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(56) **References Cited**

U.S. PATENT DOCUMENTS


| | | | | |
|---|---|---|---|---|
| 5,300,074 | A | 4/1994 | Frigg | |
| 5,401,269 | A | 3/1995 | Buttner-Janz et al. | |
| 5,458,638 | A | 10/1995 | Kuslich et al. | |
| 5,609,635 | A | 3/1997 | Michelson | |
| 5,888,223 | A | 3/1999 | Bray, Jr. | |
| 5,899,905 | A | 5/1999 | Errico et al. | |
| 6,036,701 | A | 3/2000 | Rosenman | |
| 6,120,503 | A | 9/2000 | Michelson | |
| 6,136,001 | A | 10/2000 | Michelson | |
| 6,139,550 | A | 10/2000 | Michelson | |
| 6,193,721 | B1 | 2/2001 | Michelson | |
| 6,231,610 | B1 | 5/2001 | Geisler | |
| 6,235,059 | B1 | 5/2001 | Benezech et al. | |
| 6,258,089 | B1 | 7/2001 | Campbell et al. | |
| 6,364,880 | B1 | 4/2002 | Michelson | |
| 6,383,186 | B1 | 5/2002 | Michelson | |
| 6,398,783 | B1 | 6/2002 | Michelson | |
| 6,413,259 | B1 | 7/2002 | Lyons et al. | |
| 6,416,528 | B1 | 7/2002 | Michelson | |
| 6,423,063 | B1 | 7/2002 | Bonutti | |
| 6,428,542 | B1 | 8/2002 | Michelson | |
| 6,432,106 | B1 | 8/2002 | Fraser | |
| 6,447,546 | B1 | 9/2002 | Bramlet et al. | |
| 6,454,771 | B1 | 9/2002 | Michelson | |
| 6,468,309 | B1 | 10/2002 | Lieberman | |
| 6,527,774 | B2 | 3/2003 | Lieberman | |
| 6,527,776 | B1 | 3/2003 | Michelson | |
| 6,551,319 | B2 | 4/2003 | Lieberman | |
| 6,558,423 | B1 | 5/2003 | Michelson | |
| 6,592,586 | B1 | 7/2003 | Michelson | |
| 6,616,666 | B1 | 9/2003 | Michelson | |
| 6,620,163 | B1 | 9/2003 | Michelson | |
| 6,626,907 | B2 | 9/2003 | Campell et al. | |
| 6,695,846 | B2 | 2/2004 | Richelsoph et al. | |
| 6,712,818 | B1 | 3/2004 | Michelson | |
| 6,770,096 | B2 | 8/2004 | Bolger et al. | |
| 6,916,320 | B2 | 7/2005 | Michelson | |
| 6,926,718 | B1 | 8/2005 | Michelson | |
| 6,936,050 | B2 | 8/2005 | Michelson | |
| 6,936,051 | B2 | 8/2005 | Michelson | |
| 6,953,462 | B2 | 10/2005 | Lieberman | |
| 6,969,390 | B2 | 11/2005 | Michelson | |
| 7,037,340 | B2 | 5/2006 | Gau | |
| 7,041,135 | B2 | 5/2006 | Michelson | |
| 7,051,610 | B2 | 5/2006 | Stoianovici et al. | |
| 7,056,344 | B2 | 6/2006 | Huppert et al. | |
| 7,074,221 | B2 | 7/2006 | Michelson | |
| 7,077,844 | B2 | 7/2006 | Michelson | |
| 7,137,984 | B2 | 11/2006 | Michelson | |
| 7,172,627 | B2 | 2/2007 | Fiere et al. | |
| 7,195,643 | B2 | 3/2007 | Jackson | |
| 7,255,698 | B2 | 8/2007 | Michelson | |
| 7,291,170 | B2 | 11/2007 | Huppert | |
| 7,326,250 | B2 | 2/2008 | Beaurain et al. | |
| 7,455,684 | B2 | 11/2008 | Gradel et al. | |
| 7,494,508 | B2 | 2/2009 | Zeegers | |
| 7,507,248 | B2 | 3/2009 | Beaurain et al. | |
| 7,594,931 | B2 | 9/2009 | Louis et al. | |
| 7,625,381 | B2 | 12/2009 | Michelson | |
| 7,632,282 | B2 | 12/2009 | Dinville | |
| 7,651,497 | B2 | 1/2010 | Michelson | |
| 7,662,182 | B2 | 2/2010 | Zubok et al. | |
| 7,662,185 | B2 | 2/2010 | Alfaro et al. | |
| 7,682,396 | B2 | 3/2010 | Beaurain et al. | |
| 7,695,516 | B2 | 4/2010 | Zeegers | |
| 7,695,518 | B2 | 4/2010 | Gau | |
| 7,704,255 | B2 | 4/2010 | Michelson | |
| 7,842,088 | B2 | 11/2010 | Rashbaum et al. | |
| 7,846,188 | B2 | 12/2010 | Moskowitz et al. | |
| 8,002,835 | B2 | 8/2011 | Zeegers | |
| 8,075,618 | B2 | 12/2011 | Trieu et al. | |
| 8,147,556 | B2 | 4/2012 | Louis et al. | |
| 8,162,988 | B2 | 4/2012 | Delecrin et al. | |
| 8,221,422 | B2 | 7/2012 | Mangione | |
| 8,221,457 | B2 | 7/2012 | Delecrin et al. | |
| 8,241,359 | B2 | 8/2012 | Davis et al. | |
| 8,257,439 | B2 | 9/2012 | Zeegers | |
| 8,257,443 | B2 | 9/2012 | Kamran et al. | |
| 8,262,700 | B2 | 9/2012 | Cho et al. | |
| 8,267,999 | B2 | 9/2012 | Beaurain et al. | |
| 8,303,663 | B2 | 11/2012 | Jimenez et al. | |
| 8,313,528 | B1 * | 11/2012 | Wensel | 623/17.11 |
| 8,323,345 | B2 | 12/2012 | Sledge | |
| 8,328,872 | B2 | 12/2012 | Duffield et al. | |
| 8,333,804 | B1 * | 12/2012 | Wensel | 623/17.11 |
| 8,343,197 | B2 * | 1/2013 | Gonzalez-Hernandez | 606/286 |
| 8,343,219 | B2 | 1/2013 | Allain et al. | |
| 8,409,288 | B2 | 4/2013 | Davis et al. | |
| 8,430,915 | B2 | 4/2013 | Beaurain et al. | |
| 8,439,931 | B2 | 5/2013 | Dinville | |
| 8,465,546 | B2 | 6/2013 | Jodaitis et al. | |
| 2002/0059938 | A1 | 5/2002 | Fogarty et al. | |
| 2003/0195627 | A1 | 10/2003 | Ralph et al. | |
| 2004/0054411 | A1 | 3/2004 | Kelly et al. | |
| 2004/0068258 | A1 | 4/2004 | Schlapfer et al. | |
| 2004/0082953 | A1 | 4/2004 | Petit | |
| 2004/0093087 | A1 | 5/2004 | Ferree et al. | |
| 2004/0210219 | A1 | 10/2004 | Bray | |
| 2005/0101960 | A1 | 5/2005 | Fiere et al. | |
| 2005/0107788 | A1 | 5/2005 | Beaurain et al. | |
| 2005/0197706 | A1 | 9/2005 | Hovorka et al. | |
| 2005/0251258 | A1 | 11/2005 | Jackson | |
| 2006/0030851 | A1 | 2/2006 | Bray et al. | |
| 2006/0085071 | A1 * | 4/2006 | Lechmann et al. | 623/17.11 |
| 2006/0271053 | A1 | 11/2006 | Schlapfer et al. | |
| 2006/0282074 | A1 | 12/2006 | Renaud et al. | |
| 2007/0016295 | A1 | 1/2007 | Boyd | |