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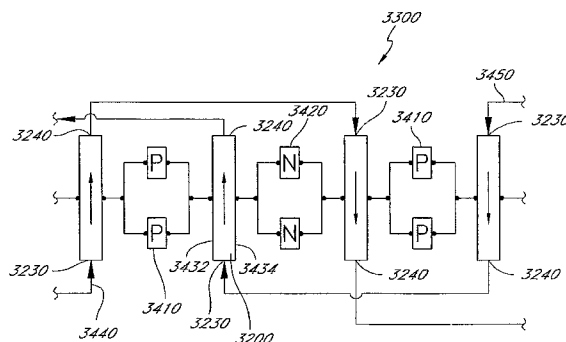
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(54) **Title:** HIGH CAPACITY THERMOELECTRIC TEMPERATURE CONTROL SYSTEMS



FIB. 34

(57) **Abstract:** A thermoelectric system includes a first plurality of thermoelectric elements and a second plurality of thermoelectric elements. The thermoelectric system further includes a plurality of heat transfer devices. Each heat transfer device has a first side in thermal communication with two or more thermoelectric elements of the first plurality of thermoelectric elements and a second side in thermal communication with one or more thermoelectric elements of the second plurality of thermoelectric elements, so as to form a stack of thermoelectric elements and heat transfer devices. The two or more thermoelectric elements of the first plurality of thermoelectric elements are in parallel electrical communication with one another, and the two or more thermoelectric elements of the first plurality of thermoelectric elements are in series electrical communication with the one or more thermoelectric elements of the second plurality of thermoelectric elements.

WO 2008/013946 A3

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. H01L35/32 F25B21/02

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)
F25B HOIL F24F

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 , 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	US 6 598 403 B1 (GHOSHAL UTTAM SHYAMALINDU [US]) 29 July 2003 (2003r07-29) column 6, line 43 - column 7, line 5; figure 6b	1-4
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Y	----- -/-	5,6,8-13

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- 'A" document defining the general state of the art which is not considered to be of particular relevance
- 'E¹ 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
- "X¹ 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
- 'Y¹ 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.
- "&¹ document member of the same patent family

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International application No
PCT/US2007/016924

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DILLER R W ET AL: "Experimental results confirming improved performance of systems using thermal isolation"</p> <p>THERMOELECTRICS, 2002. PROCEEDINGS ICT '02. TWENTY-FIRST INTERNATIONAL CONFERENCE ON AUG. 25-29, 2002, PISCATAWAY, NJ, USA, IEEE, 25 August 2002 (2002-08-25), pages 548-550, XP010637541</p> <p>ISBN: 0-7803-7683-8</p>	14,22
Y	<p>the whole document</p>	5,6,8-13
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/016924

c(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

international application No.
PCT/US2007016924

Box No. 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 No. 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. JL As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

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 and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- 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: 1-13

A thermoelectric system comprising a first and a second plurality of thermoelectric elements, and a plurality of heat transfer devices, each heat transfer device having a first side in thermal communication with two or more thermoelectric elements of the first plurality of thermoelectric elements (e.g. P-type) and a second side in thermal communication with one or more thermoelectric elements of the second plurality of thermoelectric elements (e.g. N-type), so as to form a stack of thermoelectric elements and heat transfer devices, wherein the two or more thermoelectric elements of the first plurality of thermoelectric elements are in parallel electrical communication with each other and the two or more thermoelectric elements of the first plurality of thermoelectric elements are in series electrical communication with the one or more thermoelectric elements of the second plurality of thermoelectric elements, and wherein each heat transfer device thermally isolates the two or more thermoelectric elements of the first plurality of thermoelectric elements from the two or more thermoelectric elements of the second plurality of thermoelectric elements.

2. claims: 14-28

A thermoelectric system comprising a plurality of thermoelectric modules; and a plurality of heat transfer devices, each heat transfer device comprising a housing and one or more heat exchanger elements inside the housing, each heat transfer device accepting a working fluid to flow therethrough, at least some of the heat transfer devices in thermal communication with and sandwiched between at least two thermoelectric modules of the plurality of thermoelectric modules so as to form a stack of alternating thermoelectric modules and heat transfer devices, arranged to provide thermal isolation along a direction of a working medium movement.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/016924

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