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- (21) **International Application Number:**
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62/265,518 10 December 2015 (10.12.2015) US
- (71) **Applicant:** CARRIER CORPORATION [US/US]; One Carrier Place, Farmington, Connecticut 06032 (US).
- (72) **Inventor:** SWAB, Michael; 700 Olympic Drive, Athens, Georgia 30601 (US).
- (74) **Agent:** STANGO, Nicholas; Cantor Colburn LLP, 20 Church Street, 22nd Floor, Hartford, Connecticut 06103-3207 (US).
- (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, DJ, 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, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, 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.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

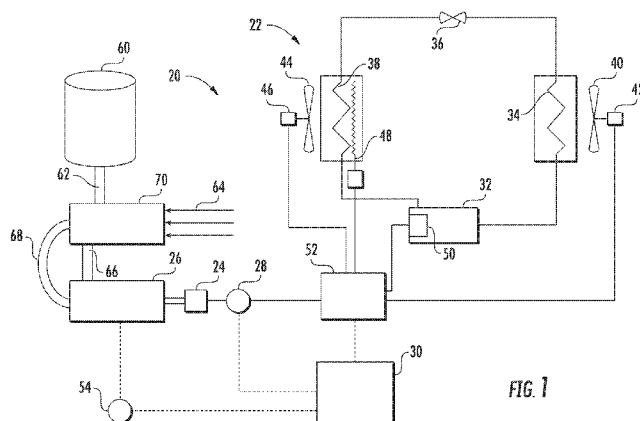
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

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))

- (88) **Date of publication of the international search report:**
20 July 2017

(54) **Title:** ARTIFICIAL ASPIRATION DEVICE FOR A COMPRESSED NATURAL GAS ENGINE



(57) **Abstract:** A transport refrigeration system (20) is provided. The transport refrigeration system includes: a natural gas engine (26), a compressed natural gas storage tank (60), an artificial aspiration device (70) providing decompressed natural gas and compressed air to the natural gas engine, an electric generation device (24) powered by the natural gas engine and providing an electric output, and a refrigeration unit (22) electrically powered by the electric output of the electric generation device.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2016/065851

A. CLASSIFICATION OF SUBJECT MATTER

INV. F25B27/00 F02B29/02
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)

F25B B60H F02B

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)

EPO-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.
A	US 2007/289325 A1 (STONE TYLER [US]) 20 December 2007 (2007-12-20) figures 1, 2	1
X	WO 2013/134355 A1 (CARRIER CORP [US]) 12 September 2013 (2013-09-12) figures 1, 3	1-4
A	US 5 081 977 A (SWENSON PAUL F [US]) 21 January 1992 (1992-01-21) figure 1	1-4
A	US 5 549 096 A (SWENSON PAUL F [US] ET AL) 27 August 1996 (1996-08-27) figure 1	1-4
A	WO 2014/085672 A1 (THERMO KING CORP [US]) 5 June 2014 (2014-06-05) figures 1A-8D	1-4



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

"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

22 February 2017

Date of mailing of the international search report

07/06/2017

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Dezso, Gabor

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/065851

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007289325	A1	20-12-2007	NONE
WO 2013134355	A1	12-09-2013	EP 2823172 A1 14-01-2015 US 2015013357 A1 15-01-2015 WO 2013134355 A1 12-09-2013
US 5081977	A	21-01-1992	CA 2026544 A1 14-08-1991 US 5081977 A 21-01-1992
US 5549096	A	27-08-1996	NONE
WO 2014085672	A1	05-06-2014	CN 105026740 A 04-11-2015 EP 2925989 A1 07-10-2015 US 2015314670 A1 05-11-2015 WO 2014085672 A1 05-06-2014

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/065851

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.:
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

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: 1-4

Transport refrigeration system with natural gas engine and electric generation device.

2. claims: 5-10

Artificial aspiration device and method of fueling natural gas engine.
