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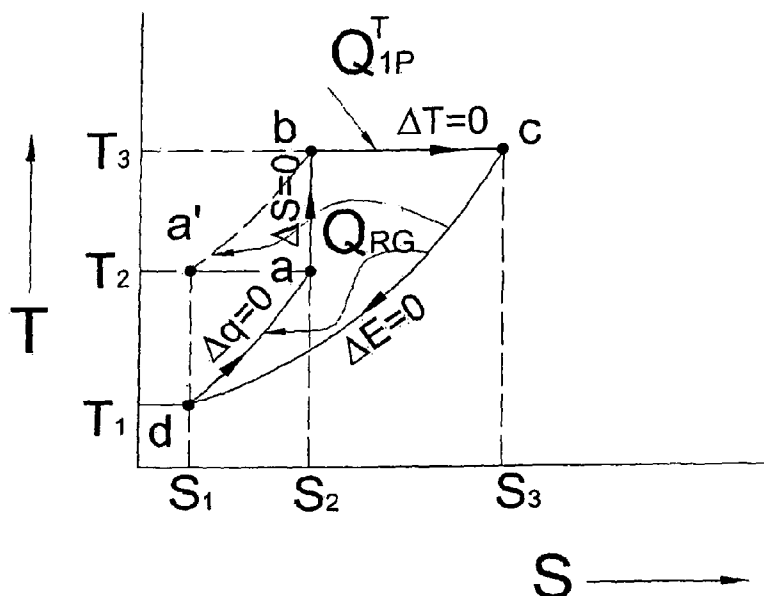
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A METHOD OF TRANSFORMATION OF HEAT AND WORK IN REVERSIBLE CYCLIC THERMOELECTRICAL CYCLES TRANSFORMATIONS AND A THERMOELECTRIC TRANSFORMER



(57) Abstract: The Invention relates to a process for transforming heat and work in a thermoelectric cycle, wherein charge carriers of an electronic gas are cyclically subjected to at least a first and second (7) heat source. Thereby, heat is exchanged between elements of the cycle representing adjacent sections (c-d, d-a) of a thermodynamic representation of the thermoelectric cycle. The process can be performed without thermal loss and without thermal (entropy) degradation of the second source, which provides a thermoelectric efficiency higher than that of Carnot cycles.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/003164

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 H01L35/00 H01L35/30

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 7 H01L

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)

EPO-Internal, PAJ, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 38 18 192 A1 (DAHLBERG, REINHARD, DR., 7101 FLEIN, DE) 7 December 1989 (1989-12-07) the whole document	13-18
X	US 5 006 505 A (SKERTIC ET AL) 9 April 1991 (1991-04-09) the whole document	13-18
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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
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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

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- "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

Date of the actual completion of the international search

31 May 2005

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Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/003164

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FEE M G: "PELTIER REFRIGERATOR USING A HIGH TC SUPERCONDUCTOR" APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS, vol. 62, no. 10, 8 March 1993 (1993-03-08), pages 1161-1163, XP000345999 NEW YORK, US ISSN: 0003-6951 the whole document	13-18
X	----- US 6 384 312 B1 (GHOSHAL UTTAM SHYAMALINDU ET AL) 7 May 2002 (2002-05-07) cited in the application the whole document	13-18
A	----- PATENT ABSTRACTS OF JAPAN vol. 013, no. 184 (E-751), 28 April 1989 (1989-04-28) & JP 01 009671 A (MITSUBISHI ELECTRIC CORP), 12 January 1989 (1989-01-12) abstract	13-18
A	----- US 5 747 418 A (METZGER ET AL) 5 May 1998 (1998-05-05) the whole document	13-18
A	----- US 2003/116869 A1 (SIU WING MING) 26 June 2003 (2003-06-26) paragraph [0004]	13-18
A	----- US 5 241 828 A (KAPITULNIK ET AL) 7 September 1993 (1993-09-07) column 5, line 25 - line 62	13-18
A	----- SUNGTAEK JU Y ET AL: "Study of interface effects in thermoelectric microrefrigerators" JOURNAL OF APPLIED PHYSICS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 88, no. 7, 1 October 2000 (2000-10-01), pages 4135-4139, XP012051707 ISSN: 0021-8979 the whole document	13-18
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/003164

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>MIN G ET AL: "A NOVEL THERMOELECTRIC CONVERTER EMPLOYING FERMI GAS/LIQUID INTERFACES" JOURNAL OF PHYSICS D. APPLIED PHYSICS, IOP PUBLISHING, BRISTOL, GB, vol. 32, no. 6, 21 March 1999 (1999-03-21), pages L26-L28, XP000888110 ISSN: 0022-3727 the whole document</p> <p style="text-align: center;">-----</p>	13-18
A	<p>GB 2 343 788 A (* UNIVERSITY COLLEGE CARDIFF CONSULTANTS LTD) 17 May 2000 (2000-05-17) the whole document</p> <p style="text-align: center;">-----</p>	13-18
A	<p>KUZNETSOV V L ET AL: "Peltier heat measurements at a junction between materials exhibiting Fermi gas and Fermi liquid behaviour" Journal of Physics D (Applied Physics) IOP Publishing UK, vol. 36, no. 21, 7 November 2003 (2003-11-07), pages 2750-2755, XP002329814 ISSN: 0022-3727 the whole document</p> <p style="text-align: center;">-----</p>	13-18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2004/003164

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.: 1-12
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(i) PCT - Scientific theory

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:

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/003164

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