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62/253,272 10 November 2015 (10.11.2015) US(71) Applicant: **3RD STONE DESIGN INC.** [US/—]; 30
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KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
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GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
- 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))

[Continued on next page]

(54) Title: PORTABLE REFRIGERATOR AND METHOD OF USING

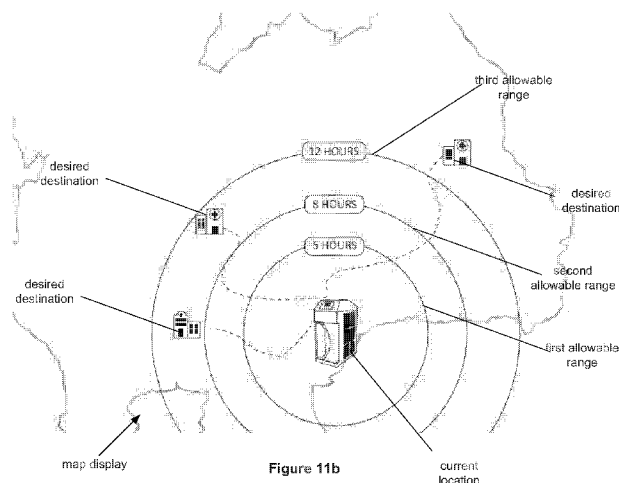


Figure 11b

(57) Abstract: A portable refrigeration system for use in transport of medicines or other valuable, temperature sensitive materials is disclosed. The system can use GPS positioning technology to provide absolute global location along with internet connection through a cellular modem on board which allows for communication to the cloud of temperature and transit data during device use. The refrigerator can be powered by a rechargeable battery back that may be recharged through connection to AC mains supply or connection to the photovoltaic panel included with the device. The insulated container can be held at a constant temperature through the use of vacuum insulated panel construction. The device can be cooled through the use of thermoelectric cooling modules coupled to the insulated chamber and paired with a heat exchanger with heat pipes and a system fan. The device can be operated either through the included graphical user interface display via touch or buttons or it may be accessed and controlled by a remote computer through the cloud via a cellular connection.



— *with information concerning request for restoration of
the right of priority in respect of one or more priority
claims (Rules 26bis.3 and 48.2(b)(vii))*

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23 March 2017

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 16/00790

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F25D 11/00 (2016.01)

CPC - F25D 19/00

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)

CPC: F25D 19/00

IPC(8): F25D 11/00 (2016.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CPC: F25D 19/00, F25D 15/00, F25D 17/06, F25D 2317/0672, F25D 2400/12, F25D 11/003

USPC: 62/89, 62/371

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Patbase; Google Patents; Google Scholar

Search Terms Used: Portable, mobile, refrigerator, cooler, temperature, thermometer, ambient, external, battery, lifetime, capacity, speed, route, path, GSM, cellular, GPS, location

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/0022696 A1 (WELLE et al.) 31 January 2008 (31.01.2008), para [0018], [0025], [0030], [0040], [0053], [0055], [0060], [0064], [0068]	1-6
Y	US 2013/0106607 A1 (CLEMENT et al.) 02 May 2013 (02.05.2013), para [0009], [0011]-[0012], [0052]	1-6
Y	US 2013/0263611 A1 (KEARNEY et al.) 10 October 2013 (10.10.2013), para [0068]-[0078], [0111]-[0112]	1-6
Y	US 2014/0352334 A1 (BARAKAT) 04 December 2014 (04.12.2014), para [0031], [0034], [0047], [0059]	5-6
A	WO 2013/153517 A2 (The Concentrate Manufacturing Company Of Ireland) 17 October 2013 (17.10.2013), see entire document	1-6

☐ Further documents are listed in the continuation of Box C.

* 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

"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

"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

16 January 2017 (16.01.2017)

Date of mailing of the international search report

02 FEB 2017

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 16/00790

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:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: claims 1-6 are drawn to a refrigeration unit system containing a portable refrigeration unit having an insulated internal space connected to a remote computer in order to calculate the remaining time of operable life or the refrigeration unit.

Group II: claims 7-16 are drawn to a refrigeration unit system comprising an assembly having thermoelectric module, a heat exchanger connected to a fan and used to cool the system, a heat conducting plate that is connected to the thermoelectric module, probes, and a microprocessor used to monitor the system temperature and perform a cooling algorithm.

---See continuation 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 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.:
1-6

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.

Continuation of Box III: Lack of Unity

Group III: claims 17-20 are drawn to a thermoelectric cooling module comprising a microprocessor that executes a software algorithm that monitors temperatures, determines the optimum power to deliver, preserves the charge of the battery pack, and maintains temperature consistency in the cold chamber.

The inventions listed as Groups I through III do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2 they lack the same or corresponding technical features for the following reasons:

Special Technical Features

The special technical feature of Group I is a refrigeration unit system containing a portable refrigeration unit having an insulated internal space connected to a remote computer in order to calculate the remaining time of operable life of the refrigeration unit, not present in any other group.

The special technical feature of Group II is a refrigeration unit system comprising an assembly having thermoelectric module, a heat exchanger connected to a fan and used to cool the system, a heat conducting plate that is connected to the thermoelectric module, probes, and a microprocessor used to monitor the system temperature and perform a cooling algorithm, not present in any other group.

The special technical feature of Group III is a thermoelectric cooling module comprising a microprocessor that executes a software algorithm that monitors temperatures, determines the optimum power to deliver, preserves the charge of the battery pack, and maintains temperature consistency in the cold chamber, not present in any other group.

Common Technical Features:

Groups I through III share the technical feature of refrigeration unit, a battery, thermometers/thermoelectric cooling module, a probe/sensor. However, these shared technical features does not represent a contribution over the prior art:

WO 2013/153517 A2 (The Concentrate Manufacturing Company Of Ireland) (hereinafter Concentrate) 17 October 2013 (17.10.2013)

Concentrate teaches refrigeration unit (e.g. refrigeration/cooling units, pg. 19, ln 27), a battery (e.g. battery life, pg. 11, ln 6); thermometers/thermoelectric cooling module (e.g. thermoelectric method...thermoelectric systems, pg. 19, ln 18-23); a probe/sensor (e.g. temperature sensor 220, pg. 9, ln 5).

Groups I and II share the technical feature of measuring an ambient temperature. However, these shared technical features does not represent a contribution over Concentrate.

Concentrate teaches measure an ambient temperature (e.g. calculation methodologies can be added to the controller 218 as well that can assist in processing incoming temperature signals from the temperature sensor 220, pg. 11, ln 9-14; e.g. ambient temperatures, pg. 15, ln 22-23; pg. 12, ln 13-24; pg. 15, ln 11-13).

Groups II and III share the technical feature of a microprocessor executing a software/cooling algorithm, temperature monitoring probe, cooling of the cold chamber. However, these shared technical features does not represent a contribution over Concentrate.

Concentrate teaches a microprocessor executing a software/cooling algorithm (e.g. the controller 218 can...be...a microprocessor based device, pg. 9, ln 29-31; e.g. one or more algorithms to process incoming temperature signals, and time related information, pg. 11, ln 1-5; e.g. algorithms based on calculation methodologies can be added to the controller 218 as well that can assist in processing incoming temperature signals from the temperature sensor 220, pg. 11, ln 9-14); temperature monitoring probe (e.g. temperature sensor 220, pg. 9, ln 5); cooling of the cold chamber (e.g. an initial cooling process, referred to as a pre-cooling step, and is then transferred to a quick chilling chamber , pg. 5, ln 21-24).

Groups I-III therefore lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.