



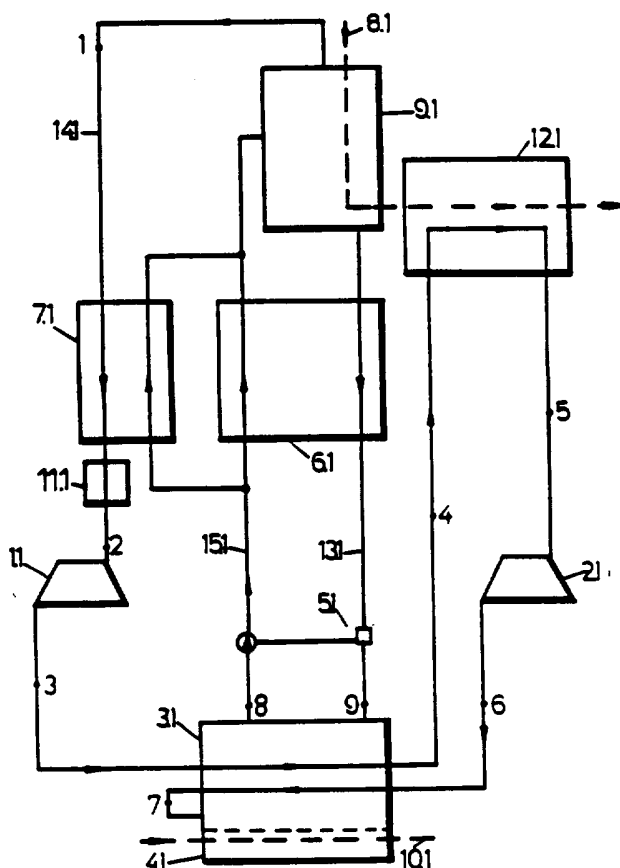
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>5</sup> : <b>F01K 25/06</b></p>	<p><b>A3</b></p>	<p>(11) International Publication Number: <b>WO 91/07573</b> (43) International Publication Date: 30 May 1991 (30.05.91)</p>
<p>(21) International Application Number: PCT/GR90/00008 (22) International Filing Date: 20 November 1990 (20.11.90) (30) Priority data: 438,203 20 November 1989 (20.11.89) US 900100405 29 May 1990 (29.05.90) GR (71)(72) Applicant and Inventor: STYLIARAS, Vasilios [GR/GR]; 6 Panou Riga Str., GR-30300 Nafraktos (GR). (81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH (European patent), CM (OAPI patent), DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB (European patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LU, LU (European patent), MC, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p>		<p><b>Published</b> <i>With international search report.</i>  (88) Date of publication of the international search report: 13 May 1993 (13.05.93)</p>

(54) Title: HEAT CONVERSION INTO MECHANICAL WORK THROUGH ABSORPTION-DESORPTION

(57) Abstract

A multicomponent working fluid consisting of a lower boiling point component "solute" dissolved in higher boiling components "absorbant", is pumped as a liquid (15.1) to a high working pressure. The liquid is heated up in a steam generator (9.1) and is partially evaporated, splitted into a gaseous working fluid (14.1) consisted mainly from the lower boiling component and a lean solution (13.1) with respect to lower boiling component. After successive reheatings and expansions the gaseous working fluid is absorbed by the lean solution returning to absorber (14.1). The purpose of this procedure is to increase the thermal efficiency of the cycle by expanding the gaseous working fluid to a low temperature and by reducing the heat amount rejected to ambient.



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# INTERNATIONAL SEARCH REPORT

International Application No PCT/GR 90/00008

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>				
According to International Patent Classification (IPC) or to both National Classification and IPC				
IPC <sup>5</sup> : F 01 K 25/06				
<b>II. FIELDS SEARCHED</b>				
Minimum Documentation Searched <sup>7</sup>				
Classification System	Classification Symbols			
IPC <sup>5</sup>	F 01 K, F 25 B			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>				
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>9</sup></b>				
Category <sup>9</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>		
A	US, A, 3505810 (GOHEE MAMIYA) 14 April 1970 see column 8, lines 18-75; figure 12 --	1,5,10		
A	EP, A, 0112041 (GASON ENERGY) 27 June 1984 see page 15, line 22 - page 20, line 8; page 28, line 22 - page 32, line 18; figures --	1,5,10		
A	EP, A, 0122017 (SAULSON) 17 October 1984 see page 18, line 19 - page 20, line 21; figures --	1,4,5,10		
A	US, A, 4069672 (MILLING) 24 January 1978 see the whole document --	1,5,6,10		
./.				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; border: none; vertical-align: top;"> <p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"A" document member of the same patent family</p> </td> </tr> </table>			<p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"A" document member of the same patent family</p>
<p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"A" document member of the same patent family</p>			
<b>IV. CERTIFICATION</b>				
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report			
27th August 1991	19.09.91			
International Searching Authority	Signature of Authorized Officer			
EUROPEAN PATENT OFFICE	miss T. MORTENSEN			

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	GB, A, 2098666 (KALINA) 24 November 1982 see page 4, line 13 - page 5, line 37; page 8, lines 73-102; figures	1,3,5,10
A	US, A, 4817437 (DAYAN) 11 April 1989 see column 7, line 57 - column 8, line 63; figures	1,5,10
A	US, A, 4573321 (KNAEBEL) 4 March 1986 see column 6, line 25 - column 7, line 28; figures	1,2,5,10
A	EP, A, 0101244 (KALINA) 22 February 1984 see page 16, line 1 - page 17, line 15; figure 1	11
A	US, A, 3041853 (HARWICH) 3 July 1962 see column 3, line 49 - column 4, line 69; figures	11
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## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V.  OBSERVATION WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE <sup>1</sup>

This International search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claim numbers \_\_\_\_\_ because they relate to subject matter not required to be searched by this Authority, namely \_\_\_\_\_
2.  Claim numbers \_\_\_\_\_ 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.  Claim numbers \_\_\_\_\_ because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6 4(a)

VI.  OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING <sup>2</sup>

This International Searching Authority found multiple Inventions in this International application as follows:

1. Claims 1-6, 8-10, 12-16
2. Claim 7, 3. Claim 11
4. Claims 17-19

1.  As all required additional search fees were timely paid by the applicant, this International search report covers all searchable claims of the International application
2.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the International application for which fees were paid, specifically claims: 1-6, 8-10, 12-16; 11
3.  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 claim numbers \_\_\_\_\_
4.  As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

**Remark on Protest**

- The additional search fees were accompanied by applicant's protest
- No protest accompanied the payment of additional search fees

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

GR 9000008  
SA 41895

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 11/09/91. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 3505810	14-04-70	DE-A- 1601003	16-07-70
		FR-A- 1546326	
		GB-A- 1214499	02-12-70
EP-A- 0112041	27-06-84	JP-A- 59112195	28-06-84
		US-A- 4534175	13-08-85
EP-A- 0122017	17-10-84	US-A- 4503682	12-03-85
		CA-A- 1205641	10-06-86
		JP-A- 59211703	30-11-84
US-A- 4069672	24-01-78	None	
GB-A- 2098666	24-11-82	None	
US-A- 4819437	11-04-89	None	
US-A- 4573321	04-03-86	AU-A- 4934085	15-05-86
		EP-A- 0181275	14-05-86
		JP-A- 61138065	25-06-86
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		AU-B- 562748	18-06-87
		AU-A- 1743383	09-02-84
		CA-A- 1215238	16-12-86
		DE-A- 3378591	05-01-89
		JP-A- 59103906	15-06-84
US-A- 3041853		None	

EPO FORM P0479

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82