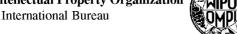
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#### (54) Title: APPARATUS AND METHOD FOR HARVESTING BONE MARROW

(57) Abstract: A minimally invasive apparatus and method for harvesting bone marrow cells, blood, and bone fragments includes a rigid cannula having a proximal end and a distal end with an opening. The distal end includes a cutting tip that is movable axially and radially to cut and disrupt bone tissue while preserving necessary viability among harvested marrow cells. The cannula further includes an inner surface defining an internal passage that extends from the opening toward the proximal end. Suction is applied to the passage to draw disrupted bone marrow cells, blood, and bone fragments into the internal passage for collection. The apparatus may include a rotatable shaft disposed co-axially within the internal passage. The shaft has a distal end with a cutting bit for further cutting and disrupting of bone tissue.

### INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/09821

A. CLAS IPC(7)	SIFICATION OF SUBJECT MATTER : A61B 10/00				
US ČĹ	: 600/565 International Patent Classification (IPC) or to both nat	ional classification and IPC	·		
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Documentation	on searched other than minimum documentation to the	extent that such documents are included in	the fields searched		
Electronic da EAST	ta base consulted during the international search (name	of data base and, where practicable, search	terms used)		
	C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where ap		Relevant to claim No.		
X	US 5,913,859 A (Shapira) 22 June 1999 (22.06.1999), fig. 2, column 3/lines 61-67; column 46/lines 1-12, 45-49; column 6/lines 43-46, 50-56, 60-65; column 7/lines 5-7, 16-19; column				
Y	4/lines 1-12, 45-49; column 6/lines 43-46, 50-56, 60-65; column //lines 5-7, 16-19; column 8/lines 38-56		38, 40-41, 54		
X	US 5,575,293 A (Miller et al.) 19 November 1996 (19	9.11.1996), fig. 5, column 7/lines 31-	1-5, 7		
<u></u> Ү	46)		11, 21, 25, 28		
X	X US 2003/0055373 A1 (Sramek et al.) 20 March 2003 (20.03.2003), figs. 1A-E; par 0071, at lines 2-8; par 0072, at lines 6-11; par 0073, at lines 1-3, 7-12, 16-21; par 0074, at lines 3-9;		37, 39, 42, 44		
Y	par 0075, at lines 1-11; par 0075, at lines 1-9; par 0071, at lines 1-11; par 0082, at lines 1-3		38, 40-41, 43, 45		
X 	X US 6,132,448 A (Perez et al.) 17 October 2000 (17.10.2000), figs. 1-2 & 5-6, column 2/lines 30-38, 47-53, 56-67, column 3/lines 16-19, 31-35, 47-54, column 4/lines 1-12		1-3, 5-6, 8-10, 12-20, 22-24, 26-27, 29-36		
Y			11, 21, 25, 28, 45, 54		
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22 January 2006 (22.01.2006)  Name and mailing address of the ISA/US  Authorized officer					
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# INTERNATIONAL SEARCH REPORT

International application No. PCT/US04/09821

ategory *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	US 2002/0042581 A1 (Cervi) 11 April 2002 (11.04.2002), fig. 4B; par 0044, at lines 3-12; par	46, 51, 53
Y	0050, at lines 1-3; par 0058, at lines 1-6; par 0062; par 0064, at lines 1-8, 12-13; par 0065; par 0066, at lines 1-7; par 0067, at lines 1-6	52
	US 4,744,364 A (Kensey) 17 May 1988 (17.05.1988), fig. 1	
 Y		43, 52
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