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(81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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[Continued on next page]

(54) **Title:** TEST SYSTEM WITH LOCALIZED HEATING AND METHOD OF MANUFACTURE THEREOF

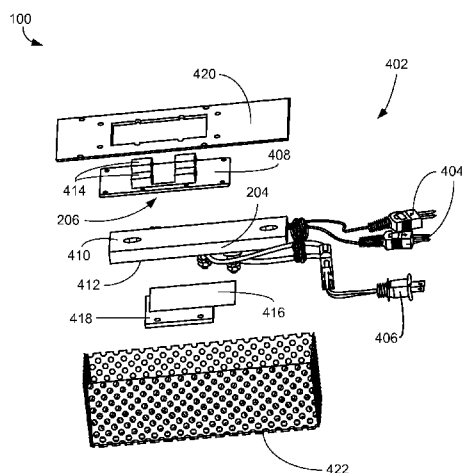


FIG. 4

(57) **Abstract:** A test system (100), and a method of manufacture thereof, including: a thermal management head (402) including a heat spreader (206); an electronic device (210) in direct contact with the heat spreader (206); and an electrical current for transferring energy between the heat spreader (206) and the electronic device (210).



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) **Date of publication of the international search report:**
8 January 2015

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. G01R31/28 F25B21/02
ADD.

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)
G01R F25B

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 practicable, search terms used)

EP0-Internal, 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 2011/132000 A1 (DEANE PHILIP A [US] ET AL) 9 June 2011 (2011-06-09) paragraphs [0002], [0003], [0025] - [0047]; claims 1,8-13,16-18; figures 1,2A,2B,3,5	1-3,6, 10,11, 16,19
X	US 4 839 587 A (FLATLEY ROBERT [US] ET AL) 13 June 1989 (1989-06-13) column 1, lines 7-27; claims 1,4,5; figures 1A,1B,2 column 2, line 33 - column 5, line 34 ----- -/--	1-3,6, 10,11, 16,19

☒ 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

"E" earlier application or patent 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

"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

"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

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5 November 2014

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/021290

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/043435 A1 (YIP TSUNWAI GARY [US] ET AL) 21 February 2008 (2008-02-21) paragraphs [0001], [0012] - [0032]; claims 1,5-17,20,25-28,31-36,39; figures 1,2,4,5,6A,6B,6C,7A,7B,7C,7D -----	1-3,6,7, 10,11, 16,17
X	WO 2004/086827 A2 (KRYOTECH INC [US]) 7 October 2004 (2004-10-07) page 1, lines 3-24; claims 1-11,17-20,24-34,36-45; figures 1,2A,2B,3A,3B,4, page 6, line 17 - page 12, line 3 -----	1-3,6,7, 10,11, 16,17
X	US 2007/057686 A1 (SUGA KAZUNARI [JP] ET AL) 15 March 2007 (2007-03-15) paragraphs [0002] - [0008], [0072] - [0112], [0128] - [0169]; claims 1-6,9-13,17-20,23-26,29-35,40-46; figures 1-10,13-19 -----	1-3,6,7, 10,11, 16,17
X,P	US 2013/285686 A1 (MALIK ZAFAR [US] ET AL) 31 October 2013 (2013-10-31) paragraphs [0002] - [0024], [0059] - [0087], [0090] - [0093]; claims 1-23; figures 1,2,3A,3B,4A,4B,8 -----	1-3,6,7, 10,11, 16,17
X	US 2008/252324 A1 (BARABI NASSER [US] ET AL) 16 October 2008 (2008-10-16) paragraphs [0002] - [0004], [0014] - [0030]; claims 1,8-12,16; figures 1,1A,2,2A,6 -----	1-3,6, 10,11,16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/021290

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. ☐ 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 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.:
1-3, 6, 7, 10, 11, 16, 17, 19
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: 1-3, 11, 19

Method of manufacture of a test system and test system,
where the temperature of an electronic device is increased
or decreased.

2. claims: 4, 14

Method of manufacture of a test system and test system,
further comprising a sensor for communicating information to
a controller.

3. claims: 5, 12, 20

Method of manufacture of a test system and test system,
further including a Peltier device.

4. claims: 6, 7, 10, 16, 17

Method of manufacture of a test system and test system,
wherein a heat spreader includes a projection.

5. claims: 8, 9, 13, 15, 18

Method of manufacture of a test system and test system,
wherein the heat spreader includes an aperture.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/021290

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011132000	A1	09-06-2011	NONE
US 4839587	A	13-06-1989	CA 1293336 C 17-12-1991 EP 0400094 A1 05-12-1990 JP H02500222 A 25-01-1990 US 4839587 A 13-06-1989 WO 8909410 A1 05-10-1989
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US 2008252324	A1	16-10-2008	NONE