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(54) **DISPLAY SCREEN OR PORTION THEREOF WITH ANIMATED GRAPHICAL USER INTERFACE**

1,306,107 A 6/1919 Elliott  
1,314,601 A 9/1919 McCaskey  
1,677,337 A 7/1928 Grove  
1,794,907 A 3/1931 Kelly  
1,849,427 A 3/1932 Hook

(Continued)

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FOREIGN PATENT DOCUMENTS

AU 2012200594 A1 2/2012  
AU 2011218702 B2 6/2013

(Continued)

OTHER PUBLICATIONS

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).

(Continued)

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(58) **Field of Classification Search**  
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See application file for complete search history.

(57) **CLAIM**

The ornamental design for a display screen or portion thereof with animated graphical user interface, as shown and described.

**DESCRIPTION**

FIG. 1 is a front view of a display screen or portion thereof with an animated graphical user interface showing a first image in a sequence.

FIG. 2 is a second image thereof.

FIG. 3 is a third image thereof; and,

FIG. 4 is a fourth image thereof.

The broken lines show a display screen or portion thereof and form no part of the claimed design.

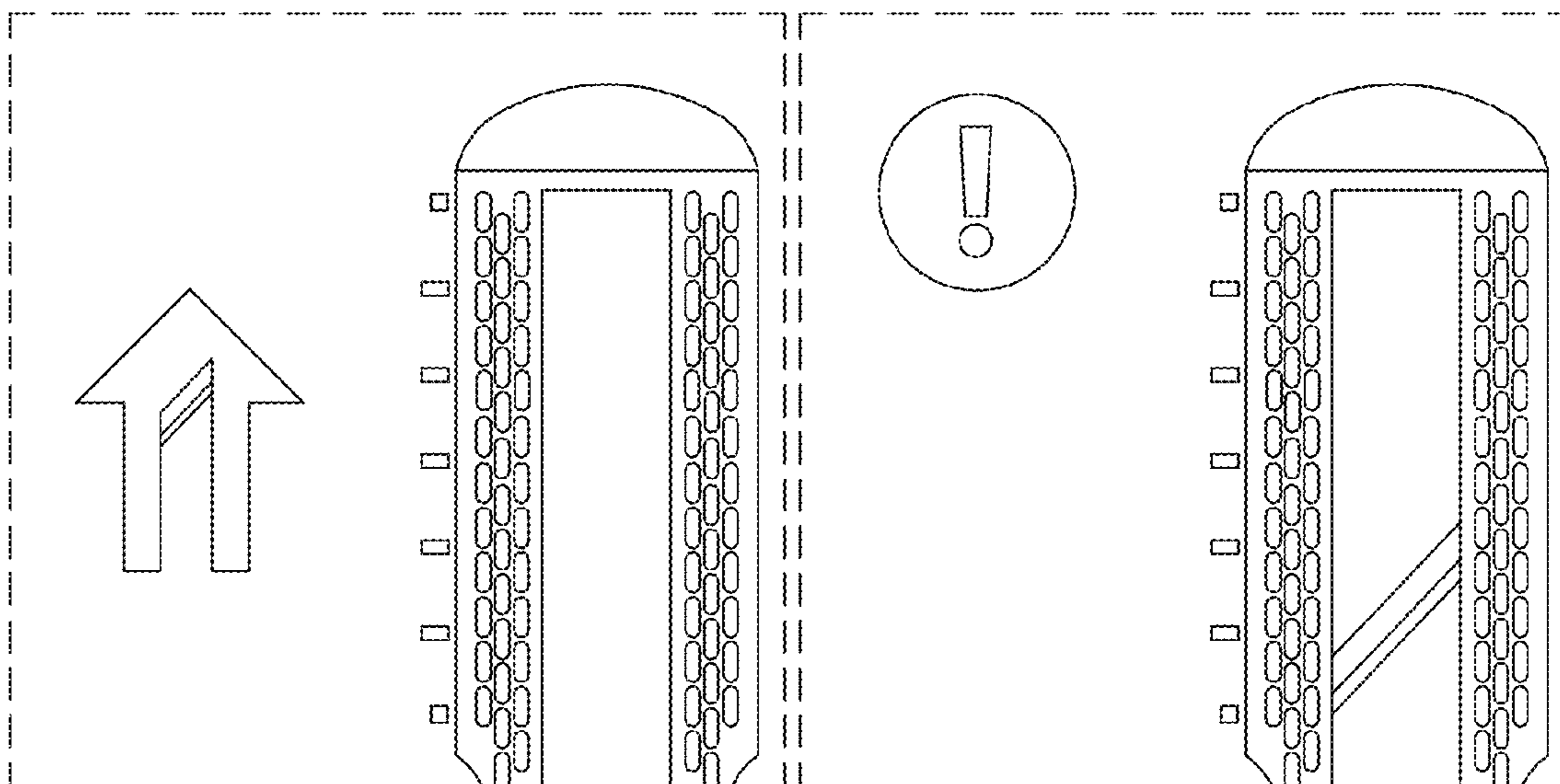
The appearance of the animated images transitions between the images shown in FIGS. 1-4. The process or period in which one image transitions to another forms no part of the claimed design.

(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  
1,188,721 A 6/1916 Bittner

**1 Claim, 4 Drawing Sheets**



(56)

## References Cited

## U.S. PATENT DOCUMENTS

1,944,116 A	1/1934	Stratman	3,726,755 A	4/1973	Shannon
1,954,048 A	4/1934	Jeffrey et al.	3,727,904 A	4/1973	Gabbey
2,037,727 A	4/1936	La Chapelle	3,734,207 A	5/1973	Fishbein
2,132,295 A	10/1938	Hawkins	3,740,994 A	6/1973	De Carlo, Jr.
2,161,632 A	6/1939	Nattenheimer	3,744,495 A	7/1973	Johnson
D120,434 S	5/1940	Gold	3,746,002 A	7/1973	Haller
2,211,117 A	8/1940	Hess	3,747,603 A	7/1973	Adler
2,214,870 A	9/1940	West	3,747,692 A	7/1973	Davidson
2,224,882 A	12/1940	Peck	3,751,902 A	8/1973	Kingsbury et al.
2,318,379 A	5/1943	Davis et al.	3,752,161 A	8/1973	Bent
2,329,440 A	9/1943	La Place	3,799,151 A	3/1974	Fukaumi et al.
2,377,581 A	6/1945	Shaffrey	3,808,452 A	4/1974	Hutchinson
2,406,389 A	8/1946	Royal Lee	3,815,476 A	6/1974	Green et al.
2,441,096 A	5/1948	Happe	3,819,100 A	6/1974	Noiles et al.
2,448,741 A	9/1948	Scott et al.	3,821,919 A	7/1974	Knohl
2,450,527 A	10/1948	Smith	3,826,978 A	7/1974	Kelly
2,507,872 A	5/1950	Unsinger	3,836,171 A	9/1974	Hayashi et al.
2,526,902 A	10/1950	Ruble	3,837,555 A	9/1974	Green
2,527,256 A	10/1950	Jackson	3,841,474 A	10/1974	Maier
2,578,686 A	12/1951	Fish	3,851,196 A	11/1974	Hinds
2,638,901 A	5/1953	Sugarbaker	3,863,639 A	2/1975	Kleaveland
2,674,149 A	4/1954	Benson	3,863,940 A	2/1975	Cummings
2,701,489 A	2/1955	Osborn	3,883,624 A	5/1975	McKenzie et al.
2,711,461 A	6/1955	Happe	3,885,491 A	5/1975	Curtis
2,742,955 A	4/1956	Dominguez	3,892,228 A	7/1975	Mitsui
2,804,848 A	9/1957	O'Farrell et al.	3,894,174 A	7/1975	Cartun
2,808,482 A	10/1957	Zanichkowsky et al.	3,902,247 A	9/1975	Fleer et al.
2,853,074 A	9/1958	Olson	3,940,844 A	3/1976	Colby et al.
2,856,192 A	10/1958	Schuster	3,944,163 A	3/1976	Hayashi et al.
2,887,004 A	5/1959	Stewart	3,950,686 A	4/1976	Randall
2,957,353 A	10/1960	Lewis	3,952,747 A	4/1976	Kimmell, Jr.
2,959,974 A	11/1960	Emrick	3,955,581 A	5/1976	Spasiano et al.
3,032,769 A	5/1962	Palmer	3,959,879 A	6/1976	Sellers
3,060,972 A	10/1962	Sheldon	RE28,932 E	8/1976	Noiles et al.
3,075,062 A	1/1963	Iaccarino	3,972,734 A	8/1976	King
3,078,465 A	2/1963	Bobrov	3,981,051 A	9/1976	Brumlik
3,079,606 A	3/1963	Bobrov et al.	4,025,216 A	5/1977	Hives
3,080,564 A	3/1963	Strekopitov et al.	4,027,746 A	6/1977	Kine
3,166,072 A	1/1965	Sullivan, Jr.	4,034,143 A	7/1977	Sweet
3,180,236 A	4/1965	Beckett	4,038,987 A	8/1977	Komiya
3,196,869 A	7/1965	Scholl	4,054,108 A	10/1977	Gill
3,204,731 A	9/1965	Bent et al.	4,060,089 A	11/1977	Noiles
3,266,494 A	8/1966	Brownrigg et al.	4,066,133 A	1/1978	Voss
3,269,630 A	8/1966	Fleischer	4,085,337 A	4/1978	Moeller
3,269,631 A	8/1966	Takaro	4,100,820 A	7/1978	Evet
3,275,211 A	9/1966	Hirsch et al.	4,106,446 A	8/1978	Yamada et al.
3,317,103 A	5/1967	Cullen et al.	4,106,620 A	8/1978	Brimmer et al.
3,317,105 A	5/1967	Astafjev et al.	4,108,211 A	8/1978	Tanaka
3,357,296 A	12/1967	Lefever	4,111,206 A	9/1978	Vishnevsky et al.
3,359,978 A	12/1967	Smith, Jr.	4,127,227 A	11/1978	Green
3,377,893 A	4/1968	Shorb	4,129,059 A	12/1978	Van Eck
3,480,193 A	11/1969	Ralston	4,132,146 A	1/1979	Uhlig
3,490,675 A	1/1970	Green et al.	4,135,517 A	1/1979	Reale
3,494,533 A	2/1970	Green et al.	4,154,122 A	5/1979	Severin
3,499,591 A	3/1970	Green	4,169,990 A	10/1979	Lerdman
3,503,396 A	3/1970	Pierie et al.	4,180,285 A	12/1979	Reneau
3,509,629 A	5/1970	Kidokoro	4,185,701 A	1/1980	Boys
3,551,987 A	1/1971	Wilkinson	4,190,042 A	2/1980	Sinnreich
3,568,675 A	3/1971	Harvey	4,198,734 A	4/1980	Brumlik
3,572,159 A	3/1971	Tschanz	4,198,982 A	4/1980	Fortner et al.
3,583,393 A	6/1971	Takahashi	4,207,898 A	6/1980	Becht
3,589,589 A	6/1971	Akopov	4,213,562 A	7/1980	Garrett et al.
3,598,943 A	8/1971	Barrett	4,226,242 A	10/1980	Jarvik
3,608,549 A	9/1971	Merrill	4,239,431 A	12/1980	Davini
3,618,842 A	11/1971	Bryan	4,241,861 A	12/1980	Fleischer
3,638,652 A	2/1972	Kelley	4,244,372 A	1/1981	Kapitanov et al.
3,640,317 A	2/1972	Panfili	4,250,436 A	2/1981	Weissman
3,643,851 A	2/1972	Green et al.	4,261,244 A	4/1981	Becht et al.
3,650,453 A	3/1972	Smith, Jr.	4,272,002 A	6/1981	Moshofsky
3,661,666 A	5/1972	Foster et al.	4,272,662 A	6/1981	Simpson
3,662,939 A	5/1972	Bryan	4,274,304 A	6/1981	Curtiss
3,688,966 A	9/1972	Perkins et al.	4,274,398 A	6/1981	Scott, Jr.
3,695,646 A	10/1972	Mommsen	4,275,813 A	6/1981	Noiles
3,709,221 A	1/1973	Riely	4,278,091 A	7/1981	Borzzone
3,717,294 A	2/1973	Green	4,282,573 A	8/1981	Imai et al.
			4,289,131 A	9/1981	Mueller
			4,289,133 A	9/1981	Rothfuss
			4,290,542 A	9/1981	Fedotov et al.
			D261,356 S	10/1981	Robinson

(56)

## References Cited

## U.S. PATENT DOCUMENTS

4,293,604 A	10/1981	Campbell	4,505,272 A	3/1985	Utyamyshev et al.
4,296,654 A	10/1981	Mercer	4,505,273 A	3/1985	Braun et al.
4,296,881 A	10/1981	Lee	4,505,414 A	3/1985	Filipi
4,304,236 A	12/1981	Conta et al.	4,506,671 A	3/1985	Green
4,305,539 A	12/1981	Korolkov et al.	4,512,038 A	4/1985	Alexander et al.
4,312,363 A	1/1982	Rothfuss et al.	4,520,817 A	6/1985	Green
4,312,685 A	1/1982	Riedl	4,522,327 A	6/1985	Korthoff et al.
4,317,451 A	3/1982	Cerwin et al.	4,526,174 A	7/1985	Froehlich
4,319,576 A	3/1982	Rothfuss	4,527,724 A	7/1985	Chow et al.
4,321,002 A	3/1982	Froehlich	4,530,357 A	7/1985	Pawloski et al.
4,321,746 A	3/1982	Grinage	4,530,453 A	7/1985	Green
4,328,839 A	5/1982	Lyons et al.	4,531,522 A	7/1985	Bedi et al.
4,331,277 A	5/1982	Green	4,532,927 A	8/1985	Miksza, Jr.
4,340,331 A	7/1982	Savino	4,540,202 A	9/1985	Amphoux et al.
4,347,450 A	8/1982	Colligan	4,548,202 A	10/1985	Duncan
4,348,603 A	9/1982	Huber	4,556,058 A	12/1985	Green
4,349,028 A	9/1982	Green	4,560,915 A	12/1985	Soultanian
4,350,151 A	9/1982	Scott	4,565,109 A	1/1986	Tsay
4,353,371 A	10/1982	Cosman	4,565,189 A	1/1986	Mabuchi
4,357,940 A	11/1982	Muller	4,566,620 A	1/1986	Green et al.
4,361,057 A	11/1982	Kochera	4,569,346 A	2/1986	Poirier
4,366,544 A	12/1982	Shima et al.	4,569,469 A	2/1986	Mongeon et al.
4,369,013 A	1/1983	Abildgaard et al.	4,571,213 A	2/1986	Ishimoto
4,373,147 A	2/1983	Carlson, Jr.	4,573,468 A	3/1986	Conta et al.
4,376,380 A	3/1983	Burgess	4,573,469 A	3/1986	Golden et al.
4,379,457 A	4/1983	Gravener et al.	4,573,622 A	3/1986	Green et al.
4,380,312 A	4/1983	Landrus	4,576,165 A	3/1986	Green et al.
4,382,326 A	5/1983	Rabuse	4,576,167 A	3/1986	Noiles
4,383,634 A	5/1983	Green	4,580,712 A	4/1986	Green
4,393,728 A	7/1983	Larson et al.	4,585,153 A	4/1986	Failla et al.
4,394,613 A	7/1983	Cole	4,586,501 A	5/1986	Claracq
4,396,139 A	8/1983	Hall et al.	4,586,502 A	5/1986	Bedi et al.
4,397,311 A	8/1983	Kanshin et al.	4,589,416 A	5/1986	Green
4,402,445 A	9/1983	Green	4,589,582 A	5/1986	Bilotti
4,406,621 A	9/1983	Bailey	4,589,870 A	5/1986	Citrin et al.
4,408,692 A	10/1983	Sigel et al.	4,591,085 A	5/1986	Di Giovanni
4,409,057 A	10/1983	Molenda et al.	RE32,214 E	7/1986	Schramm
4,415,112 A	11/1983	Green	4,597,753 A	7/1986	Turley
4,416,276 A	11/1983	Newton et al.	4,600,037 A	7/1986	Hatten
4,417,890 A	11/1983	Dennehey et al.	4,604,786 A	8/1986	Howie, Jr.
4,423,456 A	12/1983	Zaidenweber	4,605,001 A	8/1986	Rothfuss et al.
4,428,376 A	1/1984	Mericle	4,605,004 A	8/1986	Di Giovanni et al.
4,429,695 A	2/1984	Green	4,606,343 A	8/1986	Conta et al.
4,430,997 A	2/1984	DiGiovanni et al.	4,607,636 A	8/1986	Kula et al.
4,434,796 A	3/1984	Karapetian et al.	4,607,638 A	8/1986	Crainich
4,438,659 A	3/1984	Desplats	4,608,981 A	9/1986	Rothfuss et al.
4,442,964 A	4/1984	Becht	4,610,250 A	9/1986	Green
4,448,194 A	5/1984	DiGiovanni et al.	4,610,383 A	9/1986	Rothfuss et al.
4,451,743 A	5/1984	Suzuki et al.	4,612,933 A	9/1986	Brinkerhoff et al.
4,452,376 A	6/1984	Klieman et al.	D286,180 S	10/1986	Korthoff
4,454,887 A	6/1984	Kruger	D286,442 S	10/1986	Korthoff et al.
4,459,519 A	7/1984	Erdman	4,617,893 A	10/1986	Donner et al.
4,461,305 A	7/1984	Cibley	4,617,914 A	10/1986	Ueda
4,467,805 A	8/1984	Fukuda	4,619,262 A	10/1986	Taylor
4,468,597 A	8/1984	Baumard et al.	4,619,391 A	10/1986	Sharkany et al.
4,469,481 A	9/1984	Kobayashi	D287,278 S	12/1986	Spreckelmeier
4,470,414 A	9/1984	Imagawa et al.	4,628,459 A	12/1986	Shinohara et al.
4,471,780 A	9/1984	Menges et al.	4,628,636 A	12/1986	Folger
4,471,781 A	9/1984	Di Giovanni et al.	4,629,107 A	12/1986	Fedotov et al.
4,473,077 A	9/1984	Noiles et al.	4,632,290 A	12/1986	Green et al.
4,475,679 A	10/1984	Fleury, Jr.	4,633,861 A	1/1987	Chow et al.
4,478,220 A	10/1984	Di Giovanni et al.	4,633,874 A	1/1987	Chow et al.
4,480,641 A	11/1984	Failla et al.	4,634,419 A	1/1987	Kreizman et al.
4,483,562 A	11/1984	Schoolman	4,635,638 A	1/1987	Weintraub et al.
4,485,816 A	12/1984	Krumme	4,641,076 A	2/1987	Linden
4,485,817 A	12/1984	Swiggett	4,642,618 A	2/1987	Johnson et al.
4,486,928 A	12/1984	Tucker et al.	4,643,173 A	2/1987	Bell et al.
4,488,523 A	12/1984	Shichman	4,643,731 A	2/1987	Eckenhoff
4,489,875 A	12/1984	Crawford et al.	4,646,722 A	3/1987	Silverstein et al.
4,493,983 A	1/1985	Taggart	4,646,745 A	3/1987	Noiles
4,494,057 A	1/1985	Hotta	4,651,734 A	3/1987	Doss et al.
4,499,895 A	2/1985	Takayama	4,652,820 A	3/1987	Maresca
4,500,024 A	2/1985	DiGiovanni et al.	4,654,028 A	3/1987	Suma
D278,081 S	3/1985	Green	4,655,222 A	4/1987	Florez et al.
4,503,842 A	3/1985	Takayama	4,662,555 A	5/1987	Thornton
			4,663,874 A	5/1987	Sano et al.
			4,664,305 A	5/1987	Blake, III et al.
			4,665,916 A	5/1987	Green
			4,667,674 A	5/1987	Korthoff et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

4,669,647 A	6/1987	Storace	4,869,415 A	9/1989	Fox
4,671,278 A	6/1987	Chin	4,873,977 A	10/1989	Avant et al.
4,671,280 A	6/1987	Dorband et al.	4,875,486 A	10/1989	Rapoport et al.
4,671,445 A	6/1987	Barker et al.	4,880,015 A	11/1989	Nierman
4,672,964 A	6/1987	Dee et al.	4,890,613 A	1/1990	Golden et al.
4,675,944 A	6/1987	Wells	4,892,244 A	1/1990	Fox et al.
4,676,245 A	6/1987	Fukuda	4,893,622 A	1/1990	Green et al.
4,679,460 A	7/1987	Yoshigai	4,894,051 A	1/1990	Shiber
4,679,719 A	7/1987	Kramer	4,896,584 A	1/1990	Stoll et al.
4,684,051 A	8/1987	Akopov et al.	4,896,678 A	1/1990	Ogawa
4,688,555 A	8/1987	Wardle	4,900,303 A	2/1990	Lemelson
4,691,703 A	9/1987	Auth et al.	4,903,697 A	2/1990	Resnick et al.
4,693,248 A	9/1987	Failla	4,909,789 A	3/1990	Taguchi et al.
4,698,579 A	10/1987	Richter et al.	4,915,100 A	4/1990	Green
4,700,703 A	10/1987	Resnick et al.	4,919,679 A	4/1990	Averill et al.
4,705,038 A	11/1987	Sjostrom et al.	4,921,479 A	5/1990	Grayzel
4,708,141 A	11/1987	Inoue et al.	4,925,082 A	5/1990	Kim
4,709,120 A	11/1987	Pearson	4,928,699 A	5/1990	Sasai
4,715,520 A	12/1987	Roehr, Jr. et al.	4,930,503 A	6/1990	Pruitt
4,719,917 A	1/1988	Barrows et al.	4,930,674 A	6/1990	Barak
4,721,099 A	1/1988	Chikama	4,931,047 A	6/1990	Broadwin et al.
4,722,340 A	2/1988	Takayama et al.	4,931,737 A	6/1990	Hishiki
4,724,840 A	2/1988	McVay et al.	4,932,960 A	6/1990	Green et al.
4,727,308 A	2/1988	Huljak et al.	4,933,800 A	6/1990	Yang
4,728,020 A	3/1988	Green et al.	4,933,843 A	6/1990	Scheller et al.
4,728,876 A	3/1988	Mongeon et al.	D309,350 S	7/1990	Sutherland et al.
4,729,260 A	3/1988	Dudden	4,938,408 A	7/1990	Bedi et al.
4,730,726 A	3/1988	Holzwarth	4,941,623 A	7/1990	Pruitt
4,741,336 A	5/1988	Failla et al.	4,943,182 A	7/1990	Hoblingre
4,743,214 A	5/1988	Tai-Cheng	4,944,443 A	7/1990	Oddsens et al.
4,744,363 A	5/1988	Hasson	4,946,067 A	8/1990	Kelsall
4,747,820 A	5/1988	Hornlein et al.	4,948,327 A	8/1990	Crupi, Jr.
4,750,902 A	6/1988	Wuchinich et al.	4,949,707 A	8/1990	LeVahn et al.
4,752,024 A	6/1988	Green et al.	4,951,860 A	8/1990	Peters et al.
4,754,909 A	7/1988	Barker et al.	4,951,861 A	8/1990	Schulze et al.
4,755,070 A	7/1988	Cerutti	4,954,960 A	9/1990	Lo et al.
4,761,326 A	8/1988	Barnes et al.	4,955,959 A	9/1990	Tompkins et al.
4,763,669 A	8/1988	Jaeger	4,957,212 A	9/1990	Duck et al.
4,767,044 A	8/1988	Green	4,962,877 A	10/1990	Hervas
D297,764 S	9/1988	Hunt et al.	4,964,559 A	10/1990	Deniega et al.
4,773,420 A	9/1988	Green	4,964,863 A	10/1990	Kanshin et al.
4,777,780 A	10/1988	Holzwarth	4,965,709 A	10/1990	Ngo
4,781,186 A	11/1988	Simpson et al.	4,970,656 A	11/1990	Lo et al.
4,784,137 A	11/1988	Kulik et al.	4,973,274 A	11/1990	Hirukawa
4,787,387 A	11/1988	Burbank, III et al.	4,973,302 A	11/1990	Armour et al.
4,788,485 A	11/1988	Kawagishi et al.	4,978,049 A	12/1990	Green
D298,967 S	12/1988	Hunt	4,978,333 A	12/1990	Broadwin et al.
4,790,225 A	12/1988	Moody et al.	4,979,952 A	12/1990	Kubota et al.
4,790,314 A	12/1988	Weaver	4,984,564 A	1/1991	Yuen
4,805,617 A	2/1989	Bedi et al.	4,986,808 A	1/1991	Broadwin et al.
4,805,823 A	2/1989	Rothfuss	4,987,049 A	1/1991	Komamura et al.
4,807,628 A	2/1989	Peters et al.	4,988,334 A	1/1991	Hornlein et al.
4,809,695 A	3/1989	Gwathmey et al.	4,995,877 A	2/1991	Ams et al.
4,815,460 A	3/1989	Porat et al.	4,995,959 A	2/1991	Metzner
4,817,643 A	4/1989	Olson	4,996,975 A	3/1991	Nakamura
4,817,847 A	4/1989	Redtenbacher et al.	5,001,649 A	3/1991	Lo et al.
4,819,853 A	4/1989	Green	5,002,543 A	3/1991	Bradshaw et al.
4,821,939 A	4/1989	Green	5,002,553 A	3/1991	Shiber
4,827,911 A	5/1989	Broadwin et al.	5,005,754 A	4/1991	Van Overloop
4,828,542 A	5/1989	Hermann	5,009,661 A	4/1991	Michelson
4,828,944 A	5/1989	Yabe et al.	5,012,411 A	4/1991	Policastro et al.
4,830,855 A	5/1989	Stewart	5,014,898 A	5/1991	Heidrich
4,832,158 A	5/1989	Farrar et al.	5,014,899 A	5/1991	Presty et al.
4,833,937 A	5/1989	Nagano	5,015,227 A	5/1991	Broadwin et al.
4,834,720 A	5/1989	Blinkhorn	5,018,515 A	5/1991	Gilman
4,838,859 A	6/1989	Strassmann	5,018,657 A	5/1991	Pedlick et al.
4,844,068 A	7/1989	Arata et al.	5,024,652 A	6/1991	Dumenek et al.
4,848,637 A	7/1989	Pruitt	5,024,671 A	6/1991	Tu et al.
4,856,078 A	8/1989	Konopka	5,025,559 A	6/1991	McCullough
4,860,644 A	8/1989	Kohl et al.	5,027,834 A	7/1991	Pruitt
4,862,891 A	9/1989	Smith	5,030,226 A	7/1991	Green et al.
4,863,423 A	9/1989	Wallace	5,031,814 A	7/1991	Tompkins et al.
4,865,030 A	9/1989	Polyak	5,035,040 A	7/1991	Kerrigan et al.
4,868,530 A	9/1989	Ahs	5,037,018 A	8/1991	Matsuda et al.
4,869,414 A	9/1989	Green et al.	5,038,109 A	8/1991	Goble et al.
			5,038,247 A	8/1991	Kelley et al.
			5,040,715 A	8/1991	Green et al.
			5,042,707 A	8/1991	Taheri
			5,060,658 A	10/1991	Dejter, Jr. et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

- |             |         |                    |             |         |                                |
|-------------|---------|--------------------|-------------|---------|--------------------------------|
| 5,061,269 A | 10/1991 | Muller             | 5,209,756 A | 5/1993  | Seedhom et al.                 |
| 5,062,491 A | 11/1991 | Takeshima et al.   | 5,211,649 A | 5/1993  | Kohler et al.                  |
| 5,062,563 A | 11/1991 | Green et al.       | 5,211,655 A | 5/1993  | Hasson                         |
| 5,065,929 A | 11/1991 | Schulze et al.     | 5,217,457 A | 6/1993  | Delahuerga et al.              |
| 5,071,052 A | 12/1991 | Rodak et al.       | 5,217,478 A | 6/1993  | Rexroth                        |
| 5,071,430 A | 12/1991 | de Salis et al.    | 5,219,111 A | 6/1993  | Bilotti et al.                 |
| 5,074,454 A | 12/1991 | Peters             | 5,220,269 A | 6/1993  | Chen et al.                    |
| 5,077,506 A | 12/1991 | Krause             | 5,221,036 A | 6/1993  | Takase                         |
| 5,079,006 A | 1/1992  | Urquhart           | 5,221,281 A | 6/1993  | Klicek                         |
| 5,080,556 A | 1/1992  | Carreno            | 5,222,945 A | 6/1993  | Basnight                       |
| 5,083,695 A | 1/1992  | Foslien et al.     | 5,222,963 A | 6/1993  | Brinkerhoff et al.             |
| 5,084,057 A | 1/1992  | Green et al.       | 5,222,975 A | 6/1993  | Crainich                       |
| 5,088,979 A | 2/1992  | Filipi et al.      | 5,222,976 A | 6/1993  | Yoon                           |
| 5,088,997 A | 2/1992  | Delahuerga et al.  | 5,223,675 A | 6/1993  | Taft                           |
| 5,089,606 A | 2/1992  | Cole et al.        | D338,729 S  | 8/1993  | Sprecklemeier et al.           |
| 5,094,247 A | 3/1992  | Hernandez et al.   | 5,234,447 A | 8/1993  | Kaster et al.                  |
| 5,098,004 A | 3/1992  | Kerrigan           | 5,236,269 A | 8/1993  | Handy                          |
| 5,098,360 A | 3/1992  | Hirota             | 5,236,424 A | 8/1993  | Imran                          |
| 5,100,042 A | 3/1992  | Gravener et al.    | 5,236,440 A | 8/1993  | Hlavacek                       |
| 5,100,420 A | 3/1992  | Green et al.       | 5,239,981 A | 8/1993  | Anaplotis                      |
| 5,104,025 A | 4/1992  | Main et al.        | 5,240,163 A | 8/1993  | Stein et al.                   |
| 5,104,397 A | 4/1992  | Vasconcelos et al. | 5,242,456 A | 9/1993  | Nash et al.                    |
| 5,104,400 A | 4/1992  | Berguer et al.     | 5,242,457 A | 9/1993  | Akopov et al.                  |
| 5,106,008 A | 4/1992  | Tompkins et al.    | 5,244,462 A | 9/1993  | Delahuerga et al.              |
| 5,108,368 A | 4/1992  | Hammerslag et al.  | 5,246,156 A | 9/1993  | Rothfuss et al.                |
| 5,109,722 A | 5/1992  | Hufnagle et al.    | 5,246,443 A | 9/1993  | Mai                            |
| 5,111,987 A | 5/1992  | Moeinzadeh et al.  | 5,253,793 A | 10/1993 | Green et al.                   |
| 5,116,349 A | 5/1992  | Aranyi             | 5,258,007 A | 11/1993 | Spetzler et al.                |
| D327,323 S  | 6/1992  | Hunt               | 5,258,008 A | 11/1993 | Wilk                           |
| 5,119,009 A | 6/1992  | McCaleb et al.     | 5,258,009 A | 11/1993 | Connors                        |
| 5,122,156 A | 6/1992  | Granger et al.     | 5,258,010 A | 11/1993 | Green et al.                   |
| 5,124,990 A | 6/1992  | Williamson         | 5,258,012 A | 11/1993 | Luscombe et al.                |
| 5,129,570 A | 7/1992  | Schulze et al.     | 5,259,366 A | 11/1993 | Reydel et al.                  |
| 5,137,198 A | 8/1992  | Nobis et al.       | 5,259,835 A | 11/1993 | Clark et al.                   |
| 5,139,513 A | 8/1992  | Segato             | 5,260,637 A | 11/1993 | Pizzi                          |
| 5,141,144 A | 8/1992  | Foslien et al.     | 5,261,135 A | 11/1993 | Mitchell                       |
| 5,142,932 A | 9/1992  | Moya et al.        | 5,261,877 A | 11/1993 | Fine et al.                    |
| 5,155,941 A | 10/1992 | Takahashi et al.   | 5,261,922 A | 11/1993 | Hood                           |
| 5,156,315 A | 10/1992 | Green et al.       | 5,263,629 A | 11/1993 | Trumbull et al.                |
| 5,156,609 A | 10/1992 | Nakao et al.       | 5,263,937 A | 11/1993 | Shipp                          |
| 5,156,614 A | 10/1992 | Green et al.       | 5,263,973 A | 11/1993 | Cook                           |
| 5,158,222 A | 10/1992 | Green et al.       | 5,264,218 A | 11/1993 | Rogozinski                     |
| 5,158,567 A | 10/1992 | Green              | 5,268,622 A | 12/1993 | Philipp                        |
| D330,699 S  | 11/1992 | Gill               | 5,271,543 A | 12/1993 | Grant et al.                   |
| 5,163,598 A | 11/1992 | Peters et al.      | 5,271,544 A | 12/1993 | Fox et al.                     |
| 5,168,605 A | 12/1992 | Bartlett           | RE34,519 E  | 1/1994  | Fox et al.                     |
| 5,170,925 A | 12/1992 | Madden et al.      | 5,275,322 A | 1/1994  | Brinkerhoff et al.             |
| 5,171,247 A | 12/1992 | Hughett et al.     | 5,275,323 A | 1/1994  | Schulze et al.                 |
| 5,171,249 A | 12/1992 | Stefanchik et al.  | 5,275,608 A | 1/1994  | Forman et al.                  |
| 5,171,253 A | 12/1992 | Klieman            | 5,279,416 A | 1/1994  | Malec et al.                   |
| 5,173,053 A | 12/1992 | Swanson et al.     | 5,281,216 A | 1/1994  | Klicek                         |
| 5,173,133 A | 12/1992 | Morin et al.       | 5,282,806 A | 2/1994  | Haber et al.                   |
| 5,176,677 A | 1/1993  | Wuchinich          | 5,282,829 A | 2/1994  | Hermes                         |
| 5,176,688 A | 1/1993  | Narayan et al.     | 5,284,128 A | 2/1994  | Hart                           |
| 5,187,422 A | 2/1993  | Izenbaard et al.   | 5,285,381 A | 2/1994  | Iskarous et al.                |
| 5,188,102 A | 2/1993  | Idemoto et al.     | 5,285,945 A | 2/1994  | Brinkerhoff et al.             |
| 5,188,111 A | 2/1993  | Yates et al.       | 5,286,253 A | 2/1994  | Fucci                          |
| 5,190,517 A | 3/1993  | Zieve et al.       | 5,289,963 A | 3/1994  | McGarry et al.                 |
| 5,190,544 A | 3/1993  | Chapman et al.     | 5,290,271 A | 3/1994  | Jernberg                       |
| 5,190,560 A | 3/1993  | Woods et al.       | 5,290,310 A | 3/1994  | Makower et al.                 |
| 5,190,657 A | 3/1993  | Heagle et al.      | 5,292,053 A | 3/1994  | Bilotti et al.                 |
| 5,192,288 A | 3/1993  | Thompson et al.    | 5,293,024 A | 3/1994  | Sugahara et al.                |
| 5,193,731 A | 3/1993  | Aranyi             | 5,297,714 A | 3/1994  | Kramer                         |
| 5,195,505 A | 3/1993  | Josefsen           | 5,304,204 A | 4/1994  | Bregen                         |
| 5,195,968 A | 3/1993  | Lundquist et al.   | D347,474 S  | 5/1994  | Olson                          |
| 5,197,648 A | 3/1993  | Gingold            | 5,307,976 A | 5/1994  | Olson et al.                   |
| 5,197,649 A | 3/1993  | Bessler et al.     | 5,308,576 A | 5/1994  | Green et al.                   |
| 5,197,966 A | 3/1993  | Sommerkamp         | 5,309,387 A | 5/1994  | Mori et al.                    |
| 5,197,970 A | 3/1993  | Green et al.       | 5,309,927 A | 5/1994  | Welch                          |
| 5,200,280 A | 4/1993  | Karasa             | 5,312,023 A | 5/1994  | Green et al.                   |
| 5,201,750 A | 4/1993  | Hocherl et al.     | 5,312,024 A | 5/1994  | Grant et al.                   |
| 5,205,459 A | 4/1993  | Brinkerhoff et al. | 5,312,329 A | 5/1994  | Beaty et al.                   |
| 5,207,672 A | 5/1993  | Roth et al.        | 5,313,935 A | 5/1994  | Kortenbach et al.              |
| 5,207,697 A | 5/1993  | Carusillo et al.   | 5,313,967 A | 5/1994  | Lieber et al.                  |
| 5,209,747 A | 5/1993  | Knoepfler          | 5,314,424 A | 5/1994  | Nicholas                       |
|             |         |                    | 5,314,445 A | 5/1994  | Heidmueller nee Degwitz et al. |
|             |         |                    | 5,314,466 A | 5/1994  | Stern et al.                   |
|             |         |                    | 5,318,221 A | 6/1994  | Green et al.                   |
|             |         |                    | 5,320,627 A | 6/1994  | Sorensen et al.                |

(56)

## References Cited

## U.S. PATENT DOCUMENTS

D348,930 S	7/1994	Olson	5,383,888 A	1/1995	Zvenyatsky et al.
5,326,013 A	7/1994	Green et al.	5,383,895 A	1/1995	Holmes et al.
5,329,923 A	7/1994	Lundquist	5,388,568 A	2/1995	van der Heide
5,330,487 A	7/1994	Thornton et al.	5,389,098 A	2/1995	Tsuruta et al.
5,330,502 A	7/1994	Hassler et al.	5,389,102 A	2/1995	Green et al.
5,331,971 A	7/1994	Bales et al.	5,389,104 A	2/1995	Hahnen et al.
5,332,142 A	7/1994	Robinson et al.	5,391,180 A	2/1995	Tovey et al.
5,333,422 A	8/1994	Warren et al.	5,392,979 A	2/1995	Green et al.
5,333,772 A	8/1994	Rothfuss et al.	5,395,030 A	3/1995	Kuramoto et al.
5,333,773 A	8/1994	Main et al.	5,395,033 A	3/1995	Byrne et al.
5,334,183 A	8/1994	Wuchinich	5,395,034 A	3/1995	Allen et al.
5,336,130 A	8/1994	Ray	5,395,312 A	3/1995	Desai
5,336,229 A	8/1994	Noda	5,395,384 A	3/1995	Duthoit et al.
5,336,232 A	8/1994	Green et al.	5,397,046 A	3/1995	Savage et al.
5,339,799 A	8/1994	Kami et al.	5,397,324 A	3/1995	Carroll et al.
5,341,724 A	8/1994	Vatel	5,400,267 A	3/1995	Denen et al.
5,341,807 A	8/1994	Nardella	5,403,276 A	4/1995	Schechter et al.
5,341,810 A	8/1994	Dardel	5,403,312 A	4/1995	Yates et al.
5,342,380 A	8/1994	Hood	5,404,106 A	4/1995	Matsuda
5,342,381 A	8/1994	Tidemand	5,404,870 A	4/1995	Brinkerhoff et al.
5,342,385 A	8/1994	Norelli et al.	5,404,960 A	4/1995	Wada et al.
5,342,395 A	8/1994	Jarrett et al.	5,405,072 A	4/1995	Zlock et al.
5,342,396 A	8/1994	Cook	5,405,073 A	4/1995	Porter
5,343,382 A	8/1994	Hale et al.	5,405,344 A	4/1995	Williamson et al.
5,343,391 A	8/1994	Mushabac	5,405,360 A	4/1995	Tovey
5,344,059 A	9/1994	Green et al.	5,407,293 A	4/1995	Crainich
5,344,060 A	9/1994	Gravener et al.	5,408,409 A	4/1995	Glassman et al.
5,344,454 A	9/1994	Clarke et al.	5,409,498 A	4/1995	Braddock et al.
5,346,504 A	9/1994	Ortiz et al.	5,409,703 A	4/1995	McAnalley et al.
5,348,259 A	9/1994	Blanco et al.	5,409,703 A	4/1995	McAnalley et al.
5,350,355 A	9/1994	Sklar	D357,981 S	5/1995	Green et al.
5,350,388 A	9/1994	Epstein	5,411,481 A	5/1995	Allen et al.
5,350,391 A	9/1994	Iacovelli	5,411,508 A	5/1995	Bessler et al.
5,350,400 A	9/1994	Esposito et al.	5,413,107 A	5/1995	Oakley et al.
5,352,229 A	10/1994	Goble et al.	5,413,267 A	5/1995	Solyntjes et al.
5,352,235 A	10/1994	Koros et al.	5,413,268 A	5/1995	Green et al.
5,352,238 A	10/1994	Green et al.	5,413,272 A	5/1995	Green et al.
5,354,250 A	10/1994	Christensen	5,413,573 A	5/1995	Koivukangas
5,354,303 A	10/1994	Spaeth et al.	5,415,334 A	5/1995	Williamson et al.
5,356,006 A	10/1994	Alpern et al.	5,415,335 A	5/1995	Knodell, Jr.
5,356,064 A	10/1994	Green et al.	5,417,203 A	5/1995	Tovey et al.
5,358,506 A	10/1994	Green et al.	5,417,361 A	5/1995	Williamson, IV
5,358,510 A	10/1994	Luscombe et al.	5,419,766 A	5/1995	Chang et al.
5,359,231 A	10/1994	Flowers et al.	5,421,829 A	6/1995	Olichney et al.
D352,780 S	11/1994	Glaeser et al.	5,422,567 A	6/1995	Matsunaga
5,359,993 A	11/1994	Slater et al.	5,423,471 A	6/1995	Mastri et al.
5,360,305 A	11/1994	Kerrigan	5,423,809 A	6/1995	Klicek
5,360,428 A	11/1994	Hutchinson, Jr.	5,423,835 A	6/1995	Green et al.
5,361,902 A	11/1994	Abidin et al.	5,425,355 A	6/1995	Kulick
5,364,001 A	11/1994	Bryan	5,425,745 A	6/1995	Green et al.
5,364,002 A	11/1994	Green et al.	5,427,298 A	6/1995	Tegtmeier
5,364,003 A	11/1994	Williamson, IV	5,431,322 A	7/1995	Green et al.
5,366,133 A	11/1994	Geiste	5,431,323 A	7/1995	Smith et al.
5,366,134 A	11/1994	Green et al.	5,431,654 A	7/1995	Nic
5,366,479 A	11/1994	McGarry et al.	5,431,668 A	7/1995	Burbank, III et al.
5,368,015 A	11/1994	Wilk	5,433,721 A	7/1995	Hooven et al.
5,368,592 A	11/1994	Stern et al.	5,437,681 A	8/1995	Meade et al.
5,369,565 A	11/1994	Chen et al.	5,438,302 A	8/1995	Goble
5,370,645 A	12/1994	Klicek et al.	5,438,997 A	8/1995	Sieben et al.
5,372,124 A	12/1994	Takayama et al.	5,439,155 A	8/1995	Viola
5,372,596 A	12/1994	Klicek et al.	5,439,156 A	8/1995	Grant et al.
5,372,602 A	12/1994	Burke	5,439,479 A	8/1995	Shichman et al.
5,374,277 A	12/1994	Hassler	5,441,191 A	8/1995	Linden
5,375,588 A	12/1994	Yoon	5,441,193 A	8/1995	Gravener
5,376,095 A	12/1994	Ortiz	5,441,483 A	8/1995	Avitall
5,379,933 A	1/1995	Green et al.	5,441,494 A	8/1995	Ortiz
5,381,649 A	1/1995	Webb	5,441,499 A	8/1995	Fritsch
5,381,782 A	1/1995	DeLaRama et al.	5,443,197 A	8/1995	Malis et al.
5,381,943 A	1/1995	Allen et al.	5,443,463 A	8/1995	Stern et al.
5,382,247 A	1/1995	Cimino et al.	5,444,113 A	8/1995	Sinclair et al.
5,383,460 A	1/1995	Jang et al.	5,445,155 A	8/1995	Sieben
5,383,874 A	1/1995	Jackson et al.	5,445,304 A	8/1995	Plyley et al.
5,383,880 A	1/1995	Hooven	5,445,604 A	8/1995	Lang
5,383,881 A	1/1995	Green et al.	5,445,644 A	8/1995	Pietrafitta et al.
5,383,882 A	1/1995	Buess et al.	5,446,646 A	8/1995	Miyazaki
			5,447,265 A	9/1995	Vidal et al.
			5,447,417 A	9/1995	Kuhl et al.
			5,447,513 A	9/1995	Davison et al.
			5,449,355 A	9/1995	Rhum et al.
			5,449,365 A	9/1995	Green et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,449,370 A	9/1995	Vaitekunas	5,520,609 A	5/1996	Moll et al.
5,452,836 A	9/1995	Huitema et al.	5,520,634 A	5/1996	Fox et al.
5,452,837 A	9/1995	Williamson, IV et al.	5,520,678 A	5/1996	Heckele et al.
5,454,378 A	10/1995	Palmer et al.	5,520,700 A	5/1996	Beyar et al.
5,454,822 A	10/1995	Schob et al.	5,522,817 A	6/1996	Sander et al.
5,454,827 A	10/1995	Aust et al.	5,522,831 A	6/1996	Sleister et al.
5,456,401 A	10/1995	Green et al.	5,527,264 A	6/1996	Moll et al.
5,456,917 A	10/1995	Wise et al.	5,527,320 A	6/1996	Carruthers et al.
5,458,279 A	10/1995	Plyley	5,529,235 A	6/1996	Boiarski et al.
5,458,579 A	10/1995	Chodorow et al.	D372,086 S	7/1996	Grasso et al.
5,462,215 A	10/1995	Viola et al.	5,531,305 A	7/1996	Roberts et al.
5,464,013 A	11/1995	Lemelson	5,531,744 A	7/1996	Nardella et al.
5,464,144 A	11/1995	Guy et al.	5,531,856 A	7/1996	Moll et al.
5,464,300 A	11/1995	Crainich	5,533,521 A	7/1996	Granger
5,465,819 A	11/1995	Weilant et al.	5,533,581 A	7/1996	Barth et al.
5,465,894 A	11/1995	Clark et al.	5,533,661 A	7/1996	Main et al.
5,465,895 A	11/1995	Knodel et al.	5,535,934 A	7/1996	Boiarski et al.
5,465,896 A	11/1995	Allen et al.	5,535,935 A	7/1996	Vidal et al.
5,466,020 A	11/1995	Page et al.	5,535,937 A	7/1996	Boiarski et al.
5,467,911 A	11/1995	Tsuruta et al.	5,540,375 A	7/1996	Bolanos et al.
5,468,253 A	11/1995	Bezwada et al.	5,540,705 A	7/1996	Meade et al.
5,470,006 A	11/1995	Rodak	5,541,376 A	7/1996	Ladtchow et al.
5,470,007 A	11/1995	Plyley et al.	5,541,489 A	7/1996	Dunstan
5,470,008 A	11/1995	Rodak	5,542,594 A	8/1996	McKean et al.
5,470,009 A	11/1995	Rodak	5,542,945 A	8/1996	Fritsch
5,470,010 A	11/1995	Rothfuss et al.	5,542,949 A	8/1996	Yoon
5,471,129 A	11/1995	Mann	5,543,119 A	8/1996	Sutter et al.
5,472,132 A	12/1995	Savage et al.	5,543,695 A	8/1996	Culp et al.
5,472,442 A	12/1995	Klicek	5,544,802 A	8/1996	Crainich
5,473,204 A	12/1995	Temple	5,547,117 A	8/1996	Hamblin et al.
5,474,057 A	12/1995	Makower et al.	5,549,583 A	8/1996	Sanford et al.
5,474,223 A	12/1995	Viola et al.	5,549,621 A	8/1996	Bessler et al.
5,474,566 A	12/1995	Alesi et al.	5,549,627 A	8/1996	Kieturakis
5,474,570 A	12/1995	Kockerling et al.	5,549,628 A	8/1996	Cooper et al.
5,476,206 A	12/1995	Green et al.	5,549,637 A	8/1996	Crainich
5,476,479 A	12/1995	Green et al.	5,551,622 A	9/1996	Yoon
5,476,481 A	12/1995	Schondorf	5,553,624 A	9/1996	Francese et al.
5,478,003 A	12/1995	Green et al.	5,553,675 A	9/1996	Pitzen et al.
5,478,354 A	12/1995	Tovey et al.	5,553,765 A	9/1996	Knodel et al.
5,480,089 A	1/1996	Blewett	5,554,148 A	9/1996	Aebischer et al.
5,480,409 A	1/1996	Riza	5,554,169 A	9/1996	Green et al.
5,482,197 A	1/1996	Green et al.	5,556,020 A	9/1996	Hou
5,483,952 A	1/1996	Aranyi	5,556,416 A	9/1996	Clark et al.
5,484,095 A	1/1996	Green et al.	5,558,533 A	9/1996	Hashizawa et al.
5,484,398 A	1/1996	Stoddard	5,558,665 A	9/1996	Kieturakis
5,484,451 A	1/1996	Akopov et al.	5,558,671 A	9/1996	Yates
5,485,947 A	1/1996	Olson et al.	5,560,530 A	10/1996	Bolanos et al.
5,485,952 A	1/1996	Fontayne	5,560,532 A	10/1996	DeFonzo et al.
5,487,499 A	1/1996	Sorrentino et al.	5,561,881 A	10/1996	Klinger et al.
5,487,500 A	1/1996	Knodel et al.	5,562,239 A	10/1996	Boiarski et al.
5,489,058 A	2/1996	Plyley et al.	5,562,241 A	10/1996	Knodel et al.
5,489,256 A	2/1996	Adair	5,562,682 A	10/1996	Oberlin et al.
5,489,290 A	2/1996	Furnish	5,562,690 A	10/1996	Green et al.
5,490,819 A	2/1996	Nicholas et al.	5,562,701 A	10/1996	Huitema et al.
5,492,671 A	2/1996	Krafft	5,562,702 A	10/1996	Huitema et al.
5,496,312 A	3/1996	Klicek	5,563,481 A	10/1996	Krause
5,496,317 A	3/1996	Goble et al.	5,564,615 A	10/1996	Bishop et al.
5,497,933 A	3/1996	DeFonzo et al.	5,569,161 A	10/1996	Ebling et al.
5,498,164 A	3/1996	Ward et al.	5,569,270 A	10/1996	Weng
5,498,838 A	3/1996	Furman	5,569,284 A	10/1996	Young et al.
5,501,654 A	3/1996	Faila et al.	5,571,090 A	11/1996	Sherts
5,503,320 A	4/1996	Webster et al.	5,571,100 A	11/1996	Goble et al.
5,503,635 A	4/1996	Sauer et al.	5,571,116 A	11/1996	Bolanos et al.
5,503,638 A	4/1996	Cooper et al.	5,571,285 A	11/1996	Chow et al.
5,505,363 A	4/1996	Green et al.	5,571,488 A	11/1996	Beerstecher et al.
5,507,425 A	4/1996	Ziglioli	5,573,169 A	11/1996	Green et al.
5,507,426 A	4/1996	Young et al.	5,573,543 A	11/1996	Akopov et al.
5,509,596 A	4/1996	Green et al.	5,574,431 A	11/1996	McKeown et al.
5,509,916 A	4/1996	Taylor	5,575,054 A	11/1996	Klinzing et al.
5,511,564 A	4/1996	Wilk	5,575,789 A	11/1996	Bell et al.
5,514,129 A	5/1996	Smith	5,575,799 A	11/1996	Bolanos et al.
5,514,149 A	5/1996	Green et al.	5,575,803 A	11/1996	Cooper et al.
5,514,157 A	5/1996	Nicholas et al.	5,575,805 A	11/1996	Li
5,518,163 A	5/1996	Hooven	5,577,654 A	11/1996	Bishop
5,518,164 A	5/1996	Hooven	5,578,052 A	11/1996	Koros et al.
			5,579,978 A	12/1996	Green et al.
			5,580,067 A	12/1996	Hamblin et al.
			5,582,611 A	12/1996	Tsuruta et al.
			5,582,617 A	12/1996	Klieman et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,582,907 A	12/1996	Pall	5,653,373 A	8/1997	Green et al.
5,583,114 A	12/1996	Barrows et al.	5,653,374 A	8/1997	Young et al.
5,584,425 A	12/1996	Savage et al.	5,653,677 A	8/1997	Okada et al.
5,586,711 A	12/1996	Plyley et al.	5,653,721 A	8/1997	Knodel et al.
5,588,579 A	12/1996	Schnut et al.	5,653,748 A	8/1997	Strecker
5,588,580 A	12/1996	Paul et al.	5,655,698 A	8/1997	Yoon
5,588,581 A	12/1996	Conlon et al.	5,657,417 A	8/1997	Di Troia
5,591,170 A	1/1997	Spievack et al.	5,657,429 A	8/1997	Wang et al.
5,591,187 A	1/1997	Dekel	5,657,921 A	8/1997	Young et al.
5,597,107 A	1/1997	Knodel et al.	5,658,238 A	8/1997	Suzuki et al.
5,599,151 A	2/1997	Daum et al.	5,658,281 A	8/1997	Heard
5,599,279 A	2/1997	Slotman et al.	5,658,298 A	8/1997	Vincent et al.
5,599,344 A	2/1997	Paterson	5,658,300 A	8/1997	Bito et al.
5,599,350 A	2/1997	Schulze et al.	5,658,307 A	8/1997	Exconde
5,599,852 A	2/1997	Scopelianos et al.	5,662,258 A	9/1997	Knodel et al.
5,601,224 A	2/1997	Bishop et al.	5,662,260 A	9/1997	Yoon
5,601,573 A	2/1997	Fogelberg et al.	5,662,662 A	9/1997	Bishop et al.
5,601,604 A	2/1997	Vincent	5,662,667 A	9/1997	Knodel
5,602,449 A	2/1997	Krause et al.	5,665,085 A	9/1997	Nardella
5,603,443 A	2/1997	Clark et al.	5,667,517 A	9/1997	Hooven
5,605,272 A	2/1997	Witt et al.	5,667,526 A	9/1997	Levin
5,605,273 A	2/1997	Hamblin et al.	5,667,527 A	9/1997	Cook
5,607,094 A	3/1997	Clark et al.	5,667,864 A	9/1997	Landoll
5,607,095 A	3/1997	Smith et al.	5,669,544 A	9/1997	Schulze et al.
5,607,433 A	3/1997	Polla et al.	5,669,904 A	9/1997	Platt, Jr. et al.
5,607,450 A	3/1997	Zvenyatsky et al.	5,669,907 A	9/1997	Platt, Jr. et al.
5,607,474 A	3/1997	Athanasidou et al.	5,669,918 A	9/1997	Balazs et al.
5,609,285 A	3/1997	Grant et al.	5,672,945 A	9/1997	Krause
5,609,601 A	3/1997	Kolesa et al.	5,673,840 A	10/1997	Schulze et al.
5,611,709 A	3/1997	McAnulty	5,673,841 A	10/1997	Schulze et al.
5,613,499 A	3/1997	Palmer et al.	5,673,842 A	10/1997	Bittner et al.
5,613,937 A	3/1997	Garrison et al.	5,674,184 A	10/1997	Hassler, Jr.
5,613,966 A	3/1997	Makower et al.	5,674,286 A	10/1997	D'Alessio et al.
5,614,887 A	3/1997	Buchbinder	5,678,748 A	10/1997	Plyley et al.
5,615,820 A	4/1997	Viola	5,680,981 A	10/1997	Mililli et al.
5,618,294 A	4/1997	Aust et al.	5,680,982 A	10/1997	Schulze et al.
5,618,303 A	4/1997	Marlow et al.	5,680,983 A	10/1997	Plyley et al.
5,618,307 A	4/1997	Donlon et al.	5,681,341 A	10/1997	Lunsford et al.
5,619,992 A	4/1997	Guthrie et al.	5,683,349 A	11/1997	Makower et al.
5,620,289 A	4/1997	Curry	5,685,474 A	11/1997	Seeber
5,620,326 A	4/1997	Younker	5,686,090 A	11/1997	Schilder et al.
5,620,452 A	4/1997	Yoon	5,688,270 A	11/1997	Yates et al.
5,624,398 A	4/1997	Smith et al.	5,690,269 A	11/1997	Bolanos et al.
5,624,452 A	4/1997	Yates	5,690,675 A	11/1997	Sawyer et al.
5,626,587 A	5/1997	Bishop et al.	5,692,668 A	12/1997	Schulze et al.
5,626,595 A	5/1997	Sklar et al.	5,693,020 A	12/1997	Rauh
5,628,446 A	5/1997	Geiste et al.	5,693,042 A	12/1997	Boiarski et al.
5,628,743 A	5/1997	Cimino	5,693,051 A	12/1997	Schulze et al.
5,628,745 A	5/1997	Bek	5,695,494 A	12/1997	Becker
5,630,539 A	5/1997	Plyley et al.	5,695,502 A	12/1997	Pier et al.
5,630,540 A	5/1997	Blewett	5,695,504 A	12/1997	Gifford, III et al.
5,630,541 A	5/1997	Williamson, IV et al.	5,695,524 A	12/1997	Kelley et al.
5,630,782 A	5/1997	Adair	5,697,542 A	12/1997	Knodel et al.
5,631,973 A	5/1997	Green	5,697,543 A	12/1997	Burdorff
5,632,432 A	5/1997	Schulze et al.	5,697,909 A	12/1997	Eggers et al.
5,632,433 A	5/1997	Grant et al.	5,697,943 A	12/1997	Sauer et al.
5,633,374 A	5/1997	Humphrey et al.	5,700,270 A	12/1997	Peysen et al.
5,634,584 A	6/1997	Okorochoa et al.	5,700,276 A	12/1997	Benecke
5,636,779 A	6/1997	Palmer	5,702,387 A	12/1997	Arts et al.
5,636,780 A	6/1997	Green et al.	5,702,408 A	12/1997	Wales et al.
5,638,582 A	6/1997	Klatt et al.	5,702,409 A	12/1997	Rayburn et al.
5,639,008 A	6/1997	Gallagher et al.	5,704,087 A	1/1998	Strub
D381,077 S	7/1997	Hunt	5,704,534 A	1/1998	Huitema et al.
5,643,291 A	7/1997	Pier et al.	5,706,997 A	1/1998	Green et al.
5,643,293 A	7/1997	Kogasaka et al.	5,706,998 A	1/1998	Plyley et al.
5,643,294 A	7/1997	Tovey et al.	5,707,392 A	1/1998	Kortenbach
5,643,319 A	7/1997	Green et al.	5,709,334 A	1/1998	Sorrentino et al.
5,645,209 A	7/1997	Green et al.	5,709,335 A	1/1998	Heck
5,647,526 A	7/1997	Green et al.	5,709,680 A	1/1998	Yates et al.
5,647,869 A	7/1997	Goble et al.	5,709,706 A	1/1998	Kienzle et al.
5,649,937 A	7/1997	Bito et al.	5,711,472 A	1/1998	Bryan
5,649,956 A	7/1997	Jensen et al.	5,712,460 A	1/1998	Carr et al.
5,651,491 A	7/1997	Heaton et al.	5,713,128 A	2/1998	Schrenk et al.
5,651,762 A	7/1997	Bridges	5,713,505 A	2/1998	Huitema
5,651,821 A	7/1997	Uchida	5,713,895 A	2/1998	Lontine et al.
			5,713,896 A	2/1998	Nardella
			5,713,920 A	2/1998	Bezwada et al.
			5,715,604 A	2/1998	Lanzoni
			5,715,987 A	2/1998	Kelley et al.



(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,715,988 A	2/1998	Palmer	5,797,637 A	8/1998	Ervin
5,716,366 A	2/1998	Yates	5,797,900 A	8/1998	Madhani et al.
5,718,359 A	2/1998	Palmer et al.	5,797,906 A	8/1998	Rhum et al.
5,718,360 A	2/1998	Green et al.	5,797,927 A	8/1998	Yoon
5,718,548 A	2/1998	Cotellessa	5,797,941 A	8/1998	Schulze et al.
5,718,714 A	2/1998	Livneh	5,797,959 A	8/1998	Castro et al.
5,720,744 A	2/1998	Eggleston et al.	5,799,857 A	9/1998	Robertson et al.
D393,067 S	3/1998	Geary et al.	5,800,379 A	9/1998	Edwards
5,724,025 A	3/1998	Tavori	5,800,423 A	9/1998	Jensen
5,725,536 A	3/1998	Oberlin et al.	5,804,726 A	9/1998	Geib et al.
5,725,554 A	3/1998	Simon et al.	5,804,936 A	9/1998	Brodsky et al.
5,728,110 A	3/1998	Vidal et al.	5,806,676 A	9/1998	Wasgien
5,728,113 A	3/1998	Sherts	5,807,376 A	9/1998	Viola et al.
5,728,121 A	3/1998	Bimbo et al.	5,807,378 A	9/1998	Jensen et al.
5,730,758 A	3/1998	Allgeyer	5,807,393 A	9/1998	Williamson, IV et al.
5,732,821 A	3/1998	Stone et al.	5,809,441 A	9/1998	McKee
5,732,871 A	3/1998	Clark et al.	5,810,721 A	9/1998	Mueller et al.
5,732,872 A	3/1998	Bolduc et al.	5,810,811 A	9/1998	Yates et al.
5,733,308 A	3/1998	Daugherty et al.	5,810,846 A	9/1998	Virnich et al.
5,735,445 A	4/1998	Vidal et al.	5,810,855 A	9/1998	Rayburn et al.
5,735,848 A	4/1998	Yates et al.	5,812,188 A	9/1998	Adair
5,735,874 A	4/1998	Measamer et al.	5,813,813 A	9/1998	Daum et al.
5,738,474 A	4/1998	Blewett	5,814,055 A	9/1998	Knodel et al.
5,738,629 A	4/1998	Moll et al.	5,814,057 A	9/1998	Oi et al.
5,738,648 A	4/1998	Lands et al.	5,816,471 A	10/1998	Plyley et al.
5,741,271 A	4/1998	Nakao et al.	5,817,084 A	10/1998	Jensen
5,743,456 A	4/1998	Jones et al.	5,817,091 A	10/1998	Nardella et al.
5,747,953 A	5/1998	Philipp	5,817,093 A	10/1998	Williamson, IV et al.
5,749,889 A	5/1998	Bacich et al.	5,817,109 A	10/1998	McGarry et al.
5,749,893 A	5/1998	Vidal et al.	5,817,119 A	10/1998	Klieman et al.
5,749,896 A	5/1998	Cook	5,820,009 A	10/1998	Melling et al.
5,749,968 A	5/1998	Melanson et al.	5,823,066 A	10/1998	Huitema et al.
5,752,644 A	5/1998	Bolanos et al.	5,824,333 A	10/1998	Scopelianos et al.
5,752,965 A	5/1998	Francis et al.	5,826,776 A	10/1998	Schulze et al.
5,752,970 A	5/1998	Yoon	5,827,271 A	10/1998	Buysse et al.
5,752,973 A	5/1998	Kieturakis	5,827,298 A	10/1998	Hart et al.
5,755,717 A	5/1998	Yates et al.	5,827,323 A	10/1998	Klieman et al.
5,758,814 A	6/1998	Gallagher et al.	5,829,662 A	11/1998	Allen et al.
5,762,255 A	6/1998	Chrisman et al.	5,830,598 A	11/1998	Patterson
5,762,256 A	6/1998	Mastri et al.	5,833,690 A	11/1998	Yates et al.
5,765,565 A	6/1998	Adair	5,833,695 A	11/1998	Yoon
5,766,188 A	6/1998	Igaki	5,833,696 A	11/1998	Whitfield et al.
5,766,205 A	6/1998	Zvenyatsky et al.	5,836,503 A	11/1998	Ehrenfels et al.
5,769,303 A	6/1998	Knodel et al.	5,836,960 A	11/1998	Kolesa et al.
5,769,748 A	6/1998	Eyerly et al.	5,839,369 A	11/1998	Chatterjee et al.
5,769,791 A	6/1998	Benaron et al.	5,839,639 A	11/1998	Sauer et al.
5,769,892 A	6/1998	Kingwell	5,841,284 A	11/1998	Takahashi
5,772,379 A	6/1998	Evensen	5,843,021 A	12/1998	Edwards et al.
5,772,578 A	6/1998	Heimberger et al.	5,843,096 A	12/1998	Igaki et al.
5,772,659 A	6/1998	Becker et al.	5,843,097 A	12/1998	Mayenberger et al.
5,773,991 A	6/1998	Chen	5,843,122 A	12/1998	Riza
5,776,130 A	7/1998	Buysse et al.	5,843,132 A	12/1998	Ilvento
5,778,939 A	7/1998	Hok-Yin	5,843,169 A	12/1998	Taheri
5,779,130 A	7/1998	Alesi et al.	5,846,254 A	12/1998	Schulze et al.
5,779,131 A	7/1998	Knodel et al.	5,847,566 A	12/1998	Marritt et al.
5,779,132 A	7/1998	Knodel et al.	5,849,011 A	12/1998	Jones et al.
5,782,396 A	7/1998	Mastri et al.	5,849,020 A	12/1998	Long et al.
5,782,397 A	7/1998	Koukline	5,849,023 A	12/1998	Mericle
5,782,748 A	7/1998	Palmer et al.	5,851,179 A	12/1998	Ritson et al.
5,782,749 A	7/1998	Riza	5,851,212 A	12/1998	Zirps et al.
5,782,859 A	7/1998	Nicholas et al.	5,853,366 A	12/1998	Dowlatshahi
5,784,934 A	7/1998	Izumisawa	5,855,311 A	1/1999	Hamblin et al.
5,785,232 A	7/1998	Vidal et al.	5,855,583 A	1/1999	Wang et al.
5,785,647 A	7/1998	Tompkins et al.	5,860,581 A	1/1999	Robertson et al.
5,787,897 A	8/1998	Kieturakis	5,860,975 A	1/1999	Goble et al.
5,791,231 A	8/1998	Cohn et al.	5,865,361 A	2/1999	Milliman et al.
5,792,135 A	8/1998	Madhani et al.	5,865,638 A	2/1999	Trafton
5,792,162 A	8/1998	Jolly et al.	5,868,361 A	2/1999	Rinderer
5,792,165 A	8/1998	Klieman et al.	5,868,760 A	2/1999	McGuckin, Jr.
5,792,573 A	8/1998	Pitzen et al.	5,868,790 A	2/1999	Vincent et al.
5,794,834 A	8/1998	Hamblin et al.	5,871,135 A	2/1999	Williamson, IV et al.
5,796,188 A	8/1998	Bays	5,873,885 A	2/1999	Weidenbenner
5,797,536 A	8/1998	Smith et al.	5,876,401 A	3/1999	Schulze et al.
5,797,537 A	8/1998	Oberlin et al.	5,878,193 A	3/1999	Wang et al.
5,797,538 A	8/1998	Heaton et al.	5,878,607 A	3/1999	Nunes et al.
			5,878,937 A	3/1999	Green et al.
			5,878,938 A	3/1999	Bittner et al.
			5,881,777 A	3/1999	Bassi et al.
			5,891,094 A	4/1999	Masterson et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,891,160 A	4/1999	Williamson, IV et al.	6,012,494 A	1/2000	Balazs
5,891,558 A	4/1999	Bell et al.	6,013,076 A	1/2000	Goble et al.
5,893,506 A	4/1999	Powell	6,015,406 A	1/2000	Goble et al.
5,893,835 A	4/1999	Witt et al.	6,015,417 A	1/2000	Reynolds, Jr.
5,893,878 A	4/1999	Pierce	6,017,322 A	1/2000	Snoke et al.
5,894,979 A	4/1999	Powell	6,017,354 A	1/2000	Culp et al.
5,897,552 A	4/1999	Edwards et al.	6,017,356 A	1/2000	Frederick et al.
5,897,562 A	4/1999	Bolanos et al.	6,018,227 A	1/2000	Kumar et al.
5,899,824 A	5/1999	Kurtz et al.	6,019,745 A	2/2000	Gray
5,899,914 A	5/1999	Zirps et al.	6,022,352 A	2/2000	Vandewalle
5,901,895 A	5/1999	Heaton et al.	6,023,641 A	2/2000	Thompson
5,902,312 A	5/1999	Frater et al.	6,024,708 A	2/2000	Bales et al.
5,903,117 A	5/1999	Gregory	6,024,741 A	2/2000	Williamson, IV et al.
5,904,647 A	5/1999	Ouchi	6,024,748 A	2/2000	Manzo et al.
5,904,693 A	5/1999	Dicesare et al.	6,024,750 A	2/2000	Mastri et al.
5,904,702 A	5/1999	Ek et al.	6,024,764 A	2/2000	Schroepfel
5,906,577 A	5/1999	Beane et al.	6,027,501 A	2/2000	Goble et al.
5,906,625 A	5/1999	Bito et al.	6,030,384 A	2/2000	Nezhat
5,907,211 A	5/1999	Hall et al.	6,032,849 A	3/2000	Mastri et al.
5,908,402 A	6/1999	Blythe	6,033,105 A	3/2000	Barker et al.
5,908,427 A	6/1999	McKean et al.	6,033,378 A	3/2000	Lundquist et al.
5,909,062 A	6/1999	Krietzman	6,033,399 A	3/2000	Gines
5,911,353 A	6/1999	Bolanos et al.	6,033,427 A	3/2000	Lee
5,915,616 A	6/1999	Viola et al.	6,036,641 A	3/2000	Taylor et al.
5,916,225 A	6/1999	Kugel	6,036,667 A	3/2000	Manna et al.
5,918,791 A	7/1999	Sorrentino et al.	6,037,724 A	3/2000	Buss et al.
5,919,198 A	7/1999	Graves, Jr. et al.	6,037,927 A	3/2000	Rosenberg
5,921,956 A	7/1999	Grinberg et al.	6,039,733 A	3/2000	Buysse et al.
5,924,864 A	7/1999	Loge et al.	6,039,734 A	3/2000	Goble
5,928,137 A	7/1999	Green	6,042,601 A	3/2000	Smith
5,928,256 A	7/1999	Riza	6,042,607 A	3/2000	Williamson, IV et al.
5,931,847 A	8/1999	Bittner et al.	6,043,626 A	3/2000	Snyder et al.
5,931,853 A	8/1999	McEwen et al.	6,045,560 A	4/2000	McKean et al.
5,937,951 A	8/1999	Izuchukwu et al.	6,047,861 A	4/2000	Vidal et al.
5,938,667 A	8/1999	Peysen et al.	6,049,145 A	4/2000	Austin et al.
5,941,442 A	8/1999	Geiste et al.	6,050,172 A	4/2000	Corves et al.
5,941,890 A	8/1999	Voegele et al.	6,050,472 A	4/2000	Shibata
5,944,172 A	8/1999	Hannula	6,050,989 A	4/2000	Fox et al.
5,944,715 A	8/1999	Goble et al.	6,050,990 A	4/2000	Tankovich et al.
5,946,978 A	9/1999	Yamashita	6,050,996 A	4/2000	Schmaltz et al.
5,947,984 A	9/1999	Whipple	6,053,390 A	4/2000	Green et al.
5,947,996 A	9/1999	Logeman	6,053,899 A	4/2000	Slanda et al.
5,948,030 A	9/1999	Miller et al.	6,053,922 A	4/2000	Krause et al.
5,948,429 A	9/1999	Bell et al.	6,054,142 A	4/2000	Li et al.
5,951,301 A	9/1999	Younker	6,055,062 A	4/2000	Dina et al.
5,951,516 A	9/1999	Bunyan	RE36,720 E	5/2000	Green et al.
5,951,552 A	9/1999	Long et al.	6,056,735 A	5/2000	Okada et al.
5,951,574 A	9/1999	Stefanchik et al.	6,056,746 A	5/2000	Goble et al.
5,951,575 A	9/1999	Bolduc et al.	6,059,806 A	5/2000	Hoegerle
5,951,581 A	9/1999	Saadat et al.	6,062,360 A	5/2000	Shields
5,954,259 A	9/1999	Viola et al.	6,063,020 A	5/2000	Jones et al.
5,957,831 A	9/1999	Adair	6,063,025 A	5/2000	Bridges et al.
5,964,394 A	10/1999	Robertson	6,063,050 A	5/2000	Manna et al.
5,964,774 A	10/1999	McKean et al.	6,063,095 A	5/2000	Wang et al.
5,966,126 A	10/1999	Szabo	6,063,097 A	5/2000	Oi et al.
5,971,916 A	10/1999	Koren	6,063,098 A	5/2000	Houser et al.
5,973,221 A	10/1999	Collyer et al.	6,065,679 A	5/2000	Levie et al.
D416,089 S	11/1999	Barton et al.	6,065,919 A	5/2000	Peck
5,976,122 A	11/1999	Madhani et al.	6,066,132 A	5/2000	Chen et al.
5,977,746 A	11/1999	Hershberger et al.	6,066,151 A	5/2000	Miyawaki et al.
5,980,248 A	11/1999	Kusakabe et al.	6,068,627 A	5/2000	Orszulak et al.
5,984,949 A	11/1999	Levin	6,071,233 A	6/2000	Ishikawa et al.
5,988,479 A	11/1999	Palmer	6,072,299 A	6/2000	Kurle et al.
5,990,379 A	11/1999	Gregory	6,074,386 A	6/2000	Goble et al.
5,993,466 A	11/1999	Yoon	6,074,401 A	6/2000	Gardiner et al.
5,997,528 A	12/1999	Bisch et al.	6,077,280 A	6/2000	Fossum
5,997,552 A	12/1999	Person et al.	6,077,286 A	6/2000	Cuschieri et al.
6,001,108 A	12/1999	Wang et al.	6,077,290 A	6/2000	Marini
6,003,517 A	12/1999	Sheffield et al.	6,079,606 A	6/2000	Milliman et al.
6,004,319 A	12/1999	Goble et al.	6,080,181 A	6/2000	Jensen et al.
6,004,335 A	12/1999	Vaitekunas et al.	6,082,577 A	7/2000	Coates et al.
6,007,521 A	12/1999	Bidwell et al.	6,083,191 A	7/2000	Rose
6,010,054 A	1/2000	Johnson et al.	6,083,223 A	7/2000	Baker
6,010,513 A	1/2000	Tormala et al.	6,083,234 A	7/2000	Nicholas et al.
6,010,520 A	1/2000	Pattison	6,083,242 A	7/2000	Cook
			6,086,544 A	7/2000	Hibner et al.
			6,086,600 A	7/2000	Kortenbach
			6,090,106 A	7/2000	Goble et al.
			6,093,186 A	7/2000	Goble

(56)

## References Cited

## U.S. PATENT DOCUMENTS

D429,252	S	8/2000	Haitani et al.	6,214,028	B1	4/2001	Yoon et al.
6,099,537	A	8/2000	Sugai et al.	6,220,368	B1	4/2001	Ark et al.
6,099,551	A	8/2000	Gabbay	6,221,007	B1	4/2001	Green
6,102,271	A	8/2000	Longo et al.	6,221,023	B1	4/2001	Matsuba et al.
6,102,926	A	8/2000	Tartaglia et al.	6,223,100	B1	4/2001	Green
6,104,162	A	8/2000	Sainsbury et al.	6,223,835	B1	5/2001	Habedank et al.
6,104,304	A	8/2000	Clark et al.	6,224,617	B1	5/2001	Saadat et al.
6,106,511	A	8/2000	Jensen	6,228,080	B1	5/2001	Gines
6,109,500	A	8/2000	Alli et al.	6,228,081	B1	5/2001	Goble
6,110,187	A	8/2000	Donlon	6,228,083	B1	5/2001	Lands et al.
6,113,618	A	9/2000	Nic	6,228,084	B1	5/2001	Kirwan, Jr.
6,117,148	A	9/2000	Ravo et al.	6,228,089	B1	5/2001	Wahrburg
6,117,158	A	9/2000	Measamer et al.	6,228,098	B1	5/2001	Kayan et al.
6,119,913	A	9/2000	Adams et al.	6,231,565	B1	5/2001	Tovey et al.
6,120,433	A	9/2000	Mizuno et al.	6,234,178	B1	5/2001	Goble et al.
6,120,462	A	9/2000	Hibner et al.	6,237,604	B1	5/2001	Burnside et al.
6,123,241	A	9/2000	Walter et al.	6,238,384	B1	5/2001	Peer
6,123,701	A	9/2000	Nezhat	6,241,139	B1	6/2001	Milliman et al.
H001904	H	10/2000	Yates et al.	6,241,140	B1	6/2001	Adams et al.
6,126,058	A	10/2000	Adams et al.	6,241,723	B1	6/2001	Heim et al.
6,126,359	A	10/2000	Dittrich et al.	6,245,084	B1	6/2001	Mark et al.
6,126,670	A	10/2000	Walker et al.	6,248,116	B1	6/2001	Chevillon et al.
6,131,789	A	10/2000	Schulze et al.	6,248,117	B1	6/2001	Blatter
6,131,790	A	10/2000	Piraka	6,249,076	B1	6/2001	Madden et al.
6,132,368	A	10/2000	Cooper	6,249,105	B1	6/2001	Andrews et al.
6,134,962	A	10/2000	Sugitani	6,250,532	B1	6/2001	Green et al.
6,139,546	A	10/2000	Koenig et al.	6,251,485	B1	6/2001	Harris et al.
6,142,149	A	11/2000	Steen	D445,745	S	7/2001	Norman
6,142,933	A	11/2000	Longo et al.	6,254,534	B1	7/2001	Butler et al.
6,147,135	A	11/2000	Yuan et al.	6,254,619	B1	7/2001	Garabet et al.
6,149,660	A	11/2000	Lauffer et al.	6,254,642	B1	7/2001	Taylor
6,151,323	A	11/2000	O'Connell et al.	6,258,107	B1	7/2001	Balazs et al.
6,152,935	A	11/2000	Kammerer et al.	6,261,286	B1	7/2001	Goble et al.
6,155,473	A	12/2000	Tompkins et al.	6,261,679	B1	7/2001	Chen et al.
6,156,056	A	12/2000	Kearns et al.	6,264,086	B1	7/2001	McGuckin, Jr.
6,157,169	A	12/2000	Lee	6,264,087	B1	7/2001	Whitman
6,159,146	A	12/2000	El Gazayerli	6,264,617	B1	7/2001	Bales et al.
6,159,200	A	12/2000	Verdura et al.	6,270,508	B1	8/2001	Klieman et al.
6,159,224	A	12/2000	Yoon	6,270,916	B1	8/2001	Sink et al.
6,162,208	A	12/2000	Hipps	6,273,252	B1	8/2001	Mitchell
6,162,220	A	12/2000	Nezhat	6,273,876	B1	8/2001	Klima et al.
6,162,537	A	12/2000	Martin et al.	6,273,897	B1	8/2001	Dalessandro et al.
6,165,175	A	12/2000	Wampler et al.	6,277,114	B1	8/2001	Bullivant et al.
6,165,184	A	12/2000	Verdura et al.	6,280,407	B1	8/2001	Manna et al.
6,165,188	A	12/2000	Saadat et al.	6,283,981	B1	9/2001	Beaupre
6,167,185	A	12/2000	Smiley et al.	6,293,927	B1	9/2001	McGuckin, Jr.
6,168,605	B1	1/2001	Measamer et al.	6,293,942	B1	9/2001	Goble et al.
6,171,305	B1	1/2001	Sherman	6,296,640	B1	10/2001	Wampler et al.
6,171,316	B1	1/2001	Kovac et al.	6,302,311	B1	10/2001	Adams et al.
6,171,330	B1	1/2001	Benchetrit	6,302,743	B1	10/2001	Chiu et al.
6,173,074	B1	1/2001	Russo	6,305,891	B1	10/2001	Burlingame
6,174,308	B1	1/2001	Goble et al.	6,306,134	B1	10/2001	Goble et al.
6,174,309	B1	1/2001	Wrublewski et al.	6,306,149	B1	10/2001	Meade
6,174,318	B1	1/2001	Bates et al.	6,306,424	B1	10/2001	Vyakarnam et al.
6,175,290	B1	1/2001	Forsythe et al.	6,309,397	B1	10/2001	Julian et al.
6,179,195	B1	1/2001	Adams et al.	6,309,400	B2	10/2001	Beaupre
6,179,776	B1	1/2001	Adams et al.	6,309,403	B1	10/2001	Minor et al.
6,181,105	B1	1/2001	Cutolo et al.	6,312,435	B1	11/2001	Wallace et al.
6,182,673	B1	2/2001	Kindermann et al.	6,315,184	B1	11/2001	Whitman
6,185,356	B1	2/2001	Parker et al.	6,319,510	B1	11/2001	Yates
6,186,142	B1	2/2001	Schmidt et al.	6,320,123	B1	11/2001	Reimers
6,187,003	B1	2/2001	Buyse et al.	6,322,494	B1	11/2001	Bullivant et al.
6,190,386	B1	2/2001	Rydell	6,324,339	B1	11/2001	Hudson et al.
6,193,129	B1	2/2001	Bittner et al.	6,325,799	B1	12/2001	Goble
6,197,042	B1	3/2001	Ginn et al.	6,325,805	B1	12/2001	Ogilvie et al.
6,200,330	B1	3/2001	Benderev et al.	6,325,810	B1	12/2001	Hamilton et al.
6,202,914	B1	3/2001	Geiste et al.	6,328,498	B1	12/2001	Mersch
6,206,894	B1	3/2001	Thompson et al.	6,330,965	B1	12/2001	Milliman et al.
6,206,897	B1	3/2001	Jamiolkowski et al.	6,331,181	B1	12/2001	Tierney et al.
6,206,903	B1	3/2001	Ramans	6,331,761	B1	12/2001	Kumar et al.
6,206,904	B1	3/2001	Ouchi	6,333,029	B1	12/2001	Vyakarnam et al.
6,209,414	B1	4/2001	Uneme	6,334,860	B1	1/2002	Dorn
6,210,403	B1	4/2001	Kliccek	6,334,861	B1	1/2002	Chandler et al.
6,211,626	B1	4/2001	Lys et al.	6,336,926	B1	1/2002	Goble
6,213,999	B1	4/2001	Platt, Jr. et al.	6,338,737	B1	1/2002	Toledano
				6,343,731	B1	2/2002	Adams et al.
				6,346,077	B1	2/2002	Taylor et al.
				6,348,061	B1	2/2002	Whitman
				D454,951	S	3/2002	Bon

(56)

References Cited

U.S. PATENT DOCUMENTS

6,352,503 B1	3/2002	Matsui et al.	6,485,503 B2	11/2002	Jacobs et al.
6,352,532 B1	3/2002	Kramer et al.	6,485,667 B1	11/2002	Tan
6,355,699 B1	3/2002	Vyakarnam et al.	6,486,286 B1	11/2002	McGall et al.
6,356,072 B1	3/2002	Chass	6,488,196 B1	12/2002	Fenton, Jr.
6,358,224 B1	3/2002	Tims et al.	6,488,197 B1	12/2002	Whitman
6,358,263 B2	3/2002	Mark et al.	6,488,659 B1	12/2002	Rosenman
6,358,459 B1	3/2002	Ziegler et al.	6,491,201 B1	12/2002	Whitman
6,364,877 B1	4/2002	Goble et al.	6,491,690 B1	12/2002	Goble et al.
6,364,888 B1	4/2002	Niemeyer et al.	6,491,701 B2	12/2002	Tierney et al.
6,366,441 B1	4/2002	Ozawa et al.	6,491,702 B2	12/2002	Heilbrun et al.
6,370,981 B2	4/2002	Watarai	6,492,785 B1	12/2002	Kasten et al.
6,371,114 B1	4/2002	Schmidt et al.	6,494,882 B1	12/2002	Lebouitz et al.
6,373,152 B1	4/2002	Wang et al.	6,494,885 B1	12/2002	Dhindsa
6,377,011 B1	4/2002	Ben-Ur	6,494,888 B1	12/2002	Laufer et al.
6,383,201 B1	5/2002	Dong	6,494,896 B1	12/2002	D'Alessio et al.
6,387,092 B1	5/2002	Burnside et al.	6,498,480 B1	12/2002	Manara
6,387,113 B1	5/2002	Hawkins et al.	6,500,176 B1	12/2002	Truckai et al.
6,387,114 B2	5/2002	Adams	6,500,194 B2	12/2002	Benderev et al.
6,391,038 B2	5/2002	Vargas et al.	D468,749 S *	1/2003	Friedman ..... D14/489
6,392,854 B1	5/2002	O'Gorman	6,503,139 B2	1/2003	Coral
6,394,998 B1	5/2002	Wallace et al.	6,503,257 B2	1/2003	Grant et al.
6,398,779 B1	6/2002	Buysse et al.	6,503,259 B2	1/2003	Huxel et al.
6,398,781 B1	6/2002	Goble et al.	6,505,768 B2	1/2003	Whitman
6,398,797 B2	6/2002	Bombard et al.	6,506,197 B1	1/2003	Rollero et al.
6,402,766 B2	6/2002	Bowman et al.	6,510,854 B2	1/2003	Goble
6,406,440 B1	6/2002	Stefanchik	6,511,468 B1	1/2003	Cragg et al.
6,406,472 B1	6/2002	Jensen	6,512,360 B1	1/2003	Goto et al.
6,409,724 B1	6/2002	Penny et al.	6,514,252 B2	2/2003	Nezhat et al.
H002037 H	7/2002	Yates et al.	6,516,073 B1	2/2003	Schulz et al.
6,412,639 B1	7/2002	Hickey	6,517,528 B1	2/2003	Pantages et al.
6,413,274 B1	7/2002	Pedros	6,517,535 B2	2/2003	Edwards
6,415,542 B1	7/2002	Bates et al.	6,517,565 B1	2/2003	Whitman et al.
6,416,486 B1	7/2002	Wampler	6,517,566 B1	2/2003	Hovland et al.
6,416,509 B1	7/2002	Goble et al.	6,520,971 B1	2/2003	Perry et al.
6,419,695 B1	7/2002	Gabbay	6,520,972 B2	2/2003	Peters
6,423,079 B1	7/2002	Blake, III	6,522,101 B2	2/2003	Malackowski
6,424,885 B1	7/2002	Niemeyer et al.	6,524,180 B1	2/2003	Simms et al.
RE37,814 E	8/2002	Allgeyer	6,525,499 B2	2/2003	Naganuma
6,428,070 B1	8/2002	Takanashi et al.	D471,206 S	3/2003	Buzzard et al.
6,428,487 B1	8/2002	Burdorff et al.	6,527,782 B2	3/2003	Hogg et al.
6,429,611 B1	8/2002	Li	6,527,785 B2	3/2003	Sancoff et al.
6,430,298 B1	8/2002	Kettl et al.	6,530,942 B2	3/2003	Fogarty et al.
6,432,065 B1	8/2002	Burdorff et al.	6,532,958 B1	3/2003	Buan et al.
6,436,097 B1	8/2002	Nardella	6,533,157 B1	3/2003	Whitman
6,436,107 B1	8/2002	Wang et al.	6,533,723 B1	3/2003	Lockery et al.
6,436,110 B2	8/2002	Bowman et al.	6,533,784 B2	3/2003	Truckai et al.
6,436,115 B1	8/2002	Beaupre	6,535,764 B2	3/2003	Imran et al.
6,436,122 B1	8/2002	Frank et al.	6,539,297 B2	3/2003	Weiberle et al.
6,439,439 B1	8/2002	Rickard et al.	D473,239 S	4/2003	Cockerill
6,439,446 B1	8/2002	Perry et al.	6,539,816 B2	4/2003	Kogiso et al.
6,440,146 B2	8/2002	Nicholas et al.	6,540,737 B2	4/2003	Bacher et al.
6,441,577 B2	8/2002	Blumenkranz et al.	6,543,456 B1	4/2003	Freeman
D462,758 S	9/2002	Epstein et al.	6,545,384 B1	4/2003	Pelrine et al.
6,443,973 B1	9/2002	Whitman	6,547,786 B1	4/2003	Goble
6,445,530 B1	9/2002	Baker	6,550,546 B2	4/2003	Thurler et al.
6,447,518 B1	9/2002	Krause et al.	6,551,333 B2	4/2003	Kuhns et al.
6,447,523 B1	9/2002	Middleman et al.	6,554,861 B2	4/2003	Knox et al.
6,447,799 B1	9/2002	Ullman	6,555,770 B2	4/2003	Kawase
6,447,864 B2	9/2002	Johnson et al.	6,558,378 B2	5/2003	Sherman et al.
6,450,391 B1	9/2002	Kayan et al.	6,558,379 B1	5/2003	Batchelor et al.
6,450,989 B2	9/2002	Dubrul et al.	6,558,429 B2	5/2003	Taylor
6,454,781 B1	9/2002	Witt et al.	6,561,187 B2	5/2003	Schmidt et al.
6,457,625 B1	10/2002	Tormala et al.	6,565,560 B1	5/2003	Goble et al.
6,458,077 B1	10/2002	Boebel et al.	6,566,619 B2	5/2003	Gillman et al.
6,458,142 B1	10/2002	Faller et al.	6,569,085 B2	5/2003	Kortenbach et al.
6,458,147 B1	10/2002	Cruise et al.	6,569,171 B2	5/2003	DeGuillebon et al.
6,460,627 B1	10/2002	Below et al.	6,578,751 B2	6/2003	Hartwick
6,468,275 B1	10/2002	Wampler et al.	6,582,364 B2	6/2003	Butler et al.
6,468,286 B2	10/2002	Mastri et al.	6,582,427 B1	6/2003	Goble et al.
6,471,106 B1	10/2002	Reining	6,582,441 B1	6/2003	He et al.
6,471,659 B2	10/2002	Eggers et al.	6,583,533 B2	6/2003	Pelrine et al.
6,478,210 B2	11/2002	Adams et al.	6,585,144 B2	7/2003	Adams et al.
6,482,200 B2	11/2002	Shippert	6,585,664 B2	7/2003	Burdorff et al.
6,482,217 B1	11/2002	Pintor et al.	6,586,898 B2	7/2003	King et al.
6,485,490 B2	11/2002	Wampler et al.	6,587,750 B2	7/2003	Gerbi et al.
			6,588,277 B2	7/2003	Giordano et al.
			6,588,643 B2	7/2003	Bolduc et al.
			6,588,931 B2	7/2003	Betzner et al.
			6,589,118 B1	7/2003	Soma et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,589,164 B1	7/2003	Flaherty	6,692,692 B2	2/2004	Stetzel
6,592,538 B1	7/2003	Hotchkiss et al.	6,695,198 B2	2/2004	Adams et al.
6,592,597 B2	7/2003	Grant et al.	6,695,199 B2	2/2004	Whitman
6,594,552 B1	7/2003	Nowlin et al.	6,695,774 B2	2/2004	Hale et al.
6,596,296 B1	7/2003	Nelson et al.	6,695,849 B2	2/2004	Michelson
6,596,304 B1	7/2003	Bayon et al.	6,696,814 B2	2/2004	Henderson et al.
6,596,432 B2	7/2003	Kawakami et al.	6,697,048 B2	2/2004	Rosenberg et al.
6,599,295 B1	7/2003	Tornier et al.	6,698,643 B2	3/2004	Whitman
6,599,323 B2	7/2003	Melican et al.	6,699,177 B1	3/2004	Wang et al.
D478,665 S	8/2003	Isaacs et al.	6,699,214 B2	3/2004	Gellman
D478,986 S	8/2003	Johnston et al.	6,699,235 B2	3/2004	Wallace et al.
6,601,749 B2	8/2003	Sullivan et al.	6,704,210 B1	3/2004	Myers
6,602,252 B2	8/2003	Mollenauer	6,705,503 B1	3/2004	Pedicini et al.
6,602,262 B2	8/2003	Griego et al.	6,709,445 B2	3/2004	Boebel et al.
6,603,050 B2	8/2003	Heaton	6,712,773 B1	3/2004	Viola
6,605,078 B2	8/2003	Adams	6,716,223 B2	4/2004	Leopold et al.
6,605,669 B2	8/2003	Awokola et al.	6,716,232 B1	4/2004	Vidal et al.
6,605,911 B1	8/2003	Klesing	6,716,233 B1	4/2004	Whitman
6,607,475 B2	8/2003	Doyle et al.	6,720,734 B2	4/2004	Norris
6,611,793 B1	8/2003	Burnside et al.	6,722,550 B1	4/2004	Ricordi et al.
6,613,069 B2	9/2003	Boyd et al.	6,722,552 B2	4/2004	Fenton, Jr.
6,616,686 B2	9/2003	Coleman et al.	6,723,087 B2	4/2004	O'Neill et al.
6,619,529 B2	9/2003	Green et al.	6,723,091 B2	4/2004	Goble et al.
6,620,111 B2	9/2003	Stephens et al.	6,723,109 B2	4/2004	Solingen
6,620,161 B2	9/2003	Schulze et al.	6,726,697 B2	4/2004	Nicholas et al.
6,620,166 B1	9/2003	Wenstrom, Jr. et al.	6,726,706 B2	4/2004	Dominguez
6,625,517 B1	9/2003	Bogdanov et al.	6,729,119 B2	5/2004	Schnipke et al.
6,626,834 B2	9/2003	Dunne et al.	6,731,976 B2	5/2004	Penn et al.
H002086 H	10/2003	Amsler	6,736,810 B2	5/2004	Hoey et al.
6,629,630 B2	10/2003	Adams	6,736,825 B2	5/2004	Blatter et al.
6,629,974 B2	10/2003	Penny et al.	6,736,854 B2	5/2004	Vadurro et al.
6,629,988 B2	10/2003	Weadock	6,740,030 B2	5/2004	Martone et al.
6,635,838 B1	10/2003	Kornelson	6,743,230 B2	6/2004	Lutze et al.
6,636,412 B2	10/2003	Smith	6,744,385 B2	6/2004	Kazuya et al.
6,638,108 B2	10/2003	Tachi	6,747,121 B2	6/2004	Gogolewski
6,638,285 B2	10/2003	Gabbay	6,747,300 B2	6/2004	Nadd et al.
6,638,297 B1	10/2003	Huitema	6,749,560 B1	6/2004	Konstorum et al.
RE38,335 E	11/2003	Aust et al.	6,749,600 B1	6/2004	Levy
6,641,528 B2	11/2003	Torii	6,752,768 B2	6/2004	Burdorff et al.
6,644,532 B2	11/2003	Green et al.	6,752,816 B2	6/2004	Culp et al.
6,645,201 B1	11/2003	Utlely et al.	6,754,959 B1	6/2004	Guiette, III et al.
6,646,307 B1	11/2003	Yu et al.	6,755,195 B1	6/2004	Lemke et al.
6,648,816 B2	11/2003	Irion et al.	6,755,338 B2	6/2004	Hahnen et al.
6,648,901 B2	11/2003	Fleischman et al.	6,755,843 B2	6/2004	Chung et al.
6,652,595 B1	11/2003	Nicolo	6,756,705 B2	6/2004	Pulford, Jr.
D484,243 S	12/2003	Ryan et al.	6,758,846 B2	7/2004	Goble et al.
D484,595 S	12/2003	Ryan et al.	6,761,685 B2	7/2004	Adams et al.
D484,596 S	12/2003	Ryan et al.	6,762,339 B1	7/2004	Klun et al.
6,656,177 B2	12/2003	Truckai et al.	6,763,307 B2	7/2004	Berg et al.
6,656,193 B2	12/2003	Grant et al.	6,764,445 B2	7/2004	Ramans et al.
6,659,940 B2	12/2003	Adler	6,766,957 B2	7/2004	Matsuura et al.
6,660,008 B1	12/2003	Foerster et al.	6,767,352 B2	7/2004	Field et al.
6,663,623 B1	12/2003	Oyama et al.	6,767,356 B2	7/2004	Kanner et al.
6,663,641 B1	12/2003	Kovac et al.	6,769,590 B2	8/2004	Vresh et al.
6,666,854 B1	12/2003	Lange	6,769,594 B2	8/2004	Orban, III
6,666,860 B1	12/2003	Takahashi	6,770,027 B2	8/2004	Banik et al.
6,666,875 B1	12/2003	Sakurai et al.	6,770,070 B1	8/2004	Balbierz
6,667,825 B2	12/2003	Lu et al.	6,770,072 B1	8/2004	Truckai et al.
6,669,073 B2	12/2003	Milliman et al.	6,770,078 B2	8/2004	Bonutti
6,670,806 B2	12/2003	Wendt et al.	6,773,409 B2	8/2004	Truckai et al.
6,671,185 B2	12/2003	Duval	6,773,437 B2	8/2004	Ogilvie et al.
D484,977 S	1/2004	Ryan et al.	6,773,438 B1	8/2004	Knodel et al.
6,676,660 B2	1/2004	Wampler et al.	6,775,575 B2	8/2004	Bommannan et al.
6,677,687 B2	1/2004	Ho et al.	6,777,838 B2	8/2004	Miekka et al.
6,679,269 B2	1/2004	Swanson	6,778,846 B1	8/2004	Martinez et al.
6,679,410 B2	1/2004	Wursch et al.	6,780,151 B2	8/2004	Grabover et al.
6,681,978 B2	1/2004	Geiste et al.	6,780,180 B1	8/2004	Goble et al.
6,681,979 B2	1/2004	Whitman	6,783,524 B2	8/2004	Anderson et al.
6,682,527 B2	1/2004	Strul	6,786,382 B1	9/2004	Hoffman
6,682,528 B2	1/2004	Frazier et al.	6,786,864 B2	9/2004	Matsuura et al.
6,682,544 B2	1/2004	Mastri et al.	6,786,896 B1	9/2004	Madhani et al.
6,685,698 B2	2/2004	Morley et al.	6,788,018 B1	9/2004	Blumenkranz
6,685,727 B2	2/2004	Fisher et al.	6,790,173 B2	9/2004	Saadat et al.
6,689,153 B1	2/2004	Skiba	6,793,652 B1	9/2004	Whitman et al.
6,692,507 B2	2/2004	Pugsley et al.	6,793,661 B2	9/2004	Hamilton et al.
			6,793,663 B2	9/2004	Kneifel et al.
			6,793,669 B2	9/2004	Nakamura et al.
			6,796,921 B1	9/2004	Buck et al.
			6,799,669 B2	10/2004	Fukumura et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,802,822	B1	10/2004	Dodge	6,895,176	B2	5/2005	Archer et al.
6,802,843	B2	10/2004	Truckai et al.	6,899,538	B2	5/2005	Matoba
6,802,844	B2	10/2004	Ferree	6,899,593	B1	5/2005	Moeller et al.
6,805,273	B2	10/2004	Bilotti et al.	6,899,915	B2	5/2005	Yelick et al.
6,806,808	B1	10/2004	Watters et al.	6,905,057	B2	6/2005	Swayze et al.
6,808,525	B2	10/2004	Latterell et al.	6,905,497	B2	6/2005	Truckai et al.
6,810,359	B2	10/2004	Sakaguchi	6,905,498	B2	6/2005	Hooven
6,814,154	B2	11/2004	Chou	6,908,472	B2	6/2005	Wiener et al.
6,814,741	B2	11/2004	Bowman et al.	6,911,033	B2	6/2005	de Guillebon et al.
6,817,508	B1	11/2004	Racenet et al.	6,911,916	B1	6/2005	Wang et al.
6,817,509	B2	11/2004	Geiste et al.	6,913,579	B2	7/2005	Truckai et al.
6,817,974	B2	11/2004	Cooper et al.	6,913,608	B2	7/2005	Liddicoat et al.
6,818,018	B1	11/2004	Sawhney	6,913,613	B2	7/2005	Schwarz et al.
6,820,791	B2	11/2004	Adams	6,921,397	B2	7/2005	Corcoran et al.
6,821,273	B2	11/2004	Mollenauer	6,921,412	B1	7/2005	Black et al.
6,821,282	B2	11/2004	Perry et al.	6,923,093	B2	8/2005	Ullah
6,821,284	B2	11/2004	Sturtz et al.	6,923,803	B2	8/2005	Goble
6,827,246	B2	12/2004	Sullivan et al.	6,923,819	B2	8/2005	Meade et al.
6,827,712	B2	12/2004	Tovey et al.	6,925,849	B2	8/2005	Jairam
6,827,725	B2	12/2004	Batchelor et al.	6,926,716	B2	8/2005	Baker et al.
6,828,902	B2	12/2004	Casden	6,928,902	B1	8/2005	Eyssallenne
6,830,174	B2	12/2004	Hillstead et al.	6,929,641	B2	8/2005	Goble et al.
6,831,629	B2	12/2004	Nishino et al.	6,929,644	B2	8/2005	Truckai et al.
6,832,998	B2	12/2004	Goble	6,931,830	B2	8/2005	Liao
6,834,001	B2	12/2004	Myono	6,932,218	B2	8/2005	Kosann et al.
6,835,173	B2	12/2004	Couvillon, Jr.	6,932,810	B2	8/2005	Ryan
6,835,199	B2	12/2004	McGuckin, Jr. et al.	6,936,042	B2	8/2005	Wallace et al.
6,835,336	B2	12/2004	Watt	6,936,948	B2	8/2005	Bell et al.
6,836,611	B2	12/2004	Popovic et al.	D509,297	S	9/2005	Wells
6,837,846	B2	1/2005	Jaffe et al.	D509,589	S	9/2005	Wells
6,837,883	B2	1/2005	Moll et al.	6,938,706	B2	9/2005	Ng
6,838,493	B2	1/2005	Williams et al.	6,939,358	B2	9/2005	Palacios et al.
6,840,423	B2	1/2005	Adams et al.	6,942,662	B2	9/2005	Goble et al.
6,840,938	B1	1/2005	Morley et al.	6,942,674	B2	9/2005	Belef et al.
6,841,967	B2	1/2005	Kim et al.	6,945,444	B2	9/2005	Gresham et al.
6,843,403	B2	1/2005	Whitman	6,945,981	B2	9/2005	Donofrio et al.
6,843,789	B2	1/2005	Goble	6,951,562	B2	10/2005	Zwirnmann
6,843,793	B2	1/2005	Brock et al.	6,953,138	B1	10/2005	Dworak et al.
6,846,307	B2	1/2005	Whitman et al.	6,953,139	B2	10/2005	Milliman et al.
6,846,308	B2	1/2005	Whitman et al.	6,953,461	B2	10/2005	McClurken et al.
6,846,309	B2	1/2005	Whitman et al.	6,957,758	B2	10/2005	Aranyi
6,847,190	B2	1/2005	Schaefer et al.	6,958,035	B2	10/2005	Friedman et al.
6,849,071	B2	2/2005	Whitman et al.	D511,525	S	11/2005	Hernandez et al.
6,850,817	B1	2/2005	Green	6,959,851	B2	11/2005	Heinrich
6,852,122	B2	2/2005	Rush	6,959,852	B2	11/2005	Shelton, IV et al.
6,852,330	B2	2/2005	Bowman et al.	6,960,107	B1	11/2005	Schaub et al.
6,853,879	B2	2/2005	Sunaoshi	6,960,163	B2	11/2005	Ewers et al.
6,858,005	B2	2/2005	Ohline et al.	6,960,220	B2	11/2005	Marino et al.
6,859,882	B2	2/2005	Fung	6,962,587	B2	11/2005	Johnson et al.
RE38,708	E	3/2005	Bolanos et al.	6,963,792	B1	11/2005	Green
D502,994	S	3/2005	Blake, III	6,964,363	B2	11/2005	Wales et al.
6,861,142	B1	3/2005	Wilkie et al.	6,966,907	B2	11/2005	Goble
6,861,954	B2	3/2005	Levin	6,966,909	B2	11/2005	Marshall et al.
6,863,668	B2	3/2005	Gillespie et al.	6,968,908	B2	11/2005	Tokunaga et al.
6,863,694	B1	3/2005	Boyce et al.	6,969,385	B2	11/2005	Moreyra
6,863,924	B2	3/2005	Ranganathan et al.	6,969,395	B2	11/2005	Eskuri
6,866,178	B2	3/2005	Adams et al.	6,971,988	B2	12/2005	Orban, III
6,866,668	B2	3/2005	Giannetti et al.	6,972,199	B2	12/2005	Lebouitz et al.
6,866,671	B2	3/2005	Tierney et al.	6,974,435	B2	12/2005	Daw et al.
6,867,248	B1	3/2005	Martin et al.	6,974,462	B2	12/2005	Sater
6,869,430	B2	3/2005	Balbierz et al.	6,978,921	B2	12/2005	Shelton, IV et al.
6,869,435	B2	3/2005	Blake, III	6,978,922	B2	12/2005	Bilotti et al.
6,872,214	B2	3/2005	Sonnenschein et al.	6,981,628	B2	1/2006	Wales
6,874,669	B2	4/2005	Adams et al.	6,981,941	B2	1/2006	Whitman et al.
6,876,850	B2	4/2005	Maeshima et al.	6,981,978	B2	1/2006	Gannoe
6,877,647	B2	4/2005	Green et al.	6,984,203	B2	1/2006	Tartaglia et al.
6,878,106	B1	4/2005	Herrmann	6,984,231	B2	1/2006	Goble et al.
6,883,199	B1	4/2005	Lundell et al.	6,986,451	B1	1/2006	Mastri et al.
6,884,392	B2	4/2005	Malkin et al.	6,988,649	B2	1/2006	Shelton, IV et al.
6,884,428	B2	4/2005	Binette et al.	6,988,650	B2	1/2006	Schwemberger et al.
6,886,730	B2	5/2005	Fujisawa et al.	6,989,034	B2	1/2006	Hammer et al.
6,887,710	B2	5/2005	Call et al.	6,990,731	B2	1/2006	Haytayan
6,889,116	B2	5/2005	Jinno	6,990,796	B2	1/2006	Schnipke et al.
6,893,435	B2	5/2005	Goble	6,993,200	B2	1/2006	Tastl et al.
6,894,140	B2	5/2005	Roby	6,993,413	B2	1/2006	Sunaoshi
				6,994,708	B2	2/2006	Manzo
				6,995,729	B2	2/2006	Govari et al.
				6,996,433	B2	2/2006	Burbank et al.
				6,997,931	B2	2/2006	Sauer et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

6,997,935 B2	2/2006	Anderson et al.	7,083,075 B2	8/2006	Swayze et al.
6,998,736 B2	2/2006	Lee et al.	7,083,571 B2	8/2006	Wang et al.
6,998,816 B2	2/2006	Wieck et al.	7,083,615 B2	8/2006	Peterson et al.
6,999,821 B2	2/2006	Jenney et al.	7,083,619 B2	8/2006	Truckai et al.
7,000,818 B2	2/2006	Shelton, IV et al.	7,083,620 B2	8/2006	Jahns et al.
7,000,819 B2	2/2006	Swayze et al.	7,083,626 B2	8/2006	Hart et al.
7,000,911 B2	2/2006	McCormick et al.	7,086,267 B2	8/2006	Dworak et al.
7,001,380 B2	2/2006	Goble	7,087,049 B2	8/2006	Nowlin et al.
7,001,408 B2	2/2006	Knodel et al.	7,087,054 B2	8/2006	Truckai et al.
7,004,174 B2	2/2006	Eggers et al.	7,087,071 B2	8/2006	Nicholas et al.
7,007,176 B2	2/2006	Goodfellow et al.	7,090,637 B2	8/2006	Danitz et al.
7,008,433 B2	3/2006	Voellmicke et al.	7,090,673 B2	8/2006	Dycus et al.
7,008,435 B2	3/2006	Cummins	7,090,683 B2	8/2006	Brock et al.
7,009,039 B2	3/2006	Yayon et al.	7,090,684 B2	8/2006	McGuckin, Jr. et al.
7,011,657 B2	3/2006	Truckai et al.	7,091,191 B2	8/2006	Laredo et al.
7,014,640 B2	3/2006	Kemppainen et al.	7,091,412 B2	8/2006	Wang et al.
7,018,357 B2	3/2006	Emmons	7,093,492 B2	8/2006	Treiber et al.
7,018,390 B2	3/2006	Turovskiy et al.	7,094,202 B2	8/2006	Nobis et al.
7,021,669 B1	4/2006	Lindermeir et al.	7,094,247 B2	8/2006	Monassevitch et al.
7,022,131 B1	4/2006	Derowe et al.	7,094,916 B2	8/2006	DeLuca et al.
7,023,159 B2	4/2006	Gorti et al.	7,096,972 B2	8/2006	Orozco, Jr.
7,025,064 B2	4/2006	Wang et al.	7,097,089 B2	8/2006	Marczyk
7,025,732 B2	4/2006	Thompson et al.	7,097,644 B2	8/2006	Long
7,025,743 B2	4/2006	Mann et al.	7,097,650 B2	8/2006	Weller et al.
7,025,774 B2	4/2006	Freeman et al.	7,098,794 B2	8/2006	Lindsay et al.
7,025,775 B2	4/2006	Gadberry et al.	7,100,949 B2	9/2006	Williams et al.
7,028,570 B2	4/2006	Ohta et al.	7,101,187 B1	9/2006	Deconinck et al.
7,029,435 B2	4/2006	Nakao	7,101,371 B2	9/2006	Dycus et al.
7,029,439 B2	4/2006	Roberts et al.	7,101,394 B2	9/2006	Hamm et al.
7,030,904 B2	4/2006	Adair et al.	7,104,741 B2	9/2006	Krohn
7,032,798 B2	4/2006	Whitman et al.	7,108,695 B2	9/2006	Witt et al.
7,032,799 B2	4/2006	Viola et al.	7,108,701 B2	9/2006	Evens et al.
7,033,356 B2	4/2006	Latterell et al.	7,108,709 B2	9/2006	Cummins
7,033,378 B2	4/2006	Smith et al.	7,111,768 B2	9/2006	Cummins et al.
7,035,716 B2	4/2006	Harris et al.	7,111,769 B2	9/2006	Wales et al.
7,035,762 B2	4/2006	Menard et al.	7,112,214 B2	9/2006	Peterson et al.
7,036,680 B1	5/2006	Flannery	RE39,358 E	10/2006	Goble
7,037,314 B2	5/2006	Armstrong	D530,339 S *	10/2006	Hernandez ..... D14/488
7,037,344 B2	5/2006	Kagan et al.	7,114,642 B2	10/2006	Whitman
7,041,088 B2	5/2006	Nawrocki et al.	7,116,100 B1	10/2006	Mock et al.
7,041,102 B2	5/2006	Truckai et al.	7,118,020 B2	10/2006	Lee et al.
7,041,868 B2	5/2006	Greene et al.	7,118,528 B1	10/2006	Piskun
7,043,852 B2	5/2006	Hayashida et al.	7,118,563 B2	10/2006	Weckwerth et al.
7,044,350 B2	5/2006	Kameyama et al.	7,118,582 B1	10/2006	Wang et al.
7,044,352 B2	5/2006	Shelton, IV et al.	7,119,534 B2	10/2006	Butzmann
7,044,353 B2	5/2006	Mastri et al.	7,121,446 B2	10/2006	Arad et al.
7,046,082 B2	5/2006	Komiya et al.	7,121,773 B2	10/2006	Mikiya et al.
7,048,165 B2	5/2006	Haramiishi	7,122,028 B2	10/2006	Looper et al.
7,048,687 B1	5/2006	Reuss et al.	7,125,403 B2	10/2006	Julian et al.
7,048,716 B1	5/2006	Kucharczyk et al.	7,125,409 B2	10/2006	Truckai et al.
7,048,745 B2	5/2006	Tierney et al.	7,126,303 B2	10/2006	Farritor et al.
7,052,454 B2	5/2006	Taylor	7,126,879 B2	10/2006	Snyder
7,052,494 B2	5/2006	Goble et al.	7,128,253 B2	10/2006	Mastri et al.
7,052,499 B2	5/2006	Steger et al.	7,128,254 B2	10/2006	Shelton, IV et al.
7,055,730 B2	6/2006	Ehrenfels et al.	7,128,748 B2	10/2006	Mooradian et al.
7,055,731 B2	6/2006	Shelton, IV et al.	7,131,445 B2	11/2006	Amoah
7,056,284 B2	6/2006	Martone et al.	7,133,601 B2	11/2006	Phillips et al.
7,056,330 B2	6/2006	Gayton	7,134,364 B2	11/2006	Kageler et al.
7,059,331 B2	6/2006	Adams et al.	7,134,587 B2	11/2006	Schwemberger et al.
7,059,508 B2	6/2006	Shelton, IV et al.	7,135,027 B2	11/2006	Delmotte
7,063,671 B2	6/2006	Couvillon, Jr.	7,137,980 B2	11/2006	Buysse et al.
7,063,712 B2	6/2006	Vargas et al.	7,137,981 B2	11/2006	Long
7,064,509 B1	6/2006	Fu et al.	7,139,016 B2	11/2006	Squilla et al.
7,066,879 B2	6/2006	Fowler et al.	7,140,527 B2	11/2006	Ehrenfels et al.
7,066,944 B2	6/2006	Laufer et al.	7,140,528 B2	11/2006	Shelton, IV
7,067,038 B2	6/2006	Trokhani et al.	7,141,055 B2	11/2006	Abrams et al.
7,070,083 B2	7/2006	Jankowski	7,143,923 B2	12/2006	Shelton, IV et al.
7,070,559 B2	7/2006	Adams et al.	7,143,924 B2	12/2006	Scirica et al.
7,070,597 B2	7/2006	Truckai et al.	7,143,925 B2	12/2006	Shelton, IV et al.
7,071,287 B2	7/2006	Rhine et al.	7,143,926 B2	12/2006	Shelton, IV et al.
7,075,770 B1	7/2006	Smith	7,146,191 B2	12/2006	Kerner et al.
7,077,856 B2	7/2006	Whitman	7,147,138 B2	12/2006	Shelton, IV
7,080,769 B2	7/2006	Vresh et al.	7,147,139 B2	12/2006	Schwemberger et al.
7,081,114 B2	7/2006	Rashidi	7,147,140 B2	12/2006	Wukusick et al.
7,083,073 B2	8/2006	Yoshie et al.	7,147,637 B2	12/2006	Goble
			7,147,648 B2	12/2006	Lin
			7,147,650 B2	12/2006	Lee
			7,150,748 B2	12/2006	Ebbutt et al.
			7,153,300 B2	12/2006	Goble

(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,153,314 B2	12/2006	Laufer et al.	7,249,267 B2	7/2007	Chapuis
7,155,316 B2	12/2006	Sutherland et al.	7,252,641 B2	8/2007	Thompson et al.
7,156,863 B2	1/2007	Sonnenschein et al.	7,252,660 B2	8/2007	Kunz
7,159,750 B2	1/2007	Racenet et al.	7,255,012 B2	8/2007	Hedtke
7,160,296 B2	1/2007	Pearson et al.	7,255,696 B2	8/2007	Goble et al.
7,160,299 B2	1/2007	Baily	7,256,695 B2	8/2007	Hamel et al.
7,161,036 B2	1/2007	Oikawa et al.	7,258,262 B2	8/2007	Mastri et al.
7,161,580 B2	1/2007	Bailey et al.	7,258,546 B2	8/2007	Beier et al.
7,162,758 B2	1/2007	Skinner	7,260,431 B2	8/2007	Libbus et al.
7,163,563 B2	1/2007	Schwartz et al.	7,265,374 B2	9/2007	Lee et al.
7,166,117 B2	1/2007	Hellenkamp	7,267,677 B2	9/2007	Johnson et al.
7,166,133 B2	1/2007	Evans et al.	7,267,679 B2	9/2007	McGuckin, Jr. et al.
7,168,604 B2	1/2007	Milliman et al.	7,272,002 B2	9/2007	Drapeau
7,170,910 B2	1/2007	Chen et al.	7,273,483 B2	9/2007	Wiener et al.
7,171,279 B2	1/2007	Buckingham et al.	D552,623 S	10/2007	Vong et al.
7,172,104 B2	2/2007	Scirica et al.	7,275,674 B2	10/2007	Racenet et al.
7,172,593 B2	2/2007	Trieu et al.	7,276,044 B2	10/2007	Ferry et al.
7,172,615 B2	2/2007	Morriss et al.	7,276,068 B2	10/2007	Johnson et al.
7,174,202 B2	2/2007	Bladen et al.	7,278,562 B2	10/2007	Mastri et al.
7,174,636 B2	2/2007	Lowe	7,278,563 B1	10/2007	Green
7,177,533 B2	2/2007	McFarlin et al.	7,278,949 B2	10/2007	Bader
7,179,223 B2	2/2007	Motoki et al.	7,278,994 B2	10/2007	Goble
7,179,267 B2	2/2007	Nolan et al.	7,282,048 B2	10/2007	Goble et al.
7,182,239 B1	2/2007	Myers	7,283,096 B2	10/2007	Geisheimer et al.
7,182,763 B2	2/2007	Nardella	7,286,850 B2	10/2007	Frielink et al.
7,183,737 B2	2/2007	Kitagawa	7,287,682 B1	10/2007	Ezzat et al.
7,187,960 B2	3/2007	Abreu	7,289,139 B2	10/2007	Amling et al.
7,188,758 B2	3/2007	Viola et al.	7,293,685 B2	11/2007	Ehrenfels et al.
7,189,207 B2	3/2007	Viola	7,295,893 B2	11/2007	Sunaoshi
7,190,147 B2	3/2007	Gileff et al.	7,295,907 B2	11/2007	Lu et al.
7,193,199 B2	3/2007	Jang	7,296,722 B2	11/2007	Ivanko
7,195,627 B2	3/2007	Amoah et al.	7,296,724 B2	11/2007	Green et al.
7,196,911 B2	3/2007	Takano et al.	7,297,149 B2	11/2007	Vitali et al.
D541,418 S	4/2007	Schechter et al.	7,300,373 B2	11/2007	Jinno et al.
7,199,537 B2	4/2007	Okamura et al.	7,300,431 B2	11/2007	Dubrovsky
7,199,545 B2	4/2007	Oleynikov et al.	7,300,450 B2	11/2007	Vleugels et al.
7,202,576 B1	4/2007	Dechene et al.	7,303,106 B2	12/2007	Milliman et al.
7,202,653 B2	4/2007	Pai	7,303,107 B2	12/2007	Milliman et al.
7,204,404 B2	4/2007	Nguyen et al.	7,303,108 B2	12/2007	Shelton, IV
7,204,835 B2	4/2007	Latterell et al.	7,303,502 B2	12/2007	Thompson
7,206,626 B2	4/2007	Quaid, III	7,303,556 B2	12/2007	Metzger
7,207,233 B2	4/2007	Wadge	7,306,597 B2	12/2007	Manzo
7,207,471 B2	4/2007	Heinrich et al.	7,308,998 B2	12/2007	Mastri et al.
7,207,472 B2	4/2007	Wukusick et al.	7,311,238 B2	12/2007	Liu
7,207,556 B2	4/2007	Saitoh et al.	7,313,430 B2	12/2007	Urquhart et al.
7,208,005 B2	4/2007	Frecker et al.	7,314,473 B2	1/2008	Jinno et al.
7,210,609 B2	5/2007	Leiboff et al.	7,322,859 B2	1/2008	Evans
7,211,081 B2	5/2007	Goble	7,322,975 B2	1/2008	Goble et al.
7,211,084 B2	5/2007	Goble et al.	7,322,994 B2	1/2008	Nicholas et al.
7,211,092 B2	5/2007	Hughett	7,324,572 B2	1/2008	Chang
7,211,979 B2	5/2007	Khatib et al.	7,326,203 B2	2/2008	Papineau et al.
7,213,736 B2	5/2007	Wales et al.	7,326,213 B2	2/2008	Benderev et al.
7,214,224 B2	5/2007	Goble	7,328,828 B2	2/2008	Ortiz et al.
7,215,517 B2	5/2007	Takamatsu	7,328,829 B2	2/2008	Arad et al.
7,217,285 B2	5/2007	Vargas et al.	7,330,004 B2	2/2008	DeJonge et al.
7,220,260 B2	5/2007	Fleming et al.	7,331,340 B2	2/2008	Barney
7,220,272 B2	5/2007	Weadock	7,331,343 B2	2/2008	Schmidt et al.
7,225,959 B2	6/2007	Patton et al.	7,331,403 B2	2/2008	Berry et al.
7,225,963 B2	6/2007	Scirica	7,331,406 B2	2/2008	Wottreng, Jr. et al.
7,225,964 B2	6/2007	Mastri et al.	7,331,969 B1	2/2008	Ingnas et al.
7,226,450 B2	6/2007	Athanasidou et al.	7,334,717 B2	2/2008	Rethy et al.
7,228,505 B2	6/2007	Shimazu et al.	7,334,718 B2	2/2008	McAlister et al.
7,229,408 B2	6/2007	Douglas et al.	7,335,199 B2	2/2008	Goble et al.
7,234,624 B2	6/2007	Gresham et al.	7,335,401 B2	2/2008	Finke et al.
7,235,072 B2	6/2007	Sartor et al.	7,336,045 B2	2/2008	Clermonts
7,235,089 B1	6/2007	McGuckin, Jr.	7,336,048 B2	2/2008	Lohr
7,235,302 B2	6/2007	Jing et al.	7,336,184 B2	2/2008	Smith et al.
7,237,708 B1	7/2007	Guy et al.	7,337,774 B2	3/2008	Webb
7,238,195 B2	7/2007	Viola	7,338,505 B2	3/2008	Belson
7,238,901 B2	7/2007	Kim et al.	7,338,513 B2	3/2008	Lee et al.
7,239,657 B1	7/2007	Gunnarsson	7,341,554 B2	3/2008	Sekine et al.
7,241,288 B2	7/2007	Braun	7,341,555 B2	3/2008	Ootawara et al.
7,241,289 B2	7/2007	Braun	7,341,591 B2	3/2008	Grinberg
7,246,734 B2	7/2007	Shelton, IV	7,343,920 B2	3/2008	Toby et al.
7,247,161 B2	7/2007	Johnston et al.	7,344,532 B2	3/2008	Goble et al.
			7,344,533 B2	3/2008	Pearson et al.
			7,346,344 B2	3/2008	Fontaine
			7,346,406 B2	3/2008	Brotto et al.
			7,348,763 B1	3/2008	Reinhart et al.



(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,348,875 B2	3/2008	Hughes et al.	7,434,715 B2	10/2008	Shelton, IV et al.
RE40,237 E	4/2008	Bilotti et al.	7,434,717 B2	10/2008	Shelton, IV et al.
7,351,258 B2	4/2008	Ricotta et al.	7,435,249 B2	10/2008	Buysse et al.
7,354,447 B2	4/2008	Shelton, IV et al.	7,438,209 B1	10/2008	Hess et al.
7,354,502 B2	4/2008	Polat et al.	7,438,718 B2	10/2008	Milliman et al.
7,357,287 B2	4/2008	Shelton, IV et al.	7,439,354 B2	10/2008	Lenges et al.
7,357,806 B2	4/2008	Rivera et al.	7,441,684 B2	10/2008	Shelton, IV et al.
7,361,168 B2	4/2008	Makower et al.	7,441,685 B1	10/2008	Boudreaux
7,361,195 B2	4/2008	Schwartz et al.	7,442,201 B2	10/2008	Pugsley et al.
7,362,062 B2	4/2008	Schneider et al.	7,443,547 B2	10/2008	Moreno et al.
7,364,060 B2	4/2008	Milliman	7,446,131 B1	11/2008	Liu et al.
7,364,061 B2	4/2008	Swayze et al.	7,448,525 B2	11/2008	Shelton, IV et al.
7,367,485 B2	5/2008	Shelton, IV et al.	7,450,010 B1	11/2008	Gravelle et al.
7,368,124 B2	5/2008	Chun et al.	7,450,991 B2	11/2008	Smith et al.
7,371,210 B2	5/2008	Brock et al.	7,451,904 B2	11/2008	Shelton, IV
7,371,403 B2	5/2008	McCarthy et al.	7,455,208 B2	11/2008	Wales et al.
7,375,493 B2	5/2008	Calhoon et al.	7,455,676 B2	11/2008	Holsten et al.
7,377,918 B2	5/2008	Amoah	7,455,682 B2	11/2008	Viola
7,377,928 B2	5/2008	Zubik et al.	7,455,687 B2	11/2008	Saunders et al.
7,378,817 B2	5/2008	Calhoon et al.	D582,934 S	12/2008	Byeon
RE40,388 E	6/2008	Gines	7,461,767 B2	12/2008	Viola et al.
D570,868 S	6/2008	Hosokawa et al.	7,462,187 B2	12/2008	Johnston et al.
7,380,695 B2	6/2008	Doll et al.	7,464,845 B2	12/2008	Chou
7,380,696 B2	6/2008	Shelton, IV et al.	7,464,846 B2	12/2008	Shelton, IV et al.
7,384,403 B2	6/2008	Sherman	7,464,847 B2	12/2008	Viola et al.
7,384,417 B2	6/2008	Cucin	7,464,848 B2	12/2008	Green et al.
7,386,365 B2	6/2008	Nixon	7,464,849 B2	12/2008	Shelton, IV et al.
7,386,730 B2	6/2008	Uchikubo	7,467,740 B2	12/2008	Shelton, IV et al.
7,388,217 B2	6/2008	Buschbeck et al.	7,467,849 B2	12/2008	Silverbrook et al.
7,388,484 B2	6/2008	Hsu	7,472,814 B2	1/2009	Mastri et al.
7,391,173 B2	6/2008	Schena	7,472,815 B2	1/2009	Shelton, IV et al.
7,394,190 B2	7/2008	Huang	7,472,816 B2	1/2009	Holsten et al.
7,396,356 B2	7/2008	Mollenauer	7,473,221 B2	1/2009	Ewers et al.
7,397,364 B2	7/2008	Govari	7,473,253 B2	1/2009	Dycus et al.
7,398,707 B2	7/2008	Morley et al.	7,473,263 B2	1/2009	Johnston et al.
7,398,907 B2	7/2008	Racenet et al.	7,476,237 B2	1/2009	Taniguchi et al.
7,398,908 B2	7/2008	Holsten et al.	7,479,608 B2	1/2009	Smith
7,400,107 B2	7/2008	Schneider et al.	7,481,347 B2	1/2009	Roy
7,400,752 B2	7/2008	Zacharias	7,481,348 B2	1/2009	Marczyk
7,401,000 B2	7/2008	Nakamura	7,481,349 B2	1/2009	Holsten et al.
7,401,721 B2	7/2008	Holsten et al.	7,481,824 B2	1/2009	Boudreaux et al.
7,404,449 B2	7/2008	Birmingham et al.	7,485,124 B2	2/2009	Kuhns et al.
7,404,508 B2	7/2008	Smith et al.	7,485,133 B2	2/2009	Cannon et al.
7,404,509 B2	7/2008	Ortiz et al.	7,485,142 B2	2/2009	Milo
7,404,822 B2	7/2008	Viart et al.	7,487,899 B2	2/2009	Shelton, IV et al.
D575,793 S	8/2008	Ording	7,489,055 B2	2/2009	Jeong et al.
7,407,074 B2	8/2008	Ortiz et al.	7,490,749 B2	2/2009	Schall et al.
7,407,075 B2	8/2008	Holsten et al.	7,491,232 B2	2/2009	Bolduc et al.
7,407,076 B2	8/2008	Racenet et al.	7,494,039 B2	2/2009	Racenet et al.
7,407,077 B2	8/2008	Ortiz et al.	7,494,460 B2	2/2009	Haarstad et al.
7,407,078 B2	8/2008	Shelton, IV et al.	7,494,499 B2	2/2009	Nagase et al.
7,408,310 B2	8/2008	Hong et al.	7,494,501 B2	2/2009	Ahlberg et al.
7,410,085 B2	8/2008	Wolf et al.	7,500,979 B2	3/2009	Hueil et al.
7,410,086 B2	8/2008	Ortiz et al.	7,501,198 B2	3/2009	Barley et al.
7,410,483 B2	8/2008	Danitz et al.	7,503,474 B2	3/2009	Hillstead et al.
7,413,563 B2	8/2008	Corcoran et al.	7,506,790 B2	3/2009	Shelton, IV
7,416,101 B2	8/2008	Shelton, IV et al.	7,506,791 B2	3/2009	Omaits et al.
7,418,078 B2	8/2008	Blanz et al.	7,507,202 B2	3/2009	Schoellhorn
RE40,514 E	9/2008	Mastri et al.	7,510,107 B2	3/2009	Timm et al.
7,419,080 B2	9/2008	Smith et al.	7,510,534 B2	3/2009	Burdorff et al.
7,419,081 B2	9/2008	Ehrenfels et al.	7,510,566 B2	3/2009	Jacobs et al.
7,419,321 B2	9/2008	Tereschouk	7,513,407 B1	4/2009	Chang
7,419,495 B2	9/2008	Menn et al.	7,513,408 B2	4/2009	Shelton, IV et al.
7,422,136 B1	9/2008	Marczyk	7,517,356 B2	4/2009	Heinrich
7,422,138 B2	9/2008	Bilotti et al.	7,524,320 B2	4/2009	Tierney et al.
7,422,139 B2	9/2008	Shelton, IV et al.	7,527,632 B2	5/2009	Houghton et al.
7,424,965 B2	9/2008	Racenet et al.	7,530,984 B2	5/2009	Sonnenschein et al.
7,427,607 B2	9/2008	Suzuki	7,530,985 B2	5/2009	Takemoto et al.
D578,644 S	10/2008	Shumer et al.	7,533,906 B2	5/2009	Luetngen et al.
7,430,772 B2	10/2008	Van Es	7,534,259 B2	5/2009	Lashinski et al.
7,431,188 B1	10/2008	Marczyk	7,540,867 B2	6/2009	Jinno et al.
7,431,189 B2	10/2008	Shelton, IV et al.	7,540,872 B2	6/2009	Schechter et al.
7,431,230 B2	10/2008	McPherson et al.	7,542,807 B2	6/2009	Bertolero et al.
7,431,694 B2	10/2008	Stefanchik et al.	7,543,730 B1	6/2009	Marczyk
7,431,730 B2	10/2008	Viola	7,544,197 B2	6/2009	Kelsch et al.
			7,546,939 B2	6/2009	Adams et al.
			7,546,940 B2	6/2009	Milliman et al.
			7,547,287 B2	6/2009	Boecker et al.
			7,547,312 B2	6/2009	Bauman et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,549,563 B2	6/2009	Mather et al.	7,644,783 B2	1/2010	Roberts et al.
7,549,564 B2	6/2009	Boudreaux	7,644,848 B2	1/2010	Swayze et al.
7,549,998 B2	6/2009	Braun	7,645,230 B2	1/2010	Mikkaichi et al.
7,552,854 B2	6/2009	Wixey et al.	7,648,055 B2	1/2010	Marczyk
7,553,173 B2	6/2009	Kowalick	7,648,457 B2	1/2010	Stefanchik et al.
7,553,275 B2	6/2009	Padget et al.	7,648,519 B2	1/2010	Lee et al.
7,554,343 B2	6/2009	Bromfield	7,650,185 B2	1/2010	Maile et al.
7,556,185 B2	7/2009	Viola	7,651,017 B2	1/2010	Ortiz et al.
7,556,186 B2	7/2009	Milliman	7,651,498 B2	1/2010	Shifrin et al.
7,556,647 B2	7/2009	Drews et al.	7,654,431 B2	2/2010	Hueil et al.
7,559,449 B2	7/2009	Viola	7,655,003 B2	2/2010	Lorang et al.
7,559,450 B2	7/2009	Wales et al.	7,655,004 B2	2/2010	Long
7,559,452 B2	7/2009	Wales et al.	7,655,288 B2	2/2010	Bauman et al.
7,559,937 B2	7/2009	de la Torre et al.	7,655,584 B2	2/2010	Biran et al.
7,561,637 B2	7/2009	Jonsson et al.	7,656,131 B2	2/2010	Embrey et al.
7,562,910 B2	7/2009	Kertesz et al.	7,658,311 B2	2/2010	Boudreaux
7,563,269 B2	7/2009	Hashiguchi	7,658,312 B2	2/2010	Vidal et al.
7,563,862 B2	7/2009	Sieg et al.	7,658,705 B2	2/2010	Melvin et al.
7,565,993 B2	7/2009	Milliman et al.	7,659,219 B2	2/2010	Biran et al.
7,566,300 B2	7/2009	Devierre et al.	7,661,448 B2	2/2010	Kim et al.
7,567,045 B2	7/2009	Fristedt	7,662,161 B2	2/2010	Briganti et al.
7,568,603 B2	8/2009	Shelton, IV et al.	7,665,646 B2	2/2010	Prommersberger
7,568,604 B2	8/2009	Ehrenfels et al.	7,665,647 B2	2/2010	Shelton, IV et al.
7,568,619 B2	8/2009	Todd et al.	7,666,195 B2	2/2010	Kelleher et al.
7,575,144 B2	8/2009	Ortiz et al.	7,669,746 B2	3/2010	Shelton, IV
7,578,825 B2	8/2009	Huebner	7,669,747 B2	3/2010	Weisenburgh, II et al.
D600,712 S	9/2009	LaManna et al.	7,670,334 B2	3/2010	Hueil et al.
7,583,063 B2	9/2009	Dooley	7,673,780 B2	3/2010	Shelton, IV et al.
7,584,880 B2	9/2009	Racenet et al.	7,673,781 B2	3/2010	Swayze et al.
7,586,289 B2	9/2009	Andruk et al.	7,673,782 B2	3/2010	Hess et al.
7,588,174 B2	9/2009	Holsten et al.	7,673,783 B2	3/2010	Morgan et al.
7,588,175 B2	9/2009	Timm et al.	7,674,253 B2	3/2010	Fisher et al.
7,588,176 B2	9/2009	Timm et al.	7,674,255 B2	3/2010	Braun
7,588,177 B2	9/2009	Racenet	7,674,263 B2	3/2010	Ryan
7,591,783 B2	9/2009	Boulais et al.	7,674,270 B2	3/2010	Layer
7,591,818 B2	9/2009	Bertolero et al.	7,678,121 B1	3/2010	Knodel
7,593,766 B2	9/2009	Faber et al.	7,682,307 B2	3/2010	Danitz et al.
7,595,642 B2	9/2009	Doyle	7,682,367 B2	3/2010	Shah et al.
7,597,229 B2	10/2009	Boudreaux et al.	7,682,686 B2	3/2010	Curro et al.
7,597,230 B2	10/2009	Racenet et al.	7,686,201 B2	3/2010	Csiky
7,597,693 B2	10/2009	Garrison	7,686,804 B2	3/2010	Johnson et al.
7,597,699 B2	10/2009	Rogers	7,686,826 B2	3/2010	Lee et al.
7,598,972 B2	10/2009	Tomita	7,688,028 B2	3/2010	Phillips et al.
7,600,663 B2	10/2009	Green	7,691,098 B2	4/2010	Wallace et al.
7,604,118 B2	10/2009	Iio et al.	7,691,103 B2	4/2010	Fernandez et al.
7,604,150 B2	10/2009	Boudreaux	7,691,106 B2	4/2010	Schenberger et al.
7,604,151 B2	10/2009	Hess et al.	7,694,864 B2	4/2010	Okada et al.
7,604,668 B2	10/2009	Farnsworth et al.	7,694,865 B2	4/2010	Scirica
7,607,557 B2	10/2009	Shelton, IV et al.	7,695,485 B2	4/2010	Whitman et al.
7,608,091 B2	10/2009	Goldfarb et al.	7,695,493 B2	4/2010	Saadat et al.
D604,325 S	11/2009	Ebeling et al.	7,699,204 B2	4/2010	Viola
7,611,038 B2	11/2009	Racenet et al.	7,699,835 B2	4/2010	Lee et al.
7,611,474 B2	11/2009	Hibner et al.	7,699,844 B2	4/2010	Utley et al.
7,615,003 B2	11/2009	Stefanchik et al.	7,699,846 B2	4/2010	Ryan
7,615,006 B2	11/2009	Abe	7,699,856 B2	4/2010	Van Wyk et al.
7,615,067 B2	11/2009	Lee et al.	7,699,859 B2	4/2010	Bombard et al.
7,617,961 B2	11/2009	Viola	7,699,860 B2	4/2010	Huitema et al.
D605,201 S	12/2009	Lorenz et al.	7,699,868 B2	4/2010	Frank et al.
D607,010 S	12/2009	Kocmick	7,703,653 B2	4/2010	Shah et al.
7,624,902 B2	12/2009	Marczyk et al.	7,705,559 B2	4/2010	Powell et al.
7,624,903 B2	12/2009	Green et al.	7,708,180 B2	5/2010	Murray et al.
7,625,370 B2	12/2009	Hart et al.	7,708,181 B2	5/2010	Cole et al.
7,630,841 B2	12/2009	Comisky et al.	7,708,182 B2	5/2010	Viola
7,631,793 B2	12/2009	Rethy et al.	7,708,758 B2	5/2010	Lee et al.
7,631,794 B2	12/2009	Rethy et al.	7,708,768 B2	5/2010	Danek et al.
7,635,074 B2	12/2009	Olson et al.	7,712,182 B2	5/2010	Zeiler et al.
7,635,922 B2	12/2009	Becker	7,713,190 B2	5/2010	Brock et al.
7,637,409 B2	12/2009	Marczyk	7,713,542 B2	5/2010	Xu et al.
7,637,410 B2	12/2009	Marczyk	7,714,239 B2	5/2010	Smith
7,638,958 B2	12/2009	Philipp et al.	7,714,334 B2	5/2010	Lin
7,641,091 B2	1/2010	Olson et al.	7,717,312 B2	5/2010	Beetel
7,641,092 B2	1/2010	Kruszynski et al.	7,717,313 B2	5/2010	Criscuolo et al.
7,641,093 B2	1/2010	Doll et al.	7,717,846 B2	5/2010	Zirps et al.
7,641,095 B2	1/2010	Viola	7,717,873 B2	5/2010	Swick
7,641,671 B2	1/2010	Crainich	7,717,915 B2	5/2010	Miyazawa
			7,717,926 B2	5/2010	Whitfield et al.
			7,718,180 B2	5/2010	Karp
			7,718,556 B2	5/2010	Matsuda et al.
			7,721,930 B2	5/2010	McKenna et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,721,931 B2	5/2010	Shelton, IV et al.	7,793,812 B2	9/2010	Moore et al.
7,721,932 B2	5/2010	Cole et al.	7,794,475 B2	9/2010	Hess et al.
7,721,933 B2	5/2010	Ehrenfels et al.	7,798,386 B2	9/2010	Schall et al.
7,721,934 B2	5/2010	Shelton, IV et al.	7,799,039 B2	9/2010	Shelton, IV et al.
7,721,936 B2	5/2010	Shalton, IV et al.	7,799,044 B2	9/2010	Johnston et al.
7,722,527 B2	5/2010	Bouchier et al.	7,799,965 B2	9/2010	Patel et al.
7,722,607 B2	5/2010	Dumbauld et al.	7,803,151 B2	9/2010	Whitman
7,722,610 B2	5/2010	Viola et al.	7,806,871 B2	10/2010	Li et al.
7,725,214 B2	5/2010	Diolaiti	7,806,891 B2	10/2010	Nowlin et al.
7,726,171 B2	6/2010	Langlotz et al.	7,810,690 B2	10/2010	Bilotti et al.
7,726,537 B2	6/2010	Olson et al.	7,810,691 B2	10/2010	Boyden et al.
7,726,538 B2	6/2010	Holsten et al.	7,810,692 B2	10/2010	Hall et al.
7,726,539 B2	6/2010	Holsten et al.	7,810,693 B2	10/2010	Broehl et al.
7,727,954 B2	6/2010	McKay	7,811,275 B2	10/2010	Birk et al.
7,728,553 B2	6/2010	Carrier et al.	7,814,816 B2	10/2010	Alberti et al.
7,729,742 B2	6/2010	Govari	7,815,092 B2	10/2010	Whitman et al.
7,731,072 B2	6/2010	Timm et al.	7,815,565 B2	10/2010	Stefanchik et al.
7,731,073 B2	6/2010	Wixey et al.	7,815,662 B2	10/2010	Spivey et al.
7,731,724 B2	6/2010	Huitema et al.	7,819,296 B2	10/2010	Hueil et al.
7,735,703 B2	6/2010	Morgan et al.	7,819,297 B2	10/2010	Doll et al.
7,736,254 B2	6/2010	Schena	7,819,298 B2	10/2010	Hall et al.
7,736,306 B2	6/2010	Brustad et al.	7,819,299 B2	10/2010	Shelton, IV et al.
7,736,374 B2	6/2010	Vaughan et al.	7,819,799 B2	10/2010	Merril et al.
7,738,971 B2	6/2010	Swayze et al.	7,819,884 B2	10/2010	Lee et al.
7,740,159 B2	6/2010	Shelton, IV et al.	7,819,885 B2	10/2010	Cooper
7,742,036 B2	6/2010	Grant et al.	7,819,886 B2	10/2010	Whitfield et al.
7,743,960 B2	6/2010	Whitman et al.	7,823,592 B2	11/2010	Bettuchi et al.
7,744,624 B2	6/2010	Bettuchi	7,823,760 B2	11/2010	Zemlok et al.
7,744,627 B2	6/2010	Orban, III et al.	7,824,401 B2	11/2010	Manzo et al.
7,744,628 B2	6/2010	Viola	7,824,422 B2	11/2010	Benchetrit
7,747,146 B2	6/2010	Milano et al.	7,824,426 B2	11/2010	Racenet et al.
7,748,587 B2	7/2010	Haramiishi et al.	7,828,189 B2	11/2010	Holsten et al.
7,748,632 B2	7/2010	Coleman et al.	7,828,794 B2	11/2010	Sartor
7,749,204 B2	7/2010	Dhanaraj et al.	7,828,808 B2	11/2010	Hinman et al.
7,749,240 B2	7/2010	Takahashi et al.	7,831,292 B2	11/2010	Quaid et al.
7,751,870 B2	7/2010	Whitman	7,832,408 B2	11/2010	Shelton, IV et al.
7,753,245 B2	7/2010	Boudreaux et al.	7,832,611 B2	11/2010	Boyden et al.
7,753,246 B2	7/2010	Scirica	7,832,612 B2	11/2010	Baxter, III et al.
7,753,904 B2	7/2010	Shelton, IV et al.	7,833,234 B2	11/2010	Bailly et al.
7,757,924 B2	7/2010	Gerbi et al.	7,835,823 B2	11/2010	Sillman et al.
7,758,594 B2	7/2010	Lamson et al.	7,836,400 B2	11/2010	May et al.
7,758,612 B2	7/2010	Shipp	7,837,079 B2	11/2010	Holsten et al.
7,762,462 B2	7/2010	Gelbman	7,837,080 B2	11/2010	Schwemberger
7,762,998 B2	7/2010	Birk et al.	7,837,081 B2	11/2010	Holsten et al.
7,766,207 B2	8/2010	Mather et al.	7,837,425 B2	11/2010	Saeki et al.
7,766,209 B2	8/2010	Baxter, III et al.	7,837,685 B2	11/2010	Weinberg et al.
7,766,210 B2	8/2010	Shelton, IV et al.	7,837,687 B2	11/2010	Harp
7,766,821 B2	8/2010	Brunnen et al.	7,837,694 B2	11/2010	Tethrake et al.
7,766,894 B2	8/2010	Weitzner et al.	7,838,789 B2	11/2010	Stoffers et al.
7,770,658 B2	8/2010	Ito et al.	7,839,109 B2	11/2010	Carmen, Jr. et al.
7,770,773 B2	8/2010	Whitman et al.	7,840,253 B2	11/2010	Tremblay et al.
7,770,774 B2	8/2010	Mastri et al.	7,841,503 B2	11/2010	Sonnenschein et al.
7,770,775 B2	8/2010	Shelton, IV et al.	7,842,025 B2	11/2010	Coleman et al.
7,770,776 B2	8/2010	Chen et al.	7,842,028 B2	11/2010	Lee
7,771,396 B2	8/2010	Stefanchik et al.	7,843,158 B2	11/2010	Prisco
7,772,720 B2	8/2010	McGee et al.	7,845,533 B2	12/2010	Marczyk et al.
7,772,725 B2	8/2010	Siman-Tov	7,845,534 B2	12/2010	Viola et al.
7,775,972 B2	8/2010	Brock et al.	7,845,535 B2	12/2010	Scirica
7,776,037 B2	8/2010	Odom	7,845,536 B2	12/2010	Viola et al.
7,776,060 B2	8/2010	Mooradian et al.	7,845,537 B2	12/2010	Shelton, IV et al.
7,776,065 B2	8/2010	Griffiths et al.	7,845,538 B2	12/2010	Whitman
7,778,004 B2	8/2010	Nerheim et al.	7,846,085 B2	12/2010	Silverman et al.
7,779,737 B2	8/2010	Newman, Jr. et al.	7,846,149 B2	12/2010	Jankowski
7,780,054 B2	8/2010	Wales	7,848,066 B2	12/2010	Yanagishima
7,780,055 B2	8/2010	Scirica et al.	7,850,623 B2	12/2010	Griffin et al.
7,780,309 B2	8/2010	McMillan et al.	7,850,642 B2	12/2010	Moll et al.
7,780,663 B2	8/2010	Yates et al.	7,850,982 B2	12/2010	Stopek et al.
7,780,685 B2	8/2010	Hunt et al.	7,853,813 B2	12/2010	Lee
7,784,662 B2	8/2010	Wales et al.	7,854,735 B2	12/2010	Houser et al.
7,784,663 B2	8/2010	Shelton, IV	7,854,736 B2	12/2010	Ryan
7,787,256 B2	8/2010	Chan et al.	7,857,183 B2	12/2010	Shelton, IV
7,789,283 B2	9/2010	Shah	7,857,184 B2	12/2010	Viola
7,789,875 B2	9/2010	Brock et al.	7,857,185 B2	12/2010	Swayze et al.
7,789,883 B2	9/2010	Takashino et al.	7,857,186 B2	12/2010	Baxter, III et al.
7,789,889 B2	9/2010	Zubik et al.	7,857,813 B2	12/2010	Schmitz et al.
			7,861,906 B2	1/2011	Doll et al.
			7,862,502 B2	1/2011	Pool et al.
			7,862,546 B2	1/2011	Conlon et al.
			7,862,579 B2	1/2011	Ortiz et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

7,866,525 B2	1/2011	Scirica	7,935,773 B2	5/2011	Hadba et al.
7,866,527 B2	1/2011	Hall et al.	7,936,142 B2	5/2011	Otsuka et al.
7,866,528 B2	1/2011	Olson et al.	7,938,307 B2	5/2011	Bettuchi
7,870,989 B2	1/2011	Viola et al.	7,941,865 B2	5/2011	Seman, Jr. et al.
7,871,418 B2	1/2011	Thompson et al.	7,942,303 B2	5/2011	Shah
7,871,440 B2	1/2011	Schwartz et al.	7,942,890 B2	5/2011	D'Agostino et al.
7,875,055 B2	1/2011	Cichocki, Jr.	7,944,175 B2	5/2011	Mori et al.
7,879,063 B2	2/2011	Khosravi	7,945,792 B2	5/2011	Cherpantier
7,879,070 B2	2/2011	Ortiz et al.	7,945,798 B2	5/2011	Carlson et al.
7,883,461 B2	2/2011	Albrecht et al.	7,946,453 B2	5/2011	Voegelé et al.
7,883,465 B2	2/2011	Donofrio et al.	7,947,011 B2	5/2011	Birk et al.
7,883,540 B2	2/2011	Niwa et al.	7,950,560 B2	5/2011	Zemlok et al.
7,886,951 B2	2/2011	Hessler	7,950,561 B2	5/2011	Aranyi
7,886,952 B2	2/2011	Scirica et al.	7,951,071 B2	5/2011	Whitman et al.
7,887,530 B2	2/2011	Zemlok et al.	7,951,166 B2	5/2011	Orban, III et al.
7,887,535 B2	2/2011	Lands et al.	7,954,682 B2	6/2011	Giordano et al.
7,887,536 B2	2/2011	Johnson et al.	7,954,684 B2	6/2011	Boudreaux
7,887,563 B2	2/2011	Cummins	7,954,685 B2	6/2011	Viola
7,891,531 B1	2/2011	Ward	7,954,686 B2	6/2011	Baxter, III et al.
7,891,532 B2	2/2011	Mastri et al.	7,954,687 B2	6/2011	Zemlok et al.
7,892,200 B2	2/2011	Birk et al.	7,955,253 B2	6/2011	Ewers et al.
7,892,245 B2	2/2011	Liddicoat et al.	7,955,257 B2	6/2011	Frasier et al.
7,893,586 B2	2/2011	West et al.	7,955,322 B2	6/2011	Devenzeno et al.
7,896,214 B2	3/2011	Farascioni	7,955,327 B2	6/2011	Sartor et al.
7,896,215 B2	3/2011	Adams et al.	7,955,380 B2	6/2011	Chu et al.
7,896,671 B2	3/2011	Kim et al.	7,959,050 B2	6/2011	Smith et al.
7,896,869 B2	3/2011	DiSilvestro et al.	7,959,051 B2	6/2011	Smith et al.
7,896,877 B2	3/2011	Hall et al.	7,959,052 B2	6/2011	Sonnenschein et al.
7,896,895 B2	3/2011	Boudreaux et al.	7,963,432 B2	6/2011	Knodel et al.
7,896,897 B2	3/2011	Gresham et al.	7,963,433 B2	6/2011	Whitman et al.
7,896,900 B2	3/2011	Frank et al.	7,963,913 B2	6/2011	Devenzeno et al.
7,898,198 B2	3/2011	Murphree	7,963,963 B2	6/2011	Francischelli et al.
7,900,805 B2	3/2011	Shelton, IV et al.	7,963,964 B2	6/2011	Santilli et al.
7,900,806 B2	3/2011	Chen et al.	7,964,206 B2	6/2011	Suokas et al.
7,901,381 B2	3/2011	Birk et al.	7,966,236 B2	6/2011	Noriega et al.
7,905,380 B2	3/2011	Shelton, IV et al.	7,966,269 B2	6/2011	Bauer et al.
7,905,381 B2	3/2011	Baxter, III et al.	7,966,799 B2	6/2011	Morgan et al.
7,905,881 B2	3/2011	Masuda et al.	7,967,178 B2	6/2011	Scirica et al.
7,905,889 B2	3/2011	Catanese, III et al.	7,967,179 B2	6/2011	Olson et al.
7,905,890 B2	3/2011	Whitfield et al.	7,967,180 B2	6/2011	Scirica
7,905,902 B2	3/2011	Huitema et al.	7,967,181 B2	6/2011	Viola et al.
7,909,039 B2	3/2011	Hur	7,967,791 B2	6/2011	Franer et al.
7,909,191 B2	3/2011	Baker et al.	7,967,839 B2	6/2011	Flock et al.
7,909,220 B2	3/2011	Viola	7,972,298 B2	7/2011	Wallace et al.
7,909,221 B2	3/2011	Viola et al.	7,972,315 B2	7/2011	Birk et al.
7,909,224 B2	3/2011	Prommersberger	7,976,213 B2	7/2011	Bertolotti et al.
7,913,891 B2	3/2011	Doll et al.	7,976,563 B2	7/2011	Summerer
7,913,893 B2	3/2011	Mastri et al.	7,979,137 B2	7/2011	Tracey et al.
7,914,521 B2	3/2011	Wang et al.	7,980,443 B2	7/2011	Scheib et al.
7,914,543 B2	3/2011	Roth et al.	7,981,102 B2	7/2011	Patel et al.
7,914,551 B2	3/2011	Ortiz et al.	7,981,132 B2	7/2011	Dubrul et al.
7,918,230 B2	4/2011	Whitman et al.	7,987,405 B2	7/2011	Turner et al.
7,918,376 B1	4/2011	Knodel et al.	7,988,015 B2	8/2011	Mason, II et al.
7,918,377 B2	4/2011	Measamer et al.	7,988,026 B2	8/2011	Knodel et al.
7,918,845 B2	4/2011	Saadat et al.	7,988,027 B2	8/2011	Olson et al.
7,918,848 B2	4/2011	Lau et al.	7,988,028 B2	8/2011	Farascioni et al.
7,918,861 B2	4/2011	Brock et al.	7,988,779 B2	8/2011	Disalvo et al.
7,918,867 B2	4/2011	Dana et al.	7,992,757 B2	8/2011	Wheeler et al.
7,922,061 B2	4/2011	Shelton, IV et al.	7,993,360 B2	8/2011	Hacker et al.
7,922,063 B2	4/2011	Zemlok et al.	7,994,670 B2	8/2011	Ji
7,922,743 B2	4/2011	Heinrich et al.	7,997,054 B2	8/2011	Bertsch et al.
7,923,144 B2	4/2011	Kohn et al.	7,997,468 B2	8/2011	Farascioni
7,926,691 B2	4/2011	Viola et al.	7,997,469 B2	8/2011	Olson et al.
7,926,692 B2	4/2011	Racenet et al.	8,002,696 B2	8/2011	Suzuki
7,927,328 B2	4/2011	Orszulak et al.	8,002,784 B2	8/2011	Jinno et al.
7,928,281 B2	4/2011	Augustine	8,002,785 B2	8/2011	Weiss et al.
7,930,040 B1	4/2011	Kelsch et al.	8,002,795 B2	8/2011	Beetel
7,930,065 B2	4/2011	Larkin et al.	8,006,365 B2	8/2011	Levin et al.
7,931,660 B2	4/2011	Aranyi et al.	8,006,885 B2	8/2011	Marczyk
7,931,695 B2	4/2011	Ringeisen	8,006,889 B2	8/2011	Adams et al.
7,931,877 B2	4/2011	Steffens et al.	8,007,370 B2	8/2011	Hirsch et al.
7,934,630 B2	5/2011	Shelton, IV et al.	8,007,465 B2	8/2011	Birk et al.
7,934,631 B2	5/2011	Balbierz et al.	8,007,479 B2	8/2011	Birk et al.
7,934,896 B2	5/2011	Schnier	8,007,511 B2	8/2011	Brock et al.
7,935,130 B2	5/2011	Williams	8,007,513 B2	8/2011	Nalagatla et al.
			8,008,598 B2	8/2011	Whitman et al.
			8,010,180 B2	8/2011	Quaid et al.
			8,011,550 B2	9/2011	Aranyi et al.
			8,011,551 B2	9/2011	Marczyk et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,011,553 B2	9/2011	Mastri et al.	8,084,969 B2	12/2011	David et al.
8,011,555 B2	9/2011	Tarinelli et al.	8,085,013 B2	12/2011	Wei et al.
8,012,170 B2	9/2011	Whitman et al.	8,087,562 B1	1/2012	Manoux et al.
8,016,176 B2	9/2011	Kasvikis et al.	8,087,563 B2	1/2012	Milliman et al.
8,016,177 B2	9/2011	Bettuchi et al.	8,089,509 B2	1/2012	Chatenever et al.
8,016,178 B2	9/2011	Olson et al.	8,091,753 B2	1/2012	Viola
8,016,849 B2	9/2011	Wenchell	8,091,756 B2	1/2012	Viola
8,016,855 B2	9/2011	Whitman et al.	8,092,443 B2	1/2012	Bischoff
8,016,858 B2	9/2011	Whitman	8,092,932 B2	1/2012	Phillips et al.
8,016,881 B2	9/2011	Furst	8,093,572 B2	1/2012	Kuduvalli
8,020,742 B2	9/2011	Marczyk	8,096,458 B2	1/2012	Hessler
8,020,743 B2	9/2011	Shelton, IV	8,096,459 B2	1/2012	Ortiz et al.
8,021,375 B2	9/2011	Aldrich et al.	8,097,017 B2	1/2012	Viola
8,025,199 B2	9/2011	Whitman et al.	8,100,310 B2	1/2012	Zemlok
8,025,896 B2	9/2011	Malaviya et al.	8,100,824 B2	1/2012	Hegeman et al.
8,028,882 B2	10/2011	Viola	8,100,872 B2	1/2012	Patel
8,028,883 B2	10/2011	Stopek	8,102,138 B2	1/2012	Sekine et al.
8,028,884 B2	10/2011	Sniffin et al.	8,102,278 B2	1/2012	Deck et al.
8,028,885 B2	10/2011	Smith et al.	8,105,350 B2	1/2012	Lee et al.
8,029,510 B2	10/2011	Hoegerle	8,107,925 B2	1/2012	Natsuno et al.
8,031,069 B2	10/2011	Cohn et al.	8,108,033 B2	1/2012	Drew et al.
8,033,438 B2	10/2011	Scirica	8,108,072 B2	1/2012	Zhao et al.
8,033,439 B2	10/2011	Racenet et al.	8,109,426 B2	2/2012	Milliman et al.
8,033,440 B2	10/2011	Wenchell et al.	8,110,208 B1	2/2012	Hen
8,033,442 B2	10/2011	Racenet et al.	8,113,405 B2	2/2012	Milliman
8,034,077 B2	10/2011	Smith et al.	8,113,407 B2	2/2012	Holsten et al.
8,034,337 B2	10/2011	Simard	8,113,408 B2	2/2012	Wenchell et al.
8,034,363 B2	10/2011	Li et al.	8,113,410 B2	2/2012	Hall et al.
8,035,487 B2	10/2011	Malackowski	8,114,017 B2	2/2012	Bacher
8,037,591 B2	10/2011	Spivey et al.	8,114,100 B2	2/2012	Smith et al.
8,038,045 B2	10/2011	Bettuchi et al.	8,118,206 B2	2/2012	Zand et al.
8,038,046 B2	10/2011	Smith et al.	8,118,207 B2	2/2012	Racenet et al.
8,038,686 B2	10/2011	Huitema et al.	8,120,301 B2	2/2012	Goldberg et al.
8,043,207 B2	10/2011	Adams	8,122,128 B2	2/2012	Burke, II et al.
8,043,328 B2	10/2011	Hahnen et al.	8,123,103 B2	2/2012	Milliman
8,044,536 B2	10/2011	Nguyen et al.	8,123,523 B2	2/2012	Carron et al.
8,044,604 B2	10/2011	Hagino et al.	8,123,766 B2	2/2012	Bauman et al.
8,047,236 B2	11/2011	Perry	8,123,767 B2	2/2012	Bauman et al.
8,048,503 B2	11/2011	Farnsworth et al.	8,125,168 B2	2/2012	Johnson et al.
8,052,636 B2	11/2011	Moll et al.	8,127,975 B2	3/2012	Olson et al.
8,056,787 B2	11/2011	Boudreaux et al.	8,127,976 B2	3/2012	Scirica et al.
8,056,788 B2	11/2011	Mastri et al.	8,128,624 B2	3/2012	Couture et al.
8,056,789 B1	11/2011	White et al.	8,128,643 B2	3/2012	Aranyi et al.
8,057,508 B2	11/2011	Shelton, IV	8,128,645 B2	3/2012	Sonnenschein et al.
8,058,771 B2	11/2011	Giordano et al.	8,128,662 B2	3/2012	Altarac et al.
8,060,250 B2	11/2011	Reiland et al.	8,132,703 B2	3/2012	Milliman et al.
8,061,014 B2	11/2011	Smith et al.	8,132,705 B2	3/2012	Viola et al.
8,061,576 B2	11/2011	Cappola	8,132,706 B2	3/2012	Marczyk et al.
8,062,236 B2	11/2011	Soltz	8,133,500 B2	3/2012	Ringeisen et al.
8,062,306 B2	11/2011	Nobis et al.	8,134,306 B2	3/2012	Drader et al.
8,062,330 B2	11/2011	Prommersberger et al.	8,136,711 B2	3/2012	Beardsley et al.
8,063,619 B2	11/2011	Zhu et al.	8,136,712 B2	3/2012	Zingman
8,066,158 B2	11/2011	Vogel et al.	8,136,713 B2	3/2012	Hathaway et al.
8,066,166 B2	11/2011	Demmy et al.	8,137,339 B2	3/2012	Jinno et al.
8,066,167 B2	11/2011	Measamer et al.	8,140,417 B2	3/2012	Shibata
8,066,168 B2	11/2011	Vidal et al.	8,141,762 B2	3/2012	Bedi et al.
8,066,720 B2	11/2011	Knodel et al.	8,141,763 B2	3/2012	Milliman
D650,074 S	12/2011	Hunt et al.	8,142,200 B2	3/2012	Crunkilton et al.
D650,789 S	12/2011	Arnold	8,142,425 B2	3/2012	Eggers
8,070,033 B2	12/2011	Milliman et al.	8,142,461 B2	3/2012	Houser et al.
8,070,034 B1	12/2011	Knodel	8,142,515 B2	3/2012	Therin et al.
8,070,035 B2	12/2011	Holsten et al.	8,143,520 B2	3/2012	Cutler
8,070,743 B2	12/2011	Kagan et al.	8,146,790 B2	4/2012	Milliman
8,074,858 B2	12/2011	Marczyk	8,147,421 B2	4/2012	Farquhar et al.
8,074,859 B2	12/2011	Kostrzewski	8,147,456 B2	4/2012	Fisher et al.
8,074,861 B2	12/2011	Ehrenfels et al.	8,147,485 B2	4/2012	Wham et al.
8,075,476 B2	12/2011	Vargas	8,152,041 B2	4/2012	Kostrzewski
8,075,571 B2	12/2011	Vitali et al.	8,152,756 B2	4/2012	Webster et al.
8,079,950 B2	12/2011	Stern et al.	8,154,239 B2	4/2012	Katsuki et al.
8,079,989 B2	12/2011	Birk et al.	8,157,145 B2	4/2012	Shelton, IV et al.
8,080,004 B2	12/2011	Downey et al.	8,157,148 B2	4/2012	Scirica
8,083,118 B2	12/2011	Milliman et al.	8,157,151 B2	4/2012	Ingmanson et al.
8,083,119 B2	12/2011	Prommersberger	8,157,152 B2	4/2012	Holsten et al.
8,083,120 B2	12/2011	Shelton, IV et al.	8,157,153 B2	4/2012	Shelton, IV et al.
8,084,001 B2	12/2011	Burns et al.	8,157,793 B2	4/2012	Omori et al.
			8,161,977 B2	4/2012	Shelton, IV et al.
			8,162,138 B2	4/2012	Bettenhausen et al.
			8,162,197 B2	4/2012	Mastri et al.
			8,162,668 B2	4/2012	Toly

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,162,933 B2	4/2012	Francischelli et al.	8,241,271 B2	8/2012	Millman et al.
8,162,965 B2	4/2012	Reschke et al.	8,241,284 B2	8/2012	Dycus et al.
8,167,185 B2	5/2012	Shelton, IV et al.	8,241,308 B2	8/2012	Kortenbach et al.
8,167,622 B2	5/2012	Zhou	8,241,322 B2	8/2012	Whitman et al.
8,167,895 B2	5/2012	D'Agostino et al.	8,245,594 B2	8/2012	Rogers et al.
8,167,898 B1	5/2012	Schaller et al.	8,245,898 B2	8/2012	Smith et al.
8,170,241 B2	5/2012	Roe et al.	8,245,899 B2	8/2012	Swensgard et al.
8,172,004 B2	5/2012	Ho	8,245,900 B2	8/2012	Scirica
8,172,120 B2	5/2012	Boyden et al.	8,245,901 B2	8/2012	Stopek
8,172,122 B2	5/2012	Kasvikis et al.	8,246,608 B2	8/2012	Omori et al.
8,172,124 B2	5/2012	Shelton, IV et al.	8,246,637 B2	8/2012	Viola et al.
8,177,776 B2	5/2012	Humayun et al.	8,252,009 B2	8/2012	Weller et al.
8,177,797 B2	5/2012	Shimoji et al.	8,256,654 B2	9/2012	Bettuchi et al.
8,179,705 B2	5/2012	Chapuis	8,256,655 B2	9/2012	Sniffin et al.
8,180,458 B2	5/2012	Kane et al.	8,256,656 B2	9/2012	Milliman et al.
8,181,839 B2	5/2012	Beetel	8,257,251 B2	9/2012	Shelton, IV et al.
8,181,840 B2	5/2012	Milliman	8,257,356 B2	9/2012	Bleich et al.
8,182,422 B2	5/2012	Bayer et al.	8,257,386 B2	9/2012	Lee et al.
8,182,444 B2	5/2012	Uber, III et al.	8,257,391 B2	9/2012	Orban, III et al.
8,183,807 B2	5/2012	Tsai et al.	8,257,634 B2	9/2012	Scirica
8,186,555 B2	5/2012	Shelton, IV et al.	8,258,745 B2	9/2012	Smith et al.
8,186,556 B2	5/2012	Viola	8,261,958 B1	9/2012	Knodel
8,186,558 B2	5/2012	Sapienza	8,262,560 B2	9/2012	Whitman
8,186,560 B2	5/2012	Hess et al.	8,262,655 B2	9/2012	Ghabrial et al.
8,191,752 B2	6/2012	Scirica	8,266,232 B2	9/2012	Piper et al.
8,192,350 B2	6/2012	Ortiz et al.	8,267,300 B2	9/2012	Boudreaux
8,192,460 B2	6/2012	Orban, III et al.	8,267,849 B2	9/2012	Wazer et al.
8,192,651 B2	6/2012	Young et al.	8,267,924 B2	9/2012	Zemlok et al.
8,193,129 B2	6/2012	Tagawa et al.	8,267,946 B2	9/2012	Whitfield et al.
8,196,795 B2	6/2012	Moore et al.	8,267,951 B2	9/2012	Whayne et al.
8,196,796 B2	6/2012	Shelton, IV et al.	8,268,344 B2	9/2012	Ma et al.
8,197,501 B2	6/2012	Shadeck et al.	8,269,121 B2	9/2012	Smith
8,197,502 B2	6/2012	Smith et al.	8,272,553 B2	9/2012	Mastri et al.
8,197,837 B2	6/2012	Jamiolkowski et al.	8,272,554 B2	9/2012	Whitman et al.
8,201,720 B2	6/2012	Hessler	8,272,918 B2	9/2012	Lam
8,201,721 B2	6/2012	Zemlok et al.	8,273,404 B2	9/2012	Dave et al.
8,202,549 B2	6/2012	Stucky et al.	8,276,594 B2	10/2012	Shah
8,205,779 B2	6/2012	Ma et al.	8,276,801 B2	10/2012	Zemlok et al.
8,205,780 B2	6/2012	Sorrentino et al.	8,276,802 B2	10/2012	Kostrzewski
8,205,781 B2	6/2012	Baxter, III et al.	8,277,473 B2	10/2012	Sunaoshi et al.
8,210,411 B2	7/2012	Yates et al.	8,281,446 B2	10/2012	Moskovich
8,210,414 B2	7/2012	Bettuchi et al.	8,281,973 B2	10/2012	Wenchell et al.
8,210,415 B2	7/2012	Ward	8,281,974 B2	10/2012	Hessler et al.
8,210,416 B2	7/2012	Milliman et al.	8,282,654 B2	10/2012	Ferrari et al.
8,210,721 B2	7/2012	Chen et al.	8,285,367 B2	10/2012	Hyde et al.
8,211,125 B2	7/2012	Spivey	8,286,723 B2	10/2012	Puzio et al.
8,214,019 B2	7/2012	Govari et al.	8,286,845 B2	10/2012	Perry et al.
8,215,531 B2	7/2012	Shelton, IV et al.	8,286,846 B2	10/2012	Smith et al.
8,215,532 B2	7/2012	Marczyk	8,286,847 B2	10/2012	Taylor
8,215,533 B2	7/2012	Viola et al.	8,287,487 B2	10/2012	Estes
8,220,468 B2	7/2012	Cooper et al.	8,287,522 B2	10/2012	Moses et al.
8,220,688 B2	7/2012	Laurent et al.	8,287,561 B2	10/2012	Nunez et al.
8,220,690 B2	7/2012	Hess et al.	8,288,984 B2	10/2012	Yang
8,221,402 B2	7/2012	Francischelli et al.	8,289,403 B2	10/2012	Dobashi et al.
8,221,424 B2	7/2012	Cha	8,290,883 B2	10/2012	Takeuchi et al.
8,221,433 B2	7/2012	Lozier et al.	8,292,147 B2	10/2012	Viola
8,225,799 B2	7/2012	Bettuchi	8,292,148 B2	10/2012	Viola
8,225,979 B2	7/2012	Farascioni et al.	8,292,150 B2	10/2012	Bryant
8,226,553 B2	7/2012	Shelton, IV et al.	8,292,151 B2	10/2012	Viola
8,226,635 B2	7/2012	Petrie et al.	8,292,152 B2	10/2012	Milliman et al.
8,226,675 B2	7/2012	Houser et al.	8,292,155 B2	10/2012	Shelton, IV et al.
8,226,715 B2	7/2012	Hwang et al.	8,292,157 B2	10/2012	Smith et al.
8,227,946 B2	7/2012	Kim	8,292,158 B2	10/2012	Sapienza
8,228,020 B2	7/2012	Shin et al.	8,292,801 B2	10/2012	Dejima et al.
8,228,048 B2	7/2012	Spencer	8,292,888 B2	10/2012	Whitman
8,229,549 B2	7/2012	Whitman et al.	8,292,906 B2	10/2012	Taylor et al.
8,231,040 B2	7/2012	Zemlok et al.	8,294,399 B2	10/2012	Suzuki et al.
8,231,042 B2	7/2012	Hessler et al.	8,298,161 B2	10/2012	Vargas
8,231,043 B2	7/2012	Tarinelli et al.	8,298,189 B2	10/2012	Fisher et al.
8,235,272 B2	8/2012	Nicholas et al.	8,298,233 B2	10/2012	Mueller
8,236,010 B2	8/2012	Ortiz et al.	8,298,677 B2	10/2012	Wiesner et al.
8,236,011 B2	8/2012	Harris et al.	8,302,323 B2	11/2012	Fortier et al.
8,236,020 B2	8/2012	Smith et al.	8,303,621 B2	11/2012	Miyamoto et al.
8,237,388 B2	8/2012	Jinno et al.	8,308,040 B2	11/2012	Huang et al.
8,240,537 B2	8/2012	Marczyk	8,308,041 B2	11/2012	Kostrzewski
			8,308,042 B2	11/2012	Aranyi
			8,308,043 B2	11/2012	Bindra et al.
			8,308,046 B2	11/2012	Prommersberger
			8,308,659 B2	11/2012	Scheibe et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,308,725 B2	11/2012	Bell et al.	8,371,393 B2	2/2013	Higuchi et al.
8,310,188 B2	11/2012	Nakai	8,371,491 B2	2/2013	Huitema et al.
8,313,496 B2	11/2012	Sauer et al.	8,371,492 B2	2/2013	Aranyi et al.
8,313,499 B2	11/2012	Magnusson et al.	8,371,493 B2	2/2013	Aranyi et al.
8,313,509 B2	11/2012	Kostrzewski	8,371,494 B2	2/2013	Racenet et al.
8,317,070 B2	11/2012	Hueil et al.	8,372,094 B2	2/2013	Bettuchi et al.
8,317,071 B1	11/2012	Knodel	8,374,723 B2	2/2013	Zhao et al.
8,317,074 B2	11/2012	Ortiz et al.	8,376,865 B2	2/2013	Forster et al.
8,317,437 B2	11/2012	Merkley et al.	8,377,029 B2	2/2013	Nagao et al.
8,317,744 B2	11/2012	Kirschenman	8,377,044 B2	2/2013	Coe et al.
8,317,790 B2	11/2012	Bell et al.	8,381,828 B2	2/2013	Whitman et al.
8,319,002 B2	11/2012	Daniels et al.	8,382,773 B2	2/2013	Whitfield et al.
D672,784 S	12/2012	Clanton et al.	8,382,790 B2	2/2013	Uenohara et al.
8,322,455 B2	12/2012	Shelton, IV et al.	D677,273 S	3/2013	Randall et al.
8,322,589 B2	12/2012	Boudreaux	8,387,848 B2	3/2013	Johnson et al.
8,322,590 B2	12/2012	Patel et al.	8,388,633 B2	3/2013	Rousseau et al.
8,322,901 B2	12/2012	Michelotti	8,389,588 B2	3/2013	Ringeisen et al.
8,323,789 B2	12/2012	Rozhin et al.	8,393,513 B2	3/2013	Jankowski
8,324,585 B2	12/2012	McBroom et al.	8,393,514 B2	3/2013	Shelton, IV et al.
8,328,061 B2	12/2012	Kasvikis	8,393,516 B2	3/2013	Kostrzewski
8,328,062 B2	12/2012	Viola	8,397,832 B2	3/2013	Blickle et al.
8,328,063 B2	12/2012	Milliman et al.	8,397,971 B2	3/2013	Yates et al.
8,328,064 B2	12/2012	Racenet et al.	8,397,973 B1	3/2013	Hausen
8,328,802 B2	12/2012	Deville et al.	8,398,633 B2	3/2013	Mueller
8,328,823 B2	12/2012	Aranyi et al.	8,398,669 B2	3/2013	Kim
8,333,313 B2	12/2012	Boudreaux et al.	8,398,673 B2	3/2013	Hinchliffe et al.
8,333,691 B2	12/2012	Schaaf	8,398,674 B2	3/2013	Prestel
8,333,764 B2	12/2012	Francischelli et al.	8,400,851 B2	3/2013	Byun
8,333,779 B2	12/2012	Smith et al.	8,403,138 B2	3/2013	Weisshaupt et al.
8,334,468 B2	12/2012	Palmer et al.	8,403,195 B2	3/2013	Beardsley et al.
8,336,753 B2	12/2012	Olson et al.	8,403,196 B2	3/2013	Beardsley et al.
8,336,754 B2	12/2012	Cappola et al.	8,403,198 B2	3/2013	Sorrentino et al.
8,342,377 B2	1/2013	Milliman et al.	8,403,832 B2	3/2013	Cunningham et al.
8,342,378 B2	1/2013	Marczyk et al.	8,403,926 B2	3/2013	Nobis et al.
8,342,379 B2	1/2013	Whitman et al.	8,403,945 B2	3/2013	Whitfield et al.
8,342,380 B2	1/2013	Viola	8,403,946 B2	3/2013	Whitfield et al.
8,343,150 B2	1/2013	Artale	8,403,950 B2	3/2013	Palmer et al.
8,347,978 B2	1/2013	Forster et al.	D680,646 S	4/2013	Hunt et al.
8,348,118 B2	1/2013	Segura	8,408,439 B2	4/2013	Huang et al.
8,348,123 B2	1/2013	Scirica et al.	8,408,442 B2	4/2013	Racenet et al.
8,348,124 B2	1/2013	Scirica	8,409,079 B2	4/2013	Okamoto et al.
8,348,125 B2	1/2013	Viola et al.	8,409,174 B2	4/2013	Omori
8,348,126 B2	1/2013	Olson et al.	8,409,175 B2	4/2013	Lee et al.
8,348,127 B2	1/2013	Marczyk	8,409,222 B2	4/2013	Whitfield et al.
8,348,129 B2	1/2013	Bedi et al.	8,409,223 B2	4/2013	Sorrentino et al.
8,348,130 B2	1/2013	Shah et al.	8,411,500 B2	4/2013	Gapihan et al.
8,348,131 B2	1/2013	Omaits et al.	8,413,661 B2	4/2013	Rousseau et al.
8,348,837 B2	1/2013	Wenchell	8,413,870 B2	4/2013	Pastorelli et al.
8,348,959 B2	1/2013	Wolford et al.	8,413,871 B2	4/2013	Racenet et al.
8,348,972 B2	1/2013	Soltz et al.	8,413,872 B2	4/2013	Patel
8,349,987 B2	1/2013	Kapiamba et al.	8,414,469 B2	4/2013	Diolaiti
8,352,004 B2	1/2013	Mannheimer et al.	8,414,577 B2	4/2013	Boudreaux et al.
8,353,437 B2	1/2013	Boudreaux	8,414,598 B2	4/2013	Brock et al.
8,353,438 B2	1/2013	Baxter, III et al.	8,418,073 B2	4/2013	Mohr et al.
8,353,439 B2	1/2013	Baxter, III et al.	8,418,906 B2	4/2013	Farascioni et al.
8,356,740 B1	1/2013	Knodel	8,418,907 B2	4/2013	Johnson et al.
8,357,144 B2	1/2013	Whitman et al.	8,418,908 B1	4/2013	Beardsley
8,357,158 B2	1/2013	McKenna et al.	8,418,909 B2	4/2013	Kostrzewski
8,357,161 B2	1/2013	Mueller	8,419,635 B2	4/2013	Shelton, IV et al.
8,359,174 B2	1/2013	Nakashima et al.	8,419,717 B2	4/2013	Diolaiti et al.
8,360,296 B2	1/2013	Zingman	8,419,747 B2	4/2013	Hinman et al.
8,360,297 B2	1/2013	Shelton, IV et al.	8,419,754 B2	4/2013	Laby et al.
8,360,298 B2	1/2013	Farascioni et al.	8,423,182 B2	4/2013	Robinson et al.
8,360,299 B2	1/2013	Zemlok et al.	8,424,737 B2	4/2013	Scirica
8,361,501 B2	1/2013	DiTizio et al.	8,424,739 B2	4/2013	Racenet et al.
D676,866 S	2/2013	Chaudhri	8,424,740 B2	4/2013	Shelton, IV et al.
8,365,972 B2	2/2013	Aranyi et al.	8,424,741 B2	4/2013	McGuckin, Jr. et al.
8,365,973 B1	2/2013	White et al.	8,425,600 B2	4/2013	Maxwell
8,365,975 B1	2/2013	Manoux et al.	8,427,430 B2	4/2013	Lee et al.
8,365,976 B2	2/2013	Hess et al.	8,430,292 B2	4/2013	Patel et al.
8,366,559 B2	2/2013	Papenfuss et al.	8,430,892 B2	4/2013	Bindra et al.
8,366,719 B2	2/2013	Markey et al.	8,430,898 B2	4/2013	Wiener et al.
8,366,787 B2	2/2013	Brown et al.	8,435,257 B2	5/2013	Smith et al.
8,368,327 B2	2/2013	Benning et al.	8,439,246 B1	5/2013	Knodel
8,369,056 B2	2/2013	Senriuchi et al.	8,444,036 B2	5/2013	Shelton, IV
			8,444,037 B2	5/2013	Nicholas et al.
			8,444,549 B2	5/2013	Viola et al.
			8,449,536 B2	5/2013	Selig
			8,449,560 B2	5/2013	Roth et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

8,453,904 B2	6/2013	Eskaros et al.	8,523,900 B2	9/2013	Jinno et al.
8,453,906 B2	6/2013	Huang et al.	8,529,588 B2	9/2013	Ahlberg et al.
8,453,907 B2	6/2013	Laurent et al.	8,529,600 B2	9/2013	Woodard, Jr. et al.
8,453,908 B2	6/2013	Bedi et al.	8,529,819 B2	9/2013	Ostapoff et al.
8,453,912 B2	6/2013	Mastri et al.	8,532,747 B2	9/2013	Nock et al.
8,453,914 B2	6/2013	Laurent et al.	8,534,527 B2	9/2013	Brendel et al.
8,454,495 B2	6/2013	Kawano et al.	8,534,528 B2	9/2013	Shelton, IV
8,454,551 B2	6/2013	Allen et al.	8,535,304 B2	9/2013	Sklar et al.
8,454,628 B2	6/2013	Smith et al.	8,535,340 B2	9/2013	Allen
8,454,640 B2	6/2013	Johnston et al.	8,539,866 B2	9/2013	Nayak et al.
8,457,757 B2	6/2013	Caulier et al.	8,540,128 B2	9/2013	Shelton, IV et al.
8,459,520 B2	6/2013	Giordano et al.	8,540,129 B2	9/2013	Baxter, III et al.
8,459,521 B2	6/2013	Zemlok et al.	8,540,130 B2	9/2013	Moore et al.
8,459,524 B2	6/2013	Pribanic et al.	8,540,131 B2	9/2013	Swayze
8,459,525 B2	6/2013	Yates et al.	8,540,133 B2	9/2013	Bedi et al.
8,464,922 B2	6/2013	Marczyk	8,540,733 B2	9/2013	Whitman et al.
8,464,923 B2	6/2013	Shelton, IV	8,540,735 B2	9/2013	Mitelberg et al.
8,464,924 B2	6/2013	Gresham et al.	8,550,984 B2	10/2013	Takemoto
8,464,925 B2	6/2013	Hull et al.	8,551,076 B2	10/2013	Duval et al.
8,465,475 B2	6/2013	Isbell, Jr.	8,555,660 B2	10/2013	Takenaka et al.
8,465,502 B2	6/2013	Zergiebel	8,556,151 B2	10/2013	Viola
8,465,515 B2	6/2013	Drew et al.	8,556,918 B2	10/2013	Bauman et al.
8,469,254 B2	6/2013	Czernik et al.	8,556,935 B1	10/2013	Knodel et al.
8,469,946 B2	6/2013	Sugita	8,560,147 B2	10/2013	Taylor et al.
8,469,973 B2	6/2013	Meade et al.	8,561,617 B2	10/2013	Lindh et al.
8,470,355 B2	6/2013	Skalla et al.	8,561,870 B2	10/2013	Baxter, III et al.
D686,240 S	7/2013	Lin	8,561,871 B2	10/2013	Rajappa et al.
D686,244 S	7/2013	Moriya et al.	8,561,873 B2	10/2013	Ingmanson et al.
D686,638 S *	7/2013	Gardner ..... D14/489	8,562,592 B2	10/2013	Conlon et al.
8,474,677 B2	7/2013	Woodard, Jr. et al.	8,562,598 B2	10/2013	Falkenstein et al.
8,475,453 B2	7/2013	Marczyk et al.	8,567,656 B2	10/2013	Shelton, IV et al.
8,475,454 B1	7/2013	Alshemari	8,568,416 B2	10/2013	Schmitz et al.
8,475,474 B2	7/2013	Bombard et al.	8,568,425 B2	10/2013	Ross et al.
8,479,968 B2	7/2013	Hodgkinson et al.	D692,916 S	11/2013	Granchi et al.
8,479,969 B2	7/2013	Shelton, IV	8,573,459 B2	11/2013	Smith et al.
8,480,703 B2	7/2013	Nicholas et al.	8,573,461 B2	11/2013	Shelton, IV et al.
8,483,509 B2	7/2013	Matsuzaka	8,573,462 B2	11/2013	Smith et al.
8,485,412 B2	7/2013	Shelton, IV et al.	8,573,465 B2	11/2013	Shelton, IV
8,485,413 B2	7/2013	Scheib et al.	8,574,199 B2	11/2013	von Bulow et al.
8,485,970 B2	7/2013	Widenhouse et al.	8,574,263 B2	11/2013	Mueller
8,487,199 B2	7/2013	Palmer et al.	8,575,880 B2	11/2013	Grantz
8,487,487 B2	7/2013	Dietz et al.	8,575,895 B2	11/2013	Garrastacho et al.
8,490,851 B2	7/2013	Blier et al.	8,579,176 B2	11/2013	Smith et al.
8,490,853 B2	7/2013	Criscuolo et al.	8,579,178 B2	11/2013	Holsten et al.
8,491,581 B2	7/2013	Deville et al.	8,579,897 B2	11/2013	Vakharia et al.
8,491,603 B2	7/2013	Yeung et al.	8,579,937 B2	11/2013	Gresham
8,496,153 B2	7/2013	Demmy et al.	8,584,919 B2	11/2013	Hueil et al.
8,496,154 B2	7/2013	Marczyk et al.	8,584,920 B2	11/2013	Hodgkinson
8,496,156 B2	7/2013	Sniffin et al.	8,584,921 B2	11/2013	Scirica
8,496,683 B2	7/2013	Prommersberger et al.	8,585,583 B2	11/2013	Sakaguchi et al.
8,498,691 B2	7/2013	Moll et al.	8,585,721 B2	11/2013	Kirsch
8,499,673 B2	8/2013	Keller	8,590,760 B2	11/2013	Cummins et al.
8,499,992 B2	8/2013	Whitman et al.	8,590,762 B2	11/2013	Hess et al.
8,499,993 B2	8/2013	Shelton, IV et al.	8,590,764 B2	11/2013	Hartwick et al.
8,500,721 B2	8/2013	Jinno	8,596,515 B2	12/2013	Okoniewski
8,500,762 B2	8/2013	Sholev et al.	8,597,745 B2	12/2013	Farnsworth et al.
8,502,091 B2	8/2013	Palmer et al.	8,599,450 B2	12/2013	Kubo et al.
8,505,799 B2	8/2013	Viola et al.	8,602,125 B2	12/2013	King
8,505,801 B2	8/2013	Ehrenfels et al.	8,602,287 B2	12/2013	Yates et al.
8,506,555 B2	8/2013	Ruiz Morales	8,602,288 B2	12/2013	Shelton, IV et al.
8,506,557 B2	8/2013	Zemlok et al.	8,603,077 B2	12/2013	Cooper et al.
8,506,580 B2	8/2013	Zergiebel et al.	8,603,089 B2	12/2013	Viola
8,506,581 B2	8/2013	Wingardner, III et al.	8,603,110 B2	12/2013	Maruyama et al.
8,511,308 B2	8/2013	Hecox et al.	8,603,135 B2	12/2013	Mueller
8,512,359 B2	8/2013	Whitman et al.	8,608,043 B2	12/2013	Scirica
8,512,402 B2	8/2013	Marczyk et al.	8,608,044 B2	12/2013	Hueil et al.
8,517,239 B2	8/2013	Scheib et al.	8,608,045 B2	12/2013	Smith et al.
8,517,241 B2	8/2013	Nicholas et al.	8,608,046 B2	12/2013	Laurent et al.
8,517,243 B2	8/2013	Giordano et al.	8,608,745 B2	12/2013	Guzman et al.
8,517,244 B2	8/2013	Shelton, IV et al.	8,613,383 B2	12/2013	Beckman et al.
8,518,024 B2	8/2013	Williams et al.	8,616,427 B2	12/2013	Viola
8,521,273 B2	8/2013	Kliman	8,616,431 B2	12/2013	Timm et al.
8,523,042 B2	9/2013	Masiakos et al.	8,622,274 B2	1/2014	Yates et al.
8,523,043 B2	9/2013	Ullrich et al.	8,622,275 B2	1/2014	Baxter, III et al.
8,523,881 B2	9/2013	Cabiri et al.	8,627,993 B2	1/2014	Smith et al.
			8,627,994 B2	1/2014	Zemlok et al.
			8,627,995 B2	1/2014	Smith et al.
			8,628,518 B2	1/2014	Blumenkranz et al.
			8,628,544 B2	1/2014	Farascioni



(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,628,545 B2	1/2014	Cabrera et al.	8,714,430 B2	5/2014	Natarajan et al.
8,631,987 B2	1/2014	Shelton, IV et al.	8,715,256 B2	5/2014	Greener
8,631,992 B1	1/2014	Hausen et al.	8,715,302 B2	5/2014	Ibrahim et al.
8,631,993 B2	1/2014	Kostrzewski	8,720,766 B2	5/2014	Hess et al.
8,632,462 B2	1/2014	Yoo et al.	8,721,630 B2	5/2014	Ortiz et al.
8,632,525 B2	1/2014	Kerr et al.	8,721,666 B2	5/2014	Schroeder et al.
8,632,535 B2	1/2014	Shelton, IV et al.	8,727,197 B2	5/2014	Hess et al.
8,632,539 B2	1/2014	Twomey et al.	8,727,199 B2	5/2014	Wenchell
8,632,563 B2	1/2014	Nagase et al.	8,727,200 B2	5/2014	Roy
8,636,187 B2	1/2014	Hueil et al.	8,727,961 B2	5/2014	Ziv
8,636,190 B2	1/2014	Zemlok et al.	8,728,099 B2	5/2014	Cohn et al.
8,636,191 B2	1/2014	Meagher	8,728,119 B2	5/2014	Cummins
8,636,193 B2	1/2014	Whitman et al.	8,733,470 B2	5/2014	Matthias et al.
8,636,736 B2	1/2014	Yates et al.	8,733,611 B2	5/2014	Milliman
8,636,766 B2	1/2014	Milliman et al.	8,733,612 B2	5/2014	Ma
8,639,936 B2	1/2014	Hu et al.	8,733,613 B2	5/2014	Huitema et al.
8,640,788 B2	2/2014	Dachs, II et al.	8,733,614 B2	5/2014	Ross et al.
8,646,674 B2	2/2014	Schulte et al.	8,734,336 B2	5/2014	Bonadio et al.
8,647,258 B2	2/2014	Aranyi et al.	8,734,359 B2	5/2014	Ibanez et al.
8,652,120 B2	2/2014	Giordano et al.	8,734,478 B2	5/2014	Widenhouse et al.
8,652,151 B2	2/2014	Lehman et al.	8,734,831 B2	5/2014	Kim et al.
8,652,155 B2	2/2014	Houser et al.	8,739,033 B2	5/2014	Rosenberg
8,657,174 B2	2/2014	Yates et al.	8,739,417 B2	6/2014	Tokunaga et al.
8,657,175 B2	2/2014	Sonnenschein et al.	8,740,034 B2	6/2014	Morgan et al.
8,657,176 B2	2/2014	Shelton, IV et al.	8,740,037 B2	6/2014	Shelton, IV et al.
8,657,177 B2	2/2014	Scirica et al.	8,740,038 B2	6/2014	Shelton, IV et al.
8,657,178 B2	2/2014	Hueil et al.	8,740,987 B2	6/2014	Geremakis et al.
8,657,482 B2	2/2014	Malackowski et al.	8,746,529 B2	6/2014	Shelton, IV et al.
8,657,808 B2	2/2014	McPherson et al.	8,746,530 B2	6/2014	Giordano et al.
8,657,814 B2	2/2014	Werneth et al.	8,746,533 B2	6/2014	Whitman et al.
8,657,821 B2	2/2014	Palermo	8,746,535 B2	6/2014	Shelton, IV et al.
D701,238 S	3/2014	Lai et al.	8,747,238 B2	6/2014	Shelton, IV et al.
8,662,370 B2	3/2014	Takei	8,747,441 B2	6/2014	Konieczynski et al.
8,663,106 B2	3/2014	Stivoric et al.	8,752,264 B2	6/2014	Ackley et al.
8,663,192 B2	3/2014	Hester et al.	8,752,699 B2	6/2014	Morgan et al.
8,663,245 B2	3/2014	Francischelli et al.	8,752,747 B2	6/2014	Shelton, IV et al.
8,663,262 B2	3/2014	Smith et al.	8,752,748 B2	6/2014	Whitman et al.
8,663,270 B2	3/2014	Donnigan et al.	8,752,749 B2	6/2014	Moore et al.
8,664,792 B2	3/2014	Rebsdorf	8,753,664 B2	6/2014	Dao et al.
8,668,129 B2	3/2014	Olson	8,757,287 B2	6/2014	Mak et al.
8,668,130 B2	3/2014	Hess et al.	8,757,465 B2	6/2014	Woodard, Jr. et al.
8,672,206 B2	3/2014	Aranyi et al.	8,758,235 B2	6/2014	Jaworek
8,672,207 B2	3/2014	Shelton, IV et al.	8,758,366 B2	6/2014	McLean et al.
8,672,208 B2	3/2014	Hess et al.	8,758,391 B2	6/2014	Swayze et al.
8,672,922 B2	3/2014	Loh et al.	8,758,438 B2	6/2014	Boyce et al.
8,672,935 B2	3/2014	Okada et al.	8,763,875 B2	7/2014	Morgan et al.
8,672,951 B2	3/2014	Smith et al.	8,763,876 B2	7/2014	Kostrzewski
8,673,210 B2	3/2014	Deshays	8,763,877 B2	7/2014	Schall et al.
8,675,820 B2	3/2014	Baic et al.	8,763,879 B2	7/2014	Shelton, IV et al.
8,678,263 B2	3/2014	Viola	8,764,732 B2	7/2014	Hartwell
8,678,994 B2	3/2014	Sonnenschein et al.	8,765,942 B2	7/2014	Feraud et al.
8,679,093 B2	3/2014	Farra	8,770,458 B2	7/2014	Scirica
8,679,098 B2	3/2014	Hart	8,770,459 B2	7/2014	Racenet et al.
8,679,137 B2	3/2014	Bauman et al.	8,770,460 B2	7/2014	Belzer
8,679,154 B2	3/2014	Smith et al.	8,771,169 B2	7/2014	Whitman et al.
8,679,156 B2	3/2014	Smith et al.	8,771,260 B2	7/2014	Conlon et al.
8,679,454 B2	3/2014	Guire et al.	8,777,004 B2	7/2014	Shelton, IV et al.
8,684,248 B2	4/2014	Milliman	8,777,082 B2	7/2014	Scirica
8,684,249 B2	4/2014	Racenet et al.	8,777,083 B2	7/2014	Racenet et al.
8,684,250 B2	4/2014	Bettuchi et al.	8,777,898 B2	7/2014	Suon et al.
8,684,253 B2	4/2014	Giordano et al.	8,783,541 B2	7/2014	Shelton, IV et al.
8,684,962 B2	4/2014	Kirschenman et al.	8,783,542 B2	7/2014	Riestenberg et al.
8,685,004 B2	4/2014	Zemlock et al.	8,783,543 B2	7/2014	Shelton, IV et al.
8,685,020 B2	4/2014	Weizman et al.	8,784,304 B2	7/2014	Mikkaichi et al.
8,690,893 B2	4/2014	Deitch et al.	8,784,404 B2	7/2014	Doyle et al.
8,695,866 B2	4/2014	Leimbach et al.	8,784,415 B2	7/2014	Malackowski et al.
8,696,665 B2	4/2014	Hunt et al.	8,789,737 B2	7/2014	Hodgkinson et al.
8,701,958 B2	4/2014	Shelton, IV et al.	8,789,739 B2	7/2014	Swensgard
8,701,959 B2	4/2014	Shah	8,789,740 B2	7/2014	Baxter, III et al.
8,706,316 B1	4/2014	Hoevenaar	8,789,741 B2	7/2014	Baxter, III et al.
8,708,210 B2	4/2014	Zemlok et al.	8,790,658 B2	7/2014	Cigarini et al.
8,708,211 B2	4/2014	Zemlok et al.	8,790,684 B2	7/2014	Dave et al.
8,708,213 B2	4/2014	Shelton, IV et al.	D711,905 S	8/2014	Morrison et al.
8,714,352 B2	5/2014	Farascioni et al.	8,794,496 B2	8/2014	Scirica
8,714,429 B2	5/2014	Demmy	8,794,497 B2	8/2014	Zingman
			8,795,276 B2	8/2014	Dietz et al.
			8,795,308 B2	8/2014	Valin
			8,795,324 B2	8/2014	Kawai et al.
			8,796,995 B2	8/2014	Cunanan et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

8,800,681 B2	8/2014	Rousson et al.	8,887,979 B2	11/2014	Mastri et al.
8,800,837 B2	8/2014	Zemlok	8,888,688 B2	11/2014	Julian et al.
8,800,838 B2	8/2014	Shelton, IV	8,888,695 B2	11/2014	Piskun et al.
8,800,839 B2	8/2014	Beetel	8,888,792 B2	11/2014	Harris et al.
8,800,840 B2	8/2014	Jankowski	8,888,809 B2	11/2014	Davison et al.
8,800,841 B2	8/2014	Ellerhorst et al.	8,893,946 B2	11/2014	Boudreaux et al.
8,801,710 B2	8/2014	Ullrich et al.	8,893,949 B2	11/2014	Shelton, IV et al.
8,801,734 B2	8/2014	Shelton, IV et al.	8,894,647 B2	11/2014	Beardsley et al.
8,801,735 B2	8/2014	Shelton, IV et al.	8,894,654 B2	11/2014	Anderson
8,801,752 B2	8/2014	Fortier et al.	8,899,460 B2	12/2014	Wojcicki
8,801,801 B2	8/2014	Datta et al.	8,899,461 B2	12/2014	Farascioni
8,806,973 B2	8/2014	Ross et al.	8,899,462 B2	12/2014	Kostrzewski et al.
8,807,414 B2	8/2014	Ross et al.	8,899,463 B2	12/2014	Schall et al.
8,808,161 B2	8/2014	Gregg et al.	8,899,464 B2	12/2014	Hueil et al.
8,808,164 B2	8/2014	Hoffman et al.	8,899,465 B2	12/2014	Shelton, IV et al.
8,808,274 B2	8/2014	Hartwell	8,899,466 B2	12/2014	Baxter, III et al.
8,808,294 B2	8/2014	Fox et al.	8,900,267 B2	12/2014	Woolfson et al.
8,808,308 B2	8/2014	Boukhny et al.	8,905,287 B2	12/2014	Racenet et al.
8,808,311 B2	8/2014	Heinrich et al.	8,905,977 B2	12/2014	Shelton et al.
8,808,325 B2	8/2014	Hess et al.	8,910,846 B2	12/2014	Viola
8,810,197 B2	8/2014	Juergens	8,911,426 B2	12/2014	Coppeta et al.
8,811,017 B2	8/2014	Fujii et al.	8,911,448 B2	12/2014	Stein
8,813,866 B2	8/2014	Suzuki	8,911,460 B2	12/2014	Neurohr et al.
8,814,024 B2	8/2014	Woodard, Jr. et al.	8,911,471 B2	12/2014	Spivey et al.
8,814,025 B2	8/2014	Miller et al.	8,912,746 B2	12/2014	Reid et al.
8,814,836 B2	8/2014	Ignon et al.	8,920,433 B2	12/2014	Barrier et al.
8,815,594 B2	8/2014	Harris et al.	8,920,435 B2	12/2014	Smith et al.
8,818,523 B2	8/2014	Olson et al.	8,920,438 B2	12/2014	Aranyi et al.
8,820,603 B2	9/2014	Shelton, IV et al.	8,920,443 B2	12/2014	Hiles et al.
8,820,605 B2	9/2014	Shelton, IV	8,920,444 B2	12/2014	Hiles et al.
8,820,606 B2	9/2014	Hodgkinson	8,922,163 B2	12/2014	Macdonald
8,820,607 B2	9/2014	Marczyk	8,925,782 B2	1/2015	Shelton, IV
8,820,608 B2	9/2014	Miyamoto	8,925,783 B2	1/2015	Zemlok et al.
8,821,514 B2	9/2014	Aranyi	8,925,788 B2	1/2015	Hess et al.
8,822,934 B2	9/2014	Sayeh et al.	8,926,506 B2	1/2015	Widenhouse et al.
8,825,164 B2	9/2014	Tweden et al.	8,926,598 B2	1/2015	Mollere et al.
8,827,133 B2	9/2014	Shelton, IV et al.	8,931,576 B2	1/2015	Iwata
8,827,134 B2	9/2014	Viola et al.	8,931,679 B2	1/2015	Kostrzewski
8,827,903 B2	9/2014	Shelton, IV et al.	8,931,680 B2	1/2015	Milliman
8,831,779 B2	9/2014	Ortmaier et al.	8,931,682 B2	1/2015	Timm et al.
8,833,219 B2	9/2014	Pierce	8,936,614 B2	1/2015	Allen, IV
8,833,630 B2	9/2014	Milliman	8,939,343 B2	1/2015	Milliman et al.
8,833,632 B2	9/2014	Swensgard	8,939,344 B2	1/2015	Olson et al.
8,834,353 B2	9/2014	Dejima et al.	8,945,095 B2	2/2015	Blumenkranz et al.
8,834,465 B2	9/2014	Ramstein et al.	8,945,163 B2	2/2015	Voegelé et al.
8,834,498 B2	9/2014	Byrum et al.	8,955,732 B2	2/2015	Zemlok et al.
8,834,518 B2	9/2014	Faller et al.	8,956,342 B1	2/2015	Russo et al.
8,840,003 B2	9/2014	Morgan et al.	8,956,390 B2	2/2015	Shah et al.
8,840,603 B2	9/2014	Shelton, IV et al.	8,958,860 B2	2/2015	Banerjee et al.
8,840,609 B2	9/2014	Stuebe	8,960,519 B2	2/2015	Whitman et al.
8,840,876 B2	9/2014	Eemeta et al.	8,960,520 B2	2/2015	McCuen
8,844,789 B2	9/2014	Shelton, IV et al.	8,960,521 B2	2/2015	Kostrzewski
8,844,790 B2	9/2014	Demmy et al.	8,961,191 B2	2/2015	Hanshew
8,851,215 B2	10/2014	Goto	8,961,504 B2	2/2015	Hoarau et al.
8,851,354 B2	10/2014	Swensgard et al.	8,963,714 B2	2/2015	Medhal et al.
8,852,174 B2	10/2014	Burbank	D725,674 S	3/2015	Jung et al.
8,852,185 B2	10/2014	Twomey	8,967,443 B2	3/2015	McCuen
8,852,199 B2	10/2014	Deslauriers et al.	8,967,444 B2	3/2015	Beetel
8,852,218 B2	10/2014	Hughett, Sr. et al.	8,967,446 B2	3/2015	Beardsley et al.
8,857,693 B2	10/2014	Schuckmann et al.	8,967,448 B2	3/2015	Carter et al.
8,857,694 B2	10/2014	Shelton, IV et al.	8,968,276 B2	3/2015	Zemlok et al.
8,858,538 B2	10/2014	Belson et al.	8,968,308 B2	3/2015	Horner et al.
8,858,571 B2	10/2014	Shelton, IV et al.	8,968,312 B2	3/2015	Marczyk et al.
8,858,590 B2	10/2014	Shelton, IV et al.	8,968,337 B2	3/2015	Whitfield et al.
8,864,007 B2	10/2014	Widenhouse et al.	8,968,340 B2	3/2015	Chowaniec et al.
8,864,009 B2	10/2014	Shelton, IV et al.	8,968,355 B2	3/2015	Malkowski et al.
8,864,010 B2	10/2014	Williams	8,968,358 B2	3/2015	Reschke
8,864,750 B2	10/2014	Ross et al.	8,970,507 B2	3/2015	Holbein et al.
8,870,050 B2	10/2014	Hodgkinson	8,973,803 B2	3/2015	Hall et al.
8,870,867 B2	10/2014	Walberg et al.	8,973,804 B2	3/2015	Hess et al.
8,870,912 B2	10/2014	Brisson et al.	8,973,805 B2	3/2015	Scirica et al.
8,875,971 B2	11/2014	Hall et al.	8,974,440 B2	3/2015	Farritor et al.
8,875,972 B2	11/2014	Weisenburgh, II et al.	8,974,542 B2	3/2015	Fujimoto et al.
8,876,857 B2	11/2014	Burbank	8,974,932 B2	3/2015	McGahan et al.
8,876,858 B2	11/2014	Braun	8,978,954 B2	3/2015	Shelton, IV et al.
			8,978,955 B2	3/2015	Aronhalt et al.
			8,978,956 B2	3/2015	Schall et al.
			8,979,843 B2	3/2015	Timm et al.
			8,979,890 B2	3/2015	Boudreaux

(56)

References Cited

U.S. PATENT DOCUMENTS

8,982,195 B2	3/2015	Claus et al.	9,055,943 B2	6/2015	Zemlok et al.
8,985,429 B2	3/2015	Balek et al.	9,055,944 B2	6/2015	Hodgkinson et al.
8,986,302 B2	3/2015	Aldridge et al.	9,055,961 B2	6/2015	Manzo et al.
8,989,903 B2	3/2015	Weir et al.	9,060,770 B2	6/2015	Shelton, IV et al.
8,991,676 B2	3/2015	Hess et al.	9,060,776 B2	6/2015	Yates et al.
8,991,677 B2	3/2015	Moore et al.	9,060,794 B2	6/2015	Kang et al.
8,991,678 B2	3/2015	Wellman et al.	9,060,894 B2	6/2015	Wubbeling
8,992,042 B2	3/2015	Eichenholz	9,061,392 B2	6/2015	Forgues et al.
8,992,422 B2	3/2015	Spivey et al.	9,072,515 B2	7/2015	Hall et al.
8,992,565 B2	3/2015	Brisson et al.	9,072,523 B2	7/2015	Houser et al.
8,996,165 B2	3/2015	Wang et al.	9,072,535 B2	7/2015	Shelton, IV et al.
8,998,058 B2	4/2015	Moore et al.	9,072,536 B2	7/2015	Shelton, IV et al.
8,998,059 B2	4/2015	Smith et al.	9,078,653 B2	7/2015	Leimbach et al.
8,998,060 B2	4/2015	Bruewer et al.	9,078,654 B2	7/2015	Whitman et al.
8,998,061 B2	4/2015	Williams et al.	9,084,601 B2	7/2015	Moore et al.
8,998,939 B2	4/2015	Price et al.	9,084,602 B2	7/2015	Gleiman
9,000,720 B2	4/2015	Stulen et al.	9,086,875 B2	7/2015	Harrat et al.
9,002,518 B2	4/2015	Manzo et al.	9,089,326 B2	7/2015	Krumanaker et al.
9,004,339 B1	4/2015	Park	9,089,330 B2	7/2015	Widenhouse et al.
9,005,230 B2	4/2015	Yates et al.	9,089,352 B2	7/2015	Jeong
9,005,238 B2	4/2015	DeSantis et al.	9,089,360 B2	7/2015	Messerly et al.
9,005,243 B2	4/2015	Stopek et al.	9,091,588 B2	7/2015	Lefler
9,010,606 B2	4/2015	Aranyi et al.	D736,792 S	8/2015	Brinda et al.
9,010,608 B2	4/2015	Casasanta, Jr. et al.	9,095,339 B2	8/2015	Moore et al.
9,010,611 B2	4/2015	Ross et al.	9,095,346 B2	8/2015	Houser et al.
9,011,437 B2	4/2015	Woodruff et al.	9,095,362 B2	8/2015	Dachs, II et al.
9,011,439 B2	4/2015	Shalaby et al.	9,095,367 B2	8/2015	Olson et al.
9,011,471 B2	4/2015	Timm et al.	9,096,033 B2	8/2015	Holop et al.
9,016,539 B2	4/2015	Kostrzewski et al.	9,099,863 B2	8/2015	Smith et al.
9,016,540 B2	4/2015	Whitman et al.	9,099,877 B2	8/2015	Banos et al.
9,016,541 B2	4/2015	Viola et al.	9,101,358 B2	8/2015	Kerr et al.
9,016,542 B2	4/2015	Shelton, IV et al.	9,101,385 B2	8/2015	Shelton, IV et al.
9,016,545 B2	4/2015	Aranyi et al.	9,101,475 B2	8/2015	Wei et al.
9,017,331 B2	4/2015	Fox	9,101,621 B2	8/2015	Zeldis
9,017,355 B2	4/2015	Smith et al.	9,107,663 B2	8/2015	Swensgard
9,017,369 B2	4/2015	Renger et al.	9,107,690 B2	8/2015	Bales, Jr. et al.
9,017,371 B2	4/2015	Whitman et al.	9,110,587 B2	8/2015	Kim et al.
D729,274 S *	5/2015	Clement ..... D14/491	9,113,862 B2	8/2015	Morgan et al.
9,021,684 B2	5/2015	Lenker et al.	9,113,864 B2	8/2015	Morgan et al.
9,023,014 B2	5/2015	Chowaniec et al.	9,113,865 B2	8/2015	Shelton, IV et al.
9,023,069 B2	5/2015	Kasvikis et al.	9,113,868 B2	8/2015	Felder et al.
9,023,071 B2	5/2015	Miller et al.	9,113,873 B2	8/2015	Marczyk et al.
9,026,347 B2	5/2015	Gadh et al.	9,113,874 B2	8/2015	Shelton, IV et al.
9,027,817 B2	5/2015	Milliman et al.	9,113,876 B2	8/2015	Zemlok et al.
9,028,494 B2	5/2015	Shelton, IV et al.	9,113,879 B2	8/2015	Felder et al.
9,028,495 B2	5/2015	Mueller et al.	9,113,880 B2	8/2015	Zemlok et al.
9,028,510 B2	5/2015	Miyamoto et al.	9,113,881 B2	8/2015	Scirica
9,028,511 B2	5/2015	Weller et al.	9,113,883 B2	8/2015	Aronhalt et al.
9,028,519 B2	5/2015	Yates et al.	9,113,884 B2	8/2015	Shelton, IV et al.
9,030,166 B2	5/2015	Kano	9,113,887 B2	8/2015	Behnke, II et al.
9,030,169 B2	5/2015	Christensen et al.	9,119,615 B2	9/2015	Felder et al.
9,033,203 B2	5/2015	Woodard, Jr. et al.	9,119,657 B2	9/2015	Shelton, IV et al.
9,033,204 B2	5/2015	Shelton, IV et al.	9,119,898 B2	9/2015	Bayon et al.
9,034,505 B2	5/2015	Detry et al.	9,119,957 B2	9/2015	Gantz et al.
9,038,881 B1	5/2015	Schaller et al.	9,123,286 B2	9/2015	Park
9,039,690 B2	5/2015	Kersten et al.	9,124,097 B2	9/2015	Cruz
9,039,694 B2	5/2015	Ross et al.	9,125,654 B2	9/2015	Aronhalt et al.
9,039,720 B2	5/2015	Madan	9,125,662 B2	9/2015	Shelton, IV
9,043,027 B2	5/2015	Durant et al.	9,126,317 B2	9/2015	Lawton et al.
9,044,227 B2	6/2015	Shelton, IV et al.	9,131,835 B2	9/2015	Widenhouse et al.
9,044,228 B2	6/2015	Woodard, Jr. et al.	9,131,940 B2	9/2015	Huitema et al.
9,044,229 B2	6/2015	Scheib et al.	9,131,950 B2	9/2015	Matthew
9,044,230 B2	6/2015	Morgan et al.	9,131,957 B2	9/2015	Skarbnik et al.
9,044,241 B2	6/2015	Barner et al.	9,138,225 B2	9/2015	Huang et al.
9,044,261 B2	6/2015	Houser	9,138,226 B2	9/2015	Racenet et al.
9,044,281 B2	6/2015	Pool et al.	9,144,455 B2	9/2015	Kennedy et al.
9,050,083 B2	6/2015	Yates et al.	D741,882 S	10/2015	Shmilov et al.
9,050,084 B2	6/2015	Schmid et al.	9,149,274 B2	10/2015	Spivey et al.
9,050,100 B2	6/2015	Yates et al.	9,149,324 B2	10/2015	Huang et al.
9,050,120 B2	6/2015	Swarup et al.	9,149,325 B2	10/2015	Worrell et al.
9,050,123 B2	6/2015	Krause et al.	9,153,994 B2	10/2015	Wood et al.
9,050,176 B2	6/2015	Datta et al.	9,161,753 B2	10/2015	Prior
9,050,192 B2	6/2015	Mansmann	9,161,769 B2	10/2015	Stoddard et al.
9,055,941 B2	6/2015	Schmid et al.	9,161,803 B2	10/2015	Yates et al.
9,055,942 B2	6/2015	Balbierz et al.	9,161,807 B2	10/2015	Garrison
			9,164,271 B2	10/2015	Ebata et al.
			9,168,038 B2	10/2015	Shelton, IV et al.
			9,168,039 B1	10/2015	Knodel
			9,168,042 B2	10/2015	Milliman

(56)

References Cited

U.S. PATENT DOCUMENTS

9,168,054 B2	10/2015	Turner et al.	9,254,131 B2	2/2016	Soltz et al.
9,168,144 B2	10/2015	Rivin et al.	9,259,265 B2	2/2016	Harris et al.
9,179,911 B2	11/2015	Morgan et al.	9,259,274 B2	2/2016	Prisco
9,179,912 B2	11/2015	Yates et al.	9,259,275 B2	2/2016	Burbank
9,180,223 B2	11/2015	Yu et al.	9,261,172 B2	2/2016	Solomon et al.
9,182,244 B2	11/2015	Luke et al.	9,265,500 B2	2/2016	Sorrentino et al.
9,186,046 B2	11/2015	Ramamurthy et al.	9,265,516 B2	2/2016	Casey et al.
9,186,137 B2	11/2015	Farascioni et al.	9,265,585 B2	2/2016	Wingardner et al.
9,186,140 B2	11/2015	Hiles et al.	9,271,718 B2	3/2016	Milad et al.
9,186,142 B2	11/2015	Fanelli et al.	9,271,727 B2	3/2016	McGuckin, Jr. et al.
9,186,143 B2	11/2015	Timm et al.	9,271,753 B2	3/2016	Butler et al.
9,186,148 B2	11/2015	Felder et al.	9,271,799 B2	3/2016	Shelton, IV et al.
9,186,221 B2	11/2015	Burbank	9,272,406 B2	3/2016	Aronhalt et al.
9,192,380 B2	11/2015	(Tarinelli) Racenet et al.	9,274,095 B2	3/2016	Humayun et al.
9,192,384 B2	11/2015	Bettuchi	9,277,919 B2	3/2016	Timmer et al.
9,192,430 B2	11/2015	Rachlin et al.	9,277,922 B2	3/2016	Carter et al.
9,192,434 B2	11/2015	Twomey et al.	9,277,969 B2	3/2016	Brannan et al.
9,193,045 B2	11/2015	Saur et al.	9,282,962 B2	3/2016	Schmid et al.
9,197,079 B2	11/2015	Yip et al.	9,282,963 B2	3/2016	Bryant
D744,528 S	12/2015	Agrawal	9,282,966 B2	3/2016	Shelton, IV et al.
9,198,642 B2	12/2015	Storz	9,282,974 B2	3/2016	Shelton, IV
9,198,644 B2	12/2015	Balek et al.	9,283,028 B2	3/2016	Johnson
9,198,661 B2	12/2015	Swensgard	9,283,045 B2	3/2016	Rhee et al.
9,198,662 B2	12/2015	Barton et al.	9,283,054 B2	3/2016	Morgan et al.
9,198,683 B2	12/2015	Friedman et al.	9,289,206 B2	3/2016	Hess et al.
9,204,830 B2	12/2015	Zand et al.	9,289,207 B2	3/2016	Shelton, IV
9,204,877 B2	12/2015	Whitman et al.	9,289,210 B2	3/2016	Baxter, III et al.
9,204,878 B2	12/2015	Hall et al.	9,289,211 B2	3/2016	Williams et al.
9,204,879 B2	12/2015	Shelton, IV	9,289,212 B2	3/2016	Shelton, IV et al.
9,204,880 B2	12/2015	Baxter, III et al.	9,289,225 B2	3/2016	Shelton, IV et al.
9,204,881 B2	12/2015	Penna	9,289,256 B2	3/2016	Shelton, IV et al.
9,204,923 B2	12/2015	Manzo et al.	9,293,757 B2	3/2016	Toussaint et al.
9,204,924 B2	12/2015	Marczyk et al.	9,295,464 B2	3/2016	Shelton, IV et al.
9,211,120 B2	12/2015	Scheib et al.	9,295,465 B2	3/2016	Farascioni
9,211,121 B2	12/2015	Hall et al.	9,295,466 B2	3/2016	Hodgkinson et al.
9,211,122 B2	12/2015	Hagerty et al.	9,295,467 B2	3/2016	Scirica
9,216,013 B2	12/2015	Scirica et al.	9,295,468 B2	3/2016	Heinrich et al.
9,216,019 B2	12/2015	Schmid et al.	9,295,514 B2	3/2016	Shelton, IV et al.
9,216,020 B2	12/2015	Zhang et al.	9,295,522 B2	3/2016	Kostrzewski
9,216,030 B2	12/2015	Fan et al.	9,295,565 B2	3/2016	McLean
9,216,062 B2	12/2015	Duque et al.	9,295,784 B2	3/2016	Eggert et al.
9,220,500 B2	12/2015	Swayze et al.	D753,167 S	4/2016	Yu et al.
9,220,501 B2	12/2015	Baxter, III et al.	9,301,691 B2	4/2016	Hufnagel et al.
9,220,502 B2	12/2015	Zemlok et al.	9,301,752 B2	4/2016	Mandakolathur Vasudevan et al.
9,220,508 B2	12/2015	Dannaher	9,301,753 B2	4/2016	Aldridge et al.
9,220,559 B2	12/2015	Worrell et al.	9,301,755 B2	4/2016	Shelton, IV et al.
9,220,570 B2	12/2015	Kim et al.	9,301,759 B2	4/2016	Spivey et al.
D746,854 S	1/2016	Shardlow et al.	9,307,965 B2	4/2016	Ming et al.
9,226,750 B2	1/2016	Weir et al.	9,307,986 B2	4/2016	Hall et al.
9,226,751 B2	1/2016	Shelton, IV et al.	9,307,987 B2	4/2016	Swensgard et al.
9,226,754 B2	1/2016	D'Agostino et al.	9,307,988 B2	4/2016	Shelton, IV
9,226,761 B2	1/2016	Burbank	9,307,989 B2	4/2016	Shelton, IV et al.
9,226,767 B2	1/2016	Stulen et al.	9,307,994 B2	4/2016	Gresham et al.
9,232,941 B2	1/2016	Mandakolathur Vasudevan et al.	9,308,009 B2	4/2016	Madan et al.
9,232,945 B2	1/2016	Zingman	9,308,011 B2	4/2016	Chao et al.
9,232,979 B2	1/2016	Parihar et al.	9,308,646 B2	4/2016	Lim et al.
9,233,610 B2	1/2016	Kim et al.	9,313,915 B2	4/2016	Niu et al.
9,237,891 B2	1/2016	Shelton, IV	9,314,246 B2	4/2016	Shelton, IV et al.
9,237,892 B2	1/2016	Hodgkinson	9,314,247 B2	4/2016	Shelton, IV et al.
9,237,895 B2	1/2016	McCarthy et al.	9,314,261 B2	4/2016	Bales, Jr. et al.
9,237,900 B2	1/2016	Boudreaux et al.	9,314,339 B2	4/2016	Mansmann
9,237,921 B2	1/2016	Messerly et al.	9,314,908 B2	4/2016	Tanimoto et al.
9,239,064 B2	1/2016	Helbig et al.	9,320,518 B2	4/2016	Henderson et al.
9,240,740 B2	1/2016	Zeng et al.	9,320,520 B2	4/2016	Shelton, IV et al.
9,241,711 B2	1/2016	Ivanko	9,320,521 B2	4/2016	Shelton, IV et al.
9,241,712 B2	1/2016	Zemlok et al.	9,320,523 B2	4/2016	Shelton, IV et al.
9,241,714 B2	1/2016	Timm et al.	9,325,516 B2	4/2016	Pera et al.
9,241,716 B2	1/2016	Whitman	D755,196 S	5/2016	Meyers et al.
9,241,731 B2	1/2016	Boudreaux et al.	D756,373 S	5/2016	Raskin et al.
9,244,524 B2	1/2016	Inoue et al.	D756,377 S	5/2016	Connolly et al.
D748,668 S	2/2016	Kim et al.	D757,028 S	5/2016	Goldenberg et al.
D749,128 S *	2/2016	Perez ..... D14/489	9,326,767 B2	5/2016	Koch et al.
D749,623 S	2/2016	Gray et al.	9,326,768 B2	5/2016	Shelton, IV
D750,122 S	2/2016	Shardlow et al.	9,326,769 B2	5/2016	Shelton, IV et al.
D750,129 S	2/2016	Kwon	9,326,770 B2	5/2016	Shelton, IV et al.
			9,326,771 B2	5/2016	Baxter, III et al.
			9,326,788 B2	5/2016	Batross et al.
			9,326,812 B2	5/2016	Waler et al.
			9,326,824 B2	5/2016	Inoue et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,327,061 B2	5/2016	Govil et al.	9,420,967 B2	8/2016	Zand et al.
9,331,721 B2	5/2016	Martinez Nuevo et al.	9,421,003 B2	8/2016	Williams et al.
9,332,890 B2	5/2016	Ozawa	9,421,014 B2	8/2016	Ingmanson et al.
9,332,974 B2	5/2016	Henderson et al.	9,421,030 B2	8/2016	Cole et al.
9,332,984 B2	5/2016	Weaner et al.	9,421,060 B2	8/2016	Monson et al.
9,332,987 B2	5/2016	Leimbach et al.	9,421,062 B2	8/2016	Houser et al.
9,333,040 B2	5/2016	Shellenberger et al.	9,427,223 B2	8/2016	Park et al.
9,333,082 B2	5/2016	Wei et al.	9,427,231 B2	8/2016	Racenet et al.
9,337,668 B2	5/2016	Yip	D767,624 S	9/2016	Lee et al.
9,339,226 B2	5/2016	van der Walt et al.	9,433,411 B2	9/2016	Racenet et al.
9,345,477 B2	5/2016	Anim et al.	9,433,414 B2	9/2016	Chen et al.
9,345,479 B2	5/2016	(Tarinelli) Racenet et al.	9,433,419 B2	9/2016	Gonzalez et al.
9,345,480 B2	5/2016	Hessler et al.	9,433,420 B2	9/2016	Hodgkinson
9,345,481 B2	5/2016	Hall et al.	9,439,649 B2	9/2016	Shelton, IV et al.
9,345,503 B2	5/2016	Ishida et al.	9,439,650 B2	9/2016	McGuckin, Jr. et al.
9,351,726 B2	5/2016	Leimbach et al.	9,439,651 B2	9/2016	Smith et al.
9,351,727 B2	5/2016	Leimbach et al.	9,439,668 B2	9/2016	Timm et al.
9,351,728 B2	5/2016	Sniffin et al.	9,445,808 B2	9/2016	Woodard, Jr. et al.
9,351,730 B2	5/2016	Schmid et al.	9,445,813 B2	9/2016	Shelton, IV et al.
9,351,731 B2	5/2016	Carter et al.	9,445,816 B2	9/2016	Swayze et al.
9,351,732 B2	5/2016	Hodgkinson	9,445,817 B2	9/2016	Bettuchi
D758,433 S	6/2016	Lee et al.	9,446,226 B2	9/2016	Zilberman
D759,063 S	6/2016	Chen	9,451,938 B2	9/2016	Overes et al.
9,358,003 B2	6/2016	Hall et al.	9,451,958 B2	9/2016	Shelton, IV et al.
9,358,005 B2	6/2016	Shelton, IV et al.	D768,152 S	10/2016	Gutierrez et al.
9,358,015 B2	6/2016	Sorrentino et al.	D768,156 S	10/2016	Frincke
9,358,031 B2	6/2016	Manzo	D768,167 S	10/2016	Jones et al.
9,364,217 B2	6/2016	Kostrzewski et al.	D769,315 S	10/2016	Scotti
9,364,219 B2	6/2016	Olson et al.	D769,930 S	10/2016	Agrawal
9,364,220 B2	6/2016	Williams	9,461,340 B2	10/2016	Li et al.
9,364,226 B2	6/2016	Zemlok et al.	9,463,040 B2	10/2016	Jeong et al.
9,364,229 B2	6/2016	D'Agostino et al.	9,463,260 B2	10/2016	Stopek
9,364,230 B2	6/2016	Shelton, IV et al.	9,468,438 B2	10/2016	Baber et al.
9,364,231 B2	6/2016	Wenchell	9,468,447 B2	10/2016	Aman et al.
9,364,233 B2	6/2016	Alexander, III et al.	9,470,297 B2	10/2016	Aranyi et al.
9,364,279 B2	6/2016	Houser et al.	9,471,969 B2	10/2016	Zeng et al.
9,368,991 B2	6/2016	Qahouq	9,474,506 B2	10/2016	Magnin et al.
9,370,341 B2	6/2016	Ceniccola et al.	9,474,523 B2	10/2016	Meade et al.
9,370,358 B2	6/2016	Shelton, IV et al.	9,474,540 B2	10/2016	Stokes et al.
9,370,364 B2	6/2016	Smith et al.	9,475,180 B2	10/2016	Eshleman et al.
9,370,400 B2	6/2016	Parihar	D770,476 S	11/2016	Jitkoff et al.
9,375,206 B2	6/2016	Vidal et al.	D770,515 S	11/2016	Cho et al.
9,375,218 B2	6/2016	Wheeler et al.	D771,116 S	11/2016	Dellinger et al.
9,375,230 B2	6/2016	Ross et al.	D772,905 S	11/2016	Ingenlath
9,375,232 B2	6/2016	Hunt et al.	9,480,476 B2	11/2016	Aldridge et al.
9,375,255 B2	6/2016	Houser et al.	9,480,492 B2	11/2016	Aranyi et al.
D761,309 S	7/2016	Lee et al.	9,483,095 B2	11/2016	Tran et al.
9,381,058 B2	7/2016	Houser et al.	9,486,186 B2	11/2016	Fiebig et al.
9,383,881 B2	7/2016	Day et al.	9,486,213 B2	11/2016	Altman et al.
9,386,983 B2	7/2016	Swensgard et al.	9,486,214 B2	11/2016	Shelton, IV
9,386,984 B2	7/2016	Aronhalt et al.	9,486,302 B2	11/2016	Boey et al.
9,386,985 B2	7/2016	Koch, Jr. et al.	9,488,197 B2	11/2016	Wi
9,386,988 B2	7/2016	Baxter, III et al.	9,492,146 B2	11/2016	Kostrzewski et al.
9,387,003 B2	7/2016	Kaercher et al.	9,492,167 B2	11/2016	Shelton, IV et al.
9,393,015 B2	7/2016	Laurent et al.	9,492,170 B2	11/2016	Bear et al.
9,393,017 B2	7/2016	Flanagan et al.	9,492,189 B2	11/2016	Williams et al.
9,393,018 B2	7/2016	Wang et al.	9,492,192 B2	11/2016	To et al.
9,396,669 B2	7/2016	Karkanias et al.	9,492,237 B2	11/2016	Kang et al.
9,398,911 B2	7/2016	Auld	9,498,213 B2	11/2016	Marczyk et al.
D763,277 S	8/2016	Ahmed et al.	9,498,219 B2	11/2016	Moore et al.
D764,498 S	8/2016	Capela et al.	9,498,231 B2	11/2016	Haider et al.
9,402,604 B2	8/2016	Williams et al.	9,504,455 B2	11/2016	Whitman et al.
9,402,625 B2	8/2016	Coleman et al.	9,504,483 B2	11/2016	Houser et al.
9,402,626 B2	8/2016	Ortiz et al.	9,504,521 B2	11/2016	Deutmeyer et al.
9,402,627 B2	8/2016	Stevenson et al.	D774,547 S	12/2016	Capela et al.
9,402,629 B2	8/2016	Ehrenfels et al.	D775,336 S	12/2016	Shelton, IV et al.
9,402,679 B2	8/2016	Binnebaugh et al.	9,510,827 B2	12/2016	Kostrzewski
9,408,604 B2	8/2016	Shelton, IV et al.	9,510,828 B2	12/2016	Yates et al.
9,408,606 B2	8/2016	Shelton, IV	9,510,830 B2	12/2016	Shelton, IV et al.
9,408,622 B2	8/2016	Stulen et al.	9,510,846 B2	12/2016	Sholev et al.
9,411,370 B2	8/2016	Benni et al.	9,510,895 B2	12/2016	Houser et al.
9,413,128 B2	8/2016	Tien et al.	9,510,925 B2	12/2016	Hotter et al.
9,414,838 B2	8/2016	Shelton, IV et al.	9,517,063 B2	12/2016	Swayze et al.
9,414,849 B2	8/2016	Nagashimada	9,517,068 B2	12/2016	Shelton, IV et al.
9,414,880 B2	8/2016	Monson et al.	9,517,326 B2	12/2016	Hinman et al.
			9,521,996 B2	12/2016	Armstrong
			9,522,003 B2	12/2016	Weir et al.
			9,522,029 B2	12/2016	Yates et al.
			9,526,481 B2	12/2016	Storz et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,526,499 B2	12/2016	Kostrzewski et al.	D786,280 S	5/2017	Ma
9,526,563 B2	12/2016	Twomey	D786,896 S	5/2017	Kim et al.
9,526,564 B2	12/2016	Rusin	D787,547 S	5/2017	Basargin et al.
D776,683 S	1/2017	Gobinski et al.	D788,123 S	5/2017	Shan et al.
D777,773 S	1/2017	Shi	D788,140 S	5/2017	Hemsley et al.
9,532,783 B2	1/2017	Swayze et al.	9,636,111 B2	5/2017	Wenchell
9,539,060 B2	1/2017	Lightcap et al.	9,636,113 B2	5/2017	Wenchell
9,539,726 B2	1/2017	Simaan et al.	9,636,850 B2	5/2017	Stopek (nee Prommersberger) et al.
9,545,253 B2	1/2017	Worrell et al.	9,641,122 B2	5/2017	Romanowich et al.
9,545,258 B2	1/2017	Smith et al.	9,642,620 B2	5/2017	Baxter, III et al.
9,549,732 B2	1/2017	Yates et al.	9,649,096 B2	5/2017	Sholev
9,549,735 B2	1/2017	Shelton, IV et al.	9,649,110 B2	5/2017	Parihar et al.
9,554,794 B2	1/2017	Baber et al.	9,649,111 B2	5/2017	Shelton, IV et al.
9,554,796 B2	1/2017	Kostrzewski	9,655,613 B2	5/2017	Schaller
9,554,812 B2	1/2017	Inkpen et al.	9,655,614 B2	5/2017	Swensgard et al.
9,559,624 B2	1/2017	Philipp	9,655,615 B2	5/2017	Knodel et al.
9,561,013 B2	2/2017	Tsuchiya	9,655,616 B2	5/2017	Aranyi
9,561,030 B2	2/2017	Zhang et al.	9,655,624 B2	5/2017	Shelton, IV et al.
9,561,031 B2	2/2017	Heinrich et al.	9,662,108 B2	5/2017	Williams
9,561,032 B2	2/2017	Shelton, IV et al.	9,662,110 B2	5/2017	Huang et al.
9,561,038 B2	2/2017	Shelton, IV et al.	9,662,116 B2	5/2017	Smith et al.
9,561,045 B2	2/2017	Hinman et al.	9,662,131 B2	5/2017	Omori et al.
9,566,061 B2	2/2017	Aronhalt et al.	D788,792 S	6/2017	Alessandri et al.
9,566,062 B2	2/2017	Boudreaux	D789,384 S	6/2017	Lin et al.
9,566,065 B2	2/2017	Knodel	D790,570 S	6/2017	Butcher et al.
9,566,067 B2	2/2017	Milliman et al.	9,668,728 B2	6/2017	Williams et al.
9,572,574 B2	2/2017	Shelton, IV et al.	9,668,729 B2	6/2017	Williams et al.
9,572,576 B2	2/2017	Hodgkinson et al.	9,668,732 B2	6/2017	Patel et al.
9,572,577 B2	2/2017	Lloyd et al.	9,668,733 B2	6/2017	Williams
9,572,592 B2	2/2017	Price et al.	9,668,734 B2	6/2017	Kostrzewski et al.
9,574,644 B2	2/2017	Parihar	9,675,344 B2	6/2017	Combrowski et al.
9,579,088 B2	2/2017	Farritor et al.	9,675,351 B2	6/2017	Hodgkinson et al.
9,579,143 B2	2/2017	Ullrich et al.	9,675,354 B2	6/2017	Weir et al.
9,579,158 B2	2/2017	Brianza et al.	9,675,355 B2	6/2017	Shelton, IV et al.
D780,803 S	3/2017	Gill et al.	9,675,372 B2	6/2017	Laurent et al.
D781,879 S	3/2017	Butcher et al.	9,675,375 B2	6/2017	Houser et al.
D782,530 S	3/2017	Paek et al.	9,675,405 B2	6/2017	Trees et al.
9,585,550 B2	3/2017	Abel et al.	9,675,819 B2	6/2017	Dunbar et al.
9,585,657 B2	3/2017	Shelton, IV et al.	9,681,870 B2	6/2017	Baxter, III et al.
9,585,658 B2	3/2017	Shelton, IV	9,681,873 B2	6/2017	Smith et al.
9,585,659 B2	3/2017	Viola et al.	9,681,884 B2	6/2017	Clem et al.
9,585,660 B2	3/2017	Laurent et al.	9,687,230 B2	6/2017	Leimbach et al.
9,585,662 B2	3/2017	Shelton, IV et al.	9,687,231 B2	6/2017	Baxter, III et al.
9,585,663 B2	3/2017	Shelton, IV et al.	9,687,232 B2	6/2017	Shelton, IV et al.
9,585,672 B2	3/2017	Bastia	9,687,233 B2	6/2017	Fernandez et al.
9,590,433 B2	3/2017	Li	9,687,236 B2	6/2017	Leimbach et al.
9,592,050 B2	3/2017	Schmid et al.	9,687,237 B2	6/2017	Schmid et al.
9,592,052 B2	3/2017	Shelton, IV	9,687,253 B2	6/2017	Detry et al.
9,592,053 B2	3/2017	Shelton, IV et al.	9,689,466 B2	6/2017	Kanai et al.
9,592,054 B2	3/2017	Schmid et al.	9,690,362 B2	6/2017	Leimbach et al.
9,597,073 B2	3/2017	Sorrentino et al.	9,693,772 B2	7/2017	Ingmanson et al.
9,597,075 B2	3/2017	Shelton, IV et al.	9,693,774 B2	7/2017	Gettinger et al.
9,597,078 B2	3/2017	Scirica et al.	9,693,777 B2	7/2017	Schellin et al.
9,597,080 B2	3/2017	Milliman et al.	9,700,309 B2	7/2017	Jaworek et al.
9,597,104 B2	3/2017	Nicholas et al.	9,700,310 B2	7/2017	Morgan et al.
9,597,143 B2	3/2017	Madan et al.	9,700,312 B2	7/2017	Kostrzewski et al.
9,603,595 B2	3/2017	Shelton, IV et al.	9,700,314 B2	7/2017	Marczyk
9,603,598 B2	3/2017	Shelton, IV et al.	9,700,317 B2	7/2017	Aronhalt et al.
9,603,599 B2	3/2017	Miller et al.	9,700,318 B2	7/2017	Scirica et al.
9,603,991 B2	3/2017	Shelton, IV et al.	9,700,319 B2	7/2017	Motooka et al.
D783,658 S	4/2017	Hurst et al.	9,700,320 B2	7/2017	Dinardo et al.
9,610,068 B2	4/2017	Kappel et al.	9,700,321 B2	7/2017	Shelton, IV et al.
9,610,079 B2	4/2017	Kamei et al.	9,706,981 B2	7/2017	Nicholas et al.
9,610,080 B2	4/2017	Whitfield et al.	9,706,991 B2	7/2017	Hess et al.
9,614,258 B2	4/2017	Takahashi et al.	9,706,993 B2	7/2017	Hessler et al.
9,615,826 B2	4/2017	Shelton, IV et al.	9,707,003 B2	7/2017	Hoell, Jr. et al.
9,622,745 B2	4/2017	Ingmanson et al.	9,707,005 B2	7/2017	Strobl et al.
9,622,746 B2	4/2017	Simms et al.	9,707,026 B2	7/2017	Malackowski et al.
9,629,623 B2	4/2017	Lytte, IV et al.	9,707,033 B2	7/2017	Parihar et al.
9,629,626 B2	4/2017	Soltz et al.	9,707,043 B2	7/2017	Bozung
9,629,627 B2	4/2017	Kostrzewski et al.	9,707,684 B2	7/2017	Ruiz Morales et al.
9,629,628 B2	4/2017	Aranyi	9,713,468 B2	7/2017	Harris et al.
9,629,629 B2	4/2017	Leimbach et al.	9,713,470 B2	7/2017	Scirica et al.
9,629,652 B2	4/2017	Mumaw et al.	9,713,474 B2	7/2017	Lorenz
9,629,814 B2	4/2017	Widenhouse et al.	D795,919 S	8/2017	Bischoff et al.
			9,717,497 B2	8/2017	Zerkle et al.
			9,717,498 B2	8/2017	Aranyi et al.
			9,718,190 B2	8/2017	Larkin et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,722,236 B2	8/2017	Sathrum	9,802,033 B2	10/2017	Hibner et al.
9,724,091 B2	8/2017	Shelton, IV et al.	9,804,618 B2	10/2017	Leimbach et al.
9,724,092 B2	8/2017	Baxter, III et al.	D803,234 S	11/2017	Day et al.
9,724,094 B2	8/2017	Baber et al.	D803,235 S	11/2017	Markson et al.
9,724,095 B2	8/2017	Gupta et al.	D803,850 S	11/2017	Chang et al.
9,724,096 B2	8/2017	Thompson et al.	9,808,244 B2	11/2017	Leimbach et al.
9,724,098 B2	8/2017	Baxter, III et al.	9,808,246 B2	11/2017	Shelton, IV et al.
9,724,118 B2	8/2017	Schulte et al.	9,808,247 B2	11/2017	Shelton, IV et al.
9,724,163 B2	8/2017	Orban	9,808,248 B2	11/2017	Hoffman
9,730,692 B2	8/2017	Shelton, IV et al.	9,808,249 B2	11/2017	Shelton, IV
9,730,695 B2	8/2017	Leimbach et al.	9,814,460 B2	11/2017	Kimsey et al.
9,730,697 B2	8/2017	Morgan et al.	9,814,462 B2	11/2017	Woodard, Jr. et al.
9,730,717 B2	8/2017	Katsuki et al.	9,814,463 B2	11/2017	Williams et al.
9,731,410 B2	8/2017	Hirabayashi et al.	9,814,530 B2	11/2017	Weir et al.
9,733,663 B2	8/2017	Leimbach et al.	9,814,561 B2	11/2017	Forsell
9,737,297 B2	8/2017	Racenet et al.	9,820,445 B2	11/2017	Simpson et al.
9,737,301 B2	8/2017	Baber et al.	9,820,737 B2	11/2017	Beardsley et al.
9,737,302 B2	8/2017	Shelton, IV et al.	9,820,738 B2	11/2017	Lytte, IV et al.
9,737,303 B2	8/2017	Shelton, IV et al.	9,820,741 B2	11/2017	Kostrzewski
9,737,365 B2	8/2017	Hegeman et al.	9,820,768 B2	11/2017	Gee et al.
9,743,927 B2	8/2017	Whitman	9,825,455 B2	11/2017	Sandhu et al.
9,743,928 B2	8/2017	Shelton, IV et al.	9,826,976 B2	11/2017	Parihar et al.
9,743,929 B2	8/2017	Leimbach et al.	9,826,977 B2	11/2017	Leimbach et al.
D798,319 S	9/2017	Bergstrand et al.	9,826,978 B2	11/2017	Shelton, IV et al.
9,750,498 B2	9/2017	Timm et al.	9,829,698 B2	11/2017	Haraguchi et al.
9,750,499 B2	9/2017	Leimbach et al.	D806,108 S	12/2017	Day
9,750,501 B2	9/2017	Shelton, IV et al.	9,833,236 B2	12/2017	Shelton, IV et al.
9,750,502 B2	9/2017	Scirica et al.	9,833,238 B2	12/2017	Baxter, III et al.
9,750,639 B2	9/2017	Barnes et al.	9,833,239 B2	12/2017	Yates et al.
9,757,123 B2	9/2017	Giordano et al.	9,833,241 B2	12/2017	Huitema et al.
9,757,124 B2	9/2017	Schellin et al.	9,833,242 B2	12/2017	Baxter, III et al.
9,757,126 B2	9/2017	Cappola	9,839,420 B2	12/2017	Shelton, IV et al.
9,757,128 B2	9/2017	Baber et al.	9,839,421 B2	12/2017	Zerkle et al.
9,757,129 B2	9/2017	Williams	9,839,422 B2	12/2017	Schellin et al.
9,757,130 B2	9/2017	Shelton, IV	9,839,423 B2	12/2017	Vendely et al.
9,763,662 B2	9/2017	Shelton, IV et al.	9,839,427 B2	12/2017	Swayze et al.
9,763,668 B2	9/2017	Whitfield et al.	9,839,428 B2	12/2017	Baxter, III et al.
9,770,245 B2	9/2017	Swayze et al.	9,839,429 B2	12/2017	Weisenburgh, II et al.
9,770,274 B2	9/2017	Pool et al.	9,839,480 B2	12/2017	Pribanic et al.
D798,886 S	10/2017	Prophete et al.	9,844,368 B2	12/2017	Boudreaux et al.
D800,742 S	10/2017	Rhodes	9,844,369 B2	12/2017	Huitema et al.
D800,744 S	10/2017	Jitkoff et al.	9,844,372 B2	12/2017	Shelton, IV et al.
D800,766 S	10/2017	Park et al.	9,844,373 B2	12/2017	Swayze et al.
D800,904 S	10/2017	Leimbach et al.	9,844,374 B2	12/2017	Lytte, IV et al.
9,775,608 B2	10/2017	Aronhalt et al.	9,844,375 B2	12/2017	Overmyer et al.
9,775,609 B2	10/2017	Shelton, IV et al.	9,844,376 B2	12/2017	Baxter, III et al.
9,775,610 B2	10/2017	Nicholas et al.	9,844,379 B2	12/2017	Shelton, IV et al.
9,775,611 B2	10/2017	Kostrzewski	9,848,871 B2	12/2017	Harris et al.
9,775,613 B2	10/2017	Shelton, IV et al.	9,848,873 B2	12/2017	Shelton, IV
9,775,614 B2	10/2017	Shelton, IV et al.	9,848,875 B2	12/2017	Aronhalt et al.
9,775,618 B2	10/2017	Bettuchi et al.	9,848,877 B2	12/2017	Shelton, IV et al.
9,775,635 B2	10/2017	Takei	9,850,994 B2	12/2017	Schena
9,775,678 B2	10/2017	Lohmeier	D808,989 S	1/2018	Ayvazian et al.
9,782,169 B2	10/2017	Kimsey et al.	9,855,039 B2	1/2018	Racenet et al.
9,782,170 B2	10/2017	Zemlok et al.	9,855,040 B2	1/2018	Kostrzewski
9,782,180 B2	10/2017	Smith et al.	9,855,662 B2	1/2018	Ruiz Morales et al.
9,782,193 B2	10/2017	Thistle	9,861,261 B2	1/2018	Shahinian
9,782,214 B2	10/2017	Houser et al.	9,861,359 B2	1/2018	Shelton, IV et al.
9,788,834 B2	10/2017	Schmid et al.	9,861,361 B2	1/2018	Aronhalt et al.
9,788,835 B2	10/2017	Morgan et al.	9,861,362 B2	1/2018	Whitman et al.
9,788,836 B2	10/2017	Overmyer et al.	9,861,382 B2	1/2018	Smith et al.
9,788,847 B2	10/2017	Jinno	9,861,446 B2	1/2018	Lang
9,788,851 B2	10/2017	Dannaher et al.	9,867,612 B2	1/2018	Parihar et al.
9,788,902 B2	10/2017	Inoue et al.	9,867,615 B2	1/2018	Fanelli et al.
9,795,379 B2	10/2017	Leimbach et al.	9,867,618 B2	1/2018	Hall et al.
9,795,380 B2	10/2017	Shelton, IV et al.	9,867,620 B2	1/2018	Fischvogt et al.
9,795,381 B2	10/2017	Shelton, IV	9,868,198 B2	1/2018	Nicholas et al.
9,795,382 B2	10/2017	Shelton, IV	9,872,682 B2	1/2018	Hess et al.
9,795,383 B2	10/2017	Aldridge et al.	9,872,683 B2	1/2018	Hopkins et al.
9,795,384 B2	10/2017	Weaner et al.	9,872,684 B2	1/2018	Hall et al.
9,797,486 B2	10/2017	Zergiebel et al.	9,872,722 B2	1/2018	Lech
9,801,626 B2	10/2017	Parihar et al.	9,877,721 B2	1/2018	Schellin et al.
9,801,627 B2	10/2017	Harris et al.	9,877,723 B2	1/2018	Hall et al.
9,801,628 B2	10/2017	Harris et al.	9,877,776 B2	1/2018	Boudreaux
9,801,634 B2	10/2017	Shelton, IV et al.	D810,099 S	2/2018	Riedel
			9,883,843 B2	2/2018	Garlow
			9,883,860 B2	2/2018	Leimbach
			9,883,861 B2	2/2018	Shelton, IV et al.
			9,884,456 B2	2/2018	Schellin et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

9,888,919 B2	2/2018	Leimbach et al.	D819,680 S	6/2018	Nguyen
9,888,921 B2	2/2018	Williams et al.	D819,682 S	6/2018	Howard et al.
9,888,924 B2	2/2018	Ebersole et al.	D819,684 S	6/2018	Dart
9,889,230 B2	2/2018	Bennett et al.	D820,307 S	6/2018	Jian et al.
9,895,147 B2	2/2018	Shelton, IV	D820,867 S	6/2018	Dickens et al.
9,895,148 B2	2/2018	Shelton, IV et al.	9,987,000 B2	6/2018	Shelton, IV et al.
9,895,813 B2	2/2018	Blumenkranz et al.	9,987,003 B2	6/2018	Timm et al.
9,901,339 B2	2/2018	Farascioni	9,987,006 B2	6/2018	Morgan et al.
9,901,341 B2	2/2018	Kostrzewski	9,987,095 B2	6/2018	Chowaniec et al.
9,901,342 B2	2/2018	Shelton, IV et al.	9,987,099 B2	6/2018	Chen et al.
9,901,344 B2	2/2018	Moore et al.	9,993,248 B2	6/2018	Shelton, IV et al.
9,901,345 B2	2/2018	Moore et al.	9,993,258 B2	6/2018	Shelton, IV et al.
9,901,346 B2	2/2018	Moore et al.	9,999,408 B2	6/2018	Boudreaux et al.
9,901,406 B2	2/2018	State et al.	9,999,423 B2	6/2018	Schuckmann et al.
9,901,412 B2	2/2018	Lathrop et al.	9,999,426 B2	6/2018	Moore et al.
D813,899 S	3/2018	Erant et al.	9,999,431 B2	6/2018	Shelton, IV et al.
9,907,456 B2	3/2018	Miyoshi	9,999,472 B2	6/2018	Weir et al.
9,907,553 B2	3/2018	Cole et al.	10,004,497 B2	6/2018	Overmyer et al.
9,907,600 B2	3/2018	Stulen et al.	10,004,498 B2	6/2018	Morgan et al.
9,907,620 B2	3/2018	Shelton, IV et al.	10,004,500 B2	6/2018	Shelton, IV et al.
9,913,641 B2	3/2018	Takemoto et al.	10,004,501 B2	6/2018	Shelton, IV et al.
9,913,642 B2	3/2018	Leimbach et al.	10,004,505 B2	6/2018	Moore et al.
9,913,644 B2	3/2018	McCuen	10,004,506 B2	6/2018	Shelton, IV et al.
9,913,646 B2	3/2018	Shelton, IV	D822,206 S	7/2018	Shelton, IV et al.
9,913,647 B2	3/2018	Weisenburgh, II et al.	10,010,322 B2	7/2018	Shelton, IV et al.
9,913,648 B2	3/2018	Shelton, IV et al.	10,010,324 B2	7/2018	Huitema et al.
9,913,694 B2	3/2018	Brisson	10,013,049 B2	7/2018	Leimbach et al.
9,913,733 B2	3/2018	Piron et al.	10,016,199 B2	7/2018	Baber et al.
9,918,704 B2	3/2018	Shelton, IV et al.	10,016,656 B2	7/2018	Devor et al.
9,918,714 B2	3/2018	Gibbons, Jr.	10,022,125 B2	7/2018	(Prommersberger) Stopek et al.
9,918,715 B2	3/2018	Menn	10,024,407 B2	7/2018	Aranyi et al.
9,918,716 B2	3/2018	Baxter, III et al.	10,028,742 B2	7/2018	Shelton, IV et al.
9,918,717 B2	3/2018	Czernik	10,028,743 B2	7/2018	Shelton, IV et al.
9,918,730 B2	3/2018	Trees et al.	10,028,744 B2	7/2018	Shelton, IV et al.
9,924,941 B2	3/2018	Burbank	10,028,761 B2	7/2018	Leimbach et al.
9,924,942 B2	3/2018	Swayze et al.	10,029,125 B2	7/2018	Shapiro et al.
9,924,944 B2	3/2018	Shelton, IV et al.	10,034,344 B2	7/2018	Yoshida
9,924,945 B2	3/2018	Zheng et al.	10,034,668 B2	7/2018	Ebner
9,924,946 B2	3/2018	Vendely et al.	D826,405 S	8/2018	Shelton, IV et al.
9,924,947 B2	3/2018	Shelton, IV et al.	10,039,440 B2	8/2018	Fenech et al.
9,924,961 B2	3/2018	Shelton, IV et al.	10,039,529 B2	8/2018	Kerr et al.
9,931,106 B2	4/2018	Au et al.	10,039,532 B2	8/2018	Srinivas et al.
9,931,116 B2	4/2018	Racenet et al.	10,039,545 B2	8/2018	Sadowski et al.
9,931,118 B2	4/2018	Shelton, IV et al.	10,041,822 B2	8/2018	Zemlok
9,931,120 B2	4/2018	Chen et al.	10,045,769 B2	8/2018	Aronhalt et al.
9,936,949 B2	4/2018	Measamer et al.	10,045,776 B2	8/2018	Shelton, IV et al.
9,936,950 B2	4/2018	Shelton, IV et al.	10,045,778 B2	8/2018	Yates et al.
9,936,951 B2	4/2018	Hufnagel et al.	10,045,779 B2	8/2018	Savage et al.
9,936,954 B2	4/2018	Shelton, IV et al.	10,045,781 B2	8/2018	Cropper et al.
9,937,626 B2	4/2018	Rockrohr	10,045,782 B2	8/2018	Murthy Aravalli
9,943,309 B2	4/2018	Shelton, IV et al.	10,052,044 B2	8/2018	Shelton, IV et al.
9,943,310 B2	4/2018	Harris et al.	10,052,099 B2	8/2018	Morgan et al.
9,943,312 B2	4/2018	Posada et al.	10,052,100 B2	8/2018	Morgan et al.
D819,072 S	5/2018	Clediere	10,052,102 B2	8/2018	Baxter, III et al.
9,955,954 B2	5/2018	Destoumieux et al.	10,052,104 B2	8/2018	Shelton, IV et al.
9,955,965 B2	5/2018	Chen et al.	10,052,164 B2	8/2018	Overmyer
9,955,966 B2	5/2018	Zergiebel	10,058,317 B2	8/2018	Fan et al.
9,962,129 B2	5/2018	Jerebko et al.	10,058,327 B2	8/2018	Weisenburgh, II et al.
9,962,157 B2	5/2018	Sapre	10,058,373 B2	8/2018	Takashino et al.
9,962,158 B2	5/2018	Hall et al.	10,058,395 B2	8/2018	Devengenzo et al.
9,962,159 B2	5/2018	Heinrich et al.	10,058,963 B2	8/2018	Shelton, IV et al.
9,962,161 B2	5/2018	Scheib et al.	10,064,620 B2	9/2018	Gettinger et al.
9,968,354 B2	5/2018	Shelton, IV et al.	10,064,621 B2	9/2018	Kerr et al.
9,968,355 B2	5/2018	Shelton, IV et al.	10,064,624 B2	9/2018	Shelton, IV et al.
9,968,356 B2	5/2018	Shelton, IV et al.	10,064,639 B2	9/2018	Ishida et al.
9,968,397 B2	5/2018	Taylor et al.	10,064,649 B2	9/2018	Golebieski et al.
9,974,529 B2	5/2018	Shelton, IV et al.	10,064,688 B2	9/2018	Shelton, IV et al.
9,974,538 B2	5/2018	Baxter, III et al.	10,070,861 B2	9/2018	Spivey et al.
9,974,539 B2	5/2018	Yates et al.	10,070,863 B2	9/2018	Swayze et al.
9,974,541 B2	5/2018	Calderoni	10,071,452 B2	9/2018	Shelton, IV et al.
9,974,542 B2	5/2018	Hodgkinson	10,076,325 B2	9/2018	Huang et al.
9,980,713 B2	5/2018	Aronhalt et al.	10,076,326 B2	9/2018	Yates et al.
9,980,724 B2	5/2018	Farascioni et al.	10,076,340 B2	9/2018	Belagali et al.
9,980,729 B2	5/2018	Moore et al.	D831,209 S	10/2018	Huitema et al.
9,980,769 B2	5/2018	Trees et al.	D831,676 S	10/2018	Park et al.
			D832,301 S	10/2018	Smith
			10,085,624 B2	10/2018	Isoda et al.
			10,085,643 B2	10/2018	Bandic et al.
			10,085,728 B2	10/2018	Jogasaki et al.



(56)

## References Cited

## U.S. PATENT DOCUMENTS

10,085,746 B2	10/2018	Fischvogt	10,182,813 B2	1/2019	Leimbach et al.
10,085,748 B2	10/2018	Morgan et al.	10,182,815 B2	1/2019	Williams et al.
10,085,749 B2	10/2018	Cappola et al.	10,182,816 B2	1/2019	Shelton, IV et al.
10,085,750 B2	10/2018	Zergiebel et al.	10,182,818 B2	1/2019	Hensel et al.
10,085,751 B2	10/2018	Overmyer et al.	10,182,819 B2	1/2019	Shelton, IV
10,085,754 B2	10/2018	Sniffin et al.	10,188,385 B2	1/2019	Kerr et al.
10,085,806 B2	10/2018	Hagn et al.	10,188,393 B2	1/2019	Smith et al.
10,092,290 B2	10/2018	Yigit et al.	10,188,394 B2	1/2019	Shelton, IV et al.
10,092,292 B2	10/2018	Boudreaux et al.	D839,900 S	2/2019	Gan
10,098,635 B2	10/2018	Burbank	D841,667 S	2/2019	Coren
10,098,636 B2	10/2018	Shelton, IV et al.	10,194,801 B2	2/2019	Elhawary et al.
10,098,640 B2	10/2018	Bertolero et al.	10,194,904 B2	2/2019	Viola et al.
10,098,642 B2	10/2018	Baxter, III et al.	10,194,907 B2	2/2019	Marczyk et al.
10,099,303 B2	10/2018	Yoshida et al.	10,194,910 B2	2/2019	Shelton, IV et al.
10,101,861 B2	10/2018	Kiyoto	10,194,913 B2	2/2019	Nalagatla et al.
10,105,128 B2	10/2018	Cooper et al.	10,194,976 B2	2/2019	Boudreaux
10,105,136 B2	10/2018	Yates et al.	10,194,992 B2	2/2019	Robinson
10,105,139 B2	10/2018	Yates et al.	10,201,348 B2	2/2019	Scheib et al.
10,105,140 B2	10/2018	Malinouskas et al.	10,201,349 B2	2/2019	Leimbach et al.
10,105,142 B2	10/2018	Baxter, III et al.	10,201,363 B2	2/2019	Shelton, IV
10,106,932 B2	10/2018	Anderson et al.	10,201,364 B2	2/2019	Leimbach et al.
10,111,657 B2	10/2018	McCuen	10,201,365 B2	2/2019	Boudreaux et al.
10,111,679 B2	10/2018	Baber et al.	10,201,381 B2	2/2019	Zergiebel et al.
10,111,698 B2	10/2018	Scheib et al.	10,206,605 B2	2/2019	Shelton, IV et al.
10,111,702 B2	10/2018	Kostrzewski	10,206,676 B2	2/2019	Shelton, IV
10,117,649 B2	11/2018	Baxter, III et al.	10,206,677 B2	2/2019	Harris et al.
10,117,650 B2	11/2018	Nicholas et al.	10,206,678 B2	2/2019	Shelton, IV et al.
10,117,652 B2	11/2018	Schmid et al.	10,206,748 B2	2/2019	Burbank
10,117,653 B2	11/2018	Leimbach et al.	10,210,244 B1	2/2019	Branavan et al.
10,117,654 B2	11/2018	Ingmanson et al.	10,211,586 B2	2/2019	Adams et al.
10,123,798 B2	11/2018	Baxter, III et al.	10,213,198 B2	2/2019	Aronhalt et al.
10,124,493 B2	11/2018	Rothfuss et al.	10,213,201 B2	2/2019	Shelton, IV et al.
10,130,352 B2	11/2018	Widenhouse et al.	10,213,202 B2	2/2019	Flanagan et al.
10,130,359 B2	11/2018	Hess et al.	10,213,203 B2	2/2019	Swayze et al.
10,130,361 B2	11/2018	Yates et al.	10,213,262 B2	2/2019	Shelton, IV et al.
10,130,363 B2	11/2018	Huitema et al.	D842,328 S	3/2019	Jian et al.
10,130,366 B2	11/2018	Shelton, IV et al.	10,219,811 B2	3/2019	Haider et al.
10,130,367 B2	11/2018	Cappola et al.	10,219,832 B2	3/2019	Bagwell et al.
10,130,738 B2	11/2018	Shelton, IV et al.	10,220,522 B2	3/2019	Rockrohr
10,130,830 B2	11/2018	Miret Carceller et al.	10,226,239 B2	3/2019	Nicholas et al.
10,133,248 B2	11/2018	Fitzsimmons et al.	10,226,249 B2	3/2019	Jaworek et al.
10,135,242 B2	11/2018	Baber et al.	10,226,250 B2	3/2019	Beckman et al.
10,136,879 B2	11/2018	Ross et al.	10,226,251 B2	3/2019	Scheib et al.
10,136,887 B2	11/2018	Shelton, IV et al.	10,226,274 B2	3/2019	Worrell et al.
10,136,889 B2	11/2018	Shelton, IV et al.	10,231,634 B2	3/2019	Zand et al.
10,136,890 B2	11/2018	Shelton, IV et al.	10,231,653 B2	3/2019	Bohm et al.
10,136,891 B2	11/2018	Shelton, IV et al.	10,231,734 B2	3/2019	Thompson et al.
D835,659 S	12/2018	Anzures et al.	10,231,794 B2	3/2019	Shelton, IV et al.
D836,124 S	12/2018	Fan	10,238,385 B2	3/2019	Yates et al.
10,143,474 B2	12/2018	Bucciaglia et al.	10,238,386 B2	3/2019	Overmyer et al.
10,149,679 B2	12/2018	Shelton, IV et al.	10,238,387 B2	3/2019	Yates et al.
10,149,680 B2	12/2018	Parihar et al.	10,238,389 B2	3/2019	Yates et al.
10,149,682 B2	12/2018	Shelton, IV et al.	10,238,390 B2	3/2019	Harris et al.
10,149,683 B2	12/2018	Smith et al.	10,238,391 B2	3/2019	Leimbach et al.
10,149,712 B2	12/2018	Manwaring et al.	D844,666 S	4/2019	Espeleta et al.
10,154,841 B2	12/2018	Weaner et al.	D844,667 S	4/2019	Espeleta et al.
10,159,481 B2	12/2018	Whitman et al.	D845,342 S	4/2019	Espeleta et al.
10,159,482 B2	12/2018	Swayze et al.	D847,199 S	4/2019	Whitmore
10,159,483 B2	12/2018	Beckman et al.	10,245,027 B2	4/2019	Shelton, IV et al.
10,159,506 B2	12/2018	Boudreaux et al.	10,245,028 B2	4/2019	Shelton, IV et al.
10,163,589 B2	12/2018	Zergiebel et al.	10,245,029 B2	4/2019	Hunter et al.
D837,244 S	1/2019	Kuo et al.	10,245,030 B2	4/2019	Hunter et al.
D837,245 S	1/2019	Kuo et al.	10,245,032 B2	4/2019	Shelton, IV
10,166,025 B2	1/2019	Leimbach et al.	10,245,033 B2	4/2019	Overmyer et al.
10,166,026 B2	1/2019	Shelton, IV et al.	10,245,034 B2	4/2019	Shelton, IV et al.
10,172,611 B2	1/2019	Shelton, IV et al.	10,245,035 B2	4/2019	Swayze et al.
10,172,615 B2	1/2019	Marczyk et al.	10,245,038 B2	4/2019	Hopkins et al.
10,172,616 B2	1/2019	Murray et al.	10,245,058 B2	4/2019	Omori et al.
10,172,617 B2	1/2019	Shelton, IV et al.	10,251,648 B2	4/2019	Harris et al.
10,172,619 B2	1/2019	Harris et al.	10,251,649 B2	4/2019	Schellin et al.
10,172,620 B2	1/2019	Harris et al.	10,251,725 B2	4/2019	Valentine et al.
10,172,636 B2	1/2019	Stulen et al.	10,258,322 B2	4/2019	Fanton et al.
10,175,127 B2	1/2019	Collins et al.	10,258,330 B2	4/2019	Shelton, IV et al.
10,178,992 B2	1/2019	Wise et al.	10,258,331 B2	4/2019	Shelton, IV et al.
10,180,463 B2	1/2019	Beckman et al.	10,258,332 B2	4/2019	Schmid et al.
			10,258,333 B2	4/2019	Shelton, IV et al.
			10,258,336 B2	4/2019	Baxter, III et al.
			10,258,418 B2	4/2019	Shelton, IV et al.
			10,264,797 B2	4/2019	Zhang et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

10,265,065 B2	4/2019	Shelton, IV et al.	10,337,148 B2	7/2019	Rouse et al.
10,265,067 B2	4/2019	Yates et al.	10,342,533 B2	7/2019	Shelton, IV et al.
10,265,068 B2	4/2019	Harris et al.	10,342,535 B2	7/2019	Scheib et al.
10,265,072 B2	4/2019	Shelton, IV et al.	10,342,541 B2	7/2019	Shelton, IV et al.
10,265,073 B2	4/2019	Scheib et al.	10,342,543 B2	7/2019	Shelton, IV et al.
10,265,074 B2	4/2019	Shelton, IV et al.	10,342,623 B2	7/2019	Huelman et al.
10,265,090 B2	4/2019	Ingmanson et al.	10,349,939 B2	7/2019	Shelton, IV et al.
10,271,844 B2	4/2019	Valentine et al.	10,349,941 B2	7/2019	Marczyk et al.
10,271,845 B2	4/2019	Shelton, IV	10,349,963 B2	7/2019	Fiksen et al.
10,271,846 B2	4/2019	Shelton, IV et al.	10,350,016 B2	7/2019	Burbank et al.
10,271,847 B2	4/2019	Racenet et al.	10,357,246 B2	7/2019	Shelton, IV et al.
10,271,849 B2	4/2019	Vendely et al.	10,357,247 B2	7/2019	Shelton, IV et al.
10,271,851 B2	4/2019	Shelton, IV et al.	10,357,248 B2	7/2019	Dalessandro et al.
D847,989 S	5/2019	Shelton, IV et al.	10,357,252 B2	7/2019	Harris et al.
D848,473 S	5/2019	Zhu et al.	10,363,031 B2	7/2019	Alexander, III et al.
D849,046 S	5/2019	Kuo et al.	10,363,033 B2	7/2019	Timm et al.
10,278,696 B2	5/2019	Gurumurthy et al.	10,363,036 B2	7/2019	Yates et al.
10,278,697 B2	5/2019	Shelton, IV et al.	10,363,037 B2	7/2019	Aronhalt et al.
10,278,702 B2	5/2019	Shelton, IV et al.	D855,634 S	8/2019	Kim
10,278,703 B2	5/2019	Nativ et al.	D856,359 S	8/2019	Huang et al.
10,278,707 B2	5/2019	Thompson et al.	10,368,838 B2	8/2019	Williams et al.
10,278,722 B2	5/2019	Shelton, IV et al.	10,368,861 B2	8/2019	Baxter, III et al.
10,278,780 B2	5/2019	Shelton, IV	10,368,863 B2	8/2019	Timm et al.
10,285,694 B2	5/2019	Viola et al.	10,368,864 B2	8/2019	Harris et al.
10,285,695 B2	5/2019	Jaworek et al.	10,368,865 B2	8/2019	Harris et al.
10,285,699 B2	5/2019	Vendely et al.	10,368,867 B2	8/2019	Harris et al.
10,285,705 B2	5/2019	Shelton, IV et al.	10,368,892 B2	8/2019	Stulen et al.
10,292,701 B2	5/2019	Scheib et al.	10,376,263 B2	8/2019	Morgan et al.
10,292,704 B2	5/2019	Harris et al.	10,383,626 B2	8/2019	Soltz
10,292,707 B2	5/2019	Shelton, IV et al.	10,383,628 B2	8/2019	Kang et al.
10,293,100 B2	5/2019	Shelton, IV et al.	10,383,629 B2	8/2019	Ross et al.
10,293,553 B2	5/2019	Racenet et al.	10,383,630 B2	8/2019	Shelton, IV et al.
10,299,787 B2	5/2019	Shelton, IV	10,383,633 B2	8/2019	Shelton, IV et al.
10,299,788 B2	5/2019	Heinrich et al.	10,383,634 B2	8/2019	Shelton, IV et al.
10,299,789 B2	5/2019	Marczyk et al.	10,390,823 B2	8/2019	Shelton, IV et al.
10,299,792 B2	5/2019	Huitema et al.	10,390,825 B2	8/2019	Shelton, IV et al.
10,299,817 B2	5/2019	Shelton, IV et al.	10,390,828 B2	8/2019	Vendely et al.
10,299,818 B2	5/2019	Riva	10,390,829 B2	8/2019	Eckert et al.
10,299,878 B2	5/2019	Shelton, IV et al.	10,390,830 B2	8/2019	Schulz
D850,617 S	6/2019	Shelton, IV et al.	10,390,841 B2	8/2019	Shelton, IV et al.
D851,676 S	6/2019	Foss et al.	10,390,897 B2	8/2019	Kostrzewski
D851,762 S	6/2019	Shelton, IV et al.	D860,219 S	9/2019	Rasmussen et al.
10,307,159 B2	6/2019	Harris et al.	D861,035 S *	9/2019	Park ..... D14/491
10,307,160 B2	6/2019	Vendely et al.	10,398,433 B2	9/2019	Boudreaux et al.
10,307,161 B2	6/2019	Jankowski	10,398,434 B2	9/2019	Shelton, IV et al.
10,307,163 B2	6/2019	Moore et al.	10,398,436 B2	9/2019	Shelton, IV et al.
10,307,170 B2	6/2019	Parfett et al.	10,405,854 B2	9/2019	Schmid et al.
10,307,202 B2	6/2019	Smith et al.	10,405,857 B2	9/2019	Shelton, IV et al.
10,314,559 B2	6/2019	Razzaque et al.	10,405,859 B2	9/2019	Harris et al.
10,314,577 B2	6/2019	Laurent et al.	10,405,863 B2	9/2019	Wise et al.
10,314,582 B2	6/2019	Shelton, IV et al.	10,405,914 B2	9/2019	Manwaring et al.
10,314,587 B2	6/2019	Harris et al.	10,405,932 B2	9/2019	Overmyer
10,314,588 B2	6/2019	Turner et al.	10,413,291 B2	9/2019	Worthington et al.
10,314,589 B2	6/2019	Shelton, IV et al.	10,413,293 B2	9/2019	Shelton, IV et al.
10,314,590 B2	6/2019	Shelton, IV et al.	10,413,294 B2	9/2019	Shelton, IV et al.
10,315,566 B2	6/2019	Choi et al.	10,413,297 B2	9/2019	Harris et al.
10,321,907 B2	6/2019	Shelton, IV et al.	10,413,370 B2	9/2019	Yates et al.
10,321,909 B2	6/2019	Shelton, IV et al.	10,413,373 B2	9/2019	Yates et al.
10,321,927 B2	6/2019	Hinman	10,420,548 B2	9/2019	Whitman et al.
10,327,743 B2	6/2019	St. Goar et al.	10,420,549 B2	9/2019	Yates et al.
10,327,764 B2	6/2019	Harris et al.	10,420,550 B2	9/2019	Shelton, IV
10,327,765 B2	6/2019	Timm et al.	10,420,552 B2	9/2019	Shelton, IV et al.
10,327,767 B2	6/2019	Shelton, IV et al.	10,420,553 B2	9/2019	Shelton, IV et al.
10,327,769 B2	6/2019	Overmyer et al.	10,420,555 B2	9/2019	Shelton, IV et al.
10,327,776 B2	6/2019	Harris et al.	10,420,558 B2	9/2019	Nalagatla et al.
10,327,777 B2	6/2019	Harris et al.	10,420,559 B2	9/2019	Marczyk et al.
D854,032 S	7/2019	Jones et al.	10,420,560 B2	9/2019	Shelton, IV et al.
D854,151 S	7/2019	Shelton, IV et al.	10,420,561 B2	9/2019	Shelton, IV et al.
10,335,144 B2	7/2019	Shelton, IV et al.	10,420,577 B2	9/2019	Chowaniec et al.
10,335,145 B2	7/2019	Harris et al.	D861,707 S	10/2019	Yang
10,335,147 B2	7/2019	Rector et al.	D862,518 S *	10/2019	Niven ..... D14/492
10,335,148 B2	7/2019	Shelton, IV et al.	D863,343 S	10/2019	Mazlish et al.
10,335,149 B2	7/2019	Baxter, III et al.	D864,388 S	10/2019	Barber
10,335,150 B2	7/2019	Shelton, IV	10,426,463 B2	10/2019	Shelton, IV et al.
10,335,151 B2	7/2019	Shelton, IV et al.	10,426,466 B2	10/2019	Contini et al.
			10,426,467 B2	10/2019	Miller et al.
			10,426,468 B2	10/2019	Contini et al.
			10,426,469 B2	10/2019	Shelton, IV et al.
			10,426,471 B2	10/2019	Shelton, IV et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

10,426,476 B2	10/2019	Harris et al.	10,517,595 B2	12/2019	Hunter et al.
10,426,477 B2	10/2019	Harris et al.	10,517,596 B2	12/2019	Hunter et al.
10,426,478 B2	10/2019	Shelton, IV et al.	10,517,599 B2	12/2019	Baxter, III et al.
10,426,481 B2	10/2019	Aronhalt et al.	10,517,682 B2	12/2019	Giordano et al.
10,433,837 B2	10/2019	Worthington et al.	10,524,784 B2	1/2020	Kostrzewski
10,433,839 B2	10/2019	Scheib et al.	10,524,787 B2	1/2020	Shelton, IV et al.
10,433,840 B2	10/2019	Shelton, IV et al.	10,524,788 B2	1/2020	Vendely et al.
10,433,844 B2	10/2019	Shelton, IV et al.	10,524,789 B2	1/2020	Swayze et al.
10,433,845 B2	10/2019	Baxter, III et al.	10,524,790 B2	1/2020	Shelton, IV et al.
10,433,846 B2	10/2019	Vendely et al.	10,524,795 B2	1/2020	Nalagatla et al.
10,433,849 B2	10/2019	Shelton, IV et al.	10,531,874 B2	1/2020	Morgan et al.
10,433,918 B2	10/2019	Shelton, IV et al.	10,531,887 B2	1/2020	Shelton, IV et al.
10,441,279 B2	10/2019	Shelton, IV et al.	10,537,324 B2	1/2020	Shelton, IV et al.
10,441,280 B2	10/2019	Timm et al.	10,537,325 B2	1/2020	Bakos et al.
10,441,281 B2	10/2019	Shelton, IV et al.	10,542,908 B2	1/2020	Mei et al.
10,441,285 B2	10/2019	Shelton, IV et al.	10,542,974 B2	1/2020	Yates et al.
10,441,286 B2	10/2019	Shelton, IV et al.	10,542,978 B2	1/2020	Chowaniec et al.
10,441,345 B2	10/2019	Aldridge et al.	10,542,979 B2	1/2020	Shelton, IV et al.
10,441,369 B2	10/2019	Shelton, IV et al.	10,542,982 B2	1/2020	Beckman et al.
10,448,948 B2	10/2019	Shelton, IV et al.	10,542,985 B2	1/2020	Zhan et al.
10,448,950 B2	10/2019	Shelton, IV et al.	10,542,988 B2	1/2020	Schellin et al.
10,448,952 B2	10/2019	Shelton, IV et al.	10,542,991 B2	1/2020	Shelton, IV et al.
10,456,122 B2	10/2019	Koltz et al.	10,548,504 B2	2/2020	Shelton, IV et al.
10,456,132 B2	10/2019	Gettinger et al.	10,548,600 B2	2/2020	Shelton, IV et al.
10,456,133 B2	10/2019	Yates et al.	10,548,673 B2	2/2020	Harris et al.
10,456,137 B2	10/2019	Vendely et al.	10,561,418 B2	2/2020	Richard et al.
10,456,140 B2	10/2019	Shelton, IV et al.	10,561,420 B2	2/2020	Harris et al.
D865,796 S	11/2019	Xu et al.	10,561,422 B2	2/2020	Schellin et al.
10,463,367 B2	11/2019	Kostrzewski et al.	10,561,432 B2	2/2020	Estrella et al.
10,463,369 B2	11/2019	Shelton, IV et al.	10,561,474 B2	2/2020	Adams et al.
10,463,370 B2	11/2019	Yates et al.	10,562,160 B2	2/2020	Iwata et al.
10,463,372 B2	11/2019	Shelton, IV et al.	10,568,621 B2	2/2020	Shelton, IV et al.
10,463,373 B2	11/2019	Mozdzierz et al.	10,568,624 B2	2/2020	Shelton, IV et al.
10,463,382 B2	11/2019	Ingmanson et al.	10,568,625 B2	2/2020	Harris et al.
10,463,383 B2	11/2019	Shelton, IV et al.	10,568,626 B2	2/2020	Shelton, IV et al.
10,463,384 B2	11/2019	Shelton, IV et al.	10,568,629 B2	2/2020	Shelton, IV et al.
10,470,762 B2	11/2019	Leimbach et al.	10,568,632 B2	2/2020	Miller et al.
10,470,763 B2	11/2019	Yates et al.	10,568,652 B2	2/2020	Hess et al.
10,470,764 B2	11/2019	Baxter, III et al.	10,569,071 B2	2/2020	Harris et al.
10,470,767 B2	11/2019	Gleiman et al.	D879,808 S	3/2020	Harris et al.
10,470,768 B2	11/2019	Harris et al.	D879,809 S	3/2020	Harris et al.
10,470,769 B2	11/2019	Shelton, IV et al.	10,575,868 B2	3/2020	Hall et al.
10,471,576 B2	11/2019	Totsu	10,580,320 B2	3/2020	Kamiguchi et al.
10,471,607 B2	11/2019	Butt et al.	10,582,928 B2	3/2020	Hunter et al.
10,478,181 B2	11/2019	Shelton, IV et al.	10,588,623 B2	3/2020	Schmid et al.
10,478,182 B2	11/2019	Taylor	10,588,625 B2	3/2020	Weaner et al.
10,478,188 B2	11/2019	Harris et al.	10,588,626 B2	3/2020	Overmyer et al.
10,478,189 B2	11/2019	Bear et al.	10,588,629 B2	3/2020	Malinouskas et al.
10,478,190 B2	11/2019	Miller et al.	10,588,630 B2	3/2020	Shelton, IV et al.
10,478,207 B2	11/2019	Lathrop	10,588,631 B2	3/2020	Shelton, IV et al.
10,485,536 B2	11/2019	Ming et al.	10,588,632 B2	3/2020	Shelton, IV et al.
10,485,537 B2	11/2019	Yates et al.	10,588,633 B2	3/2020	Shelton, IV et al.
10,485,539 B2	11/2019	Shelton, IV et al.	10,595,835 B2	3/2020	Kerr et al.
10,485,541 B2	11/2019	Shelton, IV et al.	10,595,862 B2	3/2020	Shelton, IV et al.
10,485,542 B2	11/2019	Shelton, IV et al.	10,595,882 B2	3/2020	Parfett et al.
10,485,543 B2	11/2019	Shelton, IV et al.	10,595,929 B2	3/2020	Boudreaux et al.
10,485,546 B2	11/2019	Shelton, IV et al.	10,603,036 B2	3/2020	Hunter et al.
10,485,547 B2	11/2019	Shelton, IV et al.	10,603,039 B2	3/2020	Vendely et al.
D869,655 S	12/2019	Shelton, IV et al.	10,603,117 B2	3/2020	Schings et al.
D870,742 S	12/2019	Cornell	10,603,128 B2	3/2020	Zergiebel et al.
10,492,783 B2	12/2019	Shelton, IV et al.	10,610,224 B2	4/2020	Shelton, IV et al.
10,492,785 B2	12/2019	Overmyer et al.	10,610,313 B2	4/2020	Bailey et al.
10,492,787 B2	12/2019	Smith et al.	10,617,411 B2	4/2020	Williams
10,492,814 B2	12/2019	Snow et al.	10,617,412 B2	4/2020	Shelton, IV et al.
10,492,847 B2	12/2019	Godara et al.	10,617,413 B2	4/2020	Shelton, IV et al.
10,492,851 B2	12/2019	Hughett, Sr. et al.	10,617,414 B2	4/2020	Shelton, IV et al.
10,498,269 B2	12/2019	Zemlok et al.	10,617,416 B2	4/2020	Leimbach et al.
10,499,890 B2	12/2019	Shelton, IV et al.	10,617,417 B2	4/2020	Baxter, III et al.
10,499,914 B2	12/2019	Huang et al.	10,617,418 B2	4/2020	Barton et al.
10,499,918 B2	12/2019	Schellin et al.	10,617,420 B2	4/2020	Shelton, IV et al.
10,500,309 B2	12/2019	Shah et al.	10,624,616 B2	4/2020	Mukherjee et al.
10,512,461 B2	12/2019	Gupta et al.	10,624,630 B2	4/2020	Deville et al.
10,517,590 B2	12/2019	Giordano et al.	10,624,633 B2	4/2020	Shelton, IV et al.
10,517,592 B2	12/2019	Shelton, IV et al.	10,624,634 B2	4/2020	Shelton, IV et al.
10,517,594 B2	12/2019	Shelton, IV et al.	10,624,635 B2	4/2020	Harris et al.
			10,624,861 B2	4/2020	Widenhouse et al.
			10,631,857 B2	4/2020	Kostrzewski
			10,631,859 B2	4/2020	Shelton, IV et al.
			10,636,104 B2	4/2020	Mazar et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

10,639,018	B2	5/2020	Shelton, IV et al.	2003/0181900	A1	9/2003	Long
10,639,034	B2	5/2020	Harris et al.	2003/0190584	A1	10/2003	Heasley
10,639,035	B2	5/2020	Shelton, IV et al.	2003/0195387	A1	10/2003	Kortenbach et al.
10,639,036	B2	5/2020	Yates et al.	2003/0205029	A1	11/2003	Chapolini et al.
10,639,037	B2	5/2020	Shelton, IV et al.	2003/0212005	A1	11/2003	Petito et al.
10,639,089	B2	5/2020	Manwaring et al.	2003/0216732	A1	11/2003	Truckai et al.
10,639,115	B2	5/2020	Shelton, IV et al.	2003/0236505	A1	12/2003	Bonadio et al.
10,646,220	B2	5/2020	Shelton, IV et al.	2004/0006335	A1	1/2004	Garrison
10,653,413	B2	5/2020	Worthington et al.	2004/0006340	A1	1/2004	Latterell et al.
10,653,417	B2	5/2020	Shelton, IV et al.	2004/0007608	A1	1/2004	Ehrenfels et al.
10,653,435	B2	5/2020	Shelton, IV et al.	2004/0024457	A1	2/2004	Boyce et al.
10,660,640	B2	5/2020	Yates et al.	2004/0028502	A1	2/2004	Cummins
10,667,808	B2	6/2020	Baxter, III et al.	2004/0030333	A1	2/2004	Goble
10,667,809	B2	6/2020	Bakos et al.	2004/0034357	A1	2/2004	Beane et al.
10,667,810	B2	6/2020	Shelton, IV et al.	2004/0044295	A1	3/2004	Reinert et al.
10,667,811	B2	6/2020	Harris et al.	2004/0044364	A1	3/2004	DeVries et al.
10,675,021	B2	6/2020	Harris et al.	2004/0049121	A1	3/2004	Yaron
10,675,024	B2	6/2020	Shelton, IV et al.	2004/0049172	A1	3/2004	Root et al.
10,675,025	B2	6/2020	Swayze et al.	2004/0059362	A1	3/2004	Knodel et al.
10,675,026	B2	6/2020	Harris et al.	2004/0068161	A1	4/2004	Couvillon
10,675,028	B2	6/2020	Shelton, IV et al.	2004/0068224	A1	4/2004	Couvillon et al.
10,675,035	B2	6/2020	Zingman	2004/0068307	A1	4/2004	Goble
10,677,035	B2	6/2020	Balan et al.	2004/0070369	A1	4/2004	Sakakibara
10,682,134	B2	6/2020	Shelton, IV et al.	2004/0073222	A1	4/2004	Koseki
10,682,136	B2	6/2020	Harris et al.	2004/0078037	A1	4/2004	Batchelor et al.
10,682,138	B2	6/2020	Shelton, IV et al.	2004/0082952	A1	4/2004	Dycus et al.
10,682,141	B2	6/2020	Moore et al.	2004/0085180	A1	5/2004	Juang
10,682,142	B2	6/2020	Shelton, IV et al.	2004/0092992	A1	5/2004	Adams et al.
2001/0000531	A1	4/2001	Casscells et al.	2004/0093024	A1	5/2004	Lousararian et al.
2001/0025183	A1	9/2001	Shahidi	2004/0098040	A1	5/2004	Taniguchi et al.
2001/0025184	A1	9/2001	Messerly	2004/0101822	A1	5/2004	Wiesner et al.
2001/0034530	A1	10/2001	Malackowski et al.	2004/0102783	A1	5/2004	Sutterlin et al.
2002/0014510	A1	2/2002	Richter et al.	2004/0108357	A1	6/2004	Milliman et al.
2002/0022810	A1	2/2002	Urich	2004/0110439	A1	6/2004	Chaikof et al.
2002/0022836	A1	2/2002	Goble et al.	2004/0115022	A1	6/2004	Albertson et al.
2002/0022861	A1	2/2002	Jacobs et al.	2004/0116952	A1	6/2004	Sakurai et al.
2002/0029032	A1	3/2002	Arkin	2004/0119185	A1	6/2004	Chen
2002/0029036	A1	3/2002	Goble et al.	2004/0122419	A1	6/2004	Neuberger
2002/0042620	A1	4/2002	Julian et al.	2004/0122423	A1	6/2004	Dycus et al.
2002/0087048	A1	7/2002	Brock et al.	2004/0133095	A1	7/2004	Dunki-Jacobs et al.
2002/0091374	A1	7/2002	Cooper	2004/0133189	A1	7/2004	Sakurai
2002/0095175	A1	7/2002	Brock et al.	2004/0143297	A1	7/2004	Ramsey
2002/0103494	A1	8/2002	Pacey	2004/0147909	A1	7/2004	Johnston et al.
2002/0116063	A1	8/2002	Giannetti et al.	2004/0153100	A1	8/2004	Ahlberg et al.
2002/0117534	A1	8/2002	Green et al.	2004/0158261	A1	8/2004	Vu
2002/0127265	A1	9/2002	Bowman et al.	2004/0164123	A1	8/2004	Racenet et al.
2002/0128633	A1	9/2002	Brock et al.	2004/0166169	A1	8/2004	Malaviya et al.
2002/0134811	A1	9/2002	Napier et al.	2004/0167572	A1	8/2004	Roth et al.
2002/0135474	A1	9/2002	Sylliassen	2004/0181219	A1	9/2004	Goble et al.
2002/0143340	A1	10/2002	Kaneko	2004/0193189	A1	9/2004	Kortenbach et al.
2002/0151770	A1	10/2002	Noll et al.	2004/0197367	A1	10/2004	Rezania et al.
2002/0158593	A1	10/2002	Henderson et al.	2004/0199181	A1	10/2004	Knodel et al.
2002/0185514	A1	12/2002	Adams et al.	2004/0204735	A1	10/2004	Shiroff et al.
2002/0188170	A1	12/2002	Santamore et al.	2004/0218451	A1	11/2004	Said et al.
2002/0188287	A1	12/2002	Zvuloni et al.	2004/0222268	A1	11/2004	Bilotti et al.
2003/0009193	A1	1/2003	Corsaro	2004/0225186	A1	11/2004	Horne et al.
2003/0011245	A1	1/2003	Fiebig	2004/0232201	A1	11/2004	Wenchell et al.
2003/0012805	A1	1/2003	Chen et al.	2004/0236352	A1	11/2004	Wang et al.
2003/0040670	A1	2/2003	Govari	2004/0243147	A1	12/2004	Lipow
2003/0045835	A1	3/2003	Anderson et al.	2004/0243151	A1	12/2004	Demmy et al.
2003/0066858	A1	4/2003	Holgersson	2004/0243163	A1	12/2004	Casiano et al.
2003/0078647	A1	4/2003	Vallana et al.	2004/0247415	A1	12/2004	Mangone
2003/0083648	A1	5/2003	Wang et al.	2004/0249366	A1	12/2004	Kunz
2003/0084983	A1	5/2003	Rangachari et al.	2004/0254455	A1	12/2004	Iddan
2003/0093103	A1	5/2003	Malackowski et al.	2004/0254566	A1	12/2004	Plicchi et al.
2003/0094356	A1	5/2003	Waldron	2004/0254590	A1	12/2004	Hoffman et al.
2003/0096158	A1	5/2003	Takano et al.	2004/0260315	A1	12/2004	Dell et al.
2003/0114851	A1	6/2003	Truckai et al.	2004/0267310	A1	12/2004	Racenet et al.
2003/0121586	A1	7/2003	Mitra et al.	2005/0010158	A1	1/2005	Brugger et al.
2003/0139741	A1	7/2003	Goble et al.	2005/0010213	A1	1/2005	Stad et al.
2003/0149406	A1	8/2003	Martineau et al.	2005/0021078	A1	1/2005	Vleugels et al.
2003/0153908	A1	8/2003	Goble et al.	2005/0032511	A1	2/2005	Malone et al.
2003/0153968	A1	8/2003	Geis et al.	2005/0033352	A1	2/2005	Zepf et al.
2003/0163085	A1	8/2003	Tanner et al.	2005/0051163	A1	3/2005	Deem et al.
2003/0164172	A1	9/2003	Chumas et al.	2005/0054946	A1	3/2005	Krzyzanowski
				2005/0057225	A1	3/2005	Marquet
				2005/0058890	A1	3/2005	Brazell et al.
				2005/0059997	A1	3/2005	Bauman et al.
				2005/0070929	A1	3/2005	Dalessandro et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2005/0075561	A1	4/2005	Golden	2006/0100649	A1	5/2006	Hart
2005/0080342	A1	4/2005	Gilreath et al.	2006/0106369	A1	5/2006	Desai et al.
2005/0085693	A1	4/2005	Belson et al.	2006/0111711	A1	5/2006	Goble
2005/0090817	A1	4/2005	Phan	2006/0111723	A1	5/2006	Chapolini et al.
2005/0096683	A1	5/2005	Ellins et al.	2006/0116634	A1	6/2006	Shachar
2005/0116673	A1	6/2005	Carl et al.	2006/0142772	A1	6/2006	Ralph et al.
2005/0124855	A1	6/2005	Jaffe et al.	2006/0144898	A1	7/2006	Bilotti et al.
2005/0125897	A1	6/2005	Wyslucha et al.	2006/0154546	A1	7/2006	Murphy et al.
2005/0129735	A1	6/2005	Cook et al.	2006/0161050	A1	7/2006	Butler et al.
2005/0130682	A1	6/2005	Takara et al.	2006/0161185	A1	7/2006	Saadat et al.
2005/0131173	A1	6/2005	McDaniel et al.	2006/0167471	A1	7/2006	Phillips
2005/0131211	A1	6/2005	Bayley et al.	2006/0173290	A1	8/2006	Lavallee et al.
2005/0131390	A1	6/2005	Heinrich et al.	2006/0173470	A1	8/2006	Oray et al.
2005/0131436	A1	6/2005	Johnston et al.	2006/0176031	A1	8/2006	Forman et al.
2005/0131457	A1	6/2005	Douglas et al.	2006/0178556	A1	8/2006	Hasser et al.
2005/0137454	A1	6/2005	Saadat et al.	2006/0180633	A1	8/2006	Emmons
2005/0137455	A1	6/2005	Ewers et al.	2006/0180634	A1	8/2006	Shelton et al.
2005/0139636	A1	6/2005	Schwemberger et al.	2006/0185682	A1	8/2006	Marczyk
2005/0143759	A1	6/2005	Kelly	2006/0199999	A1	9/2006	Ikeda et al.
2005/0143769	A1	6/2005	White et al.	2006/0201989	A1	9/2006	Ojeda
2005/0145671	A1	7/2005	Viola	2006/0206100	A1	9/2006	Eskridge et al.
2005/0150928	A1	7/2005	Kameyama et al.	2006/0217729	A1	9/2006	Eskridge et al.
2005/0154258	A1	7/2005	Tartaglia et al.	2006/0235368	A1	10/2006	Oz
2005/0154406	A1	7/2005	Bombard et al.	2006/0241666	A1	10/2006	Briggs et al.
2005/0159778	A1	7/2005	Heinrich et al.	2006/0244460	A1	11/2006	Weaver
2005/0165419	A1	7/2005	Sauer et al.	2006/0252990	A1	11/2006	Kubach
2005/0169974	A1	8/2005	Tenerz et al.	2006/0252993	A1	11/2006	Freed et al.
2005/0171522	A1	8/2005	Christopherson	2006/0258904	A1	11/2006	Stefanchik et al.
2005/0177176	A1	8/2005	Gerbi et al.	2006/0259073	A1	11/2006	Miyamoto et al.
2005/0177181	A1	8/2005	Kagan et al.	2006/0261763	A1	11/2006	Iott et al.
2005/0177249	A1	8/2005	Kladakis et al.	2006/0263444	A1	11/2006	Ming et al.
2005/0182298	A1	8/2005	Ikeda et al.	2006/0264831	A1	11/2006	Skwarek et al.
2005/0182443	A1	8/2005	Jonn et al.	2006/0264929	A1	11/2006	Goble et al.
2005/0184121	A1	8/2005	Heinrich	2006/0271042	A1	11/2006	Latterell et al.
2005/0186240	A1	8/2005	Ringeisen et al.	2006/0271102	A1	11/2006	Bosshard et al.
2005/0187545	A1	8/2005	Hooven et al.	2006/0271102	A1	11/2006	Bosshard et al.
2005/0203550	A1	9/2005	Laufer et al.	2006/0282064	A1	12/2006	Shimizu et al.
2005/0209614	A1	9/2005	Fenter et al.	2006/0284730	A1	12/2006	Schmid et al.
2005/0216055	A1	9/2005	Scirica et al.	2006/0287576	A1	12/2006	Tsuji et al.
2005/0222587	A1	10/2005	Jinno et al.	2006/0289602	A1	12/2006	Wales et al.
2005/0222611	A1	10/2005	Weitkamp	2006/0291981	A1	12/2006	Viola et al.
2005/0222616	A1	10/2005	Rethy et al.	2007/0009570	A1	1/2007	Kim et al.
2005/0222665	A1	10/2005	Aranyi	2007/0010702	A1	1/2007	Wang et al.
2005/0228224	A1	10/2005	Okada et al.	2007/0010838	A1	1/2007	Shelton et al.
2005/0228446	A1	10/2005	Mooradian et al.	2007/0016235	A1	1/2007	Tanaka et al.
2005/0230453	A1	10/2005	Viola	2007/0018958	A1	1/2007	Tavakoli et al.
2005/0240178	A1	10/2005	Morley et al.	2007/0026039	A1	2/2007	Drumheller et al.
2005/0245965	A1	11/2005	Orban, III et al.	2007/0026040	A1	2/2007	Crawley et al.
2005/0246881	A1	11/2005	Kelly et al.	2007/0027468	A1	2/2007	Wales et al.
2005/0251063	A1	11/2005	Basude	2007/0027551	A1	2/2007	Farnsworth et al.
2005/0256452	A1	11/2005	DeMarchi et al.	2007/0043387	A1	2/2007	Vargas et al.
2005/0261676	A1	11/2005	Hall et al.	2007/0049951	A1	3/2007	Menn
2005/0263563	A1	12/2005	Racenet et al.	2007/0049966	A1	3/2007	Bonadio et al.
2005/0267455	A1	12/2005	Eggers et al.	2007/0051375	A1	3/2007	Milliman
2005/0274034	A1	12/2005	Hayashida et al.	2007/0055228	A1	3/2007	Berg et al.
2005/0283188	A1	12/2005	Loshakove et al.	2007/0073341	A1	3/2007	Smith et al.
2005/0283226	A1	12/2005	Haverkost	2007/0073389	A1	3/2007	Bolduc et al.
2006/0008787	A1	1/2006	Hayman et al.	2007/0078328	A1	4/2007	Ozaki et al.
2006/0015009	A1	1/2006	Jaffe et al.	2007/0078484	A1	4/2007	Talarico et al.
2006/0020258	A1	1/2006	Strauss et al.	2007/0084897	A1	4/2007	Shelton et al.
2006/0020336	A1	1/2006	Liddicoat	2007/0088376	A1	4/2007	Zacharias
2006/0025812	A1	2/2006	Shelton	2007/0090788	A1	4/2007	Hansford et al.
2006/0041188	A1	2/2006	Dirusso et al.	2007/0093869	A1	4/2007	Bloom et al.
2006/0047275	A1	3/2006	Goble	2007/0102472	A1	5/2007	Shelton
2006/0049229	A1	3/2006	Milliman et al.	2007/0103437	A1	5/2007	Rosenberg
2006/0052824	A1	3/2006	Ransick et al.	2007/0106113	A1	5/2007	Ravo
2006/0052825	A1	3/2006	Ransick et al.	2007/0106317	A1	5/2007	Shelton et al.
2006/0064086	A1	3/2006	Odom	2007/0134251	A1	6/2007	Ashkenazi et al.
2006/0079735	A1	4/2006	Martone et al.	2007/0135686	A1	6/2007	Pruitt et al.
2006/0079879	A1	4/2006	Faller et al.	2007/0135803	A1	6/2007	Belson
2006/0086032	A1	4/2006	Valencic et al.	2007/0152612	A1	7/2007	Chen et al.
2006/0087746	A1	4/2006	Lipow	2007/0155010	A1	7/2007	Farnsworth et al.
2006/0089535	A1	4/2006	Raz et al.	2007/0170225	A1	7/2007	Shelton et al.
2006/0097699	A1	5/2006	Kamenoff	2007/0173687	A1	7/2007	Shima et al.
2006/0100643	A1	5/2006	Laufer et al.	2007/0173813	A1	7/2007	Odom
				2007/0173872	A1	7/2007	Neuenfeldt
				2007/0175950	A1	8/2007	Shelton et al.
				2007/0175951	A1	8/2007	Shelton et al.
				2007/0175955	A1	8/2007	Shelton et al.
				2007/0179477	A1	8/2007	Danger

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2007/0185545	A1	8/2007	Duke	2008/0206186	A1	8/2008	Butler et al.
2007/0187857	A1	8/2007	Riley et al.	2008/0234709	A1	9/2008	Houser
2007/0190110	A1	8/2007	Pameijer et al.	2008/0242939	A1	10/2008	Johnston
2007/0191868	A1	8/2007	Theroux et al.	2008/0249536	A1	10/2008	Stahler et al.
2007/0194079	A1	8/2007	Hueil et al.	2008/0249608	A1	10/2008	Dave
2007/0194082	A1	8/2007	Morgan et al.	2008/0255413	A1	10/2008	Zemlok et al.
2007/0197954	A1	8/2007	Keenan	2008/0255663	A1	10/2008	Akpek et al.
2007/0198039	A1	8/2007	Jones et al.	2008/0262654	A1	10/2008	Omori et al.
2007/0203510	A1	8/2007	Bettuchi	2008/0269596	A1	10/2008	Revie et al.
2007/0207010	A1	9/2007	Caspi	2008/0281171	A1	11/2008	Fennell et al.
2007/0208359	A1	9/2007	Hoffman	2008/0287944	A1	11/2008	Pearson et al.
2007/0208375	A1	9/2007	Nishizawa et al.	2008/0293910	A1	11/2008	Kapiamba et al.
2007/0213750	A1	9/2007	Weadock	2008/0294179	A1	11/2008	Balbierz et al.
2007/0225562	A1	9/2007	Spivey et al.	2008/0296346	A1	12/2008	Shelton, IV et al.
2007/0233163	A1	10/2007	Bombard et al.	2008/0297287	A1	12/2008	Shachar et al.
2007/0243227	A1	10/2007	Gertner	2008/0308602	A1	12/2008	Timm et al.
2007/0244471	A1	10/2007	Malackowski	2008/0308603	A1	12/2008	Shelton et al.
2007/0244496	A1	10/2007	Hellenkamp	2008/0312686	A1	12/2008	Ellingwood
2007/0246505	A1	10/2007	Pace-Florida et al.	2008/0312687	A1	12/2008	Blier
2007/0262592	A1	11/2007	Hwang et al.	2008/0315829	A1	12/2008	Jones et al.
2007/0275035	A1	11/2007	Herman et al.	2009/0001121	A1	1/2009	Hess et al.
2007/0276409	A1	11/2007	Ortiz et al.	2009/0001130	A1	1/2009	Hess et al.
2007/0279011	A1	12/2007	Jones et al.	2009/0004455	A1	1/2009	Gravagna et al.
2007/0286892	A1	12/2007	Herzberg et al.	2009/0005809	A1	1/2009	Hess et al.
2007/0290027	A1	12/2007	Maatta et al.	2009/0012534	A1	1/2009	Madhani et al.
2007/0296286	A1	12/2007	Avenell	2009/0015195	A1	1/2009	Loth-Krausser
2008/0003196	A1	1/2008	Jonn et al.	2009/0020958	A1	1/2009	Soul
2008/0015598	A1	1/2008	Prommersberger	2009/0048583	A1	2/2009	Williams et al.
2008/0021486	A1	1/2008	Oyola et al.	2009/0048589	A1	2/2009	Takashino et al.
2008/0029570	A1	2/2008	Shelton et al.	2009/0076506	A1	3/2009	Baker
2008/0029573	A1	2/2008	Shelton et al.	2009/0078736	A1	3/2009	Van Lue
2008/0029574	A1	2/2008	Shelton et al.	2009/0081313	A1	3/2009	Aghion et al.
2008/0029575	A1	2/2008	Shelton et al.	2009/0088659	A1	4/2009	Graham et al.
2008/0030170	A1	2/2008	Dacquay et al.	2009/0090763	A1	4/2009	Zemlok et al.
2008/0039746	A1	2/2008	Hissong et al.	2009/0099579	A1	4/2009	Nentwick et al.
2008/0042861	A1	2/2008	Dacquay et al.	2009/0099876	A1	4/2009	Whitman
2008/0051833	A1	2/2008	Gramuglia et al.	2009/0112234	A1	4/2009	Crainich et al.
2008/0064921	A1	3/2008	Larkin et al.	2009/0118762	A1	5/2009	Crainch et al.
2008/0065153	A1	3/2008	Allard et al.	2009/0119011	A1	5/2009	Kondo et al.
2008/0071328	A1	3/2008	Haubrich et al.	2009/0131819	A1	5/2009	Ritchie et al.
2008/0077158	A1	3/2008	Haider et al.	2009/0132400	A1	5/2009	Conway
2008/0078802	A1	4/2008	Hess et al.	2009/0143855	A1	6/2009	Weber et al.
2008/0082114	A1	4/2008	McKenna et al.	2009/0149871	A9	6/2009	Kagan et al.
2008/0082125	A1	4/2008	Murray et al.	2009/0171147	A1	7/2009	Lee et al.
2008/0082126	A1	4/2008	Murray et al.	2009/0177226	A1	7/2009	Reinprecht et al.
2008/0083807	A1	4/2008	Beardsley et al.	2009/0181290	A1	7/2009	Baldwin et al.
2008/0085296	A1	4/2008	Powell et al.	2009/0188964	A1	7/2009	Orlov
2008/0086078	A1	4/2008	Powell et al.	2009/0192534	A1	7/2009	Ortiz et al.
2008/0091072	A1	4/2008	Omori et al.	2009/0198272	A1	8/2009	Kerver et al.
2008/0108443	A1	5/2008	Jinno et al.	2009/0204108	A1	8/2009	Steffen
2008/0114250	A1	5/2008	Urbano et al.	2009/0204109	A1	8/2009	Grove et al.
2008/0125634	A1	5/2008	Ryan et al.	2009/0206125	A1	8/2009	Huitema et al.
2008/0125749	A1	5/2008	Olson	2009/0206126	A1	8/2009	Huitema et al.
2008/0128469	A1	6/2008	Dalessandro et al.	2009/0206131	A1	8/2009	Weisenburgh, II et al.
2008/0129253	A1	6/2008	Shiue et al.	2009/0206133	A1	8/2009	Morgan et al.
2008/0135600	A1	6/2008	Hiranuma et al.	2009/0206137	A1	8/2009	Hall et al.
2008/0140115	A1	6/2008	Stopek	2009/0206139	A1	8/2009	Hall et al.
2008/0140159	A1	6/2008	Bornhoft et al.	2009/0206141	A1	8/2009	Huitema et al.
2008/0154299	A1	6/2008	Livneh	2009/0206142	A1	8/2009	Huitema et al.
2008/0154335	A1	6/2008	Thrope et al.	2009/0221993	A1	9/2009	Sohi et al.
2008/0169328	A1	7/2008	Shelton	2009/0227834	A1	9/2009	Nakamoto et al.
2008/0169332	A1	7/2008	Shelton et al.	2009/0234273	A1	9/2009	Intoccia et al.
2008/0169333	A1	7/2008	Shelton et al.	2009/0242610	A1	10/2009	Shelton, IV et al.
2008/0172087	A1	7/2008	Fuchs et al.	2009/0246873	A1	10/2009	Yamamoto et al.
2008/0177392	A1	7/2008	Williams et al.	2009/0247368	A1	10/2009	Chiang
2008/0190989	A1	8/2008	Crews et al.	2009/0247901	A1	10/2009	Zimmer
2008/0196253	A1	8/2008	Ezra et al.	2009/0248100	A1	10/2009	Vaisnys et al.
2008/0196419	A1	8/2008	Dube	2009/0253959	A1	10/2009	Yoshie et al.
2008/0197167	A1	8/2008	Viola et al.	2009/0255974	A1	10/2009	Viola
2008/0200755	A1	8/2008	Bakos	2009/0261141	A1	10/2009	Stratton et al.
2008/0200762	A1	8/2008	Stokes et al.	2009/0262078	A1	10/2009	Pizzi
2008/0200835	A1	8/2008	Monson et al.	2009/0270895	A1	10/2009	Churchill et al.
2008/0200911	A1	8/2008	Long	2009/0278406	A1	11/2009	Hoffman
2008/0200933	A1	8/2008	Bakos et al.	2009/0290016	A1	11/2009	Suda
2008/0200934	A1	8/2008	Fox	2009/0292283	A1	11/2009	Odom
				2009/0306639	A1	12/2009	Nevo et al.
				2009/0308907	A1	12/2009	Nalagatla et al.
				2009/0318557	A1	12/2009	Stockel
				2009/0325859	A1	12/2009	Ameer et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2010/0005035	A1	1/2010	Carpenter et al.	2011/0125176	A1	5/2011	Yates et al.
2010/0012703	A1	1/2010	Calabrese et al.	2011/0127945	A1	6/2011	Yoneda
2010/0015104	A1	1/2010	Fraser et al.	2011/0129706	A1	6/2011	Takahashi et al.
2010/0016888	A1	1/2010	Calabrese et al.	2011/0144764	A1	6/2011	Bagga et al.
2010/0017715	A1	1/2010	Balassanian	2011/0147433	A1	6/2011	Shelton, IV et al.
2010/0023024	A1	1/2010	Zeiner et al.	2011/0160725	A1	6/2011	Kabaya et al.
2010/0030233	A1	2/2010	Whitman et al.	2011/0163146	A1	7/2011	Ortiz et al.
2010/0036370	A1	2/2010	Mirel et al.	2011/0172495	A1	7/2011	Armstrong
2010/0051668	A1	3/2010	Milliman et al.	2011/0174861	A1	7/2011	Shelton, IV et al.
2010/0057118	A1	3/2010	Dietz et al.	2011/0192882	A1	8/2011	Hess et al.
2010/0065604	A1	3/2010	Weng	2011/0199225	A1	8/2011	Touchberry et al.
2010/0069942	A1	3/2010	Shelton, IV	2011/0218400	A1	9/2011	Ma et al.
2010/0076483	A1	3/2010	Imuta	2011/0218550	A1	9/2011	Ma
2010/0076489	A1	3/2010	Stopek et al.	2011/0225105	A1	9/2011	Scholer et al.
2010/0081883	A1	4/2010	Murray et al.	2011/0230713	A1	9/2011	Kleemann et al.
2010/0094340	A1	4/2010	Stopek et al.	2011/0238044	A1	9/2011	Main et al.
2010/0100123	A1	4/2010	Bennett	2011/0241597	A1	10/2011	Zhu et al.
2010/0100124	A1	4/2010	Calabrese et al.	2011/0256266	A1	10/2011	Orme et al.
2010/0116519	A1	5/2010	Gareis	2011/0271186	A1	11/2011	Owens
2010/0122339	A1	5/2010	Boccacci	2011/0275901	A1	11/2011	Shelton, IV
2010/0133317	A1	6/2010	Shelton, IV et al.	2011/0276083	A1	11/2011	Shelton, IV et al.
2010/0137990	A1	6/2010	Apatsidis et al.	2011/0278343	A1	11/2011	Knodel et al.
2010/0138659	A1	6/2010	Carmichael et al.	2011/0279268	A1	11/2011	Konishi et al.
2010/0145146	A1	6/2010	Melder	2011/0290856	A1	12/2011	Shelton, IV et al.
2010/0147921	A1	6/2010	Olson	2011/0293690	A1	12/2011	Griffin et al.
2010/0147922	A1	6/2010	Olson	2011/0295295	A1	12/2011	Shelton, IV et al.
2010/0179022	A1	7/2010	Shirokoshi	2011/0313894	A1	12/2011	Dye et al.
2010/0180711	A1	7/2010	Kilibarda et al.	2011/0315413	A1	12/2011	Fisher et al.
2010/0191262	A1	7/2010	Harris et al.	2012/0004636	A1	1/2012	Lo
2010/0191292	A1	7/2010	DeMeo et al.	2012/0007442	A1	1/2012	Rhodes et al.
2010/0193566	A1	8/2010	Scheib et al.	2012/0016239	A1	1/2012	Barthe et al.
2010/0204717	A1	8/2010	Knodel	2012/0016413	A1	1/2012	Timm et al.
2010/0204721	A1	8/2010	Young et al.	2012/0016467	A1	1/2012	Chen et al.
2010/0217281	A1	8/2010	Matsuoka et al.	2012/0029272	A1	2/2012	Shelton, IV et al.
2010/0222901	A1	9/2010	Swayze et al.	2012/0033360	A1	2/2012	Hsu
2010/0228250	A1	9/2010	Brogna	2012/0059286	A1	3/2012	Hastings et al.
2010/0241137	A1	9/2010	Doyle et al.	2012/0064483	A1	3/2012	Lint et al.
2010/0245102	A1	9/2010	Yokoi	2012/0074200	A1	3/2012	Schmid et al.
2010/0249497	A1	9/2010	Peine et al.	2012/0078244	A1	3/2012	Worrell et al.
2010/0249947	A1	9/2010	Lesh et al.	2012/0080336	A1	4/2012	Shelton, IV et al.
2010/0256675	A1	10/2010	Romans	2012/0080344	A1	4/2012	Shelton, IV
2010/0258327	A1	10/2010	Esenwein et al.	2012/0080478	A1	4/2012	Morgan et al.
2010/0267662	A1	10/2010	Fielder et al.	2012/0080498	A1	4/2012	Shelton, IV et al.
2010/0274160	A1	10/2010	Yachi et al.	2012/0086276	A1	4/2012	Sawyers
2010/0292540	A1	11/2010	Hess et al.	2012/0095458	A1	4/2012	Cybulski et al.
2010/0298636	A1	11/2010	Castro et al.	2012/0109186	A1	5/2012	Parrott et al.
2010/0301097	A1	12/2010	Scirica et al.	2012/0116261	A1	5/2012	Mumaw et al.
2010/0310623	A1	12/2010	Laurencin et al.	2012/0116262	A1	5/2012	Houser et al.
2010/0312261	A1	12/2010	Suzuki et al.	2012/0116265	A1	5/2012	Houser et al.
2010/0318085	A1	12/2010	Austin et al.	2012/0116266	A1	5/2012	Houser et al.
2010/0331856	A1	12/2010	Carlson et al.	2012/0116381	A1	5/2012	Houser et al.
2011/0006101	A1	1/2011	Hall et al.	2012/0118595	A1	5/2012	Pellenc
2011/0011916	A1	1/2011	Levine	2012/0123463	A1	5/2012	Jacobs
2011/0016960	A1	1/2011	Debrailly	2012/0125792	A1	5/2012	Cassivi
2011/0021871	A1	1/2011	Berkelaar	2012/0130217	A1	5/2012	Kauphusman et al.
2011/0022032	A1	1/2011	Zemlok et al.	2012/0132286	A1	5/2012	Lim et al.
2011/0024477	A1	2/2011	Hall	2012/0171539	A1	7/2012	Rejman et al.
2011/0024478	A1	2/2011	Shelton, IV	2012/0175398	A1	7/2012	Sandborn et al.
2011/0025311	A1	2/2011	Chauvin et al.	2012/0197272	A1	8/2012	Oray et al.
2011/0036891	A1	2/2011	Zemlok et al.	2012/0211542	A1	8/2012	Racenet
2011/0046667	A1	2/2011	Culligan et al.	2012/0234895	A1	9/2012	O'Connor et al.
2011/0052660	A1	3/2011	Yang et al.	2012/0234897	A1	9/2012	Shelton, IV et al.
2011/0060363	A1	3/2011	Hess et al.	2012/0239068	A1	9/2012	Morris et al.
2011/0066156	A1	3/2011	McGahan et al.	2012/0248169	A1	10/2012	Widenhouse et al.
2011/0082538	A1	4/2011	Dahlgren et al.	2012/0251861	A1	10/2012	Liang et al.
2011/0087276	A1	4/2011	Bedi et al.	2012/0253328	A1	10/2012	Cunningham et al.
2011/0088921	A1	4/2011	Forgues et al.	2012/0283707	A1	11/2012	Giordano et al.
2011/0091515	A1	4/2011	Zilberman et al.	2012/0289811	A1	11/2012	Viola et al.
2011/0095064	A1	4/2011	Taylor et al.	2012/0289979	A1	11/2012	Eskaros et al.
2011/0101069	A1	5/2011	Bombard et al.	2012/0292367	A1	11/2012	Morgan et al.
2011/0101794	A1	5/2011	Schroeder et al.	2012/0298722	A1	11/2012	Hess et al.
2011/0112517	A1	5/2011	Peine et al.	2012/0301498	A1	11/2012	Altreuter et al.
2011/0112530	A1	5/2011	Keller	2012/0330329	A1	12/2012	Harris et al.
2011/0114697	A1	5/2011	Baxter, III et al.	2013/0006227	A1	1/2013	Takashino
2011/0125149	A1	5/2011	El-Galley et al.	2013/0008937	A1	1/2013	Viola
				2013/0012983	A1	1/2013	Kleyman
				2013/0018400	A1	1/2013	Milton et al.
				2013/0020375	A1	1/2013	Shelton, IV et al.
				2013/0020376	A1	1/2013	Shelton, IV et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2013/0023861	A1	1/2013	Shelton, IV et al.	2014/0188159	A1	7/2014	Steege
2013/0023910	A1	1/2013	Solomon et al.	2014/0207124	A1	7/2014	Aldridge et al.
2013/0026208	A1	1/2013	Shelton, IV et al.	2014/0207125	A1	7/2014	Applegate et al.
2013/0026210	A1	1/2013	Shelton, IV et al.	2014/0209658	A1	7/2014	Skalla et al.
2013/0030462	A1	1/2013	Keating et al.	2014/0224857	A1	8/2014	Schmid
2013/0041292	A1	2/2013	Cunningham	2014/0228632	A1	8/2014	Sholev et al.
2013/0057162	A1	3/2013	Pollischansky	2014/0228867	A1	8/2014	Thomas et al.
2013/0068816	A1	3/2013	Mandakolathur Vasudevan et al.	2014/0239047	A1	8/2014	Hodgkinson et al.
2013/0087597	A1	4/2013	Shelton, IV et al.	2014/0243865	A1	8/2014	Swayze et al.
2013/0090534	A1	4/2013	Burns et al.	2014/0246475	A1	9/2014	Hall et al.
2013/0096568	A1	4/2013	Justis	2014/0248167	A1	9/2014	Sugimoto et al.
2013/0098970	A1	4/2013	Racenet et al.	2014/0249557	A1	9/2014	Koch et al.
2013/0105552	A1	5/2013	Weir et al.	2014/0249573	A1	9/2014	Arav
2013/0106352	A1	5/2013	Nagamine	2014/0263541	A1	9/2014	Leimbach et al.
2013/0116669	A1	5/2013	Shelton, IV et al.	2014/0263552	A1	9/2014	Hall et al.
2013/0123816	A1	5/2013	Hodgkinson et al.	2014/0263558	A1	9/2014	Hausen et al.
2013/0126202	A1	5/2013	Oomori et al.	2014/0276730	A1	9/2014	Boudreaux et al.
2013/0131476	A1	5/2013	Siu et al.	2014/0284371	A1	9/2014	Morgan et al.
2013/0131651	A1	5/2013	Strobl et al.	2014/0288460	A1	9/2014	Ouyang et al.
2013/0136969	A1	5/2013	Yasui et al.	2014/0291379	A1	10/2014	Schellin et al.
2013/0153641	A1	6/2013	Shelton, IV et al.	2014/0291383	A1	10/2014	Spivey et al.
2013/0158390	A1	6/2013	Tan et al.	2014/0299648	A1	10/2014	Shelton, IV et al.
2013/0162198	A1	6/2013	Yokota et al.	2014/0303645	A1	10/2014	Morgan et al.
2013/0169217	A1	7/2013	Watanabe et al.	2014/0303660	A1	10/2014	Boyden et al.
2013/0172878	A1	7/2013	Smith	2014/0330161	A1	11/2014	Swayze et al.
2013/0175317	A1	7/2013	Yates et al.	2014/0330298	A1	11/2014	Arshonsky et al.
2013/0211244	A1	8/2013	Nathaniel	2014/0330579	A1	11/2014	Cashman et al.
2013/0214025	A1	8/2013	Zemlok et al.	2014/0367445	A1	12/2014	Ingmanson et al.
2013/0215449	A1	8/2013	Yamasaki	2014/0374130	A1	12/2014	Nakamura et al.
2013/0233906	A1	9/2013	Hess et al.	2014/0378950	A1	12/2014	Chiu
2013/0238021	A1	9/2013	Gross et al.	2015/0002089	A1	1/2015	Rejman et al.
2013/0248578	A1	9/2013	Arteaga Gonzalez	2015/0008248	A1	1/2015	Giordano et al.
2013/0253480	A1	9/2013	Kimball et al.	2015/0025549	A1	1/2015	Kilroy et al.
2013/0256373	A1	10/2013	Schmid et al.	2015/0038961	A1	2/2015	Clark et al.
2013/0256380	A1	10/2013	Schmid et al.	2015/0053737	A1	2/2015	Leimbach et al.
2013/0267978	A1	10/2013	Trissel	2015/0053743	A1	2/2015	Yates et al.
2013/0270322	A1	10/2013	Scheib et al.	2015/0053746	A1	2/2015	Shelton, IV et al.
2013/0277410	A1	10/2013	Fernandez et al.	2015/0053748	A1	2/2015	Yates et al.
2013/0306704	A1	11/2013	Balbierz et al.	2015/0060518	A1	3/2015	Shelton, IV et al.
2013/0317753	A1	11/2013	Kamen 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.	2015/0076208	A1	3/2015	Shelton, IV
2013/0334285	A1	12/2013	Swayze et al.	2015/0076209	A1	3/2015	Shelton, IV et al.
2013/0341374	A1	12/2013	Shelton, IV et al.	2015/0076210	A1	3/2015	Shelton, IV et al.
2014/0001231	A1	1/2014	Shelton, IV et al.	2015/0076212	A1	3/2015	Shelton, IV
2014/0001234	A1	1/2014	Shelton, IV et al.	2015/0083781	A1	3/2015	Giordano et al.
2014/0005640	A1	1/2014	Shelton, IV et al.	2015/0083782	A1	3/2015	Scheib et al.
2014/0005678	A1	1/2014	Shelton, IV et al.	2015/0088547	A1	3/2015	Balram et al.
2014/0005702	A1	1/2014	Timm et al.	2015/0090760	A1	4/2015	Giordano et al.
2014/0005718	A1	1/2014	Shelton, IV et al.	2015/0090762	A1	4/2015	Giordano et al.
2014/0012299	A1	1/2014	Stoddard et al.	2015/0122870	A1	5/2015	Zemlok et al.
2014/0014705	A1	1/2014	Baxter, III	2015/0127021	A1	5/2015	Harris et al.
2014/0014707	A1	1/2014	Onukuri et al.	2015/0134077	A1	5/2015	Shelton, IV et al.
2014/0018832	A1	1/2014	Shelton, IV	2015/0150620	A1	6/2015	Miyamoto et al.
2014/0039549	A1	2/2014	Belsky et al.	2015/0173749	A1	6/2015	Shelton, IV et al.
2014/0048580	A1	2/2014	Merchant et al.	2015/0173756	A1	6/2015	Baxter, III et al.
2014/0081176	A1	3/2014	Hassan	2015/0173789	A1	6/2015	Baxter, III et al.
2014/0094681	A1	4/2014	Valentine et al.	2015/0196295	A1	7/2015	Shelton, IV et al.
2014/0100558	A1	4/2014	Schmitz et al.	2015/0196296	A1	7/2015	Swayze et al.
2014/0115229	A1	4/2014	Kothamasu et al.	2015/0196299	A1	7/2015	Swayze et al.
2014/0131418	A1	5/2014	Kostrzewski	2015/0201918	A1	7/2015	Kumar et al.
2014/0135832	A1	5/2014	Park et al.	2015/0201932	A1	7/2015	Swayze et al.
2014/0151433	A1	6/2014	Shelton, IV et al.	2015/0201936	A1	7/2015	Swayze et al.
2014/0158747	A1	6/2014	Measamer et al.	2015/0201937	A1	7/2015	Swayze et al.
2014/0166723	A1	6/2014	Beardsley et al.	2015/0201938	A1	7/2015	Swayze et al.
2014/0166724	A1	6/2014	Schellin et al.	2015/0201939	A1	7/2015	Swayze et al.
2014/0166725	A1	6/2014	Schellin et al.	2015/0201940	A1	7/2015	Swayze et al.
2014/0166726	A1	6/2014	Schellin et al.	2015/0201941	A1	7/2015	Swayze et al.
2014/0175147	A1	6/2014	Manoux et al.	2015/0209045	A1	7/2015	Hodgkinson et al.
2014/0175150	A1	6/2014	Shelton, IV et al.	2015/0222212	A1	8/2015	Iwata
2014/0175152	A1	6/2014	Hess et al.	2015/0223868	A1	8/2015	Brandt et al.
2014/0181710	A1	6/2014	Baalu et al.	2015/0231409	A1	8/2015	Racenet et al.
2014/0188091	A1	7/2014	Vidal et al.	2015/0238118	A1	8/2015	Legassey et al.
				2015/0272557	A1	10/2015	Overmyer et al.
				2015/0272571	A1	10/2015	Leimbach et al.
				2015/0272580	A1	10/2015	Leimbach et al.
				2015/0272582	A1	10/2015	Leimbach et al.



(56)

## References Cited

## U.S. PATENT DOCUMENTS

2015/0297200	A1	10/2015	Fitzsimmons et al.	2017/0049444	A1	2/2017	Schellin et al.
2015/0297222	A1	10/2015	Huitema et al.	2017/0049448	A1	2/2017	Widenhouse et al.
2015/0297223	A1	10/2015	Huitema et al.	2017/0056000	A1	3/2017	Nalagatla et al.
2015/0297225	A1	10/2015	Huitema et al.	2017/0056002	A1	3/2017	Nalagatla et al.
2015/0297228	A1	10/2015	Huitema et al.	2017/0056005	A1	3/2017	Shelton, IV et al.
2015/0297233	A1	10/2015	Huitema et al.	2017/0079642	A1	3/2017	Overmyer et al.
2015/0303417	A1	10/2015	Koeder et al.	2017/0086827	A1	3/2017	Vendely et al.
2015/0313594	A1	11/2015	Shelton, IV et al.	2017/0086829	A1	3/2017	Vendely et al.
2015/0324317	A1	11/2015	Collins et al.	2017/0086830	A1	3/2017	Yates et al.
2015/0327864	A1	11/2015	Hodgkinson et al.	2017/0086831	A1	3/2017	Shelton, IV et al.
2015/0352699	A1	12/2015	Sakai et al.	2017/0086838	A1	3/2017	Harris et al.
2015/0366585	A1	12/2015	Lemay et al.	2017/0086842	A1	3/2017	Shelton, IV et al.
2015/0372265	A1	12/2015	Morisaku et al.	2017/0105733	A1	4/2017	Scheib et al.
2015/0374369	A1	12/2015	Yates et al.	2017/0119388	A1	5/2017	Kostrzewski
2015/0374372	A1	12/2015	Zergiebel et al.	2017/0119397	A1	5/2017	Harris et al.
2015/0374378	A1	12/2015	Giordano et al.	2017/0172382	A1	6/2017	Nir et al.
2016/0000431	A1	1/2016	Giordano et al.	2017/0172662	A1	6/2017	Panescu et al.
2016/0000437	A1	1/2016	Giordano et al.	2017/0182211	A1	6/2017	Raxworthy et al.
2016/0000438	A1	1/2016	Swayze et al.	2017/0196554	A1	7/2017	Rousseau et al.
2016/0000442	A1	1/2016	Shelton, IV	2017/0196556	A1	7/2017	Shah et al.
2016/0000452	A1	1/2016	Yates et al.	2017/0196558	A1	7/2017	Morgan et al.
2016/0000453	A1	1/2016	Yates et al.	2017/0196631	A1	7/2017	Nagtegaal
2016/0023342	A1	1/2016	Koenig et al.	2017/0196637	A1	7/2017	Shelton, IV et al.
2016/0030042	A1	2/2016	Heinrich et al.	2017/0196648	A1	7/2017	Ward et al.
2016/0051316	A1	2/2016	Boudreaux	2017/0196649	A1	7/2017	Yates et al.
2016/0058443	A1	3/2016	Yates et al.	2017/0202571	A1	7/2017	Shelton, IV et al.
2016/0066913	A1	3/2016	Swayze et al.	2017/0202596	A1	7/2017	Shelton, IV et al.
2016/0069449	A1	3/2016	Kanai et al.	2017/0202770	A1	7/2017	Friedrich et al.
2016/0074040	A1	3/2016	Widenhouse et al.	2017/0209145	A1	7/2017	Swayze et al.
2016/0074103	A1	3/2016	Sartor	2017/0209146	A1	7/2017	Yates et al.
2016/0082161	A1	3/2016	Zilberman et al.	2017/0215881	A1	8/2017	Shelton, IV et al.
2016/0089137	A1	3/2016	Hess et al.	2017/0215943	A1	8/2017	Allen, IV
2016/0089198	A1	3/2016	Arya et al.	2017/0224332	A1	8/2017	Hunter et al.
2016/0106431	A1	4/2016	Shelton, IV et al.	2017/0224334	A1	8/2017	Worthington et al.
2016/0120545	A1	5/2016	Shelton, IV et al.	2017/0224339	A1	8/2017	Huang et al.
2016/0135835	A1	5/2016	Onuma	2017/0231627	A1	8/2017	Shelton, IV et al.
2016/0166256	A1	6/2016	Baxter, III et al.	2017/0231628	A1	8/2017	Shelton, IV et al.
2016/0183939	A1	6/2016	Shelton, IV et al.	2017/0238928	A1	8/2017	Morgan et al.
2016/0183943	A1	6/2016	Shelton, IV	2017/0249431	A1	8/2017	Shelton, IV et al.
2016/0183944	A1	6/2016	Swensgard et al.	2017/0258469	A1	9/2017	Shelton, IV et al.
2016/0192916	A1	7/2016	Shelton, IV et al.	2017/0265774	A1	9/2017	Johnson et al.
2016/0192918	A1	7/2016	Shelton, IV et al.	2017/0265856	A1	9/2017	Shelton, IV et al.
2016/0192960	A1	7/2016	Bueno et al.	2017/0281164	A1	10/2017	Harris et al.
2016/0199063	A1	7/2016	Mandakolathur Vasudevan et al.	2017/0281171	A1	10/2017	Shelton, IV et al.
2016/0199956	A1	7/2016	Shelton, IV et al.	2017/0281173	A1	10/2017	Shelton, IV et al.
2016/0206314	A1	7/2016	Scheib et al.	2017/0281186	A1	10/2017	Shelton, IV et al.
2016/0235404	A1	8/2016	Shelton, IV	2017/0281187	A1	10/2017	Shelton, IV et al.
2016/0235409	A1	8/2016	Shelton, IV et al.	2017/0281189	A1	10/2017	Nalagatla et al.
2016/0235494	A1	8/2016	Shelton, IV et al.	2017/0290584	A1	10/2017	Jasemian et al.
2016/0242783	A1	8/2016	Shelton, IV et al.	2017/0290585	A1	10/2017	Shelton, IV et al.
2016/0249910	A1	9/2016	Shelton, IV et al.	2017/0290586	A1	10/2017	Wellman
2016/0249922	A1	9/2016	Morgan et al.	2017/0296169	A1	10/2017	Yates et al.
2016/0256154	A1	9/2016	Shelton, IV et al.	2017/0296173	A1	10/2017	Shelton, IV et al.
2016/0256159	A1	9/2016	Pinjala et al.	2017/0296177	A1	10/2017	Harris et al.
2016/0256229	A1	9/2016	Morgan et al.	2017/0296185	A1	10/2017	Swensgard et al.
2016/0262745	A1	9/2016	Morgan et al.	2017/0296213	A1	10/2017	Swensgard et al.
2016/0262921	A1	9/2016	Balbierz et al.	2017/0311944	A1	11/2017	Morgan et al.
2016/0278771	A1	9/2016	Shelton, IV et al.	2017/0311949	A1	11/2017	Shelton, IV
2016/0287265	A1	10/2016	MacDonald et al.	2017/0312041	A1	11/2017	Giordano et al.
2016/0287279	A1	10/2016	Bovay et al.	2017/0312042	A1	11/2017	Giordano et al.
2016/0310143	A1	10/2016	Bettuchi	2017/0319201	A1	11/2017	Morgan et al.
2016/0314716	A1	10/2016	Grubbs	2017/0319207	A1	11/2017	Shelton, IV et al.
2016/0345976	A1	12/2016	Gonzalez et al.	2017/0319209	A1	11/2017	Morgan et al.
2016/0346034	A1	12/2016	Arya et al.	2017/0325813	A1	11/2017	Aranyi et al.
2016/0354088	A1	12/2016	Cabrera et al.	2017/0333034	A1	11/2017	Morgan et al.
2016/0367122	A1	12/2016	Ichimura et al.	2017/0333035	A1	11/2017	Morgan et al.
2016/0374678	A1	12/2016	Becerra et al.	2017/0333070	A1	11/2017	Laurent et al.
2017/0007236	A1	1/2017	Shelton, IV et al.	2017/0348010	A1	12/2017	Chiang
2017/0007243	A1	1/2017	Shelton, IV et al.	2017/0348043	A1	12/2017	Wang et al.
2017/0007244	A1	1/2017	Shelton, IV et al.	2017/0354413	A1	12/2017	Chen et al.
2017/0007245	A1	1/2017	Shelton, IV et al.	2017/0354415	A1	12/2017	Casasanta, Jr. et al.
2017/0007250	A1	1/2017	Shelton, IV et al.	2017/0358052	A1	12/2017	Yuan
2017/0007347	A1	1/2017	Jaworek et al.	2017/0360439	A1	12/2017	Chen et al.
2017/0014125	A1	1/2017	Shelton, IV et al.	2017/0360441	A1	12/2017	Sgroi
2017/0027572	A1	2/2017	Nalagatla et al.	2017/0364183	A1	12/2017	Xiao
				2017/0367695	A1	12/2017	Shelton, IV et al.
				2017/0367696	A1	12/2017	Shelton, IV et al.
				2017/0367697	A1	12/2017	Shelton, IV et al.
				2018/0000483	A1	1/2018	Leimbach et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2018/0000545	A1	1/2018	Giordano et al.	2018/0168614	A1	6/2018	Shelton, IV et al.
2018/0008262	A1	1/2018	Whitman et al.	2018/0168615	A1	6/2018	Shelton, IV et al.
2018/0008271	A1	1/2018	Moore et al.	2018/0168616	A1	6/2018	Shelton, IV et al.
2018/0008356	A1	1/2018	Giordano et al.	2018/0168617	A1	6/2018	Shelton, IV et al.
2018/0008357	A1	1/2018	Giordano et al.	2018/0168618	A1	6/2018	Scott et al.
2018/0028184	A1	2/2018	Shelton, IV et al.	2018/0168619	A1	6/2018	Scott et al.
2018/0028185	A1	2/2018	Shelton, IV et al.	2018/0168621	A1	6/2018	Shelton, IV et al.
2018/0042611	A1	2/2018	Swayze et al.	2018/0168623	A1	6/2018	Simms et al.
2018/0049824	A1	2/2018	Harris et al.	2018/0168624	A1	6/2018	Shelton, IV et al.
2018/0049883	A1	2/2018	Moskowitz et al.	2018/0168625	A1	6/2018	Posada et al.
2018/0055513	A1	3/2018	Shelton, IV et al.	2018/0168627	A1	6/2018	Weaner et al.
2018/0055524	A1	3/2018	Shelton, IV et al.	2018/0168628	A1	6/2018	Hunter et al.
2018/0055526	A1	3/2018	Shelton, IV et al.	2018/0168629	A1	6/2018	Shelton, IV et al.
2018/0064440	A1	3/2018	Shelton, IV et al.	2018/0168630	A1	6/2018	Shelton, IV et al.
2018/0064441	A1	3/2018	Shelton, IV et al.	2018/0168632	A1	6/2018	Harris et al.
2018/0064442	A1	3/2018	Shelton, IV et al.	2018/0168633	A1	6/2018	Shelton, IV et al.
2018/0064443	A1	3/2018	Shelton, IV et al.	2018/0168639	A1	6/2018	Shelton, IV et al.
2018/0070942	A1	3/2018	Shelton, IV et al.	2018/0168643	A1	6/2018	Shelton, IV et al.
2018/0078248	A1	3/2018	Swayze et al.	2018/0168646	A1	6/2018	Shelton, IV et al.
2018/0078268	A1	3/2018	Messerly et al.	2018/0168647	A1	6/2018	Shelton, IV et al.
2018/0085116	A1	3/2018	Yates et al.	2018/0168648	A1	6/2018	Shelton, IV et al.
2018/0085117	A1	3/2018	Shelton, IV et al.	2018/0168649	A1	6/2018	Shelton, IV et al.
2018/0103953	A1	4/2018	Shelton, IV et al.	2018/0168650	A1	6/2018	Shelton, IV et al.
2018/0103955	A1	4/2018	Shelton, IV et al.	2018/0168651	A1	6/2018	Shelton, IV et al.
2018/0110518	A1	4/2018	Overmyer et al.	2018/0168715	A1	6/2018	Strobl
2018/0110519	A1	4/2018	Lytle, IV et al.	2018/0199940	A1	7/2018	Zergiebel et al.
2018/0110520	A1	4/2018	Shelton, IV et al.	2018/0206843	A1	7/2018	Yates et al.
2018/0110521	A1	4/2018	Shelton, IV et al.	2018/0206906	A1	7/2018	Moua et al.
2018/0110522	A1	4/2018	Shelton, IV et al.	2018/0214147	A1	8/2018	Merchant et al.
2018/0110523	A1	4/2018	Shelton, IV	2018/0221046	A1	8/2018	Demmy et al.
2018/0110574	A1	4/2018	Shelton, IV et al.	2018/0221050	A1	8/2018	Kostrzewski et al.
2018/0110575	A1	4/2018	Shelton, IV et al.	2018/0228490	A1	8/2018	Richard et al.
2018/0114591	A1	4/2018	Pribanic et al.	2018/0242962	A1	8/2018	Walén et al.
2018/0116658	A1	5/2018	Aronhalt, IV et al.	2018/0249999	A1	9/2018	Parihar et al.
2018/0116662	A1	5/2018	Shelton, IV et al.	2018/0250001	A1	9/2018	Aronhalt et al.
2018/0116665	A1	5/2018	Hall et al.	2018/0250020	A1	9/2018	Carusillo
2018/0125481	A1	5/2018	Yates et al.	2018/0250086	A1	9/2018	Grubbs
2018/0125487	A1	5/2018	Beardsley	2018/0271520	A1	9/2018	Shelton, IV et al.
2018/0125488	A1	5/2018	Morgan et al.	2018/0271604	A1	9/2018	Grout et al.
2018/0125489	A1	5/2018	Leimbach et al.	2018/0273597	A1	9/2018	Stimson
2018/0125590	A1	5/2018	Giordano et al.	2018/0280020	A1	10/2018	Hess et al.
2018/0125594	A1	5/2018	Beardsley	2018/0289369	A1	10/2018	Shelton, IV et al.
2018/0126504	A1	5/2018	Shelton, IV et al.	2018/0296211	A1	10/2018	Timm et al.
2018/0132845	A1	5/2018	Schmid et al.	2018/0296213	A1	10/2018	Strobl
2018/0132849	A1	5/2018	Miller et al.	2018/0296216	A1	10/2018	Shelton, IV et al.
2018/0132850	A1	5/2018	Leimbach et al.	2018/0296217	A1	10/2018	Moore et al.
2018/0132926	A1	5/2018	Asher et al.	2018/0303481	A1	10/2018	Shelton, IV et al.
2018/0132952	A1	5/2018	Spivey et al.	2018/0303482	A1	10/2018	Shelton, IV et al.
2018/0133856	A1	5/2018	Shelton, IV et al.	2018/0310931	A1	11/2018	Hall et al.
2018/0140299	A1	5/2018	Weaner et al.	2018/0311002	A1	11/2018	Giordano et al.
2018/0146960	A1	5/2018	Shelton, IV et al.	2018/0317916	A1	11/2018	Wixey
2018/0150153	A1	5/2018	Yoon et al.	2018/0317917	A1	11/2018	Huang et al.
2018/0153542	A1	6/2018	Shelton, IV et al.	2018/0317919	A1	11/2018	Shelton, IV et al.
2018/0161034	A1	6/2018	Scheib et al.	2018/0325528	A1	11/2018	Windolf et al.
2018/0168575	A1	6/2018	Simms et al.	2018/0325611	A1	11/2018	Robinson et al.
2018/0168577	A1	6/2018	Aronhalt et al.	2018/0333155	A1	11/2018	Hall et al.
2018/0168578	A1	6/2018	Aronhalt et al.	2018/0333169	A1	11/2018	Leimbach et al.
2018/0168579	A1	6/2018	Aronhalt et al.	2018/0344319	A1	12/2018	Shelton, IV et al.
2018/0168584	A1	6/2018	Harris et al.	2018/0353170	A1	12/2018	Overmyer et al.
2018/0168586	A1	6/2018	Shelton, IV et al.	2018/0353176	A1	12/2018	Shelton, IV et al.
2018/0168589	A1	6/2018	Swayze et al.	2018/0353177	A1	12/2018	Shelton, IV et al.
2018/0168590	A1	6/2018	Overmyer et al.	2018/0353178	A1	12/2018	Shelton, IV et al.
2018/0168592	A1	6/2018	Overmyer et al.	2018/0353179	A1	12/2018	Shelton, IV et al.
2018/0168593	A1	6/2018	Overmyer et al.	2018/0360443	A1	12/2018	Shelton, IV et al.
2018/0168597	A1	6/2018	Fanelli et al.	2018/0360445	A1	12/2018	Shelton, IV et al.
2018/0168598	A1	6/2018	Shelton, IV et al.	2018/0360446	A1	12/2018	Shelton, IV et al.
2018/0168600	A1	6/2018	Shelton, IV et al.	2018/0360448	A1	12/2018	Harris et al.
2018/0168601	A1	6/2018	Bakos et al.	2018/0360449	A1	12/2018	Shelton, IV et al.
2018/0168603	A1	6/2018	Morgan et al.	2018/0360452	A1	12/2018	Shelton, IV et al.
2018/0168605	A1	6/2018	Baber et al.	2018/0360454	A1	12/2018	Shelton, IV et al.
2018/0168606	A1	6/2018	Shelton, IV et al.	2018/0360455	A1	12/2018	Shelton, IV et al.
2018/0168607	A1	6/2018	Shelton, IV et al.	2018/0360456	A1	12/2018	Shelton, IV et al.
2018/0168608	A1	6/2018	Shelton, IV et al.	2018/0360471	A1	12/2018	Parfett et al.
2018/0168609	A1	6/2018	Fanelli et al.	2018/0360472	A1	12/2018	Harris et al.
2018/0168610	A1	6/2018	Shelton, IV et al.	2018/0360473	A1	12/2018	Shelton, IV et al.
				2018/0360549	A1	12/2018	Hares et al.
				2018/0368833	A1	12/2018	Shelton, IV et al.
				2018/0368837	A1	12/2018	Morgan et al.
				2018/0368838	A1	12/2018	Shelton, IV et al.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2018/0368839	A1	12/2018	Shelton, IV et al.	2019/0099229	A1	4/2019	Spivey et al.
2018/0368840	A1	12/2018	Shelton, IV et al.	2019/0102930	A1	4/2019	Leimbach et al.
2018/0368841	A1	12/2018	Shelton, IV et al.	2019/0105035	A1	4/2019	Shelton, IV et al.
2018/0368842	A1	12/2018	Shelton, IV et al.	2019/0105036	A1	4/2019	Morgan et al.
2018/0368843	A1	12/2018	Shelton, IV et al.	2019/0105037	A1	4/2019	Morgan et al.
2018/0368844	A1	12/2018	Bakos et al.	2019/0105038	A1	4/2019	Schmid et al.
2018/0368845	A1	12/2018	Bakos et al.	2019/0105039	A1	4/2019	Morgan et al.
2018/0368846	A1	12/2018	Shelton, IV et al.	2019/0105043	A1	4/2019	Jaworek et al.
2019/0000446	A1	1/2019	Shelton, IV et al.	2019/0105044	A1	4/2019	Shelton, IV et al.
2019/0000448	A1	1/2019	Shelton, IV et al.	2019/0105049	A1	4/2019	Moore et al.
2019/0000450	A1	1/2019	Shelton, IV et al.	2019/0110791	A1	4/2019	Shelton, IV et al.
2019/0000454	A1	1/2019	Swayze et al.	2019/0110792	A1	4/2019	Shelton, IV et al.
2019/0000456	A1	1/2019	Shelton, IV et al.	2019/0110793	A1	4/2019	Parihar et al.
2019/0000457	A1	1/2019	Shelton, IV et al.	2019/0117216	A1	4/2019	Overmyer et al.
2019/0000459	A1	1/2019	Shelton, IV et al.	2019/0117217	A1	4/2019	Overmyer et al.
2019/0000460	A1	1/2019	Shelton, IV et al.	2019/0117222	A1	4/2019	Shelton, IV et al.
2019/0000461	A1	1/2019	Shelton, IV et al.	2019/0117224	A1	4/2019	Setser et al.
2019/0000462	A1	1/2019	Shelton, IV et al.	2019/0117225	A1	4/2019	Moore et al.
2019/0000463	A1	1/2019	Shelton, IV et al.	2019/0125343	A1	5/2019	Wise et al.
2019/0000465	A1	1/2019	Shelton, IV et al.	2019/0125344	A1	5/2019	DiNardo et al.
2019/0000466	A1	1/2019	Shelton, IV et al.	2019/0125345	A1	5/2019	Baber et al.
2019/0000467	A1	1/2019	Shelton, IV et al.	2019/0125380	A1	5/2019	Hunter et al.
2019/0000468	A1	1/2019	Adams et al.	2019/0125475	A1	5/2019	Wise et al.
2019/0000469	A1	1/2019	Shelton, IV et al.	2019/0133585	A1	5/2019	Smith et al.
2019/0000470	A1	1/2019	Yates et al.	2019/0142421	A1	5/2019	Shelton, IV
2019/0000471	A1	1/2019	Shelton, IV et al.	2019/0183490	A1	6/2019	Shelton, IV et al.
2019/0000472	A1	1/2019	Shelton, IV et al.	2019/0183491	A1	6/2019	Shelton, IV et al.
2019/0000473	A1	1/2019	Shelton, IV et al.	2019/0183492	A1	6/2019	Shelton, IV et al.
2019/0000474	A1	1/2019	Shelton, IV et al.	2019/0183493	A1	6/2019	Shelton, IV et al.
2019/0000475	A1	1/2019	Shelton, IV et al.	2019/0183494	A1	6/2019	Shelton, IV et al.
2019/0000476	A1	1/2019	Shelton, IV et al.	2019/0183495	A1	6/2019	Shelton, IV et al.
2019/0000477	A1	1/2019	Shelton, IV et al.	2019/0183496	A1	6/2019	Shelton, IV et al.
2019/0000478	A1	1/2019	Messerly et al.	2019/0183497	A1	6/2019	Shelton, IV et al.
2019/0000479	A1	1/2019	Harris et al.	2019/0183498	A1	6/2019	Shelton, IV et al.
2019/0000525	A1	1/2019	Messerly et al.	2019/0183499	A1	6/2019	Shelton, IV et al.
2019/0000528	A1	1/2019	Yates et al.	2019/0183500	A1	6/2019	Shelton, IV et al.
2019/0000530	A1	1/2019	Yates et al.	2019/0183501	A1	6/2019	Shelton, IV et al.
2019/0000531	A1	1/2019	Messerly et al.	2019/0183502	A1	6/2019	Shelton, IV et al.
2019/0000534	A1	1/2019	Messerly et al.	2019/0183503	A1	6/2019	Shelton, IV et al.
2019/0000538	A1	1/2019	Widenhouse et al.	2019/0183504	A1	6/2019	Shelton, IV et al.
2019/0000565	A1	1/2019	Shelton, IV et al.	2019/0183505	A1	6/2019	Vendely et al.
2019/0008511	A1	1/2019	Kerr et al.	2019/0183592	A1	6/2019	Shelton, IV et al.
2019/0015096	A1	1/2019	Shelton, IV et al.	2019/0183594	A1	6/2019	Shelton, IV et al.
2019/0015102	A1	1/2019	Baber et al.	2019/0183597	A1	6/2019	Shelton, IV et al.
2019/0015165	A1	1/2019	Giordano et al.	2019/0192137	A1	6/2019	Shelton, IV et al.
2019/0029675	A1	1/2019	Yates et al.	2019/0192138	A1	6/2019	Shelton, IV et al.
2019/0029676	A1	1/2019	Yates et al.	2019/0192141	A1	6/2019	Shelton, IV et al.
2019/0029677	A1	1/2019	Yates et al.	2019/0192144	A1	6/2019	Parfett et al.
2019/0029678	A1	1/2019	Shelton, IV et al.	2019/0192146	A1	6/2019	Widenhouse et al.
2019/0029681	A1	1/2019	Swayze et al.	2019/0192147	A1	6/2019	Shelton, IV et al.
2019/0029682	A1	1/2019	Huitema et al.	2019/0192148	A1	6/2019	Shelton, IV et al.
2019/0029701	A1	1/2019	Shelton, IV et al.	2019/0192149	A1	6/2019	Shelton, IV et al.
2019/0033955	A1	1/2019	Leimbach et al.	2019/0192150	A1	6/2019	Widenhouse et al.
2019/0038279	A1	2/2019	Shelton, IV et al.	2019/0192151	A1	6/2019	Shelton, IV et al.
2019/0038281	A1	2/2019	Shelton, IV et al.	2019/0192152	A1	6/2019	Morgan et al.
2019/0038282	A1	2/2019	Shelton, IV et al.	2019/0192153	A1	6/2019	Shelton, IV et al.
2019/0038283	A1	2/2019	Shelton, IV et al.	2019/0192154	A1	6/2019	Shelton, IV et al.
2019/0038292	A1	2/2019	Zhang	2019/0192155	A1	6/2019	Shelton, IV et al.
2019/0038371	A1	2/2019	Wixey et al.	2019/0192156	A1	6/2019	Simms et al.
2019/0046181	A1	2/2019	McCuen	2019/0192157	A1	6/2019	Scott et al.
2019/0046187	A1	2/2019	Yates et al.	2019/0192158	A1	6/2019	Scott et al.
2019/0059886	A1	2/2019	Shelton, IV et al.	2019/0192159	A1	6/2019	Simms et al.
2019/0076143	A1	3/2019	Smith	2019/0192227	A1	6/2019	Shelton, IV et al.
2019/0090870	A1	3/2019	Shelton, IV et al.	2019/0192235	A1	6/2019	Harris et al.
2019/0090871	A1	3/2019	Shelton, IV et al.	2019/0192236	A1	6/2019	Shelton, IV et al.
2019/0091183	A1	3/2019	Tomat et al.	2019/0200895	A1	7/2019	Shelton, IV et al.
2019/0099177	A1	4/2019	Yates et al.	2019/0200991	A1	7/2019	Moore et al.
2019/0099178	A1	4/2019	Leimbach et al.	2019/0200992	A1	7/2019	Moore et al.
2019/0099179	A1	4/2019	Leimbach et al.	2019/0200993	A1	7/2019	Moore et al.
2019/0099180	A1	4/2019	Leimbach et al.	2019/0200994	A1	7/2019	Moore et al.
2019/0099181	A1	4/2019	Shelton, IV et al.	2019/0201028	A1	7/2019	Shelton, IV et al.
2019/0099182	A1	4/2019	Bakos et al.	2019/0206562	A1	7/2019	Shelton, IV et al.
2019/0099183	A1	4/2019	Leimbach et al.	2019/0209164	A1	7/2019	Timm et al.
2019/0099184	A1	4/2019	Setser et al.	2019/0209165	A1	7/2019	Timm et al.
2019/0099224	A1	4/2019	Leimbach et al.	2019/0209171	A1	7/2019	Shelton, IV et al.
				2019/0209172	A1	7/2019	Shelton, IV et al.
				2019/0209247	A1	7/2019	Giordano et al.
				2019/0209248	A1	7/2019	Giordano et al.
				2019/0209249	A1	7/2019	Giordano et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2019/0209250 A1 7/2019 Giordano et al.  
 2019/0216558 A1 7/2019 Giordano et al.  
 2019/0223865 A1 7/2019 Shelton, IV et al.  
 2019/0223871 A1 7/2019 Moore et al.  
 2019/0261984 A1 8/2019 Nelson et al.  
 2019/0261991 A1 8/2019 Beckman et al.  
 2019/0267403 A1 8/2019 Li et al.  
 2019/0269400 A1 9/2019 Mandakolathur Vasudevan et al.  
 2019/0269402 A1 9/2019 Murray et al.  
 2019/0269403 A1 9/2019 Baxter, III et al.  
 2019/0269407 A1 9/2019 Swensgard et al.  
 2019/0269428 A1 9/2019 Allen et al.  
 2019/0274677 A1 9/2019 Shelton, IV  
 2019/0274678 A1 9/2019 Shelton, IV  
 2019/0274679 A1 9/2019 Shelton, IV  
 2019/0274680 A1 9/2019 Shelton, IV  
 2019/0274685 A1 9/2019 Olson et al.  
 2019/0290263 A1 9/2019 Morgan et al.  
 2019/0290264 A1 9/2019 Morgan et al.  
 2019/0290265 A1 9/2019 Shelton, IV et al.  
 2019/0290267 A1 9/2019 Baxter, III et al.  
 2019/0290274 A1 9/2019 Shelton, IV  
 2019/0290281 A1 9/2019 Aronhalt et al.  
 2019/0298348 A1 10/2019 Harris et al.  
 2019/0298360 A1 10/2019 Shelton, IV et al.  
 2019/0298361 A1 10/2019 Shelton, IV et al.  
 2019/0298362 A1 10/2019 Shelton, IV et al.  
 2019/0307452 A1 10/2019 Shelton, IV et al.  
 2019/0307453 A1 10/2019 Shelton, IV et al.  
 2019/0307454 A1 10/2019 Shelton, IV et al.  
 2019/0307455 A1 10/2019 Shelton, IV et al.  
 2019/0307456 A1 10/2019 Shelton, IV et al.  
 2019/0307476 A1 10/2019 Shelton, IV et al.  
 2019/0307477 A1 10/2019 Shelton, IV et al.  
 2019/0307478 A1 10/2019 Shelton, IV et al.  
 2019/0307479 A1 10/2019 Shelton, IV et al.  
 2019/0314016 A1 10/2019 Huitema et al.  
 2019/0314017 A1 10/2019 Huitema et al.  
 2019/0314018 A1 10/2019 Huitema et al.  
 2019/0321039 A1 10/2019 Harris et al.  
 2019/0321040 A1 10/2019 Shelton, IV  
 2019/0321041 A1 10/2019 Shelton, IV  
 2019/0328386 A1 10/2019 Harris et al.  
 2019/0328387 A1 10/2019 Overmyer et al.  
 2019/0328390 A1 10/2019 Harris et al.  
 2019/0336128 A1 11/2019 Harris et al.  
 2019/0343514 A1 11/2019 Shelton, IV et al.  
 2019/0343515 A1 11/2019 Morgan et al.  
 2019/0343518 A1 11/2019 Shelton, IV  
 2019/0343525 A1 11/2019 Shelton, IV et al.  
 2019/0350582 A1 11/2019 Shelton, IV et al.  
 2019/0357909 A1 11/2019 Huitema et al.  
 2019/0365384 A1 12/2019 Baxter, III et al.  
 2019/0374224 A1 12/2019 Huitema et al.  
 2020/0000461 A1 1/2020 Yates et al.  
 2020/0000468 A1 1/2020 Shelton, IV et al.  
 2020/0000469 A1 1/2020 Shelton, IV et al.  
 2020/0000471 A1 1/2020 Shelton, IV et al.  
 2020/0000531 A1 1/2020 Giordano et al.  
 2020/0008800 A1 1/2020 Shelton, IV et al.  
 2020/0008802 A1 1/2020 Aronhalt et al.  
 2020/0008809 A1 1/2020 Shelton, IV et al.  
 2020/0015815 A1 1/2020 Harris et al.  
 2020/0015819 A1 1/2020 Shelton, IV et al.  
 2020/0022702 A1 1/2020 Shelton, IV et al.  
 2020/0029964 A1 1/2020 Overmyer et al.  
 2020/0030050 A1 1/2020 Shelton, IV et al.  
 2020/0038016 A1 2/2020 Shelton, IV et al.  
 2020/0038018 A1 2/2020 Shelton, IV et al.  
 2020/0038020 A1 2/2020 Yates et al.  
 2020/0046348 A1 2/2020 Shelton, IV et al.  
 2020/0046893 A1 2/2020 Shelton, IV et al.  
 2020/0054320 A1 2/2020 Harris et al.  
 2020/0054321 A1 2/2020 Harris et al.  
 2020/0054322 A1 2/2020 Harris et al.

2020/0054323 A1 2/2020 Harris et al.  
 2020/0054324 A1 2/2020 Shelton, IV et al.  
 2020/0054325 A1 2/2020 Harris et al.  
 2020/0054326 A1 2/2020 Harris et al.  
 2020/0054327 A1 2/2020 Harris et al.  
 2020/0054328 A1 2/2020 Harris et al.  
 2020/0054329 A1 2/2020 Shelton, IV et al.  
 2020/0054330 A1 2/2020 Harris et al.  
 2020/0054331 A1 2/2020 Harris et al.  
 2020/0054333 A1 2/2020 Shelton, IV et al.  
 2020/0054334 A1 2/2020 Shelton, IV et al.  
 2020/0054355 A1 2/2020 Laurent et al.  
 2020/0060680 A1 2/2020 Shelton, IV et al.  
 2020/0060681 A1 2/2020 Shelton, IV et al.  
 2020/0060713 A1 2/2020 Leimbach et al.  
 2020/0077994 A1 3/2020 Shelton, IV et al.  
 2020/0078015 A1 3/2020 Miller et al.  
 2020/0078016 A1 3/2020 Swayze et al.  
 2020/0085427 A1 3/2020 Giordano et al.  
 2020/0085431 A1 3/2020 Swayze et al.  
 2020/0085435 A1 3/2020 Shelton, IV et al.  
 2020/0085436 A1 3/2020 Beckman et al.  
 2020/0085518 A1 3/2020 Giordano et al.  
 2020/0093484 A1 3/2020 Shelton, IV et al.  
 2020/0093485 A1 3/2020 Shelton, IV et al.  
 2020/0093487 A1 3/2020 Baber et al.  
 2020/0093488 A1 3/2020 Baber et al.  
 2020/0093506 A1 3/2020 Leimbach et al.  
 2020/0093550 A1 3/2020 Spivey et al.  
 2020/0100699 A1 4/2020 Shelton, IV et al.  
 2020/0100783 A1 4/2020 Yates et al.  
 2020/0100787 A1 4/2020 Shelton, IV et al.  
 2020/0107829 A1 4/2020 Shelton, IV et al.  
 2020/0138434 A1 5/2020 Miller et al.  
 2020/0138435 A1 5/2020 Shelton, IV et al.  
 2020/0138436 A1 5/2020 Yates et al.  
 2020/0138437 A1 5/2020 Vendely et al.  
 2020/0146678 A1 5/2020 Leimbach et al.  
 2020/0146741 A1 5/2020 Long et al.

FOREIGN PATENT DOCUMENTS

AU 2012200178 B2 7/2013  
 BR 112013027777 A2 1/2017  
 CA 1015829 A 8/1977  
 CA 1125615 A 6/1982  
 CA 2520413 A1 3/2007  
 CA 2725181 A1 11/2007  
 CA 2851239 A1 11/2007  
 CA 2664874 A1 11/2009  
 CA 2813230 A1 4/2012  
 CA 2940510 A1 8/2015  
 CA 2698728 C 8/2016  
 CN 1163558 A 10/1997  
 CN 2488482 Y 5/2002  
 CN 1634601 A 7/2005  
 CN 2716900 Y 8/2005  
 CN 2738962 Y 11/2005  
 CN 1777406 A 5/2006  
 CN 2796654 Y 7/2006  
 CN 2868212 Y 2/2007  
 CN 200942099 Y 9/2007  
 CN 200984209 Y 12/2007  
 CN 200991269 Y 12/2007  
 CN 201001747 Y 1/2008  
 CN 101143105 A 3/2008  
 CN 201029899 Y 3/2008  
 CN 101378791 A 3/2009  
 CN 101522120 A 9/2009  
 CN 101669833 A 3/2010  
 CN 101721236 A 6/2010  
 CN 101828940 A 9/2010  
 CN 101873834 A 10/2010  
 CN 201719298 U 1/2011  
 CN 102038532 A 5/2011  
 CN 201879759 U 6/2011  
 CN 201949071 U 8/2011  
 CN 102217961 A 10/2011  
 CN 102217963 A 10/2011

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

CN	102247183	A	11/2011	EP	1090592	A1	4/2001
CN	101779977	B	12/2011	EP	1095627	A1	5/2001
CN	101912284	B	7/2012	EP	0806914	B1	9/2001
CN	102125450	B	7/2012	EP	1234587	A1	8/2002
CN	202313537	U	7/2012	EP	1284120	A1	2/2003
CN	202397539	U	8/2012	EP	0717967	B1	5/2003
CN	202426586	U	9/2012	EP	0869742	B1	5/2003
CN	202489990	U	10/2012	EP	1374788	A1	1/2004
CN	102228387	B	11/2012	EP	1407719	A2	4/2004
CN	102835977	A	12/2012	EP	0996378	B1	6/2004
CN	202568350	U	12/2012	EP	1157666	B1	9/2005
CN	103584893	A	2/2014	EP	0880338	B1	10/2005
CN	103690212	A	4/2014	EP	1158917	B1	11/2005
CN	203564285	U	4/2014	EP	1344498	B1	11/2005
CN	203564287	U	4/2014	EP	1330989	B1	12/2005
CN	203597997	U	5/2014	EP	1632191	A2	3/2006
CN	103829981	A	6/2014	EP	1082944	B1	5/2006
CN	103829983	A	6/2014	EP	1253866	B1	7/2006
CN	103908313	A	7/2014	EP	1723914	A1	11/2006
CN	203693685	U	7/2014	EP	1285633	B1	12/2006
CN	203736251	U	7/2014	EP	1011494	B1	1/2007
CN	103981635	A	8/2014	EP	1767163	A1	3/2007
CN	203815517	U	9/2014	EP	1837041	A1	9/2007
CN	102783741	B	10/2014	EP	0922435	B1	10/2007
CN	102973300	B	10/2014	EP	1599146	B1	10/2007
CN	104337556	A	2/2015	EP	1330201	B1	6/2008
CN	204158440	U	2/2015	EP	2039302	A2	3/2009
CN	204158441	U	2/2015	EP	1719461	B1	6/2009
CN	102469995	B	3/2015	EP	2116196	A2	11/2009
CN	204636451	U	9/2015	EP	1769754	B1	6/2010
CN	103860225	B	3/2016	EP	1627605	B1	12/2010
CN	103750872	B	5/2016	EP	2316345	A1	5/2011
DE	273689	C	5/1914	EP	1962711	B1	2/2012
DE	1775926	A	1/1972	EP	2486862	A2	8/2012
DE	3036217	A1	4/1982	EP	2486868	A2	8/2012
DE	3210466	A1	9/1983	EP	2517638	A1	10/2012
DE	3709067	A1	9/1988	EP	2606812	A1	6/2013
DE	19534043	A1	3/1997	EP	2649948	A1	10/2013
DE	19851291	A1	1/2000	EP	2649949	A1	10/2013
DE	19924311	A1	11/2000	EP	2668910	A2	12/2013
DE	20016423	U1	2/2001	EP	2687164	A2	1/2014
DE	20112837	U1	10/2001	EP	2713902	A1	4/2014
DE	20121753	U1	4/2003	EP	2743042	A2	6/2014
DE	202004012389	U1	9/2004	EP	2764827	A2	8/2014
DE	10314072	A1	10/2004	EP	2777524	A2	9/2014
DE	102004014011	A1	10/2005	EP	2842500	A1	3/2015
DE	102004063606	A1	7/2006	EP	2853220	A1	4/2015
DE	202007003114	U1	6/2007	EP	2298220	B1	6/2016
DE	102010013150	A1	9/2011	EP	2510891	B1	6/2016
EP	0000756	A1	2/1979	EP	3031404	A1	6/2016
EP	0122046	A1	10/1984	EP	3047806	A1	7/2016
EP	0129442	B1	11/1987	EP	3078334	A1	10/2016
EP	0255631	A1	2/1988	EP	2364651	B1	11/2016
EP	0169044	B1	6/1991	EP	2747235	B1	11/2016
EP	0541950	A1	5/1993	EP	3095399	A2	11/2016
EP	0548998	A1	6/1993	EP	3120781	A2	1/2017
EP	0594148	A1	4/1994	EP	3135225	A2	3/2017
EP	0646357	A1	4/1995	EP	2789299	B1	5/2017
EP	0505036	B1	5/1995	EP	3225190	A2	10/2017
EP	0669104	A1	8/1995	EP	3363378	A1	8/2018
EP	0705571	A1	4/1996	EP	3275378	B1	7/2019
EP	0528478	B1	5/1996	FR	459743	A	11/1913
EP	0770355	A1	5/1997	FR	999646	A	2/1952
EP	0625335	B1	11/1997	FR	1112936	A	3/1956
EP	0879742	A1	11/1998	FR	2598905	A1	11/1987
EP	0650701	B1	3/1999	FR	2689749	B1	7/1994
EP	0923907	A1	6/1999	FR	2765794	A1	1/1999
EP	0484677	B2	7/2000	FR	2815842	A1	5/2002
EP	1034747	A1	9/2000	GB	939929	A	10/1963
EP	1034748	A1	9/2000	GB	1210522	A	10/1970
EP	0726632	B1	10/2000	GB	1217159	A	12/1970
EP	1053719	A1	11/2000	GB	1339394	A	12/1973
EP	1055399	A1	11/2000	GB	2024012	A	1/1980
EP	1055400	A1	11/2000	GB	2109241	A	6/1983
EP	1080694	A1	3/2001	GB	2090534	B	6/1984
				GB	2272159	A	5/1994
				GB	2336214	A	10/1999
				GB	2509523	A	7/2014
				GR	930100110	A	11/1993

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

JP	S4711908	Y1	5/1972	JP	2009189838	A	8/2009
JP	S5367286	A	6/1978	JP	2009189846	A	8/2009
JP	S56112235	A	9/1981	JP	2009207260	A	9/2009
JP	S60113007	A	6/1985	JP	2009226028	A	10/2009
JP	S62170011	U	10/1987	JP	2009538684	A	11/2009
JP	S63270040	A	11/1988	JP	2009539420	A	11/2009
JP	H0129503	B2	6/1989	JP	D1383743		2/2010
JP	H0378514	U	8/1991	JP	2010069307	A	4/2010
JP	H0385009	U	8/1991	JP	2010069310	A	4/2010
JP	H04215747	A	8/1992	JP	2010098844	A	4/2010
JP	H04131860	U	12/1992	JP	2010214128	A	9/2010
JP	H0584252	A	4/1993	JP	2011072574	A	4/2011
JP	H05123325	A	5/1993	JP	4722849	B2	7/2011
JP	H05226945	A	9/1993	JP	4728996	B2	7/2011
JP	H0630945	A	2/1994	JP	2011524199	A	9/2011
JP	H06237937	A	8/1994	JP	D1432094		12/2011
JP	H06327684	A	11/1994	JP	2012115542	A	6/2012
JP	H079622	U	2/1995	JP	2012143283	A	8/2012
JP	H07253735	A	5/1995	JP	5154710	B1	2/2013
JP	H07163573	A	6/1995	JP	2013126430	A	6/2013
JP	H07285089	A	10/1995	JP	D1481426		9/2013
JP	H08182684	A	7/1996	JP	2014121599	A	7/2014
JP	H08507708	A	8/1996	JP	1517663	S	2/2015
JP	H08289895	A	11/1996	JP	2016512057	A	4/2016
JP	H09-323068	A	12/1997	JP	1601498	S	4/2018
JP	H10118090	A	5/1998	KR	20100110134	A	10/2010
JP	H10-200699	A	7/1998	KR	20110003229	A	1/2011
JP	H10296660	A	11/1998	KR	300631507		3/2012
JP	2000014632	A	1/2000	KR	300747646		6/2014
JP	2000033071	A	2/2000	RU	2008830	C1	3/1994
JP	2000112002	A	4/2000	RU	2052979	C1	1/1996
JP	2000166932	A	6/2000	RU	2066128	C1	9/1996
JP	2000171730	A	6/2000	RU	2069981	C1	12/1996
JP	2000271141	A	10/2000	RU	2098025	C1	12/1997
JP	2000287987	A	10/2000	RU	2104671	C1	2/1998
JP	2000325303	A	11/2000	RU	2110965	C1	5/1998
JP	2001087272	A	4/2001	RU	2141279	C1	11/1999
JP	2001514541	A	9/2001	RU	2144791	C1	1/2000
JP	2001276091	A	10/2001	RU	2161450	C1	1/2001
JP	2002051974	A	2/2002	RU	2181566	C2	4/2002
JP	2002054903	A	2/2002	RU	2187249	C2	8/2002
JP	2002085415	A	3/2002	RU	32984	U1	10/2003
JP	2002143078	A	5/2002	RU	2225170	C2	3/2004
JP	2002153481	A	5/2002	RU	42750	U1	12/2004
JP	2002528161	A	9/2002	RU	61114	U1	2/2007
JP	2002314298	A	10/2002	RU	61122	U1	2/2007
JP	2003135473	A	5/2003	RU	2430692	C2	10/2011
JP	2003521301	A	7/2003	SU	189517	A	1/1967
JP	3442423	B2	9/2003	SU	297156	A	5/1971
JP	2003300416	A	10/2003	SU	328636	A	9/1972
JP	2004147701	A	5/2004	SU	511939	A1	4/1976
JP	2004162035	A	6/2004	SU	674747	A1	7/1979
JP	2004229976	A	8/2004	SU	728848	A1	4/1980
JP	2005013573	A	1/2005	SU	1009439	A	4/1983
JP	2005080702	A	3/2005	SU	1271497	A1	11/1986
JP	2005131163	A	5/2005	SU	1333319	A2	8/1987
JP	2005131164	A	5/2005	SU	1377052	A1	2/1988
JP	2005131173	A	5/2005	SU	1377053	A1	2/1988
JP	2005131211	A	5/2005	SU	1443874	A1	12/1988
JP	2005131212	A	5/2005	SU	1509051	A1	9/1989
JP	2005137423	A	6/2005	SU	1561964	A1	5/1990
JP	2005187954	A	7/2005	SU	1708312	A1	1/1992
JP	2005211455	A	8/2005	SU	1722476	A1	3/1992
JP	2005328882	A	12/2005	SU	1752361	A1	8/1992
JP	2005335432	A	12/2005	SU	1814161	A1	5/1993
JP	2005342267	A	12/2005	WO	WO-9315648	A1	8/1993
JP	3791856	B2	6/2006	WO	WO-9420030	A1	9/1994
JP	2006187649	A	7/2006	WO	WO-9517855	A1	7/1995
JP	2006218228	A	8/2006	WO	WO-9520360	A1	8/1995
JP	2006281405	A	10/2006	WO	WO-9623448	A1	8/1996
JP	2006346445	A	12/2006	WO	WO-9635464	A1	11/1996
JP	2007289715	A	11/2007	WO	WO-9639086	A1	12/1996
JP	D1322057		2/2008	WO	WO-9639088	A1	12/1996
JP	2008220032	A	9/2008	WO	WO-9724073	A1	7/1997
JP	2009507526	A	2/2009	WO	WO-9734533	A1	9/1997
				WO	WO-9827870	A1	7/1998
				WO	WO-9903407	A1	1/1999
				WO	WO-9903409	A1	1/1999
				WO	WO-9948430	A1	9/1999

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

WO	WO-0024322	A1	5/2000
WO	WO-0024330	A1	5/2000
WO	WO-0053112	A2	9/2000
WO	WO-0024448	A2	10/2000
WO	WO-0057796	A1	10/2000
WO	WO-0105702	A1	1/2001
WO	WO-0154594	A1	8/2001
WO	WO-0158371	A1	8/2001
WO	WO-0162164	A2	8/2001
WO	WO-0162169	A2	8/2001
WO	WO-0191646	A1	12/2001
WO	WO-0219932	A1	3/2002
WO	WO-0226143	A1	4/2002
WO	WO-0236028	A1	5/2002
WO	WO-02065933	A2	8/2002
WO	WO-03055402	A1	7/2003
WO	WO-03094747	A1	11/2003
WO	WO-03079909	A3	3/2004
WO	WO-2004019803	A1	3/2004
WO	WO-2004032783	A1	4/2004
WO	WO-2004047626	A1	6/2004
WO	WO-2004047653	A2	6/2004
WO	WO-2004056277	A1	7/2004
WO	WO-2004078050	A2	9/2004
WO	WO-2004078051	A2	9/2004
WO	WO-2004096015	A2	11/2004
WO	WO-2006044581	A2	4/2006
WO	WO-2006051252	A1	5/2006
WO	WO-2006059067	A1	6/2006
WO	WO-2006073581	A2	7/2006
WO	WO-2006085389	A1	8/2006
WO	WO-2007015971	A2	2/2007
WO	WO-2007074430	A1	7/2007
WO	WO-2007129121	A1	11/2007
WO	WO-2007137304	A2	11/2007
WO	WO-2007142625	A2	12/2007
WO	WO-2008021969	A2	2/2008
WO	WO-2008061566	A1	5/2008
WO	WO-2008089404	A2	7/2008
WO	WO-2009005969	A2	1/2009
WO	WO-2009067649	A2	5/2009
WO	WO-2009091497	A2	7/2009
WO	WO-2010126129	A1	11/2010
WO	WO-2010134913	A1	11/2010
WO	WO-2011008672	A2	1/2011
WO	WO-2011044343	A2	4/2011
WO	WO-2012006306	A2	1/2012
WO	WO-2012013577	A1	2/2012
WO	WO-2012044606	A2	4/2012
WO	WO-2012061725	A1	5/2012
WO	WO-2012072133	A1	6/2012
WO	WO-2012166503	A1	12/2012
WO	WO-2013087092	A1	6/2013
WO	WO-2013151888	A1	10/2013
WO	WO-2014004209	A2	1/2014
WO	WO-2014113438	A1	7/2014
WO	WO-2015032797	A1	3/2015
WO	WO-2015138760	A1	9/2015
WO	WO-2015187107	A1	12/2015
WO	WO-2016100682	A1	6/2016

## OTHER PUBLICATIONS

Miyata et al., "Biomolecule-Sensitive Hydrogels," *Advanced Drug Delivery Reviews*, 54 (2002) pp. 79-98.

Jeong et al., "Thermosensitive Sol-Gel Reversible Hydrogels," *Advanced Drug Delivery Reviews*, 54 (2002) pp. 37-51.

Covidien Brochure, "Endo GIA™ Ultra Universal Stapler," (2010), 2 pages.

Qiu et al., "Environment-Sensitive Hydrogels for Drug Delivery," *Advanced Drug Delivery Reviews*, 53 (2001) pp. 321-339.

Hoffman, "Hydrogels for Biomedical Applications," *Advanced Drug Delivery Reviews*, 43 (2002) pp. 3-12.

Hoffman, "Hydrogels for Biomedical Applications," *Advanced Drug Delivery Reviews*, 54 (2002) pp. 3-12.

Peppas, "Physiologically Responsive Hydrogels," *Journal of Bioactive and Compatible Polymers*, vol. 6 (Jul. 1991) pp. 241-246.

Peppas, Editor "Hydrogels in Medicine and Pharmacy," vol. I, *Fundamentals*, CRC Press, 1986.

Young, "Microcellular foams via phase separation," *Journal of Vacuum Science & Technology A* 4(3), (May/Jun. 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.

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).

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.

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=vsvu> which redirects to <http://www3.interscience.wiley.com/journal/119040681/abstract?CRETRY=1&SRETRY=0>; [online] accessed: Sep. 22, 2008 (2 pages).

Disclosed Anonymously, "Motor-Driven Surgical Stapler Improvements," Research Disclosure Database No. 526041, Published: Feb. 2008.

Van Meer et al., "A Disposable Plastic Compact Wrist for Smart Minimally Invasive Surgical Tools," LAAS/CNRS (Aug. 2005).

Breedveld et al., "A New, Easily Miniaturized Sterrable Endoscope," *IEEE Engineering in Medicine and Biology Magazine* (Nov./Dec. 2005).

ASTM procedure D2240-00, "Standard Test Method for Rubber Property-Durometer Hardness," (Published Aug. 2000).

ASTM procedure D2240-05, "Standard Test Method for Rubber Property-Durometer Hardness," (Published Apr. 2010).

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.

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

Covidien iDrive™ Ultra in Service Reference Card, "iDrive™ Ultra Powered Stapling Device," (4 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 Powered Stapling System, A Guide for Surgeons," (6 pages).

Covidien "iDrive™ Ultra Powered Stapling System, Cleaning and Sterilization Guide," (2 pages).

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

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](https://books.google.de/books?isbn=1118054474) [retrieved on Nov. 4, 2014] —book not attached.

Covidien Brochure "iDrive™ Ultra Powered Stapling System," (6 pages).

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>.

Data Sheet of LM4F230H5QR, 2007.

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

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

<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.

(56)

## References Cited

## OTHER PUBLICATIONS

- Seils et al., Covidien Summary: Clinical Study “UCONN Biodynamics: Final Report on Results,” (2 pages).
- 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.
- Chen et al., “Elastomeric Biomaterials for Tissue Engineering,” *Progress in Polymer Science* 38 (2013), pp. 584-671.
- Matsuda, “Thermodynamics of Formation of Porous Polymeric Membrane from Solutions,” *Polymer Journal*, vol. 23, No. 5, pp. 435-444 (1991).
- Covidien Brochure, “Endo GIA™ Black Reload with Tri-Staple™ Technology,” (2012), 2 pages.
- Biomedical Coatings, Fort Wayne Metals, Research Products Corporation, obtained online at [www.fwmetals.com](http://www.fwmetals.com) on Jun. 21, 2010 (1 page).
- The Sodem Aseptic Battery Transfer Kit, Sodem Systems, 2000, 3 pages.
- 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.
- Serial Communication Protocol; Michael Lemmon Feb. 1, 2009; <http://www3.nd.edu/~mlemmon/courses/ee224/web-manual/web-manual/lab12/node2.html>; Wayback Machine to Apr. 29, 2012.
- 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.
- 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].
- 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.
- 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.
- 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).
- Yan et al, Comparison of the effects of Mg-6Zn and Ti-3Al-2.5V alloys on TGF- $\beta$ /TNF- $\alpha$ /VEGF/b-FGF in the healing of the intestinal track *in vivo*, *Biomed. Mater.* 9 (2014), 11 pages.
- Pellicer et al. “On the biodegradability, mechanical behavior, and cytocompatibility of amorphous Mg<sub>70</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.
- 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>.
- 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.
- 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.
- 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.
- 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.
- Gao et al., “Mechanical Signature Enhancement of Response Vibrations in the Time Lag Domain,” *Fifth International Congress on Sound and Vibration*, Dec. 15-18, 1997, pp. 1-8.
- Trendafilova et al., “Vibration-based Methods for Structural and Machinery Fault Diagnosis Based on Nonlinear Dynamics Tools,” In: *Fault Diagnosis in Robotic and Industrial Systems*, IConcept Press Ltd, 2012, pp. 1-29.
- Youtube.com; video by Fibran (retrieved from URL: <https://www.youtube.com/watch?v?vN2Qjt51gFQ>); (Year: 2018).
- Foot and Ankle: Core Knowledge in Orthopaedics; by DiGiovanni MD, Elsevier; (p. 27, left column, heading “Materials for Soft Orthoses”, 7th bullet point); (Year: 2007).
- Lee, Youbok, “Antenna Circuit Design for RFID Applications,” 2003, pp. 1-50, DS00710C, Microchip Technology Inc., Available: <http://ww1.microchip.com/downloads/en/AppNotes/00710c.pdf>.
- Kawamura, Atsuo, et al. “Wireless Transmission of Power and Information Through One High-Frequency Resonant AC Link Inverter for Robot Manipulator Applications,” *Journal*, May/June 1996, pp. 503-508, vol. 32, No. 3, *IEEE Transactions on Industry Applications*.
- Honda HS1332AT and ATD Model Info, [powerequipment.honda.com](http://powerequipment.honda.com) [online], published on or before Mar. 22, 2016, [retrieved on May 31, 2019], retrieved from the Internet [URL: <https://powerequipment.honda.com/snowblowers/models/hss1332at-hss1332atd>] {Year: 2016}.
- Slow Safety Sign, [shutterstock.com](http://shutterstock.com) [online], published on or before May 9, 2017, [retrieved on May 31, 2019], retrieved from the [https://www.shutterstock.com/image-vector/slow-safety-sign-two-dimensional-turtle-symbolizing- . . .](https://www.shutterstock.com/image-vector/slow-safety-sign-two-dimensional-turtle-symbolizing-...) see PDF in file for full URL] (Year: 2017).
- Warning Sign Beveled Buttons, by Peter, [flarestock.com](http://flarestock.com) [online], published on or before Jan. 1, 2017, [retrieved on Jun. 4, 2019], retrieved from the Internet [URL: <https://www.flarestock.com/stock-images/warning-sign-beveled-buttons/70257>] (Year: 2017).
- Arrow Sign Icon Next Button, by Blan-k, [shutterstock.com](http://shutterstock.com) [online], published on or before Aug. 6, 2014, [retrieved on Jun. 4, 2019], retrieved from the Internet [URL:[https://www.shutterstock.com/de/image-vector/arrow-sign-icon-next-button-navigation-207700303?irgwc=1&utm . . .](https://www.shutterstock.com/de/image-vector/arrow-sign-icon-next-button-navigation-207700303?irgwc=1&utm...) see PDF in file for full URL] (Year: 2014).
- Elite Icons, by smart/icons, [iconfinder.com](http://iconfinder.com) [online], published on Aug. 18, 2016, [retrieved on Jun. 4, 2019], retrieved from the Internet [URL: <https://www.iconfinder.com/iconsets/elite>] (Year: 2016).
- Tutorial overview of inductively coupled RFID Systems, UPM, May 2003, pp. 1-7, UPM RAFSEC, <<http://cdn.mobiusconsulting.com/papers/rfidsystems.pdf>>.
- Schroeter, John, “Demystifying UHF Gen 2 RFID, HF RFID,” Online Article, Jun. 2, 2008, pp. 1-3, <<https://www.edn.com/design/industrial-control/4019123/Demystifying-UHF-Gen-2-RFID0HF-RFID>>.
- Adeeb, et al., An Inductive Link-Based Wireless Power Transfer System for Biomedical Applications, Research Article, Nov. 14, 2011, pp. 1-12, vol. 2012, Article ID 879294, Hindawi Publishing Corporation.
- Pushing Pixels (GIF), published on [dribbble.com](http://dribbble.com), 2013.
- Sodium stearate C<sub>18</sub>H<sub>35</sub>NaO<sub>2</sub>, Chemspider Search and Share Chemistry, Royal Society of Chemistry, pp. 1-3, 2015, <http://www.chemspider.com/Chemical-Structure.12639.html>, accessed May 23, 2016.
- NF Monographs: Sodium Stearate, U.S. Pharmacopeia, [http://www.pharmacopeia.cn/v29240/usp29nf24s0\\_m77360.html](http://www.pharmacopeia.cn/v29240/usp29nf24s0_m77360.html), accessed May 23, 2016.
- Fischer, Martin H, “Colloid-Chemical Studies on Soaps”, *The Chemical Engineer*, pp. 184-193, Aug. 1919.
- V.K. Ahluwalia and Madhuri Goyal, *A Textbook of Organic Chemistry*, Section 19.11.3, p. 356, 2000.
- A.V. Kasture and S.G. Wadodkar, *Pharmaceutical Chemistry-II: Second Year Diploma in Pharmacy*, Nirali Prakashan, p. 339, 2007.
- Forum discussion regarding “Speed Is Faster”, published on Oct 1, 2014 and retrieved on Nov. 8, 2019 from URL <https://english.>



(56)

**References Cited**

OTHER PUBLICATIONS

stackoverflow.com/questions/199018/how-is-that-correct-speed-is-faster-or-prices-are-cheaper (Year: 2014).

“Understanding the Requirements of ISO/IEC 14443 for Type B Proximity Contactless Identification Cards,” retrieved from <https://www.digchip.com/application-notes/22/15746.php> on Mar. 2, 2020, pp. 1-28 (Nov. 2005).

Jauchem, J.R., “Effects of low-level radio-frequency (3 kHz to 300 GHz) energy on human cardiovascular, reproductive, immune, and other systems: A review of the recent literated,” *Int. J. Hyg. Environ. Health* 211 (2008) 1-29.

Sandvik, “Welding Handbook,” <https://www.meting.rs/wp-content/uploads/2018/05/welding-handbook.pdf>, retrieved on Jun. 22, 2020, pp. 5-6.

Japanese Search Report, dated Oct. 1, 2019, for Design Application 2018-006610 (1 page).

Japanese Search Report, dated May 14, 2019, for Design Application 2018-006610 (2 pages).

Japanese Search Report, dated May 28, 2019, for Design Application 2018-024779 (2 pages).

\* cited by examiner

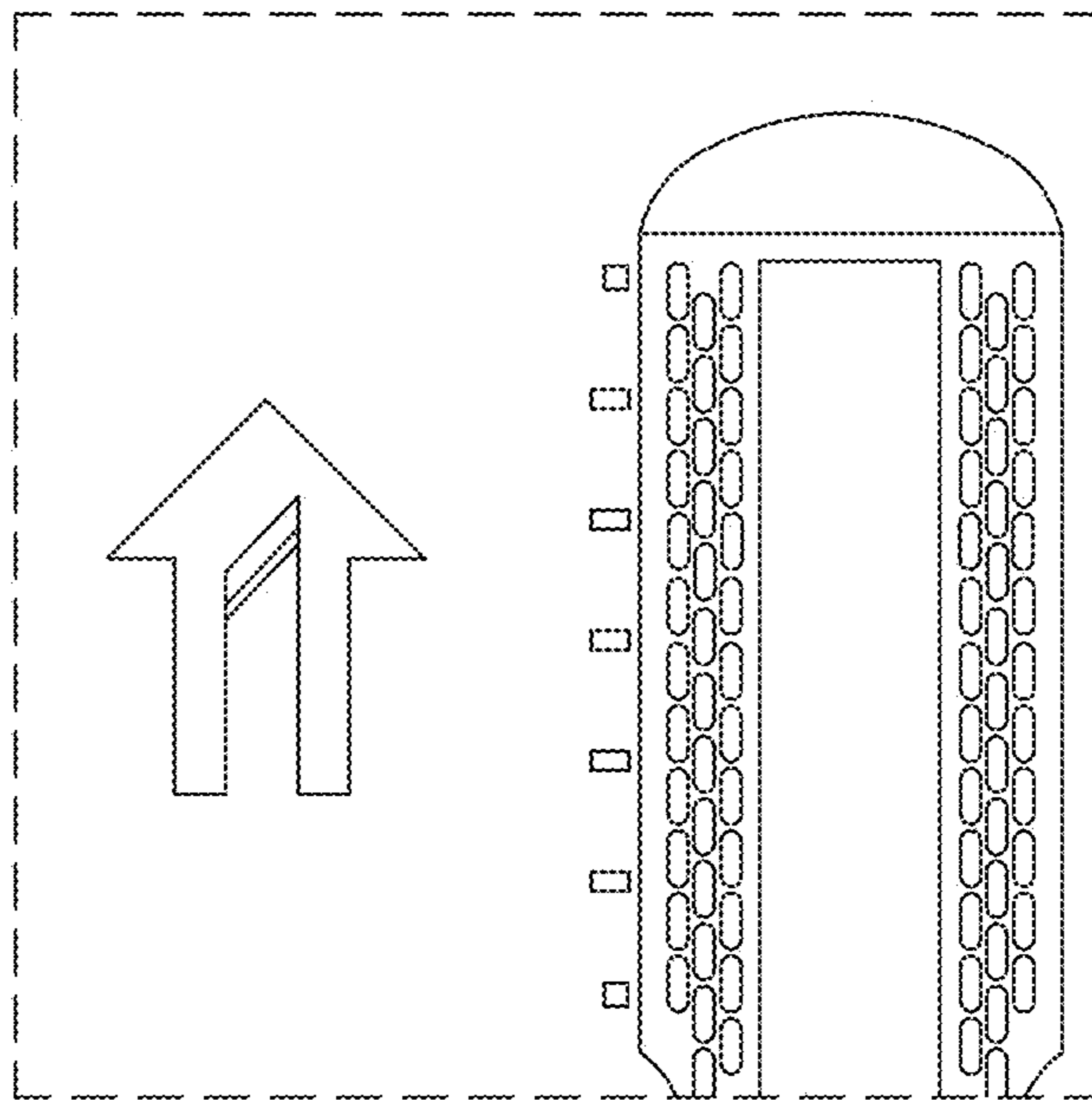


FIG. 1

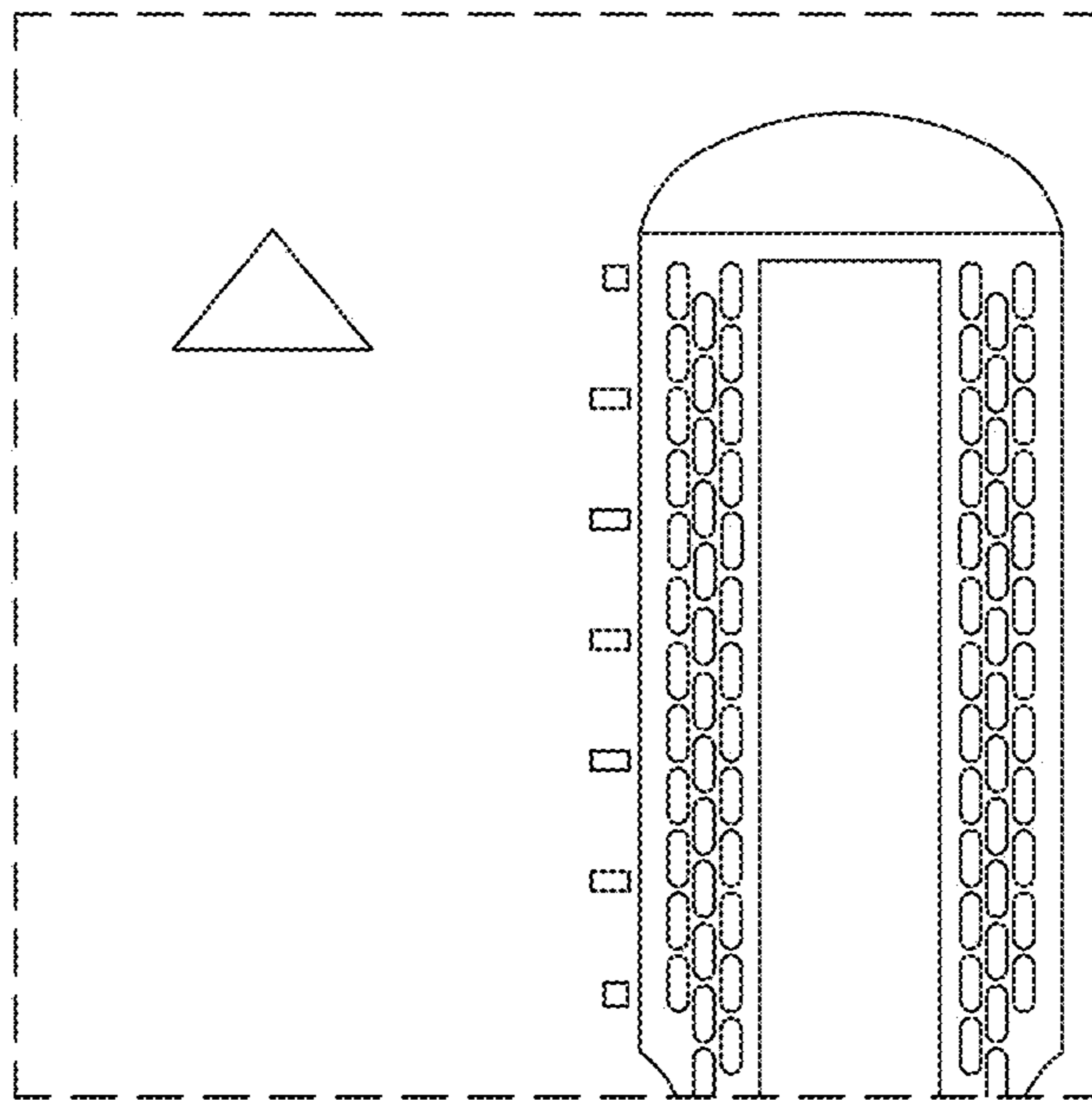


FIG. 2

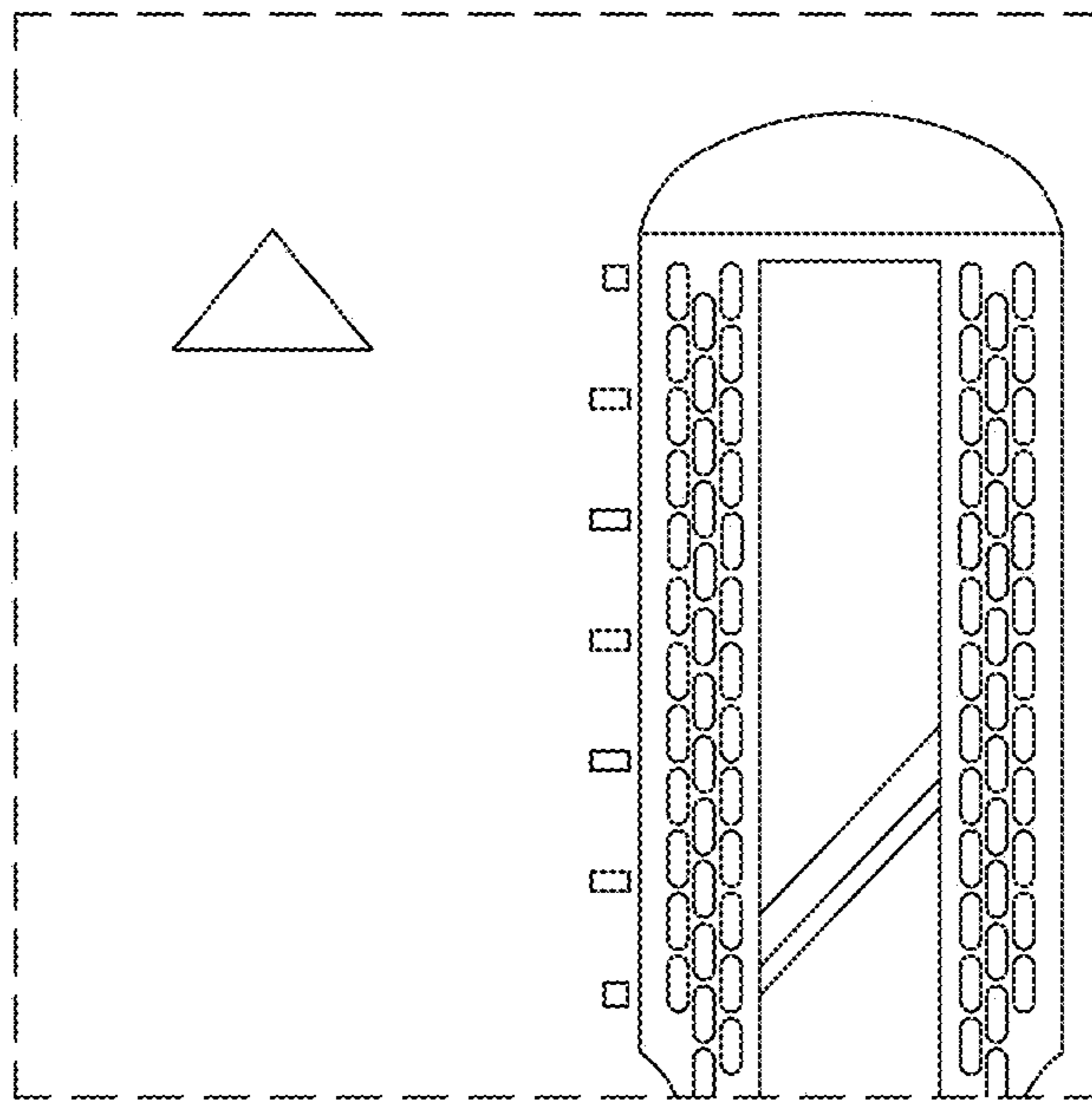


FIG. 3

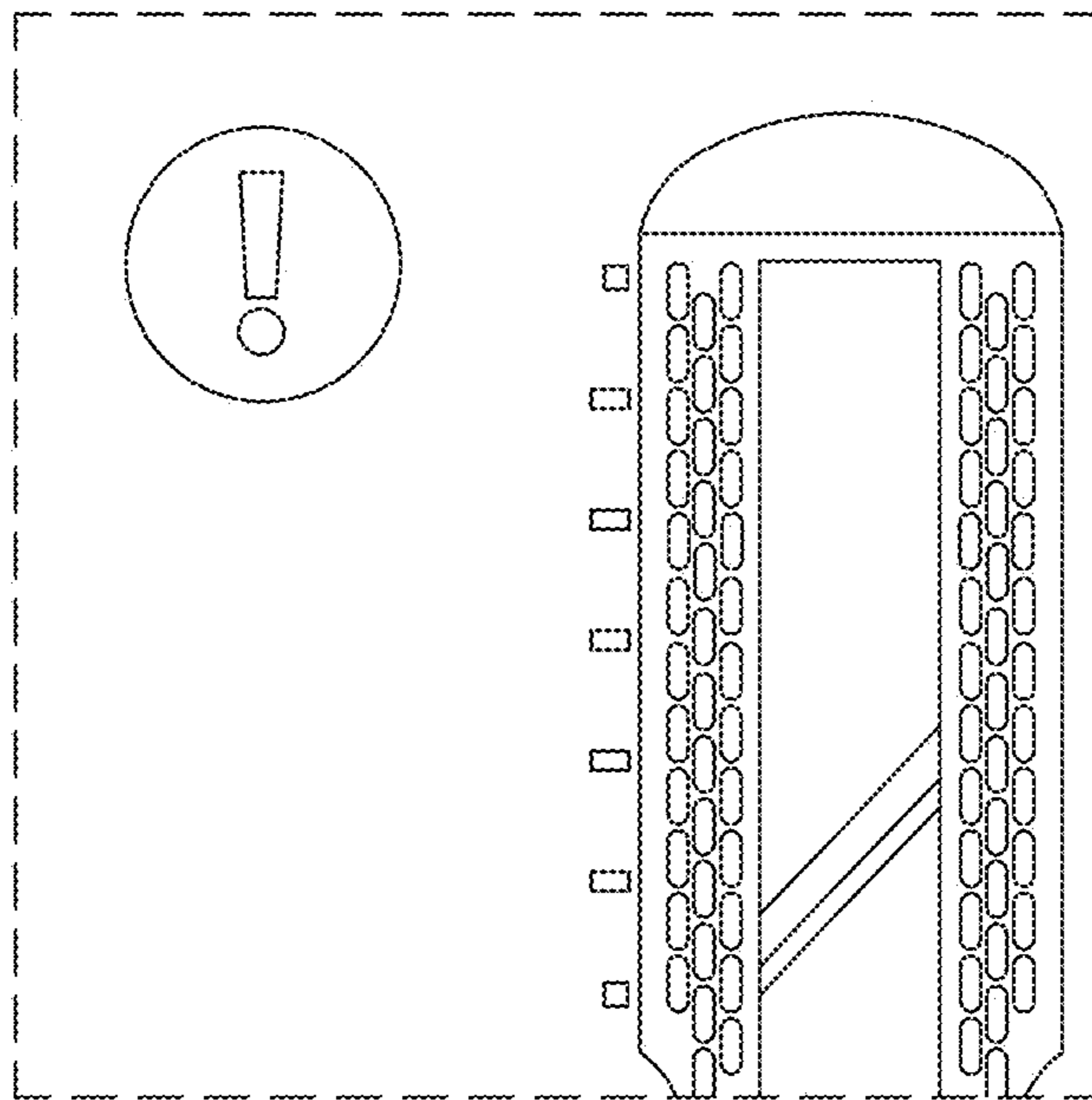


FIG. 4