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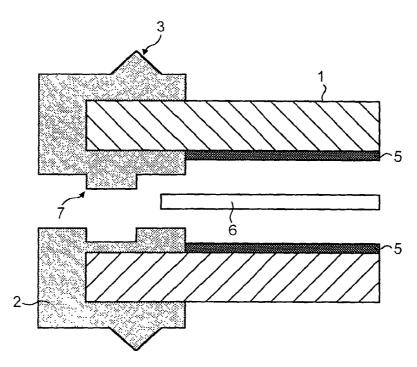
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(54) Title: MEMBRANE-ELECTRODE ASSEMBLY FOR POLYMERIC MEMBRANE FUEL CELLS



(57) Abstract: A membrane electrode assembly wherein each gas diffusion substrate (1) comprises a porous electrically conductive sheet material, wherein an integral gasket member (2) is located on the first and second planar faces of a peripheral portion of the sheet material. The electrocatalyst layers (5) are not present adjacent to the gasket members and the edge of the membrane (6) is sandwiched between the gasket members. The invention further relates to integrated cell assemblies and fuel cell stacks comprising membrane electrode assemblies according to the invention.



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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT								
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.						
Α	US 5 284 718 A (WASHINGTON KIRK B ET AL) 8 February 1994 (1994-02-08) whole document	1-10						

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internati Application No
PCT/GB 02/02121

Patent document cited in search report	Publication date		Patent family member(s)	Publication date
US 6165634 A	26-12-2000	AU BR CN EP JP WO US	1128000 A 9914660 A 1367939 T 1135812 A1 2002528862 T 0024066 A1 6159628 A 6387557 B1	08-05-2000 17-07-2001 04-09-2002 26-09-2001 03-09-2002 27-04-2000 12-12-2000 14-05-2002
US 6159628 A	12-12-2000	US US AU DE JPO US BRN EPPO ABRN EPPO WO	6165634 A 6020083 A 3206500 A 19983846 T0 2002533904 T 0039862 A1 6387557 B1 2001001052 A1 1128000 A 9914660 A 1367939 T 1135812 A1 2002528862 T 0024066 A1 1318100 A 9914923 A 1324500 T 1129497 A1 2002529890 T 0026975 A1	26-12-2000 01-02-2000 31-07-2000 21-03-2002 08-10-2002 06-07-2000 14-05-2002 10-05-2001 08-05-2000 17-07-2001 04-09-2002 26-09-2001 03-09-2002 27-04-2000 22-05-2000 10-07-2001 28-11-2001 05-09-2002 11-05-2000
US 5264299 A	23-11-1993	NONE		
US 5284718 A	08-02-1994	WO AU AU DE DE EP JP	9409520 A1 675415 B2 3054192 A 69221330 D1 69221330 T2 0665984 A1 8507403 T 3045316 B2	28-04-1994 06-02-1997 09-05-1994 04-09-1997 15-01-1998 09-08-1995 06-08-1996 29-05-2000