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- with international search report (Art. 21(3))
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(88) Date of publication of the international search report:

8 May 2014

(54) Title: REFRIGERATION SYSTEM HAVING A CONTINUOUSLY VARIABLE TRANSMISSION

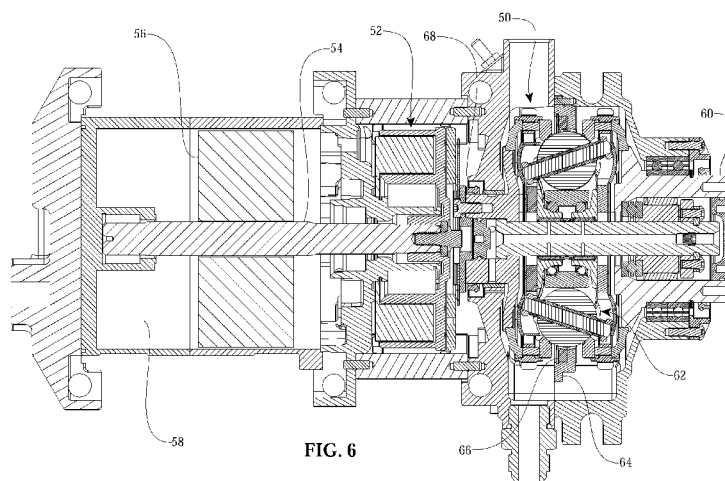


FIG. 6

(57) Abstract: Inventive embodiments are directed to components, subassemblies, systems, and/or methods for a refrigeration system having a compressor operably coupled to continuously variable accessory drive (CVAD). In one embodiment, the refrigerant is adapted to cool the CVAD. In another embodiment, the refrigerant is configured to actuate a change in operating condition of the CVAD. A change in operating condition of the CVAD can be based at least in part on the thermodynamic state, such as pressure or temperature, of the refrigerant. In one embodiment, a skew-based control system is adapted to facilitate a change in the ratio of a CVAD. In another embodiment, a skew-based control system includes a skew actuator coupled to a carrier member. In some embodiments, the skew actuator is configured to rotate a carrier member of a CVT. Among other things, shift control interfaces for a CVT are disclosed.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/058334

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25B31/00 F01P9/06
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)
B60K F25B F01P

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.
X	US 2004/231331 A1 (IWANAMI SHIGEKI [JP] ET AL) 25 November 2004 (2004-11-25)	1-3,8, 19,23
Y	paragraphs [0028], [0052] paragraph [0077] - paragraph [0083] paragraph [0092]	4-7,9, 20-22,24
Y	----- US 2003/196445 A1 (CHO YOUNG I [US] ET AL) 23 October 2003 (2003-10-23) figure 13	5,20-22, 24
Y	----- WO 2010/135407 A2 (CARRIER CORP [US]; SISHTLA VISHNU M [US]) 25 November 2010 (2010-11-25) figures 2,5	6
	----- -/-	



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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"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

26 November 2013

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07/03/2014

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/058334

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.:
1-9, 19-24

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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/058334

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2009/006481 A2 (FALLBROOK TECHNOLOGIES INC [US]; LOHR CHARLES [US]; POHL BRAD P [US];) 8 January 2009 (2009-01-08) figure 3 -----	9
Y	EP 1 347 251 A2 (CARRIER CORP [US]) 24 September 2003 (2003-09-24) figure 5 -----	4,7
A	US 6 434 960 B1 (ROUSSEAU WILLIAM H [US]) 20 August 2002 (2002-08-20) column 2, line 31 - line 34; figure 1 -----	24
A	US 2010/307173 A1 (GUO WEIHUA [CN] ET AL) 9 December 2010 (2010-12-09) paragraph [0074]; figure 14 -----	5,20,24

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-9, 19-24

A refrigeration system with a heat exchanger for heat exchange between the working fluid and a lubricant fluid of a continuously variable transmission which provides a power input to the compressor.

2. claims: 10-18

An actuator for a continuously variable transmission.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/058334

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