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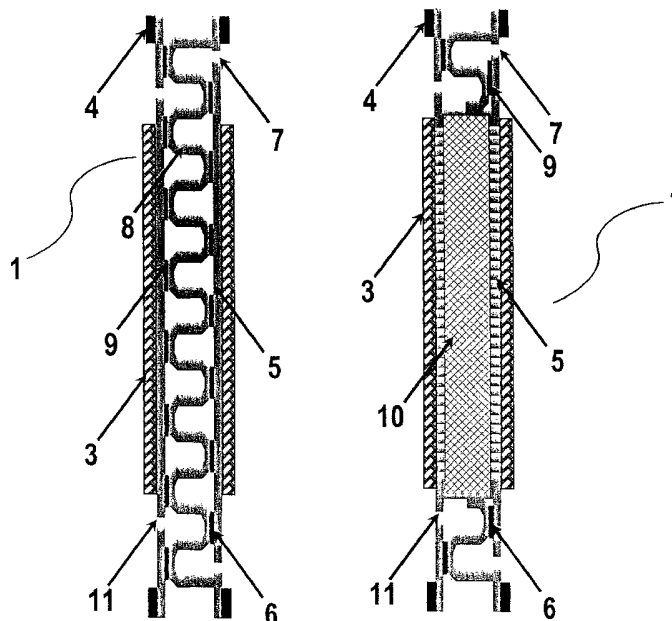
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(54) Title: BIPOLAR SEPARATOR FOR FUEL CELL STACK



(57) Abstract: It is described a bipolar separator for polymer membrane fuel cell stacks, delimited by two sheets provided with fluid passage holes connected by means of a corrugated element and comprising a passage section for a thermostating liquid, which allows to achieve the withdrawal of heat from the adjacent cells and the humidification and distribution of gases with a single integrated piece, simplifying the assembly and the hydraulic sealing of the stack.

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# INTERNATIONAL SEARCH REPORT

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PCT/EP2004/010930

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 H01M8/02 H01M8/04

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 7 H01M

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)  
 EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/23645 A (H POWER ENTERPRISES OF CANADA INC; CONDEESCU, ADRIAN; ROBERGE, RAYMOND) 21 March 2002 (2002-03-21)	1-4, 12-14
Y	page 4, line 34 - page 7, line 36; figures 7-9	10, 11
Y	----- US 5 578 388 A (FAITA ET AL) 26 November 1996 (1996-11-26) cited in the application column 10, lines 1-5; figure 5 column 4, line 66 - column 5, line 10 ----- -/--	10, 11

Further documents are listed in the continuation of box C.       Patent family members are listed in annex.

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Date of the actual completion of the international search  <b>31 August 2005</b>	Date of mailing of the international search report  <b>08/09/2005</b>
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  <b>Fitzpatrick, J</b>
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## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/010930

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 00/70698 A (DE NORA FUEL CELLS S.P.A; MAZZUCHELLI, GABRIELE; BRAMBILLA, MASSIMO;) 23 November 2000 (2000-11-23) figures 1,5 page 13, lines 16-19 page 14, lines 5-15 examples 1-3	10,11
A	US 4 279 731 A (PELLEGRI ET AL) 21 July 1981 (1981-07-21) column 6, line 59 - column 7, line 19	1-4,9,10
A	US 3 589 942 A (FRANK B. LEITZ JR ET AL) 29 June 1971 (1971-06-29) column 3, lines 12-43; figure 2	1-4, 12-14

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No PCT/EP2004/010930
---

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
WO 0223645	A	21-03-2002	AU	9353601 A	26-03-2002
			WO	0223645 A2	21-03-2002
US 5578388	A	26-11-1996	IT	1270878 B	13-05-1997
			AT	210339 T	15-12-2001
			AU	674931 B2	16-01-1997
			AU	6054194 A	03-11-1994
			BR	9401641 A	22-11-1994
			CA	2121455 A1	31-10-1994
			CN	1108005 A ,C	06-09-1995
			CZ	9400986 A3	19-10-1994
			DE	69429304 D1	17-01-2002
			DE	69429304 T2	24-10-2002
			DK	629015 T3	02-04-2002
			EP	0629015 A1	14-12-1994
			ES	2169050 T3	01-07-2002
			FI	941932 A	31-10-1994
			JP	2953555 B2	27-09-1999
			JP	6349508 A	22-12-1994
			RU	2126569 C1	20-02-1999
			SK	50694 A3	09-11-1994
			US	5482792 A	09-01-1996
			US	5565072 A	15-10-1996
WO 0070698	A	23-11-2000	IT	MI991090 A1	20-11-2000
			AU	5213700 A	05-12-2000
			BR	0010626 A	19-02-2002
			CA	2368949 A1	23-11-2000
			CN	1351769 A ,C	29-05-2002
			WO	0070698 A1	23-11-2000
			EP	1181730 A1	27-02-2002
			JP	2003500802 T	07-01-2003
			TW	456065 B	21-09-2001
			US	6737183 B1	18-05-2004
			US 4279731	A	21-07-1981
AR	227296 A1	15-10-1982			
AT	44554 T	15-07-1989			
AU	532517 B2	06-10-1983			
AU	6479780 A	02-07-1981			
BR	8007570 A	02-06-1981			
CA	1169808 A1	26-06-1984			
CS	223889 B2	25-11-1983			
DD	154831 A5	21-04-1982			
DE	3072159 D1	17-08-1989			
EP	0031897 A2	15-07-1981			
EP	0111149 A1	20-06-1984			
ES	8201638 A1	16-03-1982			
ES	8300144 A1	01-01-1983			
FI	803655 A ,B,	30-05-1981			
HU	183256 B	28-04-1984			
JP	1301957 C	14-02-1986			
JP	57203783 A	14-12-1982			
JP	60024186 B	11-06-1985			
JP	1372372 C	07-04-1987			
JP	61037355 B	23-08-1986			
JP	61096093 A	14-05-1986			
JP	1592189 C	14-12-1990			

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/EP2004/010930

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4279731      A		JP 56102586 A	17-08-1981
		JP 63015354 B	04-04-1988
		MX 148530 A	29-04-1983
		NO 803330 A ,B,	01-06-1981
		PL 228167 A1	18-09-1981
		RO 81392 A1	29-04-1983
		SU 1126210 A3	23-11-1984
		US 4417960 A	29-11-1983
		US 4389298 A	21-06-1983
		US 4425214 A	10-01-1984
		US 4518113 A	21-05-1985
		YU 302380 A1	28-02-1983
		ZA 8006648 A	25-11-1981
<hr style="border-top: 1px dashed black;"/>			
US 3589942      A	29-06-1971	NONE	
<hr style="border-top: 1px dashed black;"/>			