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(54) **SELF-PUNCHING BONE ANCHOR INSERTER**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

749,624 A 1/1904 McCullough
1,308,798 A 7/1919 Masland
(Continued)

FOREIGN PATENT DOCUMENTS

DE 3131496 A1 2/1983
DE 4231101 A1 3/1994
(Continued)

OTHER PUBLICATIONS

Burkinshaw, U.S. Appl. No. 60/418,545, filed Oct. 15, 2002.
(Continued)

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(57) **CLAIM**

The ornamental design for a self-punching bone anchor inserter, as shown and described.

DESCRIPTION

FIG. 1 is a front perspective view of a self-punching bone anchor inserted of our new design;
FIG. 2 is a front elevational view thereof;
FIG. 3 is a rear elevational view thereof;
FIG. 4 is a right side elevational view thereof;
FIG. 5 is a left side elevational view thereof;
FIG. 6 is a top plan view thereof; and,
FIG. 7 is a bottom plan view thereof.

The broken lines in FIGS. 1-7 illustrate portions of the self-punching bone anchor inserter that form no part of the claimed design. The dot-dash lines illustrate boundary lines and form no part of the claimed design. The broken line break lines indicate a symbolic break in length. The appearance of any portion of the article between the broken line break lines forms no part of the claimed design.

1 Claim, 4 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

1,624,530 A	4/1927	Caruso	5,409,494 A	4/1995	Morgan
2,073,903 A	3/1937	O'Neil	5,417,691 A	5/1995	Hayhurst
2,267,925 A	12/1941	Johnston	5,423,860 A	6/1995	Lizardi et al.
2,382,019 A	8/1945	Miller	5,437,677 A	8/1995	Shearer et al.
2,494,229 A	1/1950	Collison	5,441,502 A	8/1995	Bartlett
2,515,365 A	7/1950	Zublin	5,443,482 A	8/1995	Stone et al.
2,547,571 A	4/1951	Ettinger	5,458,604 A	10/1995	Schmieding
2,808,632 A	10/1957	Cline	5,464,407 A	11/1995	McGuire
2,833,284 A	5/1958	Springer	5,464,425 A	11/1995	Skiba
3,384,085 A	5/1968	Hall	5,464,426 A	11/1995	Bonutti
3,461,875 A	8/1969	Hall	5,466,243 A	11/1995	Schmieding et al.
3,554,192 A	1/1971	Isberner	5,472,452 A	12/1995	Trott
3,580,256 A	5/1971	Wilkinson et al.	5,486,197 A	1/1996	Le et al.
3,608,095 A	9/1971	Barry	5,488,761 A	2/1996	Leone
3,659,597 A	5/1972	Wolfers	5,496,348 A	3/1996	Bonutti
3,750,671 A	8/1973	Hedrick	5,505,736 A	4/1996	Reimels et al.
3,810,456 A	5/1974	Karman	5,520,693 A	5/1996	McGuire et al.
3,845,772 A	11/1974	Smith	5,520,700 A	5/1996	Beyar et al.
3,867,932 A	2/1975	Huene	5,522,846 A	6/1996	Bonutti
3,892,232 A	7/1975	Neufeld	5,527,316 A	6/1996	Stone et al.
3,976,079 A	8/1976	Samuels et al.	5,527,343 A	6/1996	Bonutti
4,265,231 A	5/1981	Scheller, Jr. et al.	5,529,580 A	6/1996	Kusunoki et al.
4,328,839 A	5/1982	Lyons et al.	5,531,759 A	7/1996	Kensey et al.
4,483,562 A	11/1984	Schoolman	5,534,012 A	7/1996	Bonutti
4,489,446 A	12/1984	Reed	5,540,703 A	7/1996	Barker, Jr. et al.
4,541,423 A	9/1985	Barber	5,545,178 A	8/1996	Kensey et al.
4,608,972 A	9/1986	Small	5,548,862 A	8/1996	Curtis
4,611,515 A	9/1986	Marbourg, Jr.	5,569,269 A	10/1996	Hart et al.
4,646,738 A	3/1987	Trott	5,569,306 A	10/1996	Thal
4,706,659 A	11/1987	Matthews et al.	5,570,706 A	11/1996	Howell
4,741,330 A	5/1988	Hayhurst	5,571,111 A	11/1996	Aboczky
4,748,872 A	6/1988	Brown	5,573,542 A	11/1996	Stevens
4,751,922 A	6/1988	DiPietropolo	5,575,819 A	11/1996	Amis
4,781,182 A	11/1988	Purnell et al.	5,584,695 A	12/1996	Lal Sachdeva et al.
4,823,780 A	4/1989	Odensten et al.	5,584,835 A	12/1996	Greenfield
4,863,471 A	9/1989	Mansat	5,601,557 A	2/1997	Hayhurst
4,872,451 A	10/1989	Moore et al.	5,601,561 A	2/1997	Terry et al.
4,946,462 A	8/1990	Watanabe	5,618,314 A	4/1997	Harwin et al.
5,002,546 A	3/1991	Romano	5,645,545 A	7/1997	Bryant
5,021,059 A	6/1991	Kensey et al.	5,645,589 A	7/1997	Li
5,030,219 A	7/1991	Matsen, III et al.	5,647,874 A	7/1997	Hayhurst
5,037,422 A	8/1991	Hayhurst et al.	5,649,963 A	7/1997	McDevitt
5,037,423 A	8/1991	Kenna	5,658,313 A	8/1997	Thal
5,061,277 A	10/1991	Carpentier et al.	5,662,658 A	9/1997	Wenstrom, Jr.
5,064,431 A	11/1991	Gilbertson et al.	5,665,110 A	9/1997	Chervitz et al.
5,122,134 A	6/1992	Borzone et al.	5,665,111 A	9/1997	Ray et al.
5,123,914 A	6/1992	Cope	5,665,112 A	9/1997	Thal
5,133,720 A	7/1992	Greenberg	5,667,509 A	9/1997	Westin
5,139,520 A	8/1992	Rosenberg	5,674,279 A	10/1997	Wright et al.
5,141,520 A	8/1992	Goble et al.	5,681,320 A	10/1997	McGuire
5,163,940 A	11/1992	Bourque	5,681,352 A	10/1997	Clancy, III et al.
5,190,548 A	3/1993	Davis	5,683,401 A	11/1997	Schmieding et al.
5,203,595 A	4/1993	Borzone et al.	5,683,418 A	11/1997	Luscombe et al.
5,203,787 A	4/1993	Noblitt et al.	5,683,419 A	11/1997	Thal
RE34,293 E	6/1993	Goble et al.	5,690,676 A	11/1997	DiPoto et al.
5,234,435 A	8/1993	Seagrave, Jr.	5,690,677 A	11/1997	Schmieding et al.
5,259,846 A	11/1993	Granger et al.	5,695,513 A	12/1997	Johnson et al.
5,269,785 A	12/1993	Bonutti	5,699,657 A	12/1997	Paulson
5,269,809 A	12/1993	Hayhurst et al.	5,709,708 A	1/1998	Thal
5,300,077 A	4/1994	Howell	5,713,905 A	2/1998	Goble et al.
5,314,429 A	5/1994	Goble	5,716,397 A	2/1998	Myers
5,320,115 A	6/1994	Kenna	5,718,717 A	2/1998	Bonutti
5,320,626 A	6/1994	Schmieding	5,720,765 A	2/1998	Thal
5,324,308 A	6/1994	Pierce	5,725,541 A	3/1998	Anspach, III et al.
5,350,383 A	9/1994	Schmieding et al.	5,728,136 A	3/1998	Thal
RE34,762 E	10/1994	Goble et al.	5,732,606 A	3/1998	Chiang
5,374,269 A	12/1994	Rosenberg	5,733,306 A	3/1998	Bonutti
5,385,567 A	1/1995	Goble	5,733,307 A	3/1998	Dinsdale
5,391,170 A	2/1995	McGuire et al.	5,749,899 A	5/1998	Bardin et al.
5,391,171 A	2/1995	Schmieding	5,755,724 A	5/1998	Yoon
RE34,871 E	3/1995	McGuire et al.	5,755,731 A	5/1998	Grinberg
5,395,188 A	3/1995	Bailey et al.	5,766,221 A	6/1998	Benderev et al.
5,403,317 A	4/1995	Bonutti	5,782,862 A	7/1998	Bonutti
5,403,348 A	4/1995	Bonutti	5,782,864 A	7/1998	Lizardi
5,405,359 A	4/1995	Pierce	5,782,866 A	7/1998	Wenstrom, Jr.
			5,797,918 A	8/1998	McGuire et al.
			5,810,825 A	9/1998	Huebner
			5,814,056 A	9/1998	Prosst et al.
			5,836,953 A	11/1998	Yoon

(56)

References Cited

U.S. PATENT DOCUMENTS

5,851,208	A	12/1998	Trott	6,638,283	B2	10/2003	Thal
5,885,294	A	3/1999	Pedlick et al.	6,641,597	B2	11/2003	Burkhart et al.
5,888,034	A	3/1999	Greenberg	6,660,023	B2	12/2003	McDevitt et al.
5,891,168	A	4/1999	Thal	6,712,822	B2	3/2004	Re et al.
5,897,574	A	4/1999	Bonutti	6,716,234	B2	4/2004	Grafton et al.
5,906,626	A	5/1999	Carrillo	6,740,090	B1	5/2004	Cragg et al.
5,921,986	A	7/1999	Bonutti	6,780,188	B2	8/2004	Clark et al.
5,928,244	A	7/1999	Tovey et al.	6,780,198	B1	8/2004	Gregoire et al.
5,941,139	A	8/1999	Vodehnal	6,790,210	B1	9/2004	Cragg et al.
5,948,002	A	9/1999	Bonutti	6,805,697	B1	10/2004	Helm et al.
5,951,559	A	9/1999	Burkhart	6,818,010	B2	11/2004	Eichhorn et al.
5,968,078	A	10/1999	Grotz	6,824,552	B2	11/2004	Robison et al.
5,970,697	A	10/1999	Jacobs et al.	6,830,570	B1	12/2004	Frey et al.
5,980,539	A	11/1999	Kontos	6,863,672	B2	3/2005	Reiley et al.
5,980,558	A	11/1999	Wiley	6,878,150	B1	4/2005	McGuire et al.
5,980,559	A	11/1999	Bonutti	6,887,259	B2	5/2005	Lizardi
5,989,252	A	11/1999	Fumex	6,893,445	B1	5/2005	Revie et al.
5,993,451	A	11/1999	Burkhart	6,899,716	B2	5/2005	Cragg
5,997,541	A	12/1999	Schenk	6,921,403	B2	7/2005	Cragg et al.
6,007,566	A	12/1999	Wenstrom, Jr.	6,923,811	B1	8/2005	Carl et al.
6,007,567	A	12/1999	Bonutti	6,923,814	B1	8/2005	Hildebrand et al.
6,010,515	A	1/2000	Swain et al.	6,936,052	B2	8/2005	Gellman et al.
6,010,525	A	1/2000	Bonutti et al.	6,955,683	B2	10/2005	Bonutti
6,019,767	A	2/2000	Howell	6,960,214	B2	11/2005	Burkinshaw
6,024,758	A	2/2000	Thal	6,972,027	B2	12/2005	Fallin et al.
6,045,574	A	4/2000	Thal	6,991,636	B2	1/2006	Rose
6,053,922	A	4/2000	Krause et al.	6,994,719	B2	2/2006	Grafton
6,068,642	A	5/2000	Johnson et al.	6,994,725	B1	2/2006	Goble
6,077,292	A	6/2000	Bonutti	6,995,683	B2	2/2006	Smithson et al.
6,083,522	A	7/2000	Chu et al.	7,008,431	B2	3/2006	Simonson
6,120,511	A	9/2000	Chan	7,025,770	B2	4/2006	McGuire et al.
6,143,017	A	11/2000	Thal	7,029,490	B2	4/2006	Grafton et al.
6,146,385	A	11/2000	Torrie et al.	7,048,754	B2	5/2006	Martin et al.
6,152,949	A	11/2000	Bonutti	7,060,073	B2	6/2006	Frey et al.
6,156,039	A	12/2000	Thal	7,067,132	B2	6/2006	Grabstein et al.
6,156,056	A	12/2000	Kearns et al.	7,077,863	B2	7/2006	Schmieding et al.
6,159,234	A	12/2000	Bonutti et al.	7,087,058	B2	8/2006	Cragg
6,183,461	B1	2/2001	Matsuura et al.	7,087,073	B2	8/2006	Bonutti
6,187,011	B1	2/2001	Torrie	7,204,839	B2	4/2007	Dreyfuss et al.
6,189,422	B1	2/2001	Stihl	7,214,232	B2	5/2007	Bowman et al.
6,210,415	B1	4/2001	Bester	7,217,279	B2	5/2007	Reese
6,224,608	B1	5/2001	Ciccolella et al.	7,217,290	B2	5/2007	Bonutti
6,245,081	B1	6/2001	Bowman et al.	7,235,091	B2	6/2007	Thornes
6,254,604	B1	7/2001	Howell	7,241,297	B2	7/2007	Shaolian et al.
6,306,138	B1	10/2001	Clark et al.	7,258,692	B2	8/2007	Thelen et al.
6,343,482	B1	2/2002	Endo et al.	7,261,016	B2	8/2007	Miller
6,352,538	B2	3/2002	McGuire et al.	7,309,338	B2	12/2007	Cragg
6,358,253	B1	3/2002	Torrie et al.	7,326,215	B2	2/2008	Myers et al.
6,419,678	B1	7/2002	Asfora	7,331,263	B2	2/2008	Erickson et al.
6,419,684	B1	7/2002	Heisler et al.	7,488,322	B2	2/2009	Brunnett et al.
6,423,073	B2	7/2002	Bowman	7,488,329	B2	2/2009	Thelen et al.
6,436,100	B1	8/2002	Berger	7,494,490	B2	2/2009	Justin
6,436,124	B1	8/2002	Anderson et al.	7,500,977	B2	3/2009	Assell et al.
6,440,138	B1	8/2002	Reiley et al.	7,503,920	B2	3/2009	Siegal
6,440,141	B1	8/2002	Philippon	7,520,898	B2	4/2009	Re et al.
6,447,518	B1	9/2002	Krause et al.	7,563,266	B2	7/2009	Camino et al.
6,464,713	B2	10/2002	Bonutti	7,578,836	B2	8/2009	Justin et al.
6,475,230	B1	11/2002	Bonutti et al.	7,585,300	B2	9/2009	Cha
6,478,800	B1	11/2002	Fraser et al.	7,601,155	B2	10/2009	Petersen
6,485,504	B1	11/2002	Johnson et al.	7,601,165	B2	10/2009	Stone
6,500,195	B2	12/2002	Bonutti	7,604,636	B1	10/2009	Walters et al.
RE37,963	E	1/2003	Thal	7,608,098	B1	10/2009	Stone et al.
6,508,830	B2	1/2003	Steiner	7,608,108	B2	10/2009	Bhatnagar et al.
6,511,498	B1	1/2003	Fumex	7,611,521	B2	11/2009	Lubbers et al.
6,517,578	B2	2/2003	Hein	7,621,912	B2	11/2009	Harms et al.
6,544,281	B2	4/2003	ElAttrache et al.	7,621,940	B2	11/2009	Harms et al.
6,554,852	B1	4/2003	Oberlander	7,651,509	B2	1/2010	Bojarski et al.
6,558,386	B1	5/2003	Cragg	7,651,515	B2	1/2010	Mack et al.
6,558,390	B2	5/2003	Cragg	7,658,751	B2	2/2010	Stone et al.
6,569,187	B1	5/2003	Bonutti et al.	7,666,189	B2	2/2010	Gerber et al.
6,572,635	B1	6/2003	Bonutti	7,678,134	B2	3/2010	Schmieding et al.
6,575,979	B1	6/2003	Cragg	7,749,250	B2	7/2010	Stone et al.
6,610,080	B2	8/2003	Morgan	7,776,049	B1	8/2010	Curran et al.
6,635,073	B2	10/2003	Bonutti	7,803,173	B2	9/2010	Burkhart et al.
6,638,279	B2	10/2003	Bonutti	7,811,312	B2	10/2010	Stevens et al.
				D627,459	S	11/2010	Uchida et al.
				7,857,830	B2	12/2010	Stone et al.
				D630,733	S	1/2011	Ahlgren
				7,875,057	B2	1/2011	Cook et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

7,875,058 B2	1/2011	Holmes, Jr.	2002/0019635 A1	2/2002	Wenstrom et al.
7,879,037 B2	2/2011	Brunnett et al.	2002/0188301 A1	12/2002	Dallara et al.
7,887,551 B2	2/2011	Bojarski et al.	2003/0032961 A1	2/2003	Pelo et al.
7,892,256 B2	2/2011	Grafton et al.	2003/0176919 A1	9/2003	Schmieding
7,901,431 B2	3/2011	Shumas	2003/0195565 A1	10/2003	Bonutti
7,905,903 B2	3/2011	Stone et al.	2003/0220646 A1	11/2003	Thelen et al.
7,905,904 B2	3/2011	Stone et al.	2003/0233098 A1	12/2003	Markworth
7,909,851 B2	3/2011	Stone et al.	2004/0010264 A1	1/2004	Acker et al.
7,914,539 B2	3/2011	Stone et al.	2004/0010287 A1	1/2004	Bonutti
7,918,874 B2	4/2011	Siegal	2004/0030346 A1	2/2004	Frey et al.
7,959,650 B2	6/2011	Kaiser et al.	2004/0073227 A1	4/2004	Dreyfuss et al.
7,963,972 B2	6/2011	Foerster et al.	2004/0073306 A1	4/2004	Eichhorn et al.
7,981,117 B2	7/2011	Newton et al.	2004/0092933 A1	5/2004	Shaolian et al.
7,981,140 B2	7/2011	Burkhart	2004/0138683 A1	7/2004	Shelton et al.
7,993,369 B2	8/2011	Dreyfuss	2004/0193217 A1	9/2004	Lubbers et al.
8,002,733 B2	8/2011	Kraft et al.	2004/0260300 A1	12/2004	Gorensek et al.
8,012,174 B2	9/2011	ElAttrache et al.	2004/0267277 A1	12/2004	Zannis et al.
8,034,076 B2	10/2011	Criscuolo et al.	2005/0015153 A1	1/2005	Goble et al.
8,043,253 B2	10/2011	Kraft et al.	2005/0033362 A1	2/2005	Grafton
8,057,500 B2	11/2011	Mitusina	2005/0070906 A1	3/2005	Clark et al.
8,088,130 B2	1/2012	Kaiser et al.	2005/0137600 A1	6/2005	Jacobs et al.
8,114,088 B2	2/2012	Miller	2005/0137601 A1	6/2005	Assell et al.
8,118,836 B2	2/2012	Denham et al.	2005/0143741 A1	6/2005	Timmermans et al.
8,123,750 B2	2/2012	Norton et al.	2005/0177168 A1	8/2005	Brunnett et al.
8,128,640 B2	3/2012	Harris et al.	2005/0187537 A1	8/2005	Loeb et al.
8,128,658 B2	3/2012	Kaiser et al.	2005/0203527 A1	9/2005	Garrison et al.
8,128,669 B2	3/2012	Bonutti	2005/0228399 A1	10/2005	Kubo et al.
8,133,231 B2	3/2012	Martinek et al.	2005/0251159 A1	11/2005	Ewers et al.
8,137,382 B2	3/2012	Denham et al.	2005/0251208 A1	11/2005	Elmer et al.
8,147,514 B2	4/2012	Bonutti	2006/0001518 A1	1/2006	Hayashi et al.
8,162,997 B2	4/2012	Struhl	2006/0004369 A1	1/2006	Patel et al.
8,172,846 B2	5/2012	Brunnett et al.	2006/0015108 A1	1/2006	Bonutti
8,231,654 B2	7/2012	Kaiser et al.	2006/0074434 A1	4/2006	Wenstrom et al.
8,231,674 B2	7/2012	Albertorio et al.	2006/0100631 A1	5/2006	Sullivan et al.
8,241,305 B2	8/2012	Stone	2006/0155329 A1	7/2006	Grafton et al.
8,267,959 B2	9/2012	Fallman	2006/0178748 A1	8/2006	Dinger et al.
8,273,106 B2	9/2012	Stone et al.	2006/0189993 A1	8/2006	Stone
8,292,921 B2	10/2012	Stone et al.	2006/0190042 A1	8/2006	Stone et al.
8,298,262 B2	10/2012	Stone et al.	2006/0212055 A1	9/2006	Karabey et al.
8,303,604 B2	11/2012	Stone et al.	2006/0247641 A1	11/2006	Re et al.
8,317,825 B2	11/2012	Stone	2006/0247642 A1	11/2006	Stone et al.
8,337,525 B2	12/2012	Stone et al.	2006/0282085 A1	12/2006	Stone et al.
8,361,113 B2	1/2013	Stone et al.	2006/0293689 A1	12/2006	Miller et al.
8,372,124 B2	2/2013	Paulk et al.	2007/0010843 A1	1/2007	Green
8,398,678 B2	3/2013	Baker et al.	2007/0010857 A1	1/2007	Sugimoto et al.
8,439,976 B2	5/2013	Albertorio et al.	2007/0032800 A1	2/2007	Ortiz et al.
8,512,375 B2	8/2013	Torrie et al.	2007/0093840 A1	4/2007	Pacelli et al.
8,562,647 B2	10/2013	Kaiser et al.	2007/0191853 A1	8/2007	Stone
8,591,545 B2	11/2013	Lunn et al.	2007/0213734 A1	9/2007	Bleich et al.
8,591,578 B2	11/2013	Albertorio et al.	2007/0213735 A1	9/2007	Saadat et al.
8,623,051 B2	1/2014	Bojarski et al.	2007/0225721 A1	9/2007	Thelen et al.
8,632,569 B2	1/2014	Stone et al.	2007/0233151 A1	10/2007	Chudik
8,647,368 B2	2/2014	Ducharme	2007/0260259 A1	11/2007	Fanton et al.
8,663,324 B2	3/2014	Schmieding et al.	2007/0288031 A1	12/2007	Dreyfuss et al.
8,668,718 B2	3/2014	Euteneuer et al.	2008/0027446 A1	1/2008	Stone et al.
8,702,718 B2	4/2014	Bhatnagar et al.	2008/0027457 A1	1/2008	Dienst et al.
8,753,372 B2	6/2014	Petros	2008/0046009 A1	2/2008	Albertorio et al.
8,801,800 B2	8/2014	Bagga et al.	2008/0058816 A1	3/2008	Philippon et al.
8,814,905 B2	8/2014	Sengun et al.	2008/0065080 A1	3/2008	Assell et al.
8,821,543 B2	9/2014	Hernandez et al.	2008/0065092 A1	3/2008	Assell et al.
8,821,544 B2	9/2014	Sengun et al.	2008/0071282 A1	3/2008	Assell et al.
8,821,545 B2	9/2014	Sengun	2008/0109037 A1	5/2008	Steiner et al.
8,828,052 B2	9/2014	Caborn et al.	2008/0114399 A1	5/2008	Bonutti
8,961,538 B2	2/2015	Koogole, Jr. et al.	2008/0132932 A1	6/2008	Hoepfner et al.
8,986,327 B2	3/2015	Karasic et al.	2008/0140078 A1	6/2008	Nelson et al.
9,173,652 B2	11/2015	Lombardo et al.	2008/0140116 A1	6/2008	Bonutti
9,357,992 B2	6/2016	Stone et al.	2008/0147063 A1	6/2008	Cauldwell et al.
D760,893 S	7/2016	Honda et al.	2008/0154275 A1	6/2008	Assell et al.
9,451,938 B2	9/2016	Overes et al.	2008/0161814 A1	7/2008	McAllister et al.
D785,175 S	4/2017	Zhou et al.	2008/0167660 A1	7/2008	Moreau et al.
D827,136 S	8/2018	Ueno et al.	2008/0188854 A1	8/2008	Moser
D846,116 S	4/2019	Naughton et al.	2008/0188935 A1	8/2008	Saylor et al.
D854,153 S	7/2019	Hsieh	2008/0208253 A1	8/2008	Dreyfuss et al.
10,470,786 B2	11/2019	Deeny et al.	2008/0249481 A1	10/2008	Crainich et al.
D902,405 S *	11/2020	Renwick	2008/0255613 A1	10/2008	Kaiser et al.
			2008/0275431 A1	11/2008	Stone et al.
			2008/0306483 A1	12/2008	Iannarone
			2008/0312689 A1	12/2008	Denham et al.
			2009/0012526 A1	1/2009	Fletcher

(56)

References Cited

U.S. PATENT DOCUMENTS

2009/0018654	A1	1/2009	Schmieding et al.	2011/0224799	A1	9/2011	Stone
2009/0024130	A1	1/2009	Lombardo	2011/0264141	A1	10/2011	Denham et al.
2009/0054928	A1	2/2009	Denham et al.	2011/0270278	A1	11/2011	Overes et al.
2009/0062854	A1	3/2009	Kaiser et al.	2011/0270293	A1	11/2011	Malla et al.
2009/0076514	A1	3/2009	Haines	2011/0270306	A1	11/2011	Denham et al.
2009/0082805	A1	3/2009	Kaiser et al.	2011/0295279	A1	12/2011	Stone et al.
2009/0099554	A1	4/2009	Forster et al.	2011/0301708	A1	12/2011	Stone et al.
2009/0105775	A1	4/2009	Mitchell et al.	2011/0319896	A1	12/2011	Papenfuss et al.
2009/0131940	A1	5/2009	Brunnett et al.	2012/0004672	A1	1/2012	Giap et al.
2009/0138015	A1	5/2009	Conner et al.	2012/0041485	A1	2/2012	Kaiser et al.
2009/0138042	A1	5/2009	Thal	2012/0041486	A1	2/2012	Stone et al.
2009/0143784	A1	6/2009	Petersen et al.	2012/0046693	A1	2/2012	Denham et al.
2009/0149858	A1	6/2009	Fanelli et al.	2012/0053630	A1	3/2012	Denham et al.
2009/0157081	A1	6/2009	Homan et al.	2012/0053641	A1	3/2012	Meridew
2009/0160112	A1	6/2009	Ostrovsky	2012/0059417	A1	3/2012	Norton et al.
2009/0171359	A1	7/2009	Sterrett	2012/0059418	A1	3/2012	Denham et al.
2009/0192468	A1	7/2009	Stone	2012/0071976	A1	3/2012	May et al.
2009/0194446	A1	8/2009	Miller et al.	2012/0089193	A1	4/2012	Stone et al.
2009/0198258	A1	8/2009	Workman	2012/0095470	A1	4/2012	Kaiser et al.
2009/0216238	A1	8/2009	Stark	2012/0095556	A1	4/2012	Re et al.
2009/0216243	A1	8/2009	Re	2012/0109142	A1	5/2012	Dayan
2009/0234451	A1	9/2009	Manderson	2012/0109156	A1	5/2012	Overes et al.
2009/0248029	A1	10/2009	Paulos	2012/0109194	A1	5/2012	Miller et al.
2009/0265002	A1	10/2009	Re et al.	2012/0116452	A1	5/2012	Stone et al.
2009/0306671	A1	12/2009	McCormack et al.	2012/0123474	A1	5/2012	Zajac et al.
2009/0306711	A1	12/2009	Stone et al.	2012/0150203	A1	6/2012	Brady et al.
2009/0312763	A1	12/2009	McCormack et al.	2012/0150297	A1	6/2012	Denham et al.
2009/0312776	A1	12/2009	Kaiser et al.	2012/0150301	A1	6/2012	Gamache et al.
2009/0312792	A1	12/2009	Fallin et al.	2012/0165866	A1	6/2012	Kaiser et al.
2009/0318961	A1	12/2009	Stone et al.	2012/0165867	A1	6/2012	Denham et al.
2009/0326538	A1	12/2009	Sennett et al.	2012/0165938	A1	6/2012	Denham et al.
2010/0049196	A1	2/2010	Re	2012/0172986	A1	7/2012	Stone et al.
2010/0057045	A1	3/2010	Albritton, IV et al.	2012/0179254	A1	7/2012	Saliman
2010/0076440	A1	3/2010	Pamichev et al.	2012/0180291	A1	7/2012	Oren et al.
2010/0082033	A1	4/2010	Germain	2012/0197271	A1	8/2012	Astorino et al.
2010/0087857	A1	4/2010	Stone et al.	2012/0203230	A1*	8/2012	Adams A61B 17/32002 606/80
2010/0121332	A1	5/2010	Crainich et al.	2012/0203288	A1	8/2012	Lange et al.
2010/0121333	A1	5/2010	Crainich et al.	2012/0209325	A1	8/2012	Gagliano et al.
2010/0145384	A1	6/2010	Stone et al.	2012/0245585	A1	9/2012	Kaiser et al.
2010/0152739	A1	6/2010	Sidebotham et al.	2012/0253355	A1	10/2012	Murray et al.
2010/0160962	A1	6/2010	Dreyfuss et al.	2012/0290002	A1	11/2012	Astorino
2010/0185238	A1	7/2010	Cauldwell et al.	2012/0290004	A1	11/2012	Lombardo et al.
2010/0185283	A1	7/2010	Baird et al.	2012/0290006	A1	11/2012	Collins et al.
2010/0191241	A1	7/2010	McCormack et al.	2012/0296345	A1	11/2012	Wack et al.
2010/0211075	A1	8/2010	Stone	2012/0296427	A1	11/2012	Conner et al.
2010/0241121	A1	9/2010	Logan et al.	2012/0303046	A1	11/2012	Stone et al.
2010/0249786	A1	9/2010	Schmieding et al.	2013/0012962	A1	1/2013	Stone
2010/0268275	A1	10/2010	Stone et al.	2013/0018416	A1	1/2013	Lombardo et al.
2010/0292732	A1	11/2010	Hirotsuka et al.	2013/0023928	A1	1/2013	Dreyfuss
2010/0292792	A1	11/2010	Stone et al.	2013/0023929	A1	1/2013	Sullivan et al.
2010/0305709	A1	12/2010	Metzger et al.	2013/0023930	A1	1/2013	Stone et al.
2011/0015674	A1	1/2011	Howard et al.	2013/0035698	A1	2/2013	Stone et al.
2011/0015675	A1	1/2011	Howard et al.	2013/0046341	A1	2/2013	Stone et al.
2011/0022083	A1	1/2011	DiMatteo et al.	2013/0053897	A1	2/2013	Brown et al.
2011/0022084	A1	1/2011	Sengun et al.	2013/0072989	A1	3/2013	Overes et al.
2011/0046625	A1	2/2011	Boileau et al.	2013/0085568	A1	4/2013	Smith et al.
2011/0054526	A1	3/2011	Stone et al.	2013/0096611	A1	4/2013	Sullivan
2011/0071551	A1	3/2011	Singhatat et al.	2013/0096612	A1	4/2013	Zajac et al.
2011/0079627	A1	4/2011	Cardinale et al.	2013/0110165	A1	5/2013	Burkhart et al.
2011/0087247	A1	4/2011	Fung et al.	2013/0131722	A1	5/2013	Marchand et al.
2011/0087280	A1	4/2011	Albertorio	2013/0165972	A1	6/2013	Sullivan
2011/0087284	A1	4/2011	Stone et al.	2013/0190819	A1	7/2013	Norton
2011/0098727	A1	4/2011	Kaiser et al.	2013/0237997	A1	9/2013	Arai et al.
2011/0106089	A1	5/2011	Brunnett et al.	2013/0245700	A1	9/2013	Choinski
2011/0106153	A1	5/2011	Stone et al.	2013/0268000	A1	10/2013	Harner et al.
2011/0125189	A1	5/2011	Stoll, Jr. et al.	2013/0296931	A1	11/2013	Sengun
2011/0152927	A1	6/2011	Deng et al.	2013/0296936	A1	11/2013	Burkhart
2011/0160767	A1	6/2011	Stone et al.	2013/0317544	A1	11/2013	Ferguson et al.
2011/0160768	A1	6/2011	Stone et al.	2013/0325063	A1	12/2013	Norton et al.
2011/0184516	A1	7/2011	Baird et al.	2013/0345749	A1	12/2013	Sullivan et al.
2011/0208194	A1	8/2011	Steiner et al.	2014/0005720	A1	1/2014	Hirotsuka et al.
2011/0208239	A1	8/2011	Stone et al.	2014/0025107	A1	1/2014	Sack et al.
2011/0208240	A1	8/2011	Stone et al.	2014/0163679	A1	6/2014	Re et al.
2011/0218538	A1	9/2011	Sherman et al.	2014/0188163	A1	7/2014	Sengun
2011/0218625	A1	9/2011	Berelsman et al.	2014/0277161	A1	9/2014	Spratt et al.
				2015/0182265	A1	7/2015	Biedermann et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

2015/0359571 A1 12/2015 Biedermann et al.
 2016/0296223 A1 10/2016 Monitor et al.
 2019/0365428 A1 12/2019 Jackson

FOREIGN PATENT DOCUMENTS

DE	4243715	A1	7/1994
DE	19503504	A1	3/1996
EP	153831	A2	9/1985
EP	253526	A1	1/1988
EP	0440371	A1	8/1991
EP	0611551	A1	8/1994
EP	1155776	A2	11/2001
EP	1369089	A2	12/2003
EP	2544607	A1	1/2013
FR	1166884	A	11/1958
FR	2606996	A1	5/1988
FR	2676638	A1	11/1992
GB	2093353	A	9/1982
WO	95011631	A1	5/1995
WO	9722301	A1	6/1997
WO	0044291	A1	8/2000
WO	0128457	A1	4/2001
WO	03007861	A1	1/2003
WO	2007/010389	A1	1/2007
WO	2008128075	A1	10/2008
WO	2009105880	A1	9/2009
WO	2011112371	A1	9/2011
WO	2012134999	A1	10/2012
WO	2012158583	A1	11/2012

OTHER PUBLICATIONS

Pilgeram, Kyle Craig, U.S. Appl. No. 13/588,586, filed Aug. 17, 2012, titled "Soft Tissue Fixation Devices and Methods".
 BIOMET Sports Medicine: Micromax Flex Suture Anchor, (2008).
 Pilgeram, Kyle Craig, U.S. Appl. No. 13/588,592, filed Aug. 17, 2012, titled "Surgical Instruments and Methods of Use".
 European Search Report, EP 10173568, dated Nov. 30, 2010.
 Pilgeram, Kyle Craig, U.S. Appl. No. 13/783,804, filed Mar. 4,

2013, titled "Knotless Filamentary Fixation Devices, Assemblies and Systems and Methods of Assembly and Use".
 Chen et al., Poster No. 538, 54th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA Mar. 2008.
 Pilgeram, Kyle Craig, U.S. Appl. No. 61/679,336, filed Aug. 3, 2012, titled "Soft Tissue Fixation Device and Methods".
 Cole et al., American Journal of Sports Medicine, vol. XX, No. X, Apr. 2011, 10 pages.
 Perthes, German Surgery Periodical, vol. 85, Commemorative Publication, pp. 2-18, 1906.
 Marchand et al., U.S. Appl. No. 13/303,849, filed Nov. 23, 2011, titled "Filamentary Suture Anchor".
 Perthes, Über Operationen bei habitueller Schulterluxation, Deutsch Zeitschrift für Chirurgie, vol. 85, 1906, pp. 199-227 (English translation provided.).
 International Search Report and Written Opinion for Application No. PCT/US2014/021231 dated Jun. 25, 2014.
 Sugaya et al., Journal of Bone and Joint Surgery, vol. 85-A, No. 5, pp. 878-884, May 2003.
 Chen et al., Journal of Orthopaedic Research, pp. 1432-1438, Nov. 2009.
 ConMed: Linvatec: Shoulder Restoration System Y-Knot 1.3mm All Suture Anchor, © 2011 Linvatec Corporation, a subsidiary of ConMed Corporation—CBR 3057 (4 pages).
 Medtronic, The VISAO High-Speed Otologic Drill Catalog, 2007, 12 pages.
 Steiner et al., U.S. Appl. No. 13/085,882, filed Apr. 13, 2011, titled "Flexible ACL Instrumentation, Kit and Method".
 International Search Report PCT/US2010/042264, dated Sep. 30, 2010.
 Extended European Search Report for Application No. EP 12164104 dated Jul. 11, 2012.
 Long et al., U.S. Appl. No. 13/368,730, filed Feb. 8, 2012, titled "Flexible Microdrilling Instrumentation, Kits and Methods".
 Charles McCartney, U.S. Appl. No. 13/792,982, filed Mar. 11, 2013, titled "Filamentary Fixation Device and Assembly and Method of Assembly, Manufacture and Use".
 HHS Tube, Fort Wayne Metals Research Products Corp., 2009, 2 pages.
 Extended European Search Report for Application No. EP14159656 dated Jun. 6, 2014.

* cited by examiner

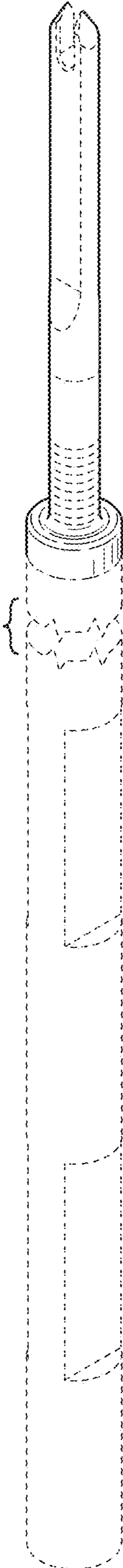


FIG. 1

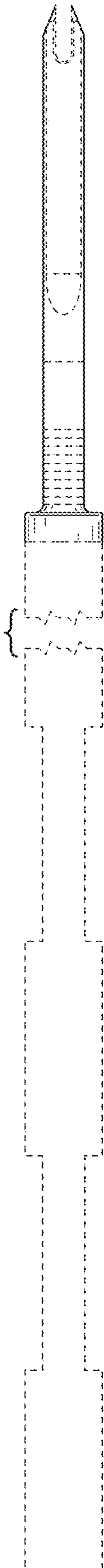


FIG. 2

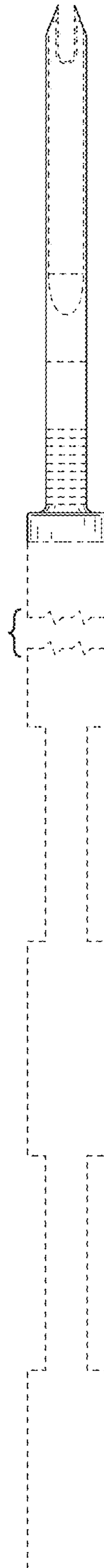


FIG. 3

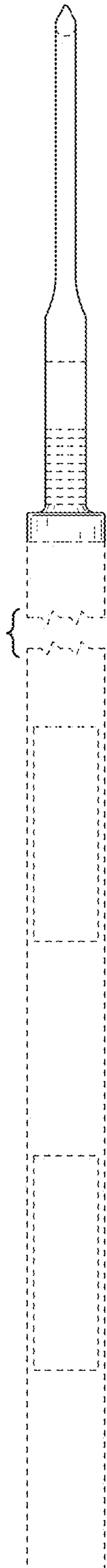


FIG. 4

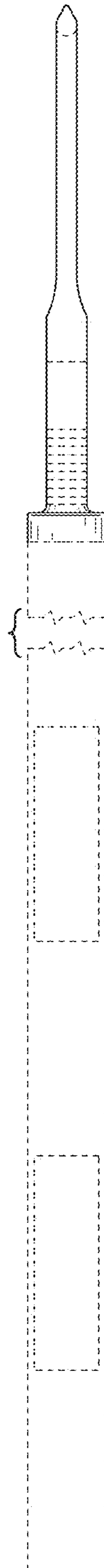


FIG. 5

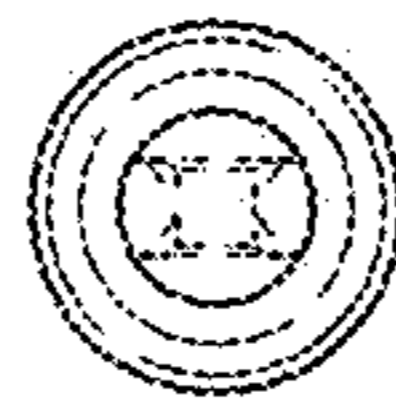


FIG. 6

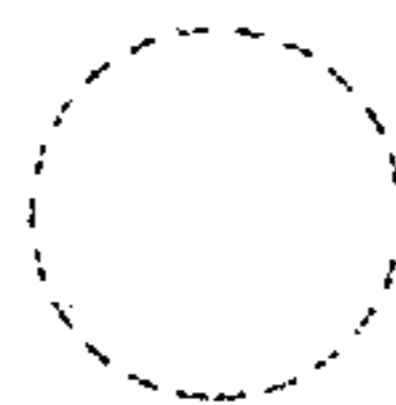


FIG. 7