

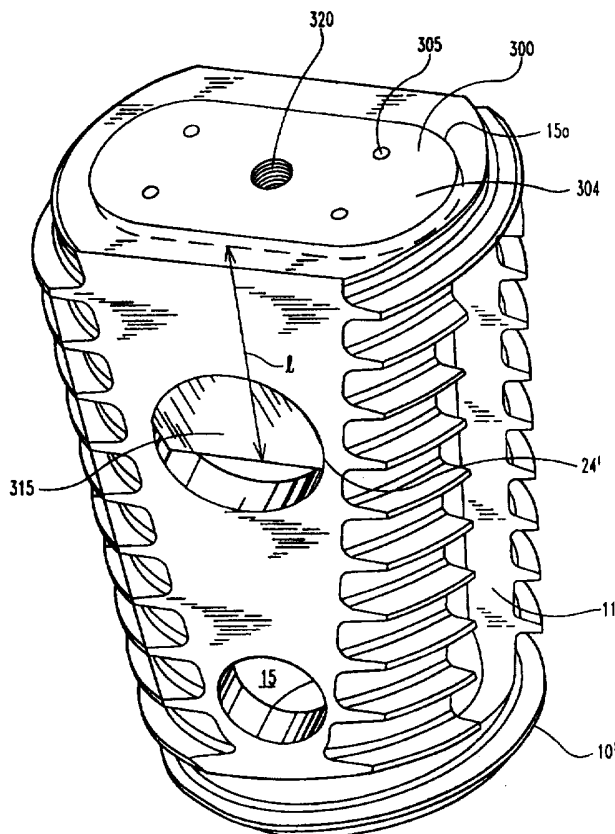


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A61F 2/44, 2/46, F16B 37/14, A61B 17/28	A3	(11) International Publication Number: WO 97/31517 (43) International Publication Date: 28 August 1997 (28.08.97)
(21) International Application Number: PCT/US97/02672 (22) International Filing Date: 19 February 1997 (19.02.97) (30) Priority Data: 08/603,674 19 February 1996 (19.02.96) US 08/799,114 11 February 1997 (11.02.97) US (71) Applicant: DANEK MEDICAL, INC. [US/US]; 1800 Pyramid Place, Memphis, TN 38132 (US). (72) Inventors: ZDEBLICK, Thomas; 9 Hodgeson Court, Madison, WI 53717 (US). MCKAY, William, F.; 3870 McElrie Cove, Memphis, TN 38133 (US). BOYD, Larry; 5105 Lynbar Avenue, Memphis, TN 38117 (US). RAY, Eddie, F., III; 8691 Cedar Farms Drive, Cordova, TN 38018 (US). McGAHAN, Thomas; 4904 Harvest Field Circle, Memphis, TN 38125 (US). (74) Agents: KNOLL, Deborah, R. et al.; Woodard, Emhardt, Naughton, Moriarty & McNett, Bank One Center/Tower, Suite 3700, 111 Monument Circle, Indianapolis, IN 46204 (US).		(81) Designated States: AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GE, HU, IL, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TR, TT, UA, UZ, VN, YU, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 23 October 1997 (23.10.97)

(54) Title: SPINAL FUSION IMPLANTS AND TOOLS FOR INSERTION AND REVISION**(57) Abstract**

An interbody fusion device (10') in one embodiment includes a load bearing body (11') defining a hollow interior or chamber (15) for receiving an osteogenic material. In another embodiment, the tapered body is solid and formed of a porous biocompatible material having sufficient structural integrity to maintain the intradiscal space and normal curvature. The material is preferably a porous tantalum composite having fully interconnected pores to facilitate complete bone tissue ingrowth into the implant. A cap (300) is also provided to block the opening (15a) of the hollow fusion device (10'). The cap (300) includes an occlusion body (301) and an elongated anchor (310). In some embodiments the anchor includes a lip (315) which is engageable to openings (24') in the body wall. Tools are also provided for manipulating caps for interbody fusion devices. In one embodiment the tool includes a cap-engaging tip for engaging a threaded tool hole (320) in the cap (300).



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INTERNATIONAL SEARCH REPORT

Internat	Application No
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PCT/US 97/02672

A. CLASSIFICATION OF SUBJECT MATTER

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61F2/44 A61F2/46 F16B37/14 A61B17/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61F F16B A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 44 09 836 A (DRAENERT) 28 September 1995	1,15,19, 20
Y	see column 4, line 1 - line 22; figures	11,12, 21,22
A	see claims 23-26	2,8-10, 13,14, 23,24
Y	--- EP 0 623 323 A (HÄRLE) 9 November 1994 see abstract; figures	11,12, 21,22
X	--- US 5 458 638 A (KUSLICH) 17 October 1995 see column 5, line 57 - line 67; figures 10,11 --- -/--	25,26, 28-31

☒

Further documents are listed in the continuation of box C.

☒

Patent family members are listed in annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

25 August 1997

Date of mailing of the international search report

11. 09. 97

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INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/US 97/02672

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 15133 A (CALCITEC) 8 June 1995 see the whole document ---	47,48
A	EP 0 307 241 A (BRANTIGAN) 15 March 1989 see the whole document ---	1,15
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A	US 3 486 505 A (MORRISON) 30 December 1969 -----	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 97/02672

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims : 1-24 A fusion device.
 2. Claims : 25-46 A cap for blocking the opening of a fusion device.
 3. Claims : 47-61 A tool for manipulating a cap.
-
1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
 2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Internal Application No

PCT/US 97/02672

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