



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : H01M 6/06, 6/50, G01R 31/36</p>	<p>A3</p>	<p>(11) International Publication Number: WO 96/38869</p> <p>(43) International Publication Date: 5 December 1996 (05.12.96)</p>
<p>(21) International Application Number: PCT/GB96/01318</p> <p>(22) International Filing Date: 3 June 1996 (03.06.96)</p> <p>(30) Priority Data: 9511205.8 2 June 1995 (02.06.95) GB</p> <p>(71) Applicant (for all designated States except US): EVER READY LIMITED [GB/GB]; Ever Ready House, 93 Burleigh Gardens, Southgate, London N14 5AQ (GB).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): RANDELL, Christopher, Fred [GB/GB]; 20 Wolsingham Drive, Newton Hall, Durham DH1 5SP (GB). WHITE, Neal, Charles [GB/GB]; Hillands, Leazes Lane, Hexham, Northumberland NE46 3AT (GB).</p> <p>(74) Agent: LORD, Hilton, David; Marks & Clerk, 57-60 Lincoln's Inn Fields, London WC2A 3LS (GB).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, 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).</p> <p>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></p> <p>(88) Date of publication of the international search report: 16 January 1997 (16.01.97)</p>	
<p>(54) Title: SEPARATORS FOR ELECTROCHEMICAL CELLS</p> <p>(57) Abstract</p> <p>The invention provides a coated paper separator for use in an electrochemical cell, wherein A coating comprises a highly crosslinked starch and an etherified cellulose derivative as a gelling agent, such separators being useful to reduce gassing, for example.</p>		

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INTERNATIONAL SEARCH REPORT

Intern. Application No
PCT/GB 96/01318

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01M6/06 H01M6/50 G01R31/36

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 H01M G01R

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	DATABASE WPI Section Ch, Week 7920 Derwent Publications Ltd., London, GB; Class A85, AN 79-38135B XP002012696 & JP,A,54 045 750 (HITACHI MAXELL) , 11 April 1979 see abstract	1-4,33, 34
X	--- DE,A,20 19 485 (SAFT) 5 November 1970 see page 3, paragraph 3 - page 4, paragraph 2; claim 2 see page 5, paragraph 3 ---	18-20
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Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "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 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
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Date of the actual completion of the international search 20 November 1996	Date of mailing of the international search report 28. 11. 96
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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 Andrews, M
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INTERNATIONAL SEARCH REPORT

Intern. Patent Application No

PCT/GB 96/01318

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DATABASE WPI Section Ch, Week 7835 Derwent Publications Ltd., London, GB; Class A85, AN 78-62448A XP002012697 & JP,A,53 084 129 (MATSUSHITA ELEC IND KK) , 25 July 1978 see abstract</p> <p style="text-align: center;">---</p>	
A	<p>US,A,3 930 887 (CONNER WILLARD P) 6 January 1976 see column 2, line 60 - line 68; figure 1</p> <p style="text-align: center;">---</p>	23
A	<p>DATABASE WPI Section EI, Week 9516 Derwent Publications Ltd., London, GB; Class X16, AN 95-119917 XP002018983 & JP,A,07 045 287 (FUJI ELECTROCHEMICAL CO LTD) , 14 February 1995 see abstract</p> <p style="text-align: center;">-----</p>	26

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 96/ 01318

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: 1-22, 33-35
2. Claims: 23-32

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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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/210

Claims 1-22 and 33-35 refer to the problems of stability of a coating for a paper separator suitable for use in an electrochemical cell containing either an alkaline zinc chloride or acid electrolyte. This has been solved by the use of a highly cross-linked starch and an etherified cellulose derivative as gelling agent. Also claimed is an electrochemical cell comprising such a separator and an electrochemical cell comprising a separator with an additional polyoxyethylene additive. Also claimed is a test whereby the condition of starch or gelling agent is monitored over time in zinc chloride aqueous solution.

Claims 23-32 refer to respectively low and high drain continuous tests for an electrochemical cell whereby the conditions experienced by batteries are simulated and consequently monitored.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern. Patent Application No

PCT/GB 96/01318

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-2019485	05-11-70	FR-A- 2040936	22-01-71
		FR-A- 2076820	15-10-71
		BE-A- 748838	13-10-70
		CA-A- 923196	20-03-73
		GB-A- 1276036	01-06-72
		LU-A- 60701	17-11-70
		NL-A- 7005866	26-10-70
		OA-A- 3244	15-12-70
		US-A- 3697327	10-10-72
US-A-3930887	06-01-76	CA-A- 1029089	04-04-78