitz et al.
7,787,256 B2	8/2010	Chan et al.	7,861,906 B2	1/2011	Doll et al.
7,789,283 B2	9/2010	Shah	7,862,502 B2	1/2011	Pool et al.
7,789,875 B2	9/2010	Brock et al.	7,862,546 B2	1/2011	Conlon et al.
7,789,883 B2	9/2010	Takashino et al.	7,862,579 B2	1/2011	Ortiz et al.
7,789,889 B2	9/2010	Zubik et al.	7,866,525 B2	1/2011	Scirica
7,793,812 B2	9/2010	Moore et al.	7,866,527 B2	1/2011	Hall et al.
7,794,475 B2	9/2010	Hess et al.	7,866,528 B2	1/2011	Olson et al.
7,798,386 B2	9/2010	Schall et al.	7,870,989 B2	1/2011	Viola et al.
7,799,039 B2	9/2010	Shelton, IV et al.	7,871,418 B2	1/2011	Thompson et al.
7,799,044 B2	9/2010	Johnston et al.	7,871,440 B2	1/2011	Schwartz et al.
7,799,965 B2	9/2010	Patel et al.	7,875,055 B2	1/2011	Cichocki, Jr.
7,803,151 B2	9/2010	Whitman	D631,964 S *	2/2011	Miles ..... D24/133
7,806,871 B2	10/2010	Li et al.	7,879,063 B2	2/2011	Khosravi
7,806,891 B2	10/2010	Nowlin et al.	7,879,070 B2	2/2011	Ortiz et al.
7,810,690 B2	10/2010	Bilotti et al.	7,883,461 B2	2/2011	Albrecht et al.
7,810,691 B2	10/2010	Boyden et al.	7,883,465 B2	2/2011	Donofrio et al.
7,810,692 B2	10/2010	Hall et al.	7,886,951 B2	2/2011	Hessler
7,810,693 B2	10/2010	Broehl et al.	7,886,952 B2	2/2011	Scirica et al.
7,811,275 B2	10/2010	Birk et al.	7,887,530 B2	2/2011	Zemlok et al.
7,814,816 B2	10/2010	Alberti et al.	7,887,535 B2	2/2011	Lands et al.
7,815,092 B2	10/2010	Whitman et al.	7,887,536 B2	2/2011	Johnson et al.
7,815,565 B2	10/2010	Stefanchik et al.	7,887,563 B2	2/2011	Cummins
7,815,662 B2	10/2010	Spivey et al.	7,891,531 B1	2/2011	Ward
7,819,296 B2	10/2010	Hueil et al.	7,891,532 B2	2/2011	Mastri et al.
7,819,297 B2	10/2010	Doll et al.	7,892,200 B2	2/2011	Birk et al.
7,819,298 B2	10/2010	Hall et al.	7,892,245 B2	2/2011	Liddicoat et al.
7,819,299 B2	10/2010	Shelton, IV et al.	7,893,586 B2	2/2011	West et al.
7,819,799 B2	10/2010	Merril et al.	7,896,214 B2	3/2011	Farascioni
7,819,884 B2	10/2010	Lee et al.	7,896,215 B2	3/2011	Adams et al.
7,819,886 B2	10/2010	Whitfield et al.	7,896,869 B2	3/2011	DiSilvestro et al.
7,823,592 B2	11/2010	Bettuchi et al.	7,896,877 B2	3/2011	Hall et al.
7,823,760 B2	11/2010	Zemlok et al.	7,896,895 B2	3/2011	Boudreaux et al.
7,824,401 B2	11/2010	Manzo et al.	7,896,897 B2	3/2011	Gresham et al.
7,824,422 B2	11/2010	Benchetrit	7,898,198 B2	3/2011	Murphree
7,824,426 B2	11/2010	Racenet et al.	7,900,805 B2	3/2011	Shelton, IV et al.
7,828,189 B2	11/2010	Holsten et al.	7,900,806 B2	3/2011	Chen et al.
7,828,794 B2	11/2010	Sartor	7,901,381 B2	3/2011	Birk et al.
7,828,808 B2	11/2010	Hinman et al.	7,905,380 B2	3/2011	Shelton, IV et al.
7,831,292 B2	11/2010	Quaid et al.	7,905,381 B2	3/2011	Baxter, III et al.
7,832,408 B2	11/2010	Shelton, IV et al.	7,905,881 B2	3/2011	Masuda et al.
7,832,611 B2	11/2010	Boyden et al.	7,905,889 B2	3/2011	Catanese, III et al.
			7,905,890 B2	3/2011	Whitfield et al.
			7,905,902 B2	3/2011	Huitema et al.
			7,909,039 B2	3/2011	Hur
			7,909,191 B2	3/2011	Baker et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,909,220 B2	3/2011	Viola	7,979,137 B2	7/2011	Tracey et al.
7,909,221 B2	3/2011	Viola et al.	7,980,443 B2	7/2011	Scheib et al.
7,909,224 B2	3/2011	Prommersberger	7,981,132 B2	7/2011	Dubrul et al.
7,913,891 B2	3/2011	Doll et al.	7,987,405 B2	7/2011	Turner et al.
7,913,893 B2	3/2011	Mastri et al.	7,988,015 B2	8/2011	Mason, II et al.
7,914,543 B2	3/2011	Roth et al.	7,988,026 B2	8/2011	Knodel et al.
7,914,551 B2	3/2011	Ortiz et al.	7,988,027 B2	8/2011	Olson et al.
7,918,230 B2	4/2011	Whitman et al.	7,988,028 B2	8/2011	Farascioni et al.
7,918,376 B1	4/2011	Knodel et al.	7,988,779 B2	8/2011	Disalvo et al.
7,918,377 B2	4/2011	Measamer et al.	7,992,757 B2	8/2011	Wheeler et al.
7,918,845 B2	4/2011	Saadat et al.	7,993,360 B2	8/2011	Hacker et al.
7,918,848 B2	4/2011	Lau et al.	7,994,670 B2	8/2011	Ji
7,918,861 B2	4/2011	Brock et al.	7,997,054 B2	8/2011	Bertsch et al.
7,918,867 B2	4/2011	Dana et al.	7,997,468 B2	8/2011	Farascioni
7,922,061 B2	4/2011	Shelton, IV et al.	7,997,469 B2	8/2011	Olson et al.
7,922,063 B2	4/2011	Zemlok et al.	8,002,696 B2	8/2011	Suzuki
7,922,743 B2	4/2011	Heinrich et al.	8,002,784 B2	8/2011	Jinno et al.
7,923,144 B2	4/2011	Kohn et al.	8,002,785 B2	8/2011	Weiss et al.
7,926,691 B2	4/2011	Viola et al.	8,002,795 B2	8/2011	Beetel
7,927,328 B2	4/2011	Orszulak et al.	8,006,365 B2	8/2011	Levin et al.
7,928,281 B2	4/2011	Augustine	8,006,885 B2	8/2011	Marczyk
7,930,040 B1	4/2011	Kelsch et al.	8,006,889 B2	8/2011	Adams et al.
7,930,065 B2	4/2011	Larkin et al.	8,007,370 B2	8/2011	Hirsch et al.
7,931,660 B2	4/2011	Aranyi et al.	8,007,465 B2	8/2011	Birk et al.
7,931,695 B2	4/2011	Ringeisen	8,007,479 B2	8/2011	Birk et al.
7,931,877 B2	4/2011	Steffens et al.	8,007,511 B2	8/2011	Brock et al.
7,934,630 B2	5/2011	Shelton, IV et al.	8,007,513 B2	8/2011	Nalagatla et al.
7,934,631 B2	5/2011	Balbierz et al.	8,011,550 B2	9/2011	Aranyi et al.
7,934,896 B2	5/2011	Schnier	8,011,551 B2	9/2011	Marczyk et al.
7,935,773 B2	5/2011	Hadba et al.	8,011,553 B2	9/2011	Mastri et al.
7,936,142 B2	5/2011	Otsuka et al.	8,011,555 B2	9/2011	Tarinelli et al.
7,938,307 B2	5/2011	Bettuchi	8,012,170 B2	9/2011	Whitman et al.
7,941,865 B2	5/2011	Seman, Jr. et al.	8,016,176 B2	9/2011	Kasvikis et al.
7,942,303 B2	5/2011	Shah	8,016,177 B2	9/2011	Bettuchi et al.
7,942,890 B2	5/2011	D'Agostino et al.	8,016,178 B2	9/2011	Olson et al.
7,944,175 B2	5/2011	Mori et al.	8,016,849 B2	9/2011	Wenchell
7,945,792 B2	5/2011	Cherpantier	8,016,855 B2	9/2011	Whitman et al.
7,945,798 B2	5/2011	Carlson et al.	8,016,858 B2	9/2011	Whitman
7,946,453 B2	5/2011	Voegele et al.	8,016,881 B2	9/2011	Furst
7,947,011 B2	5/2011	Birk et al.	8,020,742 B2	9/2011	Marczyk
7,950,560 B2	5/2011	Zemlok et al.	8,020,743 B2	9/2011	Shelton, IV
7,950,561 B2	5/2011	Aranyi	8,021,375 B2	9/2011	Aldrich et al.
7,951,071 B2	5/2011	Whitman et al.	8,025,199 B2	9/2011	Whitman et al.
7,951,166 B2	5/2011	Orban, III et al.	8,025,896 B2	9/2011	Malaviya et al.
7,954,682 B2	6/2011	Giordano et al.	8,028,882 B2	10/2011	Viola
7,954,684 B2	6/2011	Boudreaux	8,028,883 B2	10/2011	Stopek
7,954,685 B2	6/2011	Viola	8,028,884 B2	10/2011	Sniffin et al.
7,954,686 B2	6/2011	Baxter, III et al.	8,028,885 B2	10/2011	Smith et al.
7,954,687 B2	6/2011	Zemlok et al.	8,029,510 B2	10/2011	Hoegerle
7,955,253 B2	6/2011	Ewers et al.	8,031,069 B2	10/2011	Cohn et al.
7,955,257 B2	6/2011	Frasier et al.	8,033,438 B2	10/2011	Scirica
7,955,322 B2	6/2011	Devengenzo et al.	8,033,439 B2	10/2011	Racenet et al.
7,955,327 B2	6/2011	Sartor et al.	8,033,440 B2	10/2011	Wenchell et al.
7,955,380 B2	6/2011	Chu et al.	8,034,077 B2	10/2011	Smith et al.
7,959,050 B2	6/2011	Smith et al.	8,034,337 B2	10/2011	Simard
7,959,051 B2	6/2011	Smith et al.	8,034,363 B2	10/2011	Li et al.
7,959,052 B2	6/2011	Sonnenschein et al.	8,035,487 B2	10/2011	Malackowski
7,963,432 B2	6/2011	Knodel et al.	8,037,591 B2	10/2011	Spivey et al.
7,963,433 B2	6/2011	Whitman et al.	8,038,045 B2	10/2011	Bettuchi et al.
7,963,913 B2	6/2011	Devengenzo et al.	8,038,046 B2	10/2011	Smith et al.
7,963,963 B2	6/2011	Francischelli et al.	8,038,686 B2	10/2011	Huitema et al.
7,963,964 B2	6/2011	Santilli et al.	8,043,207 B2	10/2011	Adams
7,964,206 B2	6/2011	Suokas et al.	8,043,328 B2	10/2011	Hahnen et al.
7,966,236 B2	6/2011	Noriega et al.	8,044,536 B2	10/2011	Nguyen et al.
7,966,799 B2	6/2011	Morgan et al.	8,044,604 B2	10/2011	Hagino et al.
7,967,178 B2	6/2011	Scirica et al.	8,047,236 B2	11/2011	Perry
7,967,179 B2	6/2011	Olson et al.	8,048,503 B2	11/2011	Farnsworth et al.
7,967,180 B2	6/2011	Scirica	8,052,636 B2	11/2011	Moll et al.
7,967,181 B2	6/2011	Viola et al.	8,056,787 B2	11/2011	Boudreaux et al.
7,967,791 B2	6/2011	Franer et al.	8,056,788 B2	11/2011	Mastri et al.
7,967,839 B2	6/2011	Flock et al.	8,056,789 B1	11/2011	White et al.
7,972,298 B2	7/2011	Wallace et al.	8,057,508 B2	11/2011	Shelton, IV
7,972,315 B2	7/2011	Birk et al.	8,058,771 B2	11/2011	Giordano et al.
7,976,213 B2	7/2011	Bertolotti et al.	8,060,250 B2	11/2011	Reiland et al.
7,976,563 B2	7/2011	Summerer	8,061,014 B2	11/2011	Smith et al.
			8,061,576 B2	11/2011	Cappola
			8,062,236 B2	11/2011	Soltz
			8,062,330 B2	11/2011	Prommersberger et al.
			8,063,619 B2	11/2011	Zhu et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,066,158 B2	11/2011	Vogel et al.	8,142,515 B2	3/2012	Therin et al.
8,066,166 B2	11/2011	Demmy et al.	8,143,520 B2	3/2012	Cutler
8,066,167 B2	11/2011	Measamer et al.	8,146,790 B2	4/2012	Milliman
8,066,168 B2	11/2011	Vidal et al.	8,147,421 B2	4/2012	Farquhar et al.
8,066,720 B2	11/2011	Knodel et al.	8,147,456 B2	4/2012	Fisher et al.
D650,074 S	12/2011	Hunt et al.	8,147,485 B2	4/2012	Wham et al.
8,070,033 B2	12/2011	Milliman et al.	8,152,041 B2	4/2012	Kostrzewski
8,070,035 B2	12/2011	Holsten et al.	8,152,756 B2	4/2012	Webster et al.
8,070,743 B2	12/2011	Kagan et al.	8,154,239 B2	4/2012	Katsuki et al.
8,074,858 B2	12/2011	Marczyk	8,157,145 B2	4/2012	Shelton, IV et al.
8,074,861 B2	12/2011	Ehrenfels et al.	8,157,148 B2	4/2012	Scirica
8,075,476 B2	12/2011	Vargas	8,157,151 B2	4/2012	Ingmanson et al.
8,075,571 B2	12/2011	Vitali et al.	8,157,152 B2	4/2012	Holsten et al.
8,079,950 B2	12/2011	Stern et al.	8,157,153 B2	4/2012	Shelton, IV et al.
8,079,989 B2	12/2011	Birk et al.	8,157,793 B2	4/2012	Omori et al.
8,080,004 B2	12/2011	Downey et al.	8,161,977 B2	4/2012	Shelton, IV et al.
8,083,118 B2	12/2011	Milliman et al.	8,162,138 B2	4/2012	Bettenhausen et al.
8,083,119 B2	12/2011	Prommersberger	8,162,197 B2	4/2012	Mastri et al.
8,083,120 B2	12/2011	Shelton, IV et al.	8,162,668 B2	4/2012	Toly
8,084,001 B2	12/2011	Burns et al.	8,162,933 B2	4/2012	Francischelli et al.
8,084,969 B2	12/2011	David et al.	8,162,965 B2	4/2012	Reschke et al.
8,085,013 B2	12/2011	Wei et al.	8,167,185 B2	5/2012	Shelton, IV et al.
8,087,563 B2	1/2012	Milliman et al.	8,167,622 B2	5/2012	Zhou
8,089,509 B2	1/2012	Chatenever et al.	8,167,895 B2	5/2012	D'Agostino et al.
8,091,753 B2	1/2012	Viola	8,167,898 B1	5/2012	Schaller et al.
8,091,756 B2	1/2012	Viola	8,170,241 B2	5/2012	Roe et al.
8,092,443 B2	1/2012	Bischoff	8,172,004 B2	5/2012	Ho
8,092,932 B2	1/2012	Phillips et al.	8,172,120 B2	5/2012	Boyden et al.
8,093,572 B2	1/2012	Kuduvalli	8,172,122 B2	5/2012	Kasvikis et al.
8,096,458 B2	1/2012	Hessler	8,172,124 B2	5/2012	Shelton, IV et al.
8,097,017 B2	1/2012	Viola	8,177,776 B2	5/2012	Humayun et al.
8,100,310 B2	1/2012	Zemlok	8,177,797 B2	5/2012	Shimoji et al.
8,100,824 B2	1/2012	Hegeman et al.	8,179,705 B2	5/2012	Chapuis
8,100,872 B2	1/2012	Patel	8,180,458 B2	5/2012	Kane et al.
8,102,278 B2	1/2012	Deck et al.	8,181,839 B2	5/2012	Beetel
8,105,350 B2	1/2012	Lee et al.	8,181,840 B2	5/2012	Milliman
8,107,925 B2	1/2012	Natsuno et al.	8,182,422 B2	5/2012	Bayer et al.
8,108,033 B2	1/2012	Drew et al.	8,183,807 B2	5/2012	Tsai et al.
8,108,072 B2	1/2012	Zhao et al.	8,186,555 B2	5/2012	Shelton, IV et al.
8,109,426 B2	2/2012	Milliman et al.	8,186,556 B2	5/2012	Viola
8,110,208 B1	2/2012	Hen	8,186,558 B2	5/2012	Sapienza
8,113,405 B2	2/2012	Milliman	8,186,560 B2	5/2012	Hess et al.
8,113,408 B2	2/2012	Wenchell et al.	8,191,752 B2	6/2012	Scirica
8,113,410 B2	2/2012	Hall et al.	8,192,460 B2	6/2012	Orban, III et al.
8,114,017 B2	2/2012	Bacher	8,192,651 B2	6/2012	Young et al.
8,114,100 B2	2/2012	Smith et al.	8,196,795 B2	6/2012	Moore et al.
8,118,206 B2	2/2012	Zand et al.	8,196,796 B2	6/2012	Shelton, IV et al.
8,118,207 B2	2/2012	Racenet et al.	8,197,501 B2	6/2012	Shadeck et al.
8,120,301 B2	2/2012	Goldberg et al.	8,197,502 B2	6/2012	Smith et al.
8,122,128 B2	2/2012	Burke, II et al.	8,197,837 B2	6/2012	Jamiolkowski et al.
8,123,103 B2	2/2012	Milliman	8,201,720 B2	6/2012	Hessler
8,123,523 B2	2/2012	Carron et al.	8,201,721 B2	6/2012	Zemlok et al.
8,123,766 B2	2/2012	Bauman et al.	8,202,549 B2	6/2012	Stucky et al.
8,123,767 B2	2/2012	Bauman et al.	8,205,779 B2	6/2012	Ma et al.
8,125,168 B2	2/2012	Johnson et al.	8,205,780 B2	6/2012	Sorrentino et al.
8,127,975 B2	3/2012	Olson et al.	8,205,781 B2	6/2012	Baxter, III et al.
8,127,976 B2	3/2012	Scirica et al.	8,210,411 B2	7/2012	Yates et al.
8,128,624 B2	3/2012	Couture et al.	8,210,414 B2	7/2012	Bettuchi et al.
8,128,643 B2	3/2012	Aranyi et al.	8,210,415 B2	7/2012	Ward
8,128,645 B2	3/2012	Sonnenschein et al.	8,210,416 B2	7/2012	Milliman et al.
8,128,662 B2	3/2012	Altarac et al.	8,210,721 B2	7/2012	Chen et al.
8,132,703 B2	3/2012	Milliman et al.	8,211,125 B2	7/2012	Spivey
8,132,705 B2	3/2012	Viola et al.	8,214,019 B2	7/2012	Govari et al.
8,132,706 B2	3/2012	Marczyk et al.	8,215,531 B2	7/2012	Shelton, IV et al.
8,134,306 B2	3/2012	Drader et al.	8,215,532 B2	7/2012	Marczyk
8,136,711 B2	3/2012	Beardsley et al.	8,215,533 B2	7/2012	Viola et al.
8,136,712 B2	3/2012	Zingman	8,220,468 B2	7/2012	Cooper et al.
8,136,713 B2	3/2012	Hathaway et al.	8,220,688 B2	7/2012	Laurent et al.
8,137,339 B2	3/2012	Jinno et al.	8,220,690 B2	7/2012	Hess et al.
8,140,417 B2	3/2012	Shibata	8,221,424 B2	7/2012	Cha
8,141,762 B2	3/2012	Bedi et al.	8,225,799 B2	7/2012	Bettuchi
8,141,763 B2	3/2012	Milliman	8,225,979 B2	7/2012	Farascioni et al.
8,142,200 B2	3/2012	Crunkilton et al.	8,226,553 B2	7/2012	Shelton, IV et al.
8,142,425 B2	3/2012	Eggers	8,226,635 B2	7/2012	Petrie et al.
8,142,461 B2	3/2012	Houser et al.	8,226,675 B2	7/2012	Houser et al.
			8,226,715 B2	7/2012	Hwang et al.
			8,227,946 B2	7/2012	Kim
			8,228,048 B2	7/2012	Spencer
			8,229,549 B2	7/2012	Whitman et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,231,040 B2	7/2012	Zemlok et al.	8,317,071 B1	11/2012	Knodel
8,231,042 B2	7/2012	Hessler et al.	8,317,074 B2	11/2012	Ortiz et al.
8,231,043 B2	7/2012	Tarinelli et al.	8,317,437 B2	11/2012	Merkley et al.
8,235,272 B2	8/2012	Nicholas et al.	8,317,744 B2	11/2012	Kirschenman
8,236,010 B2	8/2012	Ortiz et al.	8,317,790 B2	11/2012	Bell et al.
8,236,020 B2	8/2012	Smith et al.	8,319,002 B2	11/2012	Daniels et al.
8,237,388 B2	8/2012	Jinno et al.	8,322,455 B2	12/2012	Shelton, IV et al.
8,240,537 B2	8/2012	Marczyk	8,322,589 B2	12/2012	Boudreaux
8,241,271 B2	8/2012	Millman et al.	8,322,590 B2	12/2012	Patel et al.
8,241,284 B2	8/2012	Dycus et al.	8,322,901 B2	12/2012	Michelotti
8,241,308 B2	8/2012	Kortenbach et al.	8,323,789 B2	12/2012	Rozhin et al.
8,241,322 B2	8/2012	Whitman et al.	8,328,061 B2	12/2012	Kasvikis
8,245,594 B2	8/2012	Rogers et al.	8,328,062 B2	12/2012	Viola
8,245,898 B2	8/2012	Smith et al.	8,328,063 B2	12/2012	Milliman et al.
8,245,899 B2	8/2012	Swensgard et al.	8,328,064 B2	12/2012	Racenet et al.
8,245,900 B2	8/2012	Scirica	8,328,802 B2	12/2012	Deville et al.
8,245,901 B2	8/2012	Stopek	8,328,823 B2	12/2012	Aranyi et al.
8,246,608 B2	8/2012	Omori et al.	8,333,313 B2	12/2012	Boudreaux et al.
8,246,637 B2	8/2012	Viola et al.	8,333,691 B2	12/2012	Schaaf
8,256,654 B2	9/2012	Bettuchi et al.	8,333,764 B2	12/2012	Francischelli et al.
8,256,655 B2	9/2012	Sniffin et al.	8,333,779 B2	12/2012	Smith et al.
8,256,656 B2	9/2012	Milliman et al.	8,334,468 B2	12/2012	Palmer et al.
8,257,251 B2	9/2012	Shelton, IV et al.	8,336,753 B2	12/2012	Olson et al.
8,257,356 B2	9/2012	Bleich et al.	8,336,754 B2	12/2012	Cappola et al.
8,257,386 B2	9/2012	Lee et al.	8,342,377 B2	1/2013	Milliman et al.
8,257,391 B2	9/2012	Orban, III et al.	8,342,378 B2	1/2013	Marczyk et al.
8,257,634 B2	9/2012	Scirica	8,342,379 B2	1/2013	Whitman et al.
8,258,745 B2	9/2012	Smith et al.	8,343,150 B2	1/2013	Artale
8,262,655 B2	9/2012	Ghabrial et al.	8,347,978 B2	1/2013	Forster et al.
8,267,300 B2	9/2012	Boudreaux	8,348,123 B2	1/2013	Scirica et al.
8,267,924 B2	9/2012	Zemlok et al.	8,348,124 B2	1/2013	Scirica
8,267,946 B2	9/2012	Whitfield et al.	8,348,125 B2	1/2013	Viola et al.
8,267,951 B2	9/2012	Whayne et al.	8,348,126 B2	1/2013	Olson et al.
8,269,121 B2	9/2012	Smith	8,348,127 B2	1/2013	Marczyk
8,272,553 B2	9/2012	Mastri et al.	8,348,129 B2	1/2013	Bedi et al.
8,272,554 B2	9/2012	Whitman et al.	8,348,130 B2	1/2013	Shah et al.
8,272,918 B2	9/2012	Lam	8,348,131 B2	1/2013	Omaits et al.
8,273,404 B2	9/2012	Dave et al.	8,348,837 B2	1/2013	Wenchell
8,276,801 B2	10/2012	Zemlok et al.	8,348,959 B2	1/2013	Wolford et al.
8,276,802 B2	10/2012	Kostrzewski	8,348,972 B2	1/2013	Soltz et al.
8,277,473 B2	10/2012	Sunaoshi et al.	8,349,987 B2	1/2013	Kapiamba et al.
8,281,446 B2	10/2012	Moskovich	8,352,004 B2	1/2013	Mannheimer et al.
8,281,973 B2	10/2012	Wenchell et al.	8,353,437 B2	1/2013	Boudreaux
8,281,974 B2	10/2012	Hessler et al.	8,353,438 B2	1/2013	Baxter, III et al.
8,282,654 B2	10/2012	Ferrari et al.	8,353,439 B2	1/2013	Baxter, III et al.
8,285,367 B2	10/2012	Hyde et al.	8,356,740 B1	1/2013	Knodel
8,286,723 B2	10/2012	Puzio et al.	8,357,144 B2	1/2013	Whitman et al.
8,286,845 B2	10/2012	Perry et al.	8,357,161 B2	1/2013	Mueller
8,286,846 B2	10/2012	Smith et al.	8,360,296 B2	1/2013	Zingman
8,287,487 B2	10/2012	Estes	8,360,297 B2	1/2013	Shelton, IV et al.
8,287,522 B2	10/2012	Moses et al.	8,360,298 B2	1/2013	Farascioni et al.
8,287,561 B2	10/2012	Nunez et al.	8,360,299 B2	1/2013	Zemlok et al.
8,292,147 B2	10/2012	Viola	8,361,501 B2	1/2013	DiTizio et al.
8,292,150 B2	10/2012	Bryant	8,365,973 B1	2/2013	White et al.
8,292,151 B2	10/2012	Viola	8,365,975 B1	2/2013	Manoux et al.
8,292,152 B2	10/2012	Milliman et al.	8,365,976 B2	2/2013	Hess et al.
8,292,155 B2	10/2012	Shelton, IV et al.	8,366,559 B2	2/2013	Papenfuss et al.
8,292,157 B2	10/2012	Smith et al.	8,366,787 B2	2/2013	Brown et al.
8,292,801 B2	10/2012	Dejima et al.	8,371,393 B2	2/2013	Higuchi et al.
8,292,888 B2	10/2012	Whitman	8,371,491 B2	2/2013	Huitema et al.
8,298,161 B2	10/2012	Vargas	8,371,492 B2	2/2013	Aranyi et al.
8,298,189 B2	10/2012	Fisher et al.	8,371,493 B2	2/2013	Aranyi et al.
8,298,233 B2	10/2012	Mueller	8,371,494 B2	2/2013	Racenet et al.
8,298,677 B2	10/2012	Wiesner et al.	8,372,094 B2	2/2013	Bettuchi et al.
8,302,323 B2	11/2012	Fortier et al.	8,376,865 B2	2/2013	Forster et al.
8,308,040 B2	11/2012	Huang et al.	8,377,029 B2	2/2013	Nagao et al.
8,308,042 B2	11/2012	Aranyi	8,377,044 B2	2/2013	Coe et al.
8,308,043 B2	11/2012	Bindra et al.	8,382,773 B2	2/2013	Whitfield et al.
8,308,046 B2	11/2012	Prommersberger	8,382,790 B2	2/2013	Uenohara et al.
8,308,659 B2	11/2012	Scheibe et al.	8,387,848 B2	3/2013	Johnson et al.
8,308,725 B2	11/2012	Bell et al.	8,388,633 B2	3/2013	Rousseau et al.
8,310,188 B2	11/2012	Nakai	8,389,588 B2	3/2013	Ringeisen et al.
8,313,496 B2	11/2012	Sauer et al.	8,393,513 B2	3/2013	Jankowski
8,313,509 B2	11/2012	Kostrzewski	8,393,514 B2	3/2013	Shelton, IV et al.
8,317,070 B2	11/2012	Hueil et al.	8,393,516 B2	3/2013	Kostrzewski
			8,397,971 B2	3/2013	Yates et al.
			8,397,973 B1	3/2013	Hausen
			8,398,633 B2	3/2013	Mueller
			8,398,669 B2	3/2013	Kim

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,398,673 B2	3/2013	Hinchliffe et al.	8,480,703 B2	7/2013	Nicholas et al.
8,400,851 B2	3/2013	Byun	8,485,412 B2	7/2013	Shelton, IV et al.
8,403,138 B2	3/2013	Weisshaupt et al.	8,485,413 B2	7/2013	Scheib et al.
8,403,198 B2	3/2013	Sorrentino et al.	8,485,970 B2	7/2013	Widenhouse et al.
8,403,832 B2	3/2013	Cunningham et al.	8,487,199 B2	7/2013	Palmer et al.
8,403,945 B2	3/2013	Whitfield et al.	8,490,851 B2	7/2013	Blier et al.
8,403,946 B2	3/2013	Whitfield et al.	8,490,853 B2	7/2013	Criscuolo et al.
8,403,950 B2	3/2013	Palmer et al.	8,491,581 B2	7/2013	Deville et al.
D680,646 S *	4/2013	Hunt ..... D24/145	8,491,603 B2	7/2013	Yeung et al.
D681,202 S *	4/2013	Hunt ..... D24/145	8,496,154 B2	7/2013	Marczyk et al.
8,408,439 B2	4/2013	Huang et al.	8,496,156 B2	7/2013	Sniffin et al.
8,408,442 B2	4/2013	Racenet et al.	8,496,683 B2	7/2013	Prommersberger et al.
8,409,079 B2	4/2013	Okamoto et al.	8,499,992 B2	8/2013	Whitman et al.
8,409,174 B2	4/2013	Omori	8,499,993 B2	8/2013	Shelton, IV et al.
8,409,175 B2	4/2013	Lee et al.	8,500,721 B2	8/2013	Jinno
8,409,222 B2	4/2013	Whitfield et al.	8,500,762 B2	8/2013	Sholev et al.
8,409,223 B2	4/2013	Sorrentino et al.	8,502,091 B2	8/2013	Palmer et al.
8,411,500 B2	4/2013	Gapihan et al.	8,505,799 B2	8/2013	Viola et al.
8,413,661 B2	4/2013	Rousseau et al.	8,505,801 B2	8/2013	Ehrenfels et al.
8,413,870 B2	4/2013	Pastorelli et al.	8,506,555 B2	8/2013	Ruiz Morales
8,413,871 B2	4/2013	Racenet et al.	8,506,557 B2	8/2013	Zemlok et al.
8,413,872 B2	4/2013	Patel	8,506,580 B2	8/2013	Zergiebel et al.
8,414,577 B2	4/2013	Boudreaux et al.	8,506,581 B2	8/2013	Wingardner, III et al.
8,418,073 B2	4/2013	Mohr et al.	8,511,308 B2	8/2013	Hecox et al.
8,418,906 B2	4/2013	Farascioni et al.	8,512,359 B2	8/2013	Whitman et al.
8,418,908 B1	4/2013	Beardsley	8,512,402 B2	8/2013	Marczyk et al.
8,418,909 B2	4/2013	Kostrzewski	8,517,239 B2	8/2013	Scheib et al.
8,419,717 B2	4/2013	Diolaiti et al.	8,517,241 B2	8/2013	Nicholas et al.
8,419,747 B2	4/2013	Hinman et al.	8,517,243 B2	8/2013	Giordano et al.
8,419,754 B2	4/2013	Laby et al.	8,517,244 B2	8/2013	Shelton, IV et al.
8,423,182 B2	4/2013	Robinson et al.	8,518,024 B2	8/2013	Williams et al.
8,424,737 B2	4/2013	Scirica	8,521,273 B2	8/2013	Kliman
8,424,739 B2	4/2013	Racenet et al.	8,523,043 B2	9/2013	Ullrich et al.
8,424,740 B2	4/2013	Shelton, IV et al.	8,523,881 B2	9/2013	Cabiri et al.
8,424,741 B2	4/2013	McGuckin, Jr. et al.	8,523,900 B2	9/2013	Jinno et al.
8,425,600 B2	4/2013	Maxwell	8,529,588 B2	9/2013	Ahlberg et al.
8,427,430 B2	4/2013	Lee et al.	8,529,600 B2	9/2013	Woodard, Jr. et al.
8,430,292 B2	4/2013	Patel et al.	8,529,819 B2	9/2013	Ostapoff et al.
8,430,892 B2	4/2013	Bindra et al.	8,532,747 B2	9/2013	Nock et al.
8,430,898 B2	4/2013	Wiener et al.	8,534,527 B2	9/2013	Brendel et al.
8,435,257 B2	5/2013	Smith et al.	8,534,528 B2	9/2013	Shelton, IV
8,439,246 B1	5/2013	Knodel	8,535,304 B2	9/2013	Sklar et al.
8,444,036 B2	5/2013	Shelton, IV	8,535,340 B2	9/2013	Allen
8,444,037 B2	5/2013	Nicholas et al.	8,540,128 B2	9/2013	Shelton, IV et al.
8,444,549 B2	5/2013	Viola et al.	8,540,129 B2	9/2013	Baxter, III et al.
8,453,904 B2	6/2013	Eskaros et al.	8,540,130 B2	9/2013	Moore et al.
8,453,906 B2	6/2013	Huang et al.	8,540,131 B2	9/2013	Swayze
8,453,907 B2	6/2013	Laurent et al.	8,540,133 B2	9/2013	Bedi et al.
8,453,908 B2	6/2013	Bedi et al.	8,540,733 B2	9/2013	Whitman et al.
8,453,912 B2	6/2013	Mastri et al.	8,540,735 B2	9/2013	Mitelberg et al.
8,453,914 B2	6/2013	Laurent et al.	8,550,984 B2	10/2013	Takemoto
8,454,495 B2	6/2013	Kawano et al.	8,551,076 B2	10/2013	Duval et al.
8,454,628 B2	6/2013	Smith et al.	8,555,660 B2	10/2013	Takenaka et al.
8,454,640 B2	6/2013	Johnston et al.	8,556,151 B2	10/2013	Viola
8,457,757 B2	6/2013	Cauler et al.	8,556,918 B2	10/2013	Bauman et al.
8,459,520 B2	6/2013	Giordano et al.	8,556,935 B1	10/2013	Knodel et al.
8,459,521 B2	6/2013	Zemlok et al.	8,560,147 B2	10/2013	Taylor et al.
8,459,524 B2	6/2013	Pribanic et al.	8,561,617 B2	10/2013	Lindh et al.
8,459,525 B2	6/2013	Yates et al.	8,561,870 B2	10/2013	Baxter, III et al.
8,464,922 B2	6/2013	Marczyk	8,561,871 B2	10/2013	Rajappa et al.
8,464,923 B2	6/2013	Shelton, IV	8,561,873 B2	10/2013	Ingmanson et al.
8,464,924 B2	6/2013	Gresham et al.	8,562,598 B2	10/2013	Falkenstein et al.
8,464,925 B2	6/2013	Hull et al.	8,567,656 B2	10/2013	Shelton, IV et al.
8,465,475 B2	6/2013	Isbell, Jr.	8,568,416 B2	10/2013	Schmitz et al.
8,465,502 B2	6/2013	Zergiebel	8,568,425 B2	10/2013	Ross et al.
8,465,515 B2	6/2013	Drew et al.	8,573,459 B2	11/2013	Smith et al.
8,469,946 B2	6/2013	Sugita	8,573,461 B2	11/2013	Shelton, IV et al.
8,469,973 B2	6/2013	Meade et al.	8,573,462 B2	11/2013	Smith et al.
8,470,355 B2	6/2013	Skalla et al.	8,573,465 B2	11/2013	Shelton, IV
8,474,677 B2	7/2013	Woodard, Jr. et al.	8,574,199 B2	11/2013	von Bulow et al.
8,475,453 B2	7/2013	Marczyk et al.	8,574,263 B2	11/2013	Mueller
8,475,454 B1	7/2013	Alshemari	8,575,880 B2	11/2013	Grantz
8,475,474 B2	7/2013	Bombard et al.	8,579,176 B2	11/2013	Smith et al.
8,479,968 B2	7/2013	Hodgkinson et al.	8,579,178 B2	11/2013	Holsten et al.
8,479,969 B2	7/2013	Shelton, IV	8,579,897 B2	11/2013	Vakharia et al.
			8,579,937 B2	11/2013	Gresham
			8,584,919 B2	11/2013	Hueil et al.
			8,584,920 B2	11/2013	Hodgkinson
			8,584,921 B2	11/2013	Scirica

(56)

References Cited

U.S. PATENT DOCUMENTS

8,585,583 B2	11/2013	Sakaguchi et al.	8,679,093 B2	3/2014	Farra
8,585,721 B2	11/2013	Kirsch	8,679,098 B2	3/2014	Hart
8,590,760 B2	11/2013	Cummins et al.	8,679,137 B2	3/2014	Bauman et al.
8,590,762 B2	11/2013	Hess et al.	8,679,154 B2	3/2014	Smith et al.
8,590,764 B2	11/2013	Hartwick et al.	8,679,156 B2	3/2014	Smith et al.
8,596,515 B2	12/2013	Okoniewski	8,679,454 B2	3/2014	Guire et al.
8,597,745 B2	12/2013	Farnsworth et al.	8,684,248 B2	4/2014	Milliman
8,599,450 B2	12/2013	Kubo et al.	8,684,249 B2	4/2014	Racenet et al.
8,602,287 B2	12/2013	Yates et al.	8,684,250 B2	4/2014	Bettuchi et al.
8,602,288 B2	12/2013	Shelton, IV et al.	8,684,253 B2	4/2014	Giordano et al.
8,603,077 B2	12/2013	Cooper et al.	8,684,962 B2	4/2014	Kirschenman et al.
8,603,089 B2	12/2013	Viola	8,685,004 B2	4/2014	Zemlock et al.
8,603,110 B2	12/2013	Maruyama et al.	8,685,020 B2	4/2014	Weizman et al.
8,603,135 B2	12/2013	Mueller	8,695,866 B2	4/2014	Leimbach et al.
8,608,043 B2	12/2013	Scirica	8,696,665 B2	4/2014	Hunt et al.
8,608,044 B2	12/2013	Hueil et al.	8,701,958 B2	4/2014	Shelton, IV et al.
8,608,045 B2	12/2013	Smith et al.	8,701,959 B2	4/2014	Shah
8,608,046 B2	12/2013	Laurent et al.	8,708,210 B2	4/2014	Zemlok et al.
8,608,745 B2	12/2013	Guzman et al.	8,708,211 B2	4/2014	Zemlok et al.
8,613,383 B2	12/2013	Beckman et al.	8,708,213 B2	4/2014	Shelton, IV et al.
8,616,427 B2	12/2013	Viola	8,714,352 B2	5/2014	Farascioni et al.
8,616,431 B2	12/2013	Timm et al.	8,714,429 B2	5/2014	Demmy
8,622,274 B2	1/2014	Yates et al.	8,714,430 B2	5/2014	Natarajan et al.
8,622,275 B2	1/2014	Baxter, III et al.	8,715,256 B2	5/2014	Greener
8,627,993 B2	1/2014	Smith et al.	8,715,302 B2	5/2014	Ibrahim et al.
8,627,995 B2	1/2014	Smith et al.	8,720,766 B2	5/2014	Hess et al.
8,628,518 B2	1/2014	Blumenkranz et al.	8,721,630 B2	5/2014	Ortiz et al.
8,628,545 B2	1/2014	Cabrera et al.	8,721,666 B2	5/2014	Schroeder et al.
8,631,987 B2	1/2014	Shelton, IV et al.	8,727,197 B2	5/2014	Hess et al.
8,631,992 B1	1/2014	Hausen et al.	8,727,199 B2	5/2014	Wenchell
8,631,993 B2	1/2014	Kostrzewski	8,727,200 B2	5/2014	Roy
8,632,462 B2	1/2014	Yoo et al.	8,727,961 B2	5/2014	Ziv
8,632,525 B2	1/2014	Kerr et al.	8,728,099 B2	5/2014	Cohn et al.
8,632,535 B2	1/2014	Shelton, IV et al.	8,728,119 B2	5/2014	Cummins
8,632,563 B2	1/2014	Nagase et al.	8,733,470 B2	5/2014	Matthias et al.
8,636,187 B2	1/2014	Hueil et al.	8,733,612 B2	5/2014	Ma
8,636,190 B2	1/2014	Zemlok et al.	8,733,613 B2	5/2014	Huitema et al.
8,636,191 B2	1/2014	Meagher	8,733,614 B2	5/2014	Ross et al.
8,636,193 B2	1/2014	Whitman et al.	8,734,336 B2	5/2014	Bonadio et al.
8,636,736 B2	1/2014	Yates et al.	8,734,359 B2	5/2014	Ibanez et al.
8,636,766 B2	1/2014	Milliman et al.	8,734,478 B2	5/2014	Widenhouse et al.
8,639,936 B2	1/2014	Hu et al.	8,739,033 B2	5/2014	Rosenberg
D700,325 S *	2/2014	Nalagatla ..... D24/145	8,739,417 B2	6/2014	Tokunaga et al.
8,640,788 B2	2/2014	Dachs, II et al.	8,740,034 B2	6/2014	Morgan et al.
8,646,674 B2	2/2014	Schulte et al.	8,740,037 B2	6/2014	Shelton, IV et al.
8,647,258 B2	2/2014	Aranyi et al.	8,740,038 B2	6/2014	Shelton, IV et al.
8,652,120 B2	2/2014	Giordano et al.	8,740,987 B2	6/2014	Geremakis et al.
8,652,151 B2	2/2014	Lehman et al.	8,746,529 B2	6/2014	Shelton, IV et al.
8,657,174 B2	2/2014	Yates et al.	8,746,530 B2	6/2014	Giordano et al.
8,657,175 B2	2/2014	Sonnenschein et al.	8,746,533 B2	6/2014	Whitman et al.
8,657,176 B2	2/2014	Shelton, IV et al.	8,746,535 B2	6/2014	Shelton, IV et al.
8,657,177 B2	2/2014	Scirica et al.	8,747,238 B2	6/2014	Shelton, IV et al.
8,657,178 B2	2/2014	Hueil et al.	8,747,441 B2	6/2014	Konieczynski et al.
8,657,482 B2	2/2014	Malackowski et al.	8,752,264 B2	6/2014	Ackley et al.
8,657,808 B2	2/2014	McPherson et al.	8,752,699 B2	6/2014	Morgan et al.
8,657,814 B2	2/2014	Werneth et al.	8,752,747 B2	6/2014	Shelton, IV et al.
8,657,821 B2	2/2014	Palermo	8,752,748 B2	6/2014	Whitman et al.
8,662,370 B2	3/2014	Takei	8,752,749 B2	6/2014	Moore et al.
8,663,106 B2	3/2014	Stivoric et al.	8,757,287 B2	6/2014	Mak et al.
8,663,192 B2	3/2014	Hester et al.	8,757,465 B2	6/2014	Woodard, Jr. et al.
8,663,245 B2	3/2014	Francischelli et al.	8,758,235 B2	6/2014	Jaworek
8,663,262 B2	3/2014	Smith et al.	8,758,366 B2	6/2014	McLean et al.
8,663,270 B2	3/2014	Donnigan et al.	8,758,391 B2	6/2014	Swayze et al.
8,664,792 B2	3/2014	Rebsdorf	8,758,438 B2	6/2014	Boyce et al.
8,668,129 B2	3/2014	Olson	8,763,875 B2	7/2014	Morgan et al.
8,668,130 B2	3/2014	Hess et al.	8,763,877 B2	7/2014	Schall et al.
8,672,206 B2	3/2014	Aranyi et al.	8,763,879 B2	7/2014	Shelton, IV et al.
8,672,207 B2	3/2014	Shelton, IV et al.	8,764,732 B2	7/2014	Hartwell
8,672,208 B2	3/2014	Hess et al.	8,770,458 B2	7/2014	Scirica
8,672,922 B2	3/2014	Loh et al.	8,770,459 B2	7/2014	Racenet et al.
8,672,935 B2	3/2014	Okada et al.	8,770,460 B2	7/2014	Belzer
8,672,951 B2	3/2014	Smith et al.	8,771,169 B2	7/2014	Whitman et al.
8,673,210 B2	3/2014	Deshays	8,777,004 B2	7/2014	Shelton, IV et al.
8,675,820 B2	3/2014	Baic et al.	8,777,082 B2	7/2014	Scirica
8,678,263 B2	3/2014	Viola	8,777,083 B2	7/2014	Racenet et al.
			8,777,898 B2	7/2014	Suon et al.
			8,783,541 B2	7/2014	Shelton, IV et al.
			8,783,542 B2	7/2014	Riestenberg et al.
			8,783,543 B2	7/2014	Shelton, IV et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,784,304 B2	7/2014	Mikkaichi et al.	8,888,695 B2	11/2014	Piskun et al.
8,784,404 B2	7/2014	Doyle et al.	8,888,792 B2	11/2014	Harris et al.
8,784,415 B2	7/2014	Malackowski et al.	8,888,809 B2	11/2014	Davison et al.
8,789,737 B2	7/2014	Hodgkinson et al.	8,893,946 B2	11/2014	Boudreaux et al.
8,789,739 B2	7/2014	Swensgard	8,893,949 B2	11/2014	Shelton, IV et al.
8,789,740 B2	7/2014	Baxter, III et al.	8,894,647 B2	11/2014	Beardsley et al.
8,789,741 B2	7/2014	Baxter, III et al.	8,894,654 B2	11/2014	Anderson
8,790,658 B2	7/2014	Cigarini et al.	8,899,460 B2	12/2014	Wojcicki
8,790,684 B2	7/2014	Dave et al.	8,899,461 B2	12/2014	Farascioni
8,794,496 B2	8/2014	Scirica	8,899,462 B2	12/2014	Kostrzewski et al.
8,794,497 B2	8/2014	Zingman	8,899,463 B2	12/2014	Schall et al.
8,795,276 B2	8/2014	Dietz et al.	8,899,464 B2	12/2014	Hueil et al.
8,795,308 B2	8/2014	Valin	8,899,465 B2	12/2014	Shelton, IV et al.
8,795,324 B2	8/2014	Kawai et al.	8,899,466 B2	12/2014	Baxter, III et al.
8,800,681 B2	8/2014	Rousson et al.	8,905,287 B2	12/2014	Racenet et al.
8,800,837 B2	8/2014	Zemlok	8,905,977 B2	12/2014	Shelton et al.
8,800,838 B2	8/2014	Shelton, IV	8,910,846 B2	12/2014	Viola
8,800,839 B2	8/2014	Beetel	8,911,426 B2	12/2014	Coppeta et al.
8,800,840 B2	8/2014	Jankowski	8,911,448 B2	12/2014	Stein
8,800,841 B2	8/2014	Ellerhorst et al.	8,911,460 B2	12/2014	Neurohr et al.
8,801,734 B2	8/2014	Shelton, IV et al.	8,911,471 B2	12/2014	Spivey et al.
8,801,735 B2	8/2014	Shelton, IV et al.	8,920,433 B2	12/2014	Barrier et al.
8,801,752 B2	8/2014	Fortier et al.	8,920,435 B2	12/2014	Smith et al.
8,801,801 B2	8/2014	Datta et al.	8,920,438 B2	12/2014	Aranyi et al.
8,806,973 B2	8/2014	Ross et al.	8,920,443 B2	12/2014	Hiles et al.
8,807,414 B2	8/2014	Ross et al.	8,920,444 B2	12/2014	Hiles et al.
8,808,161 B2	8/2014	Gregg et al.	8,922,163 B2	12/2014	Macdonald
8,808,274 B2	8/2014	Hartwell	8,925,782 B2	1/2015	Shelton, IV
8,808,294 B2	8/2014	Fox et al.	8,925,783 B2	1/2015	Zemlok et al.
8,808,308 B2	8/2014	Boukhny et al.	8,925,788 B2	1/2015	Hess et al.
8,808,311 B2	8/2014	Heinrich et al.	8,926,506 B2	1/2015	Widenhouse et al.
8,808,325 B2	8/2014	Hess et al.	8,926,598 B2	1/2015	Mollere et al.
8,810,197 B2	8/2014	Juergens	8,931,576 B2	1/2015	Iwata
8,811,017 B2	8/2014	Fujii et al.	8,931,679 B2	1/2015	Kostrzewski
8,813,866 B2	8/2014	Suzuki	8,931,680 B2	1/2015	Milliman
8,814,024 B2	8/2014	Woodard, Jr. et al.	8,931,682 B2	1/2015	Timm et al.
8,814,025 B2	8/2014	Miller et al.	8,936,614 B2	1/2015	Allen, IV
8,814,836 B2	8/2014	Ignon et al.	8,939,343 B2	1/2015	Milliman et al.
8,820,603 B2	9/2014	Shelton, IV et al.	8,939,344 B2	1/2015	Olson et al.
8,820,605 B2	9/2014	Shelton, IV	8,945,163 B2	2/2015	Voegele et al.
8,820,606 B2	9/2014	Hodgkinson	8,955,732 B2	2/2015	Zemlok et al.
8,820,607 B2	9/2014	Marczyk	8,956,342 B1	2/2015	Russo et al.
8,822,934 B2	9/2014	Sayeh et al.	8,956,390 B2	2/2015	Shah et al.
8,825,164 B2	9/2014	Tweden et al.	8,958,860 B2	2/2015	Banerjee et al.
8,827,133 B2	9/2014	Shelton, IV et al.	8,960,519 B2	2/2015	Whitman et al.
8,827,134 B2	9/2014	Viola et al.	8,960,520 B2	2/2015	McCuen
8,827,903 B2	9/2014	Shelton, IV et al.	8,960,521 B2	2/2015	Kostrzewski
8,833,219 B2	9/2014	Pierce	8,961,191 B2	2/2015	Hanshew
8,833,630 B2	9/2014	Milliman	8,961,504 B2	2/2015	Hoarau et al.
8,833,632 B2	9/2014	Swensgard	8,963,714 B2	2/2015	Medhal et al.
8,834,498 B2	9/2014	Byrum et al.	D725,674 S	3/2015	Jung et al.
8,840,003 B2	9/2014	Morgan et al.	8,967,443 B2	3/2015	McCuen
8,840,603 B2	9/2014	Shelton, IV et al.	8,967,444 B2	3/2015	Beetel
8,840,609 B2	9/2014	Stuebe	8,967,446 B2	3/2015	Beardsley et al.
8,844,789 B2	9/2014	Shelton, IV et al.	8,967,448 B2	3/2015	Carter et al.
8,851,215 B2	10/2014	Goto	8,968,276 B2	3/2015	Zemlok et al.
8,851,354 B2	10/2014	Swensgard et al.	8,968,312 B2	3/2015	Marczyk et al.
8,852,185 B2	10/2014	Twomey	8,968,337 B2	3/2015	Whitfield et al.
8,852,199 B2	10/2014	Deslauriers et al.	8,968,340 B2	3/2015	Chowaniec et al.
8,857,693 B2	10/2014	Schuckmann et al.	8,968,355 B2	3/2015	Malkowski et al.
8,857,694 B2	10/2014	Shelton, IV et al.	8,968,358 B2	3/2015	Reschke
8,858,538 B2	10/2014	Belson et al.	8,970,507 B2	3/2015	Holbein et al.
8,858,571 B2	10/2014	Shelton, IV et al.	8,973,803 B2	3/2015	Hall et al.
8,858,590 B2	10/2014	Shelton, IV et al.	8,973,804 B2	3/2015	Hess et al.
8,864,007 B2	10/2014	Widenhouse et al.	8,973,805 B2	3/2015	Scirica et al.
8,864,009 B2	10/2014	Shelton, IV et al.	8,974,440 B2	3/2015	Farritor et al.
8,864,010 B2	10/2014	Williams	8,974,932 B2	3/2015	McGahan et al.
8,870,050 B2	10/2014	Hodgkinson	8,978,954 B2	3/2015	Shelton, IV et al.
8,870,912 B2	10/2014	Brisson et al.	8,978,955 B2	3/2015	Aronhalt et al.
8,875,971 B2	11/2014	Hall et al.	8,978,956 B2	3/2015	Schall et al.
8,875,972 B2	11/2014	Weisenburgh, II et al.	8,979,843 B2	3/2015	Timm et al.
8,876,857 B2	11/2014	Burbank	8,979,890 B2	3/2015	Boudreaux
8,876,858 B2	11/2014	Braun	8,982,195 B2	3/2015	Claus et al.
8,887,979 B2	11/2014	Mastri et al.	8,991,676 B2	3/2015	Hess et al.
8,888,688 B2	11/2014	Julian et al.	8,991,677 B2	3/2015	Moore et al.
			8,991,678 B2	3/2015	Wellman et al.
			8,992,042 B2	3/2015	Eichenholz
			8,992,422 B2	3/2015	Spivey et al.
			8,992,565 B2	3/2015	Brisson et al.



(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,996,165 B2	3/2015	Wang et al.	9,095,346 B2	8/2015	Houser et al.
8,998,058 B2	4/2015	Moore et al.	9,095,362 B2	8/2015	Dachs, II et al.
8,998,059 B2	4/2015	Smith et al.	9,096,033 B2	8/2015	Holop et al.
8,998,060 B2	4/2015	Bruewer et al.	9,099,863 B2	8/2015	Smith et al.
8,998,061 B2	4/2015	Williams et al.	9,101,358 B2	8/2015	Kerr et al.
8,998,939 B2	4/2015	Price et al.	9,101,385 B2	8/2015	Shelton, IV et al.
9,002,518 B2	4/2015	Manzo et al.	9,101,475 B2	8/2015	Wei et al.
9,004,339 B1	4/2015	Park	9,107,663 B2	8/2015	Swensgard
9,005,230 B2	4/2015	Yates et al.	9,107,690 B2	8/2015	Bales, Jr. et al.
9,005,238 B2	4/2015	DeSantis et al.	9,110,587 B2	8/2015	Kim et al.
9,005,243 B2	4/2015	Stopek et al.	9,113,862 B2	8/2015	Morgan et al.
9,010,606 B2	4/2015	Aranyi et al.	9,113,864 B2	8/2015	Morgan et al.
9,010,608 B2	4/2015	Casasanta, Jr. et al.	9,113,865 B2	8/2015	Shelton, IV et al.
9,011,439 B2	4/2015	Shalaby et al.	9,113,873 B2	8/2015	Marczyk et al.
9,011,471 B2	4/2015	Timm et al.	9,113,874 B2	8/2015	Shelton, IV et al.
9,016,539 B2	4/2015	Kostrzewski et al.	9,113,876 B2	8/2015	Zemlok et al.
9,016,540 B2	4/2015	Whitman et al.	9,113,880 B2	8/2015	Zemlok et al.
9,016,541 B2	4/2015	Viola et al.	9,113,881 B2	8/2015	Scirica
9,016,542 B2	4/2015	Shelton, IV et al.	9,113,883 B2	8/2015	Aronhalt et al.
9,016,545 B2	4/2015	Aranyi et al.	9,113,884 B2	8/2015	Shelton, IV et al.
9,017,331 B2	4/2015	Fox	9,113,887 B2	8/2015	Behnke, II et al.
9,017,355 B2	4/2015	Smith et al.	9,119,657 B2	9/2015	Shelton, IV et al.
9,017,369 B2	4/2015	Renger et al.	9,119,898 B2	9/2015	Bayon et al.
9,017,371 B2	4/2015	Whitman et al.	9,119,957 B2	9/2015	Gantz et al.
9,021,684 B2	5/2015	Lenker et al.	9,123,286 B2	9/2015	Park
9,023,014 B2	5/2015	Chowaniec et al.	9,124,097 B2	9/2015	Cruz
9,023,071 B2	5/2015	Miller et al.	9,125,654 B2	9/2015	Aronhalt et al.
9,027,817 B2	5/2015	Milliman et al.	9,125,662 B2	9/2015	Shelton, IV
9,028,494 B2	5/2015	Shelton, IV et al.	9,126,317 B2	9/2015	Lawton et al.
9,028,495 B2	5/2015	Mueller et al.	9,131,835 B2	9/2015	Widenhouse et al.
9,028,519 B2	5/2015	Yates et al.	9,131,940 B2	9/2015	Huitema et al.
9,030,169 B2	5/2015	Christensen et al.	9,131,950 B2	9/2015	Matthew
9,033,203 B2	5/2015	Woodard, Jr. et al.	9,131,957 B2	9/2015	Skarbnik et al.
9,033,204 B2	5/2015	Shelton, IV et al.	9,138,225 B2	9/2015	Huang et al.
9,034,505 B2	5/2015	Detry et al.	9,138,226 B2	9/2015	Racenet et al.
9,038,881 B1	5/2015	Schaller et al.	9,144,455 B2	9/2015	Kennedy et al.
9,039,690 B2	5/2015	Kersten et al.	9,149,274 B2	10/2015	Spivey et al.
9,039,694 B2	5/2015	Ross et al.	9,149,324 B2	10/2015	Huang et al.
9,039,720 B2	5/2015	Madan	9,149,325 B2	10/2015	Worrell et al.
9,043,027 B2	5/2015	Durant et al.	9,153,994 B2	10/2015	Wood et al.
9,044,227 B2	6/2015	Shelton, IV et al.	9,161,753 B2	10/2015	Prior
9,044,228 B2	6/2015	Woodard, Jr. et al.	9,161,803 B2	10/2015	Yates et al.
9,044,229 B2	6/2015	Scheib et al.	9,168,038 B2	10/2015	Shelton, IV et al.
9,044,230 B2	6/2015	Morgan et al.	9,168,039 B1	10/2015	Knodel
9,044,281 B2	6/2015	Pool et al.	9,168,054 B2	10/2015	Turner et al.
9,050,083 B2	6/2015	Yates et al.	9,168,144 B2	10/2015	Rivin et al.
9,050,084 B2	6/2015	Schmid et al.	9,179,911 B2	11/2015	Morgan et al.
9,050,100 B2	6/2015	Yates et al.	9,179,912 B2	11/2015	Yates et al.
9,050,120 B2	6/2015	Swarup et al.	9,182,244 B2	11/2015	Luke et al.
9,050,123 B2	6/2015	Krause et al.	9,186,046 B2	11/2015	Ramamurthy et al.
9,050,176 B2	6/2015	Datta et al.	9,186,137 B2	11/2015	Farascioni et al.
9,055,941 B2	6/2015	Schmid et al.	9,186,140 B2	11/2015	Hiles et al.
9,055,942 B2	6/2015	Balbierz et al.	9,186,142 B2	11/2015	Fanelli et al.
9,055,943 B2	6/2015	Zemlok et al.	9,186,143 B2	11/2015	Timm et al.
9,055,944 B2	6/2015	Hodgkinson et al.	9,186,148 B2	11/2015	Felder et al.
9,055,961 B2	6/2015	Manzo et al.	9,186,221 B2	11/2015	Burbank
9,060,770 B2	6/2015	Shelton, IV et al.	9,192,380 B2	11/2015	(Tarinelli) Racenet et al.
9,060,776 B2	6/2015	Yates et al.	9,192,384 B2	11/2015	Bettuchi
9,060,794 B2	6/2015	Kang et al.	9,192,430 B2	11/2015	Rachlin et al.
9,060,894 B2	6/2015	Wubbeling	9,192,434 B2	11/2015	Twomey et al.
9,061,392 B2	6/2015	Forgues et al.	9,193,045 B2	11/2015	Saur et al.
9,072,515 B2	7/2015	Hall et al.	9,198,642 B2	12/2015	Storz
9,072,523 B2	7/2015	Houser et al.	9,198,644 B2	12/2015	Balek et al.
9,072,535 B2	7/2015	Shelton, IV et al.	9,198,661 B2	12/2015	Swensgard
9,072,536 B2	7/2015	Shelton, IV et al.	9,198,662 B2	12/2015	Barton et al.
9,078,653 B2	7/2015	Leimbach et al.	9,198,683 B2	12/2015	Friedman et al.
9,084,601 B2	7/2015	Moore et al.	9,204,830 B2	12/2015	Zand et al.
9,084,602 B2	7/2015	Gleiman	9,204,877 B2	12/2015	Whitman et al.
9,086,875 B2	7/2015	Harrat et al.	9,204,878 B2	12/2015	Hall et al.
9,089,326 B2	7/2015	Krumanaker et al.	9,204,879 B2	12/2015	Shelton, IV
9,089,330 B2	7/2015	Widenhouse et al.	9,204,880 B2	12/2015	Baxter, III et al.
9,089,352 B2	7/2015	Jeong	9,204,923 B2	12/2015	Manzo et al.
9,091,588 B2	7/2015	Lefler	9,204,924 B2	12/2015	Marczyk et al.
D736,792 S	8/2015	Brinda et al.	9,211,120 B2	12/2015	Scheib et al.
9,095,339 B2	8/2015	Moore et al.	9,211,121 B2	12/2015	Hall et al.
			9,211,122 B2	12/2015	Hagerty et al.
			9,216,013 B2	12/2015	Scirica et al.
			9,216,019 B2	12/2015	Schmid et al.
			9,216,020 B2	12/2015	Zhang et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,216,030 B2	12/2015	Fan et al.	9,314,246 B2	4/2016	Shelton, IV et al.
9,216,062 B2	12/2015	Duque et al.	9,314,247 B2	4/2016	Shelton, IV et al.
9,220,500 B2	12/2015	Swayze et al.	9,314,261 B2	4/2016	Bales, Jr. et al.
9,220,501 B2	12/2015	Baxter, III et al.	9,314,908 B2	4/2016	Tanimoto et al.
9,220,502 B2	12/2015	Zemlok et al.	9,320,518 B2	4/2016	Henderson et al.
9,220,508 B2	12/2015	Dannaher	9,320,520 B2	4/2016	Shelton, IV et al.
9,220,559 B2	12/2015	Worrell et al.	9,320,521 B2	4/2016	Shelton, IV et al.
9,220,570 B2	12/2015	Kim et al.	9,320,523 B2	4/2016	Shelton, IV et al.
D746,854 S	1/2016	Shardlow et al.	9,326,767 B2	5/2016	Koch, Jr. et al.
9,226,750 B2	1/2016	Weir et al.	9,326,768 B2	5/2016	Shelton, IV
9,226,751 B2	1/2016	Shelton, IV et al.	9,326,769 B2	5/2016	Shelton, IV et al.
9,226,767 B2	1/2016	Stulen et al.	9,326,770 B2	5/2016	Shelton, IV et al.
9,232,941 B2	1/2016	Mandakolathur Vasudevan et al.	9,326,771 B2	5/2016	Baxter, III et al.
9,232,945 B2	1/2016	Zingman	9,326,788 B2	5/2016	Batross et al.
9,232,979 B2	1/2016	Parihar et al.	9,326,812 B2	5/2016	Waalder et al.
9,233,610 B2	1/2016	Kim et al.	9,332,890 B2	5/2016	Ozawa
9,237,891 B2	1/2016	Shelton, IV	9,332,974 B2	5/2016	Henderson et al.
9,237,892 B2	1/2016	Hodgkinson	9,332,984 B2	5/2016	Weaner et al.
9,237,895 B2	1/2016	McCarthy et al.	9,332,987 B2	5/2016	Leimbach et al.
9,237,921 B2	1/2016	Messerly et al.	9,333,040 B2	5/2016	Shellenberger et al.
9,239,064 B2	1/2016	Helbig et al.	9,333,082 B2	5/2016	Wei et al.
9,240,740 B2	1/2016	Zeng et al.	9,339,226 B2	5/2016	Van der Walt et al.
9,241,712 B2	1/2016	Zemlok et al.	9,345,477 B2	5/2016	Anim et al.
9,241,714 B2	1/2016	Timm et al.	9,345,480 B2	5/2016	Hessler et al.
9,241,716 B2	1/2016	Whitman	9,345,481 B2	5/2016	Hall et al.
9,241,731 B2	1/2016	Boudreaux et al.	9,351,726 B2	5/2016	Leimbach et al.
D750,122 S	2/2016	Shardlow et al.	9,351,727 B2	5/2016	Leimbach et al.
9,259,274 B2	2/2016	Prisco	9,351,728 B2	5/2016	Sniffin et al.
9,261,172 B2	2/2016	Solomon et al.	9,351,730 B2	5/2016	Schmid et al.
9,265,500 B2	2/2016	Sorrentino et al.	9,351,731 B2	5/2016	Carter et al.
9,265,516 B2	2/2016	Casey et al.	9,351,732 B2	5/2016	Hodgkinson
9,265,585 B2	2/2016	Wingardner et al.	D758,433 S	6/2016	Lee et al.
9,271,718 B2	3/2016	Milad et al.	9,358,003 B2	6/2016	Hall et al.
9,271,727 B2	3/2016	McGuckin, Jr. et al.	9,358,005 B2	6/2016	Shelton, IV et al.
9,271,753 B2	3/2016	Butler et al.	9,358,015 B2	6/2016	Sorrentino et al.
9,271,799 B2	3/2016	Shelton, IV et al.	9,358,031 B2	6/2016	Manzo
9,272,406 B2	3/2016	Aronhalt et al.	9,364,217 B2	6/2016	Kostrzewski et al.
9,277,919 B2	3/2016	Timmer et al.	9,364,219 B2	6/2016	Olson et al.
9,277,922 B2	3/2016	Carter et al.	9,364,220 B2	6/2016	Williams
9,282,962 B2	3/2016	Schmid et al.	9,364,226 B2	6/2016	Zemlok et al.
9,282,963 B2	3/2016	Bryant	9,364,229 B2	6/2016	D'Agostino et al.
9,282,966 B2	3/2016	Shelton, IV et al.	9,364,230 B2	6/2016	Shelton, IV et al.
9,282,974 B2	3/2016	Shelton, IV	9,364,231 B2	6/2016	Wenchell
9,283,028 B2	3/2016	Johnson	9,364,233 B2	6/2016	Alexander, III et al.
9,283,045 B2	3/2016	Rhee et al.	9,364,279 B2	6/2016	Houser et al.
9,283,054 B2	3/2016	Morgan et al.	9,368,991 B2	6/2016	Qahouq
9,289,206 B2	3/2016	Hess et al.	9,370,341 B2	6/2016	Ceniccola et al.
9,289,207 B2	3/2016	Shelton, IV	9,370,358 B2	6/2016	Shelton, IV et al.
9,289,210 B2	3/2016	Baxter, III et al.	9,370,364 B2	6/2016	Smith et al.
9,289,211 B2	3/2016	Williams et al.	9,375,206 B2	6/2016	Vidal et al.
9,289,212 B2	3/2016	Shelton, IV et al.	9,375,255 B2	6/2016	Houser et al.
9,289,225 B2	3/2016	Shelton, IV et al.	9,381,058 B2	7/2016	Houser et al.
9,289,256 B2	3/2016	Shelton, IV et al.	9,386,983 B2	7/2016	Swensgard et al.
9,293,757 B2	3/2016	Toussaint et al.	9,386,984 B2	7/2016	Aronhalt et al.
9,295,464 B2	3/2016	Shelton, IV et al.	9,386,985 B2	7/2016	Koch, Jr. et al.
9,295,465 B2	3/2016	Farascioni	9,386,988 B2	7/2016	Baxter, III et al.
9,295,466 B2	3/2016	Hodgkinson et al.	9,387,003 B2	7/2016	Kaercher et al.
9,295,468 B2	3/2016	Heinrich et al.	9,393,015 B2	7/2016	Laurent et al.
9,295,514 B2	3/2016	Shelton, IV et al.	9,393,017 B2	7/2016	Flanagan et al.
9,295,522 B2	3/2016	Kostrzewski	9,393,018 B2	7/2016	Wang et al.
9,295,784 B2	3/2016	Eggert et al.	9,398,911 B2	7/2016	Auld
9,301,691 B2	4/2016	Hufnagel et al.	9,402,604 B2	8/2016	Williams et al.
9,301,752 B2	4/2016	Mandakolathur Vasudevan et al.	9,402,626 B2	8/2016	Ortiz et al.
9,301,753 B2	4/2016	Aldridge et al.	9,402,627 B2	8/2016	Stevenson et al.
9,301,755 B2	4/2016	Shelton, IV et al.	9,408,604 B2	8/2016	Shelton, IV et al.
9,301,759 B2	4/2016	Spivey et al.	9,408,606 B2	8/2016	Shelton, IV
9,307,965 B2	4/2016	Ming et al.	9,408,622 B2	8/2016	Stulen et al.
9,307,986 B2	4/2016	Hall et al.	9,411,370 B2	8/2016	Benni et al.
9,307,987 B2	4/2016	Swensgard et al.	9,413,128 B2	8/2016	Tien et al.
9,307,988 B2	4/2016	Shelton, IV	9,414,838 B2	8/2016	Shelton, IV et al.
9,307,989 B2	4/2016	Shelton, IV et al.	9,414,849 B2	8/2016	Nagashimada
9,307,994 B2	4/2016	Gresham et al.	9,414,880 B2	8/2016	Monson et al.
9,308,009 B2	4/2016	Madan et al.	9,420,967 B2	8/2016	Zand et al.
9,308,011 B2	4/2016	Chao et al.	9,421,003 B2	8/2016	Williams et al.
9,308,646 B2	4/2016	Lim et al.	9,421,014 B2	8/2016	Ingmanson et al.
			9,421,030 B2	8/2016	Cole et al.
			9,421,060 B2	8/2016	Monson et al.
			9,427,223 B2	8/2016	Park et al.
			9,427,231 B2	8/2016	Racenet et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,433,411 B2	9/2016	Racenet et al.	9,585,662 B2	3/2017	Shelton, IV et al.
9,433,419 B2	9/2016	Gonzalez et al.	9,585,663 B2	3/2017	Shelton, IV et al.
9,433,420 B2	9/2016	Hodgkinson	9,585,672 B2	3/2017	Bastia
9,439,649 B2	9/2016	Shelton, IV et al.	9,590,433 B2	3/2017	Li
9,439,650 B2	9/2016	McGuckin, Jr. et al.	9,592,050 B2	3/2017	Schmid et al.
9,439,651 B2	9/2016	Smith et al.	9,592,052 B2	3/2017	Shelton, IV
9,439,668 B2	9/2016	Timm et al.	9,592,053 B2	3/2017	Shelton, IV et al.
9,445,808 B2	9/2016	Woodard, Jr. et al.	9,592,054 B2	3/2017	Schmid et al.
9,445,813 B2	9/2016	Shelton, IV et al.	9,597,073 B2	3/2017	Sorrentino et al.
9,451,958 B2	9/2016	Shelton, IV et al.	9,597,075 B2	3/2017	Shelton, IV et al.
9,461,340 B2	10/2016	Li et al.	9,597,080 B2	3/2017	Milliman et al.
9,463,040 B2	10/2016	Jeong et al.	9,597,104 B2	3/2017	Nicholas et al.
9,463,260 B2	10/2016	Stopek	9,597,143 B2	3/2017	Madan et al.
9,468,438 B2	10/2016	Baber et al.	9,603,595 B2	3/2017	Shelton, IV et al.
9,468,447 B2	10/2016	Aman et al.	9,603,598 B2	3/2017	Shelton, IV et al.
9,470,297 B2	10/2016	Aranyi et al.	9,603,991 B2	3/2017	Shelton, IV et al.
9,471,969 B2	10/2016	Zeng et al.	9,610,080 B2	4/2017	Whitfield et al.
9,474,506 B2	10/2016	Magnin et al.	9,614,258 B2	4/2017	Takahashi et al.
9,474,523 B2	10/2016	Meade et al.	9,615,826 B2	4/2017	Shelton, IV et al.
9,474,540 B2	10/2016	Stokes et al.	9,629,623 B2	4/2017	Lytle, IV et al.
9,475,180 B2	10/2016	Eshleman et al.	9,629,626 B2	4/2017	Soltz et al.
9,480,476 B2	11/2016	Aldridge et al.	9,629,629 B2	4/2017	Leimbach et al.
9,480,492 B2	11/2016	Aranyi et al.	9,629,652 B2	4/2017	Mumaw et al.
9,483,095 B2	11/2016	Tran et al.	9,629,814 B2	4/2017	Widenhouse et al.
9,486,186 B2	11/2016	Fiebig et al.	D788,140 S	5/2017	Hemsley et al.
9,486,213 B2	11/2016	Altman et al.	9,636,850 B2	5/2017	Stopek (nee Prommersberger) et al.
9,486,214 B2	11/2016	Shelton, IV	9,641,122 B2	5/2017	Romanowich et al.
9,486,302 B2	11/2016	Boey et al.	9,642,620 B2	5/2017	Baxter, III et al.
9,488,197 B2	11/2016	Wi	9,649,096 B2	5/2017	Sholev
9,492,146 B2	11/2016	Kostrzewski et al.	9,649,110 B2	5/2017	Parihar et al.
9,492,167 B2	11/2016	Shelton, IV et al.	9,649,111 B2	5/2017	Shelton, IV et al.
9,492,170 B2	11/2016	Bear et al.	9,655,613 B2	5/2017	Schaller
9,492,189 B2	11/2016	Williams et al.	9,655,614 B2	5/2017	Swensgard et al.
9,492,192 B2	11/2016	To et al.	9,655,615 B2	5/2017	Knodel et al.
9,498,213 B2	11/2016	Marczyk et al.	9,655,624 B2	5/2017	Shelton, IV et al.
9,498,219 B2	11/2016	Moore et al.	9,662,108 B2	5/2017	Williams
9,504,521 B2	11/2016	Deutmeyer et al.	9,662,110 B2	5/2017	Huang et al.
D775,336 S	12/2016	Shelton, IV et al.	9,662,116 B2	5/2017	Smith et al.
9,510,828 B2	12/2016	Yates et al.	9,662,131 B2	5/2017	Omori et al.
9,510,830 B2	12/2016	Shelton, IV et al.	D790,570 S	6/2017	Butcher et al.
9,510,846 B2	12/2016	Sholev et al.	9,668,728 B2	6/2017	Williams et al.
9,510,895 B2	12/2016	Houser et al.	9,668,729 B2	6/2017	Williams et al.
9,510,925 B2	12/2016	Hotter et al.	9,668,732 B2	6/2017	Patel et al.
9,517,063 B2	12/2016	Swayze et al.	9,675,344 B2	6/2017	Combrowski et al.
9,517,068 B2	12/2016	Shelton, IV et al.	9,675,351 B2	6/2017	Hodgkinson et al.
9,521,996 B2	12/2016	Armstrong	9,675,355 B2	6/2017	Shelton, IV et al.
9,522,029 B2	12/2016	Yates et al.	9,675,372 B2	6/2017	Laurent et al.
9,526,481 B2	12/2016	Storz et al.	9,675,375 B2	6/2017	Houser et al.
9,526,499 B2	12/2016	Kostrzewski et al.	9,675,405 B2	6/2017	Trees et al.
9,526,564 B2	12/2016	Rusin	9,681,870 B2	6/2017	Baxter, III et al.
D777,773 S	1/2017	Shi	9,681,873 B2	6/2017	Smith et al.
9,532,783 B2	1/2017	Swayze et al.	9,681,884 B2	6/2017	Clem et al.
9,545,258 B2	1/2017	Smith et al.	9,687,230 B2	6/2017	Leimbach et al.
9,549,732 B2	1/2017	Yates et al.	9,687,231 B2	6/2017	Baxter, III et al.
9,549,735 B2	1/2017	Shelton, IV et al.	9,687,232 B2	6/2017	Shelton, IV et al.
9,554,794 B2	1/2017	Baber et al.	9,687,233 B2	6/2017	Fernandez et al.
9,554,796 B2	1/2017	Kostrzewski	9,687,236 B2	6/2017	Leimbach et al.
9,554,812 B2	1/2017	Inkpen et al.	9,687,237 B2	6/2017	Schmid et al.
9,559,624 B2	1/2017	Philipp	9,687,253 B2	6/2017	Detry et al.
9,561,031 B2	2/2017	Heinrich et al.	9,689,466 B2	6/2017	Kanai et al.
9,561,032 B2	2/2017	Shelton, IV et al.	9,690,362 B2	6/2017	Leimbach et al.
9,561,038 B2	2/2017	Shelton, IV et al.	9,693,772 B2	7/2017	Ingmanson et al.
9,561,045 B2	2/2017	Hinman et al.	9,693,774 B2	7/2017	Gettinger et al.
9,566,061 B2	2/2017	Aronhalt et al.	9,693,777 B2	7/2017	Schellin et al.
9,566,067 B2	2/2017	Milliman et al.	9,700,309 B2	7/2017	Jaworek et al.
9,572,574 B2	2/2017	Shelton, IV et al.	9,700,310 B2	7/2017	Morgan et al.
9,572,577 B2	2/2017	Lloyd et al.	9,700,312 B2	7/2017	Kostrzewski et al.
9,572,592 B2	2/2017	Price et al.	9,700,317 B2	7/2017	Aronhalt et al.
9,574,644 B2	2/2017	Parihar	9,700,318 B2	7/2017	Scirica et al.
D781,879 S	3/2017	Butcher et al.	9,700,319 B2	7/2017	Motooka et al.
9,585,550 B2	3/2017	Abel et al.	9,700,321 B2	7/2017	Shelton, IV et al.
9,585,657 B2	3/2017	Shelton, IV et al.	9,706,981 B2	7/2017	Nicholas et al.
9,585,658 B2	3/2017	Shelton, IV	9,706,991 B2	7/2017	Hess et al.
9,585,659 B2	3/2017	Viola et al.	9,706,993 B2	7/2017	Hessler et al.
9,585,660 B2	3/2017	Laurent et al.	9,707,026 B2	7/2017	Malackowski et al.
			9,707,043 B2	7/2017	Bozung
			9,707,684 B2	7/2017	Ruiz Morales et al.
			9,713,468 B2	7/2017	Harris et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

9,713,470 B2	7/2017	Scirica et al.	9,826,976 B2	11/2017	Parihar et al.
9,717,497 B2	8/2017	Zerkle et al.	9,826,977 B2	11/2017	Leimbach et al.
9,717,498 B2	8/2017	Aranyi et al.	9,826,978 B2	11/2017	Shelton, IV et al.
9,724,091 B2	8/2017	Shelton, IV et al.	9,829,698 B2	11/2017	Haraguchi et al.
9,724,092 B2	8/2017	Baxter, III et al.	9,833,236 B2	12/2017	Shelton, IV et al.
9,724,094 B2	8/2017	Baber et al.	9,833,238 B2	12/2017	Baxter, III et al.
9,724,096 B2	8/2017	Thompson et al.	9,833,239 B2	12/2017	Yates et al.
9,724,098 B2	8/2017	Baxter, III et al.	9,833,241 B2	12/2017	Huitema et al.
9,724,163 B2	8/2017	Orban	9,833,242 B2	12/2017	Baxter, III et al.
9,730,692 B2	8/2017	Shelton, IV et al.	9,839,420 B2	12/2017	Shelton, IV et al.
9,730,695 B2	8/2017	Leimbach et al.	9,839,421 B2	12/2017	Zerkle et al.
9,730,697 B2	8/2017	Morgan et al.	9,839,422 B2	12/2017	Schellin et al.
9,730,717 B2	8/2017	Katsuki et al.	9,839,423 B2	12/2017	Vendely et al.
9,731,410 B2	8/2017	Hirabayashi et al.	9,839,427 B2	12/2017	Swayze et al.
9,733,663 B2	8/2017	Leimbach et al.	9,839,428 B2	12/2017	Baxter, III et al.
9,737,297 B2	8/2017	Racenet et al.	9,839,429 B2	12/2017	Weisenburgh, II et al.
9,737,301 B2	8/2017	Baber et al.	9,839,480 B2	12/2017	Pribanic et al.
9,737,302 B2	8/2017	Shelton, IV et al.	9,844,368 B2	12/2017	Boudreaux et al.
9,737,303 B2	8/2017	Shelton, IV et al.	9,844,369 B2	12/2017	Huitema et al.
9,737,365 B2	8/2017	Hegeman et al.	9,844,372 B2	12/2017	Shelton, IV et al.
9,743,927 B2	8/2017	Whitman	9,844,373 B2	12/2017	Swayze et al.
9,743,928 B2	8/2017	Shelton, IV et al.	9,844,374 B2	12/2017	Lytle, IV et al.
9,743,929 B2	8/2017	Leimbach et al.	9,844,375 B2	12/2017	Overmyer et al.
9,750,498 B2	9/2017	Timm et al.	9,844,376 B2	12/2017	Baxter, III et al.
9,750,499 B2	9/2017	Leimbach et al.	9,844,379 B2	12/2017	Shelton, IV et al.
9,750,501 B2	9/2017	Shelton, IV et al.	9,848,873 B2	12/2017	Shelton, IV
9,750,639 B2	9/2017	Barnes et al.	9,848,875 B2	12/2017	Aronhalt et al.
9,757,123 B2	9/2017	Giordano et al.	9,848,877 B2	12/2017	Shelton, IV et al.
9,757,124 B2	9/2017	Schellin et al.	9,855,662 B2	1/2018	Ruiz Morales et al.
9,757,126 B2	9/2017	Cappola	9,861,261 B2	1/2018	Shahinian
9,757,128 B2	9/2017	Baber et al.	9,861,359 B2	1/2018	Shelton, IV et al.
9,757,129 B2	9/2017	Williams	9,861,361 B2	1/2018	Aronhalt et al.
9,757,130 B2	9/2017	Shelton, IV	9,861,382 B2	1/2018	Smith et al.
9,763,662 B2	9/2017	Shelton, IV et al.	9,867,612 B2	1/2018	Parihar et al.
9,770,245 B2	9/2017	Swayze et al.	9,867,618 B2	1/2018	Hall et al.
9,770,274 B2	9/2017	Pool et al.	9,868,198 B2	1/2018	Nicholas et al.
D800,904 S *	10/2017	Leimbach ..... D24/145	9,872,682 B2	1/2018	Hess et al.
9,775,608 B2	10/2017	Aronhalt et al.	9,872,683 B2	1/2018	Hopkins et al.
9,775,609 B2	10/2017	Shelton, IV et al.	9,872,684 B2	1/2018	Hall et al.
9,775,610 B2	10/2017	Nicholas et al.	9,877,721 B2	1/2018	Schellin et al.
9,775,611 B2	10/2017	Kostrzewski	9,877,723 B2	1/2018	Hall et al.
9,775,613 B2	10/2017	Shelton, IV et al.	9,883,843 B2	2/2018	Garlow
9,775,614 B2	10/2017	Shelton, IV et al.	9,883,860 B2	2/2018	Leimbach et al.
9,782,169 B2	10/2017	Kimsey et al.	9,883,861 B2	2/2018	Shelton, IV et al.
9,782,170 B2	10/2017	Zemlok et al.	9,884,456 B2	2/2018	Schellin et al.
9,782,180 B2	10/2017	Smith et al.	9,888,919 B2	2/2018	Leimbach et al.
9,782,214 B2	10/2017	Houser et al.	9,888,924 B2	2/2018	Ebersole et al.
9,788,834 B2	10/2017	Schmid et al.	9,889,230 B2	2/2018	Bennett et al.
9,788,835 B2	10/2017	Morgan et al.	9,895,147 B2	2/2018	Shelton, IV
9,788,836 B2	10/2017	Overmyer et al.	9,895,148 B2	2/2018	Shelton, IV et al.
9,788,847 B2	10/2017	Jinno	9,895,813 B2	2/2018	Blumenkranz et al.
9,788,851 B2	10/2017	Dannaher et al.	9,901,341 B2	2/2018	Kostrzewski
9,795,379 B2	10/2017	Leimbach et al.	9,901,342 B2	2/2018	Shelton, IV et al.
9,795,381 B2	10/2017	Shelton, IV	9,901,344 B2	2/2018	Moore et al.
9,795,382 B2	10/2017	Shelton, IV	9,901,345 B2	2/2018	Moore et al.
9,795,383 B2	10/2017	Aldridge et al.	9,901,346 B2	2/2018	Moore et al.
9,795,384 B2	10/2017	Weaner et al.	9,907,456 B2	3/2018	Miyoshi
9,797,486 B2	10/2017	Zergiebel et al.	9,907,553 B2	3/2018	Cole et al.
9,801,626 B2	10/2017	Parihar et al.	9,907,620 B2	3/2018	Shelton, IV et al.
9,801,627 B2	10/2017	Harris et al.	9,913,642 B2	3/2018	Leimbach et al.
9,801,628 B2	10/2017	Harris et al.	9,913,644 B2	3/2018	McCuen
9,801,634 B2	10/2017	Shelton, IV et al.	9,913,646 B2	3/2018	Shelton, IV
9,802,033 B2	10/2017	Hibner et al.	9,913,647 B2	3/2018	Weisenburgh, II et al.
9,804,618 B2	10/2017	Leimbach et al.	9,913,648 B2	3/2018	Shelton, IV et al.
D803,850 S	11/2017	Chang et al.	9,913,694 B2	3/2018	Brisson
9,808,244 B2	11/2017	Leimbach et al.	9,918,704 B2	3/2018	Shelton, IV et al.
9,808,246 B2	11/2017	Shelton, IV et al.	9,918,715 B2	3/2018	Menn
9,808,247 B2	11/2017	Shelton, IV et al.	9,918,716 B2	3/2018	Baxter, III et al.
9,808,249 B2	11/2017	Shelton, IV	9,924,942 B2	3/2018	Swayze et al.
9,814,460 B2	11/2017	Kimsey et al.	9,924,944 B2	3/2018	Shelton, IV et al.
9,814,462 B2	11/2017	Woodard, Jr. et al.	9,924,945 B2	3/2018	Zheng et al.
9,820,738 B2	11/2017	Lytle, IV et al.	9,924,946 B2	3/2018	Vendely et al.
9,820,741 B2	11/2017	Kostrzewski	9,924,947 B2	3/2018	Shelton, IV et al.
9,820,768 B2	11/2017	Gee et al.	9,924,961 B2	3/2018	Shelton, IV et al.
9,825,455 B2	11/2017	Sandhu et al.	9,931,116 B2	4/2018	Racenet et al.
			9,931,118 B2	4/2018	Shelton, IV et al.
			9,936,949 B2	4/2018	Measamer et al.
			9,936,950 B2	4/2018	Shelton, IV et al.
			9,936,951 B2	4/2018	Hufnagel et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,936,954 B2	4/2018	Shelton, IV et al.	10,085,624 B2	10/2018	Isoda et al.
9,943,309 B2	4/2018	Shelton, IV et al.	10,085,748 B2	10/2018	Morgan et al.
9,943,310 B2	4/2018	Harris et al.	10,085,751 B2	10/2018	Overmyer et al.
9,943,312 B2	4/2018	Posada et al.	10,085,806 B2	10/2018	Hagn et al.
9,955,965 B2	5/2018	Chen et al.	10,092,292 B2	10/2018	Boudreaux et al.
9,955,966 B2	5/2018	Zergiebel	10,098,636 B2	10/2018	Shelton, IV et al.
9,962,158 B2	5/2018	Hall et al.	10,098,642 B2	10/2018	Baxter, III et al.
9,962,159 B2	5/2018	Heinrich et al.	10,099,303 B2	10/2018	Yoshida et al.
9,962,161 B2	5/2018	Scheib et al.	10,105,128 B2	10/2018	Cooper et al.
9,968,354 B2	5/2018	Shelton, IV et al.	10,105,136 B2	10/2018	Yates et al.
9,968,355 B2	5/2018	Shelton, IV et al.	10,105,139 B2	10/2018	Yates et al.
9,968,356 B2	5/2018	Shelton, IV et al.	10,105,140 B2	10/2018	Malinouskas et al.
9,968,397 B2	5/2018	Taylor et al.	10,111,679 B2	10/2018	Baber et al.
9,974,529 B2	5/2018	Shelton, IV et al.	10,111,702 B2*	10/2018	Kostrzewski .... A61B 17/07207
9,974,538 B2	5/2018	Baxter, III et al.	10,117,649 B2	11/2018	Baxter, III et al.
9,974,539 B2	5/2018	Yates et al.	10,117,652 B2	11/2018	Schmid et al.
9,980,713 B2	5/2018	Aronhalt et al.	10,117,653 B2	11/2018	Leimbach et al.
9,980,729 B2	5/2018	Moore et al.	10,117,654 B2	11/2018	Ingmanson et al.
9,987,000 B2	6/2018	Shelton, IV et al.	10,123,798 B2	11/2018	Baxter, III et al.
9,987,003 B2	6/2018	Timm et al.	10,130,352 B2	11/2018	Widenhouse et al.
9,987,006 B2	6/2018	Morgan et al.	10,130,359 B2	11/2018	Hess et al.
9,987,099 B2	6/2018	Chen et al.	10,130,361 B2	11/2018	Yates et al.
9,993,248 B2	6/2018	Shelton, IV et al.	10,130,363 B2	11/2018	Huitema et al.
9,993,258 B2	6/2018	Shelton, IV et al.	10,130,366 B2	11/2018	Shelton, IV et al.
9,999,408 B2	6/2018	Boudreaux et al.	10,133,248 B2	11/2018	Fitzsimmons et al.
9,999,426 B2	6/2018	Moore et al.	10,135,242 B2	11/2018	Baber et al.
9,999,431 B2	6/2018	Shelton, IV et al.	10,136,887 B2	11/2018	Shelton, IV et al.
10,004,497 B2	6/2018	Overmyer et al.	10,136,889 B2	11/2018	Shelton, IV et al.
10,004,498 B2	6/2018	Morgan et al.	10,136,890 B2	11/2018	Shelton, IV et al.
10,004,500 B2	6/2018	Shelton, IV et al.	10,149,679 B2	12/2018	Shelton, IV et al.
10,004,501 B2	6/2018	Shelton, IV et al.	10,149,680 B2	12/2018	Parihar et al.
10,004,505 B2	6/2018	Moore et al.	10,149,682 B2	12/2018	Shelton, IV et al.
10,004,506 B2	6/2018	Shelton, IV et al.	10,149,683 B2	12/2018	Smith et al.
10,010,322 B2	7/2018	Shelton, IV et al.	10,149,712 B2	12/2018	Manwaring et al.
10,010,324 B2	7/2018	Huitema et al.	10,154,841 B2	12/2018	Weaner et al.
10,013,049 B2	7/2018	Leimbach et al.	2001/0000531 A1	4/2001	Casscells et al.
10,016,199 B2	7/2018	Baber et al.	2001/0025183 A1	9/2001	Shahidi
10,022,125 B2	7/2018	(Prommersberger) Stopek et al.	2002/0014510 A1	2/2002	Richter et al.
10,024,407 B2	7/2018	Aranyi et al.	2002/0022810 A1	2/2002	Urich
10,028,742 B2	7/2018	Shelton, IV et al.	2002/0022836 A1	2/2002	Goble et al.
10,028,743 B2	7/2018	Shelton, IV et al.	2002/0022861 A1	2/2002	Jacobs et al.
10,028,744 B2	7/2018	Shelton, IV et al.	2002/0029032 A1	3/2002	Arkin
10,028,761 B2	7/2018	Leimbach et al.	2002/0029036 A1	3/2002	Goble et al.
10,029,125 B2	7/2018	Shapiro et al.	2002/0042620 A1	4/2002	Julian et al.
10,034,668 B2	7/2018	Ebner	2002/0091374 A1	7/2002	Cooper
10,039,440 B2	8/2018	Fenech et al.	2002/0095175 A1	7/2002	Brock et al.
10,039,529 B2	8/2018	Kerr et al.	2002/0103494 A1	8/2002	Pacey
10,039,545 B2	8/2018	Sadowski et al.	2002/0117534 A1	8/2002	Green et al.
10,041,822 B2	8/2018	Zemlok	2002/0127265 A1	9/2002	Bowman et al.
10,045,769 B2	8/2018	Aronhalt et al.	2002/0128633 A1	9/2002	Brock et al.
10,045,776 B2	8/2018	Shelton, IV et al.	2002/0134811 A1	9/2002	Napier et al.
10,045,778 B2	8/2018	Yates et al.	2002/0135474 A1	9/2002	Sylliassen
10,045,779 B2	8/2018	Savage et al.	2002/0143340 A1	10/2002	Kaneko
10,045,781 B2	8/2018	Cropper et al.	2002/0158593 A1	10/2002	Henderson et al.
10,052,044 B2	8/2018	Shelton, IV et al.	2002/0185514 A1	12/2002	Adams et al.
10,052,099 B2	8/2018	Morgan et al.	2002/0188170 A1	12/2002	Santamore et al.
10,052,100 B2	8/2018	Morgan et al.	2002/0188287 A1	12/2002	Zvuloni et al.
10,052,102 B2	8/2018	Baxter, III et al.	2003/0009193 A1	1/2003	Corsaro
10,052,104 B2	8/2018	Shelton, IV et al.	2003/0011245 A1	1/2003	Fiebig
10,052,164 B2	8/2018	Overmyer	2003/0066858 A1	4/2003	Holgersson
10,058,317 B2	8/2018	Fan et al.	2003/0078647 A1	4/2003	Vallana et al.
10,058,327 B2	8/2018	Weisenburgh, II et al.	2003/0083648 A1	5/2003	Wang et al.
10,058,963 B2	8/2018	Shelton, IV et al.	2003/0084983 A1	5/2003	Rangachari et al.
10,064,620 B2	9/2018	Gettinger et al.	2003/0093103 A1	5/2003	Malackowski et al.
10,064,621 B2	9/2018	Kerr et al.	2003/0094356 A1	5/2003	Waldron
10,064,624 B2	9/2018	Shelton, IV et al.	2003/0096158 A1	5/2003	Takano et al.
10,064,639 B2	9/2018	Ishida et al.	2003/0114851 A1	6/2003	Truckai et al.
10,064,649 B2	9/2018	Golebieski et al.	2003/0139741 A1	7/2003	Goble et al.
10,064,688 B2	9/2018	Shelton, IV et al.	2003/0153908 A1	8/2003	Goble et al.
10,070,861 B2	9/2018	Spivey et al.	2003/0153968 A1	8/2003	Geis et al.
10,070,863 B2	9/2018	Swayze et al.	2003/0163085 A1	8/2003	Tanner et al.
10,071,452 B2	9/2018	Shelton, IV et al.	2003/0181900 A1	9/2003	Long
10,076,325 B2	9/2018	Huang et al.	2003/0190584 A1	10/2003	Heasley
10,076,326 B2	9/2018	Yates et al.	2003/0195387 A1	10/2003	Kortenbach et al.
D831,209 S	10/2018	Huitema et al.	2003/0205029 A1	11/2003	Chapolini et al.
			2003/0212005 A1	11/2003	Petito et al.
			2003/0216732 A1	11/2003	Truckai et al.
			2003/0236505 A1	12/2003	Bonadio et al.
			2004/0006335 A1	1/2004	Garrison

(56)

## References Cited

## U.S. PATENT DOCUMENTS

- |              |    |         |                     |              |    |         |                     |
|--------------|----|---------|---------------------|--------------|----|---------|---------------------|
| 2004/0006340 | A1 | 1/2004  | Latterell et al.    | 2005/0131211 | A1 | 6/2005  | Bayley et al.       |
| 2004/0007608 | A1 | 1/2004  | Ehrenfels et al.    | 2005/0131390 | A1 | 6/2005  | Heinrich et al.     |
| 2004/0024457 | A1 | 2/2004  | Boyce et al.        | 2005/0131436 | A1 | 6/2005  | Johnston et al.     |
| 2004/0028502 | A1 | 2/2004  | Cummins             | 2005/0131457 | A1 | 6/2005  | Douglas et al.      |
| 2004/0030333 | A1 | 2/2004  | Goble               | 2005/0137454 | A1 | 6/2005  | Saadat et al.       |
| 2004/0034357 | A1 | 2/2004  | Beane et al.        | 2005/0137455 | A1 | 6/2005  | Ewers et al.        |
| 2004/0044364 | A1 | 3/2004  | DeVries et al.      | 2005/0139636 | A1 | 6/2005  | Schwemberger et al. |
| 2004/0049121 | A1 | 3/2004  | Yaron               | 2005/0143759 | A1 | 6/2005  | Kelly               |
| 2004/0049172 | A1 | 3/2004  | Root et al.         | 2005/0143769 | A1 | 6/2005  | White et al.        |
| 2004/0059362 | A1 | 3/2004  | Knodel et al.       | 2005/0145671 | A1 | 7/2005  | Viola               |
| 2004/0068161 | A1 | 4/2004  | Couvillon           | 2005/0150928 | A1 | 7/2005  | Kameyama et al.     |
| 2004/0068224 | A1 | 4/2004  | Couvillon et al.    | 2005/0154258 | A1 | 7/2005  | Tartaglia et al.    |
| 2004/0068307 | A1 | 4/2004  | Goble               | 2005/0154406 | A1 | 7/2005  | Bombard et al.      |
| 2004/0070369 | A1 | 4/2004  | Sakakibara          | 2005/0159778 | A1 | 7/2005  | Heinrich et al.     |
| 2004/0073222 | A1 | 4/2004  | Koseki              | 2005/0165419 | A1 | 7/2005  | Sauer et al.        |
| 2004/0078037 | A1 | 4/2004  | Batchelor et al.    | 2005/0169974 | A1 | 8/2005  | Tenerz et al.       |
| 2004/0085180 | A1 | 5/2004  | Juang               | 2005/0171522 | A1 | 8/2005  | Christopherson      |
| 2004/0093024 | A1 | 5/2004  | Lousararian et al.  | 2005/0177181 | A1 | 8/2005  | Kagan et al.        |
| 2004/0098040 | A1 | 5/2004  | Taniguchi et al.    | 2005/0177249 | A1 | 8/2005  | Kladakis et al.     |
| 2004/0101822 | A1 | 5/2004  | Wiesner et al.      | 2005/0182298 | A1 | 8/2005  | Ikeda et al.        |
| 2004/0102783 | A1 | 5/2004  | Sutterlin et al.    | 2005/0184121 | A1 | 8/2005  | Heinrich            |
| 2004/0108357 | A1 | 6/2004  | Milliman et al.     | 2005/0186240 | A1 | 8/2005  | Ringeisen et al.    |
| 2004/0110439 | A1 | 6/2004  | Chaikof et al.      | 2005/0187545 | A1 | 8/2005  | Hooven et al.       |
| 2004/0115022 | A1 | 6/2004  | Albertson et al.    | 2005/0203550 | A1 | 9/2005  | Laufer et al.       |
| 2004/0116952 | A1 | 6/2004  | Sakurai et al.      | 2005/0209614 | A1 | 9/2005  | Fenter et al.       |
| 2004/0119185 | A1 | 6/2004  | Chen                | 2005/0216055 | A1 | 9/2005  | Scirica et al.      |
| 2004/0122423 | A1 | 6/2004  | Dycus et al.        | 2005/0222587 | A1 | 10/2005 | Jinno et al.        |
| 2004/0133095 | A1 | 7/2004  | Dunki-Jacobs et al. | 2005/0222611 | A1 | 10/2005 | Weitkamp            |
| 2004/0143297 | A1 | 7/2004  | Ramsey              | 2005/0222616 | A1 | 10/2005 | Rethy et al.        |
| 2004/0147909 | A1 | 7/2004  | Johnston et al.     | 2005/0222665 | A1 | 10/2005 | Aranyi              |
| 2004/0153100 | A1 | 8/2004  | Ahlberg et al.      | 2005/0228224 | A1 | 10/2005 | Okada et al.        |
| 2004/0158261 | A1 | 8/2004  | Vu                  | 2005/0228446 | A1 | 10/2005 | Mooradian et al.    |
| 2004/0164123 | A1 | 8/2004  | Racenet et al.      | 2005/0230453 | A1 | 10/2005 | Viola               |
| 2004/0166169 | A1 | 8/2004  | Malaviya et al.     | 2005/0240178 | A1 | 10/2005 | Morley et al.       |
| 2004/0167572 | A1 | 8/2004  | Roth et al.         | 2005/0245965 | A1 | 11/2005 | Orban, III et al.   |
| 2004/0181219 | A1 | 9/2004  | Goble et al.        | 2005/0246881 | A1 | 11/2005 | Kelly et al.        |
| 2004/0193189 | A1 | 9/2004  | Kortenbach et al.   | 2005/0251063 | A1 | 11/2005 | Basude              |
| 2004/0197367 | A1 | 10/2004 | Rezania et al.      | 2005/0256452 | A1 | 11/2005 | DeMarchi et al.     |
| 2004/0199181 | A1 | 10/2004 | Knodel et al.       | 2005/0261676 | A1 | 11/2005 | Hall et al.         |
| 2004/0204735 | A1 | 10/2004 | Shiroff et al.      | 2005/0263563 | A1 | 12/2005 | Racenet et al.      |
| 2004/0222268 | A1 | 11/2004 | Bilotti et al.      | 2005/0267455 | A1 | 12/2005 | Eggers et al.       |
| 2004/0225186 | A1 | 11/2004 | Horne et al.        | 2005/0274034 | A1 | 12/2005 | Hayashida et al.    |
| 2004/0232201 | A1 | 11/2004 | Wenchell et al.     | 2005/0283188 | A1 | 12/2005 | Loshakove et al.    |
| 2004/0236352 | A1 | 11/2004 | Wang et al.         | 2006/0008787 | A1 | 1/2006  | Hayman et al.       |
| 2004/0243147 | A1 | 12/2004 | Lipow               | 2006/0015009 | A1 | 1/2006  | Jaffe et al.        |
| 2004/0243151 | A1 | 12/2004 | Demmy et al.        | 2006/0020258 | A1 | 1/2006  | Strauss et al.      |
| 2004/0243163 | A1 | 12/2004 | Casiano et al.      | 2006/0020336 | A1 | 1/2006  | Liddicoat           |
| 2004/0247415 | A1 | 12/2004 | Mangone             | 2006/0025812 | A1 | 2/2006  | Shelton             |
| 2004/0249366 | A1 | 12/2004 | Kunz                | 2006/0041188 | A1 | 2/2006  | Dirusso et al.      |
| 2004/0254455 | A1 | 12/2004 | Iddan               | 2006/0047275 | A1 | 3/2006  | Goble               |
| 2004/0254566 | A1 | 12/2004 | Plicchi et al.      | 2006/0049229 | A1 | 3/2006  | Milliman et al.     |
| 2004/0254590 | A1 | 12/2004 | Hoffman et al.      | 2006/0052824 | A1 | 3/2006  | Ransick et al.      |
| 2004/0260315 | A1 | 12/2004 | Dell et al.         | 2006/0052825 | A1 | 3/2006  | Ransick et al.      |
| 2004/0267310 | A1 | 12/2004 | Racenet et al.      | 2006/0064086 | A1 | 3/2006  | Odom                |
| 2005/0010158 | A1 | 1/2005  | Brugger et al.      | 2006/0079735 | A1 | 4/2006  | Martone et al.      |
| 2005/0010213 | A1 | 1/2005  | Stad et al.         | 2006/0079879 | A1 | 4/2006  | Faller et al.       |
| 2005/0021078 | A1 | 1/2005  | Vleugels et al.     | 2006/0086032 | A1 | 4/2006  | Valencic et al.     |
| 2005/0032511 | A1 | 2/2005  | Malone et al.       | 2006/0087746 | A1 | 4/2006  | Lipow               |
| 2005/0033352 | A1 | 2/2005  | Zepf et al.         | 2006/0089535 | A1 | 4/2006  | Raz et al.          |
| 2005/0051163 | A1 | 3/2005  | Deem et al.         | 2006/0100643 | A1 | 5/2006  | Laufer et al.       |
| 2005/0054946 | A1 | 3/2005  | Krzyzanowski        | 2006/0100649 | A1 | 5/2006  | Hart                |
| 2005/0057225 | A1 | 3/2005  | Marquet             | 2006/0111210 | A1 | 5/2006  | Hinman              |
| 2005/0058890 | A1 | 3/2005  | Brazell et al.      | 2006/0111711 | A1 | 5/2006  | Goble               |
| 2005/0059997 | A1 | 3/2005  | Bauman et al.       | 2006/0111723 | A1 | 5/2006  | Chapolini et al.    |
| 2005/0070929 | A1 | 3/2005  | Dalessandro et al.  | 2006/0116634 | A1 | 6/2006  | Shachar             |
| 2005/0075561 | A1 | 4/2005  | Golden              | 2006/0142772 | A1 | 6/2006  | Ralph et al.        |
| 2005/0080342 | A1 | 4/2005  | Gilreath et al.     | 2006/0161050 | A1 | 7/2006  | Butler et al.       |
| 2005/0085693 | A1 | 4/2005  | Belson et al.       | 2006/0161185 | A1 | 7/2006  | Saadat et al.       |
| 2005/0090817 | A1 | 4/2005  | Phan                | 2006/0167471 | A1 | 7/2006  | Phillips            |
| 2005/0096683 | A1 | 5/2005  | Ellins et al.       | 2006/0173470 | A1 | 8/2006  | Oray et al.         |
| 2005/0116673 | A1 | 6/2005  | Carl et al.         | 2006/0176031 | A1 | 8/2006  | Forman et al.       |
| 2005/0124855 | A1 | 6/2005  | Jaffe et al.        | 2006/0178556 | A1 | 8/2006  | Hasser et al.       |
| 2005/0125897 | A1 | 6/2005  | Wyslucha et al.     | 2006/0180633 | A1 | 8/2006  | Emmons              |
| 2005/0130682 | A1 | 6/2005  | Takara et al.       | 2006/0180634 | A1 | 8/2006  | Shelton et al.      |
| 2005/0131173 | A1 | 6/2005  | McDaniel et al.     | 2006/0185682 | A1 | 8/2006  | Marczyk             |
|              |    |         |                     | 2006/0199999 | A1 | 9/2006  | Ikeda et al.        |
|              |    |         |                     | 2006/0201989 | A1 | 9/2006  | Ojeda               |
|              |    |         |                     | 2006/0206100 | A1 | 9/2006  | Eskridge et al.     |
|              |    |         |                     | 2006/0217729 | A1 | 9/2006  | Eskridge et al.     |

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2006/0235368	A1	10/2006	Oz	2008/0029570	A1	2/2008	Shelton et al.
2006/0244460	A1	11/2006	Weaver	2008/0029573	A1	2/2008	Shelton et al.
2006/0252990	A1	11/2006	Kubach	2008/0029574	A1	2/2008	Shelton et al.
2006/0252993	A1	11/2006	Freed et al.	2008/0029575	A1	2/2008	Shelton et al.
2006/0258904	A1	11/2006	Stefanchik et al.	2008/0030170	A1	2/2008	Dacquay et al.
2006/0259073	A1	11/2006	Miyamoto et al.	2008/0042861	A1	2/2008	Dacquay et al.
2006/0261763	A1	11/2006	Iott et al.	2008/0051833	A1	2/2008	Gramuglia et al.
2006/0264831	A1	11/2006	Skwarek et al.	2008/0064921	A1	3/2008	Larkin et al.
2006/0264929	A1	11/2006	Goble et al.	2008/0065153	A1	3/2008	Allard et al.
2006/0271042	A1	11/2006	Latterell et al.	2008/0071328	A1	3/2008	Haubrich et al.
2006/0271102	A1	11/2006	Bosshard et al.	2008/0078802	A1	4/2008	Hess et al.
2006/0282064	A1	12/2006	Shimizu et al.	2008/0082114	A1	4/2008	McKenna et al.
2006/0284730	A1	12/2006	Schmid et al.	2008/0082125	A1	4/2008	Murray et al.
2006/0287576	A1	12/2006	Tsuji et al.	2008/0082126	A1	4/2008	Murray et al.
2006/0289602	A1	12/2006	Wales et al.	2008/0083807	A1	4/2008	Beardsley et al.
2006/0291981	A1	12/2006	Viola et al.	2008/0085296	A1	4/2008	Powell et al.
2007/0010702	A1	1/2007	Wang et al.	2008/0086078	A1	4/2008	Powell et al.
2007/0010838	A1	1/2007	Shelton et al.	2008/0091072	A1	4/2008	Omori et al.
2007/0016235	A1	1/2007	Tanaka et al.	2008/0108443	A1	5/2008	Jinno et al.
2007/0026039	A1	2/2007	Drumheller et al.	2008/0114250	A1	5/2008	Urbano et al.
2007/0026040	A1	2/2007	Crawley et al.	2008/0125634	A1	5/2008	Ryan et al.
2007/0027468	A1	2/2007	Wales et al.	2008/0125749	A1	5/2008	Olson
2007/0027551	A1	2/2007	Farnsworth et al.	2008/0128469	A1	6/2008	Dalessandro et al.
2007/0043387	A1	2/2007	Vargas et al.	2008/0129253	A1	6/2008	Shiue et al.
2007/0049951	A1	3/2007	Menn	2008/0135600	A1	6/2008	Hiranuma et al.
2007/0049966	A1	3/2007	Bonadio et al.	2008/0140115	A1	6/2008	Stopek
2007/0051375	A1	3/2007	Milliman	2008/0140159	A1	6/2008	Bornhoft et al.
2007/0055228	A1	3/2007	Berg et al.	2008/0154299	A1	6/2008	Livneh
2007/0073341	A1	3/2007	Smith et al.	2008/0154335	A1	6/2008	Thrope et al.
2007/0073389	A1	3/2007	Bolduc et al.	2008/0169328	A1	7/2008	Shelton
2007/0078328	A1	4/2007	Ozaki et al.	2008/0169332	A1	7/2008	Shelton et al.
2007/0078484	A1	4/2007	Talarico et al.	2008/0169333	A1	7/2008	Shelton et al.
2007/0084897	A1	4/2007	Shelton et al.	2008/0172087	A1	7/2008	Fuchs et al.
2007/0090788	A1	4/2007	Hansford et al.	2008/0183193	A1	7/2008	Omori et al.
2007/0093869	A1	4/2007	Bloom et al.	2008/0190989	A1	8/2008	Crews et al.
2007/0102472	A1	5/2007	Shelton	2008/0196419	A1	8/2008	Dube
2007/0106113	A1	5/2007	Ravo	2008/0197167	A1	8/2008	Viola et al.
2007/0106317	A1	5/2007	Shelton et al.	2008/0200755	A1	8/2008	Bakos
2007/0134251	A1	6/2007	Ashkenazi et al.	2008/0200762	A1	8/2008	Stokes et al.
2007/0135686	A1	6/2007	Pruitt et al.	2008/0200835	A1	8/2008	Monson et al.
2007/0135803	A1	6/2007	Belson	2008/0200911	A1	8/2008	Long
2007/0155010	A1	7/2007	Farnsworth et al.	2008/0200933	A1	8/2008	Bakos et al.
2007/0170225	A1	7/2007	Shelton et al.	2008/0200934	A1	8/2008	Fox
2007/0173687	A1	7/2007	Shima et al.	2008/0234709	A1	9/2008	Houser
2007/0173813	A1	7/2007	Odom	2008/0242939	A1	10/2008	Johnston
2007/0175950	A1	8/2007	Shelton et al.	2008/0249536	A1	10/2008	Stahler et al.
2007/0175951	A1	8/2007	Shelton et al.	2008/0249608	A1	10/2008	Dave
2007/0175955	A1	8/2007	Shelton et al.	2008/0255413	A1	10/2008	Zemlok et al.
2007/0179477	A1	8/2007	Danger	2008/0262654	A1	10/2008	Omori et al.
2007/0185545	A1	8/2007	Duke	2008/0269596	A1	10/2008	Revie et al.
2007/0190110	A1	8/2007	Pameijer et al.	2008/0281171	A1	11/2008	Fennell et al.
2007/0191868	A1	8/2007	Theroux et al.	2008/0287944	A1	11/2008	Pearson et al.
2007/0194079	A1	8/2007	Hueil et al.	2008/0293910	A1	11/2008	Kapiamba et al.
2007/0194082	A1	8/2007	Morgan et al.	2008/0294179	A1	11/2008	Balbierz et al.
2007/0197954	A1	8/2007	Keenan	2008/0296346	A1	12/2008	Shelton, IV et al.
2007/0198039	A1	8/2007	Jones et al.	2008/0297287	A1	12/2008	Shachar et al.
2007/0203510	A1	8/2007	Bettuchi	2008/0308602	A1	12/2008	Timm et al.
2007/0207010	A1	9/2007	Caspi	2008/0308603	A1	12/2008	Shelton et al.
2007/0208359	A1	9/2007	Hoffman	2008/0312687	A1	12/2008	Blier
2007/0208375	A1	9/2007	Nishizawa et al.	2008/0315829	A1	12/2008	Jones et al.
2007/0213750	A1	9/2007	Weadock	2009/0001121	A1	1/2009	Hess et al.
2007/0225562	A1	9/2007	Spivey et al.	2009/0001130	A1	1/2009	Hess et al.
2007/0233163	A1	10/2007	Bombard et al.	2009/0004455	A1	1/2009	Gravagna et al.
2007/0243227	A1	10/2007	Gertner	2009/0005809	A1	1/2009	Hess et al.
2007/0244471	A1	10/2007	Malackowski	2009/0012534	A1	1/2009	Madhani et al.
2007/0246505	A1	10/2007	Pace-Florida et al.	2009/0015195	A1	1/2009	Loth-Krausser
2007/0262592	A1	11/2007	Hwang et al.	2009/0020958	A1	1/2009	Soul
2007/0275035	A1	11/2007	Herman et al.	2009/0048583	A1	2/2009	Williams et al.
2007/0276409	A1	11/2007	Ortiz et al.	2009/0048589	A1	2/2009	Takashino et al.
2007/0279011	A1	12/2007	Jones et al.	2009/0076506	A1	3/2009	Baker
2007/0286892	A1	12/2007	Herzberg et al.	2009/0078736	A1	3/2009	Van Lue
2007/0296286	A1	12/2007	Avenell	2009/0081313	A1	3/2009	Aghion et al.
2008/0003196	A1	1/2008	Jonn et al.	2009/0088659	A1	4/2009	Graham et al.
2008/0015598	A1	1/2008	Prommersberger	2009/0090763	A1	4/2009	Zemlok et al.
2008/0021486	A1	1/2008	Oyola et al.	2009/0092651	A1	4/2009	Shah et al.
				2009/0099579	A1	4/2009	Nentwick et al.
				2009/0099876	A1	4/2009	Whitman
				2009/0119011	A1	5/2009	Kondo et al.
				2009/0143855	A1	6/2009	Weber et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2009/0149871	A9	6/2009	Kagan et al.	2011/0036891	A1	2/2011	Zemlok et al.
2009/0171147	A1	7/2009	Lee et al.	2011/0046667	A1	2/2011	Culligan et al.
2009/0177226	A1	7/2009	Reinprecht et al.	2011/0060363	A1	3/2011	Hess et al.
2009/0181290	A1	7/2009	Baldwin et al.	2011/0066156	A1	3/2011	McGahan et al.
2009/0188964	A1	7/2009	Orlov	2011/0082538	A1	4/2011	Dahlgren et al.
2009/0198272	A1	8/2009	Kerver et al.	2011/0087276	A1	4/2011	Bedi et al.
2009/0204108	A1	8/2009	Steffen	2011/0087278	A1	4/2011	Viola et al.
2009/0204109	A1	8/2009	Grove et al.	2011/0088921	A1	4/2011	Forgues et al.
2009/0206125	A1	8/2009	Huitema et al.	2011/0095064	A1	4/2011	Taylor et al.
2009/0206126	A1	8/2009	Huitema et al.	2011/0101069	A1	5/2011	Bombard et al.
2009/0206131	A1	8/2009	Weisenburgh, II et al.	2011/0101794	A1	5/2011	Schroeder et al.
2009/0206133	A1	8/2009	Morgan et al.	2011/0112517	A1	5/2011	Peine et al.
2009/0206137	A1	8/2009	Hall et al.	2011/0112530	A1	5/2011	Keller
2009/0206139	A1	8/2009	Hall et al.	2011/0114697	A1	5/2011	Baxter, III et al.
2009/0206141	A1	8/2009	Huitema et al.	2011/0121049	A1	5/2011	Malinouskas et al.
2009/0206142	A1	8/2009	Huitema et al.	2011/0125176	A1	5/2011	Yates et al.
2009/0221993	A1	9/2009	Sohi et al.	2011/0127945	A1	6/2011	Yoneda
2009/0234273	A1	9/2009	Intoccia et al.	2011/0129706	A1	6/2011	Takahashi et al.
2009/0242610	A1	10/2009	Shelton, IV et al.	2011/0144764	A1	6/2011	Bagga et al.
2009/0247368	A1	10/2009	Chiang	2011/0147433	A1	6/2011	Shelton, IV et al.
2009/0247901	A1	10/2009	Zimmer	2011/0163146	A1	7/2011	Ortiz et al.
2009/0248041	A1	10/2009	Williams et al.	2011/0172495	A1	7/2011	Armstrong
2009/0253959	A1	10/2009	Yoshie et al.	2011/0174861	A1	7/2011	Shelton, IV et al.
2009/0255974	A1	10/2009	Viola	2011/0192882	A1	8/2011	Hess et al.
2009/0262078	A1	10/2009	Pizzi	2011/0199225	A1	8/2011	Touchberry et al.
2009/0270895	A1	10/2009	Churchill et al.	2011/0218400	A1	9/2011	Ma et al.
2009/0290016	A1	11/2009	Suda	2011/0218550	A1	9/2011	Ma
2009/0292283	A1	11/2009	Odom	2011/0230713	A1	9/2011	Kleemann et al.
2009/0306639	A1	12/2009	Nevo et al.	2011/0238044	A1	9/2011	Main et al.
2009/0308907	A1	12/2009	Nalagatla et al.	2011/0241597	A1	10/2011	Zhu et al.
2010/0012703	A1	1/2010	Calabrese et al.	2011/0275901	A1	11/2011	Shelton, IV
2010/0016888	A1	1/2010	Calabrese et al.	2011/0276083	A1	11/2011	Shelton, IV et al.
2010/0023024	A1	1/2010	Zeiner et al.	2011/0278343	A1	11/2011	Knodel et al.
2010/0030233	A1	2/2010	Whitman et al.	2011/0279268	A1	11/2011	Konishi et al.
2010/0036370	A1	2/2010	Mirel et al.	2011/0290856	A1	12/2011	Shelton, IV et al.
2010/0065604	A1	3/2010	Weng	2011/0293690	A1	12/2011	Griffin et al.
2010/0069942	A1	3/2010	Shelton, IV	2011/0295295	A1	12/2011	Shelton, IV et al.
2010/0076483	A1	3/2010	Imuta	2011/0313894	A1	12/2011	Dye et al.
2010/0076489	A1	3/2010	Stopek et al.	2011/0315413	A1	12/2011	Fisher et al.
2010/0081883	A1	4/2010	Murray et al.	2012/0004636	A1	1/2012	Lo
2010/0094340	A1	4/2010	Stopek et al.	2012/0016239	A1	1/2012	Barthe et al.
2010/0100124	A1	4/2010	Calabrese et al.	2012/0016413	A1	1/2012	Timm et al.
2010/0116519	A1	5/2010	Gareis	2012/0016467	A1	1/2012	Chen et al.
2010/0122339	A1	5/2010	Boccacci	2012/0029272	A1	2/2012	Shelton, IV et al.
2010/0133317	A1	6/2010	Shelton, IV et al.	2012/0033360	A1	2/2012	Hsu
2010/0145146	A1	6/2010	Melder	2012/0059286	A1	3/2012	Hastings et al.
2010/0147921	A1	6/2010	Olson	2012/0064483	A1	3/2012	Lint et al.
2010/0147922	A1	6/2010	Olson	2012/0074200	A1	3/2012	Schmid et al.
2010/0179022	A1	7/2010	Shirokoshi	2012/0078071	A1	3/2012	Bohm et al.
2010/0180711	A1	7/2010	Kilibarda et al.	2012/0078139	A1	3/2012	Aldridge et al.
2010/0191262	A1	7/2010	Harris et al.	2012/0078244	A1	3/2012	Worrell et al.
2010/0191292	A1	7/2010	DeMeo et al.	2012/0080336	A1	4/2012	Shelton, IV et al.
2010/0193566	A1	8/2010	Scheib et al.	2012/0080344	A1	4/2012	Shelton, IV
2010/0204717	A1	8/2010	Knodel	2012/0080478	A1	4/2012	Morgan et al.
2010/0222901	A1	9/2010	Swayze et al.	2012/0080498	A1	4/2012	Shelton, IV et al.
2010/0241137	A1	9/2010	Doyle et al.	2012/0086276	A1	4/2012	Sawyers
2010/0249497	A1	9/2010	Peine et al.	2012/0095458	A1	4/2012	Cybulski et al.
2010/0256675	A1	10/2010	Romans	2012/0109186	A1	5/2012	Parrott et al.
2010/0258327	A1	10/2010	Esenwein et al.	2012/0116261	A1	5/2012	Mumaw et al.
2010/0267662	A1	10/2010	Fielder et al.	2012/0116262	A1	5/2012	Houser et al.
2010/0274160	A1	10/2010	Yachi et al.	2012/0116265	A1	5/2012	Houser et al.
2010/0292540	A1	11/2010	Hess et al.	2012/0116266	A1	5/2012	Houser et al.
2010/0298636	A1	11/2010	Castro et al.	2012/0118595	A1	5/2012	Pellenc
2010/0312261	A1	12/2010	Suzuki et al.	2012/0123203	A1	5/2012	Riva
2010/0318085	A1	12/2010	Austin et al.	2012/0125792	A1	5/2012	Cassivi
2010/0331856	A1	12/2010	Carlson et al.	2012/0132286	A1	5/2012	Lim et al.
2011/0006101	A1	1/2011	Hall et al.	2012/0171539	A1	7/2012	Rejman et al.
2011/0011916	A1	1/2011	Levine	2012/0175398	A1	7/2012	Sandborn et al.
2011/0016960	A1	1/2011	Debrailly	2012/0197272	A1	8/2012	Oray et al.
2011/0021871	A1	1/2011	Berkelaar	2012/0211542	A1	8/2012	Racenet
2011/0022032	A1	1/2011	Zemlok et al.	2012/0223121	A1	9/2012	Viola et al.
2011/0024477	A1	2/2011	Hall	2012/0234895	A1	9/2012	O'Connor et al.
2011/0024478	A1	2/2011	Shelton, IV	2012/0234897	A1	9/2012	Shelton, IV et al.
2011/0025311	A1	2/2011	Chauvin et al.	2012/0239068	A1	9/2012	Morris et al.
2011/0034910	A1	2/2011	Ross et al.	2012/0248169	A1	10/2012	Widenhouse et al.
				2012/0251861	A1	10/2012	Liang et al.
				2012/0253328	A1	10/2012	Cunningham et al.
				2012/0283707	A1	11/2012	Giordano et al.
				2012/0289979	A1	11/2012	Eskaros et al.



(56)

References Cited

U.S. PATENT DOCUMENTS

2012/0292367	A1	11/2012	Morgan et al.	2014/0151433	A1	6/2014	Shelton, IV et al.
2012/0298722	A1	11/2012	Hess et al.	2014/0158747	A1	6/2014	Measamer et al.
2012/0303002	A1	11/2012	Chowaniec et al.	2014/0166724	A1	6/2014	Schellin et al.
2013/0006227	A1	1/2013	Takashino	2014/0166725	A1	6/2014	Schellin et al.
2013/0012983	A1	1/2013	Kleyman	2014/0166726	A1	6/2014	Schellin et al.
2013/0018400	A1	1/2013	Milton et al.	2014/0171966	A1	6/2014	Giordano et al.
2013/0020375	A1	1/2013	Shelton, IV et al.	2014/0175147	A1	6/2014	Manoux et al.
2013/0020376	A1	1/2013	Shelton, IV et al.	2014/0175150	A1	6/2014	Shelton, IV et al.
2013/0023861	A1	1/2013	Shelton, IV et al.	2014/0175152	A1	6/2014	Hess et al.
2013/0023910	A1	1/2013	Solomon et al.	2014/0188159	A1	7/2014	Steege
2013/0026208	A1	1/2013	Shelton, IV et al.	2014/0200561	A1	7/2014	Ingmanson et al.
2013/0026210	A1	1/2013	Shelton, IV et al.	2014/0207124	A1	7/2014	Aldridge et al.
2013/0030462	A1	1/2013	Keating et al.	2014/0207125	A1	7/2014	Applegate et al.
2013/0057162	A1	3/2013	Pollischansky	2014/0224857	A1	8/2014	Schmid
2013/0068816	A1	3/2013	Mandakolathur Vasudevan et al.	2014/0228867	A1	8/2014	Thomas et al.
2013/0087597	A1	4/2013	Shelton, IV et al.	2014/0230595	A1	8/2014	Butt et al.
2013/0090534	A1	4/2013	Burns et al.	2014/0243865	A1	8/2014	Swayze et al.
2013/0096568	A1	4/2013	Justis	2014/0246475	A1	9/2014	Hall et al.
2013/0098970	A1	4/2013	Racenet et al.	2014/0248167	A1	9/2014	Sugimoto et al.
2013/0105550	A1	5/2013	Zemlok et al.	2014/0249557	A1	9/2014	Koch, Jr. et al.
2013/0105552	A1	5/2013	Weir et al.	2014/0249573	A1	9/2014	Arav
2013/0116669	A1	5/2013	Shelton, IV et al.	2014/0263541	A1	9/2014	Leimbach et al.
2013/0123816	A1	5/2013	Hodgkinson et al.	2014/0263552	A1	9/2014	Hall et al.
2013/0126202	A1	5/2013	Oomori et al.	2014/0263554	A1	9/2014	Leimbach et al.
2013/0131476	A1	5/2013	Siu et al.	2014/0263558	A1	9/2014	Hausen et al.
2013/0131651	A1	5/2013	Strobl et al.	2014/0276730	A1	9/2014	Boudreaux et al.
2013/0136969	A1	5/2013	Yasui et al.	2014/0284371	A1	9/2014	Morgan et al.
2013/0153636	A1	6/2013	Shelton, IV et al.	2014/0288460	A1	9/2014	Ouyang et al.
2013/0153641	A1	6/2013	Shelton, IV et al.	2014/0291378	A1	10/2014	Shelton, IV et al.
2013/0158390	A1	6/2013	Tan et al.	2014/0291379	A1	10/2014	Schellin et al.
2013/0162198	A1	6/2013	Yokota et al.	2014/0291383	A1	10/2014	Spivey et al.
2013/0172878	A1	7/2013	Smith	2014/0299648	A1	10/2014	Shelton, IV et al.
2013/0175317	A1	7/2013	Yates et al.	2014/0303645	A1	10/2014	Morgan et al.
2013/0181033	A1	7/2013	Shelton, IV et al.	2014/0303660	A1	10/2014	Boyden et al.
2013/0181034	A1	7/2013	Shelton, IV et al.	2014/0309666	A1	10/2014	Shelton, IV et al.
2013/0214025	A1	8/2013	Zemlok et al.	2014/0330161	A1	11/2014	Swayze et al.
2013/0214030	A1	8/2013	Aronhalt et al.	2014/0367445	A1	12/2014	Ingmanson et al.
2013/0233906	A1	9/2013	Hess et al.	2014/0367448	A1*	12/2014	Cappola ..... A61B 17/29 227/177.1
2013/0238021	A1	9/2013	Gross et al.	2014/0374130	A1	12/2014	Nakamura et al.
2013/0248578	A1	9/2013	Arteaga Gonzalez	2014/0378950	A1	12/2014	Chiu
2013/0253480	A1	9/2013	Kimball et al.	2015/0002089	A1	1/2015	Rejman et al.
2013/0256373	A1	10/2013	Schmid et al.	2015/0008248	A1	1/2015	Giordano et al.
2013/0256379	A1	10/2013	Schmid et al.	2015/0053737	A1	2/2015	Leimbach et al.
2013/0256380	A1	10/2013	Schmid et al.	2015/0053742	A1	2/2015	Shelton, IV et al.
2013/0270322	A1	10/2013	Scheib et al.	2015/0053743	A1	2/2015	Yates et al.
2013/0277410	A1	10/2013	Fernandez et al.	2015/0053746	A1	2/2015	Shelton, IV et al.
2013/0317753	A1	11/2013	Kamen et al.	2015/0053748	A1	2/2015	Yates et al.
2013/0324981	A1	12/2013	Smith et al.	2015/0060518	A1	3/2015	Shelton, IV et al.
2013/0324982	A1	12/2013	Smith et al.	2015/0060519	A1	3/2015	Shelton, IV et al.
2013/0327552	A1	12/2013	Lovelass et al.	2015/0060520	A1	3/2015	Shelton, IV et al.
2013/0333910	A1	12/2013	Tanimoto et al.	2015/0060521	A1	3/2015	Weisenburgh, II et al.
2013/0334280	A1	12/2013	Krehel et al.	2015/0066000	A1	3/2015	An et al.
2013/0334283	A1	12/2013	Swayze et al.	2015/0073357	A1	3/2015	Bagwell et al.
2013/0334284	A1	12/2013	Swayze et al.	2015/0076207	A1	3/2015	Boudreaux et al.
2013/0334285	A1	12/2013	Swayze et al.	2015/0076208	A1	3/2015	Shelton, IV
2013/0341374	A1	12/2013	Shelton, IV et al.	2015/0076209	A1	3/2015	Shelton, IV et al.
2014/0001231	A1	1/2014	Shelton, IV et al.	2015/0076210	A1	3/2015	Shelton, IV et al.
2014/0001234	A1	1/2014	Shelton, IV et al.	2015/0076212	A1	3/2015	Shelton, IV
2014/0005640	A1	1/2014	Shelton, IV et al.	2015/0080868	A1	3/2015	Kerr
2014/0005678	A1	1/2014	Shelton, IV et al.	2015/0083781	A1	3/2015	Giordano et al.
2014/0005702	A1	1/2014	Timm et al.	2015/0083782	A1	3/2015	Scheib et al.
2014/0005718	A1	1/2014	Shelton, IV et al.	2015/0090760	A1	4/2015	Giordano et al.
2014/0012289	A1	1/2014	Snow et al.	2015/0090761	A1	4/2015	Giordano et al.
2014/0012299	A1	1/2014	Stoddard et al.	2015/0090762	A1	4/2015	Giordano et al.
2014/0014705	A1	1/2014	Baxter, III	2015/0090763	A1	4/2015	Murray et al.
2014/0018832	A1	1/2014	Shelton, IV	2015/0108199	A1	4/2015	Shelton, IV et al.
2014/0039549	A1	2/2014	Belsky et al.	2015/0122870	A1	5/2015	Zemlok et al.
2014/0048580	A1	2/2014	Merchant et al.	2015/0134077	A1	5/2015	Shelton, IV et al.
2014/0081176	A1	3/2014	Hassan	2015/0148830	A1	5/2015	Stulen et al.
2014/0100558	A1	4/2014	Schmitz et al.	2015/0150554	A1	6/2015	Soltz
2014/0107640	A1	4/2014	Yates et al.	2015/0150620	A1	6/2015	Miyamoto et al.
2014/0110456	A1	4/2014	Taylor	2015/0173744	A1	6/2015	Shelton, IV et al.
2014/0114327	A1	4/2014	Boudreaux et al.	2015/0173749	A1	6/2015	Shelton, IV et al.
2014/0115229	A1	4/2014	Kothamasu et al.	2015/0173756	A1	6/2015	Baxter, III et al.
2014/0131418	A1	5/2014	Kostrzewski	2015/0173789	A1	6/2015	Baxter, III et al.
				2015/0182220	A1	7/2015	Yates et al.
				2015/0196295	A1	7/2015	Shelton, IV et al.
				2015/0196296	A1	7/2015	Swayze et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2015/0196299	A1	7/2015	Swayze et al.	2016/0030042	A1	2/2016	Heinrich et al.
2015/0196347	A1	7/2015	Yates et al.	2016/0051257	A1	2/2016	Shelton, IV et al.
2015/0196348	A1	7/2015	Yates et al.	2016/0058443	A1	3/2016	Yates et al.
2015/0201932	A1	7/2015	Swayze et al.	2016/0066913	A1	3/2016	Swayze et al.
2015/0201936	A1	7/2015	Swayze et al.	2016/0069449	A1	3/2016	Kanai et al.
2015/0201937	A1	7/2015	Swayze et al.	2016/0073909	A1	3/2016	Zand et al.
2015/0201938	A1	7/2015	Swayze et al.	2016/0074040	A1	3/2016	Widenhouse et al.
2015/0201939	A1	7/2015	Swayze et al.	2016/0082161	A1	3/2016	Zilberman et al.
2015/0201940	A1	7/2015	Swayze et al.	2016/0089137	A1	3/2016	Hess et al.
2015/0201941	A1	7/2015	Swayze et al.	2016/0089142	A1	3/2016	Harris et al.
2015/0222212	A1	8/2015	Iwata	2016/0089146	A1	3/2016	Harris et al.
2015/0231409	A1	8/2015	Racenet et al.	2016/0089147	A1	3/2016	Harris et al.
2015/0238118	A1	8/2015	Legassey et al.	2016/0089149	A1	3/2016	Harris et al.
2015/0245835	A1	9/2015	Racenet et al.	2016/0089198	A1	3/2016	Arya et al.
2015/0272557	A1	10/2015	Overmyer et al.	2016/0095585	A1	4/2016	Zergiebel et al.
2015/0272571	A1	10/2015	Leimbach et al.	2016/0106431	A1	4/2016	Shelton, IV et al.
2015/0272580	A1	10/2015	Leimbach et al.	2016/0113653	A1	4/2016	Zingman
2015/0272582	A1	10/2015	Leimbach et al.	2016/0120544	A1	5/2016	Shelton, IV et al.
2015/0272604	A1	10/2015	Chowaniec et al.	2016/0120545	A1	5/2016	Shelton, IV et al.
2015/0280384	A1	10/2015	Leimbach et al.	2016/0166248	A1	6/2016	Deville et al.
2015/0282810	A1	10/2015	Shelton, IV et al.	2016/0166256	A1	6/2016	Baxter, III et al.
2015/0289873	A1	10/2015	Shelton, IV et al.	2016/0166308	A1	6/2016	Manwaring et al.
2015/0289874	A1	10/2015	Leimbach et al.	2016/0174969	A1	6/2016	Kerr et al.
2015/0297200	A1	10/2015	Fitzsimmons et al.	2016/0174972	A1	6/2016	Shelton, IV et al.
2015/0297222	A1	10/2015	Huitema et al.	2016/0174974	A1	6/2016	Schmid et al.
2015/0297223	A1	10/2015	Huitema et al.	2016/0174985	A1	6/2016	Baxter, III et al.
2015/0297225	A1	10/2015	Huitema et al.	2016/0183939	A1	6/2016	Shelton, IV et al.
2015/0297228	A1	10/2015	Huitema et al.	2016/0183943	A1	6/2016	Shelton, IV
2015/0297229	A1	10/2015	Schellin et al.	2016/0183944	A1	6/2016	Swensgard et al.
2015/0297232	A1	10/2015	Huitema et al.	2016/0183945	A1	6/2016	Shelton, IV et al.
2015/0297233	A1	10/2015	Huitema et al.	2016/0192916	A1	7/2016	Shelton, IV et al.
2015/0297234	A1	10/2015	Schellin et al.	2016/0192917	A1	7/2016	Shelton, IV et al.
2015/0297235	A1	10/2015	Harris et al.	2016/0192918	A1	7/2016	Shelton, IV et al.
2015/0297236	A1	10/2015	Harris et al.	2016/0192933	A1	7/2016	Shelton, IV
2015/0303417	A1	10/2015	Koeder et al.	2016/0192936	A1	7/2016	Leimbach et al.
2015/0313594	A1	11/2015	Shelton, IV et al.	2016/0192977	A1	7/2016	Manwaring et al.
2015/0316431	A1	11/2015	Collins et al.	2016/0192996	A1	7/2016	Spivey et al.
2015/0324317	A1	11/2015	Collins et al.	2016/0199059	A1	7/2016	Shelton, IV et al.
2015/0327864	A1	11/2015	Hodgkinson et al.	2016/0199061	A1	7/2016	Shelton, IV et al.
2015/0335328	A1	11/2015	Shelton, IV et al.	2016/0199063	A1	7/2016	Mandakolathur Vasudevan et al.
2015/0336249	A1	11/2015	Iwata et al.	2016/0199064	A1	7/2016	Shelton, IV et al.
2015/0342607	A1	12/2015	Shelton, IV et al.	2016/0199089	A1	7/2016	Hess et al.
2015/0351758	A1	12/2015	Shelton, IV et al.	2016/0199956	A1	7/2016	Shelton, IV et al.
2015/0351762	A1	12/2015	Vendely et al.	2016/0206310	A1	7/2016	Shelton, IV
2015/0351765	A1	12/2015	Valentine et al.	2016/0206314	A1	7/2016	Scheib et al.
2015/0352699	A1	12/2015	Sakai et al.	2016/0220248	A1	8/2016	Timm et al.
2015/0359536	A1*	12/2015	Cropper ..... A61B 17/07207 227/177.1	2016/0220249	A1	8/2016	Shelton, IV et al.
2015/0366220	A1	12/2015	Zhang et al.	2016/0220266	A1	8/2016	Shelton, IV et al.
2015/0372265	A1	12/2015	Morisaku et al.	2016/0220268	A1	8/2016	Shelton, IV et al.
2015/0374360	A1	12/2015	Scheib et al.	2016/0235403	A1	8/2016	Shelton, IV et al.
2015/0374361	A1	12/2015	Gettinger et al.	2016/0235404	A1	8/2016	Shelton, IV
2015/0374363	A1	12/2015	Laurent, IV et al.	2016/0235405	A1	8/2016	Shelton, IV et al.
2015/0374368	A1	12/2015	Swayze et al.	2016/0235406	A1	8/2016	Shelton, IV et al.
2015/0374369	A1	12/2015	Yates et al.	2016/0235408	A1	8/2016	Shelton, IV et al.
2015/0374371	A1	12/2015	Richard et al.	2016/0235409	A1	8/2016	Shelton, IV et al.
2015/0374374	A1	12/2015	Shelton, IV et al.	2016/0235494	A1	8/2016	Shelton, IV et al.
2015/0374375	A1	12/2015	Shelton, IV et al.	2016/0242775	A1	8/2016	Shelton, IV et al.
2015/0374376	A1	12/2015	Shelton, IV	2016/0242776	A1	8/2016	Shelton, IV et al.
2015/0374377	A1	12/2015	Shelton, IV	2016/0242777	A1	8/2016	Shelton, IV et al.
2015/0374378	A1	12/2015	Giordano et al.	2016/0242781	A1	8/2016	Shelton, IV et al.
2015/0374379	A1	12/2015	Shelton, IV	2016/0242782	A1	8/2016	Shelton, IV et al.
2015/0380187	A1	12/2015	Zergiebel et al.	2016/0242783	A1	8/2016	Shelton, IV et al.
2016/0000430	A1	1/2016	Ming et al.	2016/0249909	A1	9/2016	Shelton, IV et al.
2016/0000431	A1	1/2016	Giordano et al.	2016/0249910	A1	9/2016	Shelton, IV et al.
2016/0000437	A1	1/2016	Giordano et al.	2016/0249911	A1	9/2016	Timm et al.
2016/0000438	A1	1/2016	Swayze et al.	2016/0249915	A1	9/2016	Beckman et al.
2016/0000442	A1	1/2016	Shelton, IV	2016/0249916	A1	9/2016	Shelton, IV et al.
2016/0000452	A1	1/2016	Yates et al.	2016/0249917	A1	9/2016	Beckman et al.
2016/0000453	A1	1/2016	Yates et al.	2016/0249918	A1	9/2016	Shelton, IV et al.
2016/0000513	A1	1/2016	Shelton, IV et al.	2016/0249921	A1*	9/2016	Cappola ..... A61B 17/072 227/175.1
2016/0007992	A1	1/2016	Yates et al.	2016/0249922	A1	9/2016	Morgan et al.
2016/0008023	A1	1/2016	Yates et al.	2016/0249927	A1	9/2016	Beckman et al.
2016/0015391	A1	1/2016	Shelton, IV et al.	2016/0256071	A1	9/2016	Shelton, IV et al.
2016/0023342	A1	1/2016	Koenig et al.	2016/0256154	A1	9/2016	Shelton, IV et al.
				2016/0256156	A1	9/2016	Shelton, IV et al.
				2016/0256159	A1	9/2016	Pinjala et al.
				2016/0256160	A1	9/2016	Shelton, IV et al.
				2016/0256161	A1	9/2016	Overmyer et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2016/0256185	A1	9/2016	Shelton, IV et al.	2017/0086835	A1	3/2017	Harris et al.
2016/0256229	A1	9/2016	Morgan et al.	2017/0086836	A1	3/2017	Harris et al.
2016/0262745	A1	9/2016	Morgan et al.	2017/0086837	A1	3/2017	Vendely et al.
2016/0262746	A1	9/2016	Shelton, IV et al.	2017/0086838	A1	3/2017	Harris et al.
2016/0270780	A1	9/2016	Hall et al.	2017/0086839	A1	3/2017	Vendely et al.
2016/0270788	A1*	9/2016	Czernik ..... A61B 17/07207	2017/0086840	A1	3/2017	Harris et al.
2016/0278765	A1	9/2016	Shelton, IV et al.	2017/0086841	A1	3/2017	Vendely et al.
2016/0278775	A1	9/2016	Shelton, IV et al.	2017/0086842	A1	3/2017	Shelton, IV et al.
2016/0287249	A1	10/2016	Alexander, III et al.	2017/0086843	A1	3/2017	Vendely et al.
2016/0287250	A1	10/2016	Shelton, IV et al.	2017/0086844	A1	3/2017	Vendely et al.
2016/0287251	A1	10/2016	Shelton, IV et al.	2017/0086845	A1	3/2017	Vendely et al.
2016/0287253	A1	10/2016	Shelton, IV et al.	2017/0086936	A1	3/2017	Shelton, IV et al.
2016/0310143	A1	10/2016	Bettuchi	2017/0095250	A1	4/2017	Kostrzewski et al.
2016/0331375	A1	11/2016	Shelton, IV et al.	2017/0119386	A1	5/2017	Scheib et al.
2016/0345976	A1	12/2016	Gonzalez et al.	2017/0119387	A1	5/2017	Dalessandro et al.
2016/0346034	A1	12/2016	Arya et al.	2017/0119389	A1	5/2017	Turner et al.
2016/0354085	A1	12/2016	Shelton, IV et al.	2017/0119390	A1	5/2017	Schellin et al.
2016/0367122	A1	12/2016	Ichimura et al.	2017/0119392	A1	5/2017	Shelton, IV et al.
2016/0367245	A1	12/2016	Wise et al.	2017/0119397	A1	5/2017	Harris et al.
2016/0367246	A1	12/2016	Baxter, III et al.	2017/0128149	A1	5/2017	Heinrich et al.
2016/0367254	A1	12/2016	Baxter, III et al.	2017/0135695	A1	5/2017	Shelton, IV et al.
2016/0367255	A1	12/2016	Wise et al.	2017/0135697	A1	5/2017	Mozdzierz et al.
2016/0367256	A1	12/2016	Hensel et al.	2017/0150983	A1	6/2017	Ingmanson et al.
2016/0374672	A1	12/2016	Bear et al.	2017/0172672	A1	6/2017	Bailey et al.
2016/0374675	A1	12/2016	Shelton, IV et al.	2017/0182211	A1	6/2017	Raxworthy et al.
2017/0000485	A1	1/2017	Shelton, IV et al.	2017/0189018	A1	7/2017	Harris et al.
2017/0007236	A1	1/2017	Shelton, IV et al.	2017/0189019	A1	7/2017	Harris et al.
2017/0007237	A1	1/2017	Yates et al.	2017/0189020	A1	7/2017	Harris et al.
2017/0007238	A1	1/2017	Yates et al.	2017/0196558	A1	7/2017	Morgan et al.
2017/0007239	A1	1/2017	Shelton, IV	2017/0196560	A1	7/2017	Leimbach et al.
2017/0007241	A1	1/2017	Shelton, IV et al.	2017/0196561	A1	7/2017	Shelton, IV et al.
2017/0007242	A1	1/2017	Shelton, IV et al.	2017/0196562	A1	7/2017	Shelton, IV et al.
2017/0007243	A1	1/2017	Shelton, IV et al.	2017/0196637	A1	7/2017	Shelton, IV et al.
2017/0007244	A1	1/2017	Shelton, IV et al.	2017/0196649	A1	7/2017	Yates et al.
2017/0007245	A1	1/2017	Shelton, IV et al.	2017/0202596	A1	7/2017	Shelton, IV et al.
2017/0007246	A1	1/2017	Shelton, IV et al.	2017/0209145	A1	7/2017	Swayze et al.
2017/0007247	A1	1/2017	Shelton, IV et al.	2017/0209146	A1	7/2017	Yates et al.
2017/0007248	A1	1/2017	Shelton, IV et al.	2017/0209226	A1	7/2017	Overmyer et al.
2017/0007249	A1	1/2017	Shelton, IV et al.	2017/0215881	A1	8/2017	Shelton, IV et al.
2017/0007250	A1	1/2017	Shelton, IV et al.	2017/0224330	A1	8/2017	Worthington et al.
2017/0007251	A1	1/2017	Yates et al.	2017/0224331	A1	8/2017	Worthington et al.
2017/0007254	A1	1/2017	Jaworek et al.	2017/0224332	A1	8/2017	Hunter et al.
2017/0007255	A1	1/2017	Jaworek et al.	2017/0224333	A1	8/2017	Hunter et al.
2017/0007341	A1	1/2017	Swensgard et al.	2017/0224334	A1	8/2017	Worthington et al.
2017/0007347	A1	1/2017	Jaworek et al.	2017/0224335	A1	8/2017	Weaner et al.
2017/0014125	A1	1/2017	Shelton, IV et al.	2017/0224336	A1	8/2017	Hunter et al.
2017/0027571	A1	2/2017	Nalagatla et al.	2017/0224339	A1	8/2017	Huang et al.
2017/0027572	A1	2/2017	Nalagatla et al.	2017/0224342	A1	8/2017	Worthington et al.
2017/0027573	A1	2/2017	Nalagatla et al.	2017/0224343	A1	8/2017	Baxter, III et al.
2017/0027574	A1	2/2017	Nalagatla et al.	2017/0231623	A1	8/2017	Shelton, IV et al.
2017/0049444	A1	2/2017	Schellin et al.	2017/0231626	A1	8/2017	Shelton, IV et al.
2017/0049447	A1	2/2017	Barton et al.	2017/0231627	A1	8/2017	Shelton, IV et al.
2017/0049448	A1	2/2017	Widenhouse et al.	2017/0231628	A1	8/2017	Shelton, IV et al.
2017/0055986	A1	3/2017	Harris et al.	2017/0238928	A1	8/2017	Morgan et al.
2017/0055989	A1	3/2017	Shelton, IV et al.	2017/0238929	A1	8/2017	Yates et al.
2017/0055997	A1	3/2017	Swayze et al.	2017/0245952	A1	8/2017	Shelton, IV et al.
2017/0055998	A1	3/2017	Baxter, III et al.	2017/0245953	A1	8/2017	Shelton, IV et al.
2017/0055999	A1	3/2017	Baxter, III et al.	2017/0249431	A1	8/2017	Shelton, IV et al.
2017/0056000	A1	3/2017	Nalagatla et al.	2017/0258469	A1	9/2017	Shelton, IV et al.
2017/0056001	A1	3/2017	Shelton, IV et al.	2017/0265856	A1	9/2017	Shelton, IV et al.
2017/0056002	A1	3/2017	Nalagatla et al.	2017/0281155	A1	10/2017	Shelton, IV et al.
2017/0056004	A1	3/2017	Shelton, IV et al.	2017/0281161	A1	10/2017	Shelton, IV et al.
2017/0056005	A1	3/2017	Shelton, IV et al.	2017/0281162	A1	10/2017	Shelton, IV et al.
2017/0056006	A1	3/2017	Shelton, IV et al.	2017/0281163	A1	10/2017	Shelton, IV et al.
2017/0056007	A1	3/2017	Eckert et al.	2017/0281164	A1	10/2017	Harris et al.
2017/0079640	A1	3/2017	Overmyer et al.	2017/0281165	A1	10/2017	Harris et al.
2017/0079642	A1	3/2017	Overmyer et al.	2017/0281166	A1	10/2017	Morgan et al.
2017/0079643	A1	3/2017	Yates et al.	2017/0281167	A1	10/2017	Shelton, IV et al.
2017/0079644	A1	3/2017	Overmyer et al.	2017/0281168	A1	10/2017	Shelton, IV et al.
2017/0086823	A1	3/2017	Leimbach et al.	2017/0281169	A1	10/2017	Harris et al.
2017/0086827	A1	3/2017	Vendely et al.	2017/0281170	A1	10/2017	Shelton, IV et al.
2017/0086829	A1	3/2017	Vendely et al.	2017/0281172	A1	10/2017	Shelton, IV et al.
2017/0086830	A1	3/2017	Yates et al.	2017/0281173	A1	10/2017	Shelton, IV et al.
2017/0086831	A1	3/2017	Shelton, IV et al.	2017/0281174	A1	10/2017	Harris et al.
2017/0086832	A1	3/2017	Harris et al.	2017/0281177	A1	10/2017	Harris et al.
				2017/0281178	A1	10/2017	Shelton, IV et al.
				2017/0281179	A1	10/2017	Shelton, IV et al.
				2017/0281180	A1	10/2017	Morgan et al.
				2017/0281183	A1	10/2017	Miller et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2017/0281184	A1	10/2017	Shelton, IV et al.	2018/0110518	A1	4/2018	Overmyer et al.
2017/0281185	A1	10/2017	Miller et al.	2018/0110519	A1	4/2018	Lytle, IV et al.
2017/0281186	A1	10/2017	Shelton, IV et al.	2018/0110520	A1	4/2018	Shelton, IV et al.
2017/0281187	A1	10/2017	Shelton, IV et al.	2018/0110521	A1	4/2018	Shelton, IV et al.
2017/0281188	A1	10/2017	Shelton, IV et al.	2018/0110522	A1	4/2018	Shelton, IV et al.
2017/0281189	A1	10/2017	Nalagatla et al.	2018/0110523	A1	4/2018	Shelton, IV
2017/0290585	A1	10/2017	Shelton, IV et al.	2018/0110574	A1	4/2018	Shelton, IV et al.
2017/0296169	A1	10/2017	Yates et al.	2018/0110575	A1	4/2018	Shelton, IV et al.
2017/0296170	A1	10/2017	Shelton, IV et al.	2018/0116658	A1	5/2018	Aronhalt, IV et al.
2017/0296171	A1	10/2017	Shelton, IV et al.	2018/0116662	A1	5/2018	Shelton, IV et al.
2017/0296172	A1	10/2017	Harris et al.	2018/0116665	A1	5/2018	Hall et al.
2017/0296173	A1	10/2017	Shelton, IV et al.	2018/0125481	A1	5/2018	Yates et al.
2017/0296177	A1	10/2017	Harris et al.	2018/0125488	A1	5/2018	Morgan et al.
2017/0296178	A1	10/2017	Miller et al.	2018/0125489	A1	5/2018	Leimbach et al.
2017/0296179	A1	10/2017	Shelton, IV et al.	2018/0125590	A1	5/2018	Giordano et al.
2017/0296180	A1	10/2017	Harris et al.	2018/0126504	A1	5/2018	Shelton, IV et al.
2017/0296183	A1	10/2017	Shelton, IV et al.	2018/0132845	A1	5/2018	Schmid et al.
2017/0296184	A1	10/2017	Harris et al.	2018/0132850	A1	5/2018	Leimbach et al.
2017/0296185	A1	10/2017	Swensgard et al.	2018/0132851	A1	5/2018	Hall et al.
2017/0296189	A1	10/2017	Vendely et al.	2018/0132952	A1	5/2018	Spivey et al.
2017/0296190	A1	10/2017	Aronhalt et al.	2018/0133856	A1	5/2018	Shelton, IV et al.
2017/0296191	A1	10/2017	Shelton, IV et al.	2018/0140299	A1	5/2018	Weaner et al.
2017/0296213	A1	10/2017	Swensgard et al.	2018/0140368	A1	5/2018	Shelton, IV et al.
2017/0311944	A1	11/2017	Morgan et al.	2018/0146960	A1	5/2018	Shelton, IV et al.
2017/0311949	A1	11/2017	Shelton, IV	2018/0153542	A1	6/2018	Shelton, IV et al.
2017/0311950	A1	11/2017	Shelton, IV et al.	2018/0161034	A1	6/2018	Scheib et al.
2017/0312040	A1	11/2017	Giordano et al.	2018/0168575	A1	6/2018	Simms et al.
2017/0312041	A1	11/2017	Giordano et al.	2018/0168576	A1	6/2018	Hunter et al.
2017/0312042	A1	11/2017	Giordano et al.	2018/0168577	A1	6/2018	Aronhalt et al.
2017/0319201	A1	11/2017	Morgan et al.	2018/0168578	A1	6/2018	Aronhalt et al.
2017/0319207	A1	11/2017	Shelton, IV et al.	2018/0168579	A1	6/2018	Aronhalt et al.
2017/0319209	A1	11/2017	Morgan et al.	2018/0168580	A1	6/2018	Hunter et al.
2017/0319777	A1	11/2017	Shelton, IV et al.	2018/0168581	A1	6/2018	Hunter et al.
2017/0325813	A1	11/2017	Aranyi et al.	2018/0168582	A1	6/2018	Swayze et al.
2017/0333034	A1	11/2017	Morgan et al.	2018/0168583	A1	6/2018	Hunter et al.
2017/0333035	A1	11/2017	Morgan et al.	2018/0168584	A1	6/2018	Harris et al.
2017/0333070	A1	11/2017	Laurent et al.	2018/0168589	A1	6/2018	Swayze et al.
2017/0348043	A1	12/2017	Wang et al.	2018/0168590	A1	6/2018	Overmyer et al.
2017/0354415	A1	12/2017	Casasanta, Jr. et al.	2018/0168591	A1	6/2018	Swayze et al.
2017/0360442	A1	12/2017	Shelton, IV et al.	2018/0168592	A1*	6/2018	Overmyer ..... A61B 34/30
2017/0367700	A1	12/2017	Leimbach et al.	2018/0168593	A1	6/2018	Overmyer et al.
2017/0367991	A1	12/2017	Widenhouse et al.	2018/0168594	A1	6/2018	Shelton, IV et al.
2018/0000483	A1	1/2018	Leimbach et al.	2018/0168595	A1	6/2018	Overmyer et al.
2018/0000545	A1	1/2018	Giordano et al.	2018/0168596	A1	6/2018	Beckman et al.
2018/0008269	A1	1/2018	Moore et al.	2018/0168597	A1*	6/2018	Fanelli ..... A61B 17/07207
2018/0008270	A1	1/2018	Moore et al.	2018/0168598	A1	6/2018	Shelton, IV et al.
2018/0008271	A1	1/2018	Moore et al.	2018/0168599	A1	6/2018	Bakos et al.
2018/0008356	A1	1/2018	Giordano et al.	2018/0168600	A1	6/2018	Shelton, IV et al.
2018/0008357	A1	1/2018	Giordano et al.	2018/0168601	A1	6/2018	Bakos et al.
2018/0028184	A1	2/2018	Shelton, IV et al.	2018/0168602	A1	6/2018	Bakos et al.
2018/0028185	A1	2/2018	Shelton, IV et al.	2018/0168603	A1	6/2018	Morgan et al.
2018/0042611	A1	2/2018	Swayze et al.	2018/0168604	A1	6/2018	Shelton, IV et al.
2018/0049824	A1	2/2018	Harris et al.	2018/0168605	A1	6/2018	Baber et al.
2018/0049883	A1	2/2018	Moskowitz et al.	2018/0168606	A1	6/2018	Shelton, IV et al.
2018/0055510	A1	3/2018	Schmid et al.	2018/0168607	A1	6/2018	Shelton, IV et al.
2018/0055513	A1	3/2018	Shelton, IV et al.	2018/0168608	A1	6/2018	Shelton, IV et al.
2018/0055524	A1	3/2018	Shelton, IV et al.	2018/0168609	A1	6/2018	Fanelli et al.
2018/0055525	A1	3/2018	Shelton, IV et al.	2018/0168610	A1	6/2018	Shelton, IV et al.
2018/0055526	A1	3/2018	Shelton, IV et al.	2018/0168611	A1	6/2018	Shelton, IV et al.
2018/0064437	A1	3/2018	Yates et al.	2018/0168612	A1	6/2018	Shelton, IV et al.
2018/0064440	A1	3/2018	Shelton, IV et al.	2018/0168613	A1	6/2018	Shelton, IV et al.
2018/0064441	A1	3/2018	Shelton, IV et al.	2018/0168614	A1	6/2018	Shelton, IV et al.
2018/0064442	A1	3/2018	Shelton, IV et al.	2018/0168615	A1	6/2018	Shelton, IV et al.
2018/0064443	A1	3/2018	Shelton, IV et al.	2018/0168618	A1	6/2018	Scott et al.
2018/0070939	A1	3/2018	Giordano et al.	2018/0168619	A1	6/2018	Scott et al.
2018/0070942	A1	3/2018	Shelton, IV et al.	2018/0168620	A1	6/2018	Huang et al.
2018/0070946	A1	3/2018	Shelton, IV et al.	2018/0168621	A1	6/2018	Shelton, IV et al.
2018/0078248	A1	3/2018	Swayze et al.	2018/0168622	A1	6/2018	Shelton, IV et al.
2018/0085116	A1	3/2018	Yates et al.	2018/0168623	A1	6/2018	Simms et al.
2018/0085117	A1	3/2018	Shelton, IV et al.	2018/0168624	A1	6/2018	Shelton, IV et al.
2018/0085123	A1	3/2018	Shelton, IV et al.	2018/0168625	A1	6/2018	Posada et al.
2018/0103952	A1	4/2018	Aronhalt et al.	2018/0168626	A1	6/2018	Shelton, IV et al.
2018/0103953	A1	4/2018	Shelton, IV et al.	2018/0168627	A1	6/2018	Weaner et al.
2018/0103955	A1	4/2018	Shelton, IV et al.	2018/0168628	A1	6/2018	Hunter et al.
2018/0110516	A1	4/2018	Baxter, III et al.	2018/0168629	A1	6/2018	Shelton, IV et al.
				2018/0168630	A1	6/2018	Shelton, IV et al.
				2018/0168631	A1	6/2018	Harris et al.
				2018/0168632	A1	6/2018	Harris et al.
				2018/0168633	A1	6/2018	Shelton, IV et al.

(56)

References Cited

FOREIGN PATENT DOCUMENTS

U.S. PATENT DOCUMENTS			AU		
				2011218702	B2 6/2013
				2012200178	B2 7/2013
2018/0168634	A1*	6/2018 Harris ..... A61B 17/07207	CA	1015829	A 8/1977
2018/0168635	A1	6/2018 Shelton, IV et al.	CA	1125615	A 6/1982
2018/0168636	A1	6/2018 Shelton, IV et al.	CA	2458946	A1 3/2003
2018/0168637	A1	6/2018 Harris et al.	CA	2477181	A1 4/2004
2018/0168638	A1	6/2018 Harris et al.	CA	2512960	A1 1/2006
2018/0168639	A1	6/2018 Shelton, IV et al.	CA	2514274	A1 1/2006
2018/0168640	A1	6/2018 Shelton, IV et al.	CA	2639177	A1 2/2009
2018/0168641	A1	6/2018 Harris et al.	CA	2664874	A1 11/2009
2018/0168642	A1	6/2018 Shelton, IV et al.	CA	2576347	C 8/2015
2018/0168644	A1	6/2018 Shelton, IV et al.	CA	2940510	A1 8/2015
2018/0168645	A1	6/2018 Shelton, IV et al.	CN	86100996	A 9/1986
2018/0168646	A1	6/2018 Shelton, IV et al.	CN	1163558	A 10/1997
2018/0168649	A1	6/2018 Shelton, IV et al.	CN	2488482	Y 5/2002
2018/0168651	A1	6/2018 Shelton, IV et al.	CN	1424891	A 6/2003
2018/0199940	A1	7/2018 Zergiebel et al.	CN	1523725	A 8/2004
2018/0206843	A1	7/2018 Yates et al.	CN	1545154	A 11/2004
2018/0206906	A1	7/2018 Moua et al.	CN	1634601	A 7/2005
2018/0214147	A1	8/2018 Merchant et al.	CN	1636525	A 7/2005
2018/0221046	A1	8/2018 Demmy et al.	CN	1636526	A 7/2005
2018/0221050	A1	8/2018 Kostrzewski et al.	CN	2716900	Y 8/2005
2018/0228490	A1	8/2018 Richard et al.	CN	2738962	Y 11/2005
2018/0250001	A1	9/2018 Aronhalt et al.	CN	1726874	A 2/2006
2018/0256184	A1	9/2018 Shelton, IV et al.	CN	1726878	A 2/2006
2018/0256185	A1	9/2018 Shelton, IV et al.	CN	1868411	A 11/2006
2018/0271520	A1	9/2018 Shelton, IV et al.	CN	1915180	A 2/2007
2018/0280020	A1	10/2018 Hess et al.	CN	2868212	Y 2/2007
2018/0280021	A1	10/2018 Timm et al.	CN	1960679	A 5/2007
2018/0280022	A1	10/2018 Timm et al.	CN	101011286	A 8/2007
2018/0280023	A1	10/2018 Timm et al.	CN	200942099	Y 9/2007
2018/0289369	A1	10/2018 Shelton, IV et al.	CN	200991269	Y 12/2007
2018/0296211	A1	10/2018 Timm et al.	CN	101095621	A 1/2008
2018/0296215	A1	10/2018 Baxter, III et al.	CN	101111196	A 1/2008
2018/0296216	A1	10/2018 Shelton, IV et al.	CN	201001747	Y 1/2008
2018/0296217	A1	10/2018 Moore et al.	CN	101137402	A 3/2008
2018/0303478	A1	10/2018 Yates et al.	CN	101143105	A 3/2008
2018/0303481	A1	10/2018 Shelton, IV et al.	CN	201029899	Y 3/2008
2018/0303482	A1	10/2018 Shelton, IV et al.	CN	101224122	A 7/2008
2018/0310931	A1	11/2018 Hall et al.	CN	101224124	A 7/2008
2018/0311002	A1	11/2018 Giordano et al.	CN	101254126	A 9/2008
2018/0317917	A1	11/2018 Huang et al.	CN	101507620	A 8/2009
2018/0317918	A1	11/2018 Shelton, IV	CN	101507622	A 8/2009
2018/0317919	A1	11/2018 Shelton, IV et al.	CN	101507623	A 8/2009
2018/0344319	A1	12/2018 Shelton, IV et al.	CN	101507625	A 8/2009
2018/0353170	A1	12/2018 Overmyer et al.	CN	101507628	A 8/2009
2018/0353176	A1	12/2018 Shelton, IV et al.	CN	101522120	A 9/2009
2018/0353177	A1	12/2018 Shelton, IV et al.	CN	101534724	A 9/2009
2018/0353178	A1	12/2018 Shelton, IV et al.	CN	101626731	A 1/2010
2018/0353179	A1	12/2018 Shelton, IV et al.	CN	101669833	A 3/2010
2018/0360443	A1	12/2018 Shelton, IV et al.	CN	101675898	A 3/2010
2018/0360444	A1	12/2018 Harris et al.	CN	101683280	A 3/2010
2018/0360445	A1	12/2018 Shelton, IV et al.	CN	101721236	A 6/2010
2018/0360446	A1	12/2018 Shelton, IV et al.	CN	101801284	A 8/2010
2018/0360447	A1	12/2018 Shelton, IV et al.	CN	101828940	A 9/2010
2018/0360448	A1	12/2018 Harris et al.	CN	101868203	A 10/2010
2018/0360449	A1	12/2018 Shelton, IV et al.	CN	101873834	A 10/2010
2018/0360450	A1	12/2018 Shelton, IV et al.	CN	101073509	B 12/2010
2018/0360451	A1	12/2018 Shelton, IV et al.	CN	101912285	A 12/2010
2018/0360452	A1	12/2018 Shelton, IV et al.	CN	101028205	B 1/2011
2018/0360454	A1	12/2018 Shelton, IV et al.	CN	101933824	A 1/2011
2018/0360455	A1	12/2018 Shelton, IV et al.	CN	101934098	A 1/2011
2018/0360456	A1	12/2018 Shelton, IV et al.	CN	201719298	U 1/2011
2018/0360469	A1	12/2018 Shelton, IV et al.	CN	102038531	A 5/2011
2018/0360470	A1	12/2018 Parfett et al.	CN	102038532	A 5/2011
2018/0360471	A1	12/2018 Parfett et al.	CN	101534722	B 6/2011
2018/0360472	A1	12/2018 Harris et al.	CN	201879759	U 6/2011
2018/0360473	A1	12/2018 Shelton, IV et al.	CN	101361666	B 8/2011
2018/0368822	A1*	12/2018 Shelton, IV ..... H02J 7/0063	CN	201949071	U 8/2011
2019/0000474	A1*	1/2019 Shelton, IV ..... A61B 17/07207	CN	101224119	B 9/2011
2019/0000476	A1*	1/2019 Shelton, IV ..... A61B 17/29	CN	101336835	B 9/2011
2019/0000479	A1*	1/2019 Harris ..... A61B 17/07207	CN	102188270	A 9/2011
2019/0000525	A1*	1/2019 Messerly ..... A61B 18/1206	CN	101779977	B 12/2011
2019/0000528	A1*	1/2019 Yates ..... H01R 39/10	CN	101534723	B 1/2012
2019/0000534	A1*	1/2019 Messerly ..... A61B 17/07207	CN	101310680	B 4/2012
			CN	101912284	B 7/2012
			CN	202397539	U 8/2012

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

CN	202426586	U	9/2012	EP	0379721	B1	9/1993
CN	101317782	B	10/2012	EP	0277959	B1	10/1993
CN	202489990	U	10/2012	EP	0233940	B1	11/1993
CN	101507639	B	11/2012	EP	0261230	B1	11/1993
CN	101541251	A	11/2012	EP	0324636	B1	3/1994
CN	102835977	A	12/2012	EP	0591946	A1	4/1994
CN	101507633	B	2/2013	EP	0593920	A1	4/1994
CN	101023879	B	3/2013	EP	0594148	A1	4/1994
CN	101507624	B	3/2013	EP	0427949	B1	6/1994
CN	101327137	B	6/2013	EP	0523174	B1	6/1994
CN	101401736	B	6/2013	EP	0600182	A2	6/1994
CN	101332110	B	7/2013	EP	0310431	B1	11/1994
CN	101683281	B	1/2014	EP	0375302	B1	11/1994
CN	103648408	A	3/2014	EP	0376562	B1	11/1994
CN	203564285	U	4/2014	EP	0623311	A2	11/1994
CN	203564287	U	4/2014	EP	0630612	A1	12/1994
CN	203597997	U	5/2014	EP	0630614	A1	12/1994
CN	103829983	A	6/2014	EP	0634144	A1	1/1995
CN	103908313	A	7/2014	EP	0639349	A2	2/1995
CN	203736251	U	7/2014	EP	0646356	A2	4/1995
CN	103981635	A	8/2014	EP	0646357	A1	4/1995
CN	102783741	B	10/2014	EP	0505036	B1	5/1995
CN	102973300	B	10/2014	EP	0653189	A2	5/1995
CN	102793571	B	12/2014	EP	0669104	A1	8/1995
CN	104337556	A	2/2015	EP	0387980	B1	10/1995
CN	102166129	B	3/2015	EP	0511470	B1	10/1995
CN	102469995	B	3/2015	EP	0674876	A2	10/1995
CN	102113902	B	4/2015	EP	0676173	B1	10/1995
CN	102247177	B	2/2016	EP	0679367	A2	11/1995
CN	103750872	B	5/2016	EP	0392547	B1	12/1995
DE	273689	C	5/1914	EP	0685204	A1	12/1995
DE	1775926	A	1/1972	EP	0686374	A2	12/1995
DE	3036217	A1	4/1982	EP	0364216	B1	1/1996
DE	3212828	A1	11/1982	EP	0699418	A1	3/1996
DE	3210466	A1	9/1983	EP	0702937	A1	3/1996
DE	3709067	A1	9/1988	EP	0488768	B1	4/1996
DE	4228909	A1	3/1994	EP	0705571	A1	4/1996
DE	9412228	U1	9/1994	EP	0528478	B1	5/1996
DE	19509116	A1	9/1996	EP	0711611	A2	5/1996
DE	19534043	A1	3/1997	EP	0541987	B1	7/1996
DE	19707373	C1	2/1998	EP	0667119	B1	7/1996
DE	19851291	A1	1/2000	EP	0737446	A1	10/1996
DE	19924311	A1	11/2000	EP	0741996	B1	11/1996
DE	69328576	T2	1/2001	EP	0748614	A1	12/1996
DE	20016423	U1	2/2001	EP	0708618	B1	3/1997
DE	19941859	A1	3/2001	EP	0770355	A1	5/1997
DE	10052679	A1	5/2001	EP	0503662	B1	6/1997
DE	20112837	U1	10/2001	EP	0447121	B1	7/1997
DE	20121753	U1	4/2003	EP	0621009	B1	7/1997
DE	10314827	B3	4/2004	EP	0625077	B1	7/1997
DE	202004012389	U1	9/2004	EP	0633749	B1	8/1997
DE	10314072	A1	10/2004	EP	0710090	B1	8/1997
DE	202007003114	U1	6/2007	EP	0578425	B1	9/1997
DE	102010013150	A1	9/2011	EP	0623312	B1	9/1997
EP	0000756	A1	2/1979	EP	0621006	B1	10/1997
EP	0033633	A2	8/1981	EP	0625335	B1	11/1997
EP	0122046	A1	10/1984	EP	0552423	B1	1/1998
EP	0070230	B1	4/1985	EP	0592244	B1	1/1998
EP	0156774	A2	10/1985	EP	0648476	B1	1/1998
EP	0072754	B1	4/1986	EP	0649290	B1	3/1998
EP	0033548	B1	5/1986	EP	0598618	B1	9/1998
EP	0077262	B1	8/1986	EP	0678007	B1	9/1998
EP	0189807	A2	8/1986	EP	0869104	A1	10/1998
EP	0212278	A2	3/1987	EP	0603472	B1	11/1998
EP	0129442	B1	11/1987	EP	0605351	B1	11/1998
EP	0255631	A1	2/1988	EP	0878169	A1	11/1998
EP	0276104	A2	7/1988	EP	0879742	A1	11/1998
EP	0178940	B1	1/1991	EP	0695144	B1	12/1998
EP	0178941	B1	1/1991	EP	0722296	B1	12/1998
EP	0169044	B1	6/1991	EP	0760230	B1	2/1999
EP	0248844	B1	1/1993	EP	0623316	B1	3/1999
EP	0539762	A1	5/1993	EP	0650701	B1	3/1999
EP	0541950	A1	5/1993	EP	0537572	B1	6/1999
EP	0545029	A1	6/1993	EP	0923907	A1	6/1999
EP	0548998	A1	6/1993	EP	0640317	B1	9/1999
				EP	0843906	B1	3/2000
				EP	0552050	B1	5/2000
				EP	0833592	B1	5/2000
				EP	0832605	B1	6/2000

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

EP	0484677	B2	7/2000	EP	1064883	B1	8/2005
EP	0830094	B1	9/2000	EP	1067876	B1	8/2005
EP	1034747	A1	9/2000	EP	0870473	B1	9/2005
EP	1034748	A1	9/2000	EP	1157666	B1	9/2005
EP	0726632	B1	10/2000	EP	0880338	B1	10/2005
EP	0694290	B1	11/2000	EP	1158917	B1	11/2005
EP	1050278	A1	11/2000	EP	1344498	B1	11/2005
EP	1053719	A1	11/2000	EP	0906764	B1	12/2005
EP	1053720	A1	11/2000	EP	1330989	B1	12/2005
EP	1055399	A1	11/2000	EP	0771176	B2	1/2006
EP	1055400	A1	11/2000	EP	1621138	A2	2/2006
EP	1058177	A1	12/2000	EP	1621139	A2	2/2006
EP	1080694	A1	3/2001	EP	1621141	A2	2/2006
EP	1090592	A1	4/2001	EP	1621143	A2	2/2006
EP	1095627	A1	5/2001	EP	1621145	A2	2/2006
EP	0806914	B1	9/2001	EP	1621151	A2	2/2006
EP	0768840	B1	12/2001	EP	1034746	B1	3/2006
EP	0908152	B1	1/2002	EP	1201196	B1	3/2006
EP	0717959	B1	2/2002	EP	1632191	A2	3/2006
EP	0872213	B1	5/2002	EP	1647231	A1	4/2006
EP	0862386	B1	6/2002	EP	1065981	B1	5/2006
EP	1234587	A1	8/2002	EP	1082944	B1	5/2006
EP	0949886	B1	9/2002	EP	1230899	B1	5/2006
EP	1238634	A2	9/2002	EP	1652481	A2	5/2006
EP	0858295	B1	12/2002	EP	1382303	B1	6/2006
EP	0656188	B1	1/2003	EP	1253866	B1	7/2006
EP	0717960	B1	2/2003	EP	1676539	A1	7/2006
EP	1284120	A1	2/2003	EP	1032318	B1	8/2006
EP	1287788	A1	3/2003	EP	1045672	B1	8/2006
EP	0717966	B1	4/2003	EP	1617768	B1	8/2006
EP	0717967	B1	5/2003	EP	1693015	A2	8/2006
EP	0869742	B1	5/2003	EP	1400214	B1	9/2006
EP	0829235	B1	6/2003	EP	1702567	A2	9/2006
EP	0887046	B1	7/2003	EP	1129665	B1	11/2006
EP	1323384	A2	7/2003	EP	1400206	B1	11/2006
EP	0852480	B1	8/2003	EP	1721568	A1	11/2006
EP	0891154	B1	9/2003	EP	1723914	A1	11/2006
EP	0813843	B1	10/2003	EP	1256317	B1	12/2006
EP	0873089	B1	10/2003	EP	1285633	B1	12/2006
EP	0856326	B1	11/2003	EP	1728473	A1	12/2006
EP	1374788	A1	1/2004	EP	1736105	A1	12/2006
EP	0814712	B1	2/2004	EP	1011494	B1	1/2007
EP	1402837	A1	3/2004	EP	1479346	B1	1/2007
EP	0705570	B1	4/2004	EP	1484024	B1	1/2007
EP	0959784	B1	4/2004	EP	1749485	A1	2/2007
EP	1407719	A2	4/2004	EP	1754445	A2	2/2007
EP	1411626	A2	4/2004	EP	1759812	A1	3/2007
EP	1086713	B1	5/2004	EP	1767157	A1	3/2007
EP	0996378	B1	6/2004	EP	1767163	A1	3/2007
EP	1426012	A1	6/2004	EP	1563792	B1	4/2007
EP	0833593	B2	7/2004	EP	1769756	A1	4/2007
EP	1442694	A1	8/2004	EP	1769758	A1	4/2007
EP	0888749	B1	9/2004	EP	1581128	B1	5/2007
EP	0959786	B1	9/2004	EP	1780825	A1	5/2007
EP	1453432	A2	9/2004	EP	1785097	A2	5/2007
EP	1459695	A1	9/2004	EP	1790293	A2	5/2007
EP	1254636	B1	10/2004	EP	1790294	A1	5/2007
EP	1473819	A1	11/2004	EP	1563793	B1	6/2007
EP	1477119	A1	11/2004	EP	1791473	A2	6/2007
EP	1479345	A1	11/2004	EP	1800610	A1	6/2007
EP	1479347	A1	11/2004	EP	1300117	B1	8/2007
EP	1479348	A1	11/2004	EP	1813199	A1	8/2007
EP	0754437	B2	12/2004	EP	1813200	A2	8/2007
EP	1025807	B1	12/2004	EP	1813201	A1	8/2007
EP	1001710	B1	1/2005	EP	1813202	A1	8/2007
EP	1496805	A2	1/2005	EP	1813203	A2	8/2007
EP	1256318	B1	2/2005	EP	1813207	A1	8/2007
EP	1520521	A1	4/2005	EP	1813209	A1	8/2007
EP	1520522	A1	4/2005	EP	1815950	A1	8/2007
EP	1520523	A1	4/2005	EP	1330991	B1	9/2007
EP	1520525	A1	4/2005	EP	1837041	A1	9/2007
EP	1522264	A1	4/2005	EP	0922435	B1	10/2007
EP	1523942	A2	4/2005	EP	1487359	B1	10/2007
EP	1550408	A1	7/2005	EP	1599146	B1	10/2007
EP	1557129	A1	7/2005	EP	1839596	A1	10/2007
				EP	1679096	B1	11/2007
				EP	1857057	A2	11/2007
				EP	1402821	B1	12/2007
				EP	1872727	A1	1/2008

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

EP	1550410	B1	2/2008	EP	1813211	B1	3/2010
EP	1671593	B1	2/2008	EP	2165654	A1	3/2010
EP	1897502	A1	3/2008	EP	2165656	A2	3/2010
EP	1611856	B1	4/2008	EP	2165660	A2	3/2010
EP	1908417	A2	4/2008	EP	2165663	A2	3/2010
EP	1917929	A1	5/2008	EP	2165664	A2	3/2010
EP	1330201	B1	6/2008	EP	1566150	B1	4/2010
EP	1702568	B1	7/2008	EP	1813206	B1	4/2010
EP	1943955	A2	7/2008	EP	2184014	A2	5/2010
EP	1943957	A2	7/2008	EP	1769754	B1	6/2010
EP	1943959	A1	7/2008	EP	1854416	B1	6/2010
EP	1943962	A2	7/2008	EP	1911408	B1	6/2010
EP	1943964	A1	7/2008	EP	2198787	A1	6/2010
EP	1943976	A2	7/2008	EP	2214610	A1	8/2010
EP	1593337	B1	8/2008	EP	2218409	A1	8/2010
EP	1970014	A1	9/2008	EP	1647286	B1	9/2010
EP	1974678	A2	10/2008	EP	1825821	B1	9/2010
EP	1980213	A2	10/2008	EP	1535565	B1	10/2010
EP	1980214	A2	10/2008	EP	1702570	B1	10/2010
EP	1759645	B1	11/2008	EP	1785098	B1	10/2010
EP	1987780	A2	11/2008	EP	2005896	B1	10/2010
EP	1990014	A2	11/2008	EP	2030578	B1	11/2010
EP	1992296	A1	11/2008	EP	2036505	B1	11/2010
EP	1552795	B1	12/2008	EP	2245993	A2	11/2010
EP	1693008	B1	12/2008	EP	2245994	A1	11/2010
EP	1759640	B1	12/2008	EP	2253280	A1	11/2010
EP	1997439	A2	12/2008	EP	1627605	B1	12/2010
EP	2000101	A2	12/2008	EP	2027811	B1	12/2010
EP	2000102	A2	12/2008	EP	2130498	B1	12/2010
EP	2005894	A2	12/2008	EP	2258282	A2	12/2010
EP	2005897	A2	12/2008	EP	2263568	A2	12/2010
EP	2005901	A1	12/2008	EP	1994890	B1	1/2011
EP	2008595	A2	12/2008	EP	2005900	B1	1/2011
EP	2025293	A1	2/2009	EP	2277667	A1	1/2011
EP	1736104	B1	3/2009	EP	2283780	A2	2/2011
EP	1749486	B1	3/2009	EP	2286738	A2	2/2011
EP	1782743	B1	3/2009	EP	1494595	B1	3/2011
EP	2039302	A2	3/2009	EP	1690502	B1	3/2011
EP	2039308	A2	3/2009	EP	1884201	B1	3/2011
EP	2039316	A2	3/2009	EP	2292153	A1	3/2011
EP	1721576	B1	4/2009	EP	1769755	B1	4/2011
EP	1733686	B1	4/2009	EP	2090240	B1	4/2011
EP	2044890	A1	4/2009	EP	2305135	A1	4/2011
EP	2055243	A2	5/2009	EP	2308388	A1	4/2011
EP	1550409	B1	6/2009	EP	2314254	A2	4/2011
EP	1550413	B1	6/2009	EP	2316345	A1	5/2011
EP	1719461	B1	6/2009	EP	2316366	A2	5/2011
EP	1834594	B1	6/2009	EP	2319443	A1	5/2011
EP	1709911	B1	7/2009	EP	2324776	A2	5/2011
EP	2077093	A2	7/2009	EP	1813205	B1	6/2011
EP	1745748	B1	8/2009	EP	2042107	B1	6/2011
EP	2090231	A1	8/2009	EP	2090243	B1	6/2011
EP	2090237	A1	8/2009	EP	2329773	A1	6/2011
EP	2090241	A1	8/2009	EP	2090239	B1	7/2011
EP	2090245	A1	8/2009	EP	2340771	A2	7/2011
EP	2090254	A1	8/2009	EP	1728475	B1	8/2011
EP	2090256	A2	8/2009	EP	2353545	A1	8/2011
EP	2095777	A2	9/2009	EP	2361562	A1	8/2011
EP	2098170	A2	9/2009	EP	2377472	A1	10/2011
EP	2100562	A2	9/2009	EP	1836986	B1	11/2011
EP	2110082	A1	10/2009	EP	1908414	B1	11/2011
EP	2110083	A2	10/2009	EP	2153781	B1	11/2011
EP	2110084	A2	10/2009	EP	2387943	A2	11/2011
EP	2111803	A2	10/2009	EP	2389928	A2	11/2011
EP	1813208	B1	11/2009	EP	1847225	B1	12/2011
EP	1908426	B1	11/2009	EP	2397079	A1	12/2011
EP	2116195	A1	11/2009	EP	2399538	A2	12/2011
EP	2116196	A2	11/2009	EP	1785102	B1	1/2012
EP	2116197	A2	11/2009	EP	1316290	B1	2/2012
EP	1607050	B1	12/2009	EP	1962711	B1	2/2012
EP	1762190	B8	12/2009	EP	2415416	A1	2/2012
EP	1815804	B1	12/2009	EP	2090253	B1	3/2012
EP	1875870	B1	12/2009	EP	2430986	A2	3/2012
EP	1878395	B1	1/2010	EP	1347638	B1	5/2012
EP	2151204	A1	2/2010	EP	1943956	B1	5/2012
				EP	2446834	A1	5/2012
				EP	2455007	A2	5/2012
				EP	2457519	A1	5/2012
				EP	2462878	A1	6/2012



(56)

References Cited

FOREIGN PATENT DOCUMENTS

EP 2462880 A2 6/2012  
 EP 1813204 B1 7/2012  
 EP 2189121 B1 7/2012  
 EP 2248475 B1 7/2012  
 EP 2478845 A2 7/2012  
 EP 2005895 B1 8/2012  
 EP 2090248 B1 8/2012  
 EP 2481359 A1 8/2012  
 EP 2484304 A2 8/2012  
 EP 2486860 A2 8/2012  
 EP 2486862 A2 8/2012  
 EP 2486868 A2 8/2012  
 EP 1908412 B1 9/2012  
 EP 1935351 B1 9/2012  
 EP 2497431 A1 9/2012  
 EP 1550412 B2 10/2012  
 EP 1616549 B1 10/2012  
 EP 2030579 B1 10/2012  
 EP 2090252 B1 10/2012  
 EP 2517637 A1 10/2012  
 EP 2517638 A1 10/2012  
 EP 2517642 A2 10/2012  
 EP 2517645 A2 10/2012  
 EP 2517649 A2 10/2012  
 EP 2517651 A2 10/2012  
 EP 2526877 A1 11/2012  
 EP 2526883 A1 11/2012  
 EP 1884206 B1 3/2013  
 EP 2286735 B1 3/2013  
 EP 2090238 B1 4/2013  
 EP 1806103 B1 5/2013  
 EP 2586380 A1 5/2013  
 EP 2586383 A2 5/2013  
 EP 2606812 A1 6/2013  
 EP 2606834 A2 6/2013  
 EP 1982657 B1 7/2013  
 EP 2614782 A2 7/2013  
 EP 2617369 A1 7/2013  
 EP 2620117 A1 7/2013  
 EP 2090234 B1 9/2013  
 EP 2633830 A1 9/2013  
 EP 2090244 B1 10/2013  
 EP 2644124 A1 10/2013  
 EP 2644209 A2 10/2013  
 EP 2649948 A1 10/2013  
 EP 2649949 A1 10/2013  
 EP 1997438 B1 11/2013  
 EP 2684529 A2 1/2014  
 EP 2687164 A2 1/2014  
 EP 2700367 A1 2/2014  
 EP 2713902 A1 4/2014  
 EP 1772105 B1 5/2014  
 EP 2743042 A2 6/2014  
 EP 2759267 A2 7/2014  
 EP 2764826 A1 8/2014  
 EP 2764827 A2 8/2014  
 EP 2767243 A2 8/2014  
 EP 2772206 A2 9/2014  
 EP 2772209 A1 9/2014  
 EP 2772210 A2 \* 9/2014 ..... A61B 17/068  
 EP 2777520 A1 9/2014  
 EP 2777524 A2 9/2014  
 EP 2777528 A2 9/2014  
 EP 2777537 A1 9/2014  
 EP 2777538 A2 9/2014  
 EP 2786714 A2 10/2014  
 EP 2792313 A2 10/2014  
 EP 2803324 A2 11/2014  
 EP 2815704 A1 12/2014  
 EP 2446835 B1 1/2015  
 EP 2837337 A1 \* 2/2015 ..... A61B 17/0643  
 EP 2837338 A2 \* 2/2015 ..... A61B 17/064  
 EP 2842500 A1 3/2015  
 EP 2845545 A1 3/2015  
 EP 1943960 B1 4/2015

EP 2090255 B1 4/2015  
 EP 2853220 A1 4/2015  
 EP 2923647 A2 9/2015  
 EP 2923653 A2 9/2015  
 EP 2923660 A2 9/2015  
 EP 2932913 A1 10/2015  
 EP 2944270 A1 11/2015  
 EP 1774914 B1 12/2015  
 EP 2090235 B1 4/2016  
 EP 2823773 B1 4/2016  
 EP 2131750 B1 5/2016  
 EP 2298220 B1 6/2016  
 EP 2510891 B1 6/2016  
 EP 1915957 B1 8/2016  
 EP 2296559 B1 8/2016  
 EP 2586379 B1 8/2016  
 EP 3064141 A1 \* 9/2016 ..... A61B 17/072  
 EP 2777533 B1 10/2016  
 EP 2364651 B1 11/2016  
 EP 2747235 B1 11/2016  
 EP 2116192 B1 3/2017  
 EP 2789299 B1 5/2017  
 EP 2311386 B1 6/2017  
 EP 2839787 B1 6/2017  
 EP 3178413 A1 \* 6/2017 ..... A61B 17/07207  
 EP 2745782 B1 10/2017  
 EP 3363378 A1 8/2018  
 ES 2396594 T3 2/2013  
 FR 459743 A 11/1913  
 FR 999646 A 2/1952  
 FR 1112936 A 3/1956  
 FR 2452275 B1 4/1983  
 FR 2598905 A1 11/1987  
 FR 2689749 B1 7/1994  
 FR 2765794 A1 1/1999  
 FR 2815842 A1 5/2002  
 GB 939929 A 10/1963  
 GB 1210522 A 10/1970  
 GB 1217159 A 12/1970  
 GB 1339394 A 12/1973  
 GB 2024012 A 1/1980  
 GB 2109241 A 6/1983  
 GB 2090534 B 6/1984  
 GB 2272159 A 5/1994  
 GB 2284242 A 5/1995  
 GB 2286435 A 8/1995  
 GB 2336214 A 10/1999  
 GB 2425903 A 11/2006  
 GB 2426391 A 11/2006  
 GB 2423199 B 5/2009  
 GB 2509523 A 7/2014  
 GR 930100110 A 11/1993  
 JP S4711908 Y1 5/1972  
 JP S5033988 U 4/1975  
 JP S56112235 A 9/1981  
 JP S58500053 A 1/1983  
 JP S58501360 A 8/1983  
 JP S59174920 A 10/1984  
 JP S60100955 A 6/1985  
 JP S60212152 A 10/1985  
 JP S6198249 A 5/1986  
 JP S61502036 A 9/1986  
 JP S62170011 U 10/1987  
 JP S6359764 A 3/1988  
 JP S63147449 A 6/1988  
 JP S63203149 A 8/1988  
 JP S63270040 A 11/1988  
 JP H0129503 B2 6/1989  
 JP H02279149 A 11/1990  
 JP H0312126 A 1/1991  
 JP H0318354 A 1/1991  
 JP H0378514 U 8/1991  
 JP H0385009 U 8/1991  
 JP H04215747 A 8/1992  
 JP H04131860 U 12/1992  
 JP H0584252 A 4/1993  
 JP H05123325 A 5/1993  
 JP H05212039 A 8/1993  
 JP H 05226945 A 9/1993

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

JP	H067357	A	1/1994	JP	2003523254	A	8/2003
JP	H0630945	A	2/1994	JP	2003524431	A	8/2003
JP	H0654857	A	3/1994	JP	3442423	B2	9/2003
JP	H0663054	A	3/1994	JP	2003300416	A	10/2003
JP	H0626812	U	4/1994	JP	2004147701	A	5/2004
JP	H06121798	A	5/1994	JP	2004162035	A	6/2004
JP	H06125913	A	5/1994	JP	2004229976	A	8/2004
JP	H06197901	A	7/1994	JP	2004524076	A	8/2004
JP	H06237937	A	8/1994	JP	2004531280	A	10/2004
JP	H06327684	A	11/1994	JP	2004532084	A	10/2004
JP	H079622	U	2/1995	JP	2004532676	A	10/2004
JP	H0731623	A	2/1995	JP	2004-535217	A	11/2004
JP	H0747070	A	2/1995	JP	2004329624	A	11/2004
JP	H0751273	A	2/1995	JP	2004337617	A	12/2004
JP	H07124166	A	5/1995	JP	2004344662	A	12/2004
JP	H07163573	A	6/1995	JP	2004344663	A	12/2004
JP	H07163574	A	6/1995	JP	2005013573	A	1/2005
JP	H07171163	A	7/1995	JP	2005028147	A	2/2005
JP	H07255735	A	10/1995	JP	2005028148	A	2/2005
JP	H07285089	A	10/1995	JP	2005028149	A	2/2005
JP	H07299074	A	11/1995	JP	2005505309	A	2/2005
JP	H0833642	A	2/1996	JP	2005505322	A	2/2005
JP	H0933641	A	2/1996	JP	2005505334	A	2/2005
JP	H08164141	A	6/1996	JP	2005080702	A	3/2005
JP	H08173437	A	7/1996	JP	2005103280	A	4/2005
JP	H08182684	A	7/1996	JP	2005103281	A	4/2005
JP	H08215201	A	8/1996	JP	2005103293	A	4/2005
JP	H08507708	A	8/1996	JP	2005511131	A	4/2005
JP	H08229050	A	9/1996	JP	2005511137	A	4/2005
JP	H08289895	A	11/1996	JP	2005131163	A	5/2005
JP	H08336540	A	12/1996	JP	2005131164	A	5/2005
JP	H08336544	A	12/1996	JP	2005131173	A	5/2005
JP	H09501081	A	2/1997	JP	2005131211	A	5/2005
JP	H09501577	A	2/1997	JP	2005131212	A	5/2005
JP	H09164144	A	6/1997	JP	2005137423	A	6/2005
JP	H09-323068	A	12/1997	JP	2005137919	A	6/2005
JP	H10113352	A	5/1998	JP	2005144183	A	6/2005
JP	H10118090	A	5/1998	JP	2005152416	A	6/2005
JP	H10-200699	A	7/1998	JP	2005516714	A	6/2005
JP	H 10296660	A	11/1998	JP	2005187954	A	7/2005
JP	H10512465	A	12/1998	JP	2005521109	A	7/2005
JP	H10512469	A	12/1998	JP	2005523105	A	8/2005
JP	2000014632	A	1/2000	JP	2005524474	A	8/2005
JP	2000033071	A	2/2000	JP	2005296412	A	10/2005
JP	2000112002	A	4/2000	JP	2005529675	A	10/2005
JP	3056672	B2	6/2000	JP	2005529677	A	10/2005
JP	2000166932	A	6/2000	JP	2005328882	A	12/2005
JP	2000171730	A	6/2000	JP	2005335432	A	12/2005
JP	2000287987	A	10/2000	JP	2005342267	A	12/2005
JP	2000325303	A	11/2000	JP	2006034975	A	2/2006
JP	2001037763	A	2/2001	JP	2006034977	A	2/2006
JP	2001046384	A	2/2001	JP	2006034978	A	2/2006
JP	2001087272	A	4/2001	JP	2006034980	A	2/2006
JP	2001514541	A	9/2001	JP	2006043451	A	2/2006
JP	2001276091	A	10/2001	JP	2006506106	A	2/2006
JP	2001286477	A	10/2001	JP	2006510879	A	3/2006
JP	2001517473	A	10/2001	JP	3791856	B2	6/2006
JP	2002051974	A	2/2002	JP	2006187649	A	7/2006
JP	2002054903	A	2/2002	JP	2006218228	A	8/2006
JP	2002085415	A	3/2002	JP	2006218297	A	8/2006
JP	2002143078	A	5/2002	JP	2006223872	A	8/2006
JP	2002204801	A	7/2002	JP	2006281405	A	10/2006
JP	2002528161	A	9/2002	JP	2006289064	A	10/2006
JP	2002314298	A	10/2002	JP	2006334412	A	12/2006
JP	2002369820	A	12/2002	JP	2006334417	A	12/2006
JP	2002542186	A	12/2002	JP	2006346445	A	12/2006
JP	2003000603	A	1/2003	JP	2007000634	A	1/2007
JP	2003500153	A	1/2003	JP	2007050253	A	3/2007
JP	2003504104	A	2/2003	JP	2007061628	A	3/2007
JP	2003135473	A	5/2003	JP	3906843	B2	4/2007
JP	2003148903	A	5/2003	JP	2007083051	A	4/2007
JP	2003164066	A	6/2003	JP	2007098130	A	4/2007
JP	2003521301	A	7/2003	JP	2007105481	A	4/2007
JP	2003521304	A	7/2003	JP	2007117725	A	5/2007
JP	2003523251	A	8/2003	JP	2007130471	A	5/2007
				JP	2007130479	A	5/2007
				JP	3934161	B2	6/2007
				JP	2007203047	A	8/2007
				JP	2007203049	A	8/2007

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

JP	2007203051	A	8/2007	JP	2010279690	A	12/2010
JP	2007203055	A	8/2007	JP	2010540192	A	12/2010
JP	2007203057	A	8/2007	JP	2011005260	A	1/2011
JP	2007524435	A	8/2007	JP	2011504391	A	2/2011
JP	2007222615	A	9/2007	JP	2011509786	A	3/2011
JP	2007229448	A	9/2007	JP	2011072574	A	4/2011
JP	2007526026	A	9/2007	JP	2011072797	A	4/2011
JP	4001860	B2	10/2007	JP	2011078763	A	4/2011
JP	2007252916	A	10/2007	JP	2011-115594	A	6/2011
JP	2007307373	A	11/2007	JP	2011-520564	A	7/2011
JP	2007325922	A	12/2007	JP	4722849	B2	7/2011
JP	2008068073	A	3/2008	JP	4783373	B2	9/2011
JP	2008510515	A	4/2008	JP	2011524199	A	9/2011
JP	2008516669	A	5/2008	JP	2011251156	A	12/2011
JP	2008528203	A	7/2008	JP	2012040398	A	3/2012
JP	2008-220032	A	9/2008	JP	2012507356	A	3/2012
JP	2008206967	A	9/2008	JP	2012517289	A	8/2012
JP	2008212637	A	9/2008	JP	5140421	B2	2/2013
JP	2008212638	A	9/2008	JP	5154710	B1	2/2013
JP	2008212640	A	9/2008	JP	5162595	B2	3/2013
JP	2008220956	A	9/2008	JP	2013517891	A	5/2013
JP	2008237881	A	10/2008	JP	2013526342	A	6/2013
JP	2008259860	A	10/2008	JP	2013128791	A	7/2013
JP	2008264535	A	11/2008	JP	5333899	B2	11/2013
JP	2008283459	A	11/2008	JP	2014121599	A	7/2014
JP	2008307393	A	12/2008	JP	2016-512057	A	4/2016
JP	2009000531	A	1/2009	KR	20100110134	A	10/2010
JP	2009006137	A	1/2009	KR	20110003229	A	1/2011
JP	2009502351	A	1/2009	RU	1814161	C	5/1993
JP	2009502352	A	1/2009	RU	2008830	C1	3/1994
JP	2009022742	A	2/2009	RU	2052979	C1	1/1996
JP	2009506799	A	2/2009	RU	2066128	C1	9/1996
JP	2009507526	A	2/2009	RU	2098025	C1	12/1997
JP	2009072595	A	4/2009	RU	2141279	C1	11/1999
JP	2009072599	A	4/2009	RU	2144791	C1	1/2000
JP	2009090113	A	4/2009	RU	2161450	C1	1/2001
JP	2009106752	A	5/2009	RU	2181566	C2	4/2002
JP	2009189821	A	8/2009	RU	2187249	C2	8/2002
JP	2009189823	A	8/2009	RU	2189091	C2	9/2002
JP	2009189836	A	8/2009	RU	32984	U1	10/2003
JP	2009189837	A	8/2009	RU	2225170	C2	3/2004
JP	2009189838	A	8/2009	RU	42750	U1	12/2004
JP	2009189846	A	8/2009	RU	61114	U1	2/2007
JP	2009189847	A	8/2009	RU	61122	U1	2/2007
JP	2009201998	A	9/2009	RU	2007103563	A	8/2008
JP	2009207260	A	9/2009	SU	189517	A	1/1967
JP	2009226028	A	10/2009	SU	297156	A	5/1971
JP	2009536082	A	10/2009	SU	328636	A	9/1972
JP	2009261944	A	11/2009	SU	511939	A1	4/1976
JP	2009268908	A	11/2009	SU	674747	A1	7/1979
JP	2009538684	A	11/2009	SU	728848	A1	4/1980
JP	2009539420	A	11/2009	SU	886900	A1	12/1981
JP	2009291604	A	12/2009	SU	1009439	A	4/1983
JP	2010504808	A	2/2010	SU	1022703	A1	6/1983
JP	2010504809	A	2/2010	SU	1271497	A1	11/1986
JP	2010504813	A	2/2010	SU	1333319	A2	8/1987
JP	2010504846	A	2/2010	SU	1377052	A1	2/1988
JP	2010505524	A	2/2010	SU	1377053	A1	2/1988
JP	2010069307	A	4/2010	SU	1443874	A1	12/1988
JP	2010069310	A	4/2010	SU	1509051	A1	9/1989
JP	2010075694	A	4/2010	SU	1561964	A1	5/1990
JP	2010075695	A	4/2010	SU	1708312	A1	1/1992
JP	2010088876	A	4/2010	SU	1722476	A1	3/1992
JP	2010094514	A	4/2010	SU	1752361	A1	8/1992
JP	2010098844	A	4/2010	SU	1814161	A1	5/1993
JP	4461008	B2	5/2010	WO	WO-8202824	A1	9/1982
JP	2010-520025	A	6/2010	WO	WO-8602254	A1	4/1986
JP	2010-148879	A	7/2010	WO	WO-9115157	A1	10/1991
JP	2010142636	A	7/2010	WO	WO-9220295	A1	11/1992
JP	4549018	B2	9/2010	WO	WO-9221300	A1	12/1992
JP	2010214166	A	9/2010	WO	WO-9308755	A1	5/1993
JP	2010-240429	A	10/2010	WO	WO-9313718	A1	7/1993
JP	2010240411	A	10/2010	WO	WO-9314690	A1	8/1993
JP	2010246948	A	11/2010	WO	WO-9315648	A1	8/1993
JP	2010-540041	A	12/2010	WO	WO-9315850	A1	8/1993
				WO	WO-9319681	A1	10/1993
				WO	WO-9400060	A1	1/1994
				WO	WO-9411057	A1	5/1994
				WO	WO-9414129	A1	6/1994

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

WO	WO-9412108	A1	6/1994	WO	WO-9923959	A1	5/1999
WO	WO-9417737	A1	8/1994	WO	WO-9925261	A1	5/1999
WO	WO-9418893	A1	9/1994	WO	WO-9929244	A1	6/1999
WO	WO-9420030	A1	9/1994	WO	WO-9934744	A1	7/1999
WO	WO-9422378	A1	10/1994	WO	WO-9945849	A1	9/1999
WO	WO-9423659	A1	10/1994	WO	WO-9948430	A1	9/1999
WO	WO-9424943	A1	11/1994	WO	WO-9951158	A1	10/1999
WO	WO-9424947	A1	11/1994	WO	WO-0024322	A1	5/2000
WO	WO-9502369	A1	1/1995	WO	WO-0024330	A1	5/2000
WO	WO-9503743	A1	2/1995	WO	WO-0033755	A1	6/2000
WO	WO-9506817	A1	3/1995	WO	WO-0041638	A1	7/2000
WO	WO-9509576	A1	4/1995	WO	WO-0048506	A1	8/2000
WO	WO-9509577	A1	4/1995	WO	WO-0053112	A2	9/2000
WO	WO-9514436	A1	6/1995	WO	WO-0054653	A1	9/2000
WO	WO-9517855	A1	7/1995	WO	WO-0057796	A1	10/2000
WO	WO-9518383	A1	7/1995	WO	WO-0064365	A1	11/2000
WO	WO-9518572	A1	7/1995	WO	WO-0072762	A1	12/2000
WO	WO-9519739	A1	7/1995	WO	WO-0072765	A1	12/2000
WO	WO-9520360	A1	8/1995	WO	WO-0078222	A1	12/2000
WO	WO-9523557	A1	9/1995	WO	WO-0103587	A1	1/2001
WO	WO-9524865	A1	9/1995	WO	WO-0105702	A1	1/2001
WO	WO-9525471	A3	9/1995	WO	WO-0110482	A1	2/2001
WO	WO-9526562	A1	10/1995	WO	WO-0135845	A1	5/2001
WO	WO-9529639	A1	11/1995	WO	WO-0154594	A1	8/2001
WO	WO-9604858	A1	2/1996	WO	WO-0158371	A1	8/2001
WO	WO-9618344	A2	6/1996	WO	WO-0162158	A2	8/2001
WO	WO-9619151	A1	6/1996	WO	WO-0162161	A1	8/2001
WO	WO-9619152	A1	6/1996	WO	WO-0162162	A1	8/2001
WO	WO-9620652	A1	7/1996	WO	WO-0162163	A1	8/2001
WO	WO-9621119	A1	7/1996	WO	WO-0162164	A2	8/2001
WO	WO-9622055	A1	7/1996	WO	WO-0162169	A2	8/2001
WO	WO-9623448	A1	8/1996	WO	WO-0178605	A2	10/2001
WO	WO-9624301	A1	8/1996	WO	WO-0180757	A2	11/2001
WO	WO-9627337	A1	9/1996	WO	WO-0191646	A1	12/2001
WO	WO-9631155	A1	10/1996	WO	WO-0200121	A1	1/2002
WO	WO-9635464	A1	11/1996	WO	WO-0207608	A2	1/2002
WO	WO-9639085	A1	12/1996	WO	WO-0207618	A1	1/2002
WO	WO-9639086	A1	12/1996	WO	WO-0217799	A1	3/2002
WO	WO-9639087	A1	12/1996	WO	WO-0219920	A1	3/2002
WO	WO-9639088	A1	12/1996	WO	WO-0219932	A1	3/2002
WO	WO-9639089	A1	12/1996	WO	WO-0226143	A1	4/2002
WO	WO-9700646	A1	1/1997	WO	WO-0230297	A2	4/2002
WO	WO-9700647	A1	1/1997	WO	WO-0232322	A2	4/2002
WO	WO-9701989	A1	1/1997	WO	WO-0236028	A1	5/2002
WO	WO-9706582	A1	2/1997	WO	WO-0243571	A2	6/2002
WO	WO-9710763	A1	3/1997	WO	WO-02058568	A1	8/2002
WO	WO-9710764	A1	3/1997	WO	WO-02060328	A1	8/2002
WO	WO-9711648	A2	4/1997	WO	WO-02065933	A2	8/2002
WO	WO-9711649	A1	4/1997	WO	WO-02067785	A2	9/2002
WO	WO-9715237	A1	5/1997	WO	WO-02080781	A2	10/2002
WO	WO-9724073	A1	7/1997	WO	WO-02085218	A2	10/2002
WO	WO-9724993	A1	7/1997	WO	WO-02087586	A1	11/2002
WO	WO-9730644	A1	8/1997	WO	WO-02098302	A1	12/2002
WO	WO-9730659	A1	8/1997	WO	WO-03000138	A2	1/2003
WO	WO-9734533	A1	9/1997	WO	WO-03001329	A2	1/2003
WO	WO-9737598	A1	10/1997	WO	WO-03001986	A2	1/2003
WO	WO-9739688	A2	10/1997	WO	WO-03013363	A1	2/2003
WO	WO-9741767	A2	11/1997	WO	WO-03013372	A2	2/2003
WO	WO-9801080	A1	1/1998	WO	WO-03015604	A2	2/2003
WO	WO-9817180	A1	4/1998	WO	WO-03020106	A2	3/2003
WO	WO-9822154	A2	5/1998	WO	WO-03020139	A2	3/2003
WO	WO-9827880	A1	7/1998	WO	WO-03024339	A1	3/2003
WO	WO-9830153	A1	7/1998	WO	WO-03030743	A2	4/2003
WO	WO-9847436	A1	10/1998	WO	WO-03037193	A1	5/2003
WO	WO-9858589	A1	12/1998	WO	WO-03055402	A1	7/2003
WO	WO-9902090	A1	1/1999	WO	WO-03057048	A1	7/2003
WO	WO-9903407	A1	1/1999	WO	WO-03057058	A1	7/2003
WO	WO-9903408	A1	1/1999	WO	WO-03063694	A1	8/2003
WO	WO-9903409	A1	1/1999	WO	WO-03077769	A1	9/2003
WO	WO-9912483	A1	3/1999	WO	WO-03079911	A1	10/2003
WO	WO-9912487	A1	3/1999	WO	WO-03082126	A1	10/2003
WO	WO-9912488	A1	3/1999	WO	WO-03086206	A1	10/2003
WO	WO-9915086	A1	4/1999	WO	WO-03088845	A2	10/2003
WO	WO-9915091	A1	4/1999	WO	WO-03047436	A3	11/2003
WO	WO-9923933	A2	5/1999	WO	WO-03090630	A2	11/2003
				WO	WO-03094743	A1	11/2003
				WO	WO-03094745	A1	11/2003
				WO	WO-03094746	A1	11/2003
				WO	WO-03094747	A1	11/2003

(56)

## References Cited

FOREIGN PATENT DOCUMENTS			
WO	WO-03101313	A1	12/2003
WO	WO-03105698	A2	12/2003
WO	WO-03105702	A2	12/2003
WO	WO-2004004578	A1	1/2004
WO	WO-2004006980	A2	1/2004
WO	WO-2004011037	A2	2/2004
WO	WO-2004014238	A2	2/2004
WO	WO-03079909	A3	3/2004
WO	WO-2004019769	A1	3/2004
WO	WO-2004019803	A1	3/2004
WO	WO-2004021868	A2	3/2004
WO	WO-2004028585	A2	4/2004
WO	WO-2004030554	A1	4/2004
WO	WO-2004032754	A2	4/2004
WO	WO-2004032760	A2	4/2004
WO	WO-2004032762	A1	4/2004
WO	WO-2004032763	A2	4/2004
WO	WO-2004032783	A1	4/2004
WO	WO-2004034875	A2	4/2004
WO	WO-2004047626	A1	6/2004
WO	WO-2004047653	A2	6/2004
WO	WO-2004049956	A2	6/2004
WO	WO-2004050971	A2	6/2004
WO	WO-2004052426	A2	6/2004
WO	WO-2004056276	A1	7/2004
WO	WO-2004056277	A1	7/2004
WO	WO-2004062516	A1	7/2004
WO	WO-2004064600	A2	8/2004
WO	WO-2004078050	A2	9/2004
WO	WO-2004078051	A2	9/2004
WO	WO-2004078236	A2	9/2004
WO	WO-2004086987	A1	10/2004
WO	WO-2004096015	A2	11/2004
WO	WO-2004096057	A2	11/2004
WO	WO-2004103157	A2	12/2004
WO	WO-2004105593	A1	12/2004
WO	WO-2004105621	A1	12/2004
WO	WO-2004112618	A2	12/2004
WO	WO-2004112652	A2	12/2004
WO	WO-2005027983	A2	3/2005
WO	WO-2005037329	A2	4/2005
WO	WO-2005042041	A1	5/2005
WO	WO-2005044078	A2	5/2005
WO	WO-2005048809	A1	6/2005
WO	WO-2005055846	A1	6/2005
WO	WO-2005072634	A2	8/2005
WO	WO-2005078892	A1	8/2005
WO	WO-2005079675	A2	9/2005
WO	WO-2005087128	A1	9/2005
WO	WO-2005096954	A2	10/2005
WO	WO-2005110243	A2	11/2005
WO	WO-2005112806	A2	12/2005
WO	WO-2005112808	A1	12/2005
WO	WO-2005115251	A1	12/2005
WO	WO-2005115253	A2	12/2005
WO	WO-2005117735	A1	12/2005
WO	WO-2005122936	A1	12/2005
WO	WO-2006/026520	A2	3/2006
WO	WO-2006023486	A1	3/2006
WO	WO-2006023578	A2	3/2006
WO	WO-2006027014	A1	3/2006
WO	WO-2006028314	A1	3/2006
WO	WO-2006044490	A2	4/2006
WO	WO-2006044581	A2	4/2006
WO	WO-2006044810	A2	4/2006
WO	WO-2006049852	A2	5/2006
WO	WO-2006050360	A1	5/2006
WO	WO-2006051252	A1	5/2006
WO	WO-2006/057702	A2	6/2006
WO	WO-2006059067	A1	6/2006
WO	WO-2006/073581	A2	7/2006
WO	WO-2006083748	A1	8/2006
WO	WO-2006085389	A1	8/2006
WO	WO-2006092563	A1	9/2006
WO	WO-2006092565	A1	9/2006
WO	WO-2006115958	A1	11/2006
WO	WO-2006125940	A1	11/2006
WO	WO-2006132992	A2	12/2006
WO	WO-2007002180	A2	1/2007
WO	WO-2007014355	A2	2/2007
WO	WO-2007015971	A2	2/2007
WO	WO-2007016290	A2	2/2007
WO	WO-2007018898	A2	2/2007
WO	WO-2007034161	A2	3/2007
WO	WO-2007051000	A2	5/2007
WO	WO-2007059233	A2	5/2007
WO	WO-2007074430	A1	7/2007
WO	WO-2007089603	A2	8/2007
WO	WO-2007098220	A2	8/2007
WO	WO-2007121579	A1	11/2007
WO	WO-2007129121	A1	11/2007
WO	WO-2007131110	A2	11/2007
WO	WO-2007137304	A2	11/2007
WO	WO-2007139734	A2	12/2007
WO	WO-2007142625	A2	12/2007
WO	WO-2007145825	A2	12/2007
WO	WO-2007146987	A2	12/2007
WO	WO-2007147439	A1	12/2007
WO	WO-2008020964	A2	2/2008
WO	WO-2008021687	A1	2/2008
WO	WO-2008021969	A2	2/2008
WO	WO-2008027972	A1	3/2008
WO	WO-2008039237	A1	4/2008
WO	WO-2008039249	A1	4/2008
WO	WO-2008039270	A1	4/2008
WO	WO-2008045383	A2	4/2008
WO	WO-2008/061566	A1	5/2008
WO	WO-2008057281	A2	5/2008
WO	WO-2008070763	A1	6/2008
WO	WO-2008080148	A2	7/2008
WO	WO-2008089404	A2	7/2008
WO	WO-2008101080	A1	8/2008
WO	WO-2008101228	A2	8/2008
WO	WO-2008103797	A2	8/2008
WO	WO-2008109123	A2	9/2008
WO	WO-2008109125	A1	9/2008
WO	WO-2008112912	A2	9/2008
WO	WO-2008118728	A1	10/2008
WO	WO-2008118928	A2	10/2008
WO	WO-2008124748	A1	10/2008
WO	WO-2008131357	A1	10/2008
WO	WO-2009005969	A2	1/2009
WO	WO-2009022614	A1	2/2009
WO	WO-2009023851	A1	2/2009
WO	WO-2009033057	A2	3/2009
WO	WO-2009039506	A1	3/2009
WO	WO-2009046394	A1	4/2009
WO	WO-2009066105	A1	5/2009
WO	WO-2009067649	A2	5/2009
WO	WO-2009091497	A2	7/2009
WO	WO-2009120944	A2	10/2009
WO	WO-2009137761	A2	11/2009
WO	WO-2009143092	A1	11/2009
WO	WO-2009143331	A1	11/2009
WO	WO-2009150650	A2	12/2009
WO	WO-2009152307	A1	12/2009
WO	WO-2010028332	A2	3/2010
WO	WO-2010030434	A1	3/2010
WO	WO-2010045425	A1	4/2010
WO	WO-2010050771	A2	5/2010
WO	WO-2010054404	A1	5/2010
WO	WO-2010056714	A1	5/2010
WO	WO-2010063795	A1	6/2010
WO	WO-2010090940	A1	8/2010
WO	WO-2010093333	A1	8/2010
WO	WO-2010098871	A2	9/2010
WO	WO-2010134913	A1	11/2010
WO	WO-2011008672	A2	1/2011
WO	WO-2011013103	A1	2/2011
WO	WO-2011044343	A2	4/2011
WO	WO-2011056458	A1	5/2011
WO	WO-2011060311	A2	5/2011
WO	WO-2011084969	A1	7/2011
WO	WO-2011127137	A1	10/2011

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

WO	WO-2012006306	A2	1/2012
WO	WO-2012009431	A2	1/2012
WO	WO-2012/013577	A1	2/2012
WO	WO-2012021671	A1	2/2012
WO	WO-2012040438	A1	3/2012
WO	WO-2012044551	A1	4/2012
WO	WO-2012044554	A1	4/2012
WO	WO-2012044597	A1	4/2012
WO	WO-2012044606	A2	4/2012
WO	WO-2012044820	A1	4/2012
WO	WO-2012044844	A2	4/2012
WO	WO-2012044853	A1	4/2012
WO	WO-2012044854	A1	4/2012
WO	WO-2012058213	A2	5/2012
WO	WO-2012068156	A2	5/2012
WO	WO-2012109760	A1	8/2012
WO	WO-2012127462	A1	9/2012
WO	WO-2012135705	A1	10/2012
WO	WO-2012143913	A2	10/2012
WO	WO-2012148667	A2	11/2012
WO	WO-2012148668	A2	11/2012
WO	WO-2012148703	A2	11/2012
WO	WO-2012160163	A1	11/2012
WO	WO-2012166503	A1	12/2012
WO	WO-2013009252	A2	1/2013
WO	WO-2013009699	A2	1/2013
WO	WO-2013023114	A1	2/2013
WO	WO-2013036409	A1	3/2013
WO	WO-2013043707	A2	3/2013
WO	WO-2013043717	A1	3/2013
WO	WO-2013043721	A2	3/2013
WO	WO-2013062978	A2	5/2013
WO	WO-2013116869	A1	8/2013
WO	WO-2013148762	A2	10/2013
WO	WO-2013151888	A1	10/2013
WO	WO-2013167427	A1	11/2013
WO	WO-2013188130	A1	12/2013
WO	WO-2014/008289	A2	1/2014
WO	WO-2014004199	A1	1/2014
WO	WO-2014004209	A2	1/2014
WO	WO-2014004294	A2	1/2014
WO	WO-2014/113438	A1	7/2014
WO	WO-2014/134034	A2	9/2014
WO	WO-2014/172213	A2	10/2014
WO	WO-2014158882	A2	10/2014
WO	WO-2015/032797	A1	3/2015
WO	WO-2015138760	A1	9/2015
WO	WO-2015/148136	A1	10/2015
WO	WO-2015148141	A1	10/2015
WO	WO-2015153642	A1	10/2015
WO	WO-2015187107	A1	12/2015

## OTHER PUBLICATIONS

Texas Instruments: "Current Recirculation and Decay Modes," Application Report SLVA321—Mar. 2009; Retrieved from the Internet: URL:<http://www.ti.com/lit/an/slva321/slva321> [retrieved on Apr. 25, 2017], 7 pages.

Brar et al., "Investigation of the mechanical and degradation properties of Mg—Sr and Mg—Zn—Sr alloys for use as potential biodegradable implant materials," *J. Mech. Behavior of Biomed. Mater.* 7 (2012) pp. 87-95.

Yan et al., "Comparison of the effects of Mg—6Zn and titanium on intestinal tract in vivo," *J Mater Sci: Mater Med* (2013), 11 pages.

Pellicer et al. "On the biodegradability, mechanical behavior, and cytocompatibility of amorphous Mg<sub>72</sub>Zn<sub>23</sub>Ca<sub>5</sub> and crystalline Mg<sub>70</sub>Zn<sub>23</sub>Ca<sub>5</sub>Pd<sub>2</sub> alloys as temporary implant materials," *J Biomed Mater Res Part A* ,2013:101A:502-517.

Yan et al, Comparison of the effects of Mg—6Zn and Ti—3Al—2.5V alloys on TGF-β/TNF-α/VEGF/b-FGF in the healing of the intestinal track in vivo, *Biomed. Mater.* 9 (2014), 11 pages.

Mouser Electronics, "LM317 3-Terminal Adjustable Regulator with Overcurrent/Overtemperature Self Protection", Sep. 30, 2016 (Sep. 30, 2016), XP0555246104, Retrieved from the Internet: URL: <http://www.mouser.com/ds/2/405/lm317m-440423.pdf>, pp. 1-9.

Mouser Electronics, "LM317M 3-Terminal Adjustable Regulator with Overcurrent/Overtemperature Self Protection", Mar. 31, 2014 (Mar. 31, 2014), XP0555246104, Retrieved from the Internet: URL: <http://www.mouser.com/ds/2/405/lm317m-440423.pdf>, pp. 1-8.

The Soderm Aseptic Battery Transfer Kit, Soderm Systems, 2000, 3 pages.

Anonymous, Analog Devices Wiki, Chapter 11: The Current Mirror, Aug. 20, 2017, 22 pages. <https://wiki.analog.com/university/courses/electronics/text/chapter-11?rev=1503222341>.

Cuper et al., "The Use of Near-Infrared Light for Safe and Effective Visualization of Subsurface Blood Vessels to Facilitate Blood Withdrawal in Children," *Medical Engineering & Physics*, vol. 35, No. 4, pp. 433-440 (2013).

Anonymous: "Sense & Control Application Note Current Sensing Using Linear Hall Sensors," Feb. 3, 2009, pp. 1-18. Retrieved from the Internet: URL: [http://www.infineon.com/dgdl/Current\\_Sensing\\_Rev.1.1.pdf?fileId=db3a304332d040720132d939503e5f17](http://www.infineon.com/dgdl/Current_Sensing_Rev.1.1.pdf?fileId=db3a304332d040720132d939503e5f17) [retrieved on Oct. 18, 2016].

Lyon et al. "The Relationship Between Current Load and Temperature for Quasi-Steady State and Transient Conditions," SPIE—International Society for Optical Engineering. Proceedings, vol. 4020, (pp. 62-70), Mar. 30, 2000.

Serial Communication Protocol; Michael Lemmon Feb. 1, 2009; <http://www3.nd.edu/~lemmon/courses/ee224/web-manual/web-manual/lab12/node2.html>; Wayback Machine to Apr. 29, 2012.

Byrne et al., "Molecular Imprinting Within Hydrogels," *Advanced Drug Delivery Reviews*, 54 (2002) pp. 149-161.

Fast, Versatile Blackfin Processors Handle Advanced RFID Reader Applications; Analog Dialogue: vol. 40—Sep. 2006; <http://www.analog.com/library/analogDialogue/archives/40-09/rfid.pdf>; Wayback Machine to Feb. 15, 2012.

C.C. Thompson et al., "Peroral Endoscopic Reduction of Dilated Gastrojejunal Anastomosis After Roux-en-Y Gastric Bypass: A Possible New Option for Patients with Weight Regain," *Surg Endosc* (2006) vol. 20., pp. 1744-1748.

Covidien Brochure, "Endo GIA™ Black Reload with Tri-Staple™ Technology," (2012), 2 pages.

Chen et al., "Elastomeric Biomaterials for Tissue Engineering," *Progress in Polymer Science* 38 (2013), pp. 584-671.

Covidien Brochure, "Endo GIA™ Reloads with Tri-Staple™ Technology," (2010), 2 pages.

Covidien Brochure, "Endo GIA™ Curved Tip Reload with Tri-Staple™ Technology," (2012), 2 pages.

Covidien Brochure, "Endo GIA™ Reloads with Tri-Staple™ Technology and Endo GIA™ Ultra Universal Staplers," (2010), 2 pages.

Covidien Brochure, "Endo GIA™ Reloads with Tri-Staple™ Technology," (2010), 1 page.

Data Sheet of LM4F230H5QR, 2007.

Matsuda, "Thermodynamics of Formation of Porous Polymeric Membrane from Solutions," *Polymer Journal*, vol. 23, No. 5, pp. 435-444 (1991).

Seils et al., Covidien Summary: Clinical Study "UCONN Biodynamics: Final Report on Results," (2 pages).

"Indian Standard: Automotive Vehicles—Brakes and Braking Systems (IS 11852-1:2001)", Mar. 1, 2001.

Pitt et al., "Attachment of Hyaluronan to Metallic Surfaces," *J. Biomed. Mater. Res.* 68A: pp. 95-106, 2004.

Datasheet for Panasonic TK Relays Ultra Low Profile 2 A Polarized Relay, Copyright Matsushita Electric Works, Ltd. (Known of at least as early as Aug. 17, 2010), 5 pages.

D. Tuite, Ed., "Get the Lowdown on Ultracapacitors," Nov. 15, 2007; [online] URL: <http://electronicdesign.com/Articles/Print.cfm?ArticleID=17465>, accessed Jan. 15, 2008 (5 pages).

B.R. Coolman, DVM, MS et al., "Comparison of Skin Staples With Sutures for Anastomosis of the Small Intestine in Dogs," Abstract; <http://www.blackwell-synergy.com/doi/abs/10.1053/jvet.2000.7539?cookieSet=1&journalCode=vsu> which redirects to <http://www3.interscience.wiley.com/journal/119040681/abstract?CRETRY=1&SRETRY=0>; [online] accessed: Sep. 22, 2008 (2 pages).

(56)

**References Cited**

## OTHER PUBLICATIONS

- Allegro MicroSystems, LLC, Automotive Full Bridge MOSFET Driver, A3941-DS, Rev. 5, 21 pages, <http://www.allegromicro.com/~media/Files/Datasheets/A3941-Datasheet.ashx?la=en>.  
<http://ninpgan.net/publications/51-100/89.pdf>; 2004, Ning Pan, On Uniqueness of Fibrous Materials, Design & Nature II. Eds: Colins, M. and Brebbia, C. WIT Press, Boston, 493-504.
- Covidien Brochure "iDrive™ Ultra Powered Stapling System," (6 pages).
- Covidien "iDrive™ Ultra Powered Stapling System, Cleaning and Sterilization Guide," (2 pages).
- Covidien "iDrive™ Ultra Powered Stapling System, A Guide for Surgeons," (6 pages).
- Covidien iDrive™ Ultra Powered Stapling System brochure, "The Power of iDrive™ Ultra Powered Stapling System and Tri-Staple™ Technology," (23 pages).
- Covidien iDrive™ Ultra in Service Reference Card, "iDrive™ Ultra Powered Stapling Device," (4 pages).
- Solorio et al., "Gelatin Microspheres Crosslinked with Genipin for Local Delivery of Growth Factors," *J. Tissue Eng. Regen. Med.* (2010), 4(7): pp. 514-523.
- Schellhammer et al., "Poly-Lactic-Acid for Coating of Endovascular Stents: Preliminary Results in Canine Experimental Av-Fistulae," *Mat.-wiss. u. Werkstofftech.*, 32, pp. 193-199 (2001).
- Young, "Microcellular foams via phase separation," *Journal of Vacuum Science & Technology A* 4(3), (May/June. 1986).
- Peppas, Editor "Hydrogels in Medicine and Pharmacy," vol. I, Fundamentals, CRC Press, 1986.
- Ebara, "Carbohydrate-Derived Hydrogels and Microgels," *Engineered Carbohydrate-Based Materials for Biomedical Applications: Polymers, Surfaces, Dendrimers, Nanoparticles, and Hydrogels*, Edited by Ravin Narain, 2011, pp. 337-345.
- Peppas, "Physiologically Responsive Hydrogels," *Journal of Bioactive and Compatible Polymers*, vol. 6 (Jul. 1991) pp. 241-246.
- Hoffman, "Hydrogels for Biomedical Applications," *Advanced Drug Delivery Reviews*, 54 (2002) pp. 3-12.
- Hoffman, "Hydrogels for Biomedical Applications," *Advanced Drug Delivery Reviews*, 43 (2002) pp. 3-12.
- Qiu et al., "Environment-Sensitive Hydrogels for Drug Delivery," *Advanced Drug Delivery Reviews*, 53 (2001) pp. 321-339.
- Jeong et al., "Thermosensitive Sol-Gel Reversible Hydrogels," *Advanced Drug Delivery Reviews*, 54 (2002) pp. 37-51.
- Miyata et al., "Biomolecule-Sensitive Hydrogels," *Advanced Drug Delivery Reviews*, 54 (2002) pp. 79-98.
- Covidien Brochure, "Endo GIA™ Ultra Universal Stapler," (2010), 2 pages.
- ASTM procedure D2240-05, "Standard Test Method for Rubber Property-Durometer Hardness," (Published Apr. 2010).
- ASTM procedure D2240-00, "Standard Test Method for Rubber Property-Durometer Hardness," (Published Aug. 2000).
- Breedveld et al., "A New, Easily Miniaturized Sterrable Endoscope," *IEEE Engineering in Medicine and Biology Magazine* (Nov./Dec. 2005).
- Van Meer et al., "A Disposable Plastic Compact Wrist for Smart Minimally Invasive Surgical Tools," *LAAS/CNRS* (Aug. 2005).
- "Biomedical Coatings," Fort Wayne Metals, Research Products Corporation, obtained online at [www.fwmetals.com](http://www.fwmetals.com) on Jun. 21, 2010 (1 page).
- Disclosed Anonymously, "Motor-Driven Surgical Stapler Improvements," *Research Disclosure Database No. 526041*, Published: Feb. 2008.
- Patrick J. Sweeney: "RFID for Dummies", Mar. 11, 2010, pp. 365-365, XP055150775, ISBN: 978-1-11-805447-5, Retrieved from the Internet: URL: [books.google.de/books?isbn=1118054474](http://books.google.de/books?isbn=1118054474) [retrieved on Nov. 4, 2014]—book not attached.

\* cited by examiner

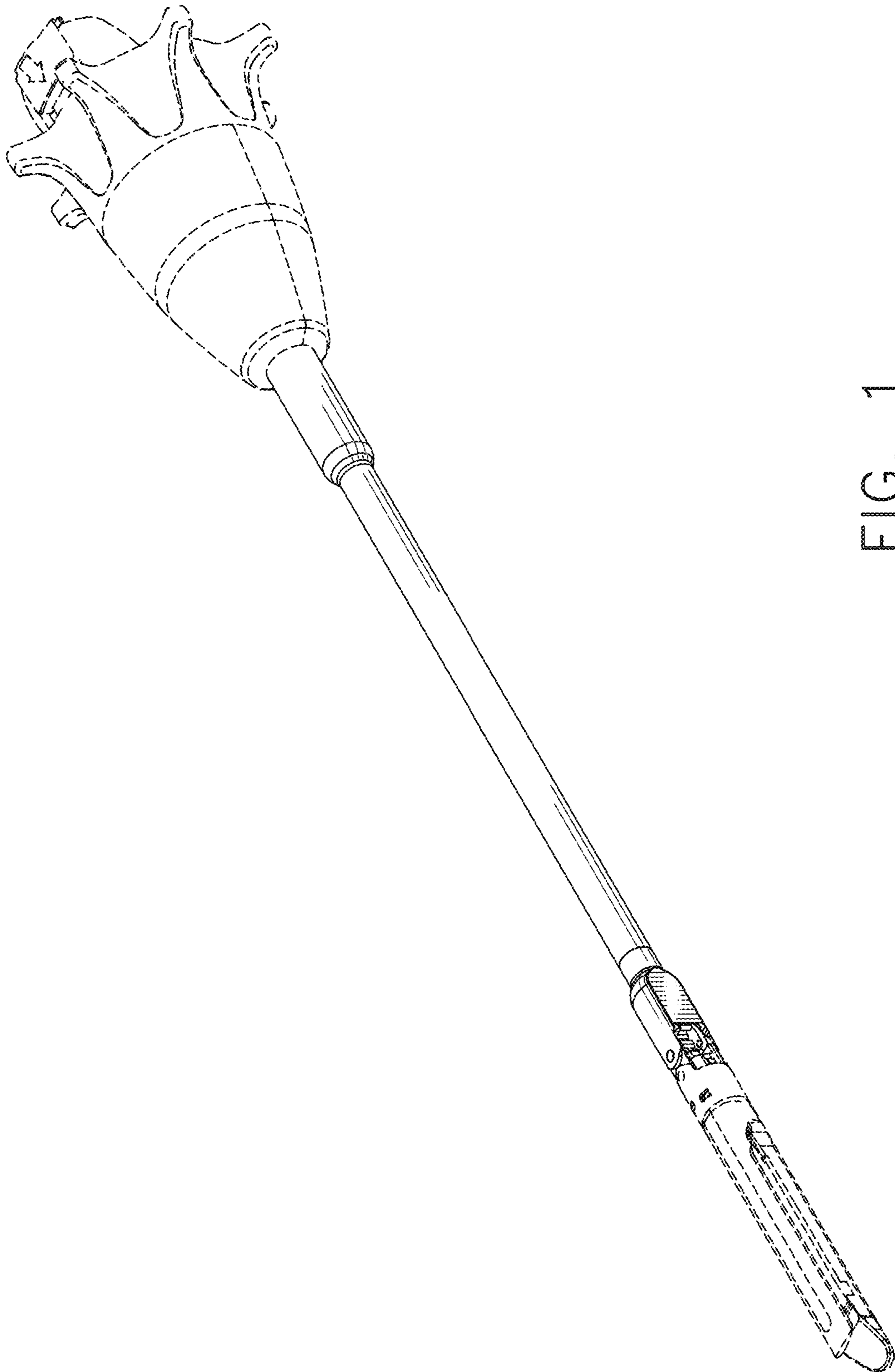


FIG. 1



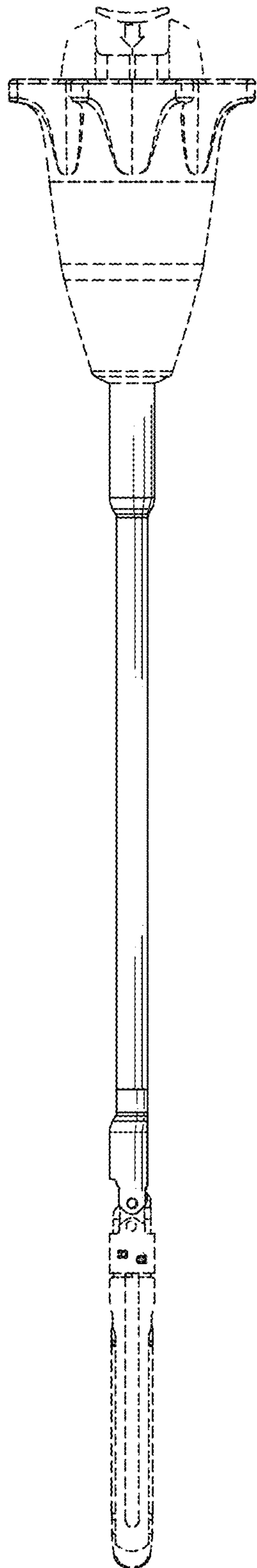


FIG. 2

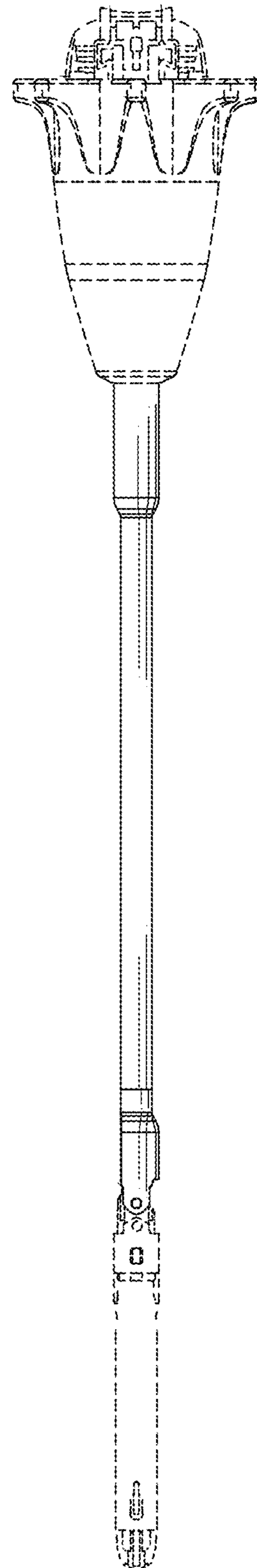


FIG. 3

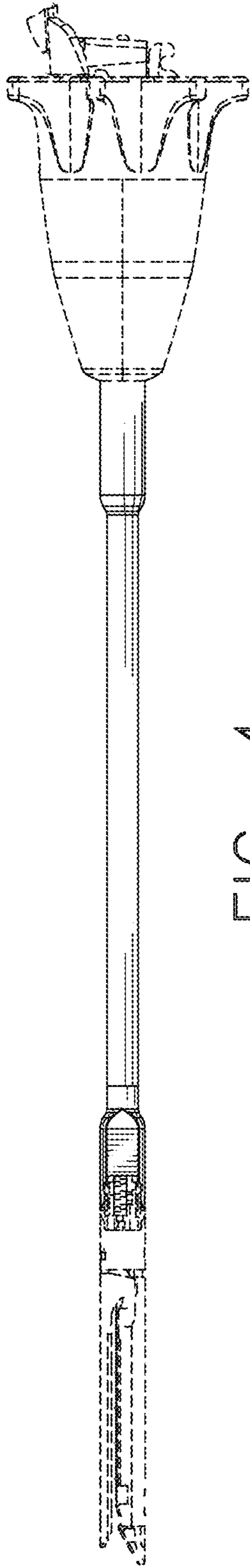


FIG. 4

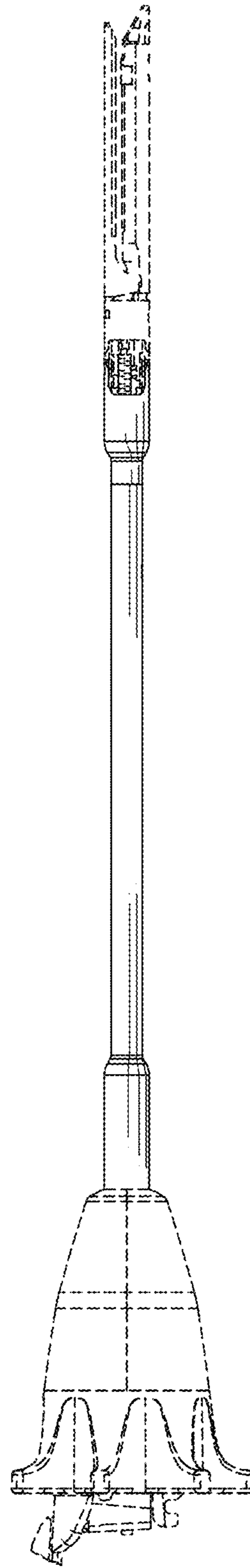


FIG. 5

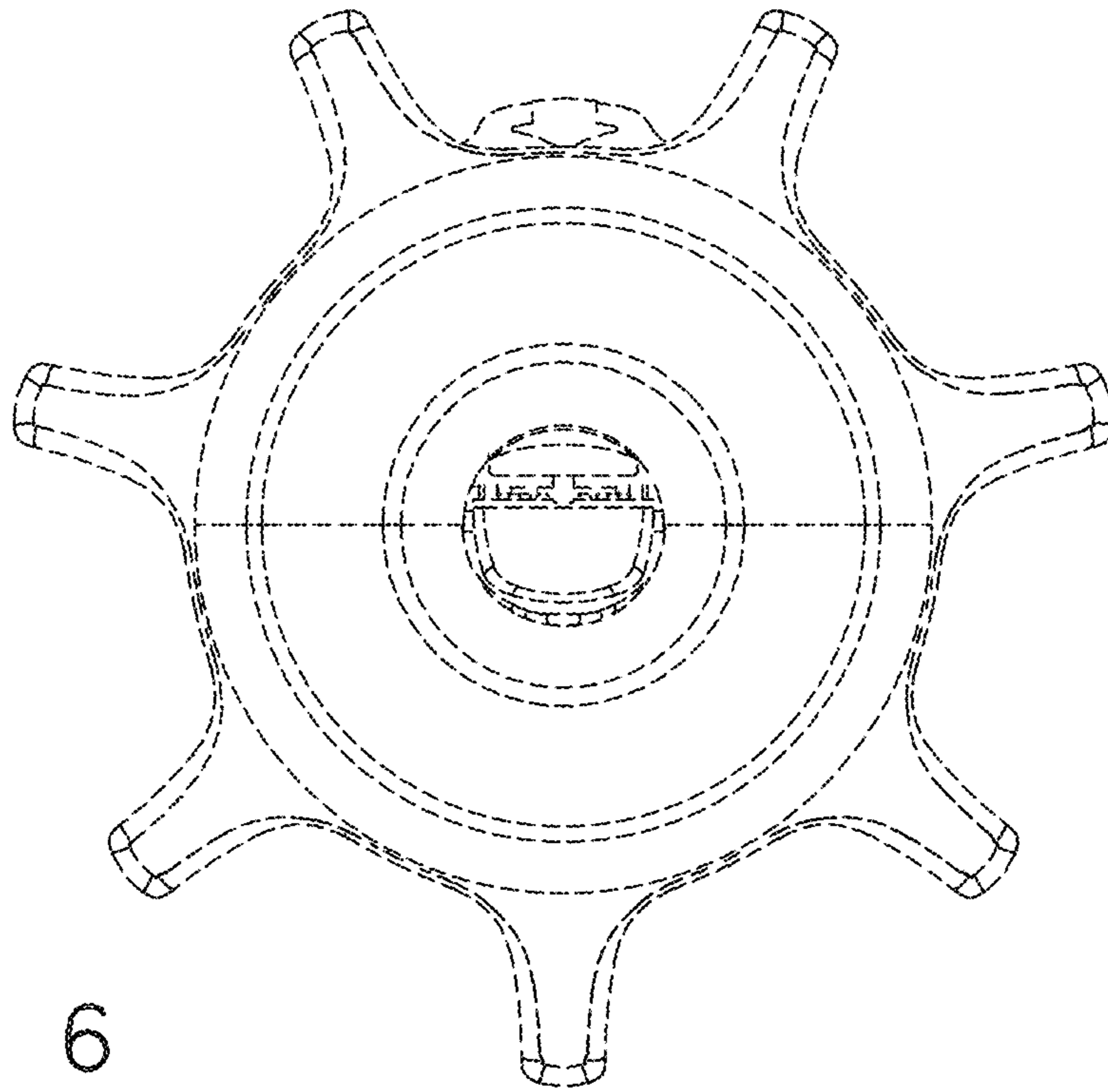


FIG. 6

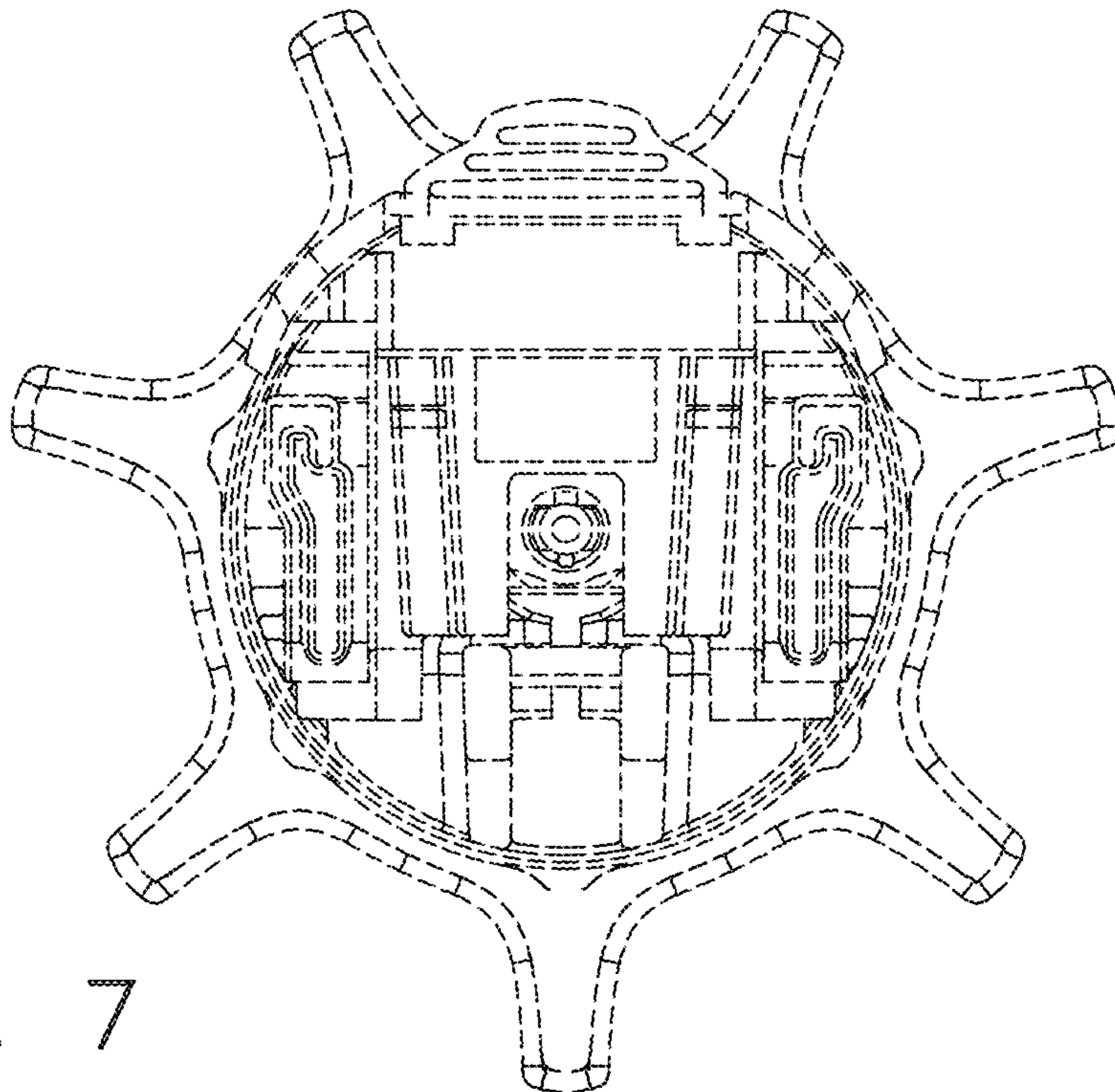


FIG. 7