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Datasheet for the decision of 16 November 2015

Case Number: T 1130/15 - 3.2.01

Application Number: 08807096.6

Publication Number: 2337695

IPC: B60H1/00, B60H1/32

Language of the proceedings: EN

Title of invention:
ELECTRICALLY POWERED TRANSPORT REFRIGERATION UNITS

Applicant:
Carrier Corporation

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:

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Case Number: T 1130/15 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 16 November 2015

Appellant: (Applicant)	Carrier Corporation One Carrier Place Farmington, CT 06034-4015 (US)
Representative:	Leckey, David Herbert Dehns St Bride's House 10 Salisbury Square London EC4Y 8JD (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 12 December 2014 refusing European patent application No. 08807096.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Pricolo
Members:	C. Narcisi
	P. Guntz

Summary of Facts and Submissions

I. European patent application No. 08 807 096.6 was refused by decision of the Examining Division, posted on 12 December 2014, on the grounds that the subject-matter of claim 1 of all requests did not involve an inventive step in view of document D2 (EP-A1-1 512 565) in combination with common general knowledge or document D1 (EP-A1-0 958 952), or in combination with D1 and common general knowledge.

II. Against this decision an appeal was filed by the applicant on 23 February 2015 and the appeal fee was paid at the same time. The statement of grounds of appeal was filed on 21 April 2015.

III. The appellant (applicant) was informed (see minutes of telephone conversation on 18 September 2015) that the Board was of the preliminary view that the inventive step objection in the contested decision was not persuasive and that claim 1 of the main request under appeal did not fulfill the requirements of Article 123(2) EPC.

IV. The Appellant filed on 30 September 2015 amended pages of the description and an amended set of claims replacing those on file.

The appellant requested to grant a patent on the basis of the main request as specified in the submission dated 29 October 2015.

V. Claim 1 of the main request reads as follows:

"A refrigerated vehicle (2;4;6;8) having at least one refrigerated compartment (10), comprising:

at least one electrical power supply; and
a refrigeration unit having:
a first module (14) mounted on the exterior of a refrigerated compartment (10), the first module (14) comprising:

a compressor (28) having a discharge port and a suction port and further having a motor hermetically disposed therein for running the compressor (28), the motor being electrically connected to the at least one electrical power supply;

a condenser heat exchanger (30) operatively coupled to the compressor discharge port; and

at least one condenser fan assembly (32) having at least one electric fan motor configured to provide air flow over the condenser heat exchanger (30); and
a second module (16) mounted on the interior of a refrigerated compartment (10), the second module comprising:

an evaporator heat exchanger (50) operatively coupled to the compressor suction port; and

at least one evaporator fan assembly (52) having at least one electric motor configured to provide air flow over the evaporator heat exchanger (50);
the at least one electrical power supply comprising at least one AC electrical power supply for providing AC electrical power to the refrigeration unit, the at least one AC electrical power supply comprising an alternator or generator assembly (64) that is operatively coupled to the engine (62) of the vehicle;
characterised in that:
the first module (14) of the refrigeration unit comprises a power converter (36) comprising means for converting AC electrical power into AC power at one or more different voltages and/or frequencies electrically connected to the alternator or generator assembly (64)

and arranged to provide electrical power to the motor of the compressor (28)."

VI. The Appellant's arguments may be summarized as follows:

The subject-matter of claim 1 involved an inventive step in view of documents D1 and D2.
D2 disclosed a refrigerator vehicle having the features of the preamble of claim 1. It showed two modules outside the refrigerated compartment, with components of the converter split between these modules. D1 disclosed a vehicle refrigeration system having a compressor which was operated by the vehicle engine. Neither D1 nor common general knowledge of the skilled person taught or suggested to bring together the components of the converter, specifically being disclosed as being spread between two modules in D2, into a single location, let alone into the condenser module of D2.

Reasons for the Decision

1. The appeal is admissible.

2. Claim 1 complies with the requirements of Article 123(2) EPC because its subject-matter is found in the combination of claims 1, 5, 6, 10 and 11 as originally filed.

3. The subject-matter of claim 1 according to the main request fulfills the requirements of Article 56 EPC.

D2, which represents the closest prior art, discloses - as acknowledged by the appellant - a refrigerated

vehicle having the features defined in the preamble of claim 1. The subject-matter of claim 1 differs therefrom by the features of the characterizing portion, according to which the first module of the refrigeration unit comprises a power converter comprising means for converting AC electrical power into AC power at one or more different voltages and/or frequencies electrically connected to the alternator or generator assembly and arranged to provide electrical power to the motor of the compressor.

According to D2 (see figures 1 and 2), the AC electrical power supplied to the condensing unit 11 of the refrigeration unit is obtained by i) converting the AC output of generator 51 to DC power by means of AC to DC converter unit 60a (see paragraph [0014] of D2), which hangs from the bed 3 of the vehicle 1; and ii) converting the DC output of converter unit 60a to AC power by means of inverter 40 (DC to AC conversion; see paragraph [0012]) provided within condensing unit 11, which condensing unit is placed above the roof of the vehicle (see paragraph [0011]). Accordingly, although D2 discloses the conversion of AC electrical power, as supplied by the generator 51, into AC power, as supplied by the inverter 40 to the motor of the compressor 31, this AC to AC conversion is split into two separated modules and requires an AC to DC conversion followed by a DC to AC conversion.
The Board agrees with the Examining Division (see page 5 of the impugned decision) that integrating electrical components into a single module generally falls within the scope of customary practice followed by persons skilled in the art. Also, converters of different types such as AC-AC, AC-DC, DC-AC and DC-DC are well known in the art. However, the question here at stake is whether, starting from the disclosure of the closest

prior art, i.e. the vehicle disclosed in D2, the skilled person would consider integrating the complete AC to AC conversion into the condensing unit 11. This is not the case because the separation of the AC to AC conversion into the AC to DC converter 60a and the DC to AC inverters 40 is not fortuitous but intended in order to avoid generation of noise and power loss, as well as to shorten electric current lines (see paragraphs [0032] to [0034] of D2). Therefore the refrigerated vehicle proposed in D2 explicitly teaches the skilled person away from mounting all the components for the AC to AC conversion of the AC power generated by the generator 51 into the condensing unit 11.

Nor does D1 provide any motivation to the skilled person in that sense. D1 does not disclose any power converter connected to an alternator or generator that is coupled to the engine of the vehicle. Indeed according to the refrigerated vehicle of D1, the engine mechanically drives the compressor 26 of the refrigeration cycle or, in the alternative, the additional stand-by compressor 34 is connected to an external electric supply through an appropriate electrical connector 64. D1 is thus silent on any kind of power conversion.

Since also the further document EP-A-1 354 735 cited in the search report is silent on any kind of power conversion, the subject-matter of claim 1 (and likewise of dependent claims 2 to 12) is found to involve an inventive step over the available prior art.

4. The description is amended to be in conformity with the claims and to acknowledge the prior art according to D1 and D2. Sheets 6 and 8 of drawings are amended to refer

to a converter rather than an inverter for consistency with the written description. These amendments do not give rise to objections and therefore the application documents in accordance with the appellant's request form a suitable basis for the grant of a European patent.

Order

For these reasons it is decided that:

1. The appealed decision is set aside.

2. The case is remitted to the first instance with the order to grant a patent according to the main request, namely:
   - claims 1 to 12 as submitted on 30 September 2015;
   - description pages:
     - 1, 3, 4, 8, 11 to 14, as originally filed,
     - 7 and 10 as submitted on 21 April 2015,
     - 2, 5, 6, 9 and 15 as submitted on 30 September 2015;
   - drawing sheets:
     - 1/8 to 5/8 and 7/8, as originally filed,
     - 6/8 and 8/8, as submitted on 21 April 2015.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated