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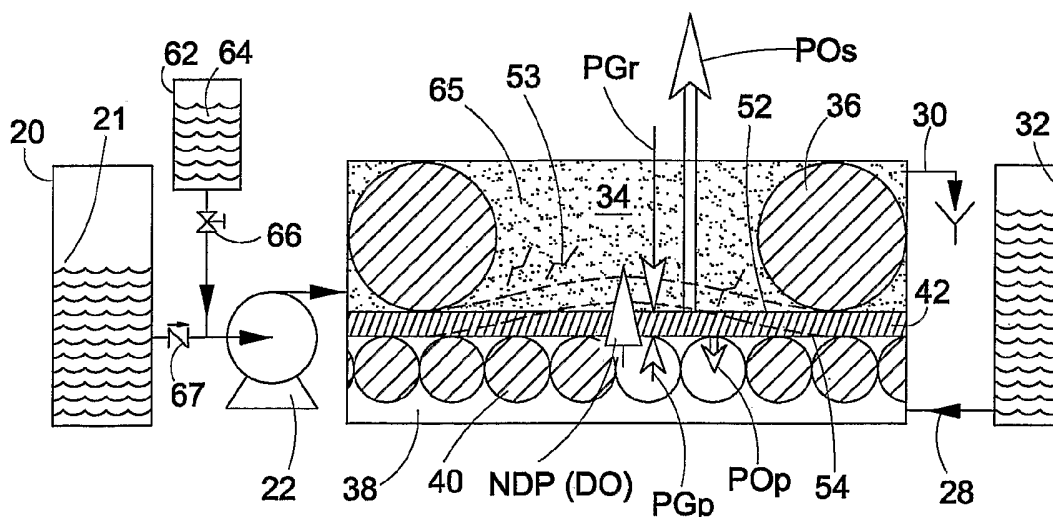
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(88) Date of publication of the international search report:

2 February 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: RO MEMBRANE CLEANING METHOD



(57) Abstract: Direct-osmosis (DO) method for cleaning a semi-permeable membrane in a RO separation module, the membrane having a feed side with foulant located thereon, and an opposite permeate side. A normal RO separation process in the same module includes: feeding, under gauge pressure PGr, raw saline solution having osmotic pressure POr to the membrane feed side; collecting permeate (solvent) having osmotic pressure POp from the permeate side, under gauge pressure PGp; and removing residual brine from the membrane feed side. The method comprises feeding to the feed side of the membrane, for a predetermined injection time, super saline solution having osmotic pressure POs > POr, such that backward flow of permeate towards the feed side of the membrane is provided so as to lift the foulant from the feed side.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IL2005/000514

A. CLASSIFICATION OF SUBJECT MATTER

B01D65/02 C02F1/44 B01D61/10

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)

B01D C02F

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)

EP0-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 827 976 A (STANA R,US ET AL) 6 August 1974 (1974-08-06) abstract column 1, lines 28-67 column 2, lines 21-46 column 3, lines 1-12,51-57 example 1 column 4, lines 1-7	1,7, 14-16
A	EP 0 768 112 A (CHRIST AG) 16 April 1997 (1997-04-16) cited in the application abstract column 1, lines 1-8,28,29,38-40 column 2, lines 52-24 column 3, lines 5-10,26-33 column 4, lines 40-44 claims 1-5	1,5,7,9, 16-19
	----- -/-	



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

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search

22 September 2005

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/IL2005/000514

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	WO 2004/062774 A (I.D.E. TECHNOLOGIES LTD; LIBERMAN, BORIS) 29 July 2004 (2004-07-29) cited in the application the whole document	1-22
A	----- US 3 853 756 A (STANA R,US) 10 December 1974 (1974-12-10) abstract the whole document	1,7,9, 16-19
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A	----- PATENT ABSTRACTS OF JAPAN vol. 1999, no. 11, 30 September 1999 (1999-09-30) & JP 11 169688 A (NITTO DENKO CORP), 29 June 1999 (1999-06-29) abstract & DATABASE WPI Section Ch, Week 199936 Derwent Publications Ltd., London, GB; Class D15, AN 1999-423078 & JP 11 169688 A (NITTO DENKO CORP) 29 June 1999 (1999-06-29) abstract	1,7,9, 16-19
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A	----- EP 0 899 238 A (HAGER + ELSAESSER GMBH; ONDEO INDUSTRIAL SOLUTIONS GMBH) 3 March 1999 (1999-03-03) abstract paragraphs [0006], [0011], [0012], [0017] ----- -/--	1-22

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IL2005/000514

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 06, 22 September 2000 (2000-09-22) & JP 2000 079328 A (NITTO DENKO CORP), 21 March 2000 (2000-03-21) cited in the application abstract & DATABASE WPI Section Ch, Week 200025 Derwent Publications Ltd., London, GB; Class D15, AN 2000-286170 & JP 2000 079328 A (NITTO DENKO CORP) 21 March 2000 (2000-03-21) abstract -----	1-22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL2005/000514

Box II Observations where certain claims were found unsearchable (Continuation of item 2 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 III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional sheet

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.:

1-22

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

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-22

Direct-Osmosis (DO) method for cleaning a semi-permeable membrane in a RO separation module wherein said direct osmosis method of membrane cleaning comprises feeding a super saline solution having osmotic pressure $P_{Os} > P_{Or}$ instead of the raw saline solution.

2. claims: 23-41

Direct-Osmosis (DO) method for cleaning a semi-permeable membrane said method including exposing a portion of its permeate side to a weak solution of low osmotic pressure P_{Op} and a corresponding portion its feed side to a super saline solution of high osmotic pressure $P_{Os} > P_{Op}$, withdrawing a stream of said super saline solution wherein said method includes displacement of said membrane. Further this invention relates to a system adapted for carrying out said method.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IL2005/000514

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