

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year) **25 OCT 2017**

Applicant's or agent's file reference

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/TH 17/00002

International filing date (day/month/year)

25 January 2017 (25.01.2017)

Priority date (day/month/year)

29 January 2016 (29.01.2016)

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - F28D 5/02 (2017.01)

CPC - F28D 5/02

Applicant CARTER, ROBERT S.

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

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Date of completion of this opinion

19 September 2017

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/TH 17/00002

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
- the international application in the language in which it was filed.
- a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a)).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
- a. forming part of the international application as filed:
- in the form of an Annex C/ST.25 text file.
- on paper or in the form of an image file.
- b. furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
- c. furnished subsequent to the international filing date for the purposes of international search only:
- in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
- on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/TH 17/00002

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>none</u>	YES
	Claims	<u>1</u>	NO
Inventive step (IS)	Claims	<u>none</u>	YES
	Claims	<u>1</u>	NO
Industrial applicability (IA)	Claims	<u>1</u>	YES
	Claims	<u>none</u>	NO

2. Citations and explanations:

Claim 1 lacks novelty under PCT Article 33(2) as being anticipated by WO 2013/041897 A1 to Renault Trucks (hereinafter 'Renault').

Regarding claim 1, Renault discloses a hybrid air conditioner system add-on (1; embodiment of Fig 4, including the reference numerals of Fig 1-2 for like components, and configured to be applied to the system of Fig 1-2; pg 5, ln 10-14; pg 11, ln 14-17), comprising:

- a. An ADD-ON system (13; Fig 4; pg 8, ln 9-14) for direct evaporative-cooling of a condensing-radiator (5; Fig 4; col 8, ln 9-14) of a conventional air conditioning system otherwise including an air cooled refrigerant-condensing-radiator (condensing-radiator 5 shown as one component in the refrigerant circuit 3 of Fig 1, and could otherwise include cooling via fan 6; pg 5, ln 22-27; col 6, ln 3-6);
- b. The ADD-ON system (13) comprising: a water reservoir (15; Fig 4; pg 8, ln 17-21 -- describing the reservoir for cooling fluid; pg 8, ln 13-14 -- describing the cooling fluid being water), a pumping unit (pg 9, ln 14-16), and a controller (12; Fig 4; pg 8, ln 17-21), the ADD-ON system (13) configured for water-evaporative cooling via the ADD-ON system (via sprayers 28 in fluid communication with reservoir 15; Fig 4; pg 11, ln 21-25), and configured to remove a latent-heat-of-condensation of a condensing refrigerant (pg 11, ln 21-23), reducing a pressure required by a compressor to facilitate condensation of the refrigerant (pg 11, ln 5-13 -- describing, by using system 13, the pressure drop of the refrigerant fluid in the fluid circuit 3, which passes through compressor 4; Fig 1, 4);
- c. The ADD-ON system configured such that the ADD-ON system reduces a pressure required and proportionally reduces a power consumption of the compressor, in turn reducing the cost to operate the air conditioner system by 30% to 50%, depending on environmental conditions (intended use, depending on environmental conditions, such as the cost of electricity at any given moment, Renault is capable of reducing such costs);
- d. The ADD-ON system configured such that the reduced pressure required by the compressor reduces a noise level of the compressor and extends the life of the compressor (intended use, Renault is capable of reducing pressure and such related symptoms of increased pressure such as noise and lifespan; see pg 11, ln 5-13 -- describing, by using system 13, the pressure drop of the refrigerant fluid in the fluid circuit 3);
- e. The ADD-ON system configured such that it reduces a cost of upgrading old air conditioning systems currently in service (intended use, Renault is capable of reducing such costs);
- f. The ADD-ON system configured such that directly evaporative-cooling the refrigerant-condensing-radiator is more effective than adding an independent evaporative cooling system for cooling water and including water to a refrigerant heat exchanger and requires less equipment, reducing a cost to upgrade or manufacture entirely new units (intended use);
- g. The ADD-ON system configured such that using, for example, a reverse-osmosis process to purify and reduce a totally dissolved solid (TDS) level of a makeup water avoids calcification and extends the life of the air conditioner system, reducing a cost of the air conditioner system (intended use, Renault is capable of reducing the cost of such a system);
- h. The ADD-ON system configured such that recycling of a condensate water from the evaporator-radiator inside the cooled space eliminates a need to dispose of the condensate water and eliminates a wasting of the condensate water, the condensate water being substantially purified water (via collector 19; Fig 2; pg 9, ln 4-7);
- i. The ADD-ON system configured such that an air expelled from the condensing-radiator, which is normally hot and heats the outside environment causing reduced efficiency to itself and adjacent units, is cooled (pg 11, ln 31 to pg 12, ln 2), increasing the efficiency of any adjacent units and configured to enhance an outside environment to be more comfortable for its inhabitants (pg 11, ln 31 to pg 12, ln 2);
- j. The ADD-ON system configured to improve an environment by reducing a load on an electrical grid and reducing carbon emissions (intended use, Renault is capable of reducing a load on an electrical grid)

Claim 1 has industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/TH 17/00002

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Regarding claim 1, part a, the recitation "the condensing-radiator" lacks antecedent basis. For the purposes of this opinion, this recitation is interpreted as "a condensing-radiator".

Regarding claim 1, part a, the recitation "the conventional air conditioning systems" lacks antecedent basis. For the purposes of this opinion, this recitation is interpreted as "a conventional air conditioning system".

Regarding claim 1, part a, the recitation "currently air cooled refrigerant-condensing-radiator." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "otherwise including an air cooled refrigerant-condensing-radiator;".

Regarding claim 1, part b, the recitation "Comprising a water reservoir, pumping unit, and controller, for water-evaporative cooling via an ADD-ON unit, far more effectively removes the latent-heat-of-condensation of the condensing refrigerant, reducing the pressure required by the compressor to facilitate condensation of the refrigerant." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system comprising: a water reservoir, a pumping unit, and a controller, the ADD-ON system configured for water-evaporative cooling via the ADD-ON system, and configured to remove a latent-heat-of-condensation of a condensing refrigerant, reducing a pressure required by a compressor to facilitate condensation of the refrigerant;".

Regarding claim 1, part c, the recitation "That the reduced pressure required, proportionally reduces the power consumption of the compressor, in turn reducing the cost to operate the system by 30% to 50% depending on environmental conditions." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured such that the ADD-ON system reduces a pressure required and proportionally reduces a power consumption of the compressor, in turn reducing the cost to operate the air conditioner system by 30% to 50%, depending on environmental conditions;".

Regarding claim 1, part d, the recitation "That the reduced pressures required by the compressor reduces its noise level considerably and extends the life of the compressor." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured such that the reduced pressure required by the compressor reduces a noise level of the compressor and extends the life of the compressor;".

Regarding claim 1, part e, the recitation "That the ADD-ON aspect of the system greatly reduces the cost of upgrading old air conditioning systems currently in service." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured such that it reduces a cost of upgrading old air conditioning systems currently in service;".

Regarding claim 1, part f, the recitation "That directly evaporative-cooling the refrigerant-condensing-radiator is far more effective than adding an independent evaporative cooling system for cooling water then using a water to refrigerant heat exchanger as in the prior art and requires far less equipment reducing the cost to upgrade or manufacture entirely new units." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured such that directly evaporative-cooling the refrigerant-condensing-radiator is more effective than adding an independent evaporative cooling system for cooling water and including water to a refrigerant heat exchanger and requires less equipment, reducing a cost to upgrade or manufacture entirely new units;".

Regarding claim 1, part g, the recitation "That using for example, reverse-osmosis to purify and reduce the TDS levels of the makeup water will avoid calcification and extend the life of the system reducing cost." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured such that using, for example, a reverse-osmosis process to purify and reduce a totally dissolved solid (TDS) level of a makeup water avoids calcification and extends the life of the air conditioner system, reducing a cost of the air conditioner system;".

Regarding claim 1, part h, the recitation "That the recycling of the condensate water from the evaporator-radiator inside the cooled space eliminates the often messy need to dispose of said water and eliminates wasting said water since it is in effect purified water." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured such that recycling of a condensate water from the evaporator-radiator inside the cooled space eliminates a need to dispose of the condensate water and eliminates a wasting of the condensate water, the condensate water being substantially purified water;".

Regarding claim 1, part i, the recitation "That the fact that the air expelled from the condensing-radiator which is normally hot and heats the outside environment causing reduced efficiency to itself and adjacent units is now cool helping the efficiency of any adjacent units while make the outside environment more comfortable for its inhabitants." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured such that an air expelled from the condensing-radiator, which is normally hot and heats the outside environment causing reduced efficiency to itself and adjacent units, is cooled, increasing the efficiency of any adjacent units and configured to enhance an outside environment to be more comfortable for its inhabitants;".

Regarding claim 1, part j, the recitation "That the present invention is extremely important to the environment because of the considerable reduction of load on the electrical grid reducing carbon emissions and therefor reducing." is confusing and lacks clarity. For the purposes of this opinion, this recitation is interpreted as "The ADD-ON system configured to improve an environment by reducing a load on an electrical grid and reducing carbon emissions;".