



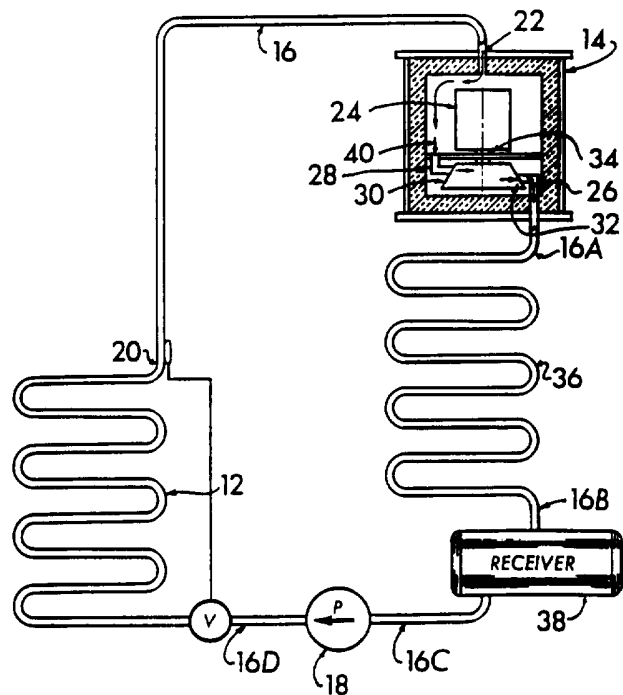
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁵ : F01K 25/08, F01D 7/00 F25B 27/00</p>	<p>A3</p>	<p>(11) International Publication Number: WO 92/07170 (43) International Publication Date: 30 April 1992 (30.04.92)</p>
<p>(21) International Application Number: PCT/US91/07823 (22) International Filing Date: 22 October 1991 (22.10.91) (30) Priority data: 602,478 22 October 1990 (22.10.90) US (71)(72) Applicant and Inventor: DURSO, Thomas [US/US]; 5522 Madison Street, Morton Grove, IL 60053 (US). (74) Agent: RUDISILL, Stephen, G.; Arnold, White & Durkee, P.O. Box 4433, Houston, TX 77210 (US). (81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent).</p>		<p>Published <i>With international search report. 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: 6 August 1992 (06.08.92)</p>

(54) Title: REFRIGERANT POWER UNIT AND METHOD FOR REFRIGERATION

(57) Abstract

A refrigerant power unit includes a closed piping loop containing refrigerant. The refrigerant is pumped to an evaporator (12) where it changes to a saturated vapor. It is directed across a generator (24) absorbing additional heat energy and changing to a super-heated hot gas. The refrigerant is directed through the nozzles in a turbine (30) and impinges upon turbine blades. As the refrigerant passes around the turbine blades, it expands and exits the turbine blades in an axial direction. The enthalpy, temperature and pressure of the refrigerant drops, reducing the refrigerant to a saturated vapor. The refrigerant then enters a condenser (36) heat exchanger dissipating heat into the surrounding medium, reducing the enthalpy of the refrigerant, changing the refrigerant into a liquid before entering the receiver tank. A pump (18) draws the liquid refrigerant from the receiver tank and pressurizes the system. The refrigerant is directed to the inlet of the evaporator, completing the cycle through the refrigerant power unit. A more detailed system includes an additional piping segment, between the receiver tank and the generator, which contains an evaporator (64), a compressor (74) and a motor (76). Another system includes a second evaporator (102) between the evaporator (100) and the generator (118). It includes a second closed piping loop containing a compressor (130) and a motor (136) between the first and third evaporators. The loop also provides the heating refrigerant for the first evaporator coil and the coolant refrigerant inside the third evaporator coil.



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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 91/07823

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.C1.5	F 01 K 25/08	F 01 D 7/00 F 25 B 27/00
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.C1.5	F 01 K F 01 D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	Brennstoff, Wärme, Kraft, vol. 40, no. 9, september 1988, (Düsseldorf, DE), H.R. ENGELHORN: "Erfahrungen bei der Abwärmenutzung mit ORC-Anlagen", pages 334-338, see page 337, left-hand column, lines 6-25 ---	1-3, 42, 44, 46
X	Proceedings of the 20th Intersociety Energy Conversion Engineering Conference (SAEP-164), August 1985, vol. 2, Society of Automotive Engineers, (Warrendale, PA, US), W.F. KOEBBEMAN: "Geothermal wellhead application of a 1-MW industrial ORC power system", pages 2712-2717 ---	1-3, 42, 44, 46
A	US,A,3314654 (THENAULT) 18 April 1967, see the whole document ---	2-4, 44, 45
A	US,A,3558237 (WALL) 26 January 1971, see column 5, lines 73-75; figures --- -/-	2-4, 44, 45
<p>¹⁰ Special categories of cited documents:</p> <ul style="list-style-type: none"> "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 "T" document published prior to the international filing date but later than the priority date claimed 		
<ul style="list-style-type: none"> "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 "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. "A" document member of the same patent family 		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
19-02-1992	09. 07. 92	
International Searching Authority	Signature of the Searching Officer	
EUROPEAN PATENT OFFICE		

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	DE,A,1941200 (AIR PRODUCTS) 19 February 1970, see page 9, line 3 - page 13, line 5; figures -----	2-4, 44, 45
A	US,A,4170116 (WILLIAMS) 9 October 1979 -----	
A	US,A,4471622 (KUWAHARA) 18 September 1984 -----	
A	US,A,4873834 (COX) 17 October 1989 -----	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US91/07823

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:
see PCT/ISA/206 dated 25.03.92

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.:

1-4, 42, 44-46

Remark on Protest

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