

Internal distribution code:

- (A) [-] Publication in OJ
- (B) [-] To Chairmen and Members
- (C) [-] To Chairmen
- (D) [X] No distribution

**Datasheet for the decision
of 26 July 2021**

Case Number: T 2654/18 - 3.2.01

Application Number: 11306156.8

Publication Number: 2570280

IPC: B60H1/00

Language of the proceedings: EN

Title of invention:

Method of cooling air in a vehicle and air conditioning system
for a vehicle

Patent Proprietor:

1. ALSTOM Transport Technologies
2. Universitat Politècnica De Catalunya

Opponent:

Mahle International GmbH

Headword:

Relevant legal provisions:

EPC Art. 100(b), 123(2), 56
RPBA 2020 Art. 11, 13(2), 13(1)

Keyword:

Principle of reformatio in peius - contravened (no)
Late-filed objection regarding inventive step admitted (yes)
regarding added subject-matter- admitted (no)
Remittal - special reasons for remittal (no)
Added subject-matter (no)
Insufficiency of disclosure (no)
Inventive step - (yes)

Decisions cited:

G 0009/92, G 0004/93

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2654/18 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 26 July 2021

Appellant: Mahle International GmbH
(Opponent) Pragstr. 26-46
70376 Stuttgart (DE)

Representative: Grauel, Andreas
Grauel IP
Patentanwaltskanzlei
Wartbergstrasse 14
70191 Stuttgart (DE)

Respondent: ALSTOM Transport Technologies
(Patent Proprietor 1) 48, rue Albert Dhalenne
93400 Saint-Ouen (FR)

Respondent: Universitat Politècnica De Catalunya
(Patent Proprietor 2) C/Jordi Girona 31
08034 Barcelona (ES)

Representative: Lavoix
2, place d'Estienne d'Orves
75441 Paris Cedex 09 (FR)

Decision under appeal: **Interlocutory decision of the Opposition**
Division of the European Patent Office posted on
10 October 2018 concerning maintenance of the
European Patent No. 2570280 in amended form.

Composition of the Board:

Chairman	G. Pricolo
Members:	S. Mangin
	O. Loizou

Summary of Facts and Submissions

- I. The appeal was filed by the appellant (opponent) against the interlocutory decision of the opposition division that held that on the basis of the auxiliary request 2, the patent in suit (hereinafter "the patent") met the requirements of the EPC.
- II. The opposition division held that:
- (1) the main request in opposition (claims as granted) did not extend beyond the content of the application as originally filed (Article 100(c) EPC)
 - (2) the patent, based on the main request, disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b))
 - (3) the subject-matter of claims 1 and 9 of the main request was not novel over D8 (EP 2 020 315 A2) and over D9 (DE 10 2004 046 853).

The opposition did not admit auxiliary request 1 in the proceedings.

As for the upheld auxiliary request 2, the opposition division found that

- (1) this request was admissible and did not infringe the requirements of Articles 123(2) and 123(3) EPC.
- (2) the subject-matter of this request was novel over D8 and
- (3) involved an inventive step over:
 - D8 in combination with D2 (US 6 568 205 B2),
 - D9 in combination with D2 and
 - D2 in combination with D8 or D9.

III. Oral proceedings were held before the Board on 26 July 2021.

IV. The appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked in its entirety.

The respondents (patent proprietors) requested that the patent be maintained in amended form on the basis of the main request filed as auxiliary request 3 with their reply and withdrew the main request and the other auxiliary requests 1, 2, 4 and 5.

V. Main request

(a) Independent claim 1 reads as follows (feature numbering added by the Board, whereby the numbering of features 1.1. to 1.8 corresponds to the numbering of features for claim 1 as granted in accordance with the decision under appeal, see pages 2 and 3):

1.1 Method of cooling inside air in a vehicle using a refrigeration circuit (6) for operating refrigeration cycles

1.2 comprising compressing a refrigerant in a compressor, condensing the refrigerant in a condenser, expanding the refrigerant in an expansion device and evaporating the refrigerant in an evaporator to produce cold,

1.3 the method comprising operating a first refrigeration cycle for producing cold in excess to cool inside air and store excess cold in a cold storage unit (60) in a first phase and

- 1.4 operating a second refrigeration cycle for retrieving cold from the cold storage unit (60) in a second phase, and
- 1.5 the first refrigeration cycle is operated using regenerative braking energy during a braking phase of the vehicle and
- 1.6 the second refrigeration cycle is operated during a coasting phase and/or a traction phase of the vehicle, characterized in that
- 1.7 the method comprises evaporating the refrigerant in the evaporator (20) with transferring thermal energy between the refrigerant in the evaporator (20) and air flowing through the evaporator (20) and
- 1.8 transferring thermal energy between the refrigerant in the evaporator (20) and the cold storage unit (60),
- 1.9 the cold storage unit (60) being a phase change material cold storage unit (60) comprising a reservoir (62) containing a phase change material (64),
- 1.10 the evaporator (20) comprising evaporator coils (28) for circulation of refrigerant and
- 1.11 an air passage (66) for air to pass through the evaporator (20) between the evaporator coils (28), the air passage (66) and the reservoir (62) being separated,
- 1.12 the evaporator coils (28) extending
 - 1.12a through the air passage (66) for refrigerant/air thermal exchange and
 - 1.12b through the reservoir (62) for the refrigerant/phase change material thermal exchange.

(b) Independent claim 8 reads as follows (feature numbering added by the Board, whereby the numbering of features 8.1 to 8.7 corresponds to the numbering of features 9.1 to 9.7 for claim 9 as granted in accordance with the decision under appeal, see page 3):

- 8.1 Vehicle air conditioning system comprising a refrigeration circuit (6) for circulation of a refrigerant,
- 8.2 the refrigerant circuit (6) comprising a variable speed compressor (8),
- 8.3 a condenser (16),
- 8.4 an expansion device (18) and
- 8.5 an evaporator (20), and
- 8.6 a regenerative braking energy device (72) for recovering energy during braking phases of the vehicle feeding the compressor (8),
- 8.7 and a cold storage unit (60), the system being characterized in that
- 8.8 the cold storage unit (60) being a phase change material cold storage unit (60) comprising a reservoir (62) containing a phase change material (64),
- 8.9 the evaporator (20) comprising evaporator coils (28) for circulation of refrigerant and
- 8.10 an air passage (66) for air to pass through the evaporator (20) between the evaporator coils (28), the air passage and the reservoir (62) being separated,
- 8.11 The evaporator coils (28) extending
 - 8.11a through the air passage (66) for refrigerant/air thermal exchange and
 - 8.11b through the reservoir (62) for the refrigerant/phase change material thermal exchange,
- 8.12 the system comprising a control unit configured to operate the method as in anyone of claims 1-7.

Reasons for the Decision

1. Admissibility of the main request - Reformatio in peius

1.1 The appellant argued that the main request was contrary to the principle of reformatio in peius, as it put the opponent as sole appellant in a worse position than if they had not filed an appeal.

In the appellant's view, the main request did not represent a limitation of the request maintained by the opposition division because claim 1 did not comprise the following features:

- (i) the evaporator (20) comprising evaporator coils (28) for circulation of refrigerant and exchange of thermal energy between the refrigerant and air flowing between the evaporator coils (28);
- (ii) the cold storage unit (60) being configured for exchanging thermal energy with the refrigerant in the evaporator coils (28).

1.2 According to established case law, if the opponent is the sole appellant against an interlocutory decision maintaining a patent in amended form, the patent proprietor during the appeal proceedings is primarily restricted to defending the patent in the form in which it was maintained by the Opposition Division in its interlocutory decision. Amendments proposed by the patent proprietor as a party to the proceedings as of right under Article 107, second sentence, EPC, may be rejected as inadmissible by the Board of Appeal if they are neither appropriate nor necessary (G9/92 and G4/93).

In the present case, contrary to the appellant's submissions, claim 1 according to the main request comprises all the features of the request maintained by the opposition division, such that the scope of the main request is not broadened as compared to the request maintained by the opposition division.

The above-mentioned feature (i) present in claim 1 of the request maintained by the opposition division is clearly found in features 1.11, 1.12 and 1.12a of claim 1 of the main request. These features define that the evaporator comprises coils for the circulation of the refrigerant, that the air passes between the evaporator coils and that there is an exchange of thermal energy between the refrigerant and the air. While feature 1.12a refers to the "refrigerant/air thermal exchange", without specifying that the exchange is with the air passing between the evaporator coils, the thermal exchange clearly takes place between the refrigerant and the air passing between the evaporator coils as feature 1.11 defines that air passes between the evaporator coils.

Feature (ii) of the request maintained by the opposition division is clearly found in features 1.12 and 1.12b of claim 1 of the main request. While feature 1.12 and 1.12b do not use the wording "configured for", these features together with feature M1.9 disclose the way the cold storage unit is configured for exchanging thermal energy with the refrigerant in the evaporator coils i.e. the cold storage unit comprising a reservoir and evaporator coils extending through the reservoir.

Finally, the Board notes that claim 1 of the main request, as compared to claim 1 of the request maintained by the opposition division, is limited in particular by the feature of the evaporator coils extending both through the air passage and the reservoir containing the phase change material. Claim 1 thus constitutes an appropriate and necessary fallback position in reply to the appellant's objection of lack

of novelty over D8 submitted with the statement of grounds of appeal.

The objections in respect of claim 8 being analogous to those in respect of claim 1, the Board judges that independent claim 8 of the main request does not contravene the principle of reformatio in peius for the same reasons as for claim 1.

2. Admissibility of objections raised after the summons to oral proceedings against the main request and remittal to the opposition division - Articles 11 and 13 RPBA 2020

2.1 The appellant argued that the case should be remitted to the opposition division as the independent claims comprised new features taken from the description leading to further objections under Article 123(2) EPC and a necessary reassessment of novelty and inventive step.

2.2 The respondents argued that unless the Board admitted new objections against the main request during the oral proceedings, the respondents were against the remittal of the case to the Opposition Division. The respondents further argued that the appellant had enough opportunities during the opposition and the appeal proceedings to submit objections against the main request such that new objections during the oral proceedings should not be admitted and the case should therefore not be remitted.

2.3 The Board notes that the main request was filed in opposition proceedings as auxiliary request 5 on 18 May 2018 and re-filed with the reply to the

statement of grounds of appeal as auxiliary request 3 on 13 May 2019.

The appellant submitted an objection of lack of inventive step against the main request with letter of 1 June 2021 (see pages 5 and 6), shortly before the oral proceedings before the Board, in view of D8 in combination with D2. This objection is analogous to the objection of lack of inventive step submitted with the statement of grounds of appeal against the claims as maintained by the opposition division, whereby the parties and the Board, being familiar with these documents, and having regard to the nature of the objection, could deal therewith without undue burden.

Under these exceptional circumstances the Board admitted this objection of lack of inventive step to the appeal proceedings (Article 13(2) RPBA 2020).

However, the Board saw no reason to delay further the proceedings and remit the case to the opposition division in order for the appellant to reassess novelty and inventive step of the present main request on an unspecified basis, considering that the appellant had ample time to submit objections against the present main request in opposition proceedings and in appeal proceedings.

Moreover, the appellant raised for the first time at the oral proceedings before the Board an objection under Article 123(2) EPC, based on the fact that features 1.9-1.12b of claim 1 of the main request were taken from the description and their incorporation in claim 1 allegedly resulted in an inadmissible intermediate generalisation. This objection constituted in the Board's view an amendment to the appellant's

case which was neither admissible in view of Article 13(1) RPBA 2020, because it was not prima facie suitable to question the validity of the claim (see below, point 4), nor in view of Article 13(2) RPBA 2020, as no exceptional circumstances justified with cogent reasons were presented by the appellant for amending its appeal case in oral proceedings, i.e. after the summons to attend oral proceedings.

Therefore, having regard to the fact that the admissible objections against the main request were substantially those put forward with the statement of grounds of appeal against the claims as maintained by the opposition division (namely the same objections of insufficiency of disclosure and of added subject-matter and the analogous objection of lack of inventive step) the Board decided not to remit the case to the Opposition Division as no special reasons presented themselves for doing so.

3. Added subject-matter - Article 123(2) EPC

The Board judges that the subject-matter of claim 1 does not extend beyond the content of the application as originally filed: Claim 1 is based on claims 1, 2, 4 and 5 of the application as filed with the addition of features 1.9 to 1.12b. The latter features are taken from the description, page 5, lines 14 to 23 of the application as filed. Apart from features 1.1. to 1.8 of the claim, features 1.9. to 1.12b are not inextricably linked to other features disclosed in the description. Independent claim 8 having been amended analogously (see features 8.8 to 8.12), it also does not contain subject-matter extending beyond the content of the application as filed.

3.1 The appellant was of the opinion that the objection raised in the statement of grounds of appeal against claims 1, 9 and 12 of the request maintained by the opposition division, according to which the omission of the following features:

- the mixing of the refrigerant with an absorbent in a mixer (10),
- an absorption of the refrigerant in the absorbent,
- a condensation of the mixture in an absorber (12) and
- the separation of the mixture in refrigerant and absorbent in a separator (14)

led to an intermediate generalisation, also applied to independent claims 1 and 8 of the main request.

3.2 The Board does not agree. Page 1, lines 12-22 and page 2, lines 19-24 of the application as originally filed (paragraphs [0003]-[0004] and [0006] of the A1 publication) discloses the invention in general terms without the mixing of the refrigerant with the absorbent and the absorption, condensation and separation. Page 1, lines 12-14 discloses the aim of the invention, namely *"to propose a method of conditioning air in a vehicle that reduces energy consumption whilst allowing to provide good thermal comfort for the passengers"* and page 1, lines 15-22 discloses the solution, namely a method of cooling inside air in a vehicle using a refrigeration circuit comprising the features 1.1-1.4 of claim 1 and page 2, lines 19-24, a vehicle air conditioning system comprising features 8.1-8.7 of claim 8. Therefore the mixing of the refrigerant with the absorbent and the absorption, condensation and separation are not described as essential in the application as originally filed. The optional character

of these features is confirmed by the fact that the mixing of the refrigerant with an absorbent, absorbing, condensing and separating is only defined in original dependent claims 6 and 13 and that page 8, lines 19-25 of the application as originally filed (paragraph [0052] of the A1 publication) discloses a third mode of operation, which by-passes the mixer, the absorber and the separator.

4. Insufficiency of disclosure - Article 100(b) EPC

The Board agrees with the findings of the opposition division that the invention is disclosed in a manner sufficiently clear and complete for a skilled person to carry out the invention. Reference is made to point 2.3 of the appealed decision.

4.1 During oral proceedings, the parties relied on their written submissions in respect of insufficiency of disclosure.

With the statement of grounds of appeal, the appellant submitted only a verbatim repetition of the arguments presented in the notice of opposition (cut-and-paste of pages of the notice of opposition), without actually dealing with, or entering into a discussion of the reasons given in the decision under appeal by the opposition division for arriving at the conclusion that the invention is sufficiently disclosed. It remains unclear therefore why the decision under appeal was wrong.

Under these circumstances the Board sees no reasons to depart from the findings of the Opposition Division and thereby confirms their conclusion.

4.2 Since the Board considers that the patent discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, the question of admissibility of the objection in the appeal proceedings raised by the respondents can be left open.

5. Inventive step - Article 56 EPC

The Board judges that the subject-matter of claim 1 involves an inventive step in view of D8 in combination with D2.

5.1 D8, which is considered to be the closest prior art, discloses in figures 1-3 and paragraphs [0008] features 1.1-1.8 (see also point 2.4 of the appealed decision). In particular D8 discloses operating a first refrigeration cycle for producing cold in excess to cool inside air and store excess cold in a heater 4 which is then used as cold storage unit, (*Heizkörper als Kältespeicher 4*, see claim 1 and figures 1 and 3), in a first phase and operating a second refrigeration cycle for retrieving cold from the cold storage unit (heater 4) in a second phase.

According to D8, the heater 4 which takes over the cold storage function is separated from, and situated downstream of, the evaporator 3. D8 thus does not disclose at least the feature of claim 1 that the evaporator coils extend both through the air passage and through the reservoir containing a phase change material, the reservoir being separate from the air passage.

5.2 The appellant submitted that this corresponded to integrating the cold storage unit in the evaporator,

whereby such an arrangement, that did not provide any particular advantages, was known from D2.

- 5.3 Document D2 indeed discloses an air-conditioner having an evaporator 1 which, in its upper area, is provided with a cold storage medium 4 (see col. 3, lines 1-3 and 13-15). However, in the Board's view, the skilled person would not combine the teaching of D8 with the teaching of D2. Paragraph [0008] of D8 discloses that: *"Because the heater takes over the storage function, an additional cold storage medium, additional components and thus additional weight can be dispensed with. The retrofitting is very simple and inexpensive, since essentially existing components of the air conditioning system are used for the modified function and the essential changes are of a control engineering nature"*.

This passage leads the skilled person away from adding a cold storage unit in the evaporator as the one in D2, as it would require additional components and increase the weight contrary to the above-mentioned advantages of having the cold storage unit being part of the heater.

Furthermore, the arrangement for the cooling in D8 is very different from the arrangement in D2. In D8 the cold storage unit being in the heater, a flap 8 with a servomotor and a microcontroller are necessary to either direct the air through the heater 4 or through the cold air bypass 7. In D2 the cold storage unit is integrated in the evaporator which does not require such arrangement.

Providing the cold storage unit in the evaporator instead of the heater would require the skilled person to extensively modify the arrangement of D8, in

particular modifying the heater by removing the necessary arrangement for it to work also as a cold storage unit.

The above reasoning for claim 1 applies mutatis mutandis for the subject-matter of claim 8.

6. As no further objections were raised in appeal proceedings by the appellant against the main request, it follows that the patent is to be maintained on the basis of the main request.

The Board concurred with the appellant and the respondents that it would be more expedient to remit the case to the opposition division for the adaptation of the description according to the main request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition decision with the order to maintain the European patent in amended form according to the main request (claims 1 to 11) filed as auxiliary request 3 with the reply and a description to be adapted.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated