



US008343224B2

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

(10) **Patent No.:** **US 8,343,224 B2**
(45) **Date of Patent:** **Jan. 1, 2013**

(54) **INTERVERTEBRAL IMPLANTS AND GRAFT DELIVERY SYSTEMS AND METHODS**

FOREIGN PATENT DOCUMENTS
WO WO 2011/116136 9/2011

(75) Inventors: **Jim R. Lynn**, San Clemente, CA (US);
Russell W. Nelson, Westlake Village, CA (US)

OTHER PUBLICATIONS

International Search Report for International Application No. PCT/US2011/028731 (a PCT counterpart of the present application) dated May 18, 2011.

(73) Assignee: **Pinnacle Spine Group, LLC**, Dallas, TX (US)

(Continued)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

Primary Examiner — Ellen C Hammond

(74) *Attorney, Agent, or Firm* — Knobbe, Martens, Olson & Bear, LLP

(21) Appl. No.: **13/049,693**

(22) Filed: **Mar. 16, 2011**

(57) **ABSTRACT**

(65) **Prior Publication Data**

US 2011/0230970 A1 Sep. 22, 2011

According to some embodiments, a method for promoting spinal fusion using a spinal implant comprises providing a spinal implant, wherein the spinal implant comprises an anterior wall, a posterior wall and two lateral walls configured to extend between the anterior wall and the posterior wall. In some embodiments, the spinal implant further comprises at least one internal chamber generally positioned between the anterior wall, the posterior wall and the two lateral walls, wherein the internal chamber being is adapted to receive at least one graft and/or other fill material. In some arrangements, the anterior wall of the spinal implant comprises at least one opening or hole that places the internal chamber in fluid communication with an exterior area or portion of the spinal implant. In one embodiment, at least one of the two lateral walls comprises an access port. The method additionally includes positioning the spinal implant between two adjacent vertebrae of a patient and directing at least one graft and/or other fill material into the internal chamber of the spinal implant through the access port. In some embodiments, at least a portion of the graft and/or other fill material delivered into the internal chamber is configured to exit through the one or more of the openings of the anterior wall.

Related U.S. Application Data

(60) Provisional application No. 61/314,509, filed on Mar. 16, 2010, provisional application No. 61/389,671, filed on Oct. 4, 2010.

(51) **Int. Cl.**
A61F 2/44 (2006.01)

(52) **U.S. Cl.** **623/17.16**; 606/99

(58) **Field of Classification Search** 623/17.11–17.16;
606/246

See application file for complete search history.

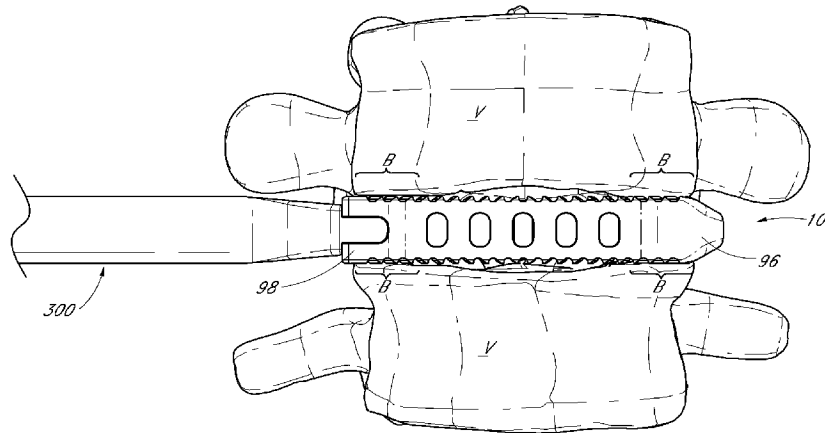
(56) **References Cited**

U.S. PATENT DOCUMENTS

- 5,123,926 A 6/1992 Pisharodi
- 5,683,394 A 11/1997 Rinner
- 5,716,415 A 2/1998 Steffee
- 5,772,661 A 6/1998 Michelson
- 5,776,199 A 7/1998 Michelson
- 5,860,973 A 1/1999 Michelson

(Continued)

20 Claims, 27 Drawing Sheets



U.S. PATENT DOCUMENTS

5,885,287	A	3/1999	Bagby	7,674,297	B2	3/2010	Falahee
5,888,223	A	3/1999	Bray, Jr.	7,758,644	B2	7/2010	Trieu
5,888,224	A	3/1999	Beckers et al.	7,776,093	B2	8/2010	Wolek et al.
5,888,227	A	3/1999	Cottle	7,776,095	B2	8/2010	Peterman et al.
5,895,427	A	4/1999	Kuslich et al.	8,308,805	B2	11/2012	Lynn et al.
5,910,315	A	6/1999	Stevenson et al.	2001/0001129	A1	5/2001	McKay et al.
5,928,284	A	7/1999	Mehdizadeh	2002/0103540	A1	8/2002	Cooper et al.
5,984,967	A	11/1999	Zdeblick et al.	2003/0083748	A1	5/2003	Lee et al.
6,019,792	A	2/2000	Cauthen	2003/0105527	A1*	6/2003	Bresina 623/17.16
6,033,438	A	3/2000	Bianchi et al.	2004/0034430	A1	2/2004	Falahee
6,056,749	A	5/2000	Kuslich	2004/0127993	A1	7/2004	Kast et al.
6,080,193	A	6/2000	Hochshuler et al.	2005/0119751	A1	6/2005	Lawson
6,143,031	A	11/2000	Knothe et al.	2005/0119753	A1	6/2005	McGahan et al.
6,146,420	A	11/2000	McKay	2006/0047341	A1	3/2006	Trieu
6,235,028	B1	5/2001	Brumfield et al.	2006/0064170	A1	3/2006	Smith et al.
6,245,108	B1	6/2001	Biscup	2007/0185580	A1	8/2007	Posel
6,428,542	B1	8/2002	Michelson	2007/0233263	A1	10/2007	Melkent
6,447,544	B1	9/2002	Michelson	2007/0293948	A1	12/2007	Bagga et al.
6,447,547	B1	9/2002	Michelson	2007/0293949	A1	12/2007	Salerni et al.
6,458,159	B1	10/2002	Thalgott	2008/0009880	A1	1/2008	Warnick et al.
6,461,359	B1	10/2002	Tribus	2008/0015701	A1	1/2008	Garcia et al.
6,478,823	B1	11/2002	Michelson	2008/0039948	A1	2/2008	Biedermann et al.
6,527,803	B1	3/2003	Crozet et al.	2008/0065219	A1	3/2008	Dye et al.
6,530,929	B1	3/2003	Justis et al.	2008/0077247	A1	3/2008	Murillo et al.
6,558,424	B2	5/2003	Thalgott	2008/0091211	A1	4/2008	Gately
6,562,041	B1	5/2003	Yonemura et al.	2008/0097610	A1	4/2008	Guyer et al.
6,592,586	B1	7/2003	Michelson	2008/0133015	A1	6/2008	Lechmann et al.
6,613,091	B1	9/2003	Zdeblick et al.	2008/0147194	A1	6/2008	Grotz et al.
6,616,695	B1	9/2003	Crozet et al.	2008/0154377	A1	6/2008	Voellmicke
6,676,703	B2	1/2004	Biscup	2008/0161927	A1	7/2008	Savage et al.
6,699,288	B2	3/2004	Moret	2008/0161933	A1	7/2008	Grotz et al.
6,719,794	B2	4/2004	Gerber	2008/0172127	A1	7/2008	Perez-Cruet et al.
6,730,127	B2	5/2004	Michelson	2008/0172128	A1	7/2008	Perez Cruet et al.
6,740,093	B2	5/2004	Hochschulter et al.	2008/0177387	A1	7/2008	Parimore et al.
6,746,484	B1	6/2004	Liu et al.	2008/0195209	A1	8/2008	Garcia et al.
6,767,366	B2	7/2004	Lee et al.	2008/0221694	A1	9/2008	Warnick et al.
6,767,367	B1	7/2004	Michelson	2008/0221695	A1	9/2008	Jacofsky et al.
6,793,679	B2	9/2004	Michelson	2008/0243252	A1	10/2008	Hansen et al.
6,916,320	B2	7/2005	Michelson	2008/0249622	A1	10/2008	Gray
6,923,830	B2	8/2005	Michelson	2008/0262623	A1	10/2008	Bagga et al.
6,936,050	B2	8/2005	Michelson	2008/0269901	A1	10/2008	Baynham et al.
6,936,051	B2	8/2005	Michelson	2008/0269902	A1	10/2008	Baynham et al.
6,945,933	B2	9/2005	Branch et al.	2008/0288076	A1	11/2008	Soo et al.
6,969,390	B2	11/2005	Michelson	2009/0012620	A1	1/2009	Youssef et al.
6,974,480	B2	12/2005	Messerli et al.	2009/0043394	A1	2/2009	Zdeblick et al.
7,008,422	B2	3/2006	Foley et al.	2009/0054987	A1	2/2009	Chin et al.
7,018,416	B2	3/2006	Hanson et al.	2009/0088849	A1	4/2009	Armstrong et al.
7,044,972	B2	5/2006	Mathys, Jr. et al.	2009/0099659	A1	4/2009	Oh et al.
7,125,424	B2	10/2006	Banick et al.	2009/0105830	A1	4/2009	Jones et al.
7,128,762	B2	10/2006	Middleton	2009/0105832	A1	4/2009	Allain et al.
7,137,997	B2	11/2006	Paul	2009/0132053	A1	5/2009	Sears et al.
7,166,129	B2	1/2007	Michelson	2009/0138083	A1	5/2009	Biyani
7,179,293	B2	2/2007	McKay	2009/0143860	A1	6/2009	Burd et al.
7,182,782	B2	2/2007	Kirschman	2009/0149957	A1	6/2009	Burd et al.
7,207,949	B2	4/2007	Miles et al.	2009/0157187	A1	6/2009	Richelsoph
7,217,293	B2	5/2007	Branch, Jr.	2009/0164017	A1	6/2009	Sommerich et al.
7,220,282	B2	5/2007	Kuslich	2009/0164018	A1	6/2009	Sommerich et al.
7,223,292	B2	5/2007	Messerli et al.	2009/0164019	A1	6/2009	Hsu et al.
7,226,480	B2	6/2007	Thalgott	2009/0182428	A1	7/2009	McClellan, III et al.
7,226,483	B2	6/2007	Gerber et al.	2009/0182430	A1	7/2009	Tyber et al.
7,229,477	B2	6/2007	Biscup	2009/0182431	A1	7/2009	Butler et al.
7,232,463	B2	6/2007	Falahee	2009/0198339	A1	8/2009	Kleiner et al.
7,238,203	B2	7/2007	Bagga et al.	2009/0248163	A1	10/2009	King et al.
7,285,134	B2	10/2007	Berry et al.	2009/0265007	A1	10/2009	Colleran
7,285,135	B2	10/2007	McKay et al.	2009/0276049	A1	11/2009	Weiland
7,303,583	B1	12/2007	Schär et al.	2009/0299479	A1	12/2009	Jones et al.
7,316,686	B2	1/2008	Dorchak et al.	2010/0049325	A1	2/2010	Biedermann et al.
D564,095	S	3/2008	Blain	2012/0123548	A1	5/2012	Lynn et al.
7,455,672	B2	11/2008	Michelson				
7,470,236	B1	12/2008	Kelleher et al.				
7,470,273	B2	12/2008	Dougherty-Shah				
7,500,991	B2	3/2009	Bartish, Jr. et al.				
7,534,254	B1	5/2009	Michelson				
7,569,074	B2	8/2009	Eisermann et al.				
7,582,058	B1	9/2009	Miles et al.				
7,591,852	B2	9/2009	Prosser				

OTHER PUBLICATIONS

Butterman et al., *Interbody device endplate engagement effects on motion segment biomechanics*, The Spine Journal 9, 2009, pp. 564-573.
 Product information in 1 page for an implant named *Cross-Fuse® Lateral Option System* by Pioneer Surgical Technology, Inc. (dated 2011 and retrieved on or about Aug. 2012 from www.pioneersurgical.com).

Product information in 1 page for an implant named *TransContinental® Spacer System* by Globus Medical, Inc. (retrieved on or about Aug. 2012 from www.globusmedical.com/intervertebral-fusion/220-transcontinental).

Product information in 1 page for an implant named *CoRoent® Interbody/VBR Implant* by NuVasive, Inc. (retrieved on or about Aug. 2012 as a partial image (screenshot) capture from www.nuvasive.com/health-providers/innovative-solutions/).

Wright, N.M., MD, *Biomechanical Testing of XLIF Constructs—Stand-Alone Interbody Versus Interbody Supplemented with Lateral*

or Posterior Instrumentation, Digital Poster presented at the Congress of Neurological Surgeons (CNS) Annual Conference 2005 in Boston, Massachusetts (Oct. 8, 2005-Oct. 13, 2005), which illustrates and discusses, inter alia, an implant named CoRoent by NuVasive, Inc.

DeWald, R.L., “Spinal Deformities: The Comprehensive Text,” (*partial excerpt from book*), published Mar. 15, 2003.

* cited by examiner

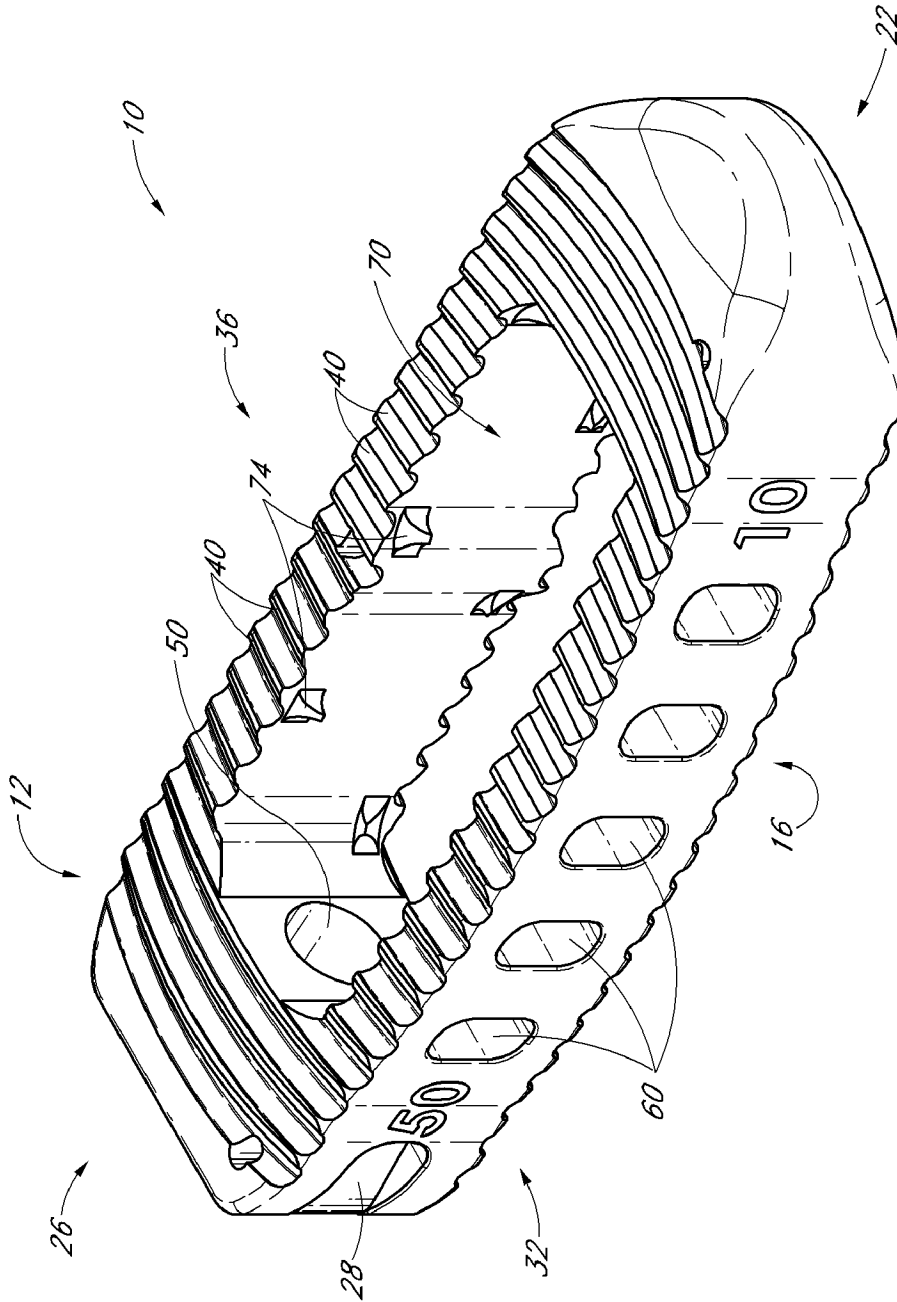


FIG. 1A

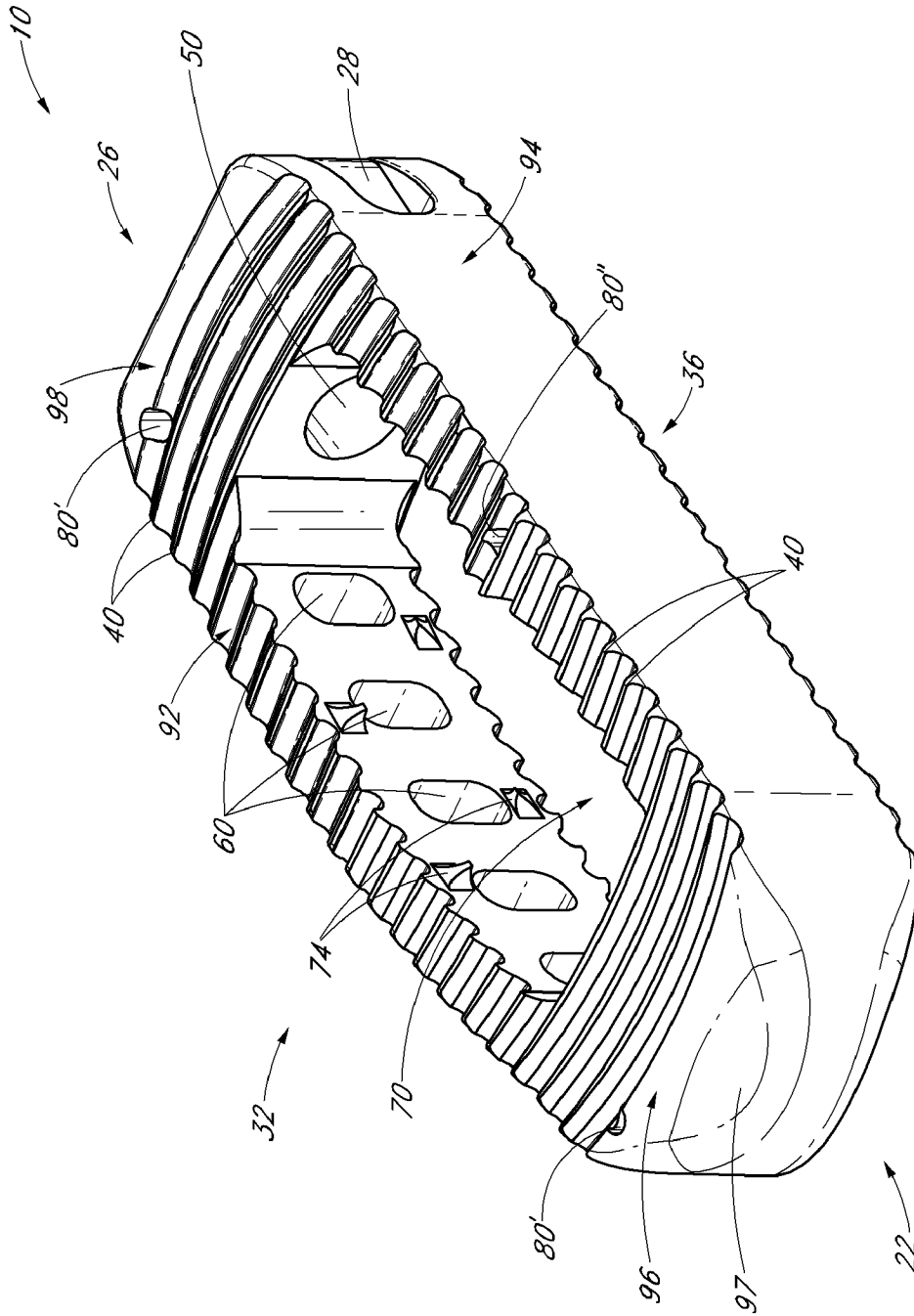


FIG. 1B

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.