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**Datasheet for the decision  
of 20 September 2016**

**Case Number:** T 1383/12 - 3.2.04

**Application Number:** 03758110.5

**Publication Number:** 1681457

**IPC:** F02M31/13

**Language of the proceedings:** EN

**Title of invention:**

MODULE FOR HEATING THE INTAKE GASES OF AN AUTOMOTIVE ENGINE,  
WITH INTEGRATED ELECTRONIC TEMPERATURE CONTROL

**Patent Proprietor:**

Nagares, S.A.

**Opponent:**

BorgWarner BERU Systems GmbH

**Headword:**

**Relevant legal provisions:**

EPC Art. 54(2), 56, 84, 108  
RPBA Art. 12(2), 12(4)

**Keyword:**

Admissibility of appeal  
Claims - clarity - main request (yes)  
Novelty - (yes)  
Inventive step - (yes)

**Decisions cited:**

J 0016/94

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 1383/12 - 3.2.04

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.04**  
**of 20 September 2016**

**Appellant:** Nagares, S.A.  
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**Decision under appeal:** **Interlocutory decision of the Opposition**  
**Division of the European Patent Office posted on**  
**17 April 2012 concerning maintenance of the**  
**European Patent No. 1681457 in amended form.**

**Composition of the Board:**

**Chairman** A. de Vries  
**Members:** S. Oechsner de Coninck  
C. Heath

## **Summary of Facts and Submissions**

I. The appellant-proprietor lodged an appeal, received on 15 June 2012, against the interlocutory decision of the Opposition Division, dispatched on 17 April 2012 on the amended form in which the patent No. 1 681 457 can be maintained. The statement setting out the grounds of appeal was received on 24 August 2016. The fee for appeal was paid on 15 June 2012.

The appellant-opponent likewise lodged an appeal, received on 21 June 2012 against the interlocutory decision of the Opposition Division. The statement setting out the grounds of appeal was received on 7 July 2012. The fee for appeal was paid on 21 June 2012.

Opposition was filed against the patent as a whole and based on Article 100(a) together with 52(1) and 54(1) EPC and together with 52(1) und 56 EPC.

The Opposition Division held that the grounds for opposition mentioned in Article 100 (a) EPC did not prejudice the maintenance of the patent as amended according to the request 0A, having regard in particular to the following document that also played a role in the present proceedings:

D5: US 2002/0000221 A1

II. The further following document was cited in appeal:

D12: EP 1 348 861 A2

III. Oral proceedings were held on 20 September 2016.

IV. The appellant-proprietor requested that the appeal of the appellant-opponent be dismissed, alternatively

that the decision under appeal be set aside and the patent be maintained on the basis of one the auxiliary requests 1, 1A, 2, 2A, 3, 3A, 4, 4A, 5, 5A, 6, 6A, 7 or 7A all filed during opposition with letter dated 10 February 2012 and re-filed with the grounds of appeal.

The appellant-opponent requested that the decision under appeal be set aside and the patent be revoked.

V. The independent claim 1 of the main request reads as follows:

"Module for heating the intake gases of an internal combustion engine, incorporating electronic temperature control which is used for heating the gases circulating through the intake pipe (13) by means of a heating element (1) connected to a battery (9) from which it receives a supply via a power control circuit (4) controlled by an electronic control unit (ECU) (12) of the engine, wherein the module incorporates a frame (2) wherein:

- the power control circuit (4) is adhered, and
- the heating element (1), consisting of a least one heating resistance, is installed,

both forming the same module to allow electronic control of the temperature of the intake gases; and wherein the control circuit (4) is inserted between the battery (9) and the heating element (1), and characterised in that

the control circuit (4) is arranged for automatically cutting off the supply of power from the battery (9) to the heating element if the temperature of the frame (2) exceeds a temperature of safe operation."

VI. The appellant-proprietor argues as follows:

-The appellant-opponent merely repeats his arguments in respect of Article 84 EPC and therefore fails to indicate the reasons why the decision should be reversed thus failing to meet the provisions of Art 12(2) RPBA.

- With respect to novelty D5 does not disclose any control of the frame temperature. Furthermore the description of D5 is silent about safe operation. D12 does not describe a battery, the control unit is outside the container connected to it by an external cable, therefore it is not part of the module as required. Furthermore the function of the controller is not related to the temperature of the casing.

- As for inventive step, starting from D5 the problem to be solved is to provide a security mechanism so that other parts of the engine are not damaged if the module is not working properly. The problem of controlling the temperature of the casing is not derivable from D12 nor obvious per se and therefore the solution of claim 1 involves an inventive step.

VII. The appellant-opponent argues as follows:

- Replacing the request made in the notice of appeal to reject the opposition by a new first request in the statement of grounds to reject the appeal of the opponent as inadmissible amounts to a withdrawal of the proprietor's original request, alternatively that that request is conditional on a finding of the opponent's appeal being admissible which is forbidden.

- As for clarity the last characterising feature added in claim 1 as upheld merely amounts to claiming the underlying problem and therefore fails to indicate technical means to solve that problem.

- D5 discloses a temperature sensor 8 that senses outlet air downstream of the module and also represents a means to indirectly measure the frame temperature as

disclosed in paragraph 16 of the patent. The skilled person considering the need in paragraph 5 to avoid damage to any component, implicitly understands that the supply of current should also be cut off before any component is damaged based on the sensed temperature. D12 describes in paragraph 44 an optical sensor that monitors the temperature of the heating resistance. According to paragraph 25 the controller serves as safety cut off when a limit temperature is attained therefore also including cutting off when a limit frame temperature is reached.

- As for inventive step starting from D5 the skilled person merely needs to identify the limited number of components that could be damaged by overheating, in particular a plastic manifold. It falls within common practice to adapt the method of D5 and implement it on the basis of a limit frame temperature.

Further considering that the safety should be improved over the intake air sensor of D5 in case of fan failure, then the skilled person would use the sensor of D12 which directly detects overheating of the heating elements and cuts off power before any damage occurs, such a damage also including overheating of the frame.

## **Reasons for the Decision**

### *1. Admissibility of the appeals*

- 1.1 The appellant-proprietor challenges admissibility of the opponent's appeal on the basis of the fact that the grounds of appeal failed to indicate the reasons why the decision should be reversed pursuant Art. 108, third sentence, EPC and Art 12(2) RPBA in relation to the ground of Article 84 EPC.

According to established jurisprudence there is no support in the EPC for the notion of 'partial admissibility' which therefore should be assessed as a whole (see Case Law of the Boards of Appeal, 8th edition, 2016 (CLBA hereinafter) IV.E.2.6.9). This is in particular so for an appellant opponent who needs to demonstrate by legal and factual reasoning only that one of a number of positive findings of an appealed decision is in error for that decision to be overturned. In the present case the grounds for appeal filed by the opponent contains detailed reasoning in respect of novelty and explains in particular that the impugned decision incorrectly concludes that the feature M9 of claim 1 is novel with respect to D5 (see paragraph bridging page 2 and 3 of the opponent's ground). Thus the requirements of Art. 108, third sentence, EPC are clearly complied with at least in respect of Novelty. Should this sole ground be confirmed during an appeal proceedings, then this would justify to set aside the impugned decision, without any need to consider an additional ground such as clarity pursuant Art. 84 EPC as in the present case h. Hence the Board concludes that the appeal of the opponent is admissible pursuant Art. 108, third sentence, EPC and Art 12(2) RPBA.

- 1.2 The appellant-opponent has challenged admissibility of the proprietor's appeal on the basis of the fact that no valid request or a conditional appeal resulted from the new first request as filed with the proprietor's statement of grounds to reject the opponent's appeal as inadmissible. Though the order of requests made in the statement of grounds appears somewhat confused this does not detract from the fact that proprietor's notice of appeal states its clear intention to contest the decision. In any case with letter of 22 August 2016 the



appellant-proprietor has now clarified the order of his requests, so that there is no longer any doubt that the new main request to be considered corresponds to the auxiliary request 0A as held allowable in the decision under appeal. The appellant-opponent did not comment further in this respect. As the appeal has been filed in due form and the fee paid in time, the Board concludes that the proprietor's appeal is also admissible.

2. *Late filed evidence*

D12 was filed together with the appellant-opponent's grounds for appeal and therefore after expiry of the opposition time limit set forth in Art 99(1) EPC. D12 appears to contain information relevant for the problem of overheating, and of safety shutdown.

Because of its prima facie relevance to the issues at hand the Board has decided to admit D12 into the proceedings, Art 114(2) EPC and Art 12(4) RPBA. Admission has indeed not been challenged by the appellant-proprietor.

3. *Background of the invention - Claim 1 as granted*

3.1 The patent is concerned with an improvement to a heating module used for heating intake gases of an automotive engine incorporating electronic temperature control. As indicated in paragraph [0002] it is sought to design a heating module that can be installed in an intake manifold, preferably of plastic, without damaging the same due to excess temperature. As depicted in figures 5 and 6 these modules are incorporated in the air intake portion of an engine between an intake duct for fresh air and an intake manifold of the engine. These modules being made with a

metallic frame (see paragraph [0003]), any overheating could damage the downstream manifold especially if made of plastic or from materials with a low operating temperature (paragraph [0014]). For this purpose the patent proposes the measurement of the frame temperature, either directly, paragraph [0015], or alternatively using less reliable indirect measuring methods on the downstream manifold, on the heating elements or on the air flow downstream of the module, paragraph [0016].

This allows a controller to cut off the power supply to the heating elements if at any time the temperature of the frame -be it directly or indirectly sensed- exceeds a temperature of safe operation in particular the maximum temperature of the plastic of the intake manifold.

Therefore with the understanding of the skilled person, the patent gives a clear and consistent instruction to use the temperature of the frame of the heating module as a threshold to shut down the heating power if a limit temperature for safe operation is attained, in particular if the integrity of the plastic manifold is impaired.

- 3.2 The above operation of the safety as a function of the frame temperature has been further refined during opposition in that claim 1 held allowable by the opposition division adds the following last two features: "wherein the control circuit is inserted between the battery and the heating element, the control circuit is arranged for automatically cutting off the supply of power from the battery to the heating element if the temperature of the frame exceeds a temperature of safe operation."

These features directly derive from paragraph [0013] of the published application which presents these features as the gist of the invention and therefore also complement the original features of the claim. The Board therefore concurs with the finding of the opposition division (see item 9 thereof) that these amendments do not extend beyond the content of the application as filed. This has also not been challenged under Art 123(2)EPC.

4. *Clarity - Article 84 EPC*

4.1 According to the appellant-opponent the last feature of claim 1 whereby the control circuit is arranged for automatically cutting off the supply of power from the battery to the heating element if the temperature of the frame exceeds a temperature of safe operation, merely amounts to claiming the underlying problem, without indicating the technical means necessary to solve that problem.

4.2 This last feature defines a way in which the control circuit needs to operate and thus relies on a technical result or a functional limitation. As usual for functional features it needs to be assessed whether from an objective viewpoint, such features could not otherwise be defined more precisely without restricting the scope of the invention, and whether they provide instructions that are sufficiently clear for the expert to reduce them to practice without undue burden (CLBA II.A.3.4).

4.3 Contrary to the appellant-opponent's opinion the board considers that objectively speaking the control cannot be defined more precisely without being unduly restrictive, and that describing its function is sufficient for the skilled person to be able reduce it to practice. A control means is meant to operate in a certain technical manner and is difficult if not impossible to define in terms of structural limitations, especially since the control means may take the form of software executed by a microprocessor. On the other hand the skilled person derives from this formulation clear information that the control means should compare a sensed temperature with a threshold and then trigger a cut off command on the switching means. The Board has no doubts that the skilled person can realize such an operation scheme. This feature added in opposition to claim 1 is thus clear in the sense of the Art. 84 EPC.

5. *Novelty*

5.1 *Novelty with respect to D5*

D5, see figure 1 and 2 and paragraphs [0017] to [0021], discloses a module for heating intake gases of an automotive engine incorporating electronic temperature control. In particular the module 6 has a heating flange 7 projecting into the intake line 2, which flange is arranged immediately upstream of the Diesel engine 1. A temperature sensor 8 is provided between the heating flange 7 (figure 1) and an intake manifold to sense the air intake temperature, paragraph [0018]. In paragraph [0021], figure 2, a switching device 15 is disclosed that is composed of a control connection 12 giving an impulse to the semiconductor element 16 that switches the heating element 14 on or off. It is in

particular contested that the last feature of claim 1 is disclosed in D5.

According to paragraph [0022] the switching device serves to regulate the output of the heating element 14 by switching it on and off with a certain frequency. It is common ground that D5 does not *explicitly* disclose the sole remaining feature of claim 1 of the main request, that the control means 15 switches off the heating element when the temperature of the frame exceeds a temperature of safe operation.

- 5.1.1 The appellant-opponent argues that the implicit disclosure of D5 also encompasses the above safety switch off function. According to established jurisprudence, implicit disclosure includes what any person skilled in the art would objectively consider as necessarily implied in the explicit content, and it should be apparent to him that nothing other than the alleged implicit feature forms part of the subject-matter disclosed (CLBA I.C.4.3).
- 5.1.2 As disclosed in paragraph [0005] of D5 the heating device should control heat output without damaging or overloading any component. Turning to the embodiment of the control means, the skilled person directly derives that the switching device 15 disclosed in paragraph [0021] allows to regulate the output of the heating element. In particular as the semiconductor element 16 of the switching device 15 is not subjected to wear of any kind, the heating element 14 can be switched off and on as often as required. As stated this is done with a certain frequency (see paragraph [0022]). In that context the optional coupling of the temperature sensor 8 to the control connection 12 mentioned in the last sentence of paragraph [0021] is

most likely to be understood as relating to improving heating power regulation by some form of temperature feedback. From the above it does not follow in any way, much less directly and unambiguously, that this temperature sensor 8 is used by the control means to monitor the temperature of the frame, even less that it is used to trigger cutting off power to the heating element in case of excess temperature or overloading of the frame. At best the temperature sensor serves as feedback in the control of the heating element to produce a precise intake air temperature.

5.1.3 Whereas the Board can follow the appellant-opponent in that the sensor is similar to the one disclosed in paragraph [0016] of the patent for indirect measurement of the frame temperature, this does not mean that it serves the same purpose. No information is present in D5 from which the skilled person can infer that it is used to derive frame temperature. The sensor is used to measure intake air temperature (paragraph [0018]) and no other aim than giving a signal that air has reached a temperature sufficient for the diesel engine can be derived from the operation of the sensor and connected switching device.

5.1.4 The appellant-opponent also submits that the general aim expressed in paragraph 5 of D5 to avoid damage to any component, which will be understood by the skilled person in the field of engines to include the engine manifold, the device frame or any further component. The Board however is of the opinion that while the skilled person's general concern to avoid damage extends to all components of the heating device this does not mean that therefore all relevant parts are specifically protected from overheating. Claim 1 as upheld requires power supply cut-off if the temperature

of the frame exceeds a temperature of safe operation. The "temperature of safe operation" will be understood by the skilled person with his mind willing to understand in this specific context. The temperature of safe operation may well be different from an overall cut-off temperature that is based on what the skilled person perceives as the most sensitive parts (such as the semiconductor element 16 and control 12). Such a cut-off will be ineffective to prevent damage to other parts associated with the frame such as a plastic manifold attached thereto, cf. patent specification paragraphs [0002] and [0003]. It is such specific damage the patent aims to avoid and D5 does not disclose any measure or safety function that specifically targets such damage. Instead, the only safety cut off function that might protect a component from overheating is performed by the fuse disclosed in paragraph 23 on the input side of the power connection to prevent overloading.

Therefore, the Board concludes that also the implicit content of D5 does not disclose last feature of claim 1, its subject-matter is thus new in respect of D5, Article 54(1) with 54(2) EPC.

## 5.2 *Novelty with respect to D12*

5.2.1 D12 discloses a heating module 100 comprising a cover 108 in which an electronic power control (144) is enclosed (column 6, lines 20-24) and from which two electrodes 114,116 for power supply protrude. A control cable 118 is connected to a remote control unit (not shown). As shown in figure 11 and explained in paragraph 42 the control electronic may include an optional temperature sensor 146. In addition paragraph [0044] describes an additional optical sensor to

monitor the infra red radiation from the heating element.

5.2.2 As for D5, it is submitted by the appellant-opponent that D12 at least implicitly discloses the same last feature of claim 1, whereby the control circuit is arranged for automatically cutting off the supply of power from the battery to the heating element if the temperature of the frame exceeds a temperature of safe operation.

5.2.3 Paragraph [0025] explains the operation of the microcontroller that should inter alia allow switching off when a maximum temperature is reached. The appellant-opponent submits that using the optical sensor to perform that safety cut off function in the eyes of the skilled person corresponds to switching off the current to the heating element before the frame starts overheating.

If D12 in these passages discloses a general safety shutdown when exceeding a temperature of safe operation of the heating element, this as above does not constitute a specific teaching to shut off power supply if the frame temperature exceeds a safe operation temperature. The Board fails to recognise any direct and unambiguous disclosure of using the optical sensor of D12 as a means to sense temperature in order to ascertain a too high temperature of the frame. D12 is silent in this respect and no hint is present that the controller translates the infra red emission of the heating elements in terms of a limit temperature, even less of a limit temperature of the frame.



5.2.4 Therefore the subject matter of claim 1 also differs from D12 at least in respect of its last feature and is thus new, Article 54(1) with 54(2) EPC.

6. *Inventive step*

The appellant-opponent has challenged inventive step starting from document D5 combined with the skilled person's general knowledge or with document D12.

6.1 According to the conclusion drawn here above, the subject-matter of claim 1 differs from D5 in that the the control circuit is arranged for automatically cutting off the supply of power from the battery to the heating element if the temperature of the frame exceeds a temperature of safe operation.

The ability to cut off power supply to the heating module when a frame temperature threshold is attained improves safety by avoiding overheating of the module and damage to other parts of the engine to which the module is attached, such as, in particular, a plastic manifold (see paragraphs [0003] and [0010] of the patent). The corresponding objective technical problem may thus be formulated accordingly as avoiding damage to the intake manifold.

6.2 According to the appellant-opponent, it would be obvious to consider all temperature sensitive components that the heat source might damage. These are of limited number including the resistance itself, the adjacent plastic components such as the manifold or the aluminium frame of the module. It would then fall within standard practice to adapt the control system of D5, and use the temperature of the frame as relevant

threshold when striving to ensure safe operation for the downstream manifold or for the frame itself.

6.3 In the Board's view however the temperature sensor of D5 is used according to paragraph [0022] merely to regulate the output of the heating element by switching it on and off with given frequency and thus serves a different purpose. The only overheating protection in D5 is provided by the separate fuse which serves in particular to protect the heating element itself including the semiconductor elements of the control, as also acknowledged by the appellant-opponent. If the skilled person is intent on avoiding damage to other parts he would therefore as a matter of obviousness pursue this route, i.e. modify the fuse accordingly.

6.4 The Board is further unconvinced that the skilled person would draw on common general knowledge in his field to use the temperature sensor to provide cut-off control in response to frame temperature. Even if temperature cut-off control might generally be known, the idea to use sensed frame temperature, specifically to avoid damage to the intake manifold is not, and goes beyond routine skill. Nor is a cut-off somehow suggested by frequency feedback control of the heating element in response to sensed temperature. That control serves the rather different purpose of adjusting on-off switching frequency to achieve a desired intake air temperature.

6.5 D12 also fails to offer the skilled person the claimed solution to the specific problem mentioned. It is true that D12 in paragraph [0025] describes a cut-off in response to sensed temperature, see also paragraph [0042], and which might involve an optical sensor as in paragraph [0044]. However as set out above there is no

suggestion, explicit or implicit, in D12 to sense frame temperature, much less to use that temperature to specifically avoid damage to the intake manifold. Paragraph [0042] provides no detailed information as to how the microcontroller prevents overload of the heating circuit, paragraph [0042]. Insofar as the temperature sensor 146 of the following lines 43 to 47 is also involved D12 is then silent as to the nature of the cut-off. The same holds for the suggestion of using an IR sensor to monitor the heating elements, where again there is no suggestion that this is related to frame temperature or possible damage to the intake manifold.

Thus even if the skilled person were to combine the teachings of D5 and D12 he would not as a matter of obviousness arrive at the claimed subject-matter.

- 6.6 For the above reasons, the Board finds that the subject matter of claim 1 involves an inventive step.
7. None of the objections raised by the appellant-opponent against the claims of the main request which are as upheld in the decision under appeal is successful. The Board therefore confirms that decision.

**Order**

**For these reasons it is decided that:**

Both appeals are dismissed

The Registrar:

The Chairman:



G. Magouliotis

A. de Vries

Decision electronically authenticated