US009408649B2

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

(10) **Patent No.: US 9,408,649 B2**
(45) **Date of Patent: Aug. 9, 2016**

(54) **RADIOLUCENT SCREW WITH RADIOPAQUE MARKER**

(75) Inventors: **Brent A. Felix**, Sandy, UT (US); **David N. McKean**, Bountiful, UT (US); **David A. Hershgold**, Draper, UT (US)

(73) Assignee: **Innovasis, Inc.**, Salt Lake City, UT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1067 days.

(21) Appl. No.: **12/208,986**

(22) Filed: **Sep. 11, 2008**

(65) **Prior Publication Data**

US 2010/0063550 A1 Mar. 11, 2010

(51) **Int. Cl.**

A61B 17/86	(2006.01)
A61B 17/70	(2006.01)
A61B 19/00	(2006.01)

(52) **U.S. Cl.**

CPC ***A61B 17/8685*** (2013.01); ***A61B 17/7032*** (2013.01); ***A61B 17/7037*** (2013.01); ***A61B 17/866*** (2013.01); *A61B 17/864* (2013.01); *A61B 17/8625* (2013.01); *A61B 19/54* (2013.01)

(58) **Field of Classification Search**

CPC A61B 17/8625; A61B 17/864; A61B 17/866; A61B 17/86; A61B 17/8685

USPC 72/46, 135, 137, 371; 264/250, 257, 264/258, 271.1, 279.1; 470/8, 9, 10, 11, 12; 411/82.2, 901, 902, 903; 623/1.22, 623/16.11

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,828,287	A	*	10/1931	MacBean	470/11
2,405,909	A	*	8/1946	Smith et al.	156/171
3,455,360	A	*	7/1969	Simons	411/301
4,063,838	A	*	12/1977	Michael	403/343
4,265,981	A	*	5/1981	Campbell	428/591
4,307,979	A	*	12/1981	Killmeyer	405/259.1
4,329,743	A		5/1982	Alexander et al.	
4,403,606	A		9/1983	Woo et al.	
4,512,038	A		4/1985	Alexander et al.	
4,623,290	A	*	11/1986	Kikuzawa et al.	411/350
4,778,637	A	*	10/1988	Adams et al.	264/136
4,863,330	A	*	9/1989	Olez et al.	411/424
4,863,470	A		9/1989	Carter	
5,084,051	A	*	1/1992	Tormala et al.	606/77

(Continued)

FOREIGN PATENT DOCUMENTS

DE	44 43 051	A1	10/1996
DE	100 65 799	C1	4/2002

(Continued)

OTHER PUBLICATIONS

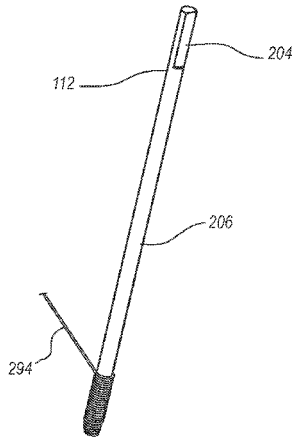
International Search and Written Opinion issued Feb. 19, 2010, PCT/US2009/056508, filed Sep. 10, 2009.

(Continued)

Primary Examiner — Edward Tolan

(74) *Attorney, Agent, or Firm* — Workman Nydegger

(57) **ABSTRACT**

A bone screw includes an elongate shaft extending longitudinally between a proximal end and an opposing distal end, the shaft bounding a first passageway at least partially extending between the proximal end and the distal end, the shaft being comprised of a radiolucent material. A core is disposed within the first passageway of the shaft, the core being comprised of a radiopaque material. A rounded head or a substantially U-shaped collar is either integrally formed with or is rigidly attached to the proximal end of the shaft.

13 Claims, 18 Drawing Sheets